IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF TEXAS, RAILROAD COMMISSION OF TEXAS, and TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, *Petitioners*, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, and MICHAEL S. REGAN, Administrator, United States Environmental Protection Agency, *Respondents*.	§ § § § § § § § § § § § § § § § §	Case No. 24-1054

PETITION FOR REVIEW

In accordance with 42 U.S.C. § 7607(b)(1), Federal Rule of Appellate Procedure 15, and D.C. Circuit Rule 15(a)(1), Petitioners the State of Texas, Railroad Commission of Texas, and Texas Commission on Environmental Quality hereby petition this Court for review of the final action taken by Respondents United States Environmental Protection Agency and Michael S. Regan, Administrator, United States Environmental Protection Agency, entitled "Standards of Performance

for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review" (attached hereto), published at 89 Fed. Reg. 16,820.[1]

Respectfully submitted,

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[1] On March 8, 2024, the Federal Register published what appears to be a partial copy of the challenged rule. This Petition for Review is intended to cover the rule in its entirety if and when a correction is made. As such, Petitioners will file a notice with the Court if and when a full version of the rule has been published.

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CERTIFICATE OF SERVICE

I hereby certify that I caused a true and correct copy of this Petition for Review to be served on March 8, 2024, by United States first-class mail on the following:

Michael S. Regan, Administrator
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The Honorable Merrick B. Garland
Attorney General of the United States
U.S. Department of Justice
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/s/ John R. Hulme
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ATTACHMENT

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[EPA–HQ–OAR–2021–0317; FRL–8510–01–OAR]

RIN 2060–AV16

Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is finalizing multiple actions to reduce air pollution emissions from the Crude Oil and Natural Gas source category. First, the EPA is finalizing revisions to the new source performance standards (NSPS) regulating greenhouse gases (GHGs) and volatile organic compounds (VOCs) emissions for the Crude Oil and Natural Gas source category pursuant to the Clean Air Act (CAA). Second, the EPA is finalizing emission guidelines (EG) under the CAA for states to follow in developing, submitting, and implementing state plans to establish performance standards to limit GHG emissions from existing sources (designated facilities) in the Crude Oil and Natural Gas source category. Third, the EPA is finalizing several related actions stemming from the joint resolution of Congress, adopted on June 30, 2021, under the Congressional Review Act (CRA), disapproving the EPA's final rule titled, ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review,'' September 14, 2020 (''2020 Policy Rule''). Fourth, the EPA is finalizing a protocol under the general provisions for optical gas imaging (OGI).

DATES: This final rule is effective on May 7, 2024. The incorporation by reference (IBR) of certain publications listed in the rules is approved by the Director of the Federal Register as of May 7, 2024.

ADDRESSES: The EPA has established a docket for this rulemaking under Docket ID No. EPA–HQ–OAR–2021–0317. All documents in the docket are listed on the *https://www.regulations.gov/* website. Although listed, some information is not publicly available, *e.g.,* Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through *https://www.regulations.gov/.*

FOR FURTHER INFORMATION CONTACT: Ms. Amy Hambrick, Sector Policies and Programs Division (E143–05), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, 109 T.W. Alexander Drive, P.O. Box 12055, Research Triangle Park, North Carolina, 27711; telephone number: (919) 541–0964; email address: *hambrick.amy@epa.gov.*

SUPPLEMENTARY INFORMATION: *Preamble acronyms and abbreviations.* Throughout this document the use of ''we,'' ''us,'' or ''our'' is intended to refer to the EPA. We use multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:

AMEL alternative means of emission limitation
ANSI American National Standards Institute
API American Petroleum Institute
ARPA–E Advanced Research Projects Agency–Energy
ASME American Society of Mechanical Engineers
ASTM ASTM, International
AVO audible, visual, and olfactory
AWP alternative work practice
bbl barrels of crude oil
BLM Bureau of Land Management
boe barrels of oil equivalents
BOEM Bureau of Ocean Energy Management
BSER best system of emission reduction
Btu/scf British thermal units per standard cubic foot
°C degrees Celsius
CAA Clean Air Act
CBI Confidential Business Information
CCR Code of Colorado Regulations
CDX EPA's Central Data Exchange
CEDRI Compliance and Emissions Data Reporting Interface
CFR Code of Federal Regulations
CO carbon monoxide
CO_2 carbon dioxide
CO_2 Eq. carbon dioxide equivalent
COS carbonyl sulfide
CRA Congressional Review Act
CS_2 carbon disulfide
CVS closed vent systems
D.C. Circuit U.S. Court of Appeals for the District of Columbia Circuit
DOE Department of Energy
EAV equivalent annual value
EDF Environmental Defense Fund
EG emission guidelines
EIA U.S. Energy Information Administration
EJ environmental justice
E.O. Executive Order
EPA Environmental Protection Agency
ESD emergency shutdown devices
°F degrees Fahrenheit
FEAST Fugitive Emissions Abatement Simulation Toolkit
FR Federal Register
FrEDI EPA's Framework for Evaluating Damages and Impacts model
FRFA final regulatory flexibility analysis
g/hr grams per hour
GHG greenhouse gas
GHGI Inventory of U.S. Greenhouse Gas Emissions and Sinks
GHGRP Greenhouse Gas Reporting Program
GOR gas-to-oil ratio
H_2S hydrogen sulfide
HAP hazardous air pollutant(s)
ICR information collection request
IRFA initial regulatory flexibility analysis
IWG Interagency Working Group on the Social Cost of Greenhouse Gases
kg kilograms
kg/hr kilograms per hour
kt kilotons
lb/yr pounds per year
low-E low emission
LDAR leak detection and repair
LPE legally and practicably enforceable
Mcf thousand cubic feet
MW megawatt
NAAQS national ambient air quality standards
NAICS North American Industry Classification System
NDE no detectable emissions
NIE no identifiable emissions
NESHAP national emission standards for hazardous air pollutants
NGO non-governmental organization
NHV net heating value
NO_X nitrogen oxides
NSPS new source performance standards
NTTAA National Technology Transfer and Advancement Act
O_2 oxygen
OAQPS Office of Air Quality Planning and Standards
OGI optical gas imaging
OMB Office of Management and Budget
PM particulate matter
$PM_{2.5}$ particulate matter with a diameter of 2.5 micrometers or less
ppb parts per billion
ppm parts per million
PRA Paperwork Reduction Act
PSD prevention of significant deterioration
PTE potential to emit
PV present value
REC reduced emissions completion
RFA Regulatory Flexibility Act
RIA regulatory impact analysis
RTC response to comments
RULOF remaining useful life and other factors
SBAR Small Business Advocacy Review
SC–CH_4 social cost of methane
SC–CO_2 social cost of carbon dioxide
SC–GHG social cost of greenhouse gases
SC–N_2O social cost of nitrous oxide
scf standard cubic feet
scfh standard cubic feet per hour
scfm standard cubic feet per minute
SIP State Implementation Plan
SO2 sulfur dioxide
SPeCS State Planning Electronic Collaboration System
tpy tons per year
the court U.S. Court of Appeals for the District of Columbia Circuit

TAR Tribal Authority Rule
TIP Tribal Implementation Plan
TSD technical support document
UMRA Unfunded Mandates Reform Act
U.S. United States
VCS voluntary consensus standards
VOC volatile organic compound(s)
VRU vapor recovery unit

Organization of this document. The information in this preamble is organized as follows:

I. General Information

A. Does this action apply to me?

The source category that is the subject of this final rulemaking is composed of the Crude Oil and Natural Gas source category regulated under CAA section 111 New Source Performance Standards and Emission Guidelines. The North American Industry Classification System (NAICS) codes for the industrial source category affected by the NSPS actions finalized in this rulemaking are summarized in table 1. The NAICS codes serve as a guide for readers outlining the type of entities that the final NSPS actions are likely to affect. The NSPS codified in 40 Code of Regulations (CFR) part 60, subpart OOOOb, are directly applicable to affected facilities that begin construction, reconstruction, or modification after December 6, 2022. Final amendments to 40 CFR part 60, subpart OOOO, are applicable to affected facilities that began construction, reconstruction, or modification after August 23, 2011, and on or before September 18, 2015. Final amendments to 40 CFR part 60, subpart OOOOa, are applicable to affected facilities that began construction, reconstruction, or modification after September 18, 2015, and on or before December 6, 2022. As shown in table 1, Federal, state, and local government entities would not be affected by the NSPS actions.

TABLE 1—INDUSTRIAL SOURCE CATEGORIES AFFECTED BY NSPS ACTIONS

Category	NAICS Code[1]	Examples of regulated entities
Industry	211120	Crude Petroleum Extraction.
	211130	Natural Gas Extraction.
	221210	Natural Gas Distribution.
	486110	Pipeline Distribution of Crude Oil.
	486210	Pipeline Transportation of Natural Gas.
Federal Government	. . . .	Not affected.
State and Local Government	. . . .	Not affected.
Tribal Government	921150	American Indian and Alaska Native Tribal Governments.

[1] North American Industry Classification System (NAICS).

This table is not intended to be exhaustive but rather provides a guide for readers regarding entities likely to be affected by the NSPS actions. Other types of entities not listed in the table could also be affected by these NSPS actions. To determine whether your entity is affected by any of the NSPS actions, you should carefully examine the applicability criteria found in the final NSPS rules. If you have questions regarding the applicability of the NSPS rules to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section, your state air pollution control agency with delegated authority for NSPS, or your EPA Regional Office.

The issuance of CAA section 111(d) final EG does not impose binding requirements directly on existing sources. The EG codified in 40 CFR part 60, subpart OOOOc, applies to states in the development, submittal, and implementation of state plans to establish performance standards to reduce emissions of GHGs from designated facilities that are existing sources on or before December 6, 2022. Under the Tribal Authority Rule (TAR), eligible Tribes may seek approval to implement a plan under CAA section 111(d) in a manner similar to a state. See 40 CFR part 49, subpart A. Tribes may, but are not required to, seek approval for treatment in a manner similar to a state for purposes of developing a Tribal implementation plan (TIP) implementing the EG codified in 40 CFR part 60, subpart OOOOc. The TAR authorizes Tribes to develop and implement their own air quality programs, or portions thereof, under the CAA. However, it does not require Tribes to develop a CAA program. Tribes may implement programs that are most relevant to their air quality needs. If a Tribe does not seek and obtain the authority from the EPA to establish a TIP, the EPA has the authority to establish a Federal CAA section 111(d) plan for designated facilities that are located in areas of Indian country.[1] A Federal plan would apply to all designated facilities located in the areas of Indian country covered by the Federal plan unless and until the EPA approves a TIP applicable to those facilities.

B. Where can I get a copy of this document and other related information?

In addition to being available in the docket, at Docket ID No. EPA–HQ–OAR–2021–0317 located at *https://www.regulations.gov/,* an electronic copy of this final rulemaking is available on the internet at *https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry.* Following signature by the EPA Administrator, the EPA will post a copy of this final rulemaking at this same website. Following publication in the **Federal Register**, the EPA will post the **Federal Register** version of the final rulemaking and key technical documents at this same website.

C. Judicial Review and Administrative Review

Under Clean Air Act (CAA) section 307(b)(1), judicial review of this final rulemaking is available only by filing a petition for review in the United States Court of Appeals for the District of Columbia Circuit by May 7, 2024. Under CAA section 307(b)(2), the requirements established by this final rulemaking may not be challenged separately in any civil or criminal proceedings brought by the EPA to enforce the requirements.

Section 307(d)(7)(B) of the CAA further provides that ''[o]nly an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review.'' This section also provides a mechanism for the EPA to convene a proceeding for reconsideration, ''[i]f the person raising an objection can demonstrate to the EPA that it was impracticable to raise such objection within [the period for public comment] or if the grounds for such objection arose after the period for public comment, (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule.'' Any person seeking to make such a demonstration to us should submit a Petition for Reconsideration to the Office of the Administrator, U.S. Environmental Protection Agency, Room 3000, WJC West Building, 1200 Pennsylvania Ave. NW, Washington, DC 20460, with a copy to both the person(s) listed in the preceding **FOR FURTHER INFORMATION CONTACT** section, and the Associate General Counsel for the Air and Radiation Law Office, Office of General Counsel (Mail Code 2344A), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, DC 20460.

II. Executive Summary

A. Purpose of the Regulatory Actions

On November 15, 2021, the EPA published a proposed rule (''November 2021 Proposal'') to mitigate climate-destabilizing pollution and protect human health by reducing greenhouse gas (GHG) and VOC emissions from the oil and natural gas industry,[2] specifically the Crude Oil and Natural Gas source category.[3] [4] In the November

[1] See the EPA's website, *https://www.epa.gov/tribal/tribes-approved-treatment-state-tas,* for information on those Tribes that have treatment as a state for specific environmental regulatory programs, administrative functions, and grant programs.

[2] The EPA characterizes the oil and natural gas industry operations as being generally composed of four segments: (1) extraction and production of crude oil and natural gas (''oil and natural gas production''), (2) natural gas processing, (3) natural gas transmission and storage, and (4) natural gas distribution.

[3] ''Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review.'' Proposed rule. 86 FR 63110, November 15, 2021.

[4] The EPA defines the Crude Oil and Natural Gas source category to mean: (1) crude oil production, which includes the well and extends to the point of custody transfer to the crude oil transmission

2021 Proposal, the EPA proposed new standards of performance under section 111(b) of the CAA for GHGs (in the form of methane limitations) and VOC emissions from new, modified, and reconstructed sources in this source category, as well as revisions to standards of performance already codified at 40 CFR part 60, subparts OOOO and OOOOa. The EPA also proposed EG under section 111(d) of the CAA for GHGs emissions (in the form of methane limitations) from existing sources (designated facilities).[5] The new CAA section 111 NSPS and EG would be codified in 40 CFR part 60 at subpart OOOOb (NSPS OOOOb) and subpart OOOOc (EG OOOOc), respectively. The EPA also proposed several related actions stemming from the joint resolution of Congress, adopted on June 30, 2021, under the CRA disapproving the EPA's final rule titled, ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review,'' September 14, 2020 (''2020 Policy Rule''). Lastly, in the November 2021 Proposal the EPA proposed a protocol under the general provisions for OGI.

On December 6, 2022, the EPA published a supplemental proposed rule (''December 2022 Supplemental Proposal'') that was composed of two main additions.[6] First, the EPA updated, strengthened, and expanded on the NSPS OOOOb standards proposed in November 2021 under CAA section 111(b) for GHGs (in the form of methane limitations) and VOC emissions from new, modified, and reconstructed facilities. Second, the EPA updated, strengthened, and expanded the presumptive standards proposed for EG OOOOc in the November 2021 Proposal as part of the CAA section 111(d) EG for GHGs emissions (in the form of methane limitations) from designated facilities. For purposes of EG OOOOc, the EPA also proposed the implementation requirements for state plans developed to limit GHGs pollution (in the form of methane limitations) from designated facilities in the Crude Oil and Natural Gas source category under CAA section 111(d).

The purpose of this final rulemaking is to finalize these multiple actions to reduce air emissions from the Crude Oil and Natural Gas source category. First, the EPA finalizes NSPS OOOOb regulating GHG (in the form of a limitation on emissions of methane) and VOCs emissions for the Crude Oil and Natural Gas source category pursuant to CAA section 111(b)(1)(B). Second, the EPA finalizes the presumptive standards in EG OOOOc to limit GHGs emissions (in the form of methane limitations) from designated facilities in the Crude Oil and Natural Gas source category, as well as requirements under the CAA section 111(d) for states to follow in developing, submitting, and implementing state plans to establish performance standards. Third, the EPA finalizes several related actions stemming from the joint resolution of Congress, adopted on June 30, 2021, under the CRA, disapproving the 2020 Policy Rule. Fourth, the EPA finalizes a protocol under the general provisions of 40 CFR part 60 for OGI.

These final actions stem from the EPA's authority and obligation under CAA section 111 to directly regulate categories of new stationary sources that cause or contribute to endangerment from air pollution and to promulgate EG for states to follow in regulating existing sources (designated facilities) in the source category. This final rulemaking takes a significant step forward in mitigating climate-destabilizing pollution and protecting human health by reducing GHG and VOC emissions from the oil and natural gas industry, specifically the Crude Oil and Natural Gas source category. These mitigations are based on proven, cost-effective technologies already required by prior EPA regulations or states' regulations or deployed by industry leaders to reduce this dangerous pollution. The final rules will also encourage the deployment of innovative technologies that currently exist to rapidly and cost-effectively detect and reduce methane pollution and promote further innovation that is already under way to find even more efficient and effective ways to mitigate this pollution. Because methane is the main component of natural gas, the rules also result in more saleable product.

The oil and natural gas industry is the United States' largest industrial emitter of methane, a highly potent GHG. Emissions of methane from human activities are responsible for about one-third of the warming due to well-mixed GHGs and constitute the second most important warming agent arising from human activity after carbon dioxide (CO_2).[7] According to the Intergovernmental Panel on Climate Change (IPCC), strong, rapid, and sustained methane reductions are critical to reducing near-term disruption of the climate system as well as a vital complement to reductions in other GHGs that are needed to limit the long-term extent of climate change and its destructive impacts. The oil and natural gas industry also emits other harmful pollutants in varying concentrations and amounts, including CO_2, VOC, sulfur dioxide (SO_2), nitrogen oxides (NO_X), hydrogen sulfide (H_2S), carbon disulfide (CS_2), and carbonyl sulfide (COS), as well as benzene, toluene, ethylbenzene, and xylenes (this group is commonly referred to as ''BTEX''), and *n*-hexane.

Under the authority of CAA section 111, this rulemaking finalizes comprehensive standards of performance for GHG emissions (in the form of methane limitations) and VOC emissions for new, modified, and reconstructed sources in the Crude Oil and Natural Gas source category, including sources located in the production, processing, and transmission and storage segments. For designated facilities, this rulemaking finalizes EG containing presumptive standards for GHG in the form of methane limitations. States must follow these EG to submit to the EPA plans that establish standards of performance for designated facilities and provide for implementation and enforcement of such standards. The EPA will provide support for states in developing their plans to reduce methane emissions from designated facilities within the Crude Oil and Natural Gas source category. Under the TAR, eligible Tribes may seek approval to implement a plan under CAA section 111(d) in a manner similar to a state. See 40 CFR part 49, subpart A. Tribes may, but are not required to, seek approval for treatment in a manner similar to a state for purposes of developing a TIP implementing the EG codified in 40 CFR part 60, subpart OOOOc. The TAR authorizes Tribes to develop and implement one or more of their own air quality programs, or portions thereof, under the CAA. However, it does not require Tribes to develop a CAA program. Tribes may implement programs that are most relevant to their air quality needs. If a Tribe does not seek and obtain the authority from the EPA to establish a TIP, the EPA has the authority to establish a Federal CAA section 111(d)

pipeline or any other forms of transportation; and (2) natural gas production, processing, transmission, and storage, which include the well and extend to, but do not include, the local distribution company custody transfer station, commonly referred to as the ''city-gate.''

[5] The term ''designated facility'' means ''any existing facility which emits a designated pollutant and which would be subject to a standard of performance for that pollutant if the existing facility were an affected facility.'' See 40 CFR 60.21a(b).

[6] ''Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review.'' Supplemental notice of proposed rulemaking. 87 FR 74702, December 6, 2022.

[7] A well-mixed gas is one with an atmospheric lifetime longer than a year or two, which allows the gas to be mixed around the world.

plan for designated facilities that are located in areas of Indian country.[8] A Federal plan would apply to all designated facilities located in the areas of Indian country covered by the Federal plan unless and until the EPA approves a TIP applicable to those facilities.

The EPA is finalizing these actions in accordance with its legal obligations and authorities following a review directed by Executive Order (E.O.) 13990, ''Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis,'' issued on January 20, 2021. These final actions address the harmful consequences of climate change, which is already resulting in severe and growing human and economic costs within the United States (and globally too). According to the IPCC AR6 assessment, ''It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.'' The IPCC AR6 assessment states that these changes have led to increases in heat waves and wildfire weather, reductions in air quality, more intense hurricanes and rainfall events, and rising sea level. These changes, along with future projected changes, endanger the physical survival, health, economic well-being, and quality of life of people living in the United States (U.S.), especially those in the most vulnerable communities.

Methane is both the main component of natural gas and a potent GHG. Using one standard metric (the 100-year global warming potential (GWP), which is a measure of the climate impact of emissions of 1 ton of a GHG over 100 years relative to the impact of the emissions of 1 ton of CO_2 over the same time frame), methane has about 30 times as much climate impact as CO_2. Because methane has a shorter lifetime than CO_2, it has a larger relative impact over shorter time frames, and a smaller one over longer time frames: the IPCC AR6 assessment found that ''Over time scales of 10 to 20 years, the global temperature response to a year's worth of current emissions of SLCFs [short lived climate forcers] is at least as large as that due to a year's worth of CO_2 emissions.'' [9] The IPCC estimated that, depending on the reference scenario, collective reductions in these SLCFs (methane, ozone precursors, and hydrofluorocarbons (HFCs)) could reduce warming by 0.2 degrees Celsius (°C) (more than one-third of a degree Fahrenheit (°F) in 2040 and 0.8 °C (almost 1.5 °F) by the end of the century. As methane is the most important SLCF, this makes methane mitigation one of the best opportunities for reducing near-term warming. Emissions from human activities have already more than doubled atmospheric methane concentrations since 1750, and that concentration has been growing larger at record rates in recent years.[10] In the absence of additional reduction policies, methane emissions are projected to continue rising through at least 2040.

Methane's radiative efficiency means that immediate reductions in methane emissions, including from sources in the Crude Oil and Natural Gas source category, can help reduce near-term warming. As natural gas is composed primarily of methane, every natural gas leak or intentional release of natural gas through venting or other processes constitutes a release of methane. Reducing human-caused methane emissions, such as controlling natural gas leaks and releases through the measures in this final action, is critical to addressing climate change and its effects. See section III of this preamble for further discussion on the air emissions from the Crude Oil and Natural Gas source category climate change, including discussion of the impacts of GHGs, VOCs, and SO_2 emissions on public health and welfare.

Methane and VOC emissions from the Crude Oil and Natural Gas source category result from a variety of industry operations across the supply chain. As natural gas moves through the necessarily interconnected system of exploration, production, storage, processing, and transmission that brings it from wellhead to commerce, emissions primarily result from intentional venting, unintentional gas carry-through (*e.g.,* vortexing from separator drain, improper liquid level settings, liquid level control valve on an upstream separator or scrubber does not seal properly at the end of an automated liquid dumping event, inefficient separation of gas and liquid phases occurring upstream of tanks allowing some gas carry-through), routine maintenance, unintentional fugitive emissions, flaring, malfunctions, abnormal process conditions, and system upsets. These emissions are associated with a range of specific equipment and practices, including leaking valves, connectors, and other components at well sites and compressor stations; leaks and vented emissions from storage vessels; releases from natural gas-driven pumps and natural gas-driven process controllers; liquids unloading at well sites; and venting or under-performing flaring of associated gas from oil wells. But technical innovations have produced a range of technologies and best practices to monitor, eliminate, or minimize these emissions, which in many cases have the benefit of reducing multiple pollutants at once and recovering saleable product. These technologies and best practices have been deployed by individual oil and natural gas companies, required by state regulations, or reflected in regulations issued by the EPA and other Federal agencies.

In developing this final rulemaking, the EPA applied the latest available information to finalize the analyses presented in the December 2022 Supplemental Proposal. This latest information provided additional insights into lessons learned from states' regulatory efforts, the emission reduction efforts of leading companies, the continued development of new and developing technologies, and information and data from peer-reviewed literature and emission measurement efforts across the U.S.

In both the November 2021 Proposal and the December 2022 Supplemental Proposal, the EPA solicited comment on various aspects of the proposed rules. This final rulemaking responds to the nearly one million total public comments the Agency received. A wide range of stakeholders, including state and local governments, Tribal nations, representatives of the oil and natural gas industry, communities affected by oil and gas pollution, environmental and public health organizations, submitted public comments on both the November 2021 Proposal and the December 2022 Supplemental Proposal. Following the November 2021 Proposal, over 470,000 public comments were submitted. After the December 2022 Supplemental

[8] See the EPA website, *https://www.epa.gov/tribal/tribes-approved-treatment-state-tas,* for information on those Tribes that have treatment as a state for specific environmental regulatory programs, administrative functions, and grant programs.

[9] However, the IPCC AR6 assessment cautioned that ''[t]he effects of the SLCFs decay rapidly over the first few decades after pulse emission. Consequently, on time scales longer than about 30 years, the net long-term temperature effects of sectors and regions are dominated by CO_2.''

[10] Naik, V., S. Szopa, B. Adhikary, P. Artaxo, T. Berntsen, W.D. Collins, S. Fuzzi, L. Gallardo, A. Kiendler 41 Scharr, Z. Klimont, H. Liao, N. Unger, P. Zanis, 2021, Short-Lived Climate Forcers. In: Climate Change 42 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the 43 Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. 44 Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. 45 Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University 46 Press. In Press.

Proposal, over 515,000 additional public comments were submitted. Many commenters representing diverse perspectives expressed general support for the proposals and requested that the EPA further strengthen the proposed rules and make them more comprehensive. Other commenters highlighted implementation or cost concerns related to elements of both proposals or provided specific data and information that the EPA was able to use to refine or revise several of the proposed standards included in the December 2022 Supplemental Proposal.

This final action also builds on extensive engagement with states, Tribes, and a broad range of stakeholders. The EPA conducted stakeholder trainings after both the November 2021 Proposal and the December 2022 Supplemental Proposal for communities with environmental justice (EJ) concerns, Tribes, and small businesses. The EPA held 3-day virtual public hearings for both the November 2021 Proposal and the December 2022 Supplemental Proposal with over 600 speakers and hundreds of viewers on livestream. Tribal consultations were completed after the November 2021 Proposal at the request of the Northern Arapahoe Tribe, Mandan, Hidatsa and Arikara Nation (MHA Nation), and Eastern Shoshone Tribe.[11] Additional Tribal consultation was completed at the request of MHA Nation and an informational meeting was held with the Ute Tribe after the December 2022 Supplemental Proposal.[12] Through this stakeholder engagement, the EPA heard from diverse voices and perspectives, all of which provided ideas and information that helped shape and inform this final rulemaking.

In this final rulemaking, the EPA is finalizing updates to various aspects of the proposed rules because of the information received through the public comment process. For example, after review of the comments, the EPA is finalizing updates to allow owners and operators the option to use advanced methane monitoring technologies for detecting fugitive emissions. All stakeholders supported allowing for the use of alternative technologies and provided the EPA with constructive feedback and information to help finalize this aspect of the rulemaking, along with improvements that provide greater flexibility for owners and operators while ensuring these technologies are used in an effective way to detect methane emissions. Among other things, the EPA is finalizing changes from the December 2022 Supplemental Proposal that will allow owners and operators to use multiple advanced technologies in combination, and facilitate the use of the best advanced technologies that we know of by streamlining certain of the proposed monitoring requirements associated with their use. The EPA is also finalizing an efficient pathway for demonstrating that new technologies meet the performance requirements established under this rulemaking, and approving their use under this program. The final rulemaking allows for either a periodic screening approach or a continuous monitoring approach. The EPA believes this program will allow owners and operators to leverage advanced technologies that are already available to detect methane emissions rapidly with accuracy, as well as to incorporate promising new technologies that are emerging in this rapidly evolving field.

As a result of information provided through the public comment process, the EPA is also finalizing revisions to the proposed requirements for new sources to limit routine flaring of associated gas. During the comment period, the EPA received extensive information regarding alternatives to routine flaring, state-level requirements to limit or prohibit routine flaring, and commitments that owners and operators have already made voluntarily to phase out routine flaring in the near future. Based on this information and the EPA's updated BSER analysis, the EPA is finalizing requirements that will phase out and eventually prohibit routine flaring of associated gas from newly constructed wells that are developed after the effective date of this rule. These requirements include reasonable exemptions for certain temporary and emergency uses of flaring, and a transition period to allow owners and operators adequate time to incorporate this requirement into their development plans and to deploy any necessary equipment and controls. For a subcategory of existing wells (with documented methane of 40 tons per year (tpy) or less), the EPA is finalizing modifications to its December 2022 Supplemental Proposal to allow routine flaring. This approach reflects information the EPA received during this rulemaking, and the EPA's updated BSER analysis, that indicates that alternatives to routine flaring at such wells are generally costly and could be technically challenging to implement, while achieving relatively small emission reductions. For higher-emitting existing (above 40 tpy methane), modified, and reconstructed wells, the EPA is finalizing the provisions proposed in the December 2022 Supplemental Proposal limiting routine flaring to situations in which a sales line to collect the associated gas is not available, and the owner and operator has submitted a demonstration that other alternatives to routine flaring are not available due to technical infeasibility. With the updates made in this final rulemaking in response to comments, the EPA believes that the final rules and emission guidelines provide an approach to limiting routine flaring from associated gas that achieves significant reductions in emissions, while also providing owners and operators with flexibility to utilize routine flaring where needed and sufficient lead time to implement alternatives to routine flaring at newly developed wells.

Further, the EPA is finalizing, with certain revisions, requirements proposed in the December 2022 Supplemental Proposal to monitor flares to ensure proper operation and assure continual compliance. Improperly operating flares are a well-documented large source of emissions, and requiring operators to monitor and fix these problems will yield significant methane reductions.

In addition, the EPA is finalizing a Super Emitter Program as part of this rulemaking that requires owners and operators to take appropriate action to investigate very large emissions events upon receiving from the EPA a notification from a certified entity, and if necessary, take steps to ensure compliance with the applicable regulation(s). The EPA has made important modifications to this program based on comments received on the December 2022 Supplemental Proposal. Public comments informed the EPA that there is widespread recognition of the need to address super-emitters, that it is critical for the EPA to have a central role in the program, and that timely information-sharing and response is key to being able to achieve emission reductions. As a result, the final Super Emitter Program provides a central role for the EPA in receiving notifications from certified third parties and verifying that these notifications are complete and have properly documented the existence of a super-emitting event before sending them to the appropriate owner or operator. In addition, as proposed, the EPA will have a central role in approving monitoring technologies, certifying and de-certifying notifiers, requiring that third parties submit

[11] See Memorandum in EPA–HQ–OAR–2021–0317.

[12] See Memorandum in EPA–HQ–OAR–2021–0317.

notifications within a limited timeframe, and obligating operators to subsequently respond in a timely manner. These targeted changes for the Super Emitter Program are intended to ensure that the program operates with a high degree of accuracy, integrity, and transparency, while providing owners and operators with prompt and reliable notifications of super-emitting events that may require follow-up investigation and remediation. See sections X and XI of this preamble for a full summary and rationale of the changes since proposal.

After careful consideration of the public comments, the EPA is finalizing other aspects of the rulemaking as proposed. For example, the EPA is finalizing the NSPS and EG for process controllers (formerly referred to as pneumatic controllers) as proposed. For both the NSPS and EG, process controllers are required to meet a methane and VOC emission rate of zero.[13] Another area of the rulemaking that the EPA is finalizing as proposed is liquids unloading. These sources are required to comply with best management practices for every well that undergoes liquids unloading that results in vented emissions. The EPA is also finalizing standards for well completions and sweetening units as proposed. See sections X and XI of this preamble for a full summary and rationale of the areas of the rulemaking that are being finalized as proposed.

The EPA conducted an analysis of EJ in the development of this final rulemaking and sought to ensure equitable treatment and meaningful involvement of all people regardless of race, color, national origin, or income in the process. The EPA engaged and consulted representatives of frontline communities that are directly affected by and particularly vulnerable to the climate and health impacts of pollution from this source category through interactions such as webinars, listening sessions, and meetings. These opportunities allowed the EPA to hear directly from the public, especially overburdened and underserved communities, on the development of the rulemaking and to factor these concerns into the rulemaking. The extensive pollution reduction measures in this final rulemaking will collectively reduce the emissions of a suite of harmful pollutants and their associated health impacts in communities adjacent to these emission sources. A full discussion and summary of engagement with pertinent stakeholders can be found in section VII of the preamble. A full discussion of the analysis of EJ is found in section XVI.F of the preamble.

In this final rulemaking, the EPA has conducted a comprehensive analysis of the available data from emission sources in the Crude Oil and Natural Gas source category, the latest available information on control measures and techniques, and information submitted by stakeholders through the public comment process to identify achievable, cost-effective measures to significantly reduce emissions, consistent with the requirements of section 111 of the CAA. This final rulemaking will lead to significant and cost-effective reductions in climate and health-harming pollution and encourage development and deployment of innovative technologies to further reduce this pollution in the Crude Oil and Natural Gas source category.

As described in more detail below, the EPA recognizes that several states and other Federal agencies currently regulate the oil and natural gas industry. The EPA also recognizes that these state and other Federal agency regulatory programs have matured since the EPA began implementing the current NSPS requirements in 2012 and 2016. The EPA further acknowledges the technical innovations that the oil and natural gas industry has made during the past decade; this industry operates at a fast pace and changes constantly as technology evolves. The EPA commends these efforts and recognizes states for their innovative standards, alternative compliance options, and implementation strategies, and these final actions build upon progress made by certain states and Federal agencies in reducing GHG and VOC emissions. See preamble section VI for further discussion of Related State Actions and Other Federal Actions Regulating Oil and Natural Gas Sources and Industry and Voluntary Actions to Address Climate Change.

As the Federal agency with primary responsibility to protect human health and the environment, the EPA has the unique responsibility and authority to regulate harmful air pollutants emitted by the Crude Oil and Natural Gas source category. The EPA recognizes that states and other Federal agencies regulate in accordance with their respective legal authorities and within their respective jurisdictions but collectively do not fully and consistently address the range of sources and emission reduction measures contained in this final rulemaking. Direct Federal regulation of methane from new, reconstructed, and modified sources in this category, combined with approved state plans that are consistent with the EPA's EG presumptive standards for designated facilities (existing sources), will help reduce both climate- and other health-harming pollution from a large number of sources that are either unregulated or from which additional, cost-effective reductions are available, level the regulatory playing field, and help promote technological innovation.

Included in this final rulemaking are the final new subparts NSPS OOOOb and EG OOOOc and amendatory regulatory text for NSPS OOOO, NSPS OOOOa, and 40 CFR part 60, subpart KKK (NSPS KKK). The public docket for this rulemaking also includes the full text redline versions of NSPS OOOO, NSPS OOOOa, and NSPS KKK amendments.[14] In addition, the EPA is providing a Response to Comments (RTC) document and updated documents including the technical support document (TSD), supporting information collection request (ICR) burden statements, and regulatory impact analysis (RIA) that seeks to account for the full impacts of these proposed actions.

B. Summary of the Major Provisions of This Regulatory Action

This final rulemaking includes four distinct groups of actions under the CAA each of which could have been promulgated as a separate final rule. First, pursuant to CAA section 111(b)(1)(B), the EPA has reviewed, and is finalizing revisions to, the standards of performance for the Crude Oil and Natural Gas source category published in 2012 and 2016 and amended in 2020, codified at 40 CFR part 60, subpart OOOO—''Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification, or Reconstruction Commenced After August 23, 2011, and on or Before September 18, 2015'' (2012 NSPS) and subpart OOOOa—''Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015'' (2016 NSPS OOOOa). Specifically, the EPA is updating, strengthening, and expanding the current requirements under CAA section 111(b) for methane and VOC emissions from sources that commenced construction, modification, or reconstruction after December 6, 2022. These final standards of performance will be in a new subpart, 40 CFR part 60, subpart OOOOb (NSPS OOOOb), and include standards for emission sources previously not regulated under the 2012 NSPS OOOO and 2016 NSPS OOOOa.

[13] See tables 3 and 4 of this preamble for a summary of process controller standards in Alaska.

[14] Docket ID No. EPA–HQ–OAR–2021–0317.

Second, pursuant to CAA section 111(d), the EPA is finalizing the first nationwide EG for states to limit methane pollution from designated facilities in the Crude Oil and Natural Gas source category. The EG being finalized in this rulemaking will be in a new subpart, 40 CFR part 60, subpart OOOOc (EG OOOOc). The EG finalizes presumptive standards for GHG emissions (in the form of methane limitations) from designated facilities that commenced construction, reconstruction, or modification on or before December 6, 2022, and implementation requirements designed to inform states in the development, submittal, and implementation of state plans that are required to establish standards of performance for emissions of GHGs from their designated facilities in the Crude Oil and Natural Gas source category. The EPA is also finalizing regulatory language in NSPS OOOO, NSPS OOOOa, and NSPS KKK to provide clarity on when sources transition from being subject to these NSPS and become subject to a state or Federal plan implementing EG OOOOc.

Third, the EPA is taking several related actions stemming from the joint resolution of Congress, adopted on June 30, 2021, under the CRA, disapproving the EPA's final rule titled, ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review,'' 85 FR 57018 (September 14, 2020) (''2020 Policy Rule''). As explained in section XII of this document, the EPA is finalizing amendments to the 2016 NSPS OOOOa to address (1) certain inconsistencies between the VOC and methane standards resulting from the disapproval of the 2020 Policy Rule and (2) certain determinations made in the final rule titled, ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration,'' 85 FR 57398 (September 15, 2020) (''2020 Technical Rule''), specifically with respect to fugitive emissions monitoring at low production well sites and gathering and boosting stations. With respect to the latter, as described below, the EPA is finalizing the rescission of provisions of the 2020 Technical Rule that were not supported by the record for that rule or by our subsequent information and analysis.

In addition, in this final rulemaking the EPA updates the NSPS OOOO and NSPS OOOOa provisions in the CFR to reflect the CRA resolution's disapproval of the final 2020 Policy Rule, specifically, the reinstatement of the NSPS OOOO and NSPS OOOOa requirements that the 2020 Policy Rule repealed but that came back into effect immediately upon enactment of the CRA resolution. It should be noted that these requirements have come back into effect already, even prior to these updates to CFR text to reflect them.[15] The EPA waited to make these updates to the CFR text until the final rule simply because it was more efficient and clearer to amend the CFR once at the end of this rulemaking process to account for all changes to the 2012 NSPS OOOO (77 FR 49490, August 16, 2012) and 2016 NSPS OOOOa at the same time.

Fourth, the EPA is finalizing a protocol for the use of OGI in leak detection being finalized as appendix K to 40 CFR part 60 (referred to hereafter as appendix K). While this protocol is being finalized in this action, the applicability of the protocol is broader. The protocol is applicable to facilities when specified in a referencing subpart to help determine the presence and location of leaks; it is not currently applicable for use in direct emission rate measurements from sources. The protocol does not on its own apply to any sources. For NSPS OOOOb and EG OOOOc, we are finalizing the use of the protocol for application at natural gas processing plants. The protocol may be applied to other sources only when incorporated through rulemaking to a specific subpart.

Each group of actions just described is severable from the other. In addition, within each group of actions, the requirements governing each emission source are separate from and so severable from the requirements for each other emission source. Specifically, for each emission source, the EPA separately analyzed and determined the appropriate BSER. And for each emission source, the EPA conducted a separate analysis for new sources governed by the NSPS and for existing sources covered by the EG. Each of the requirements in this final rule is functionally independent—*i.e.,* may operate in practice independently of the other standards of performance.

As CAA section 111(a)(1) requires, the standards of performance being finalized in this rulemaking reflect ''the degree of emission limitation achievable through the application of the best system of emission reduction [BSER] which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirement) the Administrator determines has been adequately demonstrated.'' [16] This rulemaking further finalizes EG for designated facilities, under which states must submit plans which establish standards of performance that reflect the degree of emission limitation achievable through application of the BSER, as identified in the final EG. In this final rulemaking, we evaluated new data made available to the EPA and information provided from public comments on the December 2022 Supplemental Proposal to update the analyses and evaluate whether revisions to the proposed BSER should be considered. For any potential control measure evaluated in this rulemaking, as in the December 2022 Supplemental Proposal, the EPA evaluated the emission reductions achievable through these measures and employed multiple approaches to evaluate the reasonableness of control costs associated with the options under consideration. For example, in evaluating controls for reducing VOC and methane emissions from new sources, we considered a control measure's cost effectiveness under both a ''single-pollutant cost effectiveness'' approach and a ''multipollutant cost effectiveness'' approach to appropriately consider that the systems of emission reduction considered in this rulemaking [17] typically achieve reductions in multiple pollutants at once and secure a multiplicity of climate and public health benefits. For both NSPS OOOOb and EG OOOOc, we also compared: (1) the capital costs that would be incurred through compliance with the final standards against the industry's current level of capital expenditures and (2) the annualized costs against the industry's estimated annual revenues. For a detailed discussion of the EPA's consideration of this and other BSER statutory elements, see sections IV and VIII of this

[15] See Congressional Review Act Resolution to Disapprove EPA's 2020 Oil and Gas Policy Rule Questions and Answers (June 30, 2021) available at *https://www.epa.gov/system/files/documents/2021-07/qa_cra_for_2020_oil_and_gas_policy_rule.6.30.2021.pdf.*

[16] The EPA notes that design, equipment, work practice, or operational standards established under CAA section 111(h) (commonly referred to as ''work practice standards'') reflect the ''best technological system of continuous emission reduction'' and that this phrasing differs from the ''best system of emission reduction'' phrase in the definition of ''standard of performance'' in CAA section 111(a)(1). Although the differences in these phrases may be meaningful in other contexts, for purposes of evaluating the sources and systems of emission reduction at issue in this rulemaking, the EPA has applied these concepts in an essentially comparable manner because the systems of emission reduction the EPA evaluated are all technological.

[17] For EG OOOOc, where the pollutant is GHGs in the form of limitations on methane, the EPA considered a control measure's cost effectiveness under a ''single-pollutant cost effectiveness'' approach.

preamble. Table 2 summarizes the applicability dates for the four subparts that the EPA is finalizing.

TABLE 2—APPLICABLE DATES FOR SUBPARTS ADDRESSED IN THIS RULEMAKING [18]

Subpart	Source type	Applicable dates
40 CFR part 60, subpart OOOO	New, modified, or reconstructed sources.	After August 23, 2011, and on or before September 18, 2015.
40 CFR part 60, subpart OOOOa	New, modified, or reconstructed sources.	After September 18, 2015, and on or before December 6, 2022.
40 CFR part 60, subpart OOOOb	New, modified, or reconstructed sources.	After December 6, 2022.
40 CFR part 60, subpart OOOOc	Existing sources	On or before December 6, 2022.

1. New Source Performance Standards for New, Modified, and Reconstructed Sources After December 6, 2022 (NSPS OOOOb)

As described in section X of this preamble, the EPA is finalizing several changes to the BSER and the NSPS for certain affected facilities based on a review of new data made available to the EPA and information provided in public comments. For the other NSPS that generally remain unchanged, the EPA is finalizing them as proposed in the November 2021 Proposal and/or December 2022 Supplemental Proposal. The EPA is also finalizing further justifications, flexibilities, or clarifications, as needed, based on the public comments and other additional information received, as described in section X of this preamble. The NSPS applies to affected sources across the Crude Oil and Natural Gas source category, including the production, processing, transmission, and storage segments, for which construction, reconstruction, or modification commenced after December 6, 2022, which is the date of publication of the supplemental proposal for NSPS OOOOb.

In particular, this action finalizes changes to strengthen the proposed VOC and methane standards addressing: fugitive emissions from well sites; monitoring of control devices; super-emitters; storage vessels; associated gas; pumps; equipment leaks at gas plants; appendix K; centrifugal compressors; and reciprocating compressors. It generally leaves unchanged the SO_2 performance standard for sweetening units and the VOC and methane performance standards for well completions, gas well liquids unloading operations, process controllers, and fugitive emissions from compressor stations. A summary of the final BSER determination and final NSPS for affected sources for which construction, reconstruction, or modification commenced after December 6, 2022 (NSPS OOOOb), is presented in table 2. See sections X and XI of this preamble for a complete discussion of the changes to the BSER determination and NSPS requirements.

The final NSPS OOOOb also includes provisions for the use of advanced methane detection technologies that allow for periodic screening or continuous monitoring for fugitive emissions and emissions from covers and closed vent systems (CVS) used to route emissions to control devices. These advanced methane detection technologies could also be used to identify super-emitter emissions events sooner and outside the normal periodic OGI monitoring for fugitive emissions, control devices, covers on storage vessels, and CVS. Therefore, the EPA is finalizing a Super Emitter Program where an owner or operator must investigate, and if necessary, take steps to ensure compliance with the applicable regulation(s) upon receiving certified notifications of detected emissions that are 100 kilograms per hour (kg/hr) of methane or greater. See section X.C of this preamble for a complete discussion of these final provisions.

2. EG for Sources Constructed Prior to December 6, 2022 (EG OOOOc)

As described in sections X and XI of this preamble, the EPA is finalizing several changes to the BSER determinations and presumptive standards that were proposed under the authority of CAA section 111(d) in the November 2021 Proposal and/or the December 2022 Supplemental Proposal. These changes are based on a review of new data made available to the EPA and information provided in public comments. In the November 2021 Proposal, the EPA proposed the first nationwide EG for GHG (in the form of methane limitations) for the Crude Oil and Natural Gas source category, including the production, processing, and transmission and storage segments (EG OOOOc). In the December 2022 Supplemental Proposal, the EPA proposed key implementation information unique to the EG for stakeholders.

This action finalizes revisions to strengthen the proposed presumptive standards for methane addressing: fugitive emissions from well sites; monitoring of control devices; super-emitters; storage vessels; associated gas; pumps; equipment leaks at gas plants; appendix K; centrifugal compressors; and reciprocating compressors. It generally leaves unchanged the presumptive standards for gas well liquids unloading operations, process controllers, and fugitive emissions from compressor stations. A summary of the final BSER determination and final presumptive standards for EG OOOOc is presented in table 3. See section X of this preamble for a complete discussion of the changes to the BSER determination and final presumptive standards.

The final EG OOOOc also includes the same provisions described for NSPS OOOOb that allow for the use of alternative test methods using advanced methane detection technologies for periodic screening or continuous monitoring for fugitive emissions and emissions from covers and CVS used to route emissions to control devices. Finally, the EPA is also finalizing in the final EG OOOOc presumptive requirements for state plans to include a Super Emitter Program, where an owner or operator must investigate, and if necessary, take steps to ensure compliance with the applicable regulation(s) upon receiving certified notifications of detected emissions that are 100 kilograms per hour (kg/hr) of methane or greater. See section X of this preamble for a complete discussion of these final provisions.

[18] See preamble section IX, ''Interaction of the Rules and Response to Significant Comments Thereon'' for discussion on the applicable dates.

As stated in the November 2021 Proposal [19] and the December 2022 Supplemental Proposal,[20] when the EPA establishes NSPS for a source category, the EPA is required to issue EG to reduce emissions of certain pollutants from existing sources in that same source category. In such circumstances, under CAA section 111(d), the EPA must issue regulations to establish procedures under which states submit plans to establish, implement, and enforce standards of performance for existing sources for certain air pollutants to which a Federal NSPS would apply if such existing source were a new source. Thus, the issuance of CAA section 111(d) final EG does not impose binding requirements directly on existing sources but instead provides requirements for states in developing their plans. There is a fundamental requirement under CAA section 111(d) that a state's standards of performance in its state plan submittal are no less stringent than the presumptive standard determined by the EPA, which derives from the definition of ''standard of performance'' in CAA section 111(a)(1). Further, as provided in CAA section 111(d), a state may choose to take into account remaining useful life and other factors (RULOF) in applying a standard of performance to a particular source, consistent with the CAA, the EPA's implementing regulations, and the final EG.

The EPA is finalizing changes to the BSER determinations and the degree of limitation achievable through application of the BSER for certain existing equipment, processes, and activities across the Crude Oil and Natural Gas source category. Those changes are discussed in section X of this preamble. Section XIII of this preamble discusses the components of EG, including the steps, requirements, and considerations associated with the development, submittal, and implementation of state, Tribal, and Federal plans, as appropriate. For the EG, the EPA is translating the degree of emission limitation achievable through application of the BSER (*i.e.,* level of stringency) into presumptive standards that states may use in the development of state plans for specific designated facilities. In doing so, the EPA has formatted the final EG OOOOc such that if a state chooses to adopt these presumptive standards as the standards of performance in a state plan, the EPA could approve such a plan as meeting the requirements of CAA section 111(d) and the finalized EG, if the plan meets all other applicable requirements. In this way, the presumptive standards included in the final EG OOOOc serve a function similar to that of a model rule,[21] because they are intended to assist states in developing their plan submissions by providing states with a starting point for standards that are based on general industry parameters and assumptions. The EPA anticipates that providing these presumptive standards will create a streamlined approach for states in developing state plans and for the EPA in evaluating state plans. However, the EPA's action on each state plan submission is carried out via rulemaking, which includes public notice and comment. Inclusion of presumptive standards in the final EG does not predetermine the outcomes of any future rulemaking on state plan submittals.

Designated facilities located in Indian country would not be encompassed within a state's CAA section 111(d) plan. Instead, an eligible Tribe that has one or more designated facilities located in its area of Indian country would have the opportunity, but not the obligation, to seek authority and submit a plan that establishes standards of performance for those facilities on its Tribal lands. If a Tribe does not submit a plan, or if the EPA does not approve a Tribe's plan, then the EPA has the authority to establish a Federal plan for designated facilities located within that Tribe's area of Indian country. A summary of the final EG for existing sources (EG OOOOc) for the oil and natural gas sector is presented in table 4. See section X of this preamble for a complete discussion of the final EG requirements.

3. Final Amendments to 2016 NSPS OOOOa, and CRA-Related CFR Updates

The EPA is finalizing modifications to the 2016 NSPS OOOOa to address certain amendments to the VOC standards for sources in the production and processing segments finalized in the 2020 Technical Rule. Because the methane standards for the production and processing segments and all standards for the transmission and storage segment were removed from the 2016 NSPS OOOOa via the 2020 Policy Rule prior to the finalization of the 2020 Technical Rule, the latter amendments apply only to the 2016 NSPS OOOOa VOC standards for the production and processing segments. In this final rulemaking, the EPA also is applying some of the 2020 Technical Rule amendments to the methane standards for all industry segments and to VOC standards for the transmission and storage segment in the 2016 NSPS OOOOa. These amendments are associated with the requirements for well completions, pumps, closed vent systems, fugitive emissions, alternative means of emission limitation (AMELs), and onshore natural gas processing plants, as well as other technical clarifications and corrections. The EPA is also finalizing a repeal of the amendments in the 2020 Technical Rule that (1) exempted low production well sites from monitoring fugitive emissions and (2) changed monitoring of VOC emissions at gathering and boosting compressor stations from quarterly to semiannual, which currently applies only to VOC standards (not methane standards) from the production and processing segments. A summary of the final amendments to the 2016 OOOOa NSPS is presented in section XII of this preamble.

Lastly, in this rulemaking, the EPA updates the NSPS OOOO and OOOOa provisions in the CFR to reflect the CRA resolution's disapproval of the final 2020 Policy Rule, specifically, the reinstatement of the NSPS OOOO and OOOOa requirements that the 2020 Policy Rule repealed but that came back into effect immediately upon enactment of the CRA resolution. The EPA waited to make the updates to the CFR text until the final rulemaking because it would be more efficient and clearer to amend the CFR once at the end of this rulemaking process to account for all changes to the 2012 NSPS OOOO and 2016 NSPS OOOOa at the same time, rather than make piecemeal amendments to the CFR.

[19] See 86 FR 63117 (November 15, 2021).

[20] See 87 FR 74702 (December 6, 2022).

[21] The presumptive standards are not the same as a Federal plan under CAA section 111(d)(2). The EPA has an obligation to promulgate a Federal plan if a state fails to submit a satisfactory plan. In such circumstances, the final EG and presumptive standards would serve as a guide to the development of a Federal plan. See section XIII.F of this document for information on Federal plans.

TABLE 3—SUMMARY OF FINAL BSER AND FINAL NEW SOURCE PERFORMANCE STANDARDS FOR GHGS AND VOCS (NSPS OOOOb) [22]

Affected source	Final BSER	Final new source performance standards for GHGs and VOCs
Fugitive Emissions: Single Wellhead Only Well Sites and Small Well Sites.	Quarterly AVO monitoring surveys	Quarterly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt. Fugitive monitoring continues for all well sites until the site has been closed, including plugging the wells at the site and submitting a well closure report.
Fugitive Emissions: Multi-wellhead Only Well Sites (2 or more wellheads).	Quarterly AVO monitoring surveys AND Monitoring and repair based on semiannual monitoring using OGI [2].	Quarterly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt. Semiannual OGI monitoring (Optional semiannual EPA Method 21 monitoring with 500 ppm defined as a leak). First attempt at repair within 30 days after detecting fugitive emissions. Final repair within 30 days after first attempt. Fugitive monitoring continues for all well sites until the site has been closed, including plugging the wells at the site and submitting a well closure report.
Fugitive Emissions: Well Sites with Major Production and Processing Equipment and Centralized Production Facilities.	Bimonthly AVO monitoring surveys (*i.e.,* every other month). AND Monitoring and repair based on quarterly monitoring using OGI.	Bimonthly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt. AND Well sites with specified major production and processing equipment: Quarterly OGI monitoring. (Optional quarterly EPA Method 21 monitoring with 500 ppm defined as a leak). First attempt at repair within 30 days after detecting fugitive emissions. Final repair within 30 days after first attempt. Fugitive monitoring continues for all well sites until the site has been closed, including plugging the wells at the site and submitting a well closure report.
Fugitive Emissions: Compressor Stations	Monthly AVO monitoring surveys AND Monitoring and repair based on quarterly monitoring using OGI.	Monthly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt. AND Quarterly OGI monitoring. (Optional quarterly EPA Method 21 monitoring with 500 ppm defined as a leak). First attempt at repair within 30 days after detecting fugitive emissions. Final repair within 30 days after first attempt.
Fugitive Emissions: Well Sites and Compressor Stations on Alaska North Slope.	Monitoring and repair based on annual monitoring using OGI.	Annual OGI monitoring. (Optional annual EPA Method 21 monitoring with 500 ppm defined as a leak). First attempt at repair within 30 days after detecting fugitive emissions. Final repair within 30 days after first attempt.
Storage Vessels: A Single Storage Vessel or Tank Battery with PTE [4] of 6 tpy or more of VOC or PTE of 20 tpy or more of methane.	Capture and route to a control device	95 percent reduction of VOC and methane.
Process Controllers: Natural Gas-driven	Use of zero-emissions controllers	VOC and GHG (methane) emission rate of zero.
Process Controllers: Alaska (at sites where onsite power is not available—continuous bleed natural gas-driven).	Use of low-bleed process controllers	Natural gas bleed rate no greater than 6 scfh.[5]
Process Controllers: Alaska (at sites where onsite power is not available—intermittent natural gas-driven).	Monitor and repair through fugitive emissions program.	OGI monitoring and repair of emissions from controller malfunctions.

TABLE 3—SUMMARY OF FINAL BSER AND FINAL NEW SOURCE PERFORMANCE STANDARDS FOR GHGS AND VOCS (NSPS OOOOb) [22]—Continued

Affected source	Final BSER	Final new source performance standards for GHGs and VOCs
Well Liquids Unloading	Best management practices to minimize or eliminate methane and VOC emissions to the maximum extent possible.	Perform best management practices to minimize or eliminate methane and VOC emissions to the maximum extent possible from liquids unloading events that vent emissions to the atmosphere.
Wet Seal Centrifugal Compressors (except for those located at well sites).	Capture and route emissions from the wet seal fluid degassing system to a control device.	95 percent reduction of methane and VOC emissions.
Wet Seal Centrifugal Compressors (except for those located at well sites): Self-contained centrifugal compressors and wet seal compressors equipped with a mechanical seal.	(Optional) Monitoring and repair to maintain volumetric flow rate at or below 3 scfm.	Monitoring and repair to maintain volumetric flow rate at or below 3 scfm per compressor seal.
Wet Seal Centrifugal Compressors (except for those located at well sites): Alaska North Slope centrifugal compressors equipped with a seal oil recovery system.	(Optional) Monitoring and repair to maintain volumetric flow rate at or below 9 scfm per seal.	Monitoring and repair to maintain volumetric flow rate at or below 9 scfm per compressor seal.
Dry Seal Centrifugal Compressors (except for those located at well sites).	Monitoring and repair to maintain volumetric flow rate at or below 10 scfm [7] per seal.	Monitoring and repair of seal to maintain volumetric flow rate at or below 10 scfm per compressor seal.
Reciprocating Compressors (except for those located at well sites).	Monitoring and repair or replace the reciprocating compressor rod packing in order to maintain volumetric flow rate at or below 2 scfm per cylinder.	Monitoring and repair or replacement of rod packing to maintain volumetric flow rate at or below 2 scfm per cylinder.
Pumps: Natural gas-driven	Use of zero-emissions pumps	GHG (methane) and VOC emission rate of zero.
Pumps: Natural gas-driven (at sites where onsite power is not available and there are fewer than 3 diaphragm pumps).	Use of an existing VRU or control device	Route pump emissions to a process if VRU is onsite, or to control device if onsite.
Well Completions: Subcategory 1 (non-wildcat and non-delineation wells).	Combination of REC [8] and the use of a completion combustion device.	Applies to each well completion operation with hydraulic fracturing. REC in combination with a completion combustion device; venting in lieu of combustion where combustion would present demonstrable safety hazards. Initial flowback stage: Route to a storage vessel or completion vessel (frac tank, lined pit, or other vessel) and separator. Separation flowback stage: Route all salable gas from the separator to a flow line or collection system, reinject the gas into the well or another well, use the gas as an onsite fuel source or use for another useful purpose that a purchased fuel or raw material would serve. If technically infeasible to route recovered gas as specified, recovered gas must be combusted. All liquids must be routed to a storage vessel or well completion vessel, collection system, or be reinjected into the well or another well. The operator is required to have (and use) a separator onsite during the entire flowback period.

TABLE 3—SUMMARY OF FINAL BSER AND FINAL NEW SOURCE PERFORMANCE STANDARDS FOR GHGS AND VOCS (NSPS OOOOb) [22]—Continued

Affected source	Final BSER	Final new source performance standards for GHGs and VOCs
Well Completions: Subcategory 2 (exploratory, wildcat, and delineation wells and non-wildcat and non-delineation low-pressure wells).	Use of a completion combustion device	Applies to each well completion operation with hydraulic fracturing. The operator is not required to have a separator onsite. Either: (1) Route all flowback to a completion combustion device with a continuous pilot flame; or (2) Route all flowback into one or more well completion vessels and commence operation of a separator unless it is technically infeasible for a separator to function. Any gas present in the flowback before the separator can function is not subject to control under this section. Capture and direct recovered gas to a completion combustion device with a continuous pilot flame. For both options (1) and (2), combustion is not required in conditions that may result in a fire hazard or explosion, or where high heat emissions from a completion combustion device may negatively impact tundra, permafrost, or waterways.
Equipment Leaks at Natural Gas Processing Plants.	LDAR [9] with bimonthly OGI	LDAR with OGI following procedures in appendix K.
New Wells with Associated Gas that commenced construction after May 7, 2026.	Route associated gas to a sales line	Route associated gas to a sales line; or, the gas can be used for another useful purpose that a purchased fuel, chemical feedstock, or raw material would serve, or recovered from the separator and reinjected into the well or injected into another well.
New wells with Associated Gas that commenced construction between May 7, 2024, and May 7, 2026.	Route associated gas to a sales line	Route associated gas to a sales line; or, the gas can be used for another useful purpose that a purchased fuel, chemical feedstock, or raw material would serve, or recovered from the separator and reinjected into the well or injected into another well. If demonstrated, and documented annually, that routing to a sales line and the alternatives are not technically feasible, the associated gas can be routed to a flare or other control device that achieves at least 95 percent reduction in GHG (methane) and VOC emissions. A second infeasibility determination may not extend beyond 24 months from effective date.
New Wells with Associated Gas that Commenced Construction after December 6, 2022, and before May 7, 2024.	Route associated gas to a sales line	Route associated gas to a sales line; or, the gas can be used for another useful purpose that a purchased fuel, chemical feedstock, or raw material would serve, or recovered from the separator and reinjected into the well or injected into another well. If demonstrated, and documented annually, that routing to a sales line and the alternatives are not technically feasible, the associated gas can be routed to a flare or other control device that achieves at least 95 percent reduction in GHG (methane) and VOC emissions.

TABLE 3—SUMMARY OF FINAL BSER AND FINAL NEW SOURCE PERFORMANCE STANDARDS FOR GHGS AND VOCS (NSPS OOOOb) [22]—Continued

Affected source	Final BSER	Final new source performance standards for GHGs and VOCs
Wells with Associated Gas Reconstructed or Modified after December 6, 2022.	Route associated gas to a sales line	Route associated gas to a sales line; or, the gas can be used for another useful purpose that a purchased fuel, chemical feedstock, or raw material would serve, or recovered from the separator and reinjected into the well or injected into another well. If demonstrated, and documented annually, that routing to a sales line and the alternatives are not technically feasible, the associated gas can be routed to a flare or other control device that achieves at least 95 percent reduction in GHG (methane) and VOC emissions.
Sweetening Units	Achieve SO_2 emission reduction efficiency	Achieve required minimum SO_2 emission reduction efficiency.

[1] tpy (tons per year).
[2] OGI (optical gas imaging).
[3] ppm (parts per million).
[4] PTE (potential to emit).
[5] scfh (standard cubic feet per hour).
[6] BMP (best management practices).
[7] scfm (standard cubic feet per minute).
[8] REC (reduced emissions completion).
[9] LDAR (leak detection and repair).

TABLE 4—SUMMARY OF FINAL BSER AND FINAL PRESUMPTIVE STANDARDS FOR GHGS FROM DESIGNATED FACILITIES (EG OOOOc) [23]

Designated facility	Final BSER	Final presumptive standards for GHGs
Fugitive Emissions: Single Wellhead Only Well Sites and Small Well Sites.	Quarterly AVO monitoring surveys	Quarterly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt. Fugitive monitoring continues for all well sites until the site has been closed, including plugging the wells at the site and submitting a well closure report.
Fugitive Emissions: Multi-wellhead Only Well Sites (2 or more wellheads).	Quarterly AVO monitoring surveys ..... AND Monitoring and repair based on semiannual monitoring using OGI[2].	Quarterly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt. Semiannual OGI monitoring (Optional semiannual EPA Method 21 monitoring with 500 ppm defined as a leak). First attempt at repair within 30 days after detecting fugitive emissions. Final repair within 30 days after first attempt. Fugitive monitoring continues for all well sites until the site has been closed, including plugging the wells at the site and submitting a well closure report.
Fugitive Emissions: Well Sites and Centralized Production Facilities.	Bimonthly AVO monitoring surveys (*i.e.,* every other month). AND Monitoring and repair based on quarterly monitoring using OGI.	Bimonthly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt. AND Well sites with specified major production and processing equipment: Quarterly OGI monitoring. (Optional quarterly EPA Method 21 monitoring with 500 ppm defined as a leak).

[22] For fugitive emissions at well sites,centralized production facilities, and compressor stations, the EPA is finalizing an advanced measurement technology compliance option to use alternative periodic screening and alternative continuous monitoring instead of OGI and AVO monitoring.

TABLE 4—SUMMARY OF FINAL BSER AND FINAL PRESUMPTIVE STANDARDS FOR GHGS FROM DESIGNATED FACILITIES (EG OOOOc) [23]—Continued

Designated facility	Final BSER	Final presumptive standards for GHGs
		First attempt at repair within 30 days after finding fugitive emissions. Final repair within 30 days after first attempt. Fugitive monitoring continues for all well sites until the site has been closed, including plugging the wells at the site and submitting a well closure report.
Fugitive Emissions: Compressor Stations	Monthly AVO monitoring surveys	Monthly AVO surveys. First attempt at repair within 15 days after detecting fugitive emissions. Final repair within 15 days after first attempt.
	AND Monitoring and repair based on quarterly monitoring using OGI.	AND Quarterly OGI monitoring. (Optional quarterly EPA Method 21 monitoring with 500 ppm defined as a leak). First attempt at repair within 30 days after detecting fugitive emissions. Final repair within 30 days after first attempt.
Fugitive Emissions: Well Sites and Compressor Stations on Alaska North Slope.	Monitoring and repair based on annual monitoring using OGI.	Annual OGI monitoring. (Optional annual EPA Method 21 monitoring with 500 ppm defined as a leak). First attempt at repair within 30 days after finding fugitive emissions. Final repair within 30 days after first attempt.
Storage Vessels: Tank Battery with PTE of 20 tpy or More of Methane.	Capture and route to a control device	95 percent reduction of methane.
Process Controllers: Natural gas-driven	Use of zero-emissions controllers	GHG (methane) emission rate of zero.
Process Controllers: Alaska (at sites where onsite power is not available—continuous bleed natural gas-driven).	Use of low-bleed process controllers	Natural gas bleed rate no greater than 6 scfh.
Process Controllers: Alaska (at sites where onsite power is not available—intermittent natural gas-driven).	Monitor and repair through fugitive emissions program.	OGI monitoring and repair of emissions from controller malfunctions.
Gas Well Liquids Unloading	Best management practices to minimize or eliminate methane and VOC emissions to the maximum extent possible.	Perform best management practices to minimize or eliminate methane and VOC emissions to the maximum extent possible from liquids unloading events that vent emissions to the atmosphere.
Wet Seal Centrifugal Compressors (except for those located at well sites).	Monitoring and repair to maintain volumetric flow rate at or below 3 scfm[7].	Monitoring and repair to maintain volumetric flow rate at or below 3 scfm per seal.
Wet Seal Centrifugal Compressors (except for those located at well sites): Self-contained centrifugal compressors and wet seal compressors equipped with a mechanical seal.	Monitoring and repair to maintain volumetric flow rate at or below 3 scfm.	Monitoring and repair to maintain volumetric flow rate at or below 3 scfm per seal.
Wet Seal Centrifugal Compressors (except for those located at well sites): Alaska North Slope centrifugal compressors equipped with a seal oil recovery system.	Monitoring and repair to maintain volumetric flow rate at or below 9 scfm.	Monitoring and repair to maintain volumetric flow rate at or below 9 scfm per seal.
Dry Seal Centrifugal Compressors (except for those located at well sites).	Monitoring and repair to maintain volumetric flow rate at or below 10 scfm[7].	Monitoring and repair to maintain volumetric flow rate at or below 10 scfm per seal.
Reciprocating Compressors (except for those located at well sites).	Monitoring and repair or replace the reciprocating compressor rod packing in order to maintain volumetric flow rate at or below 2 scfm.	Monitoring and repair to maintain volumetric flow rate at or below 2 scfm per cylinder.
Pumps: Natural gas-driven	Use of zero-emissions pumps	GHG (methane) emission rate of zero.
Pumps: Natural gas-driven (at sites where onsite power is not available and there are fewer than 3 diaphragm pumps).	Use of an existing VRU or control device	Route pump emissions to a process if VRU is onsite, or to control device if onsite.
Equipment Leaks at Natural Gas Processing Plants.	LDAR with bimonthly OGI	LDAR with OGI following procedures in appendix K.

TABLE 4—SUMMARY OF FINAL BSER AND FINAL PRESUMPTIVE STANDARDS FOR GHGS FROM DESIGNATED FACILITIES (EG OOOOc) [23]—Continued

Designated facility	Final BSER	Final presumptive standards for GHGs
Wells with Associated Gas greater than 40 tpy methane.	Route associated gas to a sales line	Route associated gas to a sales line. Alternatively, the gas can be used as an onsite fuel source or used for another useful purpose that a purchased fuel or raw material would serve, or be injected into the well or another well. If demonstrated, and annually documented, that a sales line and alternatives are not technically feasible, the gas can be routed to a flare or other control device that achieves at least 95 percent reduction in methane emissions.
Wells with Associated Gas 40 tpy methane or less.	Route associated gas to a flare or other control device that achieves at least 95 percent reduction in methane emissions.	Route associated gas to a sales line. Alternatively, the gas can be used as an onsite fuel source or used for another useful purpose that a purchased fuel or raw material would serve, or be injected into the well or another well. Alternatively, the gas can be routed to a flare or other control device that achieves at least 95 percent reduction in methane emissions.

C. Costs and Benefits

In accordance with the requirements of E.O. 12866, the EPA projected the emissions reductions, costs, and benefits that may result from this final rulemaking. These results are presented in detail in the RIA accompanying this final rulemaking developed in response to E.O. 12866. The RIA focuses on the elements of the final rules that are likely to result in quantifiable cost or emissions changes compared to a baseline without the rule. We estimated the cost, emissions, and benefit impacts for the 2024 to 2038 period. We present the present value (PV) and equivalent annual value (EAV) of costs, benefits, and net benefits of this rulemaking in 2019 dollars.

The initial analysis year in the RIA is 2024 as we assume the NSPS rules will take effect early in 2024. The EG will take longer to go into effect as states will need to develop implementation plans in response to the EG and have them approved by the EPA. We assume in the RIA that this process will take 4 years, and so EG impacts will begin in 2028. The final analysis year is 2038, which allows us to provide up to 15 years of projected impacts after the NSPS is assumed to take effect and 11 years of projected impacts after the EG is assumed to take effect.

The cost analysis presented in the RIA reflects a nationwide engineering analysis of compliance cost and emissions reductions, of which there are two main components. The first component is a set of representative or model plants for each regulated facility, segment, and control option. The characteristics of the model plant include typical equipment, operating characteristics, and representative factors including baseline emissions and the costs, emissions reductions, and product recovery resulting from each control option. The second component is a set of projections of activity data for affected facilities, distinguished by vintage, year, and other necessary attributes (*e.g.,* oil versus natural gas wells). Impacts are calculated by setting parameters on how and when affected facilities are assumed to respond to a particular regulatory regime, multiplying activity data by model plant cost and emissions estimates, differencing from the baseline scenario, and then summing to the desired level of aggregation. In addition to emissions reductions, some control options result in natural gas recovery, which can then be combusted in production or sold. Where applicable, we present projected compliance costs with and without the projected revenues from product recovery.

The EPA expects climate and health benefits due to the emissions reductions projected under this final rulemaking. The EPA estimated the monetized climate benefits of methane emission reductions expected from these final rules using estimates of the social cost of methane (SC–CH_4) that reflect recent advances in the scientific literature on climate change and its economic impacts and incorporate recommendations made by the National Academies of Science, Engineering, and Medicine (National Academies 2017). The EPA presented these estimates in a sensitivity analysis in the December 2022 RIA, solicited public comment on the methodology and use of these estimates, and has conducted an external peer review of these estimates, as discussed in section XVI.E of this preamble.

In addition to climate benefits from methane emissions reductions, the EPA expects that VOC emission reductions under the final rulemaking will improve air quality and improve health and welfare due to reduced exposure to ozone, particulate matter with a diameter of 2.5 micrometers or less ($PM_{2.5}$), and hazardous air pollutants (HAP). In a national-level analysis of public health impacts, the EPA used the environmental Benefits Mapping and Analysis Program—Community Edition (BenMAP–CE) software program to quantify counts of premature deaths and illnesses attributable to photochemical modeled changes in summer season average ozone concentrations resulting from projected VOC emissions reductions under the rulemaking. The methods for quantifying the number and value of air pollution-attributable premature deaths and illnesses are described in the RIA for this action and the TSD titled *Estimating $PM_{2.5}$- and Ozone-Attributable Health Benefits.*[24] These reductions in health-harming pollution would result in significant public health benefits including avoided

[23] For fugitive emissions at well sites, centralized production facilities, and compressor stations, the EPA is finalizing an advanced measurement technology compliance option to use alternative periodic screening and alternative continuous monitoring instead of OGI and AVO monitoring.

[24] *https://www.epa.gov/system/files/documents/2023-01/Estimating%20PM2.5-%20and%20Ozone-Attributable%20Health%20Benefits%20TSD_0.pdf.*

premature deaths, reductions in new asthma cases and incidences of asthma symptoms, reductions in hospital admissions and emergency department visits, and reductions in lost school days.

The EPA notes that the benefits analysis is distinct from the statutory BSER determinations finalized herein, which are based on the statutory factors the EPA is required to consider under section 111(a) of the CAA (including cost, energy requirements and nonair quality health, and environmental impacts). The assessment of benefits described above and in the RIA is presented solely for the purposes of complying with E.O. 12866 and providing the public with a complete depiction of the impacts of the rulemaking.

The projected national-level emissions reductions over the 2024 to 2038 period anticipated under the finalized requirements are presented in table 5. Table 6 presents the PV and EAV of the projected benefits, costs, and net benefits over the 2024 to 2038 period under the final rule using discount rates of 2, 3, and 7 percent.

TABLE 5—PROJECTED EMISSIONS REDUCTIONS UNDER THE FINAL RULES, 2024–2038 TOTAL

Pollutant	Emissions reductions (2024–2038 total)
Methane (million short tons) [a]	58
VOC (million short tons)	16
Hazardous Air Pollutant (million short tons)	0.59
Methane (million metric tons CO_2 Eq.) [b]	1,500

[a] To convert from short tons to metric tons, multiply the short tons by 0.907. Alternatively, to convert metric tons to short tons, multiply metric tons by 1.102.
[b] Carbon dioxide equivalent (CO_2 Eq). calculated using a global warming potential of 28.

TABLE 6—BENEFITS, COSTS, NET BENEFITS, AND EMISSIONS REDUCTIONS UNDER THE FINAL RULES, 2024–2038

[Dollar Estimates in Millions of 2019 Dollars] [a]

	2 Percent near-term Ramsey discount rate					
	PV	EAV	PV	EAV	PV	EAV
Climate Benefits [b]	$110,000	$8,500	$110,000	$8,500	$110,000	$8,500
	2 Percent discount rate		3 Percent discount rate		7 Percent discount rate	
	PV	EAV	PV	EAV	PV	EAV
Ozone Health Benefits [c]	$7,000	$540	$6,100	$510	$3,500	$380
Net Compliance Costs	19,000	1,500	18,000	1,500	14,000	1,600
Compliance Costs	31,000	2,400	29,000	2,400	22,000	2,400
Value of Product Recovery	13,000	980	11,000	950	7,400	820
Net Benefits [d]	97,000	7,600	97,000	7,500	98,000	7,300
Non-Monetized Benefits	Climate and ozone-related health benefits from reducing 58 million short tons of methane from 2024 to 2038. Benefits to provision of ecosystem services associated with reduced ozone concentrations from reducing 16 million short tons of VOC from 2024 to 2038. $PM_{2.5}$-related health benefits from reducing 16 million short tons of VOC from 2024 to 2038. HAP benefits from reducing 590 thousand short tons of HAP from 2024 to 2038.					

[a] Values rounded to two significant figures. Totals may not appear to add correctly due to rounding.
[b] Climate benefits are based on reductions in methane emissions and are calculated using three different estimates of the SC-CH_4 (under 1.5 percent, 2.0 percent, and 2.5 percent near-term Ramsey discount rates). For the presentational purposes of this table, we show the climate benefits associated with the SC-CH_4 at the 2 percent near-term Ramsey discount rate. Please see tables 3.4 and 3.5 in the RIA for the full range of monetized climate benefit estimates. All net benefits are calculated using climate benefits discounted at the 2 percent near-term rate.
[c] Monetized benefits include those related to public health associated with reductions in ozone concentrations. The health benefits are associated with several point estimates.
[d] Several categories of climate, human health, and welfare benefits from methane, VOC, and HAP emissions reductions remain unmonetized and are thus not directly reflected in the quantified benefit estimates in the table.

III. Air Emissions From the Crude Oil and Natural Gas Sector and Public Health and Welfare

A. Impacts of GHGs, VOCs, and SO_2 Emissions on Public Health and Welfare

As noted previously, the oil and natural gas industry emits a wide range of pollutants, including GHGs (such as methane and CO_2), VOCs, SO_2, NO_X, H_2S, CS_2, and COS. See 49 FR 2636, 2637 (January 20, 1984). As noted below, to this point the EPA has focused its regulatory efforts under CAA section 111 on GHGs, VOC, and SO_2.[25]

[25] We note that the EPA's focus on GHGs (in particular methane), VOC, and SO_2 in these analyses does not in any way limit the EPA's authority to promulgate standards that would apply to other pollutants emitted from the Crude Oil and Natural Gas source category, if the EPA determines in the future that such action is appropriate.

1. Climate Change Impacts From GHGs Emissions

Elevated concentrations of GHGs are and have been warming the planet, leading to changes in the Earth's climate including changes in the frequency and intensity of heat waves, precipitation, and extreme weather events; rising seas; and retreating snow and ice. The changes taking place in the atmosphere as a result of the well-documented

buildup of GHGs due to human activities are changing the climate at a pace and in a way that threatens human health, society, and the natural environment. Human-produced GHGs, largely derived from our reliance on fossil fuels, are causing serious and life-threatening environmental and health impacts. While the EPA is not making any new scientific or factual findings with regard to the well-documented impact of GHG emissions on public health and welfare in support of this rulemaking, the EPA is providing some scientific background on climate change to offer additional context for this rulemaking and to increase the public's understanding of the environmental impacts of GHGs.

Extensive additional information on climate change is available in the scientific assessments and the EPA documents that are briefly described in this section of this preamble, as well as in the technical and scientific information supporting them. One of those documents is the EPA's 2009 *Endangerment and Cause or Contribute Findings for GHGs Under Section 202(a)* of the CAA (74 FR 66496, December 15, 2009).[26] In the 2009 Endangerment Findings, the Administrator found under section 202(a) of the CAA that elevated atmospheric concentrations of six key well-mixed GHGs—CO_2, methane, N_2O, HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—''may reasonably be anticipated to endanger the public health and welfare of current and future generations'' (74 FR 66523, December 15, 2009), and the science and observed changes since that time have confirmed and strengthened the understanding and concerns regarding the climate risks considered in the Findings. The 2009 Endangerment Findings, together with the extensive scientific and technical evidence in the supporting record, documented that climate change caused by human emissions of GHGs threatens the public health of the U.S. population. It explained that by raising average temperatures, climate change increases the likelihood of heat waves, which are associated with increased deaths and illnesses (74 FR 66497, December 15, 2009). While climate change also increases the likelihood of reductions in cold-related mortality, evidence indicates that the increases in heat mortality will be larger than the decreases in cold mortality in the U.S. (74 FR 66525, December 15, 2009). The 2009 Endangerment Findings further explained that compared to a future without climate change, climate change is expected to increase tropospheric ozone pollution over broad areas of the U.S., including in the largest metropolitan areas with the worst tropospheric ozone problems, and thereby increase the risk of adverse effects on public health (74 FR 66525, December 15, 2009). Climate change is also expected to cause more intense hurricanes, and more frequent and intense storms of other types, and heavy precipitation, with impacts on other areas of public health such as the potential for increased deaths, injuries, infectious and waterborne diseases, and stress-related disorders (74 FR 66525, December 15, 2009). Children, the elderly, and the poor are among the most vulnerable to these climate-related health effects (74 FR 66498, December 15, 2009).

The 2009 Endangerment Findings also documented, together with the extensive scientific and technical evidence in the supporting record, that climate change touches nearly every aspect of public welfare[27] in the U.S. with resulting economic costs, including: changes in water supply and quality due to increased frequency of drought and extreme rainfall events; increased risk of storm surge and flooding in coastal areas and land loss due to inundation; increases in peak electricity demand and risks to electricity infrastructure; and the potential for significant agricultural disruptions and crop failures (though offset to some extent by carbon fertilization). These impacts are also global and may exacerbate problems outside the U.S. that raise humanitarian, trade, and national security issues for the U.S. (74 FR 66530, December 15, 2009).

In 2016, the Administrator similarly issued Endangerment and Cause or Contribute Findings for GHG emissions from aircraft under section 231(a)(2)(A) of the CAA (81 FR 54422, August 15, 2016).[28] In the 2016 Endangerment Findings, the Administrator found that the body of scientific evidence amassed in the record for the 2009 Endangerment Findings compellingly supported a similar endangerment finding under CAA section 231(a)(2)(A) and also found that the science assessments released between the 2009 and the 2016 Findings ''strengthen and further support the judgment that GHGs in the atmosphere may reasonably be anticipated to endanger the public health and welfare of current and future generations.'' (81 FR 54424, August 15, 2016).

Since the 2016 Endangerment Findings, the climate has continued to change, with new records being set for several climate indicators such as global average surface temperatures, GHG concentrations, and sea level rise. Moreover, heavy precipitation events have increased in the eastern U.S. while agricultural and ecological drought has increased in the western U.S. along with more intense and larger wildfires.[29] These and other trends are examples of the risks discussed the 2009 and 2016 Endangerment Findings that have already been experienced. Additionally, major scientific assessments continue to demonstrate advances in our understanding of the climate system and the impacts that GHGs have on public health and welfare both for current and future generations. These updated observations and projections document the rapid rate of current and future climate change both globally and in the U.S. These assessments include:

[26] In describing these 2009 Findings in this proposal, the EPA is neither reopening nor revisiting them.

[27] The CAA states in section 302(h) that ''[a]ll language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants.'' 42 U.S.C. 7602(h).

[28] In describing these 2016 Findings in this proposal, the EPA is neither reopening nor revisiting them.

[29] See later in this section of the document for specific examples. An additional resource for indicators can be found at *https://www.epa.gov/climate-indicators.*

• U.S. Global Change Research Program's (USGCRP) 2016 Climate and Health Assessment [30] and 2017–2018 Fourth National Climate Assessment (NCA4) [31] [32]

• IPCC's 2018 Global Warming of 1.5 °C,[33] 2019 Climate Change and Land,[34] and the 2019 Ocean and Cryosphere in a Changing Climate [35] assessments, as well as the 2023 IPCC Sixth Assessment Report (AR6).[36]

• The NAS 2016 Attribution of Extreme Weather Events in the Context of Climate Change,[37] 2017 Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide,[38] and 2019 Climate Change and Ecosystems [39] assessments.

• National Oceanic and Atmospheric Administration's (NOAA) annual State of the Climate reports published by the Bulletin of the American Meteorological Society,[40] most recently in 2022.

• EPA Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts (2021).[41]

The most recent information demonstrates that the climate is continuing to change in response to the human-induced buildup of GHGs in the atmosphere. These recent assessments show that atmospheric concentrations of GHGs have risen to a level that has no precedent in human history and that they continue to climb, primarily because of both historical and current anthropogenic emissions, and that these elevated concentrations endanger our health by affecting our food and water sources, the air we breathe, the weather we experience, and our interactions with the natural and built environments. For example, atmospheric concentrations of one of these GHGs, CO_2, measured at Mauna Loa in Hawaii and at other sites around the world reached 419 parts per million (ppm) in 2022 (nearly 50 percent higher than preindustrial levels) [42] and have continued to rise at a rapid rate. Global average temperature has increased by about 1.1 °C (2.0 °F) in the 2011–2020 decade relative to 1850–1900.[43] The years 2015–2021 were the warmest 7 years in the 1880–2021 record, contributing to the warmest decade on record with a decadal temperature of 0.82 °C (1.48 °F) above the 20th century.[44] [45] The IPCC determined (with medium confidence) that this past decade was warmer than any multi-century period in at least the past 100,000 years.[46] Global average sea level has risen by about 8 inches (about 21 centimeters (cm)) from 1901 to 2018, with the rate from 2006 to 2018 (0.15 inches/year or 3.7 millimeters (mm)/year) almost twice the rate over the 1971 to 2006 period, and three times the rate of the 1901 to 2018 period.[47] The rate of sea level rise over the 20th century was higher than in any other century in at least the last 2,800 years.[48] Higher CO_2 concentrations have led to acidification of the surface ocean in recent decades to an extent unusual in the past 2 million years, with negative impacts on marine organisms that use calcium carbonate to build shells or skeletons.[49] Arctic sea ice extent continues to decline in all months of the year; the most rapid reductions occur in September (very likely almost a 13 percent decrease per decade between 1979 and 2018) and are unprecedented in at least 1,000 years.[50] Human-induced climate change has led to heatwaves and heavy precipitation becoming more frequent and more intense, along with increases in agricultural and ecological droughts [51] in many regions.[52]

The assessment literature demonstrates that modest additional amounts of warming may lead to a climate different from anything humans have ever experienced. The 2022 CO_2 concentration of 419 ppm is already higher than at any time in the last 2 million years.[53] If concentrations exceed 450 ppm, they would likely be higher than any time in the past 23 million years: [54] at the current rate of increase of more than 2 ppm a year, this would

[30] USGCRP, 2016: *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*. Crimmins, A., J. Balbus, J.L. Gamble, C.B. Beard, J.E. Bell, D. Dodgen, R.J. Eisen, N. Fann, M.D. Hawkins, S.C. Herring, L. Jantarasami, D.M. Mills, S. Saha, M.C. Sarofim, J. Trtanj, and L. Ziska, Eds. U.S. Global Change Research Program, Washington, DC, 312 pp.

[31] USGCRP, 2017: *Climate Science Special Report: Fourth National Climate Assessment,* Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp, doi: 10.7930/J0J964J6.

[32] USGCRP, 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi:10.7930/NCA4.2018.

[33] IPCC, 2018: *Global Warming of 1.5 °C.* An IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)].

[34] IPCC, 2019: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)].

[35] IPCC, 2019: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* [H.-O. Pörtner, DC Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)].

[36] IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1–34, doi:10.59327/IPCC/AR6–9789291691647.001.

[37] National Academies of Sciences, Engineering, and Medicine. 2016. *Attribution of Extreme Weather Events in the Context of Climate Change.* Washington, DC: The National Academies Press. *https://dio.org/10.17226/21852.*

[38] National Academies of Sciences, Engineering, and Medicine. 2017. *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide.* Washington, DC: The National Academies Press. *https://doi.org/10.17226/24651.*

[39] National Academies of Sciences, Engineering, and Medicine. 2019. *Climate Change and Ecosystems.* Washington, DC: The National Academies Press. *https://doi.org/10.17226/25504.*

[40] Blunden, J. and T. Boyer, Eds., 2022: ''State of the Climate in 2021''. Bull. Amer. Meteor. Soc., 103 (8), Si–S465, *https://doi.org/10.1175/2022BAMS StateoftheClimate.1.*

[41] EPA. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. U.S. Environmental Protection Agency, EPA 430–R–21–003.

[42] *https://gml.noaa.gov/webdata/ccgg/trends/co2/co2_annmean_mlo.txt.*

[43] IPCC, 2021: Summary for Policymakers. 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.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 3–32, doi:10.1017/9781009157896.001.

[44] NOAA National Centers for Environmental Information, State of the Climate 2021 retrieved on August 3, 2023, from *https://www.ncei.noaa.gov/bams-state-of-climate.*

[45] Blunden, *et al.* 2022.

[46] IPCC, 2021.

[47] IPCC, 2021.

[48] USGCRP, 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi:10.7930/NCA4.2018.

[49] IPCC, 2021.

[27] IPCC, 2021.

[51] These are drought measures based on soil moisture.

[52] IPCC, 2021.

[53] Annual Mauna Loa CO_2 concentration data from *https://gml.noaa.gov/webdata/ccgg/trends/co2/co2_annmean_mlo.txt,* accessed September 9, 2023.

[54] IPCC, 2013.

occur in about 15 years. While GHGs are not the only factor that controls climate, it is illustrative that 3 million years ago (the last time CO_2 concentrations were above 400 ppm) Greenland was not yet completely covered by ice and still supported forests, while 23 million years ago (the last time concentrations were above 450 ppm) the West Antarctic ice sheet was not yet developed, indicating the possibility that high GHG concentrations could lead to a world that looks very different from today and from the conditions in which human civilization has developed. If the Greenland and Antarctic ice sheets were to melt substantially, sea levels would rise dramatically—the IPCC estimated that over the next 2,000 years, sea level will rise by 7 to 10 feet even if warming is limited to 1.5 °C (2.7 °F), from 7 to 20 feet if limited to 2 °C (3.6 °F), and by 60 to 70 feet if warming is allowed to reach 5 °C (9 °F) above preindustrial levels.[55] For context, almost all of the city of Miami is less than 25 feet above sea level, and the NCA4 stated that 13 million Americans would be at risk of migration due to 6 feet of sea level rise. Moreover, the CO_2 being absorbed by the ocean has resulted in changes in ocean chemistry due to acidification of a magnitude not seen in 65 million years,[56] putting many marine species—particularly calcifying species—at risk.

The NCA4 found that it is very likely (greater than 90 percent likelihood) that by mid-century, the Arctic Ocean will be almost entirely free of sea ice by late summer for the first time in about 2 million years.[57] Coral reefs will be at risk for almost complete (99 percent) losses with 1 °C (1.8 °F) of additional warming from today (2 °C or 3.6 °F since preindustrial). At this temperature, between 8 and 18 percent of animal, plant, and insect species could lose over half of the geographic area with suitable climate for their survival, and 7 to 10 percent of rangeland livestock would be projected to be lost.[58] The IPCC similarly found that climate change has caused substantial damages and increasingly irreversible losses in terrestrial, freshwater, and coastal and open ocean marine ecosystems.

Scientific assessments also demonstrate that even modest additional amounts of warming may lead to a climate different from anything humans have ever experienced. Every additional increment of temperature comes with consequences. For example, the half degree of warming from 1.5 to 2 °C (0.9 °F of warming from 2.7 °F to 3.6 °F) above preindustrial temperatures is projected on a global scale to expose 420 million more people to frequent extreme heatwaves, and 62 million more people to frequent exceptional heatwaves (where heatwaves are defined based on a heat wave magnitude index which takes into account duration and intensity—using this index, the 2003 French heat wave that led to almost 15,000 deaths would be classified as an ''extreme heatwave'' and the 2010 Russian heatwave which led to thousands of deaths and extensive wildfires would be classified as ''exceptional''). It would increase the frequency of sea-ice-free Arctic summers from once in 100 years to once in a decade. It could lead to 4 inches of additional sea level rise by the end of the century, exposing an additional 10 million people to risks of inundation as well as increasing the probability of triggering instabilities in either the Greenland or Antarctic ice sheets. Between half a million and a million additional square miles of permafrost would thaw over several centuries. Risks to food security would increase from medium-to-high for several lower-income regions in the Sahel, southern Africa, the Mediterranean, central Europe, and the Amazon. In addition to food security issues, this temperature increase would have implications for human health in terms of increasing ozone concentrations, heatwaves, and vector-borne diseases (for example, expanding the range of the mosquitoes which carry dengue fever, chikungunya, yellow fever, and the Zika virus, or the ticks which carry Lyme, babesiosis, or Rocky Mountain Spotted Fever).[59] Moreover, every additional increment in warming leads to larger changes in extremes, including the potential for events unprecedented in the observational record. Every additional degree will intensify extreme precipitation events by about 7 percent. The peak winds of the most intense tropical cyclones (hurricanes) are projected to increase with warming. In addition to a higher intensity, the IPCC found that precipitation and frequency of rapid intensification of these storms has already increased, the movement speed has decreased, and elevated sea levels have increased coastal flooding, all of which make these tropical cyclones more damaging.[60]

The NCA4 also evaluated a number of impacts specific to the U.S. Severe drought and outbreaks of insects like the mountain pine beetle have killed hundreds of millions of trees in the western U.S. Wildfires have burned more than 3.7 million acres in 14 of the 17 years between 2000 and 2016, and Federal wildfire suppression costs were about a billion dollars annually.[61] The National Interagency Fire Center has documented U.S. wildfires since 1983, and the 10 years with the largest acreage burned have all occurred since 2004.[62] Wildfire smoke degrades air quality, increasing health risks, and more frequent and severe wildfires due to climate change would further diminish air quality, increase incidences of respiratory illness, impair visibility, and disrupt outdoor activities, sometimes thousands of miles from the location of the fire. Meanwhile, sea level rise has amplified coastal flooding and erosion impacts, requiring the installation of costly pump stations, flooding streets, and increasing storm surge damages. Tens of billions of dollars of U.S. real estate could be below sea level by 2050 under some scenarios. Increased frequency and duration of drought will reduce agricultural productivity in some regions, accelerate depletion of water supplies for irrigation, and expand the distribution and incidence of pests and diseases for crops and livestock. The NCA4 also recognized that climate change can increase risks to national security, both through direct impacts on military infrastructure and by affecting factors such as food and water availability that can exacerbate conflict outside U.S. borders. Droughts, floods, storm surges, wildfires, and other extreme events stress nations and people through loss of life, displacement of populations, and impacts on livelihoods.[63]

[55] IPCC, 2021.
[56] IPCC, 2018.
[57] USGCRP, 2018.
[58] IPCC, 2018.
[59] IPCC, 2018.
[60] IPCC, 2021.
[61] USGCRP, 2018.
[62] NIFC (National Interagency Fire Center). 2021. Total wildland fires and acres (1983–2020). Accessed August 2021. *www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html.*
[63] USGCRP, 2018.

Ongoing EPA modeling efforts can shed further light on the distribution of climate change damages expected to occur within the U.S. Based on methods from over 30 peer-reviewed climate change impact studies, the EPA's Framework for Evaluating Damages and Impacts (FrEDI) model has developed estimates of the relationship between future temperature changes and physical and economic climate-driven damages occurring in specific U.S. regions for 20 specific impact categories.[64] Recent applications of FrEDI have advanced the collective understanding about how future climate change impacts in these 20 categories are expected to be substantial and distributed unevenly across U.S. regions.[65] Using this framework, the EPA estimates that under a global emission scenario with no additional mitigation, relative to a world with no additional warming since the baseline period (1986–2005), damages accruing to these impact categories in the contiguous U.S. occur mainly through increased deaths due to increasing temperatures as well as climate-driven changes in air quality, transportation impacts due to coastal flooding resulting from sea level rise, increased mortality from wildfire emission exposure and response costs for fire suppression, and reduced labor hours worked in outdoor settings and buildings without air conditioning. The relative damages from long-term climate driven changes in these sectors are also projected to vary from region to region. For example, of the impact categories examined in FrEDI, the largest source of modeled damages differ from region to region, with wildfire impacts in the Northwest, air quality impacts on the East Coast and the Southwest, labor productivity impacts in the Midwest, transportation impacts from high tide flooding in the Southern Plains, and damages to rail infrastructure in the Northern Plains. While the FrEDI framework currently quantifies damages for 20 impact categories within the contiguous U.S., it is important to note that it is still a preliminary and partial assessment of climate impacts relevant to U.S. interests in a number of ways. For example, the FrEDI framework reflects some important health damages from U.S. wildfires (*i.e.,* mortality and morbidity impacts from wildfire smoke) and suppression costs, but do not yet account for other market and non-market welfare effects of wildfires (*e.g.,* property damage, impacts to ecosystem services, climate feedback effects from wildfire CO_2 emissions). Similarly, FrEDI models several types of damages from SLR (*e.g.,* traffic delays due to flooded coastal roadways) but do not reflect others, such as the effect of groundwater intrusion, business interruptions, debris removal costs, or critical infrastructure loss. In addition, FrEDI does not reflect increased damages that occur due to climate-mediated effects to ecosystem services, or national security, interactions between different sectors impacted by climate change or all the ways in which physical impacts of climate change occurring abroad have spillover effects in different regions of the U.S. See the FrEDI Technical Documentation [66] for more details.

Some GHGs also have impacts beyond those mediated through climate change. For example, elevated concentrations of CO_2 stimulate plant growth (which can be positive in the case of beneficial species, but negative in terms of weeds and invasive species, and can also lead to a reduction in plant micronutrients [67]) and cause ocean acidification. Nitrous oxide depletes the levels of protective stratospheric ozone.[68]

As methane is the primary GHG addressed in this rulemaking, it is relevant to highlight some trends and impacts specific to methane. Concentrations of methane reached 1,912 parts per billion (ppb) in 2022, more than two and a half times the preindustrial concentration of 722 ppb.[69] Moreover, the 2022 concentration was an increase of almost 17 ppb over 2021—the largest annual increase in methane concentrations in the dataset (starting in 1984), continuing a trend of rapid rise since a temporary pause ended in 2007.[70] Methane has a high radiative efficiency—almost 30 times that of CO_2 per ppb (and, therefore, 80 times as much per unit mass).[71] In addition, methane contributes to climate change through chemical reactions in the atmosphere that produce tropospheric ozone and stratospheric water vapor. Human emissions of methane are responsible for about one-third of the warming due to well-mixed GHGs, the second most important human warming agent after CO_2.[72] Because of the substantial emissions of methane, and its radiative efficiency, methane mitigation is one of the best opportunities for reducing near-term warming.

The tropospheric ozone produced by the reaction of methane in the atmosphere has harmful effects for human health and plant growth in addition to its climate effects.[73] In remote areas, methane is an important precursor to tropospheric ozone formation.[74] Approximately 50 percent of the global annual mean ozone increase since preindustrial times is believed to be due to anthropogenic methane.[75] Projections of future

[64] EPA (2021). *Technical Documentation on the Framework for Evaluating Damages and Impacts (FrEDI).* U.S. Environmental Protection Agency, EPA 430–R–21–004, available at *https://www.epa.gov/cira/fredi.* Documentation has been subject to both a public review comment period and an independent expert peer review, following EPA peer-review guidelines.

[65] (1) Sarofim, M.C., Martinich, J., Neumann, J.E., *et al.* (2021). *A temperature binning approach for multi-sector climate impact analysis.* Climatic Change 165. *https://doi.org/10.1007/s10584-021-03048-6,* (2) *Supplementary Material for the Regulatory Impact Analysis for the Supplemental Proposed Rulemaking, ''Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review,''* Docket ID No. EPA–HQ–OAR–2021–0317, September 2022, (3) *The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050.* Published by the U.S. Department of State and the U.S. Executive Office of the President, Washington DC. November 2021, (4) *Climate Risk Exposure: An Assessment of the Federal Government's Financial Risks to Climate Change,* White Paper, Office of Management and Budget, April 2022.

[66] EPA (2021). Technical Documentation on the Framework for Evaluating Damages and Impacts (FrEDI). U.S. Environmental Protection Agency, EPA 430–R–21–004, available at *https://www.epa.gov/cira/fredi.*

[67] Ziska, L., A. Crimmins, A. Auclair, S. DeGrasse, J.F. Garofalo, A.S. Khan, I. Loladze, A.A. Pérez de León, A. Showler, J. Thurston, and I. Walls, 2016: Ch. 7: *Food Safety, Nutrition, and Distribution. The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment.* U.S. Global Change Research Program, Washington, DC, 189–216. *https://health2016.globalchange.gov/low/ClimateHealth2016_07_Food_small.pdf.*

[68] WMO (World Meteorological Organization), *Scientific Assessment of Ozone Depletion: 2018, Global Ozone Research and Monitoring Project—*Report No. 58, 588 pp., Geneva, Switzerland, 2018.

[69] Blunden, *et al.,* 2022.

[70] NOAA, *https://gml.noaa.gov/webdata/ccgg/trends/ch4/ch4_annmean_gl.txt,* accessed August 3, 2023.

[71] IPCC, 2021.

[72] IPCC, 2021.

[73] Nolte, C.G., P.D. Dolwick, N. Fann, L.W. Horowitz, V. Naik, R.W. Pinder, T.L. Spero, D.A. Winner, and L.H. Ziska, 2018: *Air Quality. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment,* Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 512–538. doi:10.7930/NCA4. 2018. CH13.

[74] U.S. EPA. 2013. ''*Integrated Science Assessment for Ozone and Related Photochemical Oxidants (Final Report).*'' EPA/600–R–10–076F. National Center for Environmental Assessment—RTP Division. Available at *https://www.epa.gov/ncea/isa/.*

[75] Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth*

emissions also indicate that methane is likely to be a key contributor to ozone concentrations in the future.[76] Unlike NO_X and VOC, which affect ozone concentrations regionally and at hourly time scales, methane emissions affect ozone concentrations globally and on decadal time scales given methane's long atmospheric lifetime when compared to these other ozone precursors.[77] Reducing methane emissions, therefore, will contribute to efforts to reduce global background ozone concentrations that contribute to the incidence of ozone-related health effects.[78] The benefits of such reductions are global and occur in both urban and rural areas.

These scientific assessments, the EPA analyses, and documented observed changes in the climate of the planet and of the U.S. present clear support regarding the current and future dangers of climate change and the importance of GHG emissions mitigation.

2. VOCs

Many VOCs can be classified as HAP (*e.g.,* benzene [79]) and can lead to a variety of health concerns such as cancer and noncancer illnesses (*e.g.,* respiratory, neurological). Further, VOCs are one of the key precursors in the formation of ozone. Tropospheric, or ground-level, ozone is formed through reactions of VOCs and NO_X in the presence of sunlight. Ozone formation can be controlled to some extent through reductions in emissions of the ozone precursors VOC and NO_X. Recent observational and modeling studies have found that VOC emissions from oil and natural gas operations can impact ozone levels.[80] [81] [82] [83] A significantly expanded body of scientific evidence shows that ozone can cause a number of harmful effects on health and the environment. Exposure to ozone can cause respiratory system effects such as difficulty breathing and airway inflammation. For people with lung diseases such as asthma and chronic obstructive pulmonary disease (COPD), these effects can lead to emergency room visits and hospital admissions. Studies have also found that ozone exposure is likely to cause premature death from lung or heart diseases. In addition, evidence indicates that long-term exposure to ozone is likely to result in harmful respiratory effects, including respiratory symptoms and the development of asthma. People most at risk from breathing air containing ozone include: children; people with asthma and other respiratory diseases; older adults; and people who are active outdoors, especially outdoor workers. An estimated 25.9 million people have asthma in the U.S., including almost 7.1 million children. Asthma disproportionately affects children, families with lower incomes, and minorities, including Puerto Ricans, Native Americans/Alaska Natives, and African Americans.[84]

In the EPA's 2020 Integrated Science Assessment (ISA) for Ozone and Related Photochemical Oxidants,[85] the EPA estimated the incidence of air pollution effects for those health endpoints above where the ISA classified as either causal or likely-to-be-causal. In brief, the ISA for ozone found short-term (less than one month) exposures to ozone to be causally related to respiratory effects, a ''likely to be causal'' relationship with metabolic effects and a ''suggestive of, but not sufficient to infer, a causal relationship'' for central nervous system effects, cardiovascular effects, and total mortality. The ISA reported that long-term exposures (one month or longer) to ozone are ''likely to be causal'' for respiratory effects including respiratory mortality, and a ''suggestive of, but not sufficient to infer, a causal relationship'' for cardiovascular effects, reproductive effects, central nervous system effects, metabolic effects, and total mortality. An example of quantified incidence of ozone health effects can be found in the Regulatory Impact Analysis for the Final Revised Cross-State Air Pollution Rule (CSAPR) Update.[86]

Scientific evidence also shows that repeated exposure to ozone can reduce growth and have other harmful effects on sensitive plants and trees. These types of effects have the potential to impact ecosystems and the benefits they provide.

3. SO_2

Current scientific evidence links short-term exposures to SO_2, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates (*e.g.,* while exercising or playing).

Studies also show an association between short-term exposure and increased visits to emergency departments and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly, and asthmatics.

SO_2 in the air can also damage the leaves of plants, decrease their ability to produce food (photosynthesis), and decrease their growth. In addition to directly affecting plants, SO_2, when deposited on land and in estuaries, lakes, and streams, can acidify sensitive ecosystems resulting in a range of harmful indirect effects on plants, soils, water quality, and fish and wildlife (*e.g.,* changes in biodiversity and loss of habitat, reduced tree growth, loss of fish species). Sulfur deposition to waterways also plays a causal role in the methylation of mercury.[87]

B. Profile of the Oil and Natural Gas Industry and Its Emissions

This section of the preamble generally describes: the structure of the oil and natural gas industry; the interconnected production, processing, transmission and storage, and distribution segments that move product from well to market; and types of emissions sources in each segment and the industry's emissions.

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. Pg. 680.

[76] *Ibid.*

[77] *Ibid.*

[78] USGCRP, 2018.

[79] Benzene Integrated Risk Information System (IRIS) Assessment: *https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=276.*

[80] Benedict, K. B., Zhou, Y., Sive, B. C., Prenni, A. J., Gebhart, K. A., Fischer, E. V., . . . & Collett Jr, J. L. 2019. Volatile organic compounds and ozone in Rocky Mountain National Park during FRAPPE. *Atmospheric Chemistry and Physics, 19*(1), 499–521.

[81] Lindaas, J., Farmer, D. K., Pollack, I. B., Abeleira, A., Flocke, F., & Fischer, E. V. 2019. Acyl peroxy nitrates link oil and natural gas emissions to high ozone abundances in the Colorado Front Range during summer 2015. *Journal of Geophysical Research: Atmospheres, 124*(4), 2336–2350.

[82] McDuffie, E. E., Edwards, P. M., Gilman, J. B., Lerner, B. M., Dubé, W. P., Trainer, M., . . . & Brown, S. S. 2016. Influence of oil and gas emissions on summertime ozone in the Colorado Northern Front Range. *Journal of Geophysical Research: Atmospheres, 121*(14), 8712–8729.

[83] Tzompa-Sosa, Z. A., & Fischer, E. V. 2021. Impacts of emissions of C2-C5 alkanes from the US oil and gas sector on ozone and other secondary species. *Journal of Geophysical Research: Atmospheres, 126*(1), e2019JD031935.

[84] National Health Interview Survey (NHIS) Data, 2011. *https://www.cdc.gov/asthma/nhis/2011/data.htm.*

[85] Integrated Science Assessment (ISA) for Ozone and Related Photochemical Oxidants (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R–20/012, 2020.

[86] U.S. EPA. *Technical Support Document (TSD) for the Final Revised Cross-State Air Pollution Rule Update for the 2008 Ozone Season NAAQS Estimating PM 2.5-and Ozone-Attributable Health Benefits.* 2021. Research Triangle Park, NC.

[87] U.S. EPA. *Integrated Science Assessment (ISA) for Oxides of Nitrogen and Sulfur Ecological Criteria* (2008 Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R–08/082F, 2008.

1. Structure of the Oil and Natural Gas Industry

The EPA characterizes the oil and natural gas industry's operations as being generally composed of four segments: (1) Extraction and production of crude oil and natural gas (''oil and natural gas production''), (2) natural gas processing, (3) natural gas transmission and storage, and (4) natural gas distribution.[88] [89] The EPA regulates oil refineries as a separate source category; accordingly, as with the previous oil and gas NSPS rulemakings, for purposes of this rulemaking, the EPA's focus for crude oil is on operations from the well to the point of custody transfer at a petroleum refinery while the focus for natural gas is on all operations from the well to the local distribution company custody transfer station, commonly referred to as the ''city-gate.'' [90]

a. Production Segment

The oil and natural gas production segment includes the wells and all related processes used in the extraction, production, recovery, lifting, stabilization, and separation or treatment of oil and/or natural gas (including condensate). Although many wells produce a combination of oil and natural gas, wells can generally be grouped into two categories: oil wells and natural gas wells. Oil wells comprise two types, oil wells that produce crude oil only and oil wells that produce both crude oil and natural gas (commonly referred to as ''associated'' gas). Production equipment and components located on the well pad may include, but are not limited to: wells and related casing heads; tubing heads; ''Christmas tree'' piping, pumps, and compressors; heater treaters; separators; storage vessels; process controllers; pumps; and dehydrators. Production operations include well drilling, completion, and recompletion processes, including all the portable non-self-propelled apparatuses associated with those operations.

Other sites that are part of the production segment include ''centralized tank batteries,'' stand-alone sites where oil, condensate, produced water, and natural gas from several wells may be separated, stored, or treated. The production segment also includes gathering pipelines, gathering and boosting compressor stations, and related components that collect and transport the oil, natural gas, and other materials and wastes from the wells to the refineries or natural gas processing plants.

Crude oil and natural gas undergo successive, separate processing. Crude oil is separated from water and other impurities and transported to a refinery via truck, railcar, or pipeline. As noted above, the EPA treats oil refineries as a separate source category; accordingly, for present purposes, the oil component of the production segment ends at the point of custody transfer at the refinery.[91]

The separated, unprocessed natural gas is commonly referred to as field gas and is composed of methane, natural gas liquids (NGL), and other impurities such as water vapor, H_2S, CO_2, helium, and nitrogen. Ethane, propane, butane, isobutane, and pentane are all considered NGL and often are sold separately for a variety of different uses. Natural gas with high methane content is referred to as ''dry gas,'' while natural gas with significant amounts of ethane, propane, or butane is referred to as ''wet gas.'' Natural gas is typically sent to gas processing plants in order to separate NGLs for use as feedstock for petrochemical plants, fuel for space heating and cooking, or a component for blending into vehicle fuel.

b. Processing Segment

The natural gas processing segment consists of separating certain hydrocarbons (HC) and fluids from the natural gas to produce ''pipeline quality'' dry natural gas. The degree and location of processing is dependent on factors such as the type of natural gas (*e.g.,* wet or dry gas), market conditions, and company contract specifications. Typically, processing of natural gas begins in the field and continues as the gas is moved from the field through gathering and boosting compressor stations to natural gas processing plants, where the complete processing of natural gas takes place. Natural gas processing operations separate and recover NGL or other non-methane gases and liquids from field gas through one or more of the following processes: oil and condensate separation, water removal, separation of NGL, sulfur and CO_2 removal, fractionation of NGL, and other processes, such as the capture of CO_2 separated from natural gas streams for delivery outside the facility.

c. Transmission and Storage Segment

Once natural gas processing is complete, the resulting natural gas exits the natural gas process plant and enters the transmission and storage segment where it is transmitted to storage and/or distribution to the end user.

Pipelines in the natural gas transmission and storage segment can be interstate pipelines, which carry natural gas across state boundaries, or intrastate pipelines, which transport the gas within a single state. Basic components of the two types of pipelines are the same, though interstate pipelines may be of a larger diameter and operated at a higher pressure. To ensure that the natural gas continues to flow through the pipeline, the natural gas must periodically be compressed, thereby increasing its pressure. Compressor stations perform this function and are usually placed at 40- to 100-mile intervals along the pipeline. At a compressor station, the natural gas enters the station, where it is compressed by reciprocating or centrifugal compressors.

Another part of the transmission and storage segment are aboveground and underground natural gas storage facilities. Storage facilities hold natural gas for use during peak seasons. The main difference between underground and aboveground storage sites is that storage takes place in storage vessels constructed of non-earthen materials in aboveground storage. Underground storage of natural gas typically occurs in depleted natural gas or oil reservoirs and salt dome caverns. One purpose of this storage is for load balancing (equalizing the receipt and delivery of natural gas). At an underground storage site, typically other processes occur, including compression, dehydration, and flow measurement.

d. Distribution Segment

The distribution segment provides the final step in delivering natural gas to customers.[92] The natural gas enters the distribution segment from delivery points located along interstate and

[88] The EPA previously described an overview of the sector in section 2.0 of the 2011 Background TSD to 40 CFR part 60, subpart OOOO, located at Document ID No. EPA–HQ–OAR–2010–0505–0045, and section 2.0 of the 2016 Background TSD to 40 CFR part 60, subpart OOOOa, located at Document ID No. EPA–HQ–OAR–2010–0505–7631.

[89] While generally oil and natural gas production includes both onshore and offshore operations, 40 CFR part 60, subpart OOOOa, addresses onshore operations.

[90] For regulatory purposes, the EPA defines the Crude Oil and Natural Gas source category to mean (1) crude oil production, which includes the well and extends to the point of custody transfer to the crude oil transmission pipeline or any other forms of transportation; and (2) natural gas production, processing, transmission, and storage, which include the well and extend to, but do not include, the local distribution company custody transfer station. The distribution segment is not part of the defined source category.

[91] See 40 CFR part 60, subparts J and Ja, and 40 CFR part 63, subparts CC and UUU.

[92] The distribution segment is not included in the definition of the Crude Oil and Natural Gas source category in NSPS OOOO, NSPS OOOOa, NSPS OOOOb, or EG OOOOc.

intrastate transmission pipelines to business and household customers. The delivery point where the natural gas leaves the transmission and storage segment and enters the distribution segment is a local distribution company's custody transfer station, commonly referred to as the ''city-gate.'' Natural gas distribution systems consist of over 2 million miles of piping, including mains and service pipelines to the customers. If the distribution network is large, compressor stations may be necessary to maintain flow. However, these stations are typically smaller than transmission compressor stations. Distribution systems include metering stations and regulating stations, which allow distribution companies to monitor the natural gas as it flows through the system.

2. Emissions From the Oil and Natural Gas Source Category

The oil and natural gas industry sector is the largest source of industrial methane emissions in the U.S.[93] Natural gas is composed primarily of methane; every natural gas leak or intentional release through venting or other industrial processes constitutes a release of methane. Methane is a potent GHG; over a 100-year timeframe, it is nearly 30 times more powerful at trapping climate warming heat than CO_2, and over a 20-year timeframe, it is 83 times more powerful.[94] Because methane is a powerful GHG and is emitted in large quantities, reductions in methane emissions provide a significant benefit in reducing near-term warming. Indeed, one-third of the warming due to GHGs that we are experiencing today is due to human-caused emissions of methane. Additionally, the Crude Oil and Natural Gas sector emits, in varying concentrations and amounts, a wide range of other health-harming pollutants, including VOCs, SO_2, NO_X, H_2S, CS_2, and COS. The year 2016 modeling platform produced by the EPA estimated about 3 million tons of VOC are emitted by oil and gas-related sources.[95]

Emissions of methane and these co-pollutants occur in every segment of the Crude Oil and Natural Gas source category, which comprises the oil and natural gas production, natural gas processing, and natural gas transmission and storage segments of the larger industry. Many of the processes and equipment types that contribute to these emissions are found in every segment of the source category and are highly similar across segments. Emissions from the crude oil portion of the regulated source category result primarily from field production operations, such as venting of associated gas from oil wells, oil storage vessels, and production-related equipment such as gas dehydrators, pig traps, process controllers, and pumps. Emissions from the natural gas portion of the industry can occur in all segments. As natural gas moves through the system, emissions primarily result from intentional venting through normal operations, routine maintenance, unintentional fugitive emissions, flaring, malfunctions, and system upsets. Venting can occur through equipment design or operational practices, such as the continuous bleed and intermittent venting of gas from process controllers (devices that control gas flows, levels, temperatures, and pressures in the equipment). In addition to vented emissions, emissions can occur from leaking equipment (also referred to as fugitive emissions) in all parts of the infrastructure, including major production and processing equipment (*e.g.,* separators or storage vessels) and individual components (*e.g.,* valves or connectors). Flares are commonly used throughout each segment in the oil and natural gas industry as a control device—to provide pressure relief to prevent risk of explosions; to destroy methane, which has a high global warming potential, and convert it to CO_2 which has a lower global warming potential; and to control other air pollutants such as VOC.

''Super-emitting'' events, sites, or equipment, which refer to a small proportion of particularly highly emitting sources that account for a large proportion of overall emissions, can occur throughout the oil and natural gas industry and have been observed in the equipment types and activities covered by this final rulemaking. There are a number of definitions for the term ''super-emitter.'' A 2018 National Academies of Sciences, Engineering, and Medicine report [96] on methane discussed three categories of ''high-emitting'' sources:

- Routine or ''chronic'' high-emitting sources, which regularly emit at higher rates relative to ''peers'' in a sample. Examples include large facilities and large emissions at smaller facilities caused by poor design or operational practices.
- Episodic high-emitting sources, which are typically large in nature and are generally intentional releases from known maintenance events at a facility. Examples include gas well liquids unloading, well workovers and maintenance activities, and compressor station or pipeline blowdowns.
- Malfunctioning high-emitting sources, which can be either intermittent or prolonged in nature and result from malfunctions and poor work practices. Examples include malfunctioning intermittent process controllers and stuck open dump valves. Another example is well blowout events. For example, a 2018 well blowout in Ohio was estimated to have emitted over 60,000 tons of methane.[97]

Super-emitters have been observed at many different scales, from site-level to component-level, across many research studies.[98] Studies will often develop a study-specific definition such as a top percentile of emissions in a study population (*e.g.,* top 10 percent), emissions exceeding a certain threshold (*e.g.,* 26 kg/day), emissions over a certain detection threshold (*e.g.,* 1–3 g/s) or as facilities with the highest proportional emission rate.[99] For certain equipment types and activities, the EPA's GHG emission estimates include the full range of conditions, including ''super-emitters.'' For other situations, where data are available, emissions estimates for abnormal events are

[93] H.R. Rep. No. 117–64, 4 (2021) (Report by the House Committee on Energy and Commerce concerning H.J. Res. 34, to disapprove the 2020 Policy Rule) (House Report).

[94] IPCC, 2021.

[95] *https://www.epa.gov/sites/default/files/2020-11/documents/2016v1_emismod_tsd_508.pdf.*

[96] *https://www.nap.edu/download/24987#.*

[97] Pandey, *et al.* (2019). *Satellite observations reveal extreme methane leakage from a natural gas well blowout.* PNAS December 26, 2019. 116 (52) 26376–81.

[98] See, for example, Brandt, A., Heath, G., Cooley, D. (2016) *Methane Leaks from Natural Gas Systems Follow Extreme Distributions.* Environ. Sci. Technol., doi:10.1021/acs.est.6b04303; Zavala-Araiza, D., Alvarez, R.A., Lyon, D.R., Allen, D.T., Marchese, A.J., Zimmerle, D.J., & Hamburg, S.P. (2017). *Super-emitters in natural gas infrastructure are caused by abnormal process conditions. Nature communications,* 8, 14012; Mitchell, A., *et al.* (2015), *Measurements of Methane Emissions from Natural Gas Gathering Facilities and Processing Plants: Measurement Results.* Environmental Science & Technology, 49(5), 3219–3227; Allen, D., *et al.* (2014), *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Pneumatic Controllers.* Environmental Science & Technology.

[99] Caulton, *et al.* (2019). *Importance of Super-emitter Natural Gas Well Pads in the Marcellus Shale.* Environ. Sci. Technol. 2019, 53, 4747–4754; Zavala-Araiza, D., Alvarez, R., Lyon, D, *et al.* (2016). *Super-emitters in natural gas infrastructure are caused by abnormal process conditions.* Nat Commun 8, 14012 (2017). *https://www.nature.com/articles/ncomms14012;* Lyon, *et al.* (2016). *Aerial Surveys of Elevated Hydrocarbon Emissions from Oil and Gas Production Sites.* Environ. Sci. Technol. 2016, 50, 4877–4886. *https://pubs.acs.org/doi/10.1021/acs.est.6b00705;* and Zavala-Araiza D, *et al.* (2015). *Toward a functional definition of methane superemitters: Application to natural gas production sites.* Environ. Sci. Technol. 49, 8167–8174. *https://pubs.acs.org/doi/10.1021/acs.est.5b00133.*

calculated separately and included in the Inventory of U.S. Greenhouse Gas Emissions and Sinks (GHGI) (*e.g.,* Aliso Canyon leak event).[100] Given the variability of practices and technologies across oil and gas systems and the occurrence of episodic events, it is possible that the EPA's estimates do not include all methane emissions from abnormal events. The EPA continues to engage with the research community and expert stakeholders to review new data from the EPA's Greenhouse Gas Reporting Program (GHGRP) petroleum and natural gas systems source category (40 CFR part 98, subpart W, also referred to as ''GHGRP subpart W''), as well as the peer-reviewed scientific literature and research studies to assess how emissions estimates can be improved. Because lost gas, whether through fugitive emissions, unintentional gas carry-through, or intentional releases, represents lost earning potential, the industry benefits from capturing and selling emissions of natural gas (and methane). Limiting super-emitters through actions included in this rulemaking such as reducing fugitive emissions, using lower emitting equipment where feasible, and employing best management practices will not only reduce emissions but reduce the loss of revenue from this valuable commodity.

Below we provide estimated emissions of methane, VOC, and SO_2 from oil and natural gas industry operation sources.

a. Methane Emissions in the U.S. and From the Oil and Natural Gas Industry

Official U.S. estimates of national-level GHG emissions and sinks are developed by the EPA for the GHGI in fulfillment of commitments under the United Nations Framework Convention on Climate Change. The GHGI, which includes recent trends, is organized by industrial sector. The oil and natural gas production, natural gas processing, and natural gas transmission and storage sectors emit 28 percent of U.S. anthropogenic methane. Table 7 presents total U.S. anthropogenic methane emissions for the years 1990, 2010, and 2021.

In accordance with the practice of the EPA GHGI, the EPA GHGRP, and international reporting standards under the U.N. Framework Convention on Climate Change, the 2007 IPCC Fourth Assessment Report value of the methane 100-year GWP is used for weighting emissions in the following tables. The 100-year GWP value of 28 for methane indicates that 1 ton of methane has approximately as much climate impact over a 100-year period as 28 tons of CO_2. The most recent IPCC AR6 assessment has calculated updated 100-year GWPs for methane of either 27.2 or 29.8 depending on whether the value includes the CO_2 produced by the oxidation of methane in the atmosphere. As mentioned earlier, because methane has a shorter lifetime than CO_2, the emissions of a ton of methane will have more impact earlier in the 100-year timespan and less impact later in the 100-year timespan relative to the emissions of a 100-year GWP-equivalent quantity of CO_2: when using the AR6 20-year GWP of 81, which only looks at impacts over the next 20 years, the total U.S. emissions of methane in 2021 would be equivalent to about 2,140 MMT CO_2.

TABLE 7—U.S. METHANE EMISSIONS BY SECTOR

[Million metric tons carbon dioxide equivalent (MMT CO_2 Eq.)]

Sector	1990	2010	2021
Oil and Natural Gas Production, and Natural Gas Processing and Transmission and Storage	206	224	202
Landfills	198	139	123
Enteric Fermentation	183	191	195
Coal Mining	108	92	45
Manure Management	39	59	66
Other Oil and Gas Sources	68	37	38
Wastewater Treatment	23	22	21
Other Methane Sources[101]	44	44	38
Total Methane Emissions	869	808	727

Emissions from the Inventory of United States Greenhouse Gas Emissions and Sinks: 1990–2021 (published April 13, 2023), calculated using GWP of 28. Note: Totals may not sum due to rounding.

Table 8 presents total methane emissions from natural gas production through transmission and storage and petroleum production, for years 1990, 2010, and 2021, in MMT CO_2 Eq. (or million metric tons CO_2 Eq.) of methane.

TABLE 8—U.S. METHANE EMISSIONS FROM NATURAL GAS AND PETROLEUM SYSTEMS

[MMT CO_2 Eq.]

Sector	1990	2010	2021
Natural Gas Production	68	121	94
Natural Gas Processing	24	11	14
Natural Gas Transmission and Storage	64	39	45

[100] The EPA's emission estimates in the GHGI are developed with the best data available at the time of their development, including data from the GHGRP in 40 CFR part 98, subpart W, and from recent research studies. GHGRP subpart W emissions data used in the GHGI are quantified by reporters using direct measurements, engineering calculations, or emission factors, as specified by the regulation. The EPA has a multi-step data verification process for GHGRP subpart W data, including automatic checks during data entry, statistical analyses on completed reports, and staff review of the reported data. Based on the results of the verification process, the EPA follows up with facilities to resolve mistakes that may have occurred.

[101] Other sources include rice cultivation, stationary combustion, abandoned coal mines, mobile combustion, composting, and several sources emitting less than 1 MMT CO_2 Eq. in 2021.

TABLE 8—U.S. METHANE EMISSIONS FROM NATURAL GAS AND PETROLEUM SYSTEMS—Continued

[MMT CO_2 Eq.]

Sector	1990	2010	2021
Petroleum Production	50	54	49

Emissions from the Inventory of United States Greenhouse Gas Emissions and Sinks: 1990–2021 (published April 13, 2023), calculated using GWP of 28. Note: Totals may not sum due to rounding.

b. Global GHG Emissions

For additional background information and context, we used 2018 World Resources Institute Climate Watch data to make comparisons between U.S. oil and natural gas production and natural gas processing and transmission and storage emissions and the emissions inventories of entire countries and regions.[102] The U.S. methane emissions from oil and natural gas production and natural gas processing and transmission and storage constitute 0.4 percent of total global emissions of all GHGs (48,600 MMT CO_2 Eq.) from all sources.[103] Ranking U.S. emissions of methane from oil and natural gas production and natural gas processing and transmission and storage against total GHG emissions for entire countries (using 2021 Climate Watch data) shows that these emissions are comparatively large as they exceed the national-level emissions totals for all GHGs and all anthropogenic sources for Colombia, the Czech Republic, Chile, Belgium, and over 164 other countries. This means that the U.S. emits more of a single GHG—methane—from a single sector—the oil and natural gas sector—than the total combined GHGs emitted by 168 countries. Furthermore, U.S. emissions of methane from oil and natural gas production and natural gas processing and transmission and storage are greater than the sum of total emissions of 63 of the lowest-emitting countries and territories using the 2021 Climate Watch data set.

As illustrated by the domestic and global GHGs comparison data summarized above, the collective GHG emissions from the Crude Oil and Natural Gas source category are significant, whether the comparison is domestic (where this sector is the largest source of methane emissions, accounting for 28 percent of U.S. methane and 3 percent of total U.S. emissions of all GHGs), global (where this sector, accounting for 0.4 percent of all global GHG emissions, emits more than the total national emissions of over 160 countries, and combined emissions of over 60 countries), or when both the domestic and global GHG emissions comparisons are viewed in combination. Consideration of the global context is important. GHG emissions from U.S. oil and natural gas production and natural gas processing and transmission and storage will become globally well-mixed in the atmosphere and thus will have an effect on both the U.S. regional and global climate for years and indeed many decades to come. No single GHG source category dominates on the global scale. While the Crude Oil and Natural Gas source category, like many (if not all) individual GHG source categories, could appear small in comparison to total emissions, in fact, it is a very important contributor both in terms of absolute emissions and in comparison to other source categories globally or within the U.S.

The IPCC AR6 assessment determined that ''[f]rom a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO_2 emissions, reaching at least net zero CO_2 emissions, along with strong reductions in other GHG emissions.'' The report also singled out the importance of ''strong and sustained methane emission reductions'' in part due to the short lifetime of methane leading to the near-term cooling from reductions in methane emissions, which can offset the warming that will result due to reductions in emissions of cooling aerosols such as SO_2. Therefore, reducing methane emissions globally is an important facet in any strategy to limit warming. In the oil and gas sector, methane reductions are highly achievable and cost-effective using existing and well-known solutions and technologies that actually result in recovery of saleable product.

c. VOC and SO_2 Emissions in the U.S. and From the Oil and Natural Gas Industry

Official U.S. estimates of national-level VOC and SO_2 emissions are developed by the EPA for the National Emissions Inventory (NEI), for which states are required to submit information under 40 CFR part 51, subpart A. Data in the NEI may be organized by various data categories, including sector, NAICS code, and Source Classification Code. Tables 9 and 10 below present total U.S. VOC and SO_2 emissions by sector, respectively, for the year 2020, in kilotons (kt) (or thousand metric tons). The oil and natural gas sector represents the top anthropogenic U.S. sector for VOC emissions after removing the biogenics and wildfire sectors in table 9 (about 23 percent of the total VOC emitting by anthropogenic sources). About 10 percent of the total U.S. anthropogenic SO_2 comes from the oil and natural gas sector.

TABLE 9—U.S. VOC EMISSIONS BY SECTOR

[kt]

Sector	2020 NEI
Biogenics—Vegetation and Soil	29,519
Fires—Wildfires	4,623
Oil and Natural Gas Production, and Natural Gas Processing and Transmission	2,761
Solvent—Consumer and Commercial Solvent Use	1,936
Fires—Prescribed Fires	1,936

[102] The Climate Watch figures presented here come from the PIK dataset included on Climate Watch. The PIK dataset combines the United Nations Framework Convention on Climate Change (UNFCCC) reported data where available and fills gaps with other sources. It does not include land use change and forestry but covers all other sectors. *https://www.climatewatchdata.org/ghg-emissions?end_year=2018&source=PIK&start_year=1990*. The PIK data set uses AR4 GWPs. For the comparisons presented here, the AR4 GWPs were applied to the U.S. oil and gas methane values.

TABLE 9—U.S. VOC EMISSIONS BY SECTOR—Continued

[kt]

Sector	2020 NEI
Mobile—Non-Road Equipment—Gasoline	935
Mobile—On-Road non-Diesel Light Duty Vehicles	835
Other VOC Sources	3,642
Total VOC Emissions	46,188

Emissions from the 2020 NEI (released March 2023). Note: Totals may not sum due to rounding.

TABLE 10—U.S. SO_2 EMISSIONS BY SECTOR

[kt]

Sector	2020 NEI
Fuel Combustion—Electric Generation—Coal	771
Industrial Processes—Not Elsewhere Classified	230
Oil and Natural Gas Production and Natural Gas Processing and Transmission	165
Fires—Wildfires	141
Fuel Combustion—Industrial Boilers, Internal Combustion Engines—Coal	115
Industrial Processes—Chemical Manufacturing	91
Other SO_2 Sources	313
Total SO_2 Emissions	1,827

Emissions from the 2020 NEI (released March 2023). Note: Totals may not sum due to rounding.

Table 11 presents total VOC and SO_2 emissions from oil and natural gas production through transmission and storage, for the year 2020, in kt. The contribution to the total anthropogenic VOC emissions budget from the oil and gas sector has been increasing in recent NEI cycles. In the 2020 NEI, the oil and gas sector makes up about 23 percent of the total VOC emissions from anthropogenic sources. The SO_2 emissions have been declining in almost every anthropogenic sector, but the oil and gas sector is an exception where SO_2 emissions have been increasing in recent years.

TABLE 11—U.S. VOC AND SO_2 EMISSIONS FROM NATURAL GAS AND PETROLEUM SYSTEMS

[kt]

Sector	VOC	SO_2
Oil and Natural Gas Production	2,729	160
Natural Gas Processing	8	3
Natural Gas Transmission and Storage	24	2

Emissions from the 2020 NEI, (published March 2023), in kt (or thousand metric tons). Note: Totals may not sum due to rounding.

IV. Statutory Background and Regulatory History

A. Statutory Background of CAA Sections 111(b), 111(d), and General Implementing Regulations

The EPA's authority for this rulemaking is CAA section 111, which governs the establishment of standards of performance for stationary sources. This CAA section requires the EPA to list source categories to be regulated, establish standards of performance for air pollutants emitted by new sources in that source category, and establish EG for states to establish standards of performance for certain pollutants emitted by existing sources in that source category.

Specifically, CAA section 111(b)(1)(A) requires that a source category be included on the list for regulation if, ''in [the EPA Administrator's] judgment it causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.'' This determination is commonly referred to as an ''endangerment finding'' and that phrase encompasses both the ''causes or contributes significantly to'' component and the ''endanger public health or welfare'' component of the determination. Once a source category is listed, CAA section 111(b)(1)(B) requires that the EPA propose and then promulgate ''standards of performance'' for new sources in such source category. CAA section 111(a)(1) defines a ''standard of performance'' as ''a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.'' As long recognized by the D.C. Circuit, ''[b]ecause Congress did not assign the specific weight the Administrator should accord each of these factors, the Administrator is free to exercise his discretion in this area.'' *New York* v. *Reilly,* 969 F.2d 1147, 1150 (D.C. Cir. 1992). *See also Lignite Energy Council* v. *EPA,* 198 F.3d 930, 933 (D.C. Cir. 1999) (''*Lignite Energy Council*'') (''Because section 111 does not set forth the weight that be [sic] should assigned to each of these factors, we have granted the Agency a great degree of discretion in balancing them'').

In determining whether a given system of emission reduction qualifies as ''the best system of emission reduction . . . adequately demonstrated,'' or ''BSER,'' CAA section 111(a)(1) requires that the EPA take into account, among other factors, ''the cost of achieving such reduction.'' As described in the proposal [104] for the 2016 Rule and in the November 2021 Proposal for this rulemaking,[105] the U.S. Court of Appeals for the District of Columbia Circuit (the D.C. Circuit) has stated that in light of this provision, the EPA may not adopt a standard the cost of which would be ''exorbitant,'' [106] ''greater than the industry could bear and survive,'' [107] ''excessive,'' [108] or ''unreasonable.'' [109] These formulations appear to be synonymous, and for convenience, in this rulemaking, as in previous rulemakings, we will refer to this standard as reasonableness, so that a control technology may be considered the ''best system of emission reduction . . . adequately demonstrated'' if its costs are reasonable, but cannot be considered the BSER if its costs are unreasonable. See 80 FR 64662, 64720–21 (October 23, 2015).

CAA section 111(a) does not provide specific direction regarding what metric or metrics to use in considering costs, affording the EPA considerable discretion in choosing a means of cost consideration.[110] In this rulemaking, we evaluated whether a control cost is reasonable under a number of approaches that we find appropriate for assessing the types of controls at issue. For example, we evaluated costs at a sector level by assessing the projected new capital expenditures required under the final rulemaking (compared to overall new capital expenditures by the sector) and the projected compliance costs (compared to overall annual revenue for the sector) if the rule were to require such controls. In evaluating controls for reducing VOC and methane emissions from new sources, we also considered a control's cost effectiveness under both a ''single-pollutant cost effectiveness'' approach and a ''multipollutant cost effectiveness'' approach, in order to appropriately take into account that the systems of emission reduction considered in this rule typically achieve reductions in multiple pollutants at once and secure a multiplicity of climate and public health benefits.[111] For a detailed discussion of these cost approaches, please see section VIII.B of the preamble as well as the November 2021 Proposal and the December 2022 Supplemental Proposal.

Under CAA section 111(a)(1), an essential, although not sufficient, condition for a ''system of emission reduction'' to serve as the basis for an ''achievable'' emission limitation is that the Administrator must determine that the system is ''adequately demonstrated.'' This means, according to the D.C. Circuit, that the system is ''one which has been shown to be reasonably reliable, reasonably efficient, and which can reasonably be expected to serve the interests of pollution control without becoming exorbitantly costly in an economic or environmental way.'' [112] It does not mean that the system ''must be in actual routine use somewhere,'' [113] though the technologies relied upon in this final rulemaking are. Similarly, the EPA may ''hold the industry to a standard of improved design and operational advances, so long as there is substantial evidence that such improvements are feasible.'' [114] Ultimately, the analysis ''is partially dependent on 'lead time,'" that is, ''the time in which the technology will have to be available.'' [115] The caselaw is clear that the EPA may treat a set of control measures as ''adequately demonstrated'' regardless of whether the measures are in widespread commercial use. For example, the D.C. Circuit upheld the EPA's determination that selective catalytic reduction (SCR) was adequately demonstrated to reduce NO_X emissions from coal-fired industrial boilers, even though it was a ''new technology.'' The court explained that ''section 111 'looks toward what may fairly be projected for the regulated future, rather than the state of the art at present.' '' [116] The court added that the EPA may determine that control measures are ''adequately demonstrated'' through a ''reasonable extrapolation of [the control measures'] performance in other industries.'' [117]

As defined in CAA section 111(a), the ''standard of performance'' that the EPA develops, based on the BSER, is expressed as a performance level (typically, a rate-based standard). CAA section 111(b)(5) precludes the EPA from prescribing a particular technological system that must be used to comply with a standard of performance. Rather, sources can select any measure or combination of measures that will achieve the standard.

CAA section 111(h)(1) authorizes the Administrator to promulgate ''a design, equipment, work practice, or operational standard, or combination thereof'' if in his or her judgment, ''it is not feasible to prescribe or enforce a standard of performance.'' CAA section 111(h)(2) provides the circumstances under which prescribing or enforcing a standard of performance is ''not feasible,'' such as when the pollutant cannot be emitted through a conveyance designed to emit or capture the pollutant, or when there is no practicable measurement methodology for the particular class of sources.[118] CAA section 111(b)(1)(B) requires the EPA to ''at least every 8 years review and, if appropriate, revise'' performance standards unless the ''Administrator determines that such review is not appropriate in light of readily available information on the efficacy'' of the standard.

As mentioned above, once the EPA lists a source category under CAA section 111(b)(1)(A), CAA section 111(b)(1)(B) provides the EPA discretion to determine the pollutants and sources to be regulated. In addition, concurrent

[104] 80 FR 56593, 56616 (September 18, 2015).

[105] 86 FR 63154 (December 6, 2022).

[106] *Lignite Energy Council,* 198 F.3d at 933.

[107] *Portland Cement Ass'n* v. *EPA,* 513 F.2d 506, 508 (D.C. Cir. 1975).

[108] *Sierra Club* v. *Costle,* 657 F.2d 298, 343 (D.C. Cir. 1981).

[109] *Id.*

[110] *See, e.g., Husqvarna AB* v. *EPA,* 254 F.3d 195, 200 (D.C. Cir. 2001) (where CAA section 213 does not mandate a specific method of cost analysis, the EPA may make a reasoned choice as to how to analyze costs).

[111] We believe that both the single and multipollutant approaches are appropriate for assessing the reasonableness of the multipollutant controls considered in this action. The EPA has considered similar approaches in the past when considering multiple pollutants that are controlled by a given control option. See, *e.g.,* 80 FR 56616–17; 73 FR 64079–83; and EPA Document ID Nos. EPA–HQ–OAR–2004–0022–0622, –0447, –0448.

[112] *Essex Chem. Corp.* v. *Ruckelshaus,* 486 F.2d 427, 433 (D.C. Cir. 1973), *cert. denied,* 416 U.S. 969 (1974).

[113] *Portland Cement Ass'n* v. *Ruckelshaus,* 486 F.2d 375, 391 (D.C. Cir. 1973) (citations omitted) (''The Administrator may make a projection based on existing technology, though that projection is subject to the restraints of reasonableness and cannot be based on 'crystal ball' inquiry.''); *ibid.* (discussing the Senate and House bills and reports from which the language in CAA section 111 grew).

[114] *Sierra Club* v. *Costle,* 657 F.2d 298, 364 (D.C. Cir. 1981).

[115] *Portland Cement Ass'n* v. *Ruckelshaus,* 486 F.2d 375, 391 (D.C. Cir. 1973) (citations omitted).

[116] *Lignite Energy Council,* 198 F.3d at 934 (citing *Portland Cement Ass'n* v. *Ruckelshaus,* 486 F.2d 375, 391 (D.C. Cir. 1973)).

[117] *Ibid.*

[118] The EPA notes that design, equipment, work practice, or operational standards established under CAA section 111(h) (commonly referred to as ''work practice standards'') reflect the ''best technological system of continuous emission reduction'' and that this phrasing differs from the ''best system of emission reduction'' phrase in the definition of ''standard of performance'' in CAA section 111(a)(1). Although the differences in these phrases may be meaningful in other contexts, for purposes of evaluating the sources and systems of emission reduction at issue in this rulemaking, the EPA has applied these concepts in an essentially comparable manner because the systems of emission reduction the EPA evaluated are all technological.

with the 8-year review (and though not a mandatory part of the 8-year review), the EPA may examine whether to add standards for pollutants or emission sources not currently regulated for that source category.

Once the EPA establishes NSPS in a particular source category, the EPA is required in certain circumstances to issue EG to reduce emissions from existing sources in that same source category. Specifically, CAA section 111(d) requires that the EPA prescribe regulations to establish procedures under which states submit plans to establish, implement, and enforce standards of performance for existing sources for certain air pollutants to which a Federal NSPS would apply if such existing source were a new source. The EPA addresses this CAA requirement both through its promulgation of general implementing regulations for CAA section 111(d) as well as through specific EG. The EPA first published general implementing regulations in 1975, 40 FR 53340 (November 17, 1975) (codified at 40 CFR part 60, subpart B), and has revised its CAA section 111(d) implementing regulations several times. on the EPA published updated implementing regulations in 2019, 84 FR 32520 (codified at 40 CFR part 60, subpart Ba), which apply to EG promulgated after July 8, 2019, 40 CFR 60.20a(a), including this EG, and which were recently revised.[119] In accordance with CAA section 111(d), states are required to submit plans pursuant to these regulations to establish standards of performance for existing sources for any air pollutant: (1) the emission of which is subject to a Federal NSPS; and (2) which is neither a pollutant regulated under CAA section 108(a) (*i.e.,* criteria pollutants such as ground-level ozone and particulate matter (PM), and their precursors, like VOC) [120] nor a HAP regulated under CAA section 112. See also definition of ''designated pollutant'' in 40 CFR 60.21a(a). The EPA's general implementing regulations use the term ''designated facility'' to identify those existing sources that may be subject to regulation under the provision of CAA section 111(d). See 40 CFR 60.21a(b).

While states are authorized to establish standards of performance for designated facilities, there is a fundamental requirement under CAA section 111(d) that a state's standards of performance in its state plan submittal are no less stringent than the presumptive standard determined by the EPA, which derives from the definition of ''standard of performance'' in CAA section 111(a)(1). The EPA identifies the degree of emission limitation achievable through application of the BSER as part of its EG. See 40 CFR 60.22a(b)(5). While standards of performance must generally reflect the degree of emission limitation achievable through application of the BSER, CAA section 111(d)(1) also requires that the EPA regulations permit the states, in applying a standard of performance to a particular source, to take into account the source's RULOF. States may apply less stringent standards of performance to particular sources based on consideration of such sources' remaining useful life and other factors.

After the EPA issues final EG per the requirements under CAA section 111(d) and under 40 CFR part 60, subpart Ba, states are required to submit to the EPA plans that establish standards of performance for the designated facilities as defined in the EPA's guidelines and that contain other measures to implement and enforce those standards. The EPA's final EG issued under CAA section 111(d) do not impose binding requirements directly on sources but instead provide requirements for states in developing their plans and criteria for assisting the EPA when judging the adequacy of such plans. Under CAA section 111(d), and the EPA's implementing regulations, a state must submit its plan to the EPA for approval; the EPA will evaluate the plan for completeness in accordance with enumerated criteria and then will act on that plan via a rulemaking process to either approve or disapprove the plan in whole or in part. If a state does not submit a plan, or if the EPA does not approve a state's plan because it is not ''satisfactory,'' then the EPA must establish a Federal plan for designated facilities in that state.[121] If the EPA approves a state's plan, the provisions in the state plan become federally enforceable against the designated facility responsible for compliance in the same manner as the provisions of an approved State Implementation Plan (SIP) under CAA section 110. If no designated facility is located within a state, the state must submit to the EPA a letter certifying to that effect in lieu of submitting a state plan. See 40 CFR 60.23a(b).

Designated facilities located in Indian country would not be addressed by a state's CAA section 111(d) plan. Instead, an eligible Tribe that has one or more designated facilities located in its area of Indian country [122] would have the opportunity, but not the obligation, to seek authority and submit a plan that establishes standards of performance for those facilities on its Tribal lands.[123] If a Tribe does not submit a plan, or if the EPA does not approve a Tribe's plan, then the EPA has the authority to establish a Federal plan for the designated facilities located on its Tribal land.[124]

B. What is the regulatory history and litigation background of NSPS and EG for the oil and natural gas industry?

1. 1979 Listing of Source Category

Subsequent to the enactment of the CAA of 1970, the EPA took action to develop standards of performance for new stationary sources as directed by Congress in CAA section 111. By 1977, the EPA had promulgated NSPS for a total of 27 source categories, while NSPS for an additional 25 source categories were then under development.[125] However, in amending the CAA that year, Congress expressed dissatisfaction that the EPA's pace was too slow. Accordingly, the 1977 CAA Amendments included a new subsection (f) in section 111, which specified a schedule for the EPA to list additional source categories under CAA section 111(b)(1)(A) and prioritize them for regulation under CAA section 111(b)(1)(B).

In 1979, as required by CAA section 111(f), the EPA published a list of source categories, which included ''*Crude Oil and Natural Gas Production,*'' for which the EPA would promulgate standards of performance under CAA section 111(b). See ''Priority List and Additions to the List of Categories of Stationary Sources,'' 44 FR 49222 (August 21, 1979) (''1979 Priority List''). That list included, in the order of priority for promulgating standards, source categories that the EPA Administrator had determined, pursuant to CAA section 111(b)(1)(A),

[119] The D.C. Circuit vacated certain timing provisions within subpart Ba. *American Lung Ass'n,* 985 F.3d 914. However, the court did not vacate the applicability provision. Therefore, 40 CFR part 60, subpart Ba, applies to the final EG. On November 17, 2023, the EPA issued final updates to the Agency's ''Implementing Regulations'' under section 111(d) of the Clean Air Act (88 FR 80480). These final amendments address the provisions that were vacated in 2021 and make other updates to the implementing regulations applicable to this EG.

[120] VOC are not listed as CAA section 108(a) pollutants, but they are regulated precursors to photochemical oxidants (*e.g.,* ozone), which is a listed CAA section 108(a) pollutant. Therefore, VOC falls within the CAA 108(a) exclusion. Accordingly, promulgation of NSPS for VOC does not trigger the application of CAA section 111(d).

[121] CAA section 111(d)(2)(A).

[122] The EPA is aware of many oil and natural gas operations located in Indian country.

[123] See 40 CFR part 49, subpart A.

[124] CAA section 111(d)(2)(A).

[125] See 44 FR 49222 (August 21, 1979).

contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. See 44 FR 49223 (August 21, 1979); see also 49 FR 2636–37 (January 20, 1984).

2. 1985 NSPS for VOC and SO_2 Emissions From Natural Gas Processing Plants

On June 24, 1985 (50 FR 26122), the EPA promulgated NSPS for the Crude Oil and Natural Gas source category that addressed VOC emissions from equipment leaks at onshore natural gas processing plants (40 CFR part 60, subpart KKK). On October 1, 1985 (50 FR 40158), the EPA promulgated additional NSPS for the source category to regulate SO_2 emissions from onshore natural gas processing plants (40 CFR part 60, subpart LLL).

3. 2012 NSPS OOOO Rule and Related Amendments

In 2012, pursuant to its duty under CAA section 111(b)(1)(B) to review and, if appropriate, revise the 1985 NSPS, the EPA published the final rule, ''Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution,'' 77 FR 49490 (August 16, 2012) (40 CFR part 60, subpart OOOO) (''2012 NSPS OOOO''). The 2012 rule updated the SO_2 standards for sweetening units and the VOC standards for equipment leaks at onshore natural gas processing plants. In addition, it established VOC standards for several oil and natural gas-related operations emission sources not covered by 40 CFR part 60, subparts KKK and LLL, including natural gas well completions, centrifugal and reciprocating compressors, certain natural gas-driven process controllers in the production and processing segments of the industry, and storage vessels in the production, processing, and transmission and storage segments.

In 2013, 2014, and 2015 the EPA amended the 2012 NSPS OOOO rule in order to address implementation of the standards. ''Oil and Natural Gas Sector: Reconsideration of Certain Provisions of New Source Performance Standards,'' 78 FR 58416 (September 23, 2013) (''2013 NSPS OOOO'') (concerning storage vessel implementation); ''Oil and Natural Gas Sector: Reconsideration of Additional Provisions of New Source Performance Standards,'' 79 FR 79018 (December 31, 2014) (''2014 NSPS OOOO'') (concerning well completion); ''Oil and Natural Gas Sector: Definitions of Low Pressure Gas Well and Storage Vessel,'' 80 FR 48262 (August 12, 2015) (''2015 NSPS OOOO'') (concerning low-pressure gas wells and storage vessels).

The EPA received petitions for both judicial review and administrative reconsiderations for the 2012, 2013, and 2014 NSPS OOOO rules. The EPA denied reconsideration for some issues, see ''Reconsideration of the Oil and Natural Gas Sector: New Source Performance Standards; Final Action,'' 81 FR 52778 (August 10, 2016), and, as noted below, granted reconsideration for other issues. As explained below, all litigation related to NSPS OOOO is currently in abeyance.

4. 2016 NSPS OOOOa Rule and Related Amendments

a. Regulatory Action

On June 3, 2016, the EPA published a final rule titled, ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources; Final Rule,'' at 81 FR 35824 (40 CFR part 60, subpart OOOOa) (''2016 Rule'' or ''2016 NSPS OOOOa'').[126] [127] The 2016 NSPS OOOOa rule established NSPS for sources of GHGs and VOC emissions for certain equipment, processes, and operations across the oil and natural gas industry, including in the transmission and storage segment (81 FR 35832). The EPA explained that the 1979 listing identified the source category broadly enough to include that segment and, in the alternative, if the listing had limited the source category to the production and processing segments, the EPA affirmatively expanded the source category to include the transmission and storage segment on grounds that operations in those segments are a sequence of functions that are interrelated and necessary for getting the recovered gas ready for distribution (81 FR 35832). In addition, because the 2016 rule represented the first time that the EPA had promulgated NSPS for GHG emissions from the Crude Oil and Natural Gas source category, the EPA predicated those NSPS on a determination that it had a rational basis on which to regulate GHG emissions from the source category (81 FR 35843). In response to comments, the EPA explained that it was not required to make an additional pollutant-specific finding that GHG emissions from the source category contribute significantly to dangerous air pollution, but in the alternative, the EPA did make such a finding, relying on the same information that it relied on when determining that it had a rational basis on which to promulgate a GHG NSPS (81 FR 35843).

Specifically, the 2016 NSPS OOOOa addresses the following emission sources:

- Sources that were unregulated under the 2012 NSPS OOOO (hydraulically fractured oil well completions, pneumatic pumps, and fugitive emissions from well sites and compressor stations);
- Sources that were regulated under the 2012 NSPS OOOO for VOC emissions, but not for GHG emissions (hydraulically fractured gas well completions and equipment leaks at natural gas processing plants); and
- Certain equipment that is used across the source category, of which the 2012 NSPS OOOO regulated emissions of VOC from only a subset (process controllers, centrifugal compressors, and reciprocating compressors, with the exception of those compressors located at well sites).

On March 12, 2018 (83 FR 10628), the EPA finalized amendments to certain aspects of the 2016 NSPS OOOOa requirements for the collection of fugitive emissions components at well sites and compressor stations, specifically (1) the requirement that components on a delay of repair must conduct repairs during unscheduled or emergency vent blowdowns, and (2) the monitoring survey requirements for well sites located on the Alaska North Slope.

b. Petitions for Judicial Review and To Reconsider

Following promulgation of the 2016 NSPS OOOOa rule, several states and industry associations challenged the final rule in the D.C. Circuit. The Administrator also received five petitions for reconsideration of several provisions of the final rule. Copies of the petitions are posted in Docket ID No. EPA–HQ–OAR–2010–0505.[128] As noted below, the EPA granted reconsideration as to several issues raised with respect to the 2016 NSPS OOOOa rule and finalized certain modifications discussed in the next section of this document. As explained in the next section, all litigation challenging the

[126] The June 3, 2016, rulemaking also included certain final amendments to 40 CFR part 60, subpart OOOO, to address issues on which the EPA had granted reconsideration.

[127] The EPA review which resulted in the 2016 NSPS OOOOa rule was instigated by a series of directives from then-President Obama targeted at reducing GHGs, including methane: the President's *Climate Action Plan* (June 2013); the President's *Climate Action Plan: Strategy to Reduce Methane Emissions* (''Methane Strategy'') (March 2014); and the President's goal to address, propose and set standards for methane and ozone-forming emissions from new and modified sources in the sector (January 2015, *https://obamawhitehouse.archives.gov/the-press-office/2015/01/14/fact-sheet-Administration-takes-steps-forward-climate-action-plan-anno-1*).

[128] See Document ID Nos. EPA–HQ–OAR–2010–0505–7682, –7683, –7684, –7685, –7686.

2016 NSPS OOOOa rule is currently stayed.

5. 2020 Policy and Technical Rules

a. Regulatory Action

In September 2020, the EPA published two final rules to amend 2012 NSPS OOOO and 2016 NSPS OOOOa. The first is titled, ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review.'' 85 FR 57018 (September 14, 2020). Commonly referred to as the 2020 Policy Rule, it first rescinded the regulations applicable to the transmission and storage segment on the basis that the 1979 listing limited the source category to the production and processing segments and that the transmission and storage segment is not ''sufficiently related'' to the production and processing segments and therefore cannot be part of the same source category (85 FR 57027, 57029). In addition, the 2020 Policy Rule rescinded methane requirements for the industry's production and processing segments on two separate bases. The first was that such standards are redundant to VOC standards for these segments (85 FR 57030). The second was that the rule interpreted CAA section 111 to require, or at least authorize the Administrator to require, a pollutant-specific ''significant contribution finding'' (SCF) as a prerequisite to a NSPS for a pollutant, and to require that such finding be supported by some identified standard or established set of criteria for determining which contributions are ''significant'' (85 FR 57034). The 2020 Policy Rule went on to conclude that the alternative significant-contribution finding that the EPA made in the 2016 Rule for GHG emissions was flawed because it accounted for emissions from the transmission and storage segment and because it was not supported by criteria or a threshold (85 FR 57038).[129]

Published on September 15, 2020, the second of the two rules is titled, ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration.'' Commonly referred to as the 2020 Technical Rule, this second rule made further amendments to the 2016 NSPS OOOOa following the 2020 Policy Rule to eliminate or reduce certain monitoring obligations and to address a range of issues in response to administrative petitions for reconsideration and other technical and implementation issues brought to the EPA's attention since the 2016 NSPS OOOOa rulemaking. Specifically, the 2020 Technical Rule exempted low production well sites from fugitives monitoring (previously required semiannually), required semiannual monitoring at gathering and boosting compressor stations (previously quarterly), streamlined recordkeeping and reporting requirements, allowed compliance with certain equivalent state requirements as an alternative to NSPS fugitive requirements, streamlined the application process to request the use of new technologies to monitor for fugitive emissions, addressed storage tank batteries for applicability determination purposes and finalized several technical corrections. Because the 2020 Technical Rule was issued the day after the EPA's rescission of methane regulations in the 2020 Policy Rule, the amendments made in the 2020 Technical Rule applied only to the requirements to regulate VOC emissions from this source category. The 2020 Policy Rule amended 40 CFR part 60, subparts OOOO and OOOOa, as finalized in 2016. The 2020 Technical Rule amended the 40 CFR part 60, subpart OOOOa, as amended by the 2020 Policy Rule.

b. Petitions To Reconsider

The EPA received three petitions for reconsideration of the 2020 rulemakings. Two of the petitions sought reconsideration of the 2020 Policy Rule. As discussed below, on June 30, 2021, the President signed into law S.J. Res. 14, a joint resolution under the CRA disapproving the 2020 Policy Rule, and as a result, the petitions for reconsideration on the 2020 Policy Rule are now moot. All three petitions sought reconsideration of certain elements of the 2020 Technical Rule.

c. Litigation

Several states and non-governmental organizations (NGOs) challenged the 2020 Policy Rule as well as the 2020 Technical Rule. All petitions for review regarding the 2020 Policy Rule were consolidated into one case in the D.C. Circuit. *State of California, et al.* v. *EPA,* No. 20–1357. On August 25, 2021, after the enactment of the joint resolution of Congress disapproving the 2020 Policy Rule (explained in section VIII of this preamble), the U.S. Court of Appeals for the District of Columbia Circuit (*i.e.,* the court) granted petitioners' motion to voluntarily dismiss their cases. *Id.* ECF Docket #1911437. All petitions for review regarding the 2020 Technical Rule were consolidated into a different case in the D.C. Circuit. *Environmental Defense Fund (EDF), et al.* v. *EPA,* No. 20–1360 (D.C. Cir.). On February 19, 2021, the court issued an order granting a motion by the EPA to hold in abeyance the consolidated litigation over the 2020 Technical Rule pending the EPA's rulemaking actions in response to E.O. 13990 and pending the conclusion of the EPA's potential reconsideration of the 2020 Technical Rule. *Id.* ECF Docket #1886335.

As mentioned above, the EPA received petitions for judicial review regarding the 2012, 2013, and 2014 NSPS OOOO rules as well as the 2016 NSPS OOOOa rule. The challenges to the 2012 NSPS OOOO rule (as amended by the 2013 NSPS OOOO and 2014 NSPS OOOO rules) were consolidated. *American Petroleum Institute* v. *EPA,* No. 13–1108 (D.C. Cir.). The majority of those cases were further consolidated with the consolidated challenges to the 2016 NSPS OOOOa rule. *West Virginia* v. *EPA,* No. 16–1264 (D.C. Cir.), see specifically ECF Docket #1654072. As such, *West Virginia* v. *EPA* includes challenges to the 2012 NSPS OOOO rule (as amended by the 2013 NSPS OOOO and 2014 NSPS OOOO rules) as well as challenges to the 2016 NSPS OOOOa rule.[130] On December 10, 2020, the court granted a joint motion of the parties in *West Virginia* v. *EPA* to hold that case in abeyance until after the mandate has issued in the case regarding challenges to the 2020 Technical Rule. *West Virginia* v. *EPA,* ECF Docket #1875192.

C. Congressional Review Act (CRA) Joint Resolution of Disapproval

On June 30, 2021, the President signed into law a joint resolution of Congress, S.J. Res. 14, adopted under the CRA,[131] disapproving the 2020 Policy Rule.[132] By the terms of the CRA, the signing into law of the CRA joint resolution of disapproval means that the

[129] Following the promulgation of the 2020 Policy Rule, the EPA promulgated a final rule that identified a standard or criteria for determining which contributions are ''significant,'' which the D.C. Circuit vacated. ''Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, and Process for Determining Significance of Other New Source Performance Standards Source Categories.'' 86 FR 2542 (January 13, 2021), vacated by *California* v. *EPA,* No. 21–1035 (D.C. Cir.) (Order, April 5, 2021, Doc. #1893155).

[130] When the EPA issued the 2016 NSPS OOOOa rule, a challenge to the 2012 NSPS OOOO rule for failing to regulate methane was severed and assigned to a separate case, *NRDC* v. *EPA,* No. 16–1425 (D.C. Cir.), pending judicial review of the 2016 NSPS OOOOa in *American Petroleum Institute* v. *EPA,* No. 13–1108 (D.C. Cir.).

[131] The Congressional Review Act was adopted in Subtitle E of the Small Business Regulatory Enforcement Fairness Act of 1996.

[132] ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review,'' 85 FR 57018 (September 14, 2020) (''2020 Policy Rule'').

2020 Policy Rule is ''treated as though [it] had never taken effect.'' 5 U.S.C. 801(f). As a result, the VOC and methane standards for the transmission and storage segment, as well as the methane standards for the production and processing segments—all of which had been rescinded in the 2020 Policy Rule—remain in effect. In addition, the EPA's authority and obligation to require the states to regulate existing sources of methane in the Crude Oil and Natural Gas source category under section 111(d) of the CAA also remains in effect.

The CRA resolution did not address the 2020 Technical Rule. Therefore, those amendments remain in effect with respect to the VOC standards for the production and processing segments in effect at the time of its enactment. As part of this rulemaking, in section XII of this document the EPA discusses the impact of the CRA resolution and identifies and finalizes appropriate changes to reinstate the regulatory text that had been rescinded by the 2020 Policy Rule and to resolve any discrepancies in the regulatory text between the 2016 NSPS OOOOa Rule and 2020 Technical Rule.[133]

V. Legal Basis for Final Rule Scope

A. Introduction

The EPA finalizes this rulemaking to revise certain NSPS, to promulgate additional NSPS for both methane and VOC emissions from new oil and gas sources in the production, processing, and transmission and storage segments of the industry; and to promulgate EG to require states to regulate methane emissions from existing sources in those segments. The large amount of methane emissions from the oil and natural gas industry—by far, the largest methane-emitting industry in the nation—coupled with the adverse effects of methane on the global climate compel expeditious regulatory action to mitigate those emissions. This section explains the EPA's legal authority for proceeding with this final action, including regulating methane and VOCs from sources in all segments of the source category, and in so doing, responds to the principal comments received.

In the November 2021 Proposal and the December 2022 Supplemental Proposal, the EPA discussed the history of our regulatory actions for oil and gas sources in the 2016 NSPS OOOOa and the 2020 Policy Rule. *See* 85 FR 63147–53, 86 FR74719–20. These discussions explained the key statutory interpretations and determinations, which we sometimes refer to as the key positions, taken in the 2016 rule that serve as the basis for this action, as well as Congress's endorsement of those positions in adopting the 2021 CRA joint resolution to disapprove the 2020 rule and thereby reinstate the 2016 rule. These discussions further explained that the EPA was not reopening those positions in this rulemaking, but added, for the purpose of informing the public, that the EPA would continue to take the same positions even if Congress had not adopted the joint resolution. The EPA includes those discussions by reference here, and the rest of this section assumes familiarity with them. For convenience, the EPA summarizes them immediately below. The EPA then summarizes the principal comments received and responds to the most significant adverse comments. For the purpose of providing more information to the public, and without reopening the positions in the 2016 rule, the EPA explains why we would take the same positions as in the 2016 rule even if Congress had not adopted the joint resolution as well as the implications of the joint resolution and its legislative history in foreclosing commenters' objections.

B. Overview

This section summarizes why the statutory interpretations the EPA took in the 2016 Rule were correct and why the contrary interpretations taken in the congressionally-voided 2020 Policy Rule were incorrect.[134] These views are confirmed by Congress's reasoning in the legislative history of the CRA resolution and so, for convenience, this section refers to that legislative history as well.

The 2016 NSPS OOOOa established the EPA's authority to regulate GHG emissions from the Crude Oil and Natural Gas source category, in the form of limits on methane emissions. In that rule, the EPA explained that the source category, as the EPA listed it in 1979 for regulation under CAA section 111(b)(1)(A), included the production and processing as well as transmission and storage segments. The EPA also explained that it was justified in promulgating standards of performance for GHG emissions from new sources in the source category because it had a rational basis for doing so. In response to comments, the EPA further explained that once it had listed a source category, it was not required to make, as a predicate to regulating GHG emissions from the source category, an additional pollutant-specific finding that those GHG emissions contribute significantly to dangerous air pollution (termed, a pollutant-specific significant contribution finding).

In addition to providing those explanations, the EPA made two determinations in the 2016 NSPS OOOOa that established alternative legal bases for the GHG NSPS. The first was that the EPA re-listed the source category under CAA section 111(b)(1)(A). To do so, the EPA determined the following: (i) In case the source category did not already include the transmission and storage segment, the EPA revised the source category to include that segment, along with the production and processing segments. The EPA explained that all the segments are interrelated because they comprise parts of a single process of extracting natural gas and preparing it for commercial sale, and that many of the same types of equipment are used in the various segments. (ii) By dint of its emissions of VOC, SO_2, and GHG, the source category thus defined ''causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare,'' under CAA section 111(b)(1)(A). 81 FR 25833–40. For convenience, we refer to this as the endangerment finding, and treat it as having two components: the significant contribution finding and the finding of dangerous air pollution. The second determination was that, in the alternative, if it were necessary to make a pollutant-specific significant contribution finding for GHG emissions as a predicate to promulgating NSPS for GHG from the source category, then the 2016 rule made such a finding. To do so, the rule relied on information concerning the large amounts of methane emissions from the source category. 81 FR 35843.

The 2020 Policy Rule rescinded the above statutory interpretations and determinations. 85 FR 57018. The rule asserted that the transmission and storage segment was not properly included as part of the same source

[133] The EPA understands that a limited number of affected facilities may have obtained, renewed, or revised a title V permit to reflect the 2020 Policy Rule, and that such permits no longer include certain applicable requirements from the 2012 NSPS OOOO and 2016 NSPS OOOOa regulations that were reinstated by the CRA. The EPA strongly encourages states to reopen Title V permits that currently reflect the 2020 Policy Rule, and to follow all appropriate requirements of 40 CFR 70.7(f) governing the reopening of Title V permits.

[134] Under *F.C.C.* v. *Fox Television Stations, Inc.,* 556 U.S. 502 (2009), an agency may revise its policy, but must demonstrate that the new policy is permissible under the statute and is supported by good reasons, taking into account the record of the previous rule. To the extent that this standard applies in this action—where Congress has disapproved the 2020 Policy Rule—the EPA believes the explanations provided here satisfy the standard.

category as the production and processing segments, and was therefore not subject to regulation under CAA section 111. The rule took the position that the transmission and storage segment had not been included in the source category when it was originally listed in 1979, and the 2016 rule's alternative determination to revise the source category was flawed because that segment was not interrelated with the production and processing segments. The rule further asserted that the EPA did not have authority to promulgate NSPS for methane emissions from sources in the production and processing segments because those NSPS were redundant to NSPS for VOC emissions from those sources. The rule further asserted, in the alternative, that the EPA did not have such authority because it was required to make, or was at least authorized to require, a pollutant-specific significant contribution finding for GHG emissions from production and processing sources as a predicate for promulgating NSPS for methane emissions. The rule explained that such a finding was necessary because the EPA had not considered GHG emissions when it listed the source category in 1979. The rule further asserted that the pollutant-specific significant contribution finding in the 2016 NSPS OOOOa was flawed because it had been based in part on emissions from the transmission and storage segment, which, in the rule's view, were not part of the oil and gas source category, and because the EPA had not first established a standard or criteria for determining when emissions contribute significantly, as opposed to simply contribute, to dangerous air pollution. 85 FR 57024–40.

The CRA joint resolution, signed into law by President Biden on June 30, 2021, disapproved the 2020 Policy Rule, and thereby reinstated the 2016 NSPS OOOOa regulation of sources in the transmission and storage segment and regulation of methane emissions from the entire oil and gas source category. 86 FR 63135–36. The legislative history of the CRA resolution—the House Report and a floor statement from Senate sponsors, 167 Cong. Rec. S2282–83 (April 28, 2021) (statement by Sen. Heinrich) (Senate Statement)—made clear Congress's intent that the EPA must regulate methane from the source category under CAA section 111, due to the large amount and impact of those emissions. The legislative history went on to make clear that Congress's basis for disapproving the 2020 rule was that Congress rejected each of the legal interpretations, described above, that underlay the rule. Specifically, the legislative history stated that: the rule was incorrect in removing the transmission and storage segment from the source category; promulgation of NSPS for methane was not redundant with promulgation of NSPS for VOCs, in light of the fact that the former, but not the latter, triggers the requirement to promulgate emission guidelines for existing sources under CAA section 111(d); the EPA is required to promulgate NSPS for a pollutant from a source category when the EPA has a rational basis for doing so, and the EPA cannot decline to promulgate a NSPS on grounds that it is required, or authorized to require, a pollutant-specific significant contribution finding; and the EPA's past approach of relying on a facts-and-circumstances approach to determine significance is acceptable, and an established standard or criteria are not necessary.

In the November 2021 Proposal, the EPA confirmed that it agreed with those interpretations. 86 FR 63151. In the December 2022 Supplemental Proposal, the EPA added that if it were required to make a pollutant-specific significant contribution finding, it would not be required to specify a standard or criterion for determining significance, and that if it were so required, methane emissions from the source category are so large that they would be significant under any reasonable standard or criterion. 87 FR 74719–20 (explaining that the ''massive quantities of methane emissions'' from the source category, combined with the ''potency of methane'' are significant in light of, among other things, the fact that the oil and gas sector accounts for 28 percent of U.S. methane emissions or more than the total national emissions of over 160 countries).[135]

C. Comments

Some stakeholders commented adversely. They assert that the November 2021 Proposal and the December 2022 Supplemental Proposal contain what they see as the same flaws as the 2016 NSPS OOOOa. One of these flaws, these commenters assert, is that the EPA is precluded from promulgating requirements for sources in the transmission and storage segment without first listing that segment as a separate source category and making an endangerment finding for GHG emissions from it. According to this view, the source category as listed in 1979 did not include that segment, and that segment must be treated as a separate source category because otherwise, the agency could expand a preexisting source category incrementally, and thereby avoid the CAA section 111 requirements to undertake an endangerment finding before promulgating regulation. A second flaw, according to these commenters, is that regulation of methane is redundant to regulation of VOC. In addition, the commenters assert that CAA section 111 precludes the EPA from promulgating requirements for GHG emissions from the source category without first making a pollutant-specific endangerment finding, including a pollutant-specific significant contribution finding. Moreover, according to the commenters, such a finding must be for methane. In addition, it must be based on an established standard or criteria for determining significance; otherwise, such a finding would be arbitrary and capricious. According to these commenters, CAA section 111 does not authorize the EPA to regulate air pollutants from a listed source category on the grounds that it has a rational basis for such regulation. These commenters further assert that although the CRA resolution disapproved the 2020 Policy Rule, it did not change the underlying requirements of CAA section 111, so that these flaws in the EPA's regulatory approach remained. They argue that only the legislative language of the joint resolution, and not the accompanying legislative history, is relevant.

Other commenters supported the November 2021 Proposal and December 2022 Supplemental Proposal. They state that the 2016 NSPS OOOOa established an appropriate basis for promulgating regulations to control methane emissions from the oil and gas industry. They state that the 1979 source category listing included the transmission and storage segment, and that in any event, the 2016 rule correctly determined that the transmission and storage segment was interrelated with the other segments and thus merited inclusion in the revised source category. They also state that regulation of methane from this source category is not redundant to regulation of VOCs. They add that because the EPA previously determined that the oil and gas source category causes or contributes significantly to dangerous air pollution, the EPA is authorized to promulgate a NSPS for methane because it is rational to do so in light of the large amount of methane emissions from the source category. For

[135] As noted above, to the extent that the standard of *Fox Television* applies in this action—where Congress has disapproved the 2020 Policy Rule—the EPA believes the explanations provided here satisfy the standard.

this reason, commenters assert, it would be arbitrary and capricious for the EPA to decline to regulate methane emissions from the source category. Commenters add that a pollutant-specific significant contribution or endangerment finding for methane is neither necessary nor authorized by CAA section 111; that any such findings under CAA section 111 should be made on the basis of the facts and circumstances, and not a predetermined standard or threshold; and that in any event, the large amounts of methane emissions from the source category must be considered to be significant under any reasonable definition. Commenters also note that the 2016 rule made an appropriate significant finding contribution for GHG from the source category in the alternative. Commenters also assert that Congress's disapproval of the 2020 Policy Rule through the CRA joint resolution reaffirmed the 2016 rule's positions.

D. Response to Comments and Discussion

The adverse arguments by commenters described above concern the positions in the 2016 NSPS OOOOa, which also provide the basis for this rulemaking, and the significance of the CRA joint resolution and its legislative history. The commenters' arguments concerning the positions in the 2016 rule were rejected in the 2016 rule itself, adopted in the 2020 Policy Rule, and then rejected in the legislative history of the joint resolution. The EPA stated in the November 2021 Proposal and December 2022 Supplemental Proposal that it was not reopening these positions, and we maintain that decision here. However, again, solely for the purpose of informing the public, we provide responses to the commenters' arguments immediately below and in the response to comment document. Our decision not to reopen the positions in the 2016 rule does not apply to issues concerning the joint resolution, which post-dated the 2016 rule. Accordingly, the EPA responds in more detail further below to the commenters' arguments concerning the joint resolution.

1. Commenters' Arguments Concerning the Key Positions in the 2016 NSPS OOOOa

Stakeholders submitted adverse comments on key positions, including statutory interpretations and determinations, that the EPA made in the 2016 NSPS OOOOa and that serve as the foundation for the present action. These adverse comments generally mirrored those made in the course of the 2016 NSPS OOOOa rulemaking and the rationale for the 2020 Policy Rule, and did not raise significant new points not addressed in the 2016 NSPS OOOOa or the November 2021 Proposal and December 2022 Supplemental Proposal. The EPA continues to disagree with those comments.

a. Scope of the Oil and Gas Source Category as Listed in 1979

i. Scope of the Source Category as Listed in 1979

The 2016 NSPS OOOOa stated that the Crude Oil and Natural Gas Production source category, as the EPA listed it for regulation under CAA section 111(b)(1)(A) in 1979, included the transmission and storage segment, along with the other two major segments of the industry, the production and processing segments. Based on this understanding, the EPA continued to promulgate NSPS for sources in that segment, after it had begun to do so in the 2012 NSPS OOOO. Adverse commenters on the November 2021 Proposal took the contrary view, reiterating adverse comments on the 2016 rule. However, the 2016 rule was correct—the EPA's 1979 listing of the source category should be considered to have included the transmission and storage segment.

The commenters' argument stems from the fact that the 1979 listing, 44 FR 49222 (Aug. 21, 1979) (1979 Listing Rule), identified the source category as ''Crude Oil and Natural Gas Production,'' and did not specifically identify the transmission and storage segment as part of the source category. *See* 44 FR 49222 (citing *Priorities for New Source Performance Standards Under the Clean Air Act Amendments of 1977,* EPA–450/3–78–019 (April 1978) (''1978 Priority List'')). This argument fails to recognize the comprehensive approach that the EPA undertook in the 1979 Listing Rule, which strongly indicates that the oil and gas source category included the transmission and storage segment. In the 1979 Listing Rule, the EPA determined that numerous source categories met the CAA section 111(b)(1)(B) requirements to be listed for regulation. The EPA based that determination on a study it had undertaken in 1978, the 1978 Priorities List, that comprehensively identified all source categories in the United States—203 in number—and indicated which ones should and should not be listed. That study identified the oil and gas source category as the ''Crude Oil and Natural Gas Production Plants,'' a name that referenced only the production segment of the oil and gas industry. However, the study, and the 1979 Listing Rule, which identified the source category as ''Crude Oil and Natural Gas Production,'' clearly intended the source category to be broader than just that segment, consistent with the fact that the 1978 Priorities List was designed to be comprehensive. This is evident because in 1985, the EPA promulgated the first set of NSPS for the source category, which concerned sources in the processing segment, not the production segment. 50 FR 26122 (June 24, 1985) (VOC emissions from equipment leaks), 50 FR 40158 (Oct. 1, 1985) (SO_2 emissions). It is evident that the source category, as listed in 1979, also included the third major segment of the industry, the transmission and storage segment. Otherwise, the 1978 Priorities List, which was designed to be comprehensive, would have completely overlooked this major segment, which is not plausible.

ii. Alternative Determination in 2016 NSPS OOOOa To Include Transmission and Storage Segment in Source Category

In addition, in the 2016 NSPS OOOOa, in the alternative, and on the assumption that the source category as listed in 1979 did not include the transmission and storage segment, the EPA revised the source category to include that segment, and relisted that source category—which it termed the Crude Oil and Natural Gas source category—under CAA section 111(b)(1)(A). 81 FR 35832–40. This alternative determination further addresses commenters' objections.

The EPA has broad discretion in determining the scope of the source category, which is reviewable under the arbitrary and capricious standard of CAA section 307(d)(9). In the 2016 NSPS OOOOa, the EPA determined that the transmission and storage segment was ''interrelated'' with the production and processing segments and therefore should be included in the same source category, the EPA provided sound reasons for doing so. 81 FR 35832. This reasoning is consistent with the ordinary understanding of the term, ''category.'' Merriam-Webster defines ''category'' as ''any of several fundamental and distinct classes to which entities or concepts belong,'' [136] and it defines a ''class [ ]'' as ''a group, set, or kind sharing common attributes.'' [137] Treating all those

[136] ''Category.'' *Merriam-Webster.com Dictionary,* Merriam-Webster, *https://www.merriamwebster.com/dictionary/category.* Accessed Sept. 25, 2023.

[137] ''Class.'' *Merriam-Webster.com Dictionary,* Merriam-Webster, *https://www.merriamwebster.com/dictionary/class.* Accessed Sept. 25, 2023.

segments as part of the source category meets this definition because, as the EPA explained in the 2016 NSPS OOOOa, the segments all included operations that were a sequence of functions in a multi-step process that is necessary to achieve the common goal of preparing recovered gas for distribution. Moreover, the segments had common equipment and control technology. 81 FR 35832. In the 2016 rule, the EPA went on to assess the air pollutants emitted from the source category, including VOC, SO_2, and GHG; as well as the associated air pollution, including hazardous air pollution, tropospheric ozone, SO_2, and atmospheric GHG; and determined that the source category causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. *Id.* 35840. The EPA has not reopened that endangerment finding.

This re-listing addresses the commenters' objections concerning the regulation of sources in the transmission and storage segment. By properly including the segment in a source category and listing that source category under CAA section 111(b)(1)(A), the EPA established the predicate for such regulation.

b. Reliance on Rational Basis Test, and Rejection of Pollutant-Specific Significant Contribution Finding, for Regulating GHG From the Source Category

In the 2016 NSPS OOOOa, the EPA interpreted CAA section 111 to authorize regulation of methane emissions from the oil and gas source category because the large amount of those emissions provided a rational basis for such regulation. 81 FR 35842. The EPA went on to determine that it had a rational basis to regulate methane emissions from the source category on grounds that, among other things, the oil and gas industry is the largest industrial emitter of methane in the U.S. *Id.* 35842–43. As stated in section III, human emissions of methane, a potent GHG, are responsible for about one third of the warming due to well-mixed GHGs, which makes methane the second most important human warming agent after carbon dioxide.[138] The EPA has not reopened that determination in the present rulemaking.

However, commenters asserted that under CAA section 111, a rational basis determination is insufficient as a predicate for regulation, and, instead, the EPA was required to determine that methane emissions from the oil and gas source category cause or contribute significantly to air pollution that is reasonably anticipated to endanger public health or welfare. Commenters took this same position in the 2016 NSPS OOOOa. For the reasons discussed immediately below, we disagree with commenters and we confirm the position in the 2016 rule. As we discuss further below, the 2016 rule also addressed commenters' objections by making a finding that the GHG emissions from the oil and gas source category contribute significantly to dangerous air pollution.

CAA section 111 is clear in authorizing the EPA to regulate air pollutants from a listed source category if it has a rational basis for doing so, and does not require, or authorize the EPA to require, a pollutant-specific significant contribution finding or endangerment finding as a predicate for such regulation. CAA section 111(b)(1)(A) requires the EPA to ''publish . . . a list of categories of stationary sources'' for regulation, and to ''include a source category in such list if . . . it causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.'' CAA section 111(b)(1)(B) provides that within a specified time after listing the source category, the EPA shall promulgate ''standards of performance for new sources within such category.'' CAA section 111(a)(1) defines ''standard of performance'' (in the singular) as ''a standard for emissions of air pollutants'' that is determined in a particular manner. CAA section 307(d)(1)(C) provides that the EPA's promulgation of standards of performance under CAA section 111 are subject to the requirements of CAA section 307(d). Those requirements include the judicial review provisions of CAA section 307(d)(9)(A), which provide that a court may reverse standards of performance ''found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.''

By their terms, these provisions require the EPA to make an endangerment finding, including a significant contribution finding, for a source category as a predicate to promulgating standards of performance, and they establish detailed requirements that standards of performance must meet. However, by their terms, they do not require, or authorize the EPA to require, any significant contribution or endangerment findings for particular air pollutants as a predicate to promulgating such standards. Instead, the EPA's promulgation of such standards is subject to the CAA section 307(d)(9)(A) arbitrary and capricious standard for judicial review. *See American Electric Power Co.* v. *Connecticut,* 564 U.S. 410, 424, 427 (2011). In contrast, numerous other provisions explicitly require a pollutant-specific contribution or endangerment finding. *See, e.g.,* CAA section 183(f)(1)(A), 202(a)(1), 211(c)(1)(A), 213(a)(1)–(3), 231(a)(2). The inclusion of clear requirements for pollutant-specific findings in other CAA provisions confirms that the absence of such a requirement in CAA section 111 indicates Congress' intention not to include such a requirement there. *See United States* v. *Gonzales,* 520 U.S. 1, 5 (1997) (''Where Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.'') (internal quotations omitted).

Importantly, the arbitrary and capricious standard is tantamount to a standard of reasonableness or rationality. *See Motor Vehicle Mfrs. Ass'n of U.S., Inc.* v. *State Farm Mut. Auto. Ins. Co.,* 463 U.S. 29, 42–43 (1983) (*Motor Vehicle Mfrs. Ass'n*) (''[t]he scope of review under the 'arbitrary and capricious' standard'' means that a court ''may not set aside an agency rule that is [, among other things,] rational''). In the 2016 NSPS OOOOa, the EPA termed this standard the rational basis test, and applied it to the promulgation of GHG standards of performance for the oil and gas source category. This standard of review is well established, and courts routinely review rules under it, as noted in the House Report at 11.

On the other hand, requiring a pollutant-specific significant contribution finding as a predicate for promulgating NSPS would disrupt the scheme Congress set out because it would render the significant contribution and endangerment findings for the source category superfluous. This is because a finding that any particular air pollutant emitted from a source category contributes significantly to dangerous air pollution necessarily means that the source category itself contributes significantly to dangerous air pollution. *See TRW Inc.* v. *Andrews,* 534 U.S. 19, 31 (2001) (''It is a cardinal principle of statutory construction that a statute ought, upon the whole, to be so construed that, if it can be prevented, no clause, sentence, or word shall be superfluous. . . .'').

[138] See preamble section III.A. for further discussion on the Crude Oil and Natural Gas Emissions and Climate Change, including discussion of the GHGs, VOCs and SO_2 Emissions on Public Health and Welfare.

The EPA's more than half-century long regulatory history of CAA section 111 is consistent with the rational basis test and provides no precedent for requiring or authorizing the EPA to require a pollutant-specific significant contribution finding. The EPA first listed source categories and promulgated standards of performance for them in 1971, 36 FR 5931 (Mar. 31, 1971) (listing initial source categories); 36 FR 24876 (Dec. 23, 1971) (promulgating initial standards of performance), and since then, has listed dozens more source categories and promulgated hundreds of standards. 40 CFR part 60. The EPA has always listed source categories by determining that they contribute significantly to dangerous air pollution, and then has proceeded to promulgate NSPS for particular air pollutants from the source categories, without making comparable significant contribution or endangerment findings for those air pollutants.[139] The EPA has followed this approach when it has promulgated standards of performance for particular air pollutants at approximately the same time that it listed the source category, *see, e.g.,* 36 FR 5931 (Mar. 31, 1971) (listing five source categories); 36 FR 24876 (Dec. 23, 1971) (promulgating standards of performance for same five source categories), and when it has promulgated standards of performance for particular air pollutants for the first time many years after it listed the source category, and which it did not address when it listed the source category. *See* 38 FR 15380 (June 11, 1973) (listing the petroleum refineries source category), 39 FR 9310 (Mar. 8, 1974) (promulgating standards of performance for PM, CO, SO_2, and opacity from the source category), 73 FR 35838 (June 24, 2008) (promulgating standards of performance for NO_X and VOC from the source category).

In other rulemakings, the EPA declined to promulgate NSPS for certain air pollutants, on the basis of what amounted to a rational basis test, although the EPA did not use that specific terminology. *See* 42 FR 22056, 22507 (May 3, 1977) (declining to promulgate NSPS for NO_X, CO, and SO_2 from lime manufacturing plants due to limited amounts of emissions of pollutants or limited reductions that controls would achieve); *National Lime Assoc.* v. *EPA,* 627 F.2d 416, 426 & n.27 (D.C. Cir. 1980). On the other hand, in rulemakings since 2009, the EPA has rejected comments that it was required to make a pollutant-specific significant contribution finding. *See* 74 FR 51950, 51957 (Oct. 8, 2009) (NSPS for coal preparation and processing plant source category); 80 FR 64510, 64530 (Oct. 23, 2015) (NSPS for GHG from electric utility generation source category); 2016 NSPS OOOOa, 81 FR 35843.

It is clear that interpreting CAA section 111 to require, or authorize the EPA to require, a pollutant-specific significant contribution finding as a predicate for regulation is novel and departs from the EPA's lengthy history of promulgating standards of performance.[140] This ''consistent and longstanding interpretation of the agency charged with administering the statute'' further supports interpreting CAA section 111 to base the promulgation of standards of performance on a rational basis standard, consistent with CAA section 307(d)(9)(A), and not to require a pollutant-specific significant contribution finding. *See Entergy Corp.* v. *Riverkeeper, Inc.,* 556 U.S. 208, 235 (2009). Indeed, interpreting CAA section 111 to require, or authorize the EPA to require, a pollutant-specific significant contribution finding as a predicate for regulation would undermine the EPA's implementation of CAA section 111 to date, including, in particular, virtually all of the standards of performance the EPA has promulgated to date.

In addition, even if commenters are correct that CAA section 111 requires a pollutant-specific finding, that finding should be simply a contribution, not a significant contribution. A contribution finding would be consistent with Congress's approach in other CAA provisions. *See, e.g.,* CAA section 183(f)(1)(A), 202(a)(1), 211(c)(1), 231(a)(2). A significant contribution finding is illogical because it would render the source category significant contribution finding under CAA section 111(b)(1)(A) superfluous, as noted above. By analogy, CAA section 213(a)(4) explicitly requires the EPA make two findings, but differentiates them: (1) emissions from new nonroad engines or vehicles contribute significantly to an air pollution problem, and (2) emissions from classes or categories of new nonroad engines or vehicles cause or contribute to the air pollution problem. Accordingly, if CAA section 111 were interpreted to require, or at least authorize, the EPA to require a pollutant-specific finding as a predicate for regulation, that finding should be that the source category's emissions of the pollutant cause or contribute to dangerous air pollution.

c. Lack of Redundancy of Regulation of Methane

Commenters also argued that the GHG NSPS in the oil and gas source category are redundant to the VOC NSPS. Adverse commenters had made this objection during the 2016 NSPS OOOOa. We rejected it there and reject it here as well.

In the 2016 rule, the EPA structured the requirements of the VOC and GHG NSPS to mirror each other, and it is that structure that forms the basis for commenters' argument that the GHG NSPS should be considered to be redundant. Because the EPA had listed the oil and gas source category for regulation, it was required to promulgate NSPS for GHG emissions under CAA section 111(b)(1)(B) (as long as doing so was rational), and that requirement is not eliminated by the fact that the GHG NSPS could be structured to mirror the VOC NSPS. Moreover, the fact that the 2016 rule structured the requirements as it did does not mean they are redundant, only that the EPA sought to allow sources to comply with them as efficiently as possible. Had the EPA not been careful to structure the two sets of NSPS to mirror each other, no argument would have arisen that the GHG NSPS were redundant, but that would have been an inefficient regulatory scheme.

Most importantly, the GHG NSPS are not redundant because only they, and not the VOC NSPS, trigger the requirement that existing sources are subject to GHG emission guidelines under CAA section 111(d). The large contribution of methane emissions from the source category to dangerous air pollution driving the grave and growing threat of climate change means that, in the agency's judgment, it would be arbitrary and capricious under CAA section 307(d)(9)(A)—as well as highly irresponsible—for the EPA to decline to promulgate NSPS for methane emissions from the source category. *See*

[139] The only exceptions have been two rules in which the EPA made pollutant-specific significant contribution findings in the alternative. 80 FR 64510, 64531 (Oct. 23, 2015) (GHG NSPS for electric power plants); 2016 NSPS OOOOa, 81 FR 35843.

[140] The only actions in which CAA section 111 has been interpreted to require or authorize the EPA to require a pollutant-specific significant contribution finding as a predicate for regulation are the 2020 Policy Rule, which was disapproved by the CRA joint resolution, and a January 2021 rule that purported to establish a significance threshold for GHG emissions from source categories, but that was adopted without notice-and-comment, and was vacated by the D.C. Circuit in April 2021. *See* ''Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, and Process for Determining Significance of Other New Source Performance Standards Source Categories—Final Rule,'' 86 FR 2542 (Jan. 13, 2021); *California* v. *EPA,* No. 21–1035 (D.C. Cir. April 5, 2021) Doc. #1893155 (order granting motion for voluntary vacatur and remand).

American Electric Power, 564 U.S. at 426–27.

d. Alternative Determination in the 2016 NSPS OOOOa for a Pollutant-Specific Endangerment Finding

The 2016 NSPS OOOOa re-listing of the source category, described above, included another alternative determination that provided an additional basis for the regulation of GHG emissions, which was that the EPA explicitly determined that GHG emissions from the Crude Oil and Natural Gas source category cause or contribute significantly to dangerous air pollution. 81 FR 35833–40. This determination—which, to be clear, the EPA is not required to do, but nevertheless did so in the alternative—further addressed commenters' objections that the EPA was required to make such a pollutant-specific determination as a predicate for regulating methane emissions. The EPA has not reopened this determination.

As noted above, this type of determination entails two findings, a significant contribution finding and a finding of dangerous air pollution. In this case, those findings were for GHG emissions. We refer to the former as the pollutant-specific significant contribution finding. In the 2016 rule, the EPA based the pollutant-specific significant contribution finding on the same facts concerning the large amount of methane emissions from the oil and gas source category that it relied on in making the rational basis determination, as noted above. *Id.* 35842–43. It made the finding of dangerous air pollution based on the endangerment finding for GHG that the EPA made under CAA section 202(a) in 2009 [141] (the 2009 Endangerment Finding) and the 2010 denial of petitions to reconsider,[142] updated with more recent information. *See Coalition for Responsible Regulation* v. *EPA,* 684 F.3d 102, 117–123 (D.C. Cir. 2012) (upholding the 2009 Endangerment Finding and 2010 denial of petitions to reconsider, and noting, among other things, the ''substantial . . . body of scientific evidence marshaled by EPA in support'').

This pollutant-specific determination for GHG from the oil and gas source category addresses the commenters' arguments that the EPA cannot regulate GHG from the source category without making such a finding. *See American Lung Ass'n* v. *EPA,* 985 F.3d 914, 974–77 (D.C. Cir. 2021) (*American Lung Ass'n*) (the pollutant-specific significant-contribution finding that the EPA made in the alternative for GHG emissions from electric power plants provided a sufficient basis for regulation and addressed petitioners' arguments that the NSPS for GHG emissions from those sources was invalid due to lack of such a finding), *rev'd in part sub nom West Virginia* v. *EPA,* 142 S.Ct. 2587 (2022) (*West Virginia*).[143]

Commenters also argued that an endangerment finding specifically for methane emissions—that is, a determination that methane emissions from the oil and gas source category cause or contribute significantly to atmospheric levels of methane, and that those levels may reasonably be anticipated to endanger public health or welfare—is necessary as a predicate for regulation of methane emissions from the source category. The EPA responded to the same comment in the 2016 NSPS OOOOa. 81 FR 35841–42, 35877. The EPA is not reopening this issue, but for the purpose of providing information to the public, will explain why, assuming that a pollutant-specific determination is necessary as a predicate for CAA section 111 regulation, it is appropriate for the EPA to make the significant contribution finding on the basis of GHG emissions and for the EPA to rely on the finding of dangerous air pollution that it made for GHG, and it is not necessary for the EPA to make comparable determinations for methane emissions.

The EPA's approach in the 2016 NSPS OOOOa to make the findings for GHG is fully consistent with other rulemakings in which this issue arose. The first was the 2009 Endangerment Finding. 74 FR 66496. CAA section 202(a)(1) requires the EPA to establish ''standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines'' that ''in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.'' The EPA explained that this provision sets forth a two-part test for regulatory action: first, whether the relevant air pollution may reasonably be anticipated to endanger public health or welfare, and second, whether emissions of any air pollutant from the class or classes of the sources in question (there, new motor vehicles) cause or contribute to this air pollution. 74 FR 66505, 66516, 66536. The EPA explained that ''the air pollution can be thought of as the total, cumulative stock in the atmosphere, while the air pollutant can be thought of as the flow that changes the size of the total stock.'' 74 FR 66536 (emphasis omitted). The EPA went on to explain that the ''air pollution'' that it was determining endangered public health and welfare is the elevated atmospheric concentrations of ''the combined mix of six key directly-emitted, long-lived and well-mixed greenhouse gases''—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides. *Id.* 66516–23. The EPA supported this conclusion by explaining, among other things, that these six gases have the common attributes regarding their climate effects. *Id.* 66517. For the same reasons, in the 2009 Endangerment Finding, the EPA also defined the air pollutant as GHG—a single air pollutant made up of the same six gases in an aggregate group for purposes of determining whether the air pollutant causes or contributes to the endangering air pollution. *Id.* 66537. The EPA explained that ''they are all greenhouse gases that are directly emitted . . .; they are sufficiently long-lived in the atmosphere such that, once emitted, concentrations of each gas become well mixed throughout the entire global atmosphere; and they exert a climate warming effect by trapping outgoing, infrared heat that would otherwise escape to space. Moreover, the radiative forcing effect of these six greenhouse gases is well understood.'' *Id.* The EPA further explained that this definition of the GHG air pollutant was reasonable, even if emissions from the source category did not include all six gases. *Id.* In fact, in the 2009 Endangerment Finding, the EPA noted that the emissions from the relevant class or classes of new motor vehicles or new motor vehicle engines included only four of the gases. *Id.* 66538, 66541. As noted in section III.A.1 above, the oil and gas source category emits methane and CO_2, although the limits established in this action focus on regulating GHG through requirements that are expressed in the form of limits on methane, as a constituent of the GHG air pollutant.

In subsequent actions that entailed or referenced GHG endangerment findings, the EPA has taken the same position that the air pollution consists of the elevated atmospheric concentrations of these six greenhouse gases and the air pollutant consists of the mix of the same six gases. 81 FR 54422 (2016 GHG

[141] ''Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,'' 74 FR 66496 (Dec. 15, 2009).

[142] *See* ''EPA's Denial of the Petitions To Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,'' 75 FR 49556 (August 13, 2010).

[143] It should be noted that the part of the D.C. Circuit's opinion in *American Lung Ass'n* concerning the pollutant-specific significant contribution finding was not affected by the Supreme Court's decision in *West Virginia.*

endangerment and cause or contribute finding for certain aircraft under CAA section 231(a)(2)(A)). The EPA took this same position in the 2016 NSPS OOOOa, as mentioned at the beginning of this section. 81 FR 35833, 35877. For the same reasons that the EPA has consistently articulated in the 2009 Endangerment Finding and afterwards, it is appropriate to base that determination on the contribution of GHG emitted from the source category to atmospheric GHG levels. This is because, as noted above, the 2016 rule identifies the air pollutant as GHG, even though it expresses the requirements in the form of limits on methane. 40 CFR 60.5360a. Any significant contribution finding must address the pollutant being regulated, in this case, GHG. In addition, for the finding of dangerous air pollution, the air pollution of concern is the elevated concentration of the six well-mixed greenhouse gases, and not only concentrations of methane.

e. Standards or Criteria for Determining Significance

Commenters argued that when the EPA makes a significant contribution determination for the pollutant and the source category as a predicate for regulation, the EPA must first establish a standard or criteria for when a contribution is significant.[144] They stated that such a standard or criteria is necessary to allow the EPA to distinguish between a contribution and a significant contribution, and that without it, the significant contribution finding is arbitrary. The EPA disagrees with this comment. Rather, it is fully appropriate for the EPA to exercise its discretion to employ a facts-and-circumstances approach, particularly in light of the wide range of source categories and the air pollutants they emit that the EPA must regulate under CAA section 111.

With respect to the significant contribution finding for a source category, CAA section 111(b)(1)(A) by its terms does not require that such a finding be based on established criteria or a standard or threshold. In fact, during the 50 years that it has listed dozens of source categories,[145] the EPA has never identified a standard or criteria for determining significance, and instead, has always relied on the particular facts and circumstances. This approach is appropriate because Congress intended that CAA section 111 apply to a wide range of source categories and pollutants, from wood heaters to emergency backup engines to petroleum refineries. In that context, it is reasonable to interpret CAA section 111 to allow the EPA the discretion to determine how best to assess significant contribution and endangerment based on the individual circumstances of each pollutant and each source category. For example, among the six well-mixed gases that comprise GHG, CO_2 is emitted in the greatest quantities while methane emissions have a greater impact than CO_2 emissions on a per-ton basis. In addition, source categories that emit the same air pollutant may differ from each other in several ways that may be relevant for purposes of a significance finding, including whether new sources are expected to be constructed.

With respect to any significant contribution finding for an air pollutant—and as noted above, CAA section 111 does not require one as a predicate for regulation—established criteria or standards are also not required. The D.C. Circuit adopted this position in *American Lung Ass'n,* 985 F.3d at 976–77, when it upheld the EPA's pollutant-specific significant-contribution finding for GHG emissions from electric power plants even though the EPA did not ''articulate a specific threshold measurement for significance.'' The court relied on the same reasoning that it used when, in upholding the 2009 Endangerment Finding, it rejected an argument that the EPA must establish criteria in order to determine that an air pollutant endangers public health and welfare. *Coal. for Responsible Regulation, Inc.* v. *EPA,* 684 F.3d 102 (D.C. Cir. 2012). The court stated that ''EPA need not establish a minimum threshold of risk or harm before determining whether an air pollutant endangers'' because ''the inquiry necessarily entails a case-by-case, sliding-scale approach.'' *Id.* at 122–23. Although there, the court was discussing whether an air pollutant endangers public health or welfare, the court later, in *American Lung Ass'n,* made clear that the same principle applies to whether an air pollutant contributes significantly to dangerous air pollution. On this point, as well, the EPA is in full agreement with the statements in the House Report stating that the EPA is not required to base a significance finding on an established standard or criteria. House Report at 9–10.

Commenters who interpret CAA section 111 to require a pollutant-specific significant contribution finding rely on the requirement in CAA section 111(b)(1)(A) for a source-category significant endangerment finding. By that logic, the facts-and-circumstances method by which the EPA has always determined the source category significant-contribution finding should also apply to any pollutant-specific significant contribution finding. *See Alaska Dep't of Envtl. Conservation,* 540 U.S. 461, 487 (2004) (explaining, in a case under the CAA, ''[w]e normally accord particular deference to an agency interpretation of longstanding duration'' (internal quotation marks omitted) (citing *Barnhart* v. *Walton,* 535 U.S. 212, 220 (2002)). In fact, in each of the first two rules in which the EPA made a pollutant-specific significant contribution finding as an alternative basis for regulating GHG from the relevant source category, the EPA relied on a facts-and-circumstances test for determining significance. 80 FR 64531 (NSPS for GHG from electric power plants); 2016 NSPS OOOOa, 81 FR 35843.[146] The EPA's long track record for basing CAA section 111 significance findings on an examination of facts and circumstances, and not relying on established criteria or other standards or thresholds, coupled with the importance of allowing the EPA the flexibility to take into account the particular circumstances of the pollutant and the source category, makes clear that a lack of such criteria or standards does not render the significance determinations arbitrary and capricious. The courts have long reviewed agency actions under the arbitrary-and-capricious standard without requiring quantitative or numerical standards. *See Motor Vehicle Mfrs. Ass'n,* 463 U.S. 42–43 (stating that the court ''may not set aside an agency rule that is rational, based on consideration of the relevant factors and within the scope of the authority delegated to the agency by the statute'').

Other CAA provisions require the EPA to make a pollutant-specific determination, and the EPA's actions under these provisions are informative here as well. The EPA has implemented some of these provisions through a facts and circumstances test, *see* 59 FR 31308 (June 17, 1994) (under CAA section 213, in determining whether emissions from nonroad engines and vehicles contribute significantly to dangerous air pollution, the EPA made a qualitative assessment, and rejected assertions by commenters

[144] Comments of Permian Basin Petroleum Ass'n, Document ID No. EPA–HQ–OAR–2021–0317–0793 at 3–4 (citing 85 FR 57018, 57038 (September 14, 2020)).

[145] List of Categories of Stationary Sources, 36 FR 5931 (March 31, 1971); *see* 40 CFR part 60.

[146] As noted above, a January 2021 rule, promulgated without notice and comment and vacated by the D.C. Circuit, took the position that standards or criteria for a pollutant-specific significant contribution finding are necessary. 86 FR 2542; *California* v. *EPA,* No. 21–1035 (D.C. Cir. April 5, 2021) Doc. #1893155 (order granting motion for voluntary vacatur and remand).

that it was required to determine a specific numerical standard for significance); and has implemented some of these provisions through both a facts and circumstances test and criteria or standards. *See* 84 FR 50268 (Sept. 24, 2019) (proposal for 2020 Policy Rule; discusses EPA action under CAA section 189(e), which requires the EPA to regulate sources of precursors to PM_{10} except where EPA determines such sources do not contribute significantly to PM_{10} levels that exceed the NAAQS; EPA has determined significance through a combination of a facts-and-circumstances test and criteria); *compare id.* at 50267–68 (discussing EPA's implementation of CAA section 110(a)(2)(D)(i), the Good Neighbor Provision, which requires states to prohibit emissions ''in amounts which will contribute significantly to nonattainment'' of the NAAQS in any other state; in rules concerning ozone and $PM_{2.5,}$ the EPA has identified a numerical criterion for determining significant contribution) *with* 84 FR 54498, 54499 (October 10, 2019) (in rules under the Good Neighbor Provision concerning the SO_2 NAAQS, EPA has applied a weight of evidence (that is, evaluating all available facts and circumstances) test for determining whether there is significant contribution). The fact that the EPA has sometimes relied on a facts-and-circumstances test for determining significance in these CAA provisions supports its view that such a test is reasonable under CAA section 111.

If the EPA were required to develop a standard or criteria to determine significance, any reasonable standard or criteria would necessarily focus on the amount of emissions from the source category and the harmfulness of the pollutant emitted. In the case of the oil and gas source category, the ''massive quantities of methane emissions'' contributed by the sector to the levels of well-mixed GHG in the atmosphere, as described in the November 2021 Proposal, 86 FR 63148, coupled with the potency of methane (with a global warming potential (GWP) of almost 30 or more than 80, depending on the time period of the impacts, *id.* 63130), demonstrate that the source category's GHG emissions would be significant under any reasonable criteria-based approach. *See* 86 FR 63131.

In particular, the fact that the oil and gas source category has the largest amount of methane emissions in the United States, in the context of a problem such as climate change that is caused by the collective contribution of many different sources, confirms that those emissions would meet any reasonable standard or criteria for significance.[147] *See American Lung Ass'n,* 985 F.3d at 977 (''The global nature of the air pollution problem means that '[a] country or a source may be a large contributor, in comparison to other countries or sources, even though its percentage contribution may appear relatively small' in the context of total emissions worldwide.'' (quoting 2009 Endangerment Findings). In fact, as noted above and discussed at further length in the December 2022 Supplemental Proposal, 87 FR 74719–20, the oil and gas source category's position as the largest methane-emitting source category in the U.S. would itself qualify as a criterion that supports treating it as a significant contributor of methane, if such a criterion were necessary.

2. Commenters' Arguments Concerning the CRA Joint Resolution and its Legislative History

Commenters dismiss the significance of the CRA joint resolution that disapproved the 2020 Policy Rule by arguing that although the joint resolution had the effect of reinstating the 2016 NSPS OOOOa, it did not change the underlying requirements of CAA section 111, so that the flaws the commenters perceived in the 2016 rule's positions remained. The commenters further argue that the legislative history of the joint resolution that supported the 2016 rule's positions is irrelevant. We disagree with these commenters. Under the CRA, the enactment of the joint resolution not only disapproved the 2020 Policy Rule and had the effect of reinstating the 2016 rule, it also prohibited the EPA from promulgating another rule that is ''substantially the same'' as the 2020 Policy Rule. CRA section 801(b)(2). The joint resolution, confirmed by its legislative history, made clear what rules would and would not be prohibited. The commenters' arguments, if accepted, would lead to the adoption of a rule that would be considered substantially the same as the 2020 rule, and for that reason, their arguments must be rejected. In this section, we provide background information concerning the CRA and the role of legislative history, we summarize the discussion in the joint resolution's legislative history, and then we explain why commenters' arguments must be rejected.

a. The CRA Joint Resolution of Disapproval

Congress enacted the CRA in 1996 to facilitate Congressional oversight of agency action by streamlining the process for adopting legislation to disapprove agency rules.[148] The CRA provides the specific wording for a joint resolution of disapproval for an agency action, which is a sentence that states (including the standard prefatory phrase for a joint resolution): ''Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That Congress disapproves the rule submitted by the __ relating to __, and such rule shall have no force or effect.'' 5 U.S.C. 802(a). The blank spaces are for the name of the agency and the rule. The CRA further provides that after Congress adopts a joint resolution of disapproval of an agency rule, the agency is precluded from promulgating a new rule that is ''substantially the same'' as the disapproved rule, absent a new act of Congress authorizing such a rule. CRA section 801(b)(2).

Notwithstanding this constraint, the affected agency may still have the discretion to, and in fact may still be required to, promulgate further rulemaking in accordance with the underlying statute that authorized the disapproved rule. The legislative history of the joint resolution may clarify the parts of the disapproved rule that Congress objected to, and thereby clarify what subsequent rules would or would not be substantially the same as the disapproved rule. The potential importance of legislative history that accompanies a joint resolution and that explains Congress's objections to the rule, is highlighted by the fact that the legislative language of the joint resolution is, by the terms of the CRA,

[147] The EPA acknowledges that the collective nature of the climate change problem means that other source categories of methane emissions that are not necessarily as large as the oil and gas source category may also require regulation, *cf. EPA* v. *EME Homer City,* 572 U.S. 489, 514 (2014) (affirming framework to address ''the collective and interwoven contributions of multiple upwind States'' to ozone nonattainment), as indicated by the fact that the EPA has long regulated landfill gas, which consists of methane in 50 percent part. ''Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills; Final Rule,'' 81 FR 59276, 59281 (August 29, 2016). But this does not necessarily mean that it would be appropriate to regulate *all* other types of sources, even ones with few emissions. In the past, the EPA has declined to regulate air pollutants emitted from source categories in quantities too small to be of concern and when regulation would have produced little environmental benefit for other reasons. *See Nat'l Lime Ass'n.* v. *EPA,* 627 F.2d 416, 426 & n.27 (D.C. Cir. 1980) (small amounts of emissions of nitrogen oxides and carbon monoxide from lime kilns was a key factor in EPA decision not to promulgate new source performance standards for those pollutants; citing Standards of Performance for New Stationary Sources Lime Manufacturing Plants—Proposed Rule, 42 FR 22506, 22507 (May 3, 1977)).

[148] Congressional Research Service, ''The Congressional Review Act (CRA): Frequently Asked Questions (Jan. 14, 2020) at 1–2.

simply a one-sentence disapproval of the agency action, as noted above.

b. CRA Joint Resolution of Disapproval of the 2020 Policy Rule

The joint resolution of disapproval of the 2020 Policy Rule provided, consistent with the form mandated under the CRA, ''Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That Congress disapproves the rule submitted by the Administrator of the Environmental Protection Agency relating to ''Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review'' (85 FR 57018 (September 14, 2020)), and such rule shall have no force or effect.'' [149] In adopting it, Congress explained its understanding of CAA section 111 and, based on that, its reasons why the 2020 Policy Rule was inconsistent with CAA section 111 and must be disapproved. Specifically, as discussed in the November 2021 Proposal and summarized above, the Senate floor debate over the joint resolution and the House Report made clear Congress's views concerning the relevant provisions of CAA section 111 and the statutory interpretations contained in the 2016 NSPS OOOOa and the 2020 Policy Rule, and its intention that the EPA take further rulemaking action consistent with those views. Thus, the legislative history made clear that Congress (i) intended the EPA to treat the transmission and storage segment as part of the Crude Oil and Natural Gas Production source category and to promulgate NSPS and emission guidelines for GHG from the source category, (ii) viewed the 2016 rule's statutory interpretations of CAA section 111 to be correct and to serve as the basis for these regulatory actions, and (iii) viewed the contrary statutory interpretations contained in the 2020 rule to be incorrect. The statutory interpretations that Congress viewed to be correct include that the EPA is not authorized to promulgate a pollutant-specific significant contribution finding as a predicate for regulation, and that a facts and circumstances test for determining significant contribution for the source category listing is appropriate.

c. Commenters' Arguments and the EPA's Responses

Commenters assert that while the CRA joint resolution disapproved the 2020 Policy Rule, that action did not extend to the legal rationale and policy positions in the 2020 rule, and did not endorse the legal rationale and policy positions in the 2016 rule. They also assert that only the text of the joint resolution—again, a single sentence, quoted above, stating that Congress disapproves the 2020 rule and it shall have no force or effect—is relevant, and that the legislative history is not relevant. The commenters then assert that the joint resolution did not change the requirements of CAA section 111. From there, they assert that CAA section 111 requires the interpretations and determinations that the 2020 Policy Rule made, including that in order for the EPA to promulgate NSPS for sources in the transmission and storage segment, the EPA must first list that segment as a separate source category, including making significant contribution and endangerment findings for it; and in order for the EPA to promulgate NSPS for GHG emissions from oil and gas sources, the EPA must first make a pollutant-specific significant contribution finding, including specifying a standard or criterion for significance.

The EPA rejects the commenters' arguments. In essence, commenters seek to minimize the importance of the joint resolution in order to argue that the EPA must rescind most of the 2016 NSPS OOOOa on grounds that it is inconsistent with CAA section 111's requirements, as the commenters see them. However, such a rescission rule would be substantially the same as the 2020 Policy Rule, and is therefore precluded by the joint resolution.

The central features of the disapproved 2020 Policy Rule were its position that the transmission and storage segment is separate from the production and processing segments; its position that a GHG-specific significant contribution finding, supported by standards or criteria for determining significance, was a necessary predicate for regulating GHG emissions; and the statutory interpretations that underlay those positions. In addition, the legislative history of the CRA resolution made clear that Congress disapproved the 2020 Policy Rule because it rejected those positions and the underlying legal interpretations. Thus, a rule that adopted the same positions and interpretations as the 2020 Policy Rule would be precluded by the joint resolution as substantially the same as the 2020 Policy Rule.

Looked at another way, the commenters' in essence argue that the EPA should withdraw the November 2021 Proposal and the December 2022 Supplemental Proposal and instead propose and promulgate a rule stating that the EPA is not authorized to further regulate oil and gas sources, including promulgating emission guidelines, unless it lists the transmission and storage segment as a separate source category and makes a pollutant-specific significant contribution finding for GHGs,[150] based on standards or criteria for determining significance. However, such a rule would also be precluded by the joint resolution as substantially the same as the key aspects of the 2020 Policy Rule because it would be based on the same statutory interpretations as that rule. Indeed, it is difficult to see what effect the disapproval would have if not to preclude the EPA from re-instating the positions and underlying legal interpretations included in the 2020 Policy Rule.

These commenters also err in asserting that the legislative history is irrelevant. Agencies and courts regularly look to legislative history to inform their actions and decisions. This makes particular sense in the case of a CRA joint resolution given the very limited language Congress may use in the joint resolution itself. Commenters also argue that the EPA's position that the joint resolution of disapproval applies to the legal and policy positions in the 2020 Policy Rule would call into question the interpretations of CAA section 111 that the rule included that are noncontroversial and necessary to proper implementation of the provision. There is no reason to think that Congress would have objected to those interpretations, but in any event, this argument by commenters makes clear that the joint resolution's legislative history is useful because it clarifies which interpretations and positions in the rule that Congress did object to.

After reviewing the text of the disapproval and, separately, the disapproval resolution's legislative history, the EPA is proceeding with further rulemaking under CAA section 111 for sources in the Crude Oil and Natural Gas source category. With the 2016 Rule reinstated by the operation of the CRA resolution, the EPA is revising and adding certain NSPS and is promulgating emission guidelines for existing sources. These actions apply to sources in the transmission and storage segment, and apply to methane emissions. This rule is fully consistent with the CRA joint resolution.

[149] S.J. Res.14—117th Congress, Public Law 117–23.

[150] As noted above, commenters' argument that the EPA must make a pollutant-specific significant contribution finding for GHG emissions from the source category has been addressed because the 2016 NSPS OOOOA made such a finding in the alternative.

VI. Other Actions and Related Efforts

This section of this preamble describes related state actions and other Federal actions regulating oil and natural gas emissions sources; industry and voluntary efforts to reduce methane emissions from this sector; and other EPA programs to reduce methane emissions, including the Methane Emissions Reduction Program that was signed into law as part of the Inflation Reduction of 2022. The final NSPS OOOOb and EG OOOOc include specific measures that build on the experience and knowledge the Agency and industry have gained through voluntary programs and previous regulatory efforts, as well as the leadership of the states in developing their own regulatory programs. The final NSPS OOOOb and EG OOOOc consists of reasonable, proven, cost-effective technologies and practices that reflect the evolutionary nature of the oil and natural gas industry and these proactive regulatory and voluntary efforts.

At the same time, the final NSPS OOOOb and EG OOOOc reflect the EPA's unique authority and responsibility under the CAA to ensure that new and existing sources throughout the nation are subject to appropriate standards of performance through NSPS and approved state plans. By requiring all owners and operators of the sources regulated in this final rulemaking to limit methane emissions, the EPA intends to achieve methane emission reductions on a more consistent and comprehensive basis than has been achieved through current programs and efforts. Direct Federal regulation of methane and VOCs from new sources, combined with approved state plans that are consistent with the EPA's EG for methane from existing sources, will bring national consistency to the regulatory landscape, help promote technological innovation, and reduce both climate- and other health-harming pollution from a large number of sources that are either currently unregulated or where additional cost-effective reductions are available.

A. Related State Actions and Other Federal Actions Regulating Oil and Natural Gas Sources

The EPA recognizes that several states currently regulate emissions from the oil and natural gas industry.[151] The EPA also recognizes that some of these state programs have been expanded and strengthened since the EPA began implementing its 2012 NSPS and subsequent 2016 NSPS. These state-level efforts have been important in spurring the deployment of emission control technologies and practices, and developing a broad base of experience that has informed the final rule. At the same time, the EPA recognizes that state-level regulatory efforts cannot, alone, address the increasingly dangerous impacts of methane emissions on public health and welfare. State agencies regulate in accordance with their own authorities and within their own respective jurisdictions; as a result, there is considerable variation in the scope and stringency of such programs. Collectively, these programs do not fully address the range of sources and emission reduction measures contained in this rulemaking. The EPA is committed to working within its authority to provide opportunities to align its programs with these existing state programs in order to reduce regulatory redundancy where appropriate.

In addition to states, certain Federal agencies also regulate aspects of the oil and natural gas industry pursuant to their own authorities. The EPA has maintained an ongoing dialogue with its Federal partners during the development of this final rulemaking in order to avoid potential regulatory conflicts and unnecessary regulatory obligations on the part of owners and operators as each agency responds to its particular statutory charge.

The below description summarizes other Federal regulations and programs related to air emissions from the oil and natural gas industry. The U.S. Department of the Interior (DOI) regulates the extraction of oil and gas from Federal and Indian lands. DOI bureaus that are responsible for administering natural resources conservation and safety related to onshore and offshore energy development include the Bureau of Land Management (BLM) (Federal onshore fossil fuel related activities), the Bureau of Safety and Environmental Enforcement (Federal offshore safety and environmental protection of oil and gas development), and the Bureau of Ocean Energy Management (BOEM) (Federal offshore oil and gas related activities). The BLM manages the Federal Government's onshore subsurface mineral estate—about 700 million acres (30 percent of the U.S.)—for the benefit of the American public. The BLM maintains the Federal onshore oil and gas leasing program pursuant to the Mineral Leasing Act, the Mineral Leasing Act for Acquired Lands, the Federal Land Management and Policy Act, and the Federal Oil and Gas Royalty Management Act. The BLM's oil and gas operating regulations are found in 43 CFR part 3160. An oil and gas operator's general environmental and safety obligations for onshore activities are found at 43 CFR 3162.5. Pursuant to a delegation of Secretarial authority, the BLM also oversees oil and gas operations on many Indian/Tribal leases.

The BLM has the express authority and responsibility to regulate both for the prevention of waste and the protection of the environment for operations on Federal and Indian lands. This responsibility includes promulgating regulations to reduce the waste of natural gas from oil and gas leases administered by the BLM. This gas is lost during oil and gas exploration and production activities through venting, flaring, and leaks. More detailed information can be found at the BLM's website: *https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/methane-and-waste-prevention-rule.*

BOEM manages the development of U.S. Outer Continental Shelf (offshore) energy and mineral resources. BOEM has air quality jurisdiction in the Gulf of Mexico [152] and the North Slope Borough of Alaska.[153] BOEM also has air jurisdiction in Federal waters on the Outer Continental Shelf 3–9 miles offshore (depending on the state) and beyond. The Outer Continental Shelf Lands Act (OCSLA), section 5(a)(8) states, ''The Secretary of the Interior is authorized to prescribe regulations 'for compliance with the national ambient air quality standards pursuant to the CAA . . . to the extent that activities authorized under [the Outer Continental Shelf Lands Act] significantly affect the air quality of any state.' '' The EPA and states have the air jurisdiction onshore and in state waters, and the EPA has air jurisdiction offshore in certain areas. More detailed information can be found at BOEM's website: *https://www.boem.gov/.*

The U.S. Department of Transportation (DOT) manages the U.S. transportation system. Within DOT, the Pipeline and Hazardous Materials Safety Administration (PHMSA) is responsible for regulating and ensuring the safe and secure transport of energy and other hazardous materials to industry and consumers by all modes of transportation, including pipelines.

[151] The EPA summarized examples of state programs in the November 2021 Proposal and November 2021 TSD. See 86 FR 63137 and Document ID No. EPA–HQ–OAR–2021–0317–0166.

[152] The CAA gave BOEM air jurisdiction west of 87.5 degrees longitude in the Gulf of Mexico region.

[153] The Consolidated Appropriations Act of 2012 gave BOEM air jurisdiction in the North Slope Borough of Alaska.

While PHMSA regulatory requirements for gas pipeline facilities have focused on human safety, which has attendant environmental co-benefits, the ''Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2020'' (Pub. L. 116–260, Division R; ''PIPES Act of 2020''), which was signed into law on December 27, 2020, revised PHMSA organic statutes to emphasize the centrality of environmental safety and protection of the environment in PHMSA decision making. For example, the PHMSA's Office of Pipeline Safety ensures safety in the design, construction, operation, maintenance, and incident response of the U.S.' approximately 3.3 million miles of natural gas and hazardous liquid transportation pipelines. When pipelines are maintained, the likelihood of environmental releases like leaks are reduced.[154] In addition, the PIPES Act of 2020 contains several provisions that specifically address the minimization of releases of natural gas from pipeline facilities, such as a mandate that the Secretary of Transportation promulgate regulations related to gas pipeline LDAR programs. More detailed information can be found at PHMSA's website: *https://www.phmsa.dot.gov/.*

The U.S. Department of Energy (DOE) develops oil and natural gas policies and funds research on advanced fuels and monitoring and measurement technologies. Specifically, the Advanced Research Projects Agency-Energy (ARPA–E) program advances high-potential, high-impact energy technologies that are too early for private-sector investment. APRA–E awardees are unique because they are developing entirely new technologies. More detailed information can be found at ARPA–E's website: *https://arpa-e.energy.gov/.* Also, the U.S. Energy Information Administration (EIA) compiles data on energy consumption, prices, including natural gas, and coal. More detailed information can be found at the EIA's website: *https://www.eia.gov/.*

The U.S. Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity, natural gas,[155] and oil.[156] FERC also reviews proposals to build liquefied natural gas terminals and interstate natural gas pipelines, and licenses hydropower projects. FERC's responsibilities for the crude oil industry include the following: regulation of rates and practices of oil pipeline companies engaged in interstate transportation; establishment of equal service conditions to provide shippers with equal access to pipeline transportation; and establishment of reasonable rates for transporting petroleum and petroleum products by pipeline. FERC's responsibilities for the natural gas industry include the following: regulation of pipeline, storage, and liquefied natural gas facility construction; regulation of natural gas transportation in interstate commerce; issuance of certificates of public convenience and necessity to prospective companies providing energy services or constructing and operating interstate pipelines and storage facilities; regulation of facility abandonment, establishment of rates for services; regulation of the transportation of natural gas as authorized by the Natural Gas Policy Act and OCSLA; and oversight of the construction and operation of pipeline facilities at U.S. points of entry for the import or export of natural gas. FERC has no jurisdiction over construction or maintenance of production wells, oil pipelines, refineries, or storage facilities. More detailed information can be found at FERC's website: *https://www.ferc.gov/.*

B. Industry and Voluntary Actions To Address Climate Change

Separate from regulatory requirements, some owners or operators of facilities in the oil and natural gas industry choose to participate in voluntary initiatives to reduce methane emissions from their operations. Over 100 oil and natural gas companies have participated in the EPA Natural Gas STAR Program and Methane Challenge partnership over the past several decades. Owners or operators also participate in a growing number of voluntary programs unaffiliated with the EPA voluntary programs; the EPA is aware of at least 19 such initiatives.[157] Firms participate in voluntary environmental programs for a variety of reasons, including attracting customers, employees, and investors who value more environmentally-responsible goods and services; finding approaches to improve efficiency and reduce costs; and preparing for or helping inform future regulations.[158] [159]

The EPA's Natural Gas STAR Program started in 1993 with the objective of achieving methane emission reductions through implementation of cost-effective best practices and technologies. Through the program, partner companies documented their voluntary emission reduction activities and reported their accomplishments to the EPA annually. Over the course of the Natural Gas STAR Partnership from 1993 to 2022, the EPA collaborated with over 100 companies across the natural gas value chain. Through the partnership, the EPA tracked more than 150 different methane-reducing activities and technologies which it then shared among partners and through the program website. Between 1993 and 2020, partner companies reported cumulative methane emissions reductions of nearly 1.7 trillion cubic feet.

The EPA's Methane Challenge Program was launched in 2016 to expand upon the Natural Gas STAR Program by providing partner companies the opportunity to make ambitious, quantifiable emissions reduction commitments, provide detailed, transparent reporting, and receive partner recognition. Annually, Methane Challenge Partners submit facility-level reports that characterize methane emission sources at their facilities and detail voluntary actions taken to reduce methane emissions. The EPA emphasizes the importance of transparency by publishing these facility-level data. Since its inception, the Methane Challenge Program has included nearly 70 companies and currently has 54 active partners, primarily from the transmission and distribution segments.

Other voluntary programs for the oil and natural gas industry are administered by numerous organizations, including trade associations and non-profits. These voluntary efforts have helped reduce methane emissions beyond what is required by current regulations, as well as to significantly expand the understanding of methane mitigation measures within the industry and among Federal and state regulators. Although the EPA recognizes and commends the value of these programs, such voluntary efforts are not legally

[154] See Final Report on Leak Detection Study to PHMSA. December 10, 2012. *https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/technical-resources/pipeline/16691/leak-detection-study.pdf.*

[155] *https://www.ferc.gov/industries-data/natural-gas.*

[156] *https://www.ferc.gov/industries-data/oil.*

[157] Highwood Emissions Management (2021). ''Voluntary Emissions Reduction Initiatives for Responsibly Sourced Oil and Gas.'' Available for download at: *https://highwoodemissions.com/research/.*

[158] Borck, J.C. and C. Coglianese (2009). ''Voluntary Environmental Programs: Assessing Their Effectiveness.'' Annual Review of Environment and Resources 34(1): 305–324.

[159] Brouhle, K., C. Griffiths, and A. Wolverton. (2009). ''Evaluating the role of EPA policy levers: An examination of a voluntary program and regulatory threat in the metal-finishing industry.'' Journal of Environmental Economics and Management. 57(2): 166–181.

binding and do not alter the EPA's own statutory responsibility to regulate methane emissions from this sector under the CAA. Moreover, as the information and analysis reflected in this final rulemaking make clear, there is still considerable need and opportunity to further reduce methane emissions from the industry.

C. Methane Emissions Reduction Program

In August 2022, Congress passed, and President Biden signed, the Inflation Reduction Act of 2022 into law. Section 60113 of the Inflation Reduction Act of 2022 amended the CAA by adding section 136, ''Methane Emissions and Waste Reduction Incentive Program for Petroleum and Natural Gas Systems'' (also referred to as the ''Methane Emissions Reduction Program'').

Subsections (a) and (b) of CAA section 136 provide $1.55 billion for the Methane Emissions Reduction Program, including for incentives for methane mitigation and monitoring. The EPA is partnering with the DOE and National Energy Technology Laboratory to provide financial assistance for monitoring and reducing methane emissions from the oil and gas sector, as well as technical assistance to help implement solutions for monitoring and reducing methane emissions. As designed by Congress, these incentives were intended to complement the regulatory programs and to help facilitate the transition to a more efficient petroleum and natural gas industry.

On August 1, 2023, the EPA proposed revisions to GHGRP subpart W consistent with the authority and directives set forth in CAA section 136(h), as well as the EPA's authority under CAA section 114 (88 FR 50282). In that rulemaking, the EPA proposed revisions to require reporting of additional emissions or emissions sources to address potential gaps in the total methane emissions reported by facilities to GHGRP subpart W. For example, these proposed revisions would add a new emissions source, referred to as ''other large release events,'' to capture large emissions events that are not accurately accounted for using existing methods in GHGRP subpart W. The EPA also proposed revisions to add or revise existing calculation methodologies to improve the accuracy of reported emissions, incorporate additional empirical data, and allow owners and operators of applicable facilities to submit empirical emissions data that could appropriately demonstrate the extent to which a charge is owed in implementation of CAA section 136, as directed by CAA section 136(h). The EPA also proposed revisions to existing reporting requirements to collect data that would improve verification of reported data, ensure accurate reporting of emissions, and improve the transparency of reported data. Additionally, the EPA proposed revisions that would align GHGRP subpart W with other EPA programs and regulations, including proposing revisions to certain requirements in GHGRP subpart W relative to the requirements proposed for NSPS OOOOb and the presumptive standards proposed in EG OOOOc (such that, as applicable, facilities would use a consistent method to demonstrate compliance with multiple EPA programs once their emission sources are required to comply with either the final NSPS OOOOb or an approved state plan or applicable Federal plan in 40 CFR part 62).

CAA section 136(c) directs the Administrator of the EPA to ''impose and collect a charge on methane emissions that exceed an applicable waste emissions threshold under subsection (f) from an owner or operator of an applicable facility that reports more than 25,000 metric tons of carbon dioxide equivalent (CO_2 Eq.) of GHG emitted per year pursuant to subpart W of part 98 of title 40 (40 CFR part 98), regardless of the reporting threshold under that subpart'' (hereinafter, waste emissions charge). An ''applicable facility'' is defined under CAA section 136(d) to include nine specific industry segments as defined in GHGRP subpart W. Pursuant to CAA section 136(g), the waste emissions charge ''shall be imposed and collected beginning with respect to emissions reported for calendar year 2024 and for each year thereafter.''

CAA section 136(f) includes specific exemption from the waste emissions charge for certain applicable facilities that meet certain criteria, including what the EPA refers to as a ''regulatory compliance exemption.'' Specifically, CAA section 136(f)(6)(A) states that ''charges shall not be imposed pursuant to subsection (c) on an applicable facility that is subject to and in compliance with methane emissions requirements pursuant to subsections (b) and (d) of section 111 upon a determination by the Administrator that: (i) Methane emissions standards and plans pursuant to subsections (b) and (d) of section 111 have been approved and are in effect in all states with respect to the applicable facilities; and (ii) compliance with the requirements described in clause (i) will result in equivalent or greater emissions reductions as would be achieved by the proposed rule of the Administrator entitled 'Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review' (86 FR 63110; (November 15, 2021), if such rule had been finalized and implemented.'' Per CAA section 136(f)(6)(B), ''if the conditions in clause (i) or (ii) of subparagraph (A) cease to apply after the Administrator has made the determination in that subparagraph, the applicable facility will again be subject to the charge under subsection (c) beginning in the first calendar year in which the conditions in either clause (i) or (ii) of that subparagraph are no longer met.''

In the preamble to the December 2022 Supplemental Proposal, the EPA noted that implementation of CAA section 136 was outside the scope of the present rulemaking, and that the EPA intended to take one or more separate actions in the future to implement CAA section 136. However, the EPA requested comment on the criteria and approaches that the Administrator should consider in making the CAA section 136(f)(6)(A)(ii) ''equivalency determination'' in such separate future action. Consistent with our statements in the December 2022 Supplemental Proposal, the EPA is not taking any final actions to implement CAA section 136 in this action and these comments are therefore outside the scope of this final rule.

VII. Summary of Engagement With Pertinent Stakeholders

As part of the regulatory development process for this rulemaking, the EPA conducted extensive outreach with the public, states, Tribal nations, and a broad range of pertinent stakeholders in order to gather information from a variety of viewpoints. This engagement allowed the EPA to provide stakeholders with overviews of the November 2021 Proposal and the December 2022 Supplemental Proposal, and to explain to the public and pertinent stakeholders how to effectively engage in the regulatory process. Such outreach is consistent with several E.O.s that encourage the Federal government to have a robust public participation process in regulatory development, particularly for communities with EJ concerns. The EPA specifically identified a long list of stakeholders with which to engage throughout the rulemaking process—including, but not limited to, industry, small businesses, Tribal nations, and

communities most affected by, and vulnerable to, the impacts of the rule.[160]

Prior to the November 2021 Proposal, the EPA opened a public docket for pre-proposal input.[161] Throughout the rulemaking, the EPA engaged with pertinent stakeholders likely to be interested in this rulemaking in several ways, including through meetings, training webinars, round tables, public listening sessions, and a technical workshop. For example, the EPA hosted a two-part webinar training specifically targeted toward both communities with EJ concerns and Tribal nations on November 16 and 17, 2021. The purpose of this training event was for the EPA to facilitate stakeholder panel discussions and to provide background information and an overview of the November 2021 Proposal, as well as information on how to effectively engage in the regulatory process. Subsequently, on November 14, 2022, the EPA hosted a call for environmental groups and EJ communities; on November 17, 2022, the EPA held a webinar for both members of Tribal nations and communities; and on November 30, 2022, the EPA held a training for Tribal Environmental Professionals. In a second example, the EPA held a training for small businesses on May 25, 2021, November 18, 2021, and November 30, 2022, that provided an overview of how the oil and natural gas industry is regulated and offered information on how to participate in the rulemaking process. In a third example, the EPA held calls with the Association of Air Pollution Control Agencies and the National Association of Clean Air Agencies on December 6, 2022, and December 14, 2022. In addition, on November 14, 2022, the EPA held a meeting with industry and labor groups to provide an overview of the proposed supplemental changes to the rulemaking. Throughout the rulemaking process the EPA has met individually with hundreds of industry representatives, NGOs, technology vendors, academics, data companies, and others.[162] The EPA held 3-day virtual public hearings for all stakeholders on both the November 2021 Proposal and the December 2022 Supplemental Proposal.

The EPA notes that the implementing regulations (40 CFR part 60, subpart Ba) require states to include a description of how they have engaged with pertinent stakeholders in the development of their state plans implementing the EG in their state plan submission to the EPA (to implement EG OOOOc). The EPA has led by example and demonstrated various examples of engagement with pertinent stakeholders so that states—while not limited by the EPA's outreach examples—will have a model for how they can structure their own outreach. For additional discussion on meaningful engagement as related to the development of state plans implementing the EG, please see section XIII.C.6 of this preamble.[163]

VIII. Overview of Control and Control Costs

A. Control of Methane and VOC Emissions in the Crude Oil and Natural Gas Source Category—Overview

As described in the November 2021 Proposal and the December 2022 Supplemental Proposal, the EPA reviewed the standards in the 2012 NSPS OOOO and 2016 NSPS OOOOa pursuant to CAA section 111(b)(1)(B). Based on this review, the EPA is finalizing revisions to the standards for a number of affected facilities to reflect the updated BSER for those affected facilities. Where our analyses show that the BSER for an affected facility remains the same, the EPA is finalizing to retain the current standard for that affected facility. In addition to the review of the existing standards, the EPA is finalizing new standards for GHGs (in the form of limitation on methane) and VOCs for some sources that were previously unregulated under NSPS OOOO and NSPS OOOOa. The NSPS OOOOb would apply to new, modified, and reconstructed emission sources across the Crude Oil and Natural Gas source category for which construction, reconstruction, or modification is commenced after December 6, 2022.

Further, pursuant to CAA section 111(d), the EPA is finalizing EG, which include presumptive standards for GHGs (in the form of limitations on methane) (designated pollutant), for certain existing emission sources across the Crude Oil and Natural Gas source category in EG OOOOc. While the requirements in NSPS OOOOb would apply directly to new sources, the requirements in EG OOOOc are for states to use in the development of plans that establish standards of performance that will apply to existing sources (designated facilities).

B. How does the EPA evaluate control costs in this final action?

Section 111 of the CAA requires the EPA to consider a number of factors, including cost, in determining ''the best system of emission reduction . . . adequately demonstrated.'' CAA section 111(a)(1). The D.C. Circuit has long recognized that ''[CAA] section 111 does not set forth the weight that [ ] should [be] assigned to each of these factors;'' therefore, ''[the court has] granted the agency a great degree of discretion in balancing them.'' *Lignite Energy Council* v. *EPA,* 198 F.3d 930, 933 (D.C. Cir. 1999). The courts have recognized that the EPA has ''considerable discretion under [CAA] section 111,'' *id.,* on how it considers cost under CAA section 111(a)(1). As the Supreme Court has more recently noted, ''[i]t will be up to the Agency to decide (as always, within the limits of reasonable interpretation) how to account for cost.'' *Michigan* v. *EPA,* 576 U.S. 743, 759 (2015). A more detailed description of relevant case law guiding the EPA's consideration of costs is set forth in section IV.A of this document and in the November 2021 Proposal. See 86 FR at 63133, 63154 (November 15, 2021). For the purposes of this final rule, we use the term ''reasonable'' to describe costs which, based on our evaluation, are considered to be well within the boundaries of our discretion granted by Congress and recognized by the courts.

As explained in further detail below, the EPA has determined that the costs of controls associated with the BSER for the final NSPS OOOOb and EG OOOOc are reasonable. In reaching this determination, the EPA conducted numerous cost analyses, described in detail in section XII of the November 2021 Proposal, Section IV of the December 2022 Supplemental Proposal, and section XI of this preamble—all of which discuss the BSER determinations for each of the regulated emissions sources—and in the final rule TSD in the docket for this rulemaking.

In evaluating whether the cost of a control is reasonable, the EPA considers various associated costs, including capital costs and operating costs, when evaluating the BSER for each emission source. In addition, as discussed further below, the Agency considered the costs of the collective standards for the final NSPS OOOOb and EG OOOOc in the context of the industry's overall capital expenditures and revenues. As discussed in more detail below, the capital expenditures in pollution control estimated to result from this

[160] For a list of the EPA's engagement with pertinent stakeholders, please see Memorandum in EPA–HQ–OAR–2021–0317.

[161] EPA Document ID No. EPA–HQ–OAR–2021–0317–0295.

[162] See various stakeholder meeting memoranda reflected in EPA's Docket ID No. EPA–HQ–OAR–2021–0317.

[163] To better inform this final rulemaking, the EPA analyzed the characteristics of communities with EJ concerns. Please see the discussion in section XVI.F of this preamble and the RIA for additional information.

rulemaking represent 2–3 percent of the industry's annual capital expenditures. The estimated total annual expenditures represent less than one percent of the industry's annual revenue. Neither estimate includes increased industry revenue from the sales of captured gas resulting from pollution controls, which offsets some of these costs. At the same time, this rulemaking is estimated to reduce 58 million short tons of methane from 2024 to 2038—representing a 79 percent reduction in projected emissions from the sources covered in this rulemaking.[164]

As discussed in more detail in the November 2021 Proposal, see 86 FR 63154–7 (November 15, 2021), the EPA also considers a cost effectiveness analysis to be a useful metric, as it provides a means of evaluating whether a given control achieves emissions reduction at a reasonable cost and allows comparisons of relative costs and outcomes (effects) of two or more options. Cost effectiveness also provides a means of assessing consistency across rules regulating, and sectors regulated for, the same pollutant. In the context of an air pollution control option, cost effectiveness typically refers to the annualized cost of implementing an air pollution control measure divided by the amount of pollutant reductions realized annually. Notably, a cost effectiveness analysis is not intended to constitute or approximate a benefit-cost analysis in which monetized benefits are compared to costs, but rather is intended to provide a metric to compare the relative cost of emissions reductions. As explained in further detail in the November 2021 Proposal and the December 2022 Supplemental Proposal, the EPA estimated the cost effectiveness values of the various control options assessed for this rulemaking using the best information available to the Agency. The sources upon which the EPA relied in assessing cost effectiveness are described in detail in the TSDs and include studies by academia, non-governmental organizations, and state and Federal agencies. The EPA also relied upon costs and emissions data, as well as information related to technical limitations, submitted by members of the affected industry, including oil and gas production companies, and control device vendors and numerous other stakeholders,[165] in the form of public comments in this rulemaking and previous rulemakings. The EPA also relied upon financial information provided by industry organizations that represent small businesses, such as the Michigan Oil & Gas Association (MOGA).[166]

The EPA used two approaches to determine cost effectiveness in this rulemaking. The first approach—the ''single-pollutant cost effectiveness approach''—assigns all costs to the emission reduction of one pollutant and zero costs to all other concurrent reductions; where the cost of the control is reasonable for reducing any of the targeted pollutants alone, the cost is reasonable for all concurrent emissions reductions (because these additional pollutants are reduced at no additional cost). The second approach—the ''multipollutant cost effectiveness approach''—apportions annualized cost of all pollutant reductions achieved by the control option in proportion to the relative percentage reduction of each pollutant controlled. A more detailed explanation of these approaches is set forth at 86 FR 63154–56 (November 15, 2021) and 87 FR 74718–19 (December 6, 2022).

As such, in the individual BSER analyses set forth in further detail section XII of the November 2021 Proposal, Section IV of the December 2022 Supplemental Proposal, and section XI of this preamble, for each control required in the final NSPS OOOOb, if a device is cost-effective under either of these two approaches, it is considered cost-effective. For EG OOOOc, which regulates only methane, a control is considered reasonable if it is cost-effective under the single-pollutant cost effectiveness approach. In addition to evaluating the annual average cost effectiveness of a control option, the EPA also considered the incremental costs associated with increasing the stringency of emissions standards in determining the appropriate level of stringency. See 86 FR 63156 (November 15, 2021) and 87 FR 74718–19 (December 6, 2022) for further details on incremental cost effectiveness analysis.

The EPA provides the cost effectiveness estimates for reducing VOC and methane emissions for various control options considered in the November 2021 Proposal and the December 2022 Supplemental Proposal, as well as in section XI of this preamble and associated TSDs. With respect to VOC emissions, the EPA finds that cost effectiveness values up to $5,540/ton of VOC reduction are reasonable for controls that we have identified as BSER in the final NSPS OOOOb and EG OOOOc. These VOC values are within the range of what the EPA has historically considered to represent cost-effective controls for the reduction of VOC emissions, including in the 2016 NSPS, based on the Agency's long history of regulating a wide range of industries.[167]

For methane, the 2016 NSPS OOOOa was the first national standard for reducing methane emissions. Accordingly, at that time, the EPA considered a variety of information in evaluating whether the costs of control that would be imposed by the final NSPS and presumptive EG standards in this action are reasonable. As discussed in the November 2021 Proposal, the EPA previously determined that methane cost effectiveness values for the controls identified as BSER for the 2016 NSPS OOOOa, which ranged up to $2,185/ton of methane reduction, represent reasonable costs for the industry as a whole to bear to reduce pollution. 86 FR 63155 (November 15, 2021). The reasonableness of the methane value selected in that rulemaking is reinforced by the fact that sources have been complying with the 2016 NSPS OOOOa for years without deleterious effect on the industry as a whole, which indicates that the NSPS OOOOa standards are not unduly burdensome from a cost perspective. The final standards in this rulemaking similarly reflect control mechanisms and measures that many companies and sources around the country are already implementing—again, without deleterious effect on industry as a whole—which shows not only that such controls are ''adequately demonstrated'' but also underscores their reasonableness from a cost perspective.

[164] The percent reduction is calculated as the ratio of the sum of estimated emissions reductions for the NSPS from 2024–2038 and for the EG from 2028–2038 to the sum of estimated baseline emissions for the NSPS from 2024–2038 and for the EG from 2028–2038.

[165] For a more detailed summary of engagement and pertinent stakeholders that the EPA has engaged with, please see section VII of this preamble.

[166] See section XVII.C. of this preamble for summary of the EPA's final regulatory flexibility analysis (FRFA) for this action.

[167] The EPA has never established a bright line value with respect to cost effectiveness of VOC reductions under CAA section 111, because the cost effectiveness conclusions in individual rulemakings can be influenced by a variety of factors. Nonetheless, the cost effectiveness values determined to be reasonable for VOC reductions in this action are consistent with values the EPA has determined to be reasonable in actions for other industries. See, *e.g.,* 88 FR 29978 (May 9, 2023) (finding control measures available at $6,800/ton of VOC reduced reasonable for Automobile and Light Duty Truck Surface Coating Operations); 87 FR 35608 (June 10, 2022) (proposing to find control measures available for Bulk Gasoline Terminals with incremental cost effectiveness reasonable at $4,020/ton of VOC reduced and unreasonable at $8,300/ton of VOC reduced).

For methane, the controls that we have identified as BSER in the final NSPS OOOOb and EG OOOOc to be reasonable at cost-effectiveness values up to $2,048/ton of methane reduction. The fact that the cost effectiveness estimates for the final standards in this action are comparable to (and in many individual instances, lower than) the cost effectiveness values estimated for the controls that served as the basis (*i.e.,* BSER) for the standards in the 2016 NSPS OOOOa, which have been in place for years, reinforces the conclusion that the final NSPS and presumptive standards in this rule are also cost-effective and reasonable.

As explained in further detail in the November 2021 Proposal, when determining the overall costs of implementation of the control technology and the associated cost effectiveness, the EPA takes into account cost savings from any natural gas recovered instead of vented as a result of the emissions controls. In our analysis, we consider any natural gas that is either recovered or not emitted as a result of a control option as being ''saved;'' we then apply the monetary value of the saved natural gas (estimated at $3.13 per Mcf),[168] as an offset to the control cost. Notably, this offset does not apply where the owner or operator does not own the gas and would not likely realize the monetary value of the natural gas saved (*e.g.,* transmission stations and storage facilities). Detailed discussions of this approach are presented in section 2 of the RIA and at 86 FR 63156 (November 15, 2021).

We also updated the two additional analyses that the EPA performed for both the November 2021 Proposal and the December 2022 Supplemental Proposal to further inform our determination of whether the cost of control of the collection of standards would be reasonable, similar to compliance cost analyses we have completed for other NSPS.[169] The two additional analyses include: (1) a comparison of the capital costs incurred by compliance with the rulemaking to the industry's estimated new annual capital expenditures, and (2) a comparison of the annualized costs that would be incurred by compliance with the final NSPS and presumptive EG standards to the industry's estimated annual revenues. In this section, the EPA provides updated information regarding these cost analyses based on the standards described in this document. See 86 FR 63156–7 (November 15, 2021) and 87 FR 74718–19 (December 6, 2022) for additional discussion on these two analyses. The results of both analyses, described in more detail in the following paragraphs, each independently demonstrate the reasonableness of the cost-effectiveness values applied in this final NSPS OOOOb and EG OOOOc, as well as demonstrate that the collective costs of the suite of final standards are reasonable in the context of the industry as a whole.

First, for the capital expenditures analysis, the EPA divided the nationwide capital expenditures projected to be spent to comply with the standards finalized in this rulemaking by an estimate of the total sector-level new capital expenditures for a representative year; this calculation shows the percentage that the nationwide capital cost requirements under the final standards represent of the total capital expenditures by the sector. The EPA combined the compliance-related capital costs under the final standards for NSPS OOOOb and for the presumptive standards in the final EG OOOOc in order to analyze the potential aggregate impact of the rulemaking. The equivalent annualized value (EAV) of the projected compliance-related capital expenditures over the 2024 to 2038 period is projected to be about $2.5 billion in 2019 dollars. We obtained new capital expenditure data for relevant NAICS codes for 2018–2021 from the 2019, 2020, and 2021 editions of the U.S. Census Annual Capital Expenditures Survey.[170] According to these data, new capital expenditures for the sector ranged from $79 billion in 2021 to $156 billion in 2019 w in 2019 dollars.[171] The wide range of annual expenditures across years are likely due to COVID–19-related impacts that dampened spending in 2020 and 2021. As such, while we conducted the analysis for all years from 2018 to 2021, we view the results for 2018 and 2019 as more representative of expected industry outlays going forward. Note that new capital expenditures in 2019 for pipeline transportation of natural gas (NAICS 4862) includes only expenditures on structures because data on equipment expenditures are withheld to avoid disclosing data for individual enterprises. As a result, the 2019 capital expenditures used here represent an underestimate of the sector's expenditures. Comparing the EAV of the projected compliance-related capital expenditures under this rule with the 2019 total sector-level new capital expenditures yields a percentage of about 1.6 percent, which is well below the percentage increase previously upheld by the courts as reasonable under CAA section 111. See detailed discussion at 86 FR 63156–7 (November 15, 2021) (citing *Essex Chem. Corp.* v. *Ruckelshaus,* 486 F.2d 427, 437–40 (D.C. Cir. 1973); *Portland Cement Ass'n* v. *Train,* 513 F.2d 506, 508 (D.C. Cir. 1975)). The same comparison for 2021 total sector-level new capital expenditures yields a percentage of about 3.2 percent.

Second, for the comparison of compliance costs to revenues, we used the EAV of the projected compliance costs both with and without projected revenues from product recovery under the rule for the 2024 to 2038 period, then divided the nationwide annualized costs by the annual revenues for the appropriate NAICS code(s) for a representative year in order to determine the percentage that the nationwide annualized costs represent of annual revenues. Like we do for capital expenditures, we combine the costs projected to be expended to comply with the standards for NSPS and the presumptive standards in the EG in order to analyze the potential aggregate impact of the rule. The EAV of the associated increase in compliance cost over the 2024 to 2038 period is projected to be about $2.7 billion without revenues from product recovery and about $1.7 billion with revenues from product recovery (in 2019 dollars). Revenue data for relevant NAICS codes were obtained from the U.S. Census 2017 County Business Patterns and Economic Census, the most recent revenue figures available.[172] According to these data, 2017 receipts for the sector were about $357 billion in 2019 dollars. Comparing the EAV of the projected compliance costs under the rulemaking with the sector-level

[168] This value reflects the forecasted Henry Hub price for 2022 from: U.S. Energy Information Administration. Short-Term Energy Outlook. *https://www.eia.gov/outlooks/steo/archives/may21.pdf.* Release Date: May 11, 2021.

[169] For example, see our compliance cost analysis in ''Regulatory Impact Analysis (RIA) for Residential Wood Heaters NSPS Revision. Final Report.'' U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. EPA–452/R–15–001, February 2015.

[170] U.S. Census Bureau, 2020 Annual Capital Expenditures Survey, table 4b. Capital Expenditures for Structures and Equipment for Companies with Employees by Industry: 2019 Revised, *https://www.census.gov/data/tables/2020/econ/aces/2020-aces-summary.html,* accessed July 12, 2022.

[171] The total capital expenditures for the same NAICS codes during 2018 and 2020 were about $154 billion and $90 billion, respectively, in 2019 dollars.

[172] 2017 County Business Patterns and Economic Census. The Number of Firms and Establishments, Employment, Annual Payroll, and Receipts by Industry and Enterprise Receipts Size: 2017, *https://www.census.gov/programs-surveys/susb/data/tables.2017.html,* accessed October 16. 2023.

receipts figure yields a percentage of about 0.8 percent without revenues from product recovery and about 0.5 percent with revenues from product recovery. More data and analysis supporting the comparison of capital expenditures and annualized costs projected to be incurred under the rule and the sector-level capital expenditures and receipts is presented in the TSD for this action, which is in the public docket.

Based on all of the cost-related information, data, and analyses described above, and as explained in further detail in the individual sections describing the BSER for each control in this preamble, the November 2021 Proposal, and the December 2022 Supplemental Proposal, the EPA concludes that the costs of the controls that serve as the basis the final NSPS OOOOb and EG OOOOc are reasonable.

Some commenters have argued that the EPA was required to perform a cost-benefit analysis of this rulemaking demonstrating that the costs outweigh the benefits, and have cited the Supreme Court's decision in *Michigan* v. *EPA,* 576 U.S. 743 (2015) in support of this contention. One commenter [173] contends that the EPA's proposal is not reasonable if the climate benefits are illusory, and questions ''[w]hat benefit-cost calculation makes the proposed regulatory surge a smart investment of public and private resources.'' The commenter also takes issue with the EPA's statement in the Supplemental Proposal that our ''monetized benefits analysis is entirely distinct from the statutory BSER determinations proposed herein and is presented solely for the purposes of complying with E.O. 12866,'' 87 FR 74843. The commenter cites one excerpt from the Supreme Court's decision *Michigan* in support of its argument: ''One would not say that it is even rational, never mind 'appropriate,' to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits . . . No regulation is 'appropriate' if it does significantly more harm than good.'' 576 U.S. at 752. Another group of commenters [174] quotes the same language from the case and asserts that the EPA must ''balance the costs associated with government regulation against compliance costs,'' and that the November 2021 Proposed Rule ''fails the cost-benefits test.''

The EPA is mindful of the Supreme Court's holding in *Michigan* and has carefully considered how it applies to this rulemaking. The EPA disagrees with the commenters insofar as they suggest that the EPA was required—under *Michigan* or any other authority—to undertake a formal cost-benefit analysis in this rulemaking. In *Michigan,* the Supreme Court concluded that the EPA erred when it concluded it could not consider costs when deciding whether it is ''appropriate and necessary'' under CAA section 112(n)(1)(A) to regulate hazardous air pollutants from electric utility steam generating units (power plants), despite the relevant statutory provision containing no specific reference to cost. 576 U.S. at 751. In doing so, the Court held that the EPA ''must consider cost—including, most importantly, cost of compliance—before deciding whether regulation is appropriate and necessary'' under CAA section 112. *Id.* at 759. In examining the language of CAA section 112(n)(1)(A), the Court concluded that the phrase ''appropriate and necessary'' was ''capacious'' and held that ''[r]ead naturally in the present context, the phrase 'appropriate and necessary' requires at least some attention to cost.'' *Id.* at 752. This capaciousness was relevant in the context of section 112(n)(1)(A) because that section directs the EPA to determine ''*whether* to regulate'' the emission source, which is a context in which ''[a]gencies have long treated cost as a centrally relevant factor.'' *Id.* at 753 (emphasis added).

The Supreme Court added in *Michigan* that it ''need not and [does] not hold that the law unambiguously required the Agency, when making this preliminary estimate [of costs under the 'appropriate and necessary' standard of CAA 112(n)(a)(1)], to conduct a formal cost-benefit analysis in which each advantage and disadvantage is assigned a monetary value. It will be up to the Agency to decide (as always, within the limits of reasonable interpretation) how to account for cost.'' *Id.* at 759.

Section 111 differs in material respects from the provision the Supreme Court interpreted in *Michigan.* Unlike the circumstances at issue in *Michigan,* the predicate decision *whether* to regulate the emission source has already been made here. CAA section 111(b)(1)(A) requires the Administrator to list a source category ''if, in his judgment, it causes or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.'' Notably, this provision does not hinge on a determination, like that under consideration in *Michigan* with respect to CAA section 112, that such listing is ''appropriate and necessary.'' Indeed, the EPA has long regulated emissions from the oil and gas source category, having first listed the source category in 1979. And once the EPA has listed a source category, CAA section 111(b)(1)(B) and (d)(1) require the EPA to promulgate new source performance standards and, for certain pollutants, emission guidelines for regulation of existing sources. Pursuant to this authority, the EPA has regulated VOC emissions since 1985 and GHG emissions (in the form of limitations on methane) since 2016. See section IV.B for further explanation of the regulatory history for the source category; and section V for further discussion of the EPA's authority to promulgate methane regulations.

Importantly, unlike the statutory provision at issue in *Michigan,* CAA section 111 already requires the EPA to consider costs when determining the appropriate level of control. Specifically, the ''standards of performance'' for new and existing sources finalized in this rule are ''standard[s] for emissions of air pollutants which reflect[] the degree of emission limitation achievable through the application of the best system of emission reduction which (*taking into account the cost of achieving such reduction* and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.'' CAA section 111(a)(1) (emphasis added). Thus, even if the Court's examination of CAA 112(n)(a)(1) in *Michigan* did apply to CAA section 111—which the EPA disputes—the EPA's decision here, unlike in the rule reviewed in *Michigan,* is not blind to costs. Rather, the EPA has satisfied the Court's directive to consider costs, both in the context of the individual BSER analyses for individual emissions source (as directed by the language of the statute) and in the context of the rule as a whole. Moreover, while the EPA is not required to undertake a ''formal cost-benefit analysis in which each advantage and disadvantage [of a regulation] is assigned a monetary value,'' *Michigan,* 576 U.S. at 759,[175] the EPA has contemplated and carefully considered both the advantages and disadvantages of the final NSPS OOOOb and EG OOOOc, including the qualitative and quantitative benefits of

[173] Document ID No. EPA–HQ–OAR–2021–0317–2359.

[174] Document ID No. EPA–HQ–OAR–2021–0317–0790.

[175] Accordingly, the EPA disagrees with the commenters that the EPA was required to demonstrate that the monetized benefits of the regulations outweigh the costs, and the EPA does not rely on the analysis of costs and benefits conducted to comply with E.O. 12866 for this purpose.

the regulation and the costs of compliance.

The primary disadvantage that the EPA has weighed in finalizing the NSPS OOOOb and EG OOOOc is the cost of compliance and the effects of those costs on industry. Notably, neither CAA section 111 nor *Michigan* directs that costs be considered in any particular way, and in this action, the EPA has considered costs using the same cost metrics that the EPA has historically used in numerous rulemakings under CAA section 111 for decades. As explained above, the EPA has used cost effectiveness as a metric to evaluate whether the costs associated with emissions reductions from a given technology are reasonable. This metric (widely used in environmental regulation) provides a way for the EPA to specifically consider the cost associated with each ton of reduction achieved by a particular control measure, and thereby determine whether the emission reductions achieved by the control measure are worthwhile, both as to the individual control measure in comparison to other available control measures, and in comparison to the regulation of the same pollutant in other industries. As explained in detail in section XI of this preamble, section XII of the November 2021 Proposal, and Section IV of the December 2022 Supplemental Proposal discussing the BSER determinations for each of the regulated emissions sources, the EPA has also considered costs in various other ways, including capital costs and operating costs, when evaluating the reasonableness of various control measures to determine the BSER.

In addition, the EPA conducted two cost analyses specifically for purposes of this action in order to evaluate the costs of compliance with the collective standards in the final NSPS OOOOb and EG OOOOc at a sector level and consider them in the context of the industry's overall capital expenditures and revenues. As explained in detail above, the EPA estimates that the capital costs expected to be incurred by compliance with the final NSPS OOOOb and EG OOOOc are about two to three percent of the industry's estimated new annual capital expenditures, and that the annualized compliance costs are less than one percent of the industry's estimated annual revenues. Notably, neither value includes increased industry revenue from the sales of captured gas resulting from pollution controls. Thus, while the industry will bear some costs to comply with the final NSPS OOOOb and EG OOOOc, each of these analyses supports the EPA's determination that the costs associated with compliance with the final standards are reasonable and consistent with costs of control that the source category has expended for years to comply with existing state and Federal standards, and on voluntary actions to reduce emissions.

In terms of advantages, the final NSPS OOOOb and EG OOOOc will have numerous benefits to the climate, the natural environment, and human health through their projected reductions in methane and VOC emissions. Regarding methane, the oil and natural gas sector is the largest source of industrial methane emissions in the U.S. As described in greater detail in section III.B.2, it represents 28 percent of U.S. anthropogenic methane emissions and three percent of overall U.S. GHG emissions. Moreover, methane is a powerful and potent GHG—over a 100-year timeframe, it is nearly 30 times more powerful at trapping climate warming heat than CO_2, and over a 20-year timeframe, it is 83 times more powerful. Because it is particularly potent and emitted in large quantities, methane mitigation provides one of the best opportunities to reduce near-term warming and offers important climate benefits.

The projected methane emissions reductions from the final NSPS OOOOb and EG OOOOc standards, for each regulated emission source and taken together as a whole, will contribute to avoided climate and human health impacts, which are described in greater detail in section III.A.1 of this preamble, as well as in section III.A of the November 2021 Proposal. Warming temperatures in the atmosphere, ocean, and land have led to, for example: increased numbers of heat waves, wildfires, and other severe weather events; reduced air quality; more intense hurricanes and rainfall events; and sea level rise. These environmental changes, along with future projected changes, endanger the physical survival, health, economic well-being, and quality of life of people living in the U.S., particularly those in the most vulnerable communities. As discussed in greater detail in section III.A.1, impacts from climate change driven by GHG emissions are wide-ranging in type and scope, and present serious threats to human life and the natural environment. For example, severe weather events and natural disasters exacerbated by climate change—such as droughts, floods, storm surges, wildfires, and heat waves—affect food security, air quality and respiratory health, availability of fresh drinking water, population stability, national security, participation in the workforce, and infrastructure and property, among many others. Other environmental impacts of climate change such as ocean acidification, altered plant growth, and increased concentrations of ozone also affect human health and well-being, in addition to that of the natural environment.

The final NSPS OOOOb and EG OOOOc standards are projected to reduce 58 million short tons of methane emissions from 2024 to 2038, which represents a 79 percent reduction in projected emissions from the sources covered in NSPS OOOOb and EG OOOOc. Accordingly, significantly reducing emissions of methane from the largest U.S. industrial source of this highly potent GHG will have meaningful climate benefits and environmental impacts, which will in turn have beneficial impacts on human health.

As described in more detail in section III.A.2, reducing VOC emissions will also benefit human health and the environment. The oil and natural gas sector represents the top anthropogenic U.S. sector for VOC emissions (after removing the biogenics and wildfire sectors), which is about 23 percent of total VOCs emitted by U.S. anthropogenic sources. See section III.B.2. VOCs can cause a variety of health concerns, including cancerous and noncancerous illnesses, particularly respiratory and neurological ones. VOCs are also one of the key precursors in the formation of ozone. Tropospheric, or ground-level, ozone is formed through reactions of VOC and NOx in the presence of sunlight; ozone formation can be controlled to some extent through reductions in emissions of the ozone precursors VOC and NOx. Health effects of ozone exposure include premature death from lung or heart diseases, as well as harmful symptoms and the development of asthma. Repeated exposure to ozone can also have harmful effects on sensitive plants and trees, which have the potential to impact ecosystems and the services they provide. The final NSPS OOOOb and EG OOOOc standards are projected to reduce 16 million short tons of VOC emissions from 2024–2038, which represent a 47 percent reduction in projected emissions from the sources covered in NSPS OOOOb and EG OOOOc.[176] Significant reductions in

[176] The percent reduction is calculated as the ratio of the sum of estimated emissions reductions for the NSPS from 2024–2038 and for the EG from 2028–2038 to the sum of estimated baseline emissions for the NSPS from 2024–2038 and for the EG from 2028–2038.

VOCs, like methane reductions, will have significant benefits to human health and the environment.

In consideration of all of this information, the EPA has concluded that, based on the totality of circumstances, the advantages that the rule provides—namely in the form of a substantial and meaningful reduction in methane and VOC pollution, and the associated positive impacts on public health and the natural environment (as discussed in detail in Section III.A)—outweigh its disadvantages, namely cost of industry compliance in the context of the industry's revenue and expenditures.

IX. Interaction of the Rules and Response to Significant Comments Thereon

A. What date defines a new, modified, or reconstructed source for purposes of the final NSPS OOOOb?

NSPS OOOOb would apply to all emissions sources (''affected facilities'') identified in the final 40 CFR 60.5365b that commenced construction, reconstruction, or modification after December 6, 2022.

Pursuant to CAA section 111(b), the EPA proposed NSPS for a wide range of emissions sources in the Crude Oil and Natural Gas source category in November 2021. Some of the proposed standards resulted from the EPA's review of the current NSPS codified at 40 CFR part 60 subpart OOOOa, while others were proposed standards for additional emissions sources that are currently unregulated. The emissions sources for which the EPA proposed standards in the November 2021 Proposal are as follows:

- Well completions
- Gas well liquids unloading operations
- Associated gas from oil wells
- Wet seal centrifugal compressors
- Reciprocating compressors
- Process controllers
- Pumps
- Storage vessels
- Collection of fugitive emissions components at well sites, centralized production facilities, and compressor stations
- Equipment leaks at natural gas processing plants
- Sweetening units

The EPA proposed standards for an additional emissions source, specifically dry seal centrifugal compressors, in the December 2022 Supplemental Proposal, while also providing numerous significant updates to the standards previously proposed in the November 2021 Proposal.

These final standards of performance apply to ''new sources.'' CAA section 111(a)(2) defines a ''new source'' as ''any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source.'' While the initial rulemaking proposing the standards for these emission sources was published November 15, 2021, due to many significant updates included in the December 2022 Supplemental Proposal, and the addition of dry seal centrifugal compressor proposed standards, the EPA is specifying that the ''new sources'' to which the final standards in NSPS OOOOb apply are those that commenced construction, reconstruction, or modification after December 6, 2022 (the date the supplemental proposal published in the **Federal Register**).

We received comments on the November 2021 Proposal that the proposal lacked regulatory text and therefore should not be used to define new sources for purposes of NSPS OOOOb.[177] The EPA disagrees that absence of a regulatory text in a proposal necessarily means that sources constructed after the date of the proposal cannot be ''new sources'' for purposes of an NSPS. Regardless, based on the unique facts and circumstances here, the EPA has concluded that only sources constructed, modified, or reconstructed after the date of the supplemental proposal should be considered new sources for the purposes of NSPS OOOOb.

On the unique facts and circumstances here, defining new sources based on the date of the supplemental proposal is consistent with CAA section 111(a)(2). That provision does not require the EPA to define new sources based on the date of the first proposal. Instead, CAA section 111(a)(2) states that a new source is ''any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source.'' The statute's general reference to ''proposed regulations'' gives the EPA discretion to determine which proposal (either an initial proposal or a supplemental proposal) should be used to define the universe of new sources in appropriate circumstances. For the reasons stated above, it is reasonable based on the facts and circumstances of this rule to define the date for NSPS OOOOb based on the date of the supplemental proposal. These facts and circumstances include that the supplemental proposal included several updates to the proposed standards and rationale supporting those standards for many different sources, and that the supplemental proposal included new standards for a new source of emissions not addressed by the initial proposal. For example, in the December 2022 Supplemental Proposal, the EPA proposed changes to the proposed standards for fugitives at well sites, the use of alternative monitoring approaches for fugitives, pumps, and standards for dry seal centrifugal compressors. Having potentially differing dates for various new sources (*e.g.,* one date for sources that the EPA did not propose changes in the December 2022 Supplemental Proposal and another date for sources that the EPA did propose changes to in the December 2022 Supplemental Proposal) that could be within the same facility would complicate the due dates for annual reporting. Having the same date for all sources at a facility will reduce burden on owners and operators to be able to have all annual reporting due simultaneously. Taken together, these facts support establishing the definition of new sources for purposes of NSPS OOOOb as those sources for which construction, modification, or reconstruction commenced after the date of the supplemental proposal.

Moreover, defining new sources as the EPA has described allows the EPA to establish a single new source definition for all NSPS OOOOb, which will streamline administration of the program for states and for the EPA. Because the supplemental proposal included proposed standards for certain sources not addressed in the initial proposal, if the EPA set the definition for new sources for NSPS OOOOb based on the dates upon which each of the standards were first proposed for each emissions source, the new source definition would run from the date of initial proposal for some sources of emissions, and the date of the supplemental proposal for others. Put another way, under that scenario, NSPS OOOOb would contain multiple definitions of ''new source'' which would differ from standard to standard. This complexity could make administration of the NSPS OOOOb unnecessarily cumbersome. Moreover, the time between the original November

[177] See Document ID Nos. EPA–HQ–OAR–2021–0317–0424, –0539, –0579, –0598, –0599, –0815, and –0929.

2021 Proposal and the December 2022 Supplemental Proposal was not vast. Within this single year, the EPA believes that a relatively modest number of sources commenced construction. While moving the applicability date for NSPS OOOOb does mean that these sources which commenced construction between the November 2021 Proposal and the December 2022 Supplemental Proposal will be considered ''existing sources'' for purposes of EG OOOOc instead of ''new sources'' under NSPS OOOOb, the EPA believes that this is an acceptable and preferred outcome when compared to the complexities associated with the alternative which are explained above. Notably, the EPA is also finalizing existing source EG in this action, which will ultimately require these sources to comply with standards of performance adopted in state plans under EG OOOOc.

B. What date defines an existing source for purposes of the final EG OOOOc?

The November 2021 Proposal and December 2022 Supplemental Proposal also included proposed emissions guidelines for states to follow to develop plans to regulate existing sources in the Crude Oil and Natural Gas source category under EG OOOOc. Under CAA section 111, relative to a particular NSPS, a source is considered either new, *i.e.,* construction, reconstruction, or modification commenced after a proposed NSPS is published in the **Federal Register** (CAA section 111(a)(2)), or existing, *i.e.,* any source other than a new source (CAA section 111(a)(6)). Accordingly, any source that is not subject to the proposed NSPS OOOOb as described is an existing source for purposes of EG OOOOc. As explained, the EPA is finalizing that for purposes of NSPS OOOOb new sources are those that commenced construction, reconstruction, or modification after December 6, 2022. Therefore, existing sources are those that commenced construction, reconstruction, or modification on or before December 6, 2022.

C. How will the final EG OOOOc impact sources already subject to NSPS KKK, NSPS OOOO, or NSPS OOOOa?

Sources currently subject to 40 CFR part 60, subpart KKK (NSPS KKK), 40 CFR part 60, subpart OOOO, or NSPS OOOOa would continue to comply with their respective VOC and methane standards until sources are subject to and in compliance with a state or Federal plan implementing EG OOOOc. While EG OOOOc specifically addresses methane and not VOC, any reductions from the methane standards established in a state or Federal plan implementing EG OOOOc will similarly reduce VOCs. Therefore, the EPA concludes that the methane presumptive standards in EG OOOOc will result in the same or greater emission reductions than the VOC and methane standards in previous NSPS KKK, NSPS OOOO, or NSPS OOOOa. Once sources are subject to and in compliance with a state or Federal plan implementing EG OOOOc, and if that plan is just as stringent as or more stringent than the presumptive standards in EG OOOOc, the source will be deemed to comply with the previous respective VOC NSPS, and no longer subject to the methane NSPS, and will comply with only the state or Federal plan implementing EG OOOOc. Because the EG OOOOc does not contain SO_2 standards, sources subject to SO_2 standards in NSPS OOOO or NSPS OOOOa would continue to comply with their respective SO_2 standards unless they modify and become subject to the requirements in NSPS OOOOb.

In this rulemaking, the EPA is finalizing standards for dry seal centrifugal compressor and intermittent vent process controllers for the first time in NSPS OOOOb and presumptive standards in EG OOOOc. These designated facilities (*i.e.,* dry seal centrifugal compressors and intermittent vent process controllers) are not subject to regulation under a previous NSPS. The EPA is also finalizing presumptive standards in EG OOOOc for fugitive emissions at compressor stations, pumps at natural gas processing plants, and process controllers at natural gas processing plants that are all the same or more stringent than previous standards in NSPS KKK, NSPS OOOO, and NSPS OOOOa, as applicable. Additionally, the final presumptive standards in EG OOOOc for pumps (excluding processing) and natural gas processing plant equipment leaks are more stringent than the standards in NSPS OOOOa for pneumatic pumps and the standards in NSPS KKK, NSPS OOOO, and NSPS OOOOa for natural gas processing plant equipment leaks.

For wet seal centrifugal compressors, two different standards are in place in the previous NSPS. NSPS KKK is an equipment standard that provides several compliance options including: (1) Operating the compressor with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure; (2) equipping the compressor with a barrier fluid system degassing reservoir that is routed to a process or fuel gas system, or that is connected by a CVS to a control device that reduces VOC emissions by 95 percent or more; or (3) equipping the compressor with a system that purges the barrier fluid into a process stream with zero VOC emissions to the atmosphere. NSPS KKK exempts a compressor from these requirements if it is either equipped with a closed vent system to capture and transport leakage from the compressor drive shaft back to a process or fuel gas system or to a control device that reduces VOC emissions by 95 percent, or if it is designated for no detectable emissions (NDE). NSPS OOOO and NSPS OOOOa require 95 percent reduction of emissions from each centrifugal compressor wet seal fluid degassing system. NSPS OOOO and OOOOa also allow the alternative of routing the emissions to a process. For sources transitioning from NSPS KKK to EG OOOOc, the EPA is finalizing a subcategory for wet seal centrifugal compressors at onshore natural gas processing plants for which construction, reconstruction, or modification commenced after January 20, 1984, and on or before August 23, 2011. This subcategory will apply to all sources that were previously subject to NSPS KKK, and have EG OOOOc presumptive standards that are equivalent to NSPS KKK with three compliance options including: (1) operating the compressor with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure; (2) equipping the compressor with a barrier fluid system degassing reservoir that is routed to a process or fuel gas system, or that is connected by a CVS to a control device that reduces methane emissions by 95 percent or more; or (3) equipping the compressor with a system that purges the barrier fluid into a process stream with zero methane emissions to the atmosphere. While EG OOOOc specifically addresses methane and not VOC, any reductions from the methane standards contained in this subcategory that reduce methane as established in a state or Federal plan implementing EG OOOOc will similarly reduce VOCs. Therefore, wet seal centrifugal compressors within this subcategory will only need to comply with a state or Federal plan implementing EG OOOOc and will then no longer need to comply with NSPS KKK. The EPA is not aware of any wet seal centrifugal compressors subject to NSPS OOOO or NSPS OOOOa, and the EPA believes that centrifugal compressors installed since those rules went into effect (August 2011 and September 2015) are utilizing dry seals rather than wet seals.

Similarly, there are two different standards for reciprocating compressors

in the previous NSPS: (1) NSPS KKK requires the use of a seal system and includes a barrier fluid system that prevents leakage of VOC to the atmosphere for reciprocating compressors located at natural gas processing plants, and (2) NSPS OOOO and NSPS OOOOa require changing out the rod packing every 3 years or routing emissions to a control. For sources transitioning from NSPS KKK to EG OOOOc, the EPA is finalizing a subcategory for reciprocating compressors at onshore natural gas processing plants for which construction, reconstruction, or modification commenced after January 20, 1984, and on or before August 23, 2011. This subcategory will apply to all sources that were previously subject to the VOC standards of NSPS KKK and have EG OOOOc presumptive standards that are equivalent to the VOC standards of NSPS KKK with the requirement of the use of a seal system and including a barrier fluid system that prevents leakage of methane to the atmosphere. Again, while EG OOOOc specifically regulates methane and not VOC, any methane standards contained in this subcategory that reduce methane as established in a state or Federal plan implementing EG OOOOc will similarly reduce VOCs. Therefore, reciprocating compressors within this subcategory will only need to comply with a state or Federal plan implementing EG OOOOc and will then no longer need to comply with NSPS KKK. For sources transitioning from NSPS OOOO and NSPS OOOOa, as previously explained in section XII.E.1.d of the November 2021 Proposal [178] and section IV.I of the December 2022 Supplemental Proposal, the EPA concludes that the final EG OOOOc presumptive methane standard is more efficient at discovering and reducing any emissions that may develop than the set 3-year replacement interval from NSPS OOOO and NSPS OOOOa. Overall, the final presumptive standards in EG OOOOc would result in more rod packing replacements, thereby reducing more emissions compared to the 3-year interval. Therefore, reciprocating compressors transitioning from NSPS OOOO and NSPS OOOOa only need to comply with a state or Federal plan implementing EG OOOOc, and will then be no longer needed to comply with NSPS OOOO or NSPS OOOOa.

The affected facility for storage vessels is defined in the NSPS OOOO and NSPS OOOOa as a single storage vessel with the potential to emit (PTE) greater than 6 tons of VOC per year and the standard that applies is 95 percent emissions reduction. Under the final EG OOOOc, the designated facility is a tank battery with the PTE greater than 20 tons of methane per year with the same 95 percent emission reduction standard. Affected facilities under NSPS OOOO or OOOOa that are part of a designated facility under the EG presumptive standard would be required to meet the 95 percent reduction standard, and therefore only need to comply with a state or Federal plan implementing EG OOOOc and will then no longer need to comply with NSPS OOOO or OOOOa. Affected facilities under NSPS OOOO or OOOOa that emit 6 tpy or more of VOCs but that do not meet the PTE 20 tons of methane per year definition would continue to comply with the 95-percent emissions reduction standard in their respective NSPS. Scenarios regarding further physical or operational changes in NSPS OOOOb that would reclassify sources from the previous NSPS and/or EG OOOOc into NSPS OOOOb are discussed in section IV.J.1.b of this preamble.

Similarly, process controller affected facilities not located at natural gas processing plants are defined as single high-bleed controllers with a low-bleed standard under NSPS OOOO and NSPS OOOOa, while the designated facility under EG OOOOc is defined as a collection of natural gas-driven process controllers at a site with a zero-emissions standard (discussed further in section IV.D of this preamble). Because the final zero-emissions presumptive standard in EG OOOOc is more stringent than the low-bleed standard found in the previous NSPS, sources only need to comply with a state or Federal plan implementing EG OOOOc and will then no longer need to comply with NSPS OOOO and OOOOa (assuming the state or Federal plan implementing EG OOOOc is as stringent as the presumptive standard of zero emissions in the final EG).

Lastly, standards for fugitive emissions from well sites under NSPS OOOOa require semiannual OGI monitoring on all components at the well site except for wellhead only well sites (which are not affected facilities), while the presumptive standards under the final EG OOOOc would require quarterly OGI monitoring with bimonthly audible, visual, and olfactory (AVO) inspections at well sites with major production and processing equipment, semiannual OGI combined with quarterly AVO inspections at multi-wellhead only well sites,[179] and quarterly AVO inspections for small sites and single wellhead well sites, as described in sections X and XI of this preamble. It is clear that the final presumptive standards in EG OOOOc for well sites with major production and processing equipment and the final presumptive standards for multi-wellheads only well sites are both more stringent than the semiannual OGI monitoring standard under NSPS OOOOa because one would require more frequent OGI monitoring while the other would require AVO inspections in addition to semiannual OGI monitoring. Therefore, these existing well sites only need to comply with a state or Federal plan implementing EG OOOOc and will then no longer need to comply with NSPS OOOOa. Likewise, as the EPA has concluded that the advanced methane detection technology periodic screening work practice being finalized in EG OOOOc is equivalent to the standard fugitive emissions work practice using OGI and AVO, the advanced methane detection technology periodic screening work practice being finalized in EG OOOOc is also more stringent than the OGI monitoring standard in NSPS OOOOa. In order to allow owners and operators to adopt implementation of these advanced methane detection technologies early, the EPA is finalizing in NSPS OOOOa an option for owners and operators to comply with the advanced methane detection technology work practices in NSPS OOOOb in lieu of the OGI surveys required in 40 CFR 60.5397a. The EPA recognizes that there are some differences between the definition of fugitive emissions component between EG OOOOc and NSPS OOOOa. In NSPS OOOOa, the EPA has clarified that if an owner or operator subject to NSPS OOOOa chooses to implement the advanced methane detection technology work practices in NSPS OOOOb the definitions in 40 CFR 60.5430b, which would include the definition of fugitive emissions component, apply for the purposes of the advanced methane detection technology work practice.

For existing single wellhead only well sites and small sites that are previously subject to the semiannual monitoring under NSPS OOOOa and transitioning to EG OOOOc, the EPA is concluding that, as explained in more detail in section IV.A of this preamble, AVO is effective, and therefore OGI is unnecessary, for detecting fugitive emissions from many of the fugitive emissions components at these sites. By

[178] 86 FR 63215–20 (November 15, 2021).

[179] Because of a difference in the definition of a wellhead only well site in NSPS OOOOa and the proposed EG OOOOc, some single and multi-wellhead only well sites could be subject to the semiannual OGI monitoring under NSPS OOOOa.

requiring more frequent visits to the sites, the final presumptive standard in EG OOOOc would allow earlier detection and repair of fugitive emissions, in particular large emissions from components such as thief hatches on uncontrolled storage vessels. The EPA concludes that the final presumptive standards under the proposed EG OOOOc would effectively address the fugitive emissions at these well sites and that semiannual OGI monitoring would no longer be necessary for these well sites. Therefore, these sources need to comply with NSPS OOOOa until they are in compliance with a state or Federal plan implementing EG OOOOc. Once subject to and in compliance with such a plan, then they no longer need to comply with NSPS OOOOa.

X. Summary of Final Standards NSPS OOOOb and EG OOOOc

A. Fugitive Emissions From Well Sites, Centralized Production Facilities, and Compressor Stations

As described in section IV.A of the December 2022 Supplemental Proposal preamble (87 FR 74722, December 6, 2022) and section XI.A of the November 2021 Proposal preamble (86 FR 63169, November 15, 2021), fugitive emissions are unintended emissions that can occur from a range of components at any time due to leaks. Collectively, these emissions constitute one of the largest sources of methane from this source category, representing approximately 700 kt of the 2019 methane emissions from this source category reported in the GHGI. The magnitude of these emissions can also vary widely across different facilities and over time. The EPA has historically addressed fugitive emissions from the Crude Oil and Natural Gas source category through ground-based component level monitoring using OGI or EPA Method 21 of appendix A–7 to 40 CFR part 60.

This section of the preamble presents a summary of the final standards for NSPS OOOOb and final presumptive standards for EG OOOOc regarding fugitive emissions components affected facilities and designated facilities located at well sites, centralized production facilities, and compressor stations. As defined in the final NSPS OOOOb, a fugitive emissions component is ''any component that has the potential to emit fugitive emissions of methane or VOC at a well site, centralized production facility, or compressor station, such as valves (including separator dump valves), connectors, pressure relief devices, open-ended lines, flanges, covers and closed vent systems not subject to § 60.5411b, thief hatches or other openings on a storage vessel not subject to § 60.5395b, compressors, instruments, meters, and yard piping.'' [180]

1. Fugitive Emissions at Well Sites and Centralized Production Facilities

a. NSPS OOOOb

i. Affected Facility

The standards apply to each fugitive emissions components affected facility, which is the collection of fugitive emissions components at a well site or centralized production facility.

ii. Final Standards

In this final rule, the EPA is finalizing the work practice standards for monitoring and repairing (including replacing) fugitive emissions components at fugitive emissions components affected facilities located at well sites and centralized production facilities, as proposed in the December 2022 Supplemental Proposal. Specifically, the EPA is finalizing monitoring and repair programs for four subcategories of well sites as follows:

1. Single wellhead only well sites: Quarterly AVO inspections,
2. Multi-wellhead only well sites: Semiannual OGI (or EPA Method 21) monitoring following the monitoring plan required in 40 CFR 60.5397b and quarterly AVO inspections,
3. Well sites with major production and processing equipment and centralized production facilities: Quarterly OGI (or EPA Method 21) monitoring following the monitoring plan required in 40 CFR 60.5397b and bimonthly AVO inspections, and
4. Small well sites: Quarterly AVO inspections.

The third subcategory includes well sites and centralized production facilities that have:

1. One or more controlled storage vessels or tank batteries,
2. One or more control devices,
3. One or more natural gas-driven process controllers or pumps, or
4. Two or more pieces of major production or processing equipment not listed in items 1–3.

The EPA explained in the December 2022 Supplemental Proposal that it was proposing to define this third subcategory as such (in particular items 1–3 above) ''because those sources individually are known sources of super-emitter emissions events (see section IV.C) and are subject to quarterly OGI for compliance assurance (storage vessels and pneumatic controllers) or are subject to other continuous monitoring requirements (control devices).'' [181] As discussed in section XI.D.3 of this preamble, we have changed the terminology from ''pneumatic controllers'' to ''process controllers'' in the final rule.

Also, as explained in the December 2022 Supplemental Proposal, the fourth subcategory, small well sites, includes single wellhead well sites that do not contain any controlled storage vessels, control devices, natural gas-driven process controllers, or natural gas-driven pumps and contain only one piece of certain major production and processing equipment. Major production and processing equipment that would be allowed at a small well site would include a single separator, glycol dehydrator, centrifugal or reciprocating compressor, heater/treater, or a storage vessel that is not controlled. *Id.* at 74723.

For the second subcategory, multi-wellhead only well sites, where semiannual OGI monitoring is required, subsequent semiannual monitoring would be required to occur at least 4 months apart and no more than 7 months apart. For the third subcategory, well sites with major production and processing equipment and centralized production facilities, where quarterly OGI monitoring is required, subsequent quarterly monitoring would occur at least 60 days apart. Quarterly OGI monitoring may be waived when temperatures are below 0 °F for two of three consecutive calendar months of a quarterly monitoring period.

In the final rule, the EPA clarified that the monitoring requirements for fugitive emissions components do not apply to buried yard piping and associated buried fugitive emissions components (*e.g.,* buried connectors on the buried yard piping).

In addition to clarifying in the fugitive emissions component definition that ''valves'' include dump valves, the EPA specifies in the final rule the requirement to visually inspect the separator dump valve while at the site conducting regular AVO monitoring surveys (either quarterly or bimonthly, depending on the site) to ensure that it is operating as designed and not stuck in an open position. As proposed in the December 2022 Supplemental Proposal, the EPA is also finalizing the closed and sealed requirement for thief hatches or other openings (on storage vessels or tank batteries) that are fugitive emissions components and the

[180] The definition of a fugitive emissions component in EG OOOOc is the same except for the reference to 60.5411c instead of 60.5411b and 60.5396c instead of 60.5395b.

[181] 87 FR 74735.

requirement to visually inspect the hatch to confirm compliance during the AVO monitoring survey.

The EPA is finalizing the following repair timelines. A first attempt at repair of malfunctioning separator dump valves, open or unsealed thief hatches and other storage vessel openings, or other sources of fugitive emissions identified with AVO must be made within 15 days after the detection, with final repair required within 15 days after the first attempt. A first attempt at repair of the source of fugitive emissions identified with OGI or EPA Method 21 must be made within 30 days after the detection, with final repair required within 30 days after the first attempt. The EPA is also finalizing provisions to allow a delay of repair if the repair is technically infeasible, would require a vent blowdown, well shutdown, or well shut-in, would be unsafe to repair during operation of the unit, or would require replacement parts that are unavailable for certain reasons (see section XI.A.1.e for details); in no case is delay allowed beyond 2 years.

Monitoring surveys of fugitive emissions components affected facilities at a well site or centralized production facility must continue until the site or facility is permanently closed following the required well closure plan. After all well closure activities are completed, a final OGI survey of the site must be conducted (and recorded in the well closure plan) and any emissions detected must be eliminated.

iii. Recordkeeping and Reporting Requirements

The final rule requires specific recordkeeping and reporting requirements for each fugitive emissions components affected facility located at a well site or centralized production facility. The recordkeeping requirements closely follow those in the December 2022 Supplemental Proposal but incorporate the addition of new delay of repair recordkeeping requirements. In the case of delay of repair due to parts unavailability, operators must document the date the leak was added to the delay of repair list, the date the replacement fugitive emissions component or part thereof was ordered, the anticipated delivery date, and the actual delivery date.

The reporting requirements are unchanged from the December 2022 Supplemental Proposal. Sources would be required to report the designation of the type of site (*i.e.,* well site or centralized production facility) at which the fugitive emissions components affected facility is located. In addition, for each fugitive emissions components affected facility that becomes an affected facility during the reporting period, the date of the startup of production or the date of the first day of production after the modification would be required to be reported for well sites or centralized production facility. Each fugitive emissions components affected facility at a well site would also be required to specify in the annual report what type of site it is (*i.e.,* a single wellhead only well site, small well site, a multi-wellhead only well site, or a well site with major production and processing equipment) and to report information on changes such as the removal of all major production and processing equipment or well closure activities during the reporting period.

For fugitive emissions components affected facilities located at well sites and centralized production facilities, the following information is required to be included in the annual report for fugitive emissions monitoring surveys conducted using AVO, OGI, or Method 21:

- Date of the survey,
- Monitoring instrument or, if the survey was conducted using AVO, notation that AVO was used,
- Any deviations from key monitoring plan elements or a statement that there were no deviations from these elements of the monitoring plan,
- Number and type of components for which fugitive emissions were detected,
- Number and type of fugitive emissions components that were not repaired as required,
- Number and type of fugitive emissions components (including designation as difficult-to-monitor or unsafe-to-monitor, if applicable) on delay of repair and explanation for each delay of repair, and
- Date of planned shutdown(s) that occurred during the reporting period if there are any components that have been placed on delay of repair.

For fugitive emissions components affected facilities located at well sites and centralized production facilities complying with an alternative fugitive emissions standard under 40 CFR 60.5399b, the annual report must identify the alternative standard and include either the site-specific report or the same information described above. For fugitive emissions components affected facilities located at well sites and centralized production facilities complying with an alternative fugitive emissions standard under 40 CFR 60.5398b, the annual report must include information specified in 40 CFR 60.5424b.

b. EG OOOOc

i. Designated Facility

These final EG define designated facilities as the collection of fugitive emissions components at a well site or a centralized production facility.

ii. Final Presumptive Standards

The presumptive methane standards for existing sources under EG OOOOc are the same as the methane standards for new sources under NSPS OOOOb.

2. Fugitive Emissions at Compressor Stations

a. NSPS OOOOb

i. Affected Facility

The standards apply to each fugitive emissions components affected facility, which is the collection of fugitive emissions components at a compressor station.

ii. Final Standards

In this final rule, the EPA is finalizing the quarterly OGI (or EPA Method 21) monitoring requirement for fugitive emissions components affected facilities located at compressor stations, as proposed in the December 2022 Supplemental Proposal. Specifically, the EPA is finalizing the requirement that quarterly surveys be performed using OGI or EPA Method 21 following the monitoring plan required in the final regulatory text at 40 CFR 60.5397b. The EPA is also finalizing the requirement to conduct monthly AVO monitoring at compressor stations. Any indications of fugitive emissions identified via AVO would be subject to repair requirements.

The EPA is also finalizing the repair timelines proposed in the December 2022 Supplemental Proposal. A first attempt at repair of the source of fugitive emissions identified with AVO must be made within 15 days after the detection, with final repair required within 15 days after the first attempt. A first attempt at repair of the source of fugitive emissions identified with OGI or EPA Method 21 must be made within 30 days after the detection, with final repair required within 30 days after the first attempt. The EPA is also finalizing provisions to allow a delay of repair if the repair is technically infeasible, would require a vent blowdown, a compressor station shutdown, a well shutdown or well shut-in, would be unsafe to repair during operation of the unit, or would require replacement parts that are unavailable for certain reasons (see section XI.A.2.b for details); in no case is delay allowed beyond 2 years.

The final rule for fugitive emissions components affected facilities located at

compressor stations includes the requirement that consecutive quarterly monitoring surveys be conducted at least 60 days apart. As proposed, the EPA is finalizing the provision that the quarterly OGI monitoring may be waived when temperatures are below 0 °F for 2 of 3 consecutive calendar months of a quarterly monitoring period.

iii. Recordkeeping and Reporting Requirements

The final rule requires specific recordkeeping and reporting requirements for each fugitive emissions components affected facility. The recordkeeping requirements closely follow those in the December 2022 Supplemental Proposal but incorporate the addition of new delay of repair recordkeeping requirements. In the case of delay of repair due to parts unavailability, operators must document the date the leak was added to the delay of repair list, the date the replacement fugitive emissions component or part thereof was ordered, the anticipated delivery date, and the actual delivery date.

The reporting requirements are unchanged from the December 2022 Supplemental Proposal. Sources would be required to report the designation of the type of site (*i.e.,* compressor station) at which the fugitive emissions components affected facility is located. For fugitive emissions components affected facilities located at compressor stations, the following information is required to be included in the annual report for monthly surveys conducted using AVO, OGI, or Method 21:

- Date of the survey,
- Monitoring instrument or, if the survey was conducted using AVO, notation that AVO was used,
- Any deviations from key monitoring plan elements or a statement that there were no deviations from these elements of the monitoring plan,
- Number and type of components for which fugitive emissions were detected,
- Number and type of fugitive emissions components that were not repaired as required,
- Number and type of fugitive emissions components (including designation as difficult-to-monitor or unsafe-to-monitor, if applicable) on delay of repair and explanation for each delay of repair, and
- Date of planned shutdown(s) that occurred during the reporting period if there are any components that have been placed on delay of repair.

For fugitive emissions components affected facilities located at compressor stations complying with an alternative fugitive emissions standard under 40 CFR 60.5399b, the annual report must identify the alternative standard and include either the site-specific report or the same information described above. For fugitive emissions components affected facilities located at compressor stations complying with an alternative fugitive emissions standard under 40 CFR 60.5398b, the annual report must include information specified in 40 CFR 60.5424b.

b. EG OOOOc

i. Designated Facility

These final EG define designated facilities as the collection of fugitive emissions components at a compressor station.

ii. Final Presumptive Standards

The presumptive methane standards for existing sources under EG OOOOc are the same as the methane standards for new sources under NSPS OOOOb.

B. Advanced Methane Detection Technology Work Practices

The EPA has included the use of advanced methane detection technologies in this final rule, in recognition of the rapid and continued advancement of these technologies and their current use by owner or operators to supplement their existing ground based OGI surveys and AVO inspections. Industry has applied many such technologies, from on-site sensor networks to aerial flyovers using remote sensing technology that can screen hundreds of sites in a single deployment, to efficiently detect methane emissions at a variety of facilities and focus their methane mitigation efforts. In the November 2021 Proposal, we proposed to allow owners and operators to undertake an approach with bimonthly periodic screening events using these technologies as an alternative to periodic OGI surveys. In doing so, the EPA acknowledged that these advanced methane detection technologies have important advantages, including the ability to detect fugitive emissions quickly and cost-effectively in a manner that may be less susceptible to operator error or judgement than traditional leak detection technologies. Because many of these advanced methane detection technologies are designed to scan multiple sites at once, owners and operators have used them as an effective ''screening'' tool to rapidly identify particular high-emitting sites that warrant targeted inspection and repair efforts.

The inclusion of these advanced methane detection technologies in NSPS OOOOb and EG OOOOc received widespread support from stakeholders. We also received feedback on how the EPA could improve on its proposal and expand this approach to maximize its efficacy in reducing methane emissions and its utility as a compliance flexibility for owners and operators. In the December 2022 Supplemental Proposal, we provided additional flexibility for advanced methane technologies using the periodic screening approach by allowing the frequency of the surveys to vary according to the sensitivity of the technology used, instead of requiring the same frequency of monitoring for all technologies (*i.e.,* periodic screening surveys performed with technologies with lower detection thresholds would need to be performed less frequently than screening surveys performed with technologies with higher detection thresholds). We also introduced a separate alternative work practice using continuous methane monitoring systems. Finally, we proposed a streamlined approach to approving new technology that is similar to our current alternative test method approval process. This approach ensures that the advanced methane detection technologies used to conduct periodic screening or continuous monitoring will provide consistent and reliable information for emission reductions, while also allowing an easier pathway for owners and operators to adopt the use of the technologies. We believe that this approach will continue to incentivize the continued development and improvement of these technologies, thus leading to even greater emission reductions.

This section summarizes the final provisions in NSPS OOOOb and in the model rule implementing EG OOOOc for the use of advanced methane detection technologies in lieu of OGI and/or AVO at well sites, centralized production facilities, and compressor stations. As described here, the EPA is finalizing a compliance option that would allow the use of these advanced methane detection technologies as an alternative to the use of ground-based OGI surveys, EPA Method 21 (which the final rule continues to allow as an alternative to OGI), and AVO inspections to identify emissions from the collection of fugitive emissions components located at well sites, centralized production facilities, and compressor stations. In response to comments received on the December 2022 Supplemental Proposal, the EPA has made revisions and clarifications to the periodic screening approach, continuous monitoring provisions, and alternative test method process for

approving advanced methane detection technologies for use in these work practices.

1. Periodic Screening

In this final rulemaking, the EPA is expanding the proposed alternative periodic screening approach to provide more flexibility in selection of appropriate advanced methane detection technology and to account for the spatial resolution of these technologies. The EPA has also re-evaluated the equivalency modeling from the December 2022 Supplemental Proposal used to develop the screening frequency matrix and is finalizing revisions to these tables to account for uncertainty in the models as discussed in the revised Supplemental TSD Fugitive Emissions Abatement Simulation Toolkit (FEAST) Memo.[182] The updated periodic screening frequency matrices are specified in tables 3 and 4 of the final NSPS OOOOb and the model rule implementing the final EG OOOOc. The EPA is also finalizing an interim periodic screening option that will expire on March 9, 2026. See section XI.B.1 of this preamble for more information on this interim periodic screening matrix.

For periodic screening using advanced methane detection technology, the final rules provide greater flexibility by allowing the owner or operator to utilize multiple detection technologies in combination, instead of requiring the owner or operator to choose one technology. This approach will allow end-users to optimize their periodic screening program by choosing the most suitable technology based on time of year and availability of technology providers. The periodic screening frequency will be based on the technology with the highest aggregate detection threshold that the owner or operator lists as a technology they plan to use in their monitoring plan (*e.g.,* if you use methods with aggregate detection thresholds of 15 kg/hr, your periodic screenings must be conducted monthly). The final rule also allows an owner or operator to replace any periodic screening survey with an OGI survey.

This final rulemaking will require owners and operators to develop a monitoring plan, which can be site-specific or cover multiple sites. The monitoring plan must contain the following information at a minimum, consistent with the December 2022 Supplemental Proposal:

- Identification of each site, including latitude and longitude;
- Identification of the alternative test methods(s) used (*i.e.,* advanced methane detection technology) and required frequency;
- Contact information of the entities performing the screening;
- Procedures for conducting OGI surveys;
- Procedures for identifying and repairing fugitive emissions components, covers, and closed vents systems when emissions are detected; and
- Procedures for verifying repairs of fugitive emissions components, covers, and closed vents system.

The final rulemaking finalizes the proposed timeframe in the December 2022 Supplemental Proposal that an owner or operator must initiate periodic screenings using advanced methane detection technology, within 90 days after startup or modification of a fugitive emissions components affected facility and storage vessel affected facility at new, modified, or existing well sites, centralized production facilities, and/or compressor stations, as well as timeframes for initiating periodic screenings if an owner or operator opts to switch to periodic screenings at a later time (*i.e.,* the owner or operator was originally conducting fugitive emissions surveys with OGI or EPA Method 21). The final rule also sets timeframes for conducting annual OGI surveys, if an owner or operator is required to do so based on the periodic screening matrix.

The final rulemaking finalizes the requirement in the December 2022 Supplemental Proposal that owners and operators must receive the data from a periodic screening event within 5 calendar days. If the screening event indicates a confirmed detection, the owner or operator must conduct follow-up monitoring. In the final rule, we are allowing a more targeted follow-up survey, dependent on the spatial resolution of the advanced methane detection technology used during the periodic screening event. The final rulemaking includes three different classifications for spatial resolution: facility-level, which must be able to identify emissions within the boundary of a well site, centralized production facility, or compressor station; area-level, which must be able to identify emissions within a radius of 2 meters of the emission source; and component-level, which must be able to identify emissions within a radius of 0.5 meters of the emission source. The follow-up monitoring that must be conducted for a confirmed detection during a periodic screening event using a technology with facility-level spatial resolution includes:

- A monitoring survey of all the fugitive emissions components in an affected facility using either OGI or EPA Method 21;
- Inspection of all covers and closed vent systems of the affected facility with either OGI or EPA Method 21; and
- Visual inspection of all closed vent systems and covers to identify if there are any defects.

The follow-up monitoring that must be conducted for a confirmed detection during a periodic screening event using a technology with area-level spatial resolution includes:

- A monitoring survey of all the fugitive emissions components located within a 4-meter radius of the location of the confirmed detection using either OGI or EPA Method 21; and
- If the confirmed detection occurred in a portion of a site with a storage vessel or closed vent system, inspection of all covers and closed vent systems that are connected to all storage vessels and closed vent systems that are within a 2-meter radius of the confirmed detection location (*i.e.,* you must inspect the whole system that is connected to the portion of the system, not just the portion of the system that falls within the radius of the detected event). Inspection must be conducted using either OGI or EPA Method 21, as well as visually to identify defects.

The follow-up monitoring that must be conducted for a confirmed detection during a periodic screening event using a technology with component-level spatial resolution includes:

- A monitoring survey of all the fugitive emissions components located within a 1-meter radius of the location of the confirmed detection using either OGI or EPA Method 21; and
- If the confirmed detection occurred in a portion of a site with a storage vessel or closed vent system, inspection of all covers and closed vent systems that are connected to all storage vessels and closed vent systems that are within a 0.5-meter radius of the confirmed detection location (*i.e.,* you must inspect the whole system that is connected to the portion of the system, not just the portion of the system that falls within the radius of the detected event). Inspection must be conducted, as well as visually to identify defects.

As proposed, the final rulemaking requires that the owner or operator follow the repair requirements and timelines in the December 2022 Supplemental Proposal for fugitive emissions components where emissions are detected from fugitive components, and the repair requirements for covers

[182] See Memorandum in EPA–HQ–OAR–2021–0317.

and closed vent systems (CVS) if emissions are detected during the follow-up monitoring survey. We are also finalizing as proposed the requirement to conduct an investigative analysis when the source of a confirmed detection is determined to be a control device subject to the rule or an emission from or defect from a cover or closed vent system associated with an affected facility, although we have refined the requirements. These requirements include:

- Repair all fugitive emissions components, covers, and closed vent systems within 30 days after receiving the periodic screening data (except where delay of repair is allowed).
- Initiate an investigative analysis within 5 days if an emission or defect in a closed vent system or cover is determined to be the cause of the emissions.
- Initiate an investigative analysis within 24 hours of receiving the monitoring survey and inspection results if a failed control device is determined to be the cause of the emissions.
- Investigative analyses must be used to determine the underlying primary cause and other contributing causes to the emissions event. Owners and operators must determine the actions needed to bring the control device into compliance; how to prevent future failures of the control device from the same underlying cause(s); and updates are necessary to the engineering analysis for the cover or closed vent system to prevent future emissions from the cover and closed vent system.

2. Continuous Monitoring Screening

In this final rulemaking, the EPA is finalizing the continuing monitoring approach and associated work practice in the December 2022 Supplemental Proposed Rule with some changes to better account for background methane concentrations and to better incorporate additional types of measurement systems. The EPA has reexamined the proposed detection threshold for these systems and has adjusted that threshold in the final rule to better account for background methane concentrations.

The final rule includes defined requirements for operating continuous monitoring systems, including using advanced methane monitoring technology approved by the EPA for this purpose. This system must be set-up in a manner to generate a valid methane mass emission rate (or equivalent) once at least every twelve-hour block, have an operation downtime of less than 10 percent, and have checks in place to monitor the health of the system. We have revised the proposed sensitivity requirements to allow systems with detection thresholds of 0.40 kg/hr of methane or lower and, are requiring systems to transmit data at least once every 24 hours. The final rule maintains the timeframe in the December 2022 Supplemental Proposal for when the owner or operator must initiate continuous monitoring using advanced methane detection technology (*i.e.,* within 120 days after startup of a fugitive emissions components affected facility and storage vessel affected facility at new, modified, and existing well sites, centralized production facilities, and/or compressor stations), as well as timeframes for initiating continuous monitoring if an owner or operator opts to switch to periodic screenings at a later time (*i.e.,* the owner or operator was originally conducting fugitive emissions surveys with OGI or EPA Method 21).

In the final rulemaking, we have revised the ''action-levels'' in the December 2022 Supplemental Proposal to account for the potential for background methane emission levels at many of these sites. An action-level is the time weighted average that triggers an investigative analysis to identify the cause(s) of the exceedance. For affected facilities located at wellhead only well sites, these ''action-levels'' are as follows:

- Rolling 90-day average of 1.2 kg/hr of methane over the site-specific baseline.
- Rolling 7-day average of 15 kg/hr of methane over site-specific baseline.

For affected facilities located at well sites with major production and processing equipment, small well sites, centralized production facilities, and compressor stations, the action levels are as follows:

- Rolling 90-day average of 1.6 kg/hr of methane over the site-specific baseline.
- Rolling 7-day average of 21 kg/hr of methane over the site-specific baseline.

The final rule includes a new and defined set of criteria for the timeframe and site conditions under which to establish the site-specific baseline emissions since the December 2022 Supplemental Proposal, finalizes as proposed how to calculate emissions after the baseline has been established, and has refined the proposed actions the owner or operator must take when an ''action-level'' is exceeded. Prior to establishing the site-specific baseline, the owner or operator must perform inspections of the fugitive emissions components, any covers and closed vent systems, and control devices to ensure the site is leak free and in compliance with the requirements in NSPS OOOOb and/or the applicable state plan implementing EG OOOOc. The owner or operator must then record the site-level emissions from the continuous monitoring system for 30 days and determine the mean emission rate, less any time periods when maintenance activities were conducted.

The final rule has changed the requirements in the December 2022 Supplemental Proposal for how to calculate the 7-day and 90-day rolling average to account for the site-specific baseline and has maintained the intent of required follow-up activities when exceedances of the action-level have occurred. We have also changed the nomenclature of the follow-up activities from ''root cause analysis'' to ''investigative analysis'' and from ''corrective action'' to ''mass emission rate reduction plan'' to eliminate confusion caused by the terminology we used in the December 2022 Supplemental Proposal. We have also more clearly specified the requirements for these activities. The requirements for an investigative analysis are as follows:

- The investigative analysis must be initiated within 5 days after an exceedance of an action-level to determine the underlying primary and contributing cause(s).
- When the 7-day action-level is exceeded, within 5 days after the exceedance the investigative analysis must be completed and initial steps must be taken to reduce the mass emission rate.
- When the 90-day action-level is exceeded, within 30 days after the exceedance the investigative analysis must be completed and initial steps must be taken to reduce the mass emission rate.

An owner or operator must develop a mass emission rate reduction plan when any of the following conditions have been met:

- For an exceedance of the 90-day action-level, 30-day average mass emission rate for the 30 days following the completion of the investigative analysis and initial steps to reduce the mass emission rate is not below the applicable 90-day action-level.
- For an exceedance of the 7-day action-level, the mass emission rate for the 24-hour period after the completion of the investigative analysis and initial steps to reduce the mass emission rate is not below the applicable 7-day action-level.
- The actions needed to reduce the emission rate below the applicable action-level will take more than 30 days to implement.

3. Alternative Test Method for Methane Detection Technology

In this final rule, the EPA has strengthened the alternative test method approval process for advanced methane detection technology used in periodic screening and continuous monitoring. The EPA has further clarified the Administrator authority in the approval process, the criteria for who may submit requests for approval, and the requirements for what information must be submitted by those entities seeking approval.

This final rule specifies a process for applying and obtaining the EPA's approval for the use of an advanced methane detection technology in lieu of the required monitoring methods in the rule by submitting the test method for the alternative technology. However, instead of relying on existing provisions for alternative test methods 40 CFR 60.8(b), we are in the final rule citing a new alternative test method provision in 40 CFR 60.5398b(d). This provision incorporates specific criteria for the review, evaluation, and potential use of advanced methane detection technology for use in periodic screening, continuous monitoring, and/or super-emitter detection.

This final rule maintains the procedures in the December 2022 Supplemental Proposal for submitting an alternative test method for methane detection technology request. These requests must be submitted to the Leader, Measurement Technology Group along with any supporting data to the methane detection portal at (*www.epa.gov/emc/oil-and-gas-alternative-test-methods*). Confidential Business Information (CBI) must not be submitted through this portal; detailed instructions for submitting information for which an entity submits a claim of CBI are provided in 40 CFR 60.5398b(d)(1). The Administrator will complete an initial completeness review of submissions within 90 days. An approval or disapproval will be issued in writing within 270 days after receiving a request. Submission approvals may be considered on a site-specific basis or more broadly applicable, depending on the technology and the information provided in the request.

The December 2022 Supplemental Proposal included limitations on which entities could submit an alternative test method request. The final rule retains these provisions while also providing improvements to allow for proprietary advanced methane measurement technology internally developed by owners and operators. Any entity that meets the following specifications may submit an alternative test method request:

- The entity must be an individual or organization located in or that has representation in the United States.
- The entity must be an owner or operator of an affected facility under NSPS OOOOb or EG OOOOc.
- If the entity is the not the owner or operator of an affected facility, the entity must directly represent the provider of the candidate measurement system using advanced methane detection technology and the measurement system must have been applied to measurements and monitoring in the oil and gas sector (domestically or internationally).
- The candidate measurement system must have been sold, leased, or licensed, or offered for sale, lease, or license to the general public or developed by an owner or operator for internal use and/or use by external partners.

The final rule also expands upon the information you are required to provide to the Administrator when submitting a request to use an alternative test method for advanced methane detection technology. These expanded requirements represent the minimum amount of material required by the EPA to completely understand the functionality of candidate measurement technology systems, how these systems are applied to generate a methane mass emission rate (kg/hr) or equivalent emission rate, data management, detection threshold, and spatial resolution.

The final rule requires an entity to provide the Administrator contact information for the requester, the desired applicability of the technology, and a description of the candidate measurement technology system, including:

- A description of the scientific theory and appropriate references outlining the underlying technology;
- A description of the physical instrument;
- Type of measurement and desired application (*e.g.,* airborne, in-situ); and
- Potential limitations of the candidate measurement system, including application limitations.

The request must also include information on how the system converts results to a mass emission rate or equivalent. This information must include the following:

- Workflow and description covering all steps and processes from measurement technology signal output to final, validated mass emission rate (*i.e.,* kg/hr) or equivalent.
- Description of how any meteorological data are used, including how they are collected and/or sourced.
- Identification of any model(s) used, including how inputs are determined or derived.
- All calculations used, including the defined variables for any calculations.
- A-priori methods and datasets used.
- Explanation of any algorithms/machine learning procedures used in the data processing, if applicable.

The request must also include a description of how data collected and generated by the system are collected, maintained, and stored; how these data streams are processed and manipulated, including how the resultant data processing is documented; and a description of which data streams are provided to the end-user of the data and how that information is delivered or supplied.

The EPA has further refined the supporting information that must be used to verify detection thresholds and information on how the candidate measurement system must be applied to ensure the detection thresholds are maintained during monitoring events. We have also revised the detection threshold to an average aggregate detection threshold, which is defined as the average of all site-level detection thresholds from a single deployment (*e.g.,* a singular flight that surveys multiple well sites, centralized production facility, and/or compressor stations). The information provided in the request must include published reports produced by either the submitting entity or an outside entity evaluating the technology, standard operating procedures, alternative testing procedure(s) (preferably in the format described in Guideline Document 45),[183] and documents provided to end-users of the data.

The final rule includes a new requirement for entities to verify the spatial resolution of the candidate measurement system. The supporting information verifying the spatial resolution must be in the form of published report (*e.g.,* scientific papers) produced by either the submitting entity or an outside entity evaluating the submitted measurement technology that has been independently evaluated.

C. Super Emitter Program

This section presents a summary of the final standards for the Super Emitter Program. As described in section IV.C of the December 2022 Supplemental Proposal preamble (87 FR 74722,

[183] Available at *https://www.epa.gov/sites/default/files/2020-08/documents/gd-045.pdf.*

December 6, 2022), the EPA proposed the Super Emitter Program to ensure that this rulemaking comprehensively addresses the widespread problem of abnormally large emissions events known as super-emitters. The EPA is including the Super Emitter Program in this final rulemaking, previously proposed as the Super Emitter Response Program in the December 2022 Supplemental Proposal. The EPA has developed this program in response to recent studies, which indicate that a small portion of sources contribute almost 50 percent of the methane emissions in the oil and gas sector, and on a global scale, the largest of these emissions sources may represent as much as 12 percent of global methane emissions from oil and gas production. For purposes of this rule, a super-emitter event is one that has a quantified emission rate of 100 kg/hr of methane or greater.

As described here, this program is designed to provide a transparent, reliable, and efficient mechanism by which the EPA will provide owners and operators with timely notifications of super-emitter emissions data collected by the EPA-certified third parties using the EPA-approved remote sensing technologies (*e.g.,* satellites). Where such an event is attributable to a source regulated under CAA section 111 (NSPS OOOO, OOOOa, or OOOOb, or a state or Federal plan implementing EG OOOOc), the responsible owner or operator will take action in response to such notifications in accordance with the applicable regulation.

The EPA anticipates that the NSPS and presumptive standards for existing sources that are included in this final rulemaking will reduce many sources of super-emitters. However, these events sometimes arise from planned maintenance, other routine operations, and are also frequently attributable to major malfunctions or improperly operating control devices. These events are unpredictable and can occur in between routine inspections and/or fugitive emissions monitoring surveys. Moreover, these events are sufficiently large to result in significant emissions of the harmful air pollutants regulated under this rule in a short span of time. By leveraging data collected by the EPA-approved third parties using the EPA-approved methods to identify such events and providing a mechanism for the EPA to promptly notify owners and operators of such events for appropriate follow-up action, the Super Emitter Program serves as both a complement and a backstop to the other requirements of this rulemaking.

As described in our response to comments, the EPA received several comments—including from owners and operators of regulated facilities—supporting the objectives of the Super Emitter Program and the importance of timely identifying and resolving super-emitter events. In this final rulemaking, the EPA has also made a number of changes to the Super Emitter Program in order to provide appropriate oversight by the EPA, address implementation concerns raised by commenters, and ensure that the program provides owners and operators with transparent, reliable, and timely information about super-emitter events.

As described in section IV.C of the December 2022 Supplemental Proposal preamble (87 FR 74746, December 6, 2022), the EPA proposed a Super Emitter Program as a backstop to address large methane super-emitters from this sector. This program is designed for the EPA to receive super-emitter emission data collected by the EPA-certified third parties using the EPA-approved remote sensing technologies (*e.g.,* satellites) in a timely manner. In response to comments objecting to or otherwise expressing concerns with requiring owners and operators to respond directly to third-party notifications of super-emitter events, the EPA has revised the program in the final rulemaking such that it is the EPA, and not third parties, that will notify an identified owner or operator after reviewing third-party notifications of the presence of a super-emitter event at or near its oil and gas facility (*e.g.,* a specific well site, centralized production facility, gas processing plant, or compressor station), requiring the owner or operator to investigate and report the results to the EPA. Also, in response to comments, the EPA emphasizes that certified third parties will only be authorized to use remote sensing technologies such as satellites or aerial surveys—*i.e.,* this program does not authorize third parties to enter well sites or other oil and gas facilities, and it does not allow for the use of technologies such as OGI that would require close access to such facilities.

1. Statutory Authority

The Super Emitter Program finalized in this rule is based on the EPA's authority under CAA section 114(a) to require ''any person who owns or operates any emission source'' (except mobile sources) [184] to provide information necessary for purposes of carrying out the CAA and its authority to regulate sources under CAA section 111. In the 2022 Supplemental Proposal, the EPA proposed two separate legal frameworks for the Super Emitter Program. 87 FR 74752. The final Super Emitter Program is based on the second legal framework. Under this framework, the EPA's authority to require sources (regardless of whether those sources are regulated under CAA section 111) to investigate potential sources of super-emitter events and report to EPA is CAA section 114. The EPA's authority to require regulated sources to repair or otherwise address the cause of the super-emitter event is CAA section 111. In particular, for sources regulated under CAA section 111, the Super Emitter Program will serve as: (1) an additional work practice standard under NSPS OOOOb (and presumptive standard under EG OOOOc) for fugitive emissions at well sites, centralized production facilities and compressor stations, and as (2) an additional compliance assurance measure for other NSPS OOOOb affected facilities, NSPS OOOO and OOOOa affected facilities, and designated facilities under EG OOOOc.

a. Authority To Require Investigation and Reporting for all Sources

The EPA's authority to require all sources, regardless of whether they are regulated under CAA section 111, to investigate potential super-emitter events and report back to the EPA stems from the EPA's broad authority under CAA section 114(a) to require, among other things, monitoring, reporting, and recordkeeping from owners and operators of stationary sources. CAA section 114(a)(1) gives the EPA broad authority to ''require any person . . . to (A) establish and maintain such records; (B) make such reports; (C) install, use and maintain such monitoring equipment, and use such audit procedures, or methods; . . . and (G) provide such other information as the administrator may reasonably require . . . .'' The EPA can impose such obligations on ''any person who owns or operates any emission source,'' whether or not the emission source is regulated under the CAA, ''[f]or the purpose of assisting in the development of any implementation plan under . . . section 7411(d) of this title, any standard of performance under section 7411 of this title,'' ''determining whether any person is in violation of any such standard or any requirement of such plan,'' or ''carrying out any provision of this chapter.'' CAA section 111(b) requires that the EPA review and, if appropriate, revise an NSPS at least every 8 years

[184] The EPA has similar information collection authority with respect to mobile sources under CAA section 208.

following its promulgation.[185] The information on super-emitter events from both regulated and unregulated oil and gas sources can help inform the EPA on the effectiveness of its current NSPS for this sector and potential focus in its future review. Therefore, based on the authority under CAA section 114(a), the Super Emitter Program requires owners and operators to investigate and report all sources, including non-NSPS/EG sources, that they suspect may have caused or contributed to the super-emitter event specified in the EPA notice that they have received, to ensure that a regulated source is not contributing to the event, as well as to provide useful information to the EPA in carrying out its review obligation under CAA section 111(b). The information on super-emitter events can also help owners and operators prevent or minimize losing a valuable product (natural gas).

b. Authority To Require Repair for Regulated Sources: Work Practice Standards for Fugitive Emissions

Pursuant to CAA section 111, the EPA has incorporated the Super Emitter Program, in particular the requirement to repair fugitive emissions components that are sources of super-emitter events, as a part of the BSER and therefore work practice standards for fugitive emissions components affected/designated facilities under NSPS OOOOb/EG OOOOc. As the first part of the fugitive emissions BSER and work practice standards, discussed in section X.A of this document, the EPA has established periodic monitoring and repair work practice standards as the BSER for these fugitive emissions components affected/designated facilities under NSPS OOOOb and EG OOOOc. Fugitive emissions may nevertheless occur from these components between the specified periodic monitoring. Emissions from certain fugitive emissions components can be significant (as one example, a stuck-open thief hatch) and can remain undetected until the next scheduled periodic monitoring. Accordingly, as the second part of the fugitive emissions BSER and work practice standard for affected/designated facilities under NSPS OOOOb and EG OOOOc, the EPA is requiring repair of fugitive emissions components that are the cause of super-emitter events in between routine monitoring. While the EPA has determined that it is not cost effective to require more frequent periodic monitoring, where a super-emitter event (*i.e.,* 100 kg/hr) is caused by fugitive emissions components, repair to reduce such large emissions is clearly cost effective. To that end, the Super Emitter Program supplements the periodic monitoring and repair work practice standards in NSPS OOOOb (and presumptive standards in EG OOOOc) by requiring repair of fugitive emissions components affected/designated facilities under these subparts that the owner or operator has identified as the source of the super-emitter event through this program.[186] The owner or operator will conduct repair in accordance with the same repair requirements as those for fugitive emissions detected during the periodic monitoring, as specified in the applicable standard (*i.e.,* NSPS OOOOb or a state plan implementing EG OOOOc).

c. Authority To Require Monitoring and Reporting for Regulated Sources: Compliance Assurance for Other Regulated Sources

For regulated sources that are not fugitive emissions components affected/designated facilities under NSPS OOOOb/EG OOOOc, the presence of a super-emitter event suggests that the source may not be in compliance with the applicable requirements for that source contained in the EPA's regulations. The compliance assurance aspect of the Super Emitter Program is based on the EPA's regulations for individual emissions sources in the NSPS and EG promulgated pursuant to CAA section 111. NSPS OOOO/OOOOa/OOOOb and the model rule implementing EG OOOOc all include design and/or operational requirements[187] and monitoring, recordkeeping, and reporting requirements[188] to assure that standards of performance[189] are being met. However, as explained above, super emitter events are unpredictable; they can occur between routine inspections and release significant emissions in a short span of time. To address this concern, the Super Emitter Program provides additional monitoring, reporting and recordkeeping for affected/designated facilities under NSPS OOOO/OOOOa/OOOOb and EG OOOOc based on the EPA's authority under CAA section 114(a) to impose such requirements for purposes of determining whether or not standards under these subparts are being met. Where a super-emitter event originates from one of these affected/designated facilities or associated equipment regulated under NSPS OOOO, OOOOa, OOOOb, or a state or Federal plan implementing EG OOOOc, the Super Emitter Program serves as an additional source of monitoring data to inform and alert owners and operators to check and make sure that the source and associated control device and equipment are operating as required under the applicable NSPS or State or Federal plan implementing EG OOOOc. For example, a super-emitter event may be caused by an open thief hatch on a storage vessel subject to NSPS OOOOa, which is not permitted except for very limited circumstances as defined in the rule. In that event, the Super Emitter Program serves to alert an owner or operator of the need to close the thief hatch pursuant to the requirements of NSPS OOOOa, but the Super Emitter Program does not itself impose a requirement to close the thief hatch. Since there are already requirements in place to bring emissions down to or below the applicable NSPS standards (and will be in state or Federal plans implementing EG OOOOc), the Super Emitter Program does not itself independently require specific actions

[185] As explained earlier in section IV.A of this preamble, CAA section 111(b)(1)(B) provides the EPA discretion to determine the pollutants and sources to be regulated. In addition, concurrent with the 8-year review (and though not a mandatory part of the 8-year review), the EPA may examine whether to add standards for pollutants or emission sources not currently regulated for that source category.

[186] As explained in the 2022 Supplemental Proposal (87 FR 74753), despite our incorporation of this additional repair requirement under the Super Emitter Program into the work practice standards for the fugitive emissions components at well sites, centralized production facilities and compressor stations, this repair requirement is nevertheless severable from the periodic monitoring and repair work practices that we have separately analyzed and established as the BSER for fugitive emissions at each of these facilities. In addition, the additional repair requirement of the Super Emitter Program is severable from the CAA section 114(a)(1) monitoring and reporting aspect of the Program.

[187] The EPA establishes ''standards of performance'' pursuant to CAA section 111. CAA section 302(l) defines a ''standard of performance'' to include not only standards limiting the quantity, rate, or concentration of emissions, but also requirements ''relating to the operation or maintenance of a source to assure continuous emission reduction.'' Examples of such compliance assurance requirements include 40 CFR 60.5411/60.5411a (cover and closed vent system requirements) and 60.5412/60.5412a (control device requirements) in NSPS OOOO/OOOOa.

[188] The EPA has long relied on CAA section 114 to establish monitoring, recordkeeping, and reporting requirements to implement and enforce the emissions standards promulgated under CAA section 111 (*see, e.g.,* 36 FR 24876 (December 23, 1971) (NSPS for the initial five listed source categories, citing both CAA sections 111 and 114 as the statutory authorities). That was the case with the 2012 NSPS OOOO and 2016 NSPS OOOOa, and the EPA has similarly included such measures in the present rule in NSPS OOOOb and in the model rule for EG OOOOc.

[189] These do not include fugitive emissions components affected/designated facilities under NSPS OOOOb and EG OOOOc, which the EPA has separately addressed, as discussed above.

to address emissions from super-emitter events attributed to NSPS or EG sources; it merely puts owners and operators on notice that action may be required to bring a source back into compliance with the applicable emission standards. To clarify this point, the final rule includes amendments to NSPS OOOO and OOOOa to incorporate relevant compliance assurance provisions of the Super Emitter Program, specifically the requirement to investigate and report whether the super-emitter event was caused by a NSPS OOOO or OOOOa affected facility or associated equipment.

2. Major Elements

The following describes the major elements in the Super Emitter Program that serve to assure the reliability of the super-emitter data that the EPA receives under this program. These elements ensure that the data the EPA receives is meaningful and lead to expeditious and effective mitigation of super-emitter events by owners and operators, whether required or voluntarily.

a. Qualifications for Third-Party Notifiers

A third party can be any independent entity, meaning that the third party does not own or operate the site where a super-emitter is detected. In this final rulemaking, the EPA is maintaining the requirements for the qualification of the third-party notifiers in the December 2022 Supplemental Proposal, including the requirement that notifiers use remote sensing technologies. These technologies and their method for operation must be approved under the advanced methane detection technology program in 40 CFR 60.5398b(d). Third parties are limited to using remote sensing technologies such as satellites or aerial surveys and would not be authorized by this program to enter a site.

b. Third-Party Notifier Certification

In this final rulemaking, the EPA establishes a framework by which we will certify third-party notifiers from whom the EPA would accept data from super-emitter events under the Super Emitter Program. The final rulemaking includes provisions governing how the third-party must submit a request to be certified, requirements that a third-party must meet to be certified and/or re-certified, obligations for notifiers to maintain records of surveys performed to maintain certification, and procedures for revoking a notifiers certification.

A third-party notifier certification request must be submitted to the Leader, Measurement Technology Group, 109 T.W. Alexander Drive, P.O. Box 12055, Research Triangle Park, NC 27711. If your request contains CBI, you must transmit these data electronically using email attachments, File Transfer Protocol, or other online file sharing services.[190] This request must include general identification for the entity submitting the request, including the mailing address, physical address, and contact information for the principal officer and certifying officials(s). This request must also include the following information:

- Description of the advanced methane detection technologies that the third party intends to use, including reference to any alternative test method approval under 40 CFR 60.5398b(d), and any agreements with the technology providers.
- Curriculum vitae of the certifying official(s) detailing training for evaluating results of the chosen advanced methane detection technology.
- The entity's standard operating procedure(s) detailing the procedures and processes used by the entity for data review, including the accuracy of emissions data and locality data provided by the technology provider, how the entity will identify the owner or operator of a site, and procedures for handling potentially erroneous data.
- Description of the system for maintaining essential records.
- A Quality Management Plan consistent with the EPA's Quality Management Plan Standard (Directive No: CIO 2015–S–01.0, January 17, 2023).

An entity that has received third-party approval must maintain the following records in order to retain its certification status:

- Records for all surveys conducted by or sponsored by the certified third-party notifier that are the basis for a third-party super-emitter identification submitted to the EPA.
- Records for any notifications provided to the EPA and any additional data collected supporting the notification not required by the EPA to be reported.
- Records or identification of databases used to identify owner or operators of sites where super-emitter events reported to the EPA occurred.

The Administrator will assess the completeness, reasonableness, and accuracy of the third party's request based on the updated certification criteria in the final rule. Once certified, the third-party notifier will receive a unique notifier ID which will be posted at *www.epa.gov/emc-third-party-certifications.* If there is any material change to the information included in the third party's initial certification request, *e.g.,* a change to the technology that the third party intends to use or a change to the certifying official(s), the final rule requires the third party to submit a revised request and be recertified before implementing those changes.

As proposed, the EPA is finalizing provisions providing for the revocation of a third party's certification under certain conditions. In response to comments, the EPA has expanded in the final rule the circumstances for removing a third-party certification, which are as follows:

- Submitting super-emitter notifications after making material changes to the third party's procedures for identifying super-emitters without seeking recertification.
- If the Administrator finds that the certified third-party notifier has persistently submitted data with significant errors.
- Having engaged in illegal activity during the assessment of a super-emitter event (*e.g.,* trespassing).
- Upon determination by the Administrator, following petition from the owner or operator, that the owner or operator has received from the EPA more than three notices with meaningful and/or demonstrable errors of a super-emitter event at the same oil and natural gas facility (*e.g.,* a well site, centralized production facility, natural gas processing plant, or compressor station), that were submitted to the EPA by the same third party, and the owner or operator demonstrates that the claimed super-emitter event did not occur. The failure of the owner or operator to find the source of the super-emitter emissions event upon subsequent inspection would not be proof, by itself, of demonstrable error on the part of the third-party notifier.

c. Notification of Super-Emitter Events

In the final rules, the EPA has amended the super-emitter notification process in the December 2022 Supplemental Proposal to now include a step whereby the EPA will receive and review the super-emitter data from certified third-party notifiers before triggering any obligation on the part of the owner or operator. The final rules require the third-party notifier to submit notifications to the EPA within 15 calendar days after detection of a super-emitter event to ensure timely notice and includes standards for the content of the notification to aid in the EPA's

[190] Please email *oaqpscbi@epa.gov* to request a file transfer link.

review of the data. Third-party notifications must be submitted into the Super Emitter Program Portal at *https://www.epa.gov/super-emitter* and must include the following:

- Unique Third-Party Notifier ID.
- Date of detection of the super-emitter event.
- Location of super-emitter event in latitude and longitude coordinates.
- Owner(s) or operator(s) of an oil and natural gas facility of any individual well site, centralized production facility, or compressor station within 50 meters of the latitude and longitude coordinates of the super-emitter event, if available, and the method used by the third party to identify the owner or operator.
- Identification of the detection technology and reference to the approval of the technology.
- Documentation (*e.g.,* imagery) depicting the detected super-emitter event and the site from which the super-emitter event was detected.
- Quantified emission rate of the super-emitter event in kg/hr.
- Attestation statement that the information submitted by the third-party notifier is true and accurate to the best of the notifier's knowledge.

Upon receiving a third-party notification of super-emitter data through the Super Emitter Program Portal, the EPA will evaluate the notifications for completeness and accuracy to a reasonable degree of certainty. When the EPA determines that a notification has met these conditions, the EPA shall assign the notification a unique notification identification number, provide the notification to the owner/operator. and post the notification, except for the owner/operator attribution, at *www.epa.gov/super-emitter.* This approach responds to comments asking that notice of super-emitter events be provided as quickly as possible, both to the public and the identified owner/operator, but also that the owner/operator have an opportunity to respond before the super-emitter event is publicly attributed to a particular owner/operator. The EPA shall post owner/operator attributions that have been confirmed through the responses received; where response submittal deadlines have passed but no responses have been received, the EPA intends to post owner/operator attributions that the EPA reasonably believes to be accurate.

d. Identification of a Super-Emitter Event

In the final rules, the owner or operator must initiate an investigation within 5 days after receiving an EPA notification of a super-emitter event and report the results to the EPA within 15 days after receiving such notification. If an owner or operator determines that they do not own or operate a well site, centralized production facility, or compressor station within 50 meters from the latitude and longitude provided in the notification, the owner or operator must report that to the EPA and the investigation is then complete. Otherwise, the owner or operator must investigate to determine the source of the super-emitter event.

As explained earlier in this section X.C, a super-emitter event may have been emitted from one or more of the following: (1) an affected facility or associated equipment (*e.g.,* a control device or CVS) subject to regulation under NSPS OOOO, OOOOa, or OOOOb (''NSPS sources''); (2) a designated facility or associated equipment subject to a state or Federal Plan promulgated pursuant to EG OOOOc (''EG sources''); or (3) an unregulated source (*i.e.,* one that is not (1) or (2) above). Therefore, the investigation is not limited to NSPS or EG sources but also includes other sources that the owner or operator may suspect could be the source of the super-emitter event.

The owner or operator must investigate and report to the EPA the results of the investigation within 15 days after receiving a notification from the EPA. The owner and operator must also maintain a record of these investigations. To provide confidence in the reported information, the final rule has updated the list of investigations that the EPA believes will most likely reveal the source of the super-emitter event. Because the relevant investigations for identifying the source(s) of the super-emitter event may vary depending on what the third-party data reveals, the final rules defer to the owner and operator in deciding the appropriate investigation(s). However, where there are affected or designated facilities or associated equipment onsite, the owner and operator may conclude that they are unable to identify the source of the super-emitter event only after having conducted the applicable investigation listed in the respective final rule for each affected or designated facility and associated equipment.

The list of potential actions to identify the potential cause of super-emitter events may include but are not limited to the following:

- Review any maintenance activities (*e.g.,* liquids unloading) or process activities starting from the date of detection of the super-emitter event as identified in the notification.
- Review all monitoring data from control devices (*e.g.,* flares) over the same time period.
- Review any fugitive emissions survey performed under a fugitive emissions monitoring plan over the same time period.
- Review data from any continuous alternative technology systems over the same time period.
- Screen the entire well site, centralized production facility, or compressor station with OGI, EPA Method 21, or an alternative test method(s).

e. Super-Emitter Event Report

As was proposed, the final rules require that the owner or operator submit a report to the EPA within 15 days after receiving a Super-Emitter Event notification through the Super Emitter Program Portal, including an attestation that the report is complete and accurate. The report must include the following information:

- Notification Report ID
- Confirmation that you are the owner or operator of the oil and gas facility within the immediate area (*i.e.,* 50 meters) of the latitude and longitude provided in the notification. If you do not own or operate an oil and gas facility within 50 meters of the of the latitude and longitude provided in the notification, you are not required to provide the additional information described below.
- General identification for the facility, including physical address and applicable ID (*e.g.,* EPA ID Number, American Petroleum Institute (API) Well ID) and the responsible official.
- Whether there are affected facilities or associated equipment subject to NSPS OOOO, OOOOa or OOOOb or designated facilities or associated equipment subject to a state or Federal plan pursuant EG OOOOc.
- Attestation that investigations were conducted to verify the presence or the absence of a super-emitter event.
- If you were unable to identify the source of the super-emitter and if there are NSPS OOOO, OOOOa or OOOOb affected facilities or associated equipment, or designated facilities or associated equipment subject to a state or Federal plan pursuant EG OOOOc, onsite, confirmation that you have conducted all investigations listed in the Super Emitter Program (as specified above in section X.C.2.d) that are applicable to such affected or designated facilities and associated equipment.

- If a super-emitter source is identified, what the source is and whether it is (i) an affected facility or associated equipment subject to NSPS OOOO, OOOOa, or OOOOb or (ii) a designated facility or associated equipment subject to a state or Federal plan under EG OOOOc.
- If a super-emitter event is found, the date and time the super-emitter event ended.

Upon receiving this information from the owner or operator, the EPA will update the notification report with the information provided by the owner or operator and will make the updated report publicly available at *www.epa.gov/super-emitter.* If a super-emitter event emitted from an NSPS OOOO, OOOOa or OOOOb affected facility or associated equipment or a designated facility or associated equipment subject to a state or Federal plan pursuant EG OOOOc, or associated equipment, is ongoing, you are also required to report to the Super Emitter Program Portal the following information:

- A short narrative on how you intend to end the super-emitter event, including the targeted date for completion.
- Within 5 days after the super-emitter event has ended, the date and time the super-emitter event ended.

As discussed earlier in this section X.C, CAA 114(a) gives the EPA broad authority to require that owners and operators investigate and report all sources that they suspect may have caused or contributed to the super-emitter event specified in the EPA notice that they have received under the Super Emitter Program. CAA 114(a) does not require regulatory text for the EPA to exercise its information gathering authority under CAA 114(a), and the EPA believes that adequate notice is provided in this **Federal Register** document, which clearly sets forth the required investigations and reporting requirements under the Super Emitter Program and their applicability to all oil and gas emission sources, whether or not they are subject to any applicable CAA section 111 standard. Nevertheless, to facilitate the implementation of the Super Emitter Program, the EPA has codified provisions of the Super Emitter Program into the regulatory text of the new NSPS OOOOb and, as appropriate, in the model rule implementing EG OOOOc and amendments to NSPS OOOO and OOOOa. Specifically, NSPS OOOOb provides the major framework for the Super Emitter Program, including criteria for certifying third-party notifiers, criteria for third-party notifications to the EPA, and provisions governing the EPA's notification of identified owners and operators.[191] In addition, NSPS OOOOb includes regulatory text governing the investigation and reporting as they relate to NSPS OOOOb affected facilities and associated equipment. Similarly, the EPA has amended NSPS OOOO and OOOOa to include super-emitter event investigation and reporting requirements as they relate to affected facilities and associated equipment under those NSPS. Such provisions are also included in the model rule implementing EG OOOOc. In addition, both NSPS OOOOb and the model rule implementing EG OOOOc includes a requirement to repair fugitive component(s) that owners and operators have identified as the source of super-emitter event specified in the EPA notice; as explained earlier in this section X.C, the standards for fugitive emissions components affected facilities under NSPS OOOOb (and presumptive standards under EG OOOOc) include a requirement to repair fugitive component(s) that owners and operators have identified as the source of super emitter-event specified in the EPA notice.

Further, pursuant to the Paperwork Reduction Act (PRA), the EPA estimated the reporting burden under the Super Emitter Program when it issued the December 2022 Supplemental Proposal. The total burden presented in section XVII.B for NSPS OOOOb of this final preamble includes the reporting burden for the entire Super Emitter Program, including reporting pertaining to affected facilities under NSPS OOOO and NSPS OOOOa and non-NSPS sources. The estimated reporting burden for the final Super Emitter Program has not changed since the December 2022 Supplemental Proposal and includes the estimated burden of required activities under the Super Emitter Program such as third-party certifications and notifications to the EPA and reporting requirements for identified owners and operators. Both the supplemental proposal and this final rulemaking have been reviewed by the Office of Management and Budget (OMB) through the interagency review process. The EPA envisions that for simplicity, completeness, and transparency, owners and operators would prefer one comprehensive Super Emitter Program over the possibility of having to respond to two EPA notices on a super-emitter event.

[191] Unlike the EPA, the Super Emitter Program imposes no obligations on States; their obligation under this final rule is to promulgate a state plan implementing EG OOOOc, as required under CAA 111(d) and EPA's implementing regulation at 40 CFR part 60, subpart Ba.

D. Process Controllers

Process controllers are automated instruments used for maintaining a process condition, such as liquid level, pressure, pressure difference, or temperature. In the oil and gas industry, many process controllers are powered by pressurized natural gas and emit natural gas to the atmosphere. However, process controllers may also be powered by electricity or compressed air, and these types of controllers do not use or emit natural gas. Natural gas-driven process controllers are a significant source of methane emissions. For instance, in the 2019 GHGRP, methane emissions from process controllers made up 65 percent of the total methane emissions from petroleum system onshore production and 28 percent of the total methane emissions from natural gas systems onshore production.

In the December 2022 Supplemental Proposal, the EPA proposed a ''zero emissions'' VOC and methane standard in NSPS OOOOb and a ''zero emissions'' methane presumptive standard in EG OOOOc. This standard can be achieved by using a process controller that is not powered by natural gas, by capturing the emissions from the natural gas-driven controllers and routing them to a process, or by using self-contained controllers. The proposed rules included an exemption from the zero-emissions requirement for process controllers in Alaska at locations where access to electrical power from the power grid is not available. The proposed requirements for these sources in Alaska were to use lower emitting natural gas-driven process controllers and to perform inspections to ensure that they are operating properly. While there are changes to some compliance aspects in the final rules, such as a further-out compliance date than proposed with an interim standard for the NSPS, the zero-emissions standard in NSPS OOOOb and presumptive standard in EG OOOOc (with the Alaska exemption) are being finalized as proposed.

1. NSPS OOOOb

a. Affected Facility

The standards apply to the collection of new, modified, and reconstructed natural gas-driven process controllers at a site (*i.e.,* a well site, centralized production facility, onshore natural gas processing plant, or compressor station). Process controllers that are emergency shutdown devices (ESD) or that are not