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Part II

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40 CFR Part 60
Emission Guidelines, Compliance Times, and Standards of Performance for Municipal Solid Waste Landfills; Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[EPA–HQ–OAR–2014–0451; FRL–9930–64–OAR]

RIN 2060–AS23

Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing a new subpart that updates the Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills (Emission Guidelines). The EPA determined that it was appropriate to review the landfills Emission Guidelines based on changes in the landfills industry since the Emission Guidelines were promulgated in 1996. The EPA's review of the Emission Guidelines for municipal solid waste (MSW) landfills applies to landfills that accepted waste after November 8, 1987, and commenced construction, reconstruction, or modification on or before July 17, 2014. Based on its initial review, the EPA has determined that it is appropriate to propose revisions to the Emission Guidelines that reflect changes to the population of landfills and the results of an analysis of the timing and methods for reducing emissions. This action proposes to achieve additional reductions of landfill gas (LFG) and its components, including methane, by lowering the emissions threshold at which a landfill must install controls. This action also incorporates new data and information received in response to an advanced notice of proposed rulemaking and addresses other regulatory issues including surface emissions monitoring, wellhead monitoring, and the definition of landfill gas treatment system.

In addition to considering information received in response to this proposed rule in evaluating potential changes to the Emission Guidelines, the EPA intends to consider the information in evaluating whether changes to the requirements for new sources beyond those in the July 17, 2014, proposed rule for new sources are warranted.

The proposed revisions to the Emission Guidelines, once implemented through revised state plans or a revised federal plan, would reduce emissions of LFG, which contains both nonmethane organic compounds and methane. Landfills are a significant source of methane which is a potent greenhouse gas (GHG) pollutant. These avoided emissions will improve air quality and reduce public health and welfare effects associated with exposure to landfill gas emissions.

DATES:

Comments. Comments must be received on or before October 26, 2015. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before September 28, 2015.

Public Hearing. If anyone contacts the EPA requesting a public hearing by September 1, 2015, the EPA will hold a public hearing on September 11, 2015 from 1:00 p.m. (Eastern Standard Time) to 5:00 p.m. (Eastern Standard Time) at the location in the **ADDRESSES** section. If no one contacts the EPA requesting a public hearing to be held concerning this proposed rule by September 1, 2015, a public hearing will not take place. Information regarding whether or not a hearing will be held will be posted on the rule's Web site located at *http://www.epa.gov/ttnatw01/landfill/landflpg.htm.* Please contact Ms. Aimee St. Clair at (919) 541–1063 or at *stclair.aimee@epa.gov* to register to speak at the hearing. The last day to pre-register to speak at the hearing will be September 8, 2015.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2014–0451, to the Federal eRulemaking Portal: *http://www.regulations.gov.* Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or withdrawn. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.,* on the Web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *http://www2.epa.gov/dockets/commenting-epa-dockets.*

Public Hearing. If a public hearing is held, it will be at the U.S. Environmental Protection Agency building located at 109 T.W. Alexander Drive, Research Triangle Park, NC 27711. Information regarding whether or not a hearing will be held will be posted on the rule's Web site located at *http://www.epa.gov/ttnatw01/landfill/landflpg.htm.*

Please see section II.D of the **SUPPLEMENTARY INFORMATION** for detailed information on the public hearing.

Docket: All documents in the docket are listed in the *http://www.regulations.gov* index. Although listed in the index, some information is not publicly available, *e.g.,* CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *http://www.regulations.gov* or in hard copy at the EPA Docket Center, EPA/DC, EPA WJC West Building, Room 3334, 1301 Constitution Ave. NW., Washington, DC. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: For information concerning this proposal, contact Ms. Hillary Ward, Fuels and Incineration Group, Sector Policies and Programs Division, Office of Air Quality Planning and Standards (E143–05), Environmental Protection Agency, Research Triangle Park, NC 27711; telephone number: (919) 541–3154; fax number: (919) 541–0246; email address: *ward.hillary@epa.gov.*

SUPPLEMENTARY INFORMATION:

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

ACUS Administrative Conference of the United States
ANPRM Advance notice of proposed rulemaking
ANSI American National Standards Institute
ARB Air Resources Board
BMP Best management practice
BSER Best system of emission reduction
Btu British thermal unit
CAA Clean Air Act
CA LMR California Landfill Methane Rule
CBI Confidential business information
CDX Central Data Exchange
CEA Council of Economic Advisers
CEDRI Compliance and Emissions Data Reporting Interface

CFR Code of Federal Regulations
CO_2 Carbon dioxide
CO_2e Carbon dioxide equivalent
DOC Degradable organic carbon
EPA Environmental Protection Agency
ERT Electronic Reporting Tool
GCCS Gas collection and control system
GHG Greenhouse gas
GHGRP Greenhouse Gas Reporting Program
GWP Global warming potential
HAP Hazardous air pollutant
HOV Higher operating value
IAMS Integrated assessment models
ICR Information collection request
IPCC Intergovernmental Panel on Climate Change
IRFA Initial regulatory flexibility analysis
IWG Interagency working group
lb/MMBtu Pounds per million British thermal unit
LCRS Leachate collection and removal system
LFG Landfill gas
LFGCost Landfill Gas Energy Cost Model
LMOP Landfill Methane Outreach Program
m^3 Cubic meters
Mg Megagram
Mg/yr Megagram per year
mph Miles per hour
MSW Municipal solid waste
$mtCO_2e$ Metric tons of carbon dioxide equivalent
MW Megawatt
MWh Megawatt hour
NAICS North American Industry Classification System
NMOC Nonmethane organic compound
NRC National Research Council
NSPS New source performance standards
NTTAA National Technology Transfer and Advancement Act
OAQPS Office of Air Quality Planning and Standards
OMB Office of Management & Budget
PM Particulate matter
$PM_{2.5}$ Fine particulate matter
ppm Parts per million
ppmvd Parts per million by dry volume
RCRA Resource Conservation and Recovery Act
RFA Regulatory Flexibility Act
RFS Renewable Fuel Standard
RIA Regulatory Impacts Analysis
SBAR Small Business Advocacy Review
$SC–CH_4$ Social cost of methane
$SC–CO_2$ Social cost of carbon dioxide
SEM Surface emissions monitoring
SER Small entity representative
SO_2 Sulfur dioxide
SSM Startup, shutdown and malfunction
Tg Teragram
TIP Tribal implementation plan
TTN Technology Transfer Network
U.S. United States
USGCRP U.S. Global Change Research Program
VCS Voluntary consensus standard
VOC Volatile organic compound
WWW World Wide Web

Organization of This Document. The following outline is provided to aid in locating information in this preamble.

I. Executive Summary

A. Purpose of Regulatory Action

This action proposes changes to the MSW landfills Emission Guidelines resulting from the EPA's review of the Emission Guidelines under Clean Air Act (CAA) section 111. The EPA's review identified a number of advances in technology and operating practices and the proposed changes are based on our evaluation of those advances and our understanding of LFG emissions. The resulting changes to the Emission Guidelines, if adopted, will achieve additional reductions in emissions of landfill gas and its components, including methane. This proposed rule is consistent with the President's 2013 Climate Action Plan,[1] which directs federal agencies to focus on ''assessing current emissions data, addressing data gaps, identifying technologies and best practices for reducing emissions, and identifying existing authorities and incentive-based opportunities to reduce methane emissions.'' The proposed changes are also consistent with the

[1] Executive Office of the President, ''The President's Climate Action Plan'' June 2013. *https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.*

President's Methane Strategy,[2] which directs EPA's regulatory and voluntary programs to continue to pursue emission reductions through regulatory updates and to encourage LFG energy recovery through voluntary programs. These directives are discussed in detail in section III.A of this preamble. This regulatory action also proposes to either resolve or clarify implementation issues that were previously addressed in amendments proposed on May 23, 2002 (67 FR 36475) and September 8, 2006 (71 FR 53271).

1. Need for Regulatory Action

The EPA reviewed the Emission Guidelines to determine the potential for achieving additional reductions in emissions of LFG. Such reductions would reduce air pollution and the resulting harm to public health and welfare. Significant changes have occurred in the landfill industry over time, including changes to the size and number of existing landfills, industry practices, and gas control methods and technologies. Based on the EPA's initial review, we are proposing changes to the Emission Guidelines. The proposed changes, if adopted, will achieve additional emission reductions of LFG and its components (including methane), provide more effective options for demonstrating compliance, and provide clarification of implementation issues raised during the amendments proposed in 2002 and 2006.

2. Legal Authority

The EPA is not statutorily obligated to conduct a review of the Emission Guidelines, but has the discretion to do so when circumstances indicate that it is appropriate. The EPA has determined that it is appropriate to review and propose changes to the Emission Guidelines at this time based on changes in the landfill industry and changes in the size, ownership, and age of landfills since the Emission Guidelines were promulgated in 1996. The EPA compiled new information on landfills through data collection efforts for a statutorily mandated review of the existing new source performance standards (NSPS) (40 CFR part 60, subpart WWW), public comments received on the NSPS proposal (79 FR 41796, July 17, 2014), and public comments received on the Advanced Notice of Proposed Rulemaking (ANPRM) (79 FR 41772, July 17, 2014) for a review of the Emission Guidelines. This information is allowing the EPA to assess current practices, emissions, and the potential for additional emission reductions.

B. Summary of Major Provisions

The proposed revised Emission Guidelines will ultimately apply to landfills that accepted waste after November 8, 1987,[3] and that commenced construction, reconstruction, or modification on or before July 17, 2014 (the date of publication of proposed revisions to the landfills NSPS, 40 CFR part 60, subpart XXX). The proposed rule provisions are described below.

Thresholds for installing or removing controls. The proposed revised Emission Guidelines retain the current design capacity threshold of 2.5 million megagrams (Mg) and 2.5 million cubic meters (m^3), but reduce the nonmethane organic compounds (NMOC) emission threshold for the installation and removal of a gas collection and control system (GCCS) from 50 Mg/yr to 34 Mg/yr for landfills that are not closed. As proposed, an MSW landfill that exceeds the design capacity threshold must install and start up a GCCS within 30 months after LFG emissions reach or exceed an NMOC level of 34 Mg/yr NMOC. (A megagram is also known as a metric ton, which is equal to 1.1 U.S. short tons or about 2,205 pounds.) Consistent with the existing Emission Guidelines, the owner or operator of a landfill may control the gas by routing it to a non-enclosed flare, an enclosed combustion device, or a treatment system that processes the collected gas for subsequent sale or beneficial use.

Landfill Gas Treatment. The EPA is proposing to address two issues related to LFG treatment. First, the EPA is proposing to clarify that the use of treated LFG is not limited to use as a fuel for a stationary combustion device but also allows other beneficial uses such as vehicle fuel, production of high-Btu gas for pipeline injection, and use as a raw material in a chemical manufacturing process. Second, the EPA is proposing to define *Treated landfill gas* as LFG processed in a treatment system meeting the requirements in 40 CFR part 60, subpart Cf and to define *Treatment system* as a system that filters, de-waters, and compresses LFG for sale or beneficial use. The proposed definition allows the level of treatment to be tailored to the type and design of the specific combustion or other equipment for other beneficial uses such as vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process in which the LFG is used. Owners or operators would develop a site-specific treatment system monitoring plan that would include monitoring parameters addressing all three elements of treatment (filtration, de-watering, and compression) to ensure the treatment system is operating properly for the intended end use of the treated LFG. They would also keep records that demonstrate that such parameters effectively monitor filtration, de-watering, and compression system performance necessary for the end use of the treated LFG.

Surface Monitoring. The EPA proposes monitoring of all surface penetrations for existing landfills. In proposed 40 CFR part 60, subpart Cf, landfills must conduct surface emissions monitoring (SEM) at all cover penetrations and openings within the area of the landfill where waste has been placed and a gas collection system is required to be in place and operating according to the operational standards in proposed 40 CFR part 60, subpart Cf. Specifically, landfill owners or operators must conduct surface monitoring on a quarterly basis at the specified intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations.

Emission Threshold Determination. The EPA is proposing an alternative site-specific emission threshold determination for when a landfill must install and operate a GCCS. This alternative emission threshold determination, referred to as ''Tier 4,'' is based on surface emission monitoring and demonstrates that surface emissions are below a specific threshold. The Tier 4 SEM demonstration would allow landfills that exceed modeled NMOC emission rates using Tiers 1, 2, or 3 to demonstrate that site-specific surface methane emissions are low. A landfill that can demonstrate that surface emissions are below 500 parts per million (ppm) for 4 consecutive quarters would not trigger the requirement to install a GCCS even if Tier 1, 2, or 3 calculations indicate that the 34 Mg/yr threshold has been exceeded.

Wellhead Operational Standards. The EPA proposes to remove the operational

[2] Executive Office of the President, ''Climate Action Plan Strategy to Reduce Methane, March 2014. *https://www.whitehouse.gov/sites/default/files/strategy_to_reduce_methane_emissions_2014-03-28_final.pdf.*

[3] This date in 1987 is the date on which permit programs were established under the Hazardous and Solid Waste Amendments of the Resource, Conservation and Recovery Act (RCRA) which amended the Solid Waste Disposal Act (SWDA), 42 U.S.C. 6901–6992k. This date was also selected as the regulatory cutoff in the EG for landfills no longer receiving wastes because the EPA judged States would be able to identify active facilities as of this date.

standards (*i.e.,* the requirement to meet operating limits) for temperature and nitrogen/oxygen at the wellheads. Landfill owners or operators would not be required to take corrective action based on exceedances of specified operational standards, but they would continue to monitor temperature and oxygen/nitrogen levels at wellheads in order to inform any necessary adjustments to the GCCS and would maintain records of monthly readings. The operational standard, corrective action, and corresponding recordkeeping and reporting remain for maintaining negative pressure at the wellhead.

Closed Landfills. Because many landfills are closed and do not produce as much LFG, the EPA is proposing a separate subcategory for landfills that closed on or before August 27, 2015. Landfills in this subcategory will continue to be subject to an NMOC emission threshold of 50 Mg/yr for determining when controls must be installed or can be removed.

Low LFG Producing Areas. The EPA is also proposing alternative criteria for determining when it is appropriate to cap or remove a portion of the GCCS at such landfills. The proposed alternative criteria for capping or removing the GCCS are: (1) The landfill is closed or an area of an active landfill is closed, (2) the GCCS has operated for at least 15 years or the landfill owner or operator can demonstrate that the GCCS will be unable to operate for 15 years due to declining gas flows, and (3) the landfill owner or operator demonstrates that there are no surface methane emissions of 500 ppm or greater in the landfill or closed area for 4 consecutive quarters.

Startup, Shutdown, and Malfunction. The EPA is proposing that standards in the Emission Guidelines apply at all times, including periods of startup, shutdown, and malfunction (SSM). In addition, to enable the EPA to determine the severity of any emissions exceedance that might occur during periods when the gas collection system or a control device is not operating, the EPA is proposing to add a recordkeeping and reporting requirement for landfill owners or operators to estimate emissions during such periods.

Requests for Comment. The EPA welcomes comments on all aspects of this proposal and is specifically requesting comments on the following topics:

- Defining closed areas of open landfills.
- Changing the walking pattern for surface emissions monitoring from 30 meters (98 ft) to 25 ft and adding a methane concentration limit of 25 ppm as determined by an integrated reading.
- Addressing wet landfills.
- Monitoring wellhead flow rate.
- Establishing a program for third-party design plan certification.
- Using a portable gas composition analyzer as acceptable alternative to Method 3A or 3C.

Other Clarifications. The EPA is proposing other clarifications to address issues that have been raised by landfill owners or operators during implementation of the current NSPS and Emission Guidelines. These other clarifications include adding criteria for when an affected source must update its design plan and clarifying when landfill owners or operators must submit corrective action timeline requests. The EPA is also proposing to update several definitions in the Emission Guidelines. In addition, while the EPA is not proposing to mandate organics diversion we are proposing two specific compliance flexibilities in the Emission Guidelines to encourage wider adoption of organics diversion and GCCS Best Management Practices (BMPs) for emission reductions at landfills. These compliance flexibilities are discussed in sections VI.B (wellhead monitoring) and VII.A (Tier 4 emission threshold determination) of this preamble.

C. Costs and Benefits

The proposed revised Emission Guidelines are expected to significantly reduce emissions of landfill gas and its components, which include methane, volatile organic compounds (VOC), and hazardous air pollutants (HAP). Landfills are a significant source of methane emissions, and in 2013, landfills represented the third largest source of human-related methane emissions in the U.S.

To comply with the emissions limits in the proposed rule, MSW landfill owners or operators are expected to install the least-cost control for collecting and combusting landfill gas. The annualized net cost for the proposed Emission Guidelines is estimated to be $46.8 million (2012$) in 2025, when using a 7 percent discount rate. The annualized costs represent the costs compared to no changes to the current Emission Guidelines (*i.e.,* baseline) and include $101 million to install and operate a GCCS, as well as $0.64 million to complete the corresponding testing and monitoring. These control costs are offset by $55.3 million in revenue from electricity sales, which is incorporated into the net control costs for certain landfills that are expected to generate revenue by using the landfill gas to produce electricity.

Installation of a GCCS to comply with the 34 Mg/yr NMOC emissions threshold at open landfills would achieve reductions of 2,770 Mg/yr NMOC and 436,100 Mg/yr methane (about 10.9 million metric tons of carbon dioxide equivalent per year ($mtCO_2e/yr$)) beyond the baseline in year 2025. In addition, the proposal is expected to result in the net reduction of 238,000 Mg CO_2, due to reduced demand for electricity from the grid as landfills generate electricity from landfill gas. The NMOC portion of landfill gas can contain a variety of air pollutants, including VOC and various organic HAP. VOC emissions are precursors to both fine particulate matter ($PM_{2.5}$) and ozone formation. These pollutants, along with methane, are associated with substantial health effects, welfare effects, and climate effects. The EPA expects that the reduced emissions will result in improvements in air quality and lessen health effects associated with exposure to air pollution related emissions, and result in climate benefits due to reductions of the methane component of landfill gas.

The EPA estimates that the proposal's estimated methane emission reductions and secondary CO_2 emission reductions in the year 2025 would yield global monetized climate benefits of $310 million to approximately $1.7 billion, depending on the discount rate. Using the mean social cost of methane (SC-CH_4) and social cost of CO_2 (SC-CO_2), at a 3-percent discount rate, results in an estimate of about $670 million in 2025.

The SC-CH_4 and SC-CO_2 are the monetary values of impacts associated with marginal changes in methane and CO_2 emissions, respectively, in a given year. It includes a wide range of anticipated climate impacts, such as net changes in agricultural productivity, property damage from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning.

With the data available, we are not able to provide health benefit estimates for the reduction in exposure to HAP, ozone, and $PM_{2.5}$ for this rule. This is not to imply that there are no such benefits of the rule; rather, it is a reflection of the difficulties in modeling the direct and indirect impacts of the reductions in emissions for this sector with the data currently available.

Based on the monetized benefits and costs, the estimated net benefits of the rule are estimated to be $620 million ($2012) in 2025.

II. General Information

A. Does this action apply to me?

This proposed rule addresses existing MSW landfills and associated solid waste management programs. Potentially affected categories include those listed in Table 1 of this preamble.

TABLE 1—REGULATED ENTITIES

Category	NAICS [a]	Examples of affected facilities
Industry: Air and water resource and solid waste management ..	924110	Solid waste landfills.
Industry: Refuse systems—solid waste landfills	562212	Solid waste landfills.
State, local, and tribal government agencies	924110	Administration of air and water resource and solid waste management programs.

[a] North American Industry Classification System.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by the new subpart. To determine whether your facility would be regulated by this action, you should carefully examine the applicability criteria in proposed 40 CFR 60.32f of subpart Cf. If you have any questions regarding the applicability of the proposed subpart to a particular entity, contact the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. What should I consider as I prepare my comments?

1. Submitting CBI

Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD–ROM that you mail to the EPA, mark the outside of the disk or CD–ROM as CBI and then identify electronically within the disk or CD–ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

Do not submit information that you consider to be CBI or otherwise protected through *http://www.regulations.gov* or email. Send or deliver information identified as CBI to only the following address: OAQPS Document Control Officer (Room C404–02), U.S. EPA, Research Triangle Park, NC 27711, Attention Docket ID No. EPA–HQ–OAR–2014–0451.

If you have any questions about CBI or the procedures for claiming CBI, please consult the person identified in the **FOR FURTHER INFORMATION CONTACT** section.

2. Docket

The docket number for the Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills (proposed 40 CFR part 60, subpart Cf) is Docket ID No. EPA–HQ–OAR–2014–0451. Docket ID No. A–88–09 for related 40 CFR part 60, subparts WWW and Cc contains supporting information.

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

World Wide Web (WWW). In addition to being available in the docket, an electronic copy of the proposed Emission Guidelines is available on the Technology Transfer Network (TTN) Web site. Following signature, the EPA will post a copy of proposed 40 CFR part 60, subpart Cf on the TTN's policy and guidance page for newly proposed or promulgated rules at *http://www.epa.gov/ttnatw01/landfill/landflpg.html.* The TTN provides information and technology exchange in various areas of air pollution control.

D. Public Hearing

Please contact Ms. Aimee St. Clair at (919) 541–1063 or at *stclair.aimee@epa.gov* to register to speak at the hearing. The last day to pre-register to speak at the hearing will be September 8, 2015. Requests to speak will be taken the day of the hearing at the hearing registration desk, although preferences on speaking times may not be able to be fulfilled. If you require the service of a translator or special accommodations such as audio description, please let us know at the time of registration.

If a hearing is held, it will provide interested parties the opportunity to present data, views or arguments concerning the proposed action. The EPA will make every effort to accommodate all speakers who arrive and register. Because this hearing, if held, will be at U.S. government facilities, individuals planning to attend the hearing should be prepared to show valid picture identification to the security staff in order to gain access to the meeting room. Please note that the REAL ID Act, passed by Congress in 2005, established new requirements for entering federal facilities. If your driver's license is issued by Alaska, American Samoa, Arizona, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, Montana, New York, Oklahoma or the state of Washington, you must present an additional form of identification to enter the federal building. Acceptable alternative forms of identification include: Federal employee badges, passports, enhanced driver's licenses and military identification cards. In addition, you will need to obtain a property pass for any personal belongings you bring with you. Upon leaving the building, you will be required to return this property pass to the security desk. No large signs will be allowed in the building, cameras may only be used outside of the building and demonstrations will not be allowed on federal property for security reasons.

The EPA may ask clarifying questions during the oral presentations, but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral comments and supporting information presented at the public hearing. Commenters should notify Ms. St. Clair if they will need specific equipment, or if there are other special needs related to providing comments at the hearings. Verbatim transcripts of the hearing and written statements will be included in the docket for the rulemaking. The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearing to run either ahead of schedule or behind schedule. A public hearing will not be held unless requested. Please contact Ms. Aimee St. Clair at (919) 541–1063 or at stclair.aimee@epa.gov to

request or register to speak at the hearing or to inquire as to whether a hearing will be held. Again further information on the public hearing will be provided on the rule's Web site located at *http://www.epa.gov/ttnatw01/landfill/landflpg.html.*

III. Background

The Emission Guidelines for MSW landfills were promulgated on March 12, 1996, and subsequently amended on June 16, 1998, February 24, 1999, and April 10, 2000, to make technical corrections and clarifications. Amendments were proposed on May 23, 2002, and September 8, 2006, to address implementation issues, but those amendments were never finalized. On July 17, 2014, the EPA issued an ANPRM for the MSW landfills Emission Guidelines (79 FR 41772). The purpose of that action was to request public input on controls and practices that could further reduce emissions from existing MSW landfills and to evaluate that input to determine if changes to the Emission Guidelines were appropriate. On July 17, 2014, the EPA issued a concurrent proposal for revised NSPS for new MSW landfills (79 FR 41796). In this action, the EPA is proposing a review of and certain changes to the Emission Guidelines to build on progress to date to (1) achieve additional reductions in emissions of LFG and its components, (2) account for changes in size, ownership and age of landfills and trends in GCCS installations, as reflected in new data, (3) provide new options for demonstrating compliance, and (4) to complete efforts regarding unresolved implementation issues. The proposed approaches are consistent with the Methane Strategy developed as part of the President's Climate Action Plan.

A. Landfill Gas Emissions and Climate Change

In June 2013, President Obama issued a Climate Action Plan that directed federal agencies to focus on ''assessing current emissions data, addressing data gaps, identifying technologies and best practices for reducing emissions, and identifying existing authorities and incentive-based opportunities to reduce methane emissions.'' [4] Methane is a potent GHG that is 28–36 times greater than carbon dioxide (CO_2) and has an atmospheric life of about 12 years.[5] Because of methane's potency as a GHG and its atmospheric life, reducing methane emissions is one of the best ways to achieve near-term beneficial impact in mitigating global climate change.

The ''Climate Action Plan: Strategy to Reduce Methane Emissions'' [6] (the Methane Strategy) was released in March 2014. The strategy recognized the methane reductions achieved through the EPA's regulatory and voluntary programs to date. It also directed the EPA to continue to pursue emission reductions through regulatory updates and to encourage LFG energy recovery through voluntary programs.

The EPA recognized the climate benefits associated with reducing methane emissions from landfills nearly 25 years ago. The 1991 NSPS Background Information Document [7] asserted that the reduction of methane emissions from MSW landfills was one of many options available to reduce global warming. The NSPS for MSW landfills, promulgated in 1996, also recognized the climate co-benefits of controlling methane (61 FR 9917, March 12, 1996). The review and proposed revision of the MSW landfills Emission Guidelines explores additional opportunities to achieve methane reductions while acknowledging historical agency perspectives and research on climate, a charge from the President's Climate Action Plan, the Methane Strategy, and improvements in the science surrounding GHG emissions.

LFG is a collection of air pollutants, including methane and NMOC. LFG is typically composed of 50-percent methane, 50-percent CO_2, and less than 1-percent NMOC by volume. The NMOC portion of LFG can contain various organic HAP and VOC. When the Emission Guidelines and NSPS were promulgated in 1996, NMOC was selected as a surrogate for MSW LFG emissions because NMOC contains the air pollutants that at that time were of most concern due to their adverse effects on health and welfare. Today, methane's effects on climate change are also considered important. In 2012, methane emissions from MSW landfills represented 15.3 percent of total U.S. methane emissions and 1.5 percent of total U.S. GHG emissions.[8] In 2013, landfills continued to be the third largest source of human-related methane emissions among stationary source categories in the U.S., representing 18.0 percent of total methane emissions [9] and 1.7 percent of all GHG emissions (in CO_2e) in the U.S.[10] For these reasons and because additional emissions reductions can be achieved at a reasonable cost, the EPA is proposing changes to the Emission Guidelines that are based on reducing the NMOC and methane components of LFG.

B. What are the health and welfare effects of landfill gas emissions?

1. Health Impacts of VOC and Various Organic HAP

VOC emissions are precursors to both $PM_{2.5}$ and ozone formation. As documented in previous analyses (U.S. EPA, 2006,[11] 2010,[12] and 2014,[13]), exposure to $PM_{2.5}$ and ozone is associated with significant public health effects. $PM_{2.5}$ is associated with health effects, including premature mortality for adults and infants, cardiovascular morbidity such as heart attacks, and respiratory morbidity such as asthma attacks, acute bronchitis, hospital admissions and emergency room visits, work loss days, restricted activity days and respiratory symptoms, as well as welfare impacts such as visibility impairment.[14] Ozone is associated with health effects, including hospital and emergency department visits, school loss days and premature mortality, as well as ecological effects (*e.g.,* injury to

[4] Executive Office of the President, ''The President's Climate Action Plan'' June 2013. *https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.*

[5] The IPCC updates GWP estimates with each new assessment report, and in the latest assessment report, AR5, the latest estimate of the methane GWP ranged from 28–36, compared to a GWP of 25 in AR4. The impacts analysis in this proposal is based on AR4 instead of AR5 (*i.e.,* a GWP of 25).

[6] Executive Office of the President, ''Climate Action Plan Strategy to Reduce Methane, March 2014. *https://www.whitehouse.gov/sites/default/files/strategy_to_reduce_methane_emissions_2014–03–28_final.pdf.*

[7] Air Emissions from Municipal Solid Waste Landfills-Background Information for Proposed Standards and Guidelines, U.S. EPA (EPA–450/3–90–011a) (NTIS PB 91–197061) page 2–15.

[8] Total U.S. methane emissions were 636 Tg CO_2e in 2013. U.S. EPA ''Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013.'' Available at *http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.*

[9] Ibid, Page ES–14.

[10] Ibid, Table ES–2.

[11] U.S. EPA. *RIA. National Ambient Air Quality Standards for Particulate Matter,* Chapter 5. Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 2006. Available on the Internet at *http://www.epa.gov/ttn/ecas/regdata/RIAs/Chapter%205-Benefits.pdf.*

[12] U.S. EPA. *RIA. National Ambient Air Quality Standards for Ozone.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 2010. Available on the Internet at *http://www.epa.gov/ttn/ecas/regdata/RIAs/s1-supplemental_analysis_full.pdf.*

[13] U.S. EPA. *RIA. National Ambient Air Quality Standards for Ozone.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 2014. Available on the Internet at *http://www.epa.gov/ttnecas1/regdata/RIAs/20141125ria.pdf.*

[14] U.S. EPA. *Integrated Science Assessment for Particulate Matter (Final Report).* EPA–600–R–08–139F. National Center for Environmental Assessment—RTP Division. December 2009. Available at *http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546.*

vegetation and climate change).[15] Nearly 30 organic HAP have been identified in uncontrolled LFG, including benzene, toluene, ethyl benzene, and vinyl chloride.[16] Benzene is a known human carcinogen.

2. Climate Impacts of Methane Emissions

In addition to the improvements in air quality and resulting benefits to human health and the non-climate welfare effects discussed above, reducing emissions from landfills is expected to result in climate co-benefits due to reductions of the methane component of LFG. Methane is a potent GHG with a global warming potential (GWP) 28–36 times greater than CO_2, which accounts for methane's stronger absorption of infrared radiation per ton in the atmosphere, but also its shorter lifetime (on the order of 12 years compared to centuries or millennia for CO_2).[17] [18] According to the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report, methane is the second leading long-lived climate forcer after CO_2 globally.[19]

In 2009, based on a large body of robust and compelling scientific evidence, the EPA Administrator issued the Endangerment Finding under CAA section 202(a)(1).[20] In the Endangerment Finding, the Administrator found that the current, elevated concentrations of GHGs in the atmosphere—already at levels unprecedented in human history—may reasonably be anticipated to endanger public health and welfare of current and future generations in the U.S. We summarize these adverse effects on public health and welfare briefly here.

3. Public Health Impacts Detailed in the 2009 Endangerment Finding

The 2009 Endangerment Finding documented that climate change caused by human emissions of GHGs threatens the health of Americans. By raising average temperatures, climate change increases the likelihood of heat waves, which are associated with increased deaths and illnesses. 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 United States. Compared to a future without climate change, climate change is expected to increase ozone pollution over broad areas of the U.S., including in the largest metropolitan areas with the worst ozone problems, and thereby increase the risk of morbidity and mortality. Climate change is also expected to cause more intense hurricanes and more frequent and intense storms 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. Children, the elderly, and the poor are among the most vulnerable to these climate-related health effects.

4. Public Welfare Impacts Detailed in the 2009 Endangerment Finding

The 2009 Endangerment Finding documented that climate change impacts touch nearly every aspect of public welfare. Among the multiple threats caused by human emissions of GHGs, climate changes are expected to place large areas of the country at serious risk of reduced water supplies, increased water pollution, and increased occurrence of extreme events such as floods and droughts. Coastal areas are expected to face a multitude of increased risks, particularly from rising sea level and increases in the severity of storms. These communities face storm and flooding damage to property, or even loss of land due to inundation, erosion, wetland submergence and habitat loss.

Impacts of climate change on public welfare also include threats to social and ecosystem services. Climate change is expected to result in an increase in peak electricity demand, Extreme weather from climate change threatens energy, transportation, and water resource infrastructure. Climate change may also exacerbate ongoing environmental pressures in certain settlements, particularly in Alaskan indigenous communities, and is very likely to fundamentally rearrange U.S. ecosystems over the 21st century. Though some benefits may balance adverse effects on agriculture and forestry in the next few decades, the body of evidence points towards increasing risks of net adverse impacts on U.S. food production, agriculture and forest productivity as temperature continues to rise. These impacts are global and may exacerbate problems outside the U.S. that raise humanitarian, trade, and national security issues for the U.S.

5. New Scientific Assessments

Since the 2009 administrative record concerning the Endangerment Finding closed following the EPA's 2010 Reconsideration Denial, the climate has continued to change, with new records being set for a number of climate indicators such as global average surface temperatures, Arctic sea ice retreat, CO_2 concentrations, and sea level rise. Additionally, a number of major, scientific assessments have been released that improve understanding of the climate system and strengthen the case that GHGs endanger public health and welfare both for current and future generations. These assessments, from the Intergovernmental Panel on Climate Change (IPCC), the U.S. Global Change Research Program (USGCRP), and the National Research Council of the National Academies (NRC), include: IPCC's 2012 *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (SREX) and the 2013–2014 Fifth Assessment Report (AR5), USGCRP's 2014 National Climate Assessment, *Climate Change Impacts in the United States* (NCA3), and the NRC's 2010 *Ocean Acidification: A National Strategy to Meet the Challenges of a Changing Ocean* (Ocean Acidification), 2011 *Report on Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia* (Climate Stabilization Targets), 2011 *National Security Implications for U.S. Naval Forces* (National Security Implications), 2011 *Understanding Earth's Deep Past: Lessons for Our Climate Future* (Understanding Earth's Deep Past), 2012 *Sea Level Rise for the Coasts of*

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[15] U.S. EPA. *Air Quality Criteria for Ozone and Related Photochemical Oxidants (Final).* EPA/600/R–05/004aF–cF. Washington, DC: U.S. EPA. February 2006. Available on the Internet at *http://cfpub.epa.gov/ncea/CFM/recordisplay.cfm?deid=149923.*

[16] U.S. EPA. 1998. Office of Air and Radiation, Office of Air Quality Planning and Standards. ''Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I: Stationary Point and Area Sources, Chapter 2: Solid Waste Disposal, Section 2.4: Municipal Solid Waste Landfills''. Available at: *http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s04.pdf.*

[17] IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.–K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[18] Note that this proposal uses a GWP value for methane of 25 for CO_2 equivalency calculations, consistent with the GHG emissions inventories and the IPCC Fourth Assessment Report.

[19] IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.–K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[19] ''Endangerment and Cause or Contribute Findings for Greenhouse Gases Under

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

California, Oregon, and Washington: Past, Present, and Future, 2012 *Climate and Social Stress: Implications for Security Analysis* (Climate and Social Stress), and 2013 *Abrupt Impacts of Climate Change* (Abrupt Impacts) assessments.

The EPA has carefully reviewed these recent assessments in keeping with the same approach outlined in Section VIII.A of the 2009 Endangerment Finding, which was to rely primarily upon the major assessments by the USGCRP, IPCC, and the NRC to provide the technical and scientific information to inform the Administrator's judgment regarding the question of whether GHGs endanger public health and welfare. These assessments addressed the scientific issues that the EPA was required to examine were comprehensive in their coverage of the GHG and climate change issues, and underwent rigorous and exacting peer review by the expert community, as well as rigorous levels of U.S. government review.

The findings of the recent scientific assessments confirm and strengthen the conclusion that GHGs endanger public health, now and in the future. The NCA3 indicates that human health in the United States will be impacted by ''increased extreme weather events, wildfire, decreased air quality, threats to mental health, and illnesses transmitted by food, water, and disease-carriers such as mosquitoes and ticks.'' The most recent assessments now have greater confidence that climate change will influence production of pollen that exacerbates asthma and other allergic respiratory diseases such as allergic rhinitis, as well as effects on conjunctivitis and dermatitis. Both the NCA3 and the IPCC AR5 found that increasing temperature has lengthened the allergenic pollen season for ragweed, and that increased CO_2 by itself can elevate production of plant-based allergens.

The NCA3 also finds that climate change, in addition to chronic stresses such as extreme poverty, is negatively affecting indigenous peoples' health in the United States through impacts such as reduced access to traditional foods, decreased water quality, and increasing exposure to health and safety hazards. The IPCC AR5 finds that climate change-induced warming in the Arctic and resultant changes in environment (*e.g.,* permafrost thaw, effects on traditional food sources) have significant impacts, observed now and projected, on the health and well-being of Arctic residents, especially indigenous peoples. Small, remote, predominantly-indigenous communities are especially vulnerable given their ''strong dependence on the environment for food, culture, and way of life; their political and economic marginalization; existing social, health, and poverty disparities; as well as their frequent close proximity to exposed locations along ocean, lake, or river shorelines.'' [21] In addition, increasing temperatures and loss of Arctic sea ice increases the risk of drowning for those engaged in traditional hunting and fishing.

The NCA3 concludes that children's unique physiology and developing bodies contribute to making them particularly vulnerable to climate change. Impacts on children are expected from heat waves, air pollution, infectious and waterborne illnesses, and mental health effects resulting from extreme weather events. The IPCC AR5 indicates that children are among those especially susceptible to most allergic diseases, as well as health effects associated with heat waves, storms, and floods. The IPCC finds that additional health concerns may arise in low income households, especially those with children, if climate change reduces food availability and increases prices, leading to food insecurity within households.

Both the NCA3 and IPCC AR5 conclude that climate change will increase health risks facing the elderly. Older people are at much higher risk of mortality during extreme heat events. Pre-existing health conditions also make older adults susceptible to cardiac and respiratory impacts of air pollution and to more severe consequences from infectious and waterborne diseases. Limited mobility among older adults can also increase health risks associated with extreme weather and floods.

The new assessments also confirm and strengthen the conclusion that GHGs endanger public welfare, and emphasize the urgency of reducing GHG emissions due to their projections that show GHG concentrations climbing to ever-increasing levels in the absence of mitigation. The NRC assessment *Understanding Earth's Deep Past* projected that, without a reduction in emissions, CO_2 concentrations by the end of the century would increase to levels that the Earth has not experienced for more than 30 million years.[22] In fact, that assessment stated that ''the magnitude and rate of the present greenhouse gas increase place the climate system in what could be one of the most severe increases in radiative forcing of the global climate system in Earth history.'' [23] Because of these unprecedented changes, several assessments state that we may be approaching critical, poorly understood thresholds: as stated in the NRC assessment *Understanding Earth's Deep Past,* ''As Earth continues to warm, it may be approaching a critical climate threshold beyond which rapid and potentially permanent—at least on a human timescale—changes not anticipated by climate models tuned to modern conditions may occur.'' Moreover, due to the time lags inherent in the Earth's climate, the NRC Climate Stabilization Targets assessment notes that the full warming from increased GHG concentrations will not be fully realized for several centuries, underscoring that emission activities today carry with them climate commitments far into the future.

Future temperature changes will depend on what emission path the world follows. In its high emission scenario, the IPCC AR5 projects that global temperatures by the end of the century will likely be 2.6 °C to 4.8 °C (4.7 to 8.6 °F) warmer than today. Temperatures on land and in northern latitudes will likely warm even faster than the global average. However, according to the NCA3, significant reductions in emissions would lead to noticeably less future warming beyond mid-century, and therefore less impact to public health and welfare.

While rainfall may see only small globally and annually averaged changes, there are expected to be substantial shifts in where and when that precipitation falls. According to the NCA3, regions closer to the poles will see more precipitation, while the dry subtropics are expected to expand (colloquially, this has been summarized as wet areas getting wetter and dry regions getting drier). In particular, the NCA3 notes that the western U.S., and especially the Southwest, is expected to become drier. This projection is consistent with the recent observed drought trend in the West. At the time of publication of the NCA, even before the last 2 years of extreme drought in California, tree ring data were already indicating that the region might be experiencing its driest period in 800

[21] IPCC, 2014: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects.* Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, p. 1581.

[22] National Research Council, Understanding Earth's Deep Past, p. 1.

[23] Id., p. 138.

years. Similarly, the NCA3 projects that heavy downpours are expected to increase in many regions, with precipitation events in general becoming less frequent but more intense. This trend has already been observed in regions such as the Midwest, Northeast, and upper Great Plains. Meanwhile, the NRC Climate Stabilization Targets assessment found that the area burned by wildfire is expected to grow by 2 to 4 times for 1 °C (1.8 °F) of warming. For 3 °C of warming, the assessment found that nine out of 10 summers would be warmer than all but the 5 percent of warmest summers today, leading to increased frequency, duration, and intensity of heat waves. Extrapolations by the NCA also indicate that Arctic sea ice in summer may essentially disappear by mid-century. Retreating snow and ice, and emissions of carbon dioxide and methane released from thawing permafrost, will also amplify future warming.

Since the 2009 Endangerment Finding, the USGCRP NCA3 and multiple NRC assessments have projected future rates of sea level rise that are 40 percent larger to more than twice as large as the previous estimates from the 2007 IPCC 4th Assessment Report due in part to improved understanding of the future rate of melt of the Antarctic and Greenland ice sheets. The NRC Sea Level Rise assessment projects a global sea level rise of 0.5 to 1.4 meters (1.6 to 4.6 feet) by 2100, the NRC National Security Implications assessment suggests that ''the Department of the Navy should expect roughly 0.4 to 2 meters (1.3 to 6.6 feet) global average sea-level rise by 2100,'' [24] and the NRC Climate Stabilization Targets assessment states that an increase of 3 °C will lead to a sea level rise of 0.5 to 1 meter (1.6 to 3.3 feet) by 2100. These assessments continue to recognize that there is uncertainty inherent in accounting for ice sheet processes. Additionally, local sea level rise can differ from the global total depending on various factors: The east coast of the U.S. in particular is expected to see higher rates of sea level rise than the global average. For comparison, the NCA3 states that ''five million Americans and hundreds of billions of dollars of property are located in areas that are less than four feet above the local high-tide level,'' and the NCA3 finds that ''[c]oastal infrastructure, including roads, rail lines, energy infrastructure, airports, port facilities, and military bases, are increasingly at risk from sea level rise and damaging storm surges.'' [25] Also, because of the inertia of the oceans, sea level rise will continue for centuries after GHG concentrations have stabilized (though more slowly than it would have otherwise). Additionally, there is a threshold temperature above which the Greenland ice sheet will be committed to inevitable melting: according to the NCA, some recent research has suggested that even present day carbon dioxide levels could be sufficient to exceed that threshold.

In general, climate change impacts are expected to be unevenly distributed across different regions of the United States and have a greater impact on certain populations, such as indigenous peoples and the poor. The NCA3 finds climate change impacts such as the rapid pace of temperature rise, coastal erosion and inundation related to sea level rise and storms, ice and snow melt, and permafrost thaw are affecting indigenous people in the United States. Particularly in Alaska, critical infrastructure and traditional livelihoods are threatened by climate change and, ''[i]n parts of Alaska, Louisiana, the Pacific Islands, and other coastal locations, climate change impacts (through erosion and inundation) are so severe that some communities are already relocating from historical homelands to which their traditions and cultural identities are tied.'' [26] The IPCC AR5 notes, ''Climate-related hazards exacerbate other stressors, often with negative outcomes for livelihoods, especially for people living in poverty (high confidence). Climate-related hazards affect poor people's lives directly through impacts on livelihoods, reductions in crop yields, or destruction of homes and indirectly through, for example, increased food prices and food insecurity.'' [27]

Events outside the United States, as also pointed out in the 2009 Endangerment Finding, will also have relevant consequences. The NRC Climate and Social Stress assessment concluded that it is prudent to expect that some climate events ''will produce consequences that exceed the capacity of the affected societies or global systems to manage and that have global security implications serious enough to compel international response.'' The NRC National Security Implications assessment recommends preparing for increased needs for humanitarian aid; responding to the effects of climate change in geopolitical hotspots, including possible mass migrations; and addressing changing security needs in the Arctic as sea ice retreats.

In addition to future impacts, the NCA3 emphasizes that climate change driven by human emissions of GHGs is already happening now and it is happening in the United States. According to the IPCC AR5 and the NCA3, there are a number of climate-related changes that have been observed recently, and these changes are projected to accelerate in the future. The planet warmed about 0.85 °C (1.5 °F) from 1880 to 2012. It is extremely likely (>95 percent probability) that human influence was the dominant cause of the observed warming since the mid-20th century, and likely (>66 percent probability) that human influence has more than doubled the probability of occurrence of heat waves in some locations. In the Northern Hemisphere, the last 30 years were likely the warmest 30 year period of the last 1,400 years. U.S. average temperatures have similarly increased by 1.3 to 1.9 degrees F since 1895, with most of that increase occurring since 1970. Global sea levels rose 0.19 m (7.5 inches) from 1901 to 2010. Contributing to this rise was the warming of the oceans and melting of land ice. It is likely that 275 gigatons per year of ice melted from land glaciers (not including ice sheets) since 1993, and that the rate of loss of ice from the Greenland and Antarctic ice sheets increased substantially in recent years, to 215 gigatons per year and 147 gigatons per year respectively since 2002. For context, 360 gigatons of ice melt is sufficient to cause global sea levels to rise 1 millimeter (mm). Annual mean Arctic sea ice has been declining at 3.5 to 4.1 percent per decade, and Northern Hemisphere snow cover extent has decreased at about 1.6 percent per decade for March and 11.7 percent per decade for June. Permafrost temperatures have increased in most regions since the 1980s, by up to 3 °C

[24] NRC, 2011: *National Security Implications of Climate Change for U.S. Naval Forces.* The National Academies Press, p. 28.

[25] Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States:* T*he Third National Climate Assessment.* U.S. Global Change Research Program, p. 9.

[26] Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment.* U.S. Global Change Research Program, p. 17.

[27] IPCC, 2014: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects.* Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, p. 796.

(5.4 °F) in parts of Northern Alaska. Winter storm frequency and intensity have both increased in the Northern Hemisphere. The NCA3 states that the increases in the severity or frequency of some types of extreme weather and climate events in recent decades can affect energy production and delivery, causing supply disruptions, and compromise other essential infrastructure such as water and transportation systems.

In addition to the changes documented in the assessment literature, there have been other climate milestones of note. According to the IPCC, methane concentrations in 2011 were about 1,803 parts per billion, 150 percent higher than concentrations were in 1750. After a few years of nearly stable concentrations from 1999 to 2006, methane concentrations have resumed increasing at about 5 parts per billion per year. Concentrations today are likely higher than they have been for at least the past 800,000 years. Arctic sea ice has continued to decline, with September of 2012 marking a new record low in terms of Arctic sea ice extent, 40 percent below the 1979–2000 median. Sea level has continued to rise at a rate of 3.2 mm per year (1.3 inches/decade) since satellite observations started in 1993, more than twice the average rate of rise in the 20th century prior to 1993.[28] And 2014 was the warmest year globally in the modern global surface temperature record, going back to 1880; this now means 19 of the 20 warmest years have occurred in the past 20 years, and except for 1998, the 10 warmest years on record have occurred since 2002.[29] The first months of 2015 have also been some of the warmest on record.

These assessments and observed changes make it clear that reducing emissions of GHGs across the globe is necessary in order to avoid the worst impacts of climate change, and underscore the urgency of reducing emissions now. The NRC Committee on America's Climate Choices listed a number of reasons ''why it is imprudent to delay actions that at least begin the process of substantially reducing emissions.'' [30] For example:

• The faster emissions are reduced, the lower the risks posed by climate change. Delays in reducing emissions could commit the planet to a wide range of adverse impacts, especially if the sensitivity of the climate to GHGs is on the higher end of the estimated range.

• Waiting for unacceptable impacts to occur before taking action is imprudent because the effects of GHG emissions do not fully manifest themselves for decades and, once manifest, many of these changes will persist for hundreds or even thousands of years.

In the committee's judgment, the risks associated with doing business as usual are a much greater concern than the risks associated with engaging in strong response efforts.

Methane is a precursor to ground-level ozone, a health-harmful air pollutant. Additionally, ozone is a short-lived climate forcer that contributes to global warming. In remote areas, methane is a dominant precursor to tropospheric ozone formation.[31] Approximately 50 percent of the global annual mean ozone increase since preindustrial times is believed to be due to anthropogenic methane.[32] Projections of future emissions also indicate that methane is likely to be a key contributor to ozone concentrations in the future.[33] Unlike nitrogen oxide (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 relatively long atmospheric lifetime compared to these other ozone precursors.[34] Reducing methane emissions, therefore, may contribute to efforts to reduce global background ozone concentrations that contribute to the incidence of ozone-related health effects.[35] [36] These benefits are global and occur in both urban and rural areas.

C. What is EPA's authority for reviewing the Emission Guidelines?

The EPA is not statutorily obligated to conduct a review of the Emission Guidelines, but has the discretionary authority to do so when circumstances indicate that it is appropriate. The EPA has determined that it is appropriate to conduct a review of and propose certain changes to the Emission Guidelines due to changes in the size, ownership and age of landfills and the types of MSW landfills with gas collection systems installed since the Emission Guidelines were promulgated in 1996 and the opportunities for significant reductions in methane and other pollutants at reasonable cost. The EPA compiled new information on MSW landfills through data collection efforts for a statutorily mandated review of the NSPS, public comments received on the NSPS proposal, and public comments received on an ANPRM for a review of the Emission Guidelines. This information allowed the EPA to conduct an assessment of current practices, emissions and potential for additional emission reductions. Information received in response to this proposed rule will allow EPA to further refine that assessment.

D. What is the purpose and scope of this action?

The purpose of this action is to (1) present the results of EPA's initial review of the Emission Guidelines, (2) propose and take comment on revisions to the Emission Guidelines based on that review, and (3) propose resolution or provide clarification regarding implementation issues that were addressed in prior proposed amendments published on May 23, 2002 (67 FR 36475) and September 8, 2006 (71 FR 53271) as they apply to existing sources. The proposed revisions appear in the proposed 40 CFR part 60, subpart Cf.[37] Although the EPA is not required to respond to comments received on the July 17, 2014, ANPRM (79 FR 41772) for the MSW landfills Emission Guidelines or comments it received on the concurrent proposal for revised NSPS for new MSW landfills in this document, the EPA is summarizing several comments it received to provide a framework and support the rationale

[28] Blunden, J., and D. S. Arndt, Eds., 2014: State of the Climate in 2013. Bull. Amer. Meteor. Soc., 95 (7), S1–S238.

[29] *http://www.ncdc.noaa.gov/sotc/global/2014/13.*

[30] NRC, 2011: *America's Climate Choices,* The National Academies Press.

[31] 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 *http://www.epa.gov/ncea/isa/.*

[32] 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 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.

[33] *Ibid.*

[34] *Ibid.*

[35] West, J.J., Fiore, A.M. 2005. ''Management of tropospheric ozone by reducing methane emissions.'' *Environ. Sci. Technol.* 39:4685–4691.

[36] Anenberg, S.C., et al. 2009. ''Intercontinental impacts of ozone pollution on human mortality,'' *Environ. Sci. & Technol.* 43: 6482–6487.

[37] Rather than merely updating 40 CFR part 60, subpart Cc, the existing emissions guidelines, the EPA has determined that the most appropriate way to proceed is to establish a new subpart that includes both the verbatim restatement of certain provisions in the existing emission guidelines and proposed revisions to, or the addition of, other provisions.

for the proposed revisions to the Emission Guidelines.

E. How would the proposed changes in applicability affect sources currently subject to subparts Cc and WWW?

Landfills currently subject to 40 CFR part 60, subparts Cc and WWW would be considered ''existing'' and would ultimately be affected by any changes to the Emission Guidelines resulting from this review. Any source for which construction, modification, or reconstruction commenced on or before July 17, 2014, the date of proposal of new subpart XXX, is an existing source. Under section 111, a source is either new, *i.e.,* construction, modification, or reconstruction commenced after a proposed NSPS is published in the **Federal Register** (CAA section 111(a)(1)) or existing, *i.e.,* any source other than a new source (CAA section 111(a)(6)). Since the revised Emission Guidelines apply to existing sources, any source that is not subject to new subpart XXX will be subject to the revised Emission Guidelines. Consistent with the general approach evinced by section 111, sources currently subject to subpart WWW would need to continue to comply with the requirements in that rule unless and until they become subject to more stringent requirements in the revised Emission Guidelines as implemented through a revised state or federal plan. The current Emission Guidelines, subpart Cc, refer to subpart WWW for their substantive requirements. That is, the requirements regarding the installation and operation of a well-designed and well-operated GCCS and compliance with the specified emission limits are the same in both rules. Thus, if the EPA were to finalize its proposal to revise the Emission Guidelines to increase their stringency, a landfill currently subject to 40 CFR part 60, subpart WWW would need to comply with the more stringent requirements in a revised state plan or federal plan implementing the revised Emission Guidelines (40 CFR part 60, subpart Cf). States with designated facilities would be required to develop (or revise) and submit a state plan to the EPA within 9 months of promulgation of any revisions to the Emission Guidelines unless the EPA specifies a longer timeframe in promulgating those revisions (40 CFR 60.23). Any revisions to an existing state plan and any newly adopted state plan must be established following the requirements of 40 CFR part 60, subpart B (40 CFR 60.20–60.29). Those requirements include making the state plan publically available and providing the opportunity for public discussion.

Once the EPA receives a complete state plan or plan revision, and completes its review of that plan or plan revision, the EPA will propose the plan or plan revision for approval or disapproval. The EPA will approve or disapprove the plan or plan revision no later than 4 months after the date the plan or plan revision was required to be submitted 40 CFR 60.27(b). The EPA will publish state plan approvals or disapprovals in the **Federal Register** and will include an explanation of its decision. The EPA also intends to revise the existing federal plan (40 CFR part 62, subpart GGG) to incorporate any changes and other requirements that result from the EPA's review of the Emission Guidelines. The revised federal plan will apply in states that have either never submitted a state plan or not received approval of any necessary revised state plan until such time as an initial state plan or revised state plan is approved.[38]

Because many of the landfills currently subject to 40 CFR part 60, subparts Cc and WWW are closed, the EPA is proposing several items to minimize the burden on these closed landfills, as discussed in section VIII.A of this preamble.

F. Where in the CFR will these changes appear?

The EPA is proposing to add a new subpart Cf to 40 CFR part 60, beginning at 40 CFR 60.30f. Subpart Cf would apply to landfills that have accepted waste after November 8, 1987, and were constructed, reconstructed, or modified on or before July 17, 2014. Proposed subpart Cf in 40 CFR part 60 contains a revision to the NMOC emission threshold for landfills that are not closed and addresses technical and implementation issues for all landfills subject to this subpart.

IV. Summary of Proposed Changes Based on Review of the Emission Guidelines

The EPA is proposing several changes to the Emission Guidelines following its review of the Emission Guidelines and the NSPS for MSW landfills. The EPA reviewed both landfills regulations and considered the current technology, practices, and associated monitoring, recordkeeping, and reporting requirements. The rationale for the following proposed changes is presented in sections V through IX of this preamble.

A. Control Technology Review

1. Best System of Emission Reduction

The EPA has determined that a well-designed and well operated landfill GCCS with a control device capable of reducing NMOC by 98 percent by weight continues to be the best system of emission reduction (BSER) for controlling LFG emissions. Thus, there is no change to the fundamental means of controlling LFG: Proposed 40 CFR part 60, subpart Cf requires landfill owners or operators to install a system to collect the LFG from the landfill and to route the collected gas to a combustion device or treatment system. Landfill owners or operators must submit for approval a site-specific GCCS design plan prepared by a professional engineer. The EPA is proposing 98 percent reduction of NMOC, expressed as a performance level (*i.e.,* a rate-based standard or percent control), as the appropriate BSER-based standard. Thus, 40 CFR part 60, subpart Cf requires combustion control devices to demonstrate 98 percent reduction by weight of NMOC or an outlet concentration of 20 parts per million dry volume (ppmvd) of NMOC, as hexane. Enclosed combustion devices have the option of reducing emissions to 20 ppmvd.

The EPA carefully considered whether various emission reduction techniques and BMPs that could improve collection and control of LFG emissions should be considered a component of BSER. As explained in section V.A. of this document, the EPA has concluded that the various emission reduction techniques and BMPs should not be considered to be components of BSER and, therefore, is not proposing to require their use. The EPA believes that the techniques and BMPs can, however, be useful in minimizing emissions in appropriate circumstances.

2. Criteria for Installing and Expanding GCCS

The EPA undertook an analysis of existing landfills to determine whether applying the existing 40 CFR part 60, subpart Cc and WWW size, emissions, and timing criteria for installing and operating a landfill GCCS to the population of existing MSW landfills remains the preferred approach to implementing BSER. Based on the analysis of the threshold and timing parameters, the EPA is proposing to

[38] Indian 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 emission guidelines. If a tribe obtains such approval and submits a proposed TIP, the EPA will use the same criteria and follow the same procedure in approving that plan as it does with state plans. The federal plan will apply to all affected facilities located in Indian country unless and until EPA approves an applicable TIP.

reduce the NMOC emission rate threshold for installing the GCCS from 50 Mg/yr to 34 Mg/yr. There are no proposed changes regarding the size of landfill covered by the Emission Guidelines or the timing of installation and expansion: The requirements would continue to apply to landfills with a design capacity greater than 2.5 million Mg and 2.5 million cubic meters, landfill owners or operators would continue to have 30 months to install and begin operating the GCCS upon the landfill exceeding the emission threshold and owners or operators would be required to expand the GCCS into new areas of the landfill within 5 years for active areas and within 2 years for areas that are closed or at final grade. However, a landfill could potentially delay the requirement to install a GCCS through the use of emission reduction techniques and BMPs in conjunction with Tier 4 monitoring. The rationale for the change to the NMOC emissions threshold is provided in section V.B of this preamble and the rationale for Tier 4 is presented in section VII.A of this preamble.

B. Proposed Changes to Monitoring, Recordkeeping, and Reporting

1. Proposed Changes to Monitoring

Surface Monitoring. The EPA proposes that all surface penetrations at existing landfills must be monitored. In proposed 40 CFR part 60, subpart Cf, landfills must monitor all cover penetrations and openings within the area of the landfill where waste has been placed and a gas collection system is required to be in place and operating according to the operational standards in proposed 40 CFR part 60, subpart Cf. Specifically, landfill owners or operators must conduct surface monitoring on a quarterly basis at 30-meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations.

The EPA is also considering alternative surface monitoring provisions for 40 CFR part 60, subpart Cf. The alternative provisions would reduce the walking pattern for conducting surface monitoring from 30-meter (98 feet (ft)) intervals to 25-ft intervals. The alternative would also add a methane concentration limit of 25 ppm as determined by integrated surface emissions monitoring, in addition to the instantaneous methane concentration limit of 500 ppm. This alternative would also limit surface monitoring during windy conditions. Under the alternative, the landfill would have to take corrective action if either the integrated or instantaneous limits were exceeded. More information about this approach is provided in sections VI.A and X.B of this preamble.

The EPA is also proposing an alternative site-specific emission threshold determination based on surface emission monitoring for when a landfill must install and operate a GCCS, as described in sections IV.C and VII.A, and when to cap or remove a GCCS, as described in section VIII of this preamble.

Wellhead Monitoring. The EPA proposes to remove the operational standards (*i.e.,* the requirement to meet operating limits) for temperature and nitrogen/oxygen at the wellheads and is thus removing the corresponding requirement to take corrective action for exceedances of these two parameters as discussed in section VI.B of this preamble. These adjustments to the wellhead monitoring parameters would apply to all landfills. Monthly monitoring of oxygen/nitrogen and temperature would still be required; however, fluctuations/variations in these parameters would no longer be required to be identified as exceedances in the annual reports. Instead, the landfill would maintain the records of this monthly monitoring on site and use the monitoring to inform any necessary adjustments to the GCCS and make them available to the Administrator (EPA Administrator or administrator of a state air pollution control agency or his or her designee) upon request. Landfill owners or operators would continue to be required to operate their GCCS with negative pressure and in a manner that collects the most LFG and minimizes losses of LFG through the surface of the landfill. Landfills would also continue to be required to prepare and submit to the regulating authority for approval a gas collection design plan, prepared by a professional engineer.

2. Proposed Changes to Recordkeeping and Reporting

Update and Approval of Design Plan. We propose two criteria for when an affected source must update its design plan and submit it to the Administrator for approval. A revised design plan would be submitted on the following timeline: (1) Within 90 days of expanding operations to an area not covered by the previously approved design plan; and (2) prior to installing or expanding the gas collection system in a manner other than one described in a previously approved design plan. The EPA is also taking comment on potentially establishing a third-party design plan certification program, which could reduce the burden associated with EPA or state review and approval of site-specific design plans and plan revisions, as discussed in section X.E of this preamble.

Submitting Corrective Action Timeline Requests. The EPA expects that eliminating the operational standards for oxygen/nitrogen and temperature will drastically reduce the number of requests for alternative timelines for making necessary corrections. However, landfills would still be required to maintain negative pressure at the wellhead to demonstrate a sufficient extraction rate and would be required to take corrective action in the event that a negative pressure is not maintained. Therefore, proposed 40 CFR part 60, subpart Cf outlines the timeline for correcting positive pressure. A landfill must submit an alternative corrective action timeline request to the Administrator if the landfill cannot restore negative pressure within 15 calendar days of the initial failure to maintain negative pressure and the landfill is unable to (or does not plan to) expand the gas collection within 120 days of the initial exceedance.

Electronic Reporting. The EPA is proposing electronic reporting of required performance test reports, NMOC emission rate reports, and annual reports. We also propose that industry should be required to maintain only electronic copies of the records to satisfy federal recordkeeping requirements. The proposed electronic submission and storage procedures are discussed in detail in section VI.E of this preamble.

The proposal to submit performance test data electronically to the EPA applies only to those performance tests conducted using test methods that are supported by the Electronic Reporting Tool (ERT). A listing of the pollutants and test methods supported by the ERT is available at: *http://www.epa.gov/ttn/chief/ert/index.html.* When the EPA adds new methods to the ERT, a notice will be sent out through the Clearinghouse for Inventories and Emissions Factors (CHIEF) Listserv (*http://www.epa.gov/ttn/chief/listserv.html#chief*) and a notice of availability will be added to the ERT Web site. You are encouraged to check the ERT Web site regularly for up-to-date information on methods supported by the ERT.

C. Emission Threshold Determinations

The EPA is proposing an alternative site-specific emission threshold determination for when a landfill must

install and operate a GCCS based on surface emission monitoring using EPA Method 21. This alternative emission threshold determination is referred to as ''Tier 4.'' The Tier 4 SEM demonstration would allow landfills that have modeled NMOC emission rates (using Tiers 1, 2, or 3) at or above the threshold to demonstrate that site-specific methane emissions are actually below the threshold. A landfill that can demonstrate that surface emissions are below 500 ppm for 4 consecutive quarters does not trigger the requirement to install a GCCS. Tier 4 would be based on the results of quarterly site-specific methane emissions monitoring of the entire surface of the landfill along a 30-meter (98-ft) path, in addition to monitoring areas where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations. If the landfill opts to use Tier 4 for its emission threshold determination and there is any measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must install a GCCS, and the landfill cannot go back to using Tiers 1, 2, or 3. Because Tier 4 is based on site-specific actual surface data whereas Tiers 1–3 are based on modeled emission rates, the EPA is requiring a GCCS to be installed and operated within 30 months of a Tier 4 exceedance of 500 ppm or higher.

D. Proposed Changes To Address Closed or Non-Producing Areas

1. Subcategory for Closed Landfills

The EPA recognizes that many landfills subject to proposed subpart Cf are closed. Therefore, the EPA is proposing a separate subcategory for landfills that closed on or before August 27, 2015. These landfills would be subject to a 50 Mg/yr NMOC emission rate threshold, consistent with the NMOC thresholds in subparts Cc and WWW of 40 CFR part 60. These landfills would also be exempt from initial reporting requirements, provided that the landfill already met these requirements under subparts Cc or WWW of 40 CFR part 60. The EPA also solicits comments on an alternative approach which would expand the closed landfill subcategory to include those landfills that close within 13 months after publication of the final emission guidelines.

2. Alternative Criteria for Removing GCCS

The EPA also recognizes that many open landfills subject to proposed subpart Cf contain inactive areas that do not produce as much landfill gas. Therefore, the EPA is also proposing an alternative set of criteria for determining when it is appropriate to cap or remove a portion of the GCCS. The proposed alternative criteria for capping or removing the GCCS are: (1) The landfill is closed or an area of an active landfill is closed, (2) the GCCS has operated for at least 15 years or the landfill owner or operator can demonstrate that the GCCS will be unable to operate for 15 years due to declining gas flows, and (3) the landfill owner or operator demonstrates that there are no surface emissions of 500 ppm methane or greater for 4 consecutive quarters. With these provisions, the landfill can employ various technologies or practices to minimize surface emissions and have the flexibility to decommission or permanently cap and remove the GCCS based on site-specific surface emission readings. Note that the EPA is requesting comment on defining closed areas of open landfills as discussed in section X.A of this preamble.

E. Other Proposed Changes

1. Treated Landfill Gas

The EPA is proposing a definition of treated landfill gas and treatment systems. Specifically, the EPA proposes to define *Treated landfill gas* as landfill gas processed in a treatment system meeting the criteria in proposed 40 CFR part 60, subpart Cf and to define *Treatment system* as a system that filters, de-waters, and compresses landfill gas. The proposed definition allows the level of treatment to be tailored to the type and design of the specific combustion equipment, chemical process, or other purpose for which the landfill gas is used. These definitions would be available for all MSW landfill owners or operators. Owners or operators would identify monitoring parameters, develop a site-specific treatment system monitoring plan, and keep records that demonstrate that such parameters effectively monitor filtration, de-watering, and compression system performance necessary for the end use of the treated LFG.

Uses of Treated LFG. In addition, the EPA is proposing that the use of treated landfill gas not be limited to use as a fuel for a stationary combustion device but also for other beneficial uses such as vehicle fuel, production of high-Btu gas for pipeline injection, and use as a raw material in a chemical manufacturing process.

2. Startup, Shutdown, and Malfunction Provisions

The general provisions in 40 CFR part 60 provide that emissions in excess of the level of the applicable emissions limit during periods of SSM shall not be considered a violation of the applicable emission limit *unless otherwise specified in the applicable standard* (see 40 CFR 60.8(c)) (emphasis added). As reflected in the italicized language, an individual subpart can supersede this provision. In this action, the EPA is proposing standards in 40 CFR part 60, subpart Cf that apply at all times, including periods of startup or shutdown, and periods of malfunction. In addition, the EPA is proposing to add a recordkeeping and reporting requirement for landfill owners or operators to estimate emissions during periods when the gas collection system or control device is not operating, to determine the severity of any emissions exceedance during such periods.

3. Other Proposed Changes

We are proposing to revise the definition of ''Modification'' and ''Household waste'' ''Solid waste,'' and ''Sludge'' and to add a definition of ''Segregated yard waste'' to make clear the applicability of proposed 40 CFR part 60, subpart Cf.

Method 25A. Method 25A is being included in proposed 40 CFR part 60, subpart Cf. After reviewing the comments received on the NSPS for new landfills proposed on July 17, 2014, the EPA recognizes that the use of Method 25A is necessary for measuring outlet concentrations less than 50 ppm NMOC. Per Emission Measurement Center Guidance Document 033 (EMC GD–033—available at *http://www.epa.gov//ttn/emc/guidlnd/gd-033.pfd*), Method 25A should be used only in cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane).

Method 18. Method 18 is not included in proposed 40 CFR part 60, subpart Cf. While Method 18 may be used in conjunction with Method 25A for methane or specific compounds of interest, there are limitations on the number of analytes that can be reasonably quantified in measuring the sum of all NMOCs. With the possibility of 40 target analytes listed in the current landfill section of AP–42 (160 analytes in the draft landfill AP–42), Method 18 is not an appropriate or cost effective method to test all NMOCs found in landfill samples. The extensive quality

assurance required by the method makes the method technically and economically prohibitive for all the potential target analytes.

Surface monitoring intervals. The EPA is clarifying that surface emissions monitoring can be conducted at an interval less than specified in the rule text. Thus, the EPA is adding ''no more than'' in front of the specified interval in proposed 40 CFR part 60, subpart Cf (*i.e.,* at no more than 30-meter intervals).

V. Rationale for the Proposed Changes Based on GCCS Technology Review

A. Control Technology Review

1. Gas Collection and Control Systems

The EPA has determined that a well-designed and well operated GCCS that collects the LFG from the landfill and routes the collected gas to a combustion device that reduces NMOC by 98 percent by weight or an outlet concentration of 20 ppmvd of NMOC, as hexane, or to a treatment system that processes the gas for subsequent beneficial use in a process that ensures that such reductions are achieved continues to be BSER for controlling LFG emissions for both new and existing MSW landfills. As discussed in section IX.A of this preamble, LFG energy recovery has environmental benefits in controlling emissions and offsetting conventional energy sources. The BSER determination is based on the EPA's review of the NSPS for new landfills as described in the landfills NSPS proposal at 79 FR 41800–41805, as well as public comments and information received on the proposed NSPS (79 FR 41796) and public input received on both the proposed NSPS and the ANPRM (79 FR 41772) for existing landfills.

The majority of comments on this topic, received in response to the proposed NSPS (79 FR 41796), including those from industry owners and operators, landfill engineering consultants, and trade organizations, as well as input received in response to the ANPRM (79 FR 41772), agreed that a GCCS and 98 percent NMOC destruction represent BSER for MSW landfills.

2. Open Flares and Destruction Efficiencies 98 Percent Reduction

The EPA is proposing 98 percent reduction of NMOC, expressed as a performance level (*i.e.,* a rate-based standard or percent control), as the appropriate BSER-based standard. The EPA previously determined that this level was reasonable considering costs, nonair quality health and environmental impacts, and energy requirements.[39] That determination still stands today and the EPA proposes 98 percent NMOC reduction for proposed 40 CFR part 60, subpart Cf. The following combustion controls can achieve at least 98 percent destruction of NMOCs and we propose that they continue to represent BSER: Enclosed flares and incinerators, and devices that burn LFG to recover energy, such as boilers, turbines, and internal combustion engines. The EPA solicits comment on whether these devices can in fact achieve at least 98 percent destruction of NMOCs and whether uses of the LFG other than for combustion achieve equivalent reductions. Note that although the landfills rules measure NMOC, similar reductions are expected for methane.[40]

The EPA continues to believe that 98 percent reduction is appropriate because this continues to be the level achievable by demonstrated technologies. Current data are consistent with 98 percent destruction. Nonetheless, in the **Federal Register** notice for the proposed NSPS (79 FR 41803), we requested comment and additional data on the NMOC destruction efficiency of incinerators and devices that burn LFG to recover energy, such as boilers, turbines, and internal combustion engines. The EPA did not receive new data on the NMOC destruction of energy recovery devices.

Open/Non-Enclosed Flares. Both enclosed and non-enclosed (open) flares have been determined to be BSER combustion devices and these technologies continue to be used today. Commenters on the proposed landfills NSPS noted the prevalence of non-enclosed flares as both a primary and secondary control device. Commenters contend that non-enclosed flares used at landfills meeting the criteria in 40 CFR 60.18(b) have been demonstrated to have destruction efficiencies similar to enclosed flares and incinerators, and devices that burn LFG to recover energy, such as boilers, turbines, and internal combustion engines.

Commenters on the NSPS did not submit new data on flare performance. However, one commenter included a statement of a guaranteed 98 percent destruction efficiency from a commonly used flare technology provider at landfills.[41] Commenters on the proposed NSPS (79 FR 41796) and information submitted in response to the ANPRM (79 FR 41772) indicate that hundreds of open/non-enclosed flares are currently in use and that these flares are fully capable of achieving a performance standard of 98 percent reduction of NMOC. The use of open/non-enclosed flares is supported because of their inherent flexibility in addressing multiple operational components including flow rate, Btu content, other gas constituents, proximity to neighbors, and cost. The information provided also indicates that open/non-enclosed flares are simpler and therefore easier and less expensive to operate when compared with enclosed combustion devices; in addition, their simplicity makes them less susceptible to malfunctions or shutdowns. A better turndown ratio for open/non-enclosed flares was cited as an important consideration in addressing variable operating flow rates over the life of the landfill. The ability to use flares as a back up to LFG energy recovery projects is also an important consideration.

One commenter on the proposed landfills NSPS did, however, state that EPA should not consider open flares to be part of the BSER for landfills, given issues with their performance in reducing emissions. The commenter provided several references that identified the difficulty in measuring the performance of flares and poor or questionable flare performance when measurements were made, especially in windy conditions.

Based on the operational flexibilities, open flares offer landfill operators, and the flare design and operational requirements in the general provisions, the EPA is retaining the option for landfills to comply with proposed 40 CFR part 60, subpart Cf using an open

[39] Air Emissions from Municipal Solid Waste Landfills—Background Information for Final Standards and Guidelines, EPA–453/R–94–021. EPA Office of Air and Radiation/Office of Air Quality Planning and Standards, Emission Standards Division, December 1995, page 2–79.

[40] Methane is more readily combustible than other organic compounds, thus methane generally has higher destruction (or control) efficiencies than other organic compounds such as NMOC and VOC. Therefore, although compliance with the landfills regulations is expressed as a percent reduction (or reduction to a level of 20 ppmv) of NMOC, landfills that reduce NMOC by 98 percent reduce methane by a similar percentage. Two EPA programs use a 99 percent destruction efficiency for methane: the U.S. Greenhouse Gas Emissions and Sinks: 1990–2013 and the Greenhouse Gas Reporting Program. In addition, the EPA's AP–42 Compilation of Air Pollutant Emission Factors, Chapter 2.4 (1998), contains typical NMOC control efficiencies of 94–99+ for various devices used at landfills, including flares, internal combustion engines, boiler/steam turbines, and gas turbines. Draft updates (2008) to AP–42 contain typical NMOC control efficiencies for flares of 97.7 percent. Because methane is more readily combustible than NMOC, methane destruction efficiencies would be at least at this level.

[41] Comment submitted by Republic Waste Services (EPA–HQ–OAR–2003–0215–0100). Attachment 15 includes statement from John Zink Company on standard emissions for elevated flares.

flare operated in accordance with 40 CFR 60.18(b) of the general provisions. The EPA maintains that the design and operational requirements set forth in 40 CFR 60.18(b) ensure that open flares are operated to adequately destroy NMOC to a level consistent with NMOC destruction requirements for other control devices. The general provisions require a minimum heating value to ensure combustion efficiency. Specifically, 40 CFR 60.18(c)(3)(ii) requires the net heating value of the gas being combusted to be 7.45 megajoules per standard cubic meter (MJ/scm)(200 Btu/standard cubic foot) or greater if the flare is nonassisted or 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted. LFG typically contains 50 percent methane, but methane content generally ranges from 45 to 60 percent, depending on several factors including waste characteristics and landfill design and operation activities. This range of methane contents is equivalent to LFG heating values of approximately 450 to 600 Btu/scf, which are above the minimum net heating values outlined in 40 CFR 60.18(c)(3)(ii). Regardless of the specific methane content of LFG, the landfill owner or operator must calculate the net heating value of the LFG for comparison to the appropriate minimum net heating value defined in 40 CFR 60.18. Proposed subpart Cf (40 CFR 60.35f(d)) complements the general provision requirements by requiring three 30-minute samples obtained by Method 3C. These rule provisions ensure that the landfill gas burned in the flare has adequate heating value to ensure complete combustion, which in turn, ensures adequate NMOC destruction.

Note that flares at landfills are typically non-assisted and generally have low variability in the flow of LFG. A non-assisted, relatively constant flow of gas means there is nothing to dilute or interrupt the mixture of gas in the combustion zone. Thus, LFG and its components are destroyed more efficiently. In addition, with respect to concerns about operating flares in windy conditions, the EPA has found extremely limited data exists to indicate that wind conditions adversely affect destruction efficiencies of flares. Studies cited regarding wind conditions are based on experiments conducted in laboratory environments using very small diameter flares (4.5 to 6 inches) that are more susceptible to wind than larger diameter flares used at MSW landfills.

Although flaring remains one compliance option for collecting and controlling emissions of landfill gas, the EPA believes that the use of landfill gas to produce energy represents a higher value use and requests comments on whether there are opportunities to incentivize the use of landfill gas for energy production rather than flaring. Thus, the EPA solicits comments on incentive approaches to encourage landfill owners or operators to productively use landfill gas for energy.

3. Emission Reduction Techniques and GCCS Best Management Practices

In the ANPRM for existing landfills (79 FR 41784), the EPA presented several alternative technologies, including oxidative technologies, that could potentially serve as a component of BSER. The principle of oxidative technologies is the use of methanotrophic bacteria, commonly found in most soils and compost, to oxidize methane into water, carbon dioxide, and biomass. The EPA also presented information on various BMPs that could improve the operation and performance of GCCS and thus achieve additional emission reductions. Such BMPs included installing final cover early to increase gas collection efficiency, connecting the leachate collection and removal system (LCRS) to a GCCS, providing redundant seals on wellheads, installing horizontal collectors to facilitate earlier gas collection (*i.e.,* shorter lag times), and preventing flooded wells via the use of pumps and surface collectors. The EPA received comments both supporting and objecting to considering BMPs and oxidative control technologies as BSER.

Commenters generally pointed out the site-specific nature of the various GCCS BMPs. Several commenters disagreed that the EPA should prescribe enhanced wellhead seals in the rule and indicated that landfill operators are already employing site-specific approaches to ensure that wells are properly sealed in order to avoid exceedances of wellhead standards and maintain good gas quality. Regarding connecting to a LCRS, two commenters raised several technical site-specific issues associated with connecting an LCRS to a GCCS. Several commenters indicated that LCRS connections are typically shallow and can introduce ambient air into the GCCS, which could increase the risk of subsurface fire. According to these commenters, to reduce these risks, each individual connection point of an LCRS would need to be evaluated to determine if it was suitable for connection to a GCCS. For cover, several commenters stated that landfill cover materials must meet multiple objectives, including controlling odors, vectors, fires, and litter, shedding moisture to reduce infiltration, and supporting vegetation and compaction. One of the commenters added that Resource Conservation and Recovery Act (RCRA) and state and local regulations govern many of these cover criteria and expressed concerns that cover requirements in the Emission Guidelines could be contradictory to other requirements. These commenters indicated that as landfill owners and operators select cover materials and designs intended to promote methane oxidation, such as biocovers or cover soils, these performance objectives should be taken into consideration.

Other commenters advocated for requiring BMPs including enhanced or duplicate seals on wellheads, connections to LCRS to collect LFG, early final covers, horizontal collectors, and BMPs for dewatering gas collection wells.

With respect to oxidative covers, several commenters mentioned or provided information on articles and other literature that discuss selecting appropriate biocover materials.[42] Some of these commenters noted that the rate of oxidation depends on both material properties and site-specific operations, including moisture, temperature, material particle size, depth, and compaction. One state agency agreed that methane oxidation is well demonstrated for cover materials such as compost or yard waste, but expressed concern that methane oxidation performance in extreme climate conditions is not well known, in particular as related to daily and intermediate cover thicknesses. One commenter expressed concerns that the use of an oxidizing cover can reduce gas collection efficiency and should not be required by the Emission Guidelines.

Several commenters expressed concern with whether the long-term performance of oxidative control technologies in real-world conditions has been established for controlling landfill methane and NMOC emissions. Several commenters appreciated the EPA's willingness to recognize the role of oxidation in mitigating methane and NMOC emissions and agreed that the use of biocovers or biofilters for landfill methane oxidation is promising but did not recommend requiring oxidative controls in the Emission Guidelines. A couple of these commenters indicated that these technologies are not BSER, one of which specifically noted that biocover technology has not been sufficiently demonstrated to support a regulatory requirement under CAA

[42] Refer to pages 55–56 of the original comment letter at DCN EPA–HQ–OAR–2003–0215–0100 for references.

section 111, as that requires the EPA to determine performance standards based on adequately demonstrated technology.

The EPA recognizes the site-specific nature of GCCS design and operation and that the effectiveness of any particular BMP, therefore, depends on the site-specific circumstances of a particular MSW landfill. Therefore, while EPA strongly encourages the use of appropriate BMP to ensure the best possible design and operation of each GCCS, EPA does not consider any particular BMPs to constitute BSER and, thus, is not proposing to prescribe the use of GCCS BMPs in proposed 40 CFR part 60, subpart Cf. The EPA continues to believe that BSER remains a well-designed and well-operated GCCS and that while all such systems have certain characteristics in common, what constitutes a well-designed and well-operated GCCS will vary somewhat from landfill to landfill. While we agree with commenters that these alternative technologies and BMPs can achieve additional reductions in some circumstances, the performance, cost, and technical feasibility of these BMPs can vary greatly from site to site as well as from cell to cell even within the same site. Further, designing specific components of a GCCS (*e.g.,* biofiltration cells, prescribed wellhead seals, horizontal collectors, LCRS connection to GCCS, and surface collectors) depends on climate-specific and site-specific conditions that must be assessed on a case-by-case basis and requires engineering judgment, which is best exercised by the professional engineer that reviews the GCCS design plan for approval and the staff at each delegated authority responsible for approving the GCCS design plan.

The EPA recognizes that the effectiveness of cover practices, both early installation of final cover and the use of oxidative covers in reducing emissions is also site-specific. Therefore, the EPA does not consider these to constitute BSER and is not proposing to prescribe specific cover practices in proposed 40 CFR part 60, subpart Cf. The timing of final cover installation depends on the filling sequence and cell design of the particular landfill. For biocovers, the applicability is dependent on whether the area is closed or open. The materials allowed to be used for oxidative covers could also vary from site to site depending on state or local yard waste or compost bans, materials most favorable to the local climate, or materials that are best suited to meet multiple site-specific performance objectives in addition to reducing landfill gas emissions. The EPA also agrees with commenters who noted that long-term performance of oxidative covers has not yet been adequately demonstrated in a full-scale industrial setting at a landfill.

Based on the information and public input it received on emission reduction techniques and various BMPs that could improve collection and control of LFG emissions, the EPA proposes to conclude that BSER does not include specific GCCS BMPs, cover practices, or oxidative controls and, therefore, is not proposing to require landfills to adopt those practices in the Emission Guidelines. The EPA does not consider oxidative technologies (biocovers and biofilters) or BMPs to be part of BSER.

Although the EPA is not prescribing BMPs for GCCS or advanced cover practices in proposed 40 CFR part 60, subpart Cf, the EPA expects that two proposed rule flexibilities will encourage and promote more widespread adoption of BMPs and alternative cover technologies. First, the proposed Tier 4 surface monitoring demonstration allows a landfill owner or operator to use site-specific surface methane emissions measurements prior to determining when the installation of a regulatory compliant GCCS is required. (The Tier 4 surface emissions threshold is discussed in section VII.A of this preamble. Tier 4 may also be used to determine when the GCCS can be removed, as discussed in section VIII of this preamble.) Thus, the EPA expects that at least some landfill owners or operators will utilize oxidative cover practices or BMPs such as early gas collection or LCRS connection to minimize surface emissions.

Second, the EPA is proposing to remove the wellhead temperature and oxygen/nitrogen performance requirements and the corresponding requirement to take corrective action upon exceeding one of these parameters, thereby providing flexibility with regard to wellhead operating parameters. (The wellhead operating parameters are discussed in section VI.B of this preamble.) With the proposed wellhead operating parameter flexibility, landfill owners or operators may employ cover practices or GCCS BMPs that are suitable for their sites and GCCS designs, thereby allowing them to collect more LFG and reduce emissions without the risk of exceeding a wellhead operating parameter.

In addition to these two flexibilities, the EPA is requesting comment on other compliance flexibilities to better promote the use of GCCS BMPs that could be used in the final Emission Guidelines. To complement the compliance flexibilities proposed in these Emission Guidelines, the EPA intends to explore the creation of technical assistance documents and other tools or resources for educating the owners or operators of affected landfills and delegated authorities about how GCCS BMPs and oxidative controls can be implemented effectively to achieve additional methane and NMOC emission reductions from landfills.

4. Organics Diversion and Source Separation

LFG is a by-product of the decomposition of organic material in MSW under anaerobic conditions in landfills. The amount of LFG created primarily depends on the quantity of waste and its composition and moisture content, as well as the design and management practices at the site. Food waste, yard debris, and other organic materials continue to be the largest component of MSW discarded, with food waste comprising the largest portion. Decreasing the amount of organics disposed in landfills would reduce the amount of LFG generated.

As previously discussed in this section V.A, we are proposing to define BSER as a well-designed, installed and operated GCCS. We are proposing to conclude that organics diversion and source separation are not part of a well-designed, installed and operated GCCS and, therefore, not part of BSER. The EPA does, however, consider organics diversion and source separation advantageous because such practices reduce the amount of LFG generated and, thus, may serve as a useful compliance tool as it may allow landfill owners or operators to postpone the need to install a GCCS.

In the ANPRM for existing landfills (79 FR 41787, July 17, 2014), the EPA solicited input on methods to encourage organics diversion in any proposed revised Emission Guidelines. The EPA received a variety of ideas on how best to encourage diversion.

Many commenters generally recognized that organics diversion could achieve emission reductions from landfills. Although the ANPRM (79 FR 41772) specifically stated EPA was not soliciting comments on mandating organics diversion, many commenters cautioned against an organics diversion mandate in the Emission Guidelines, given the complexity and local nature of waste management. Specific examples of how a Tier 4 emission threshold determination and flexible wellhead operating parameters could encourage more landfills to adopt organics diversion programs were provided, as discussed in sections VI, VII, and VIII of this preamble. Several commenters

suggested that the EPA encourage partial organics diversion programs instead of focusing on rule exemptions for landfills with 100 percent diversion rates, which commenters said is impractical at this point given current infrastructure and technology limitations. One commenter touted the economic and job creation benefits of increased organic diversion rates. A state agency suggested that a separate subcategory with a higher design capacity threshold could be developed for landfills diverting organics. Another commenter suggested that the EPA should provide states the flexibility to incorporate both source control requirements and landfill diversion programs into their state plans. States and municipalities in the U.S. are increasingly moving toward the diversion of organic wastes from landfills to composting and anaerobic digesters. At least 21 states have mandated organics diversion and/or banned disposal of at least some organics (primarily yard waste) from landfills. Five of these states (California, Connecticut, Massachusetts, Rhode Island, and Vermont) have enacted legislation governing organics disposal specific to food waste.[43] In addition, state initiatives to recycle organic wastes have contributed to the growth of local residential organics collection, with 198 communities in 19 states reporting curbside collection of food scraps.[44] Between 2009 and 2014, the number of municipalities with source separated food waste collection more than doubled (from 90 to 198) and the number of affected households grew by nearly 50 percent.[45] Separate collection and treatment of organics in the commercial and institutional sectors has also risen. The nature of organics management initiatives and programs at the state and local levels varies across the country by several factors, including type of organics targeted (*e.g.,* food waste, yard waste), source of organics generation (*e.g.,* commercial, residential, institutional), implementation phase (*e.g.,* pilot projects, mandatory with fines for violations), and pricing formats (*e.g.,* ''pay-as-you-throw,'' property tax, fixed fee).

The EPA recognizes the emission reduction benefit of organics diversion from landfills. A recent study indicated that modest organics diversion programs could achieve a 9 percent reduction in LFG generation rates, while more aggressive diversion programs could yield up to 18.5 percent reduction.[46] Nevertheless, while the EPA has proposed several pathways to encourage voluntary organics diversion in this proposal, the EPA is not proposing a federal mandate of organics diversion under this proposal. There are significant barriers to issuing a federal mandate for diversion under the Emission Guidelines, including: Lack of regulations and incentives at the state and local level; limited processing and transfer capacity for organic wastes; low cost to dispose of waste in landfills relative to other waste treatment technologies; multifaceted and regional nature of the solid waste management industry; and behavioral changes needed among waste generators (individuals, businesses, and industries) to divert their organic wastes from landfills.[47]

In the 1996 Landfills NSPS Background Information Document,[48] the EPA ''decided not to include materials separation requirements within the final rules because the EPA continues to believe RCRA and local regulations are the most appropriate vehicle to address wide-ranging issues associated with solid waste management for landfills.'' The EPA continues to believe that this is the case. The EPA has, however, proposed three compliance flexibilities as discussed in sections VI.B (wellhead monitoring), VII.A (Tier 4 emission threshold determination), and VIII.B (Criteria for Capping or Removing a GCCS) of this preamble that may aid landfills in increasing organics diversion. The proposed adjustments to wellhead operating standards provide some GCCS operational flexibility to accommodate declining LFG quantity or quality resulting from modified waste composition at landfills employing an organic diversion program. The formats of the Tier 4 option and alternative set of surface emission-based GCCS removal criteria serve as built-in incentives for the landfill owner or operator to implement a variety of surface emission reduction techniques, including organics diversion.

In addition to the three compliance flexibilities discussed in sections VI.B (wellhead monitoring), VII.A (Tier 4 emission threshold determination), and VIII.B (criteria for capping or removing a GCCS), the EPA is seeking comment on other compliance flexibilities it should consider when issuing the final Emission Guidelines to encourage more organics diversion. The EPA is also requesting comment on other ways we could structure the guidelines to credit organics diversion.

In response to public input, the EPA is also seeking comment on what, if any, role organics diversion policies or measures could play in an approvable state plan. The EPA must ensure that each state plan establishes requirements for LFG emission controls that are at least as stringent as the Emission Guidelines. We are, therefore, interested in how states might demonstrate that a state plan that contains organics diversion policies and measures is at least as stringent as the Emission Guidelines. The EPA is interested in supporting state organics diversion initiatives and one way of doing this may be to provide flexibility to include such initiatives as a component of an approvable state plan. As previously stated, however, to be approvable, a state plan must be at least as stringent in its effect on LFG as the Emission Guidelines, *i.e.,* it must ensure emission reductions equivalent to those achieved with a well-designed, installed, and well-operated GCCS with a NMOC destruction efficiency of 98 percent and we request comments on how a state that relies on organics diversion could do this. The EPA, through its various voluntary programs intends to explore the creation of outreach materials, technical assistance documents, trainings, and other tools or resources for educating owners and operators of affected landfills and implementing authorities about the benefits of organics diversion and how organics diversion programs can be implemented effectively to achieve additional reductions in methane and NMOC emissions from landfills. The EPA is also exploring opportunities through its voluntary programs to recognize leadership in diverting organics from landfills.

B. What data and control costs did the EPA consider in evaluating potential changes to the timing of installing, expanding, and removing the GCCS?

To examine the potential impact of changes to the timing of initiating and removing landfill gas collection and control, the EPA updated a dataset of information for landfills, as described below, and applied a model to assess when controls were needed under the baseline control scenario (2.5 million

[43] U.S. EPA, Regulatory Impact Analysis for Proposed Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills, Section 2.7, 2015.

[44] Ibid.

[45] Ibid.

[46] Stege, Alex. The Effects of Organic Waste Diversion on LFG Generation and Recovery from U.S. Landfills. SWANA's 37th Annual Landfill Gas Symposium. 2014.

[47] Ibid.

[48] Air Emissions from Municipal Solid Waste Landfills—Background Information for Proposed Standards and Guidelines, U.S. EPA (EPA–450/3–90–011a) (NTIS PB 91–197061).

Mg design capacity threshold and 50 Mg/yr NMOC threshold) as well as various regulatory options.

As discussed at 79 FR 41805 in determining whether to revise the proposed standards of performance for new MSW landfills, the EPA developed a dataset of information for landfills, which included landfill-specific data such as landfill open and closure year, landfill design capacity, landfill design area, and landfill depth. For the regulatory analysis, we approximated the number of landfills that would become subject to the regulation based on size using the reported design capacities, which were provided in units of megagrams. For purposes of rule applicability, size is based on both mass (Mg) and volume (m^3).

The EPA made several significant updates to this original dataset to evaluate the impacts of this proposal. Notably, the EPA updated the technical attributes of over 1,200 landfills based on new detailed data reported to 40 CFR part 98, subpart HH of the Greenhouse Gas Reporting Program (GHGRP). In addition, the EPA consulted with its regional offices, as well as state and local authorities, to identify landfills expected to undergo a modification within the next 5 years. According to the applicability of the proposed subpart XXX, if a landfill commenced construction on its modification after July 17, 2014, it would no longer be subject to the state or federal plans implementing these proposed revisions to the Emission Guidelines; therefore, these landfills were excluded from the impacts analysis conducted for this proposal, and their impacts will be considered as part of the final revisions to the standards of performance for new (and modified) landfills issued under 40 CFR part 60, subpart XXX. After incorporating all of the updates to the inventory and taking out the landfills expected to modify, the revised dataset now has 1,839 existing landfills that accepted waste after 1987 [49] and opened prior to 2014 [50] that are analyzed in this regulatory options analysis. A detailed discussion of updates made to the landfill dataset is in the docketed memorandum, ''Summary of Updated Landfill Dataset Used in the Cost and Emission Reduction Analysis of Landfills Regulations. 2015.''

The EPA programmed a Microsoft® Access database (hereinafter referred to as the ''model'') to calculate the costs and emission reductions associated with the regulatory options for each of the landfills in the revised dataset. The default parameters for methane generation potential (L_0), the methane generation rate (k), and the NMOC concentration used to estimate when the landfills exceeded regulatory emission thresholds and estimate emission reductions are the same as those discussed at 79 FR 41805. Similarly, the default parameters for methane generation potential (L_0), the methane generation rate (k), and the NMOC concentration used to estimate when landfills could cap or remove controls are the same as those discussed at 79 FR 41805.

When modeled landfill gas emissions for a particular landfill exceeded the emission rate threshold, the EPA assumed that collection equipment was installed and started operating at the landfill 30 months after first exceeding the threshold (as discussed in the docketed memorandum ''Methodology for Estimating Cost and Emission Impacts of MSW Landfills Regulations. 2014''). The EPA also assumed that as the landfill was filled over time, the landfill would expand the GCCS into new areas of waste placement according to an expansion lag time of 5 years for active areas and 2 years for areas that are closed or at final grade. Based on input received during public outreach to small entity representatives (SERs) as well as comments received on the proposed NSPS (79 FR 41796), most modern large landfills do not reach final grade within 2 years and a majority of landfills are complying with the 5 year provision.

Although we are proposing a new Tier 4 option as a site-specific alternative for determining if a landfill has exceeded the regulatory emission threshold (and must install controls) or if a landfill has fallen below the regulatory emission threshold (and can remove or cap controls), the number and types of landfills that could opt to use a Tier 4 option are unknown and could not be incorporated into the impacts calculated in the model. As a result, the number of landfills expected to control under each regulatory option, as well as the estimated emission reductions and costs associated with each regulatory option are based on modeled estimates of landfill gas emissions. To estimate the costs of each regulatory option, the EPA made minor changes to the cost methodology discussed in the landfills NSPS proposal at 79 FR 41805. In this analysis, cost equations were obtained from a recent update to EPA's Landfill Gas Energy Cost Model (LFGcost-Web), version 3.0, which was updated by EPA's Landfill Methane Outreach Program (LMOP) in August 2014. The EPA also updated estimates for surface emission monitoring costs based on revised estimates made available to the EPA since proposal of the NSPS in July 2014.

The capital costs continue to be presented in year 2012 dollars and annualized using an interest rate of 7 percent over the lifetime of the equipment (typically 15 years), or in the case of drill mobilization costs, the length of time between each wellfield expansion. These annualized capital costs were added to the annual operating and maintenance costs estimated by LFGcost-Web. The annualized cost includes capital related to the purchase, installation, operation and maintenance of GCCS, and costs related to testing and monitoring.

For certain landfills that were expected to generate revenue by using the LFG for energy, the EPA also estimated LFG energy recovery rates and associated costs to install and operate the energy recovery equipment as well as the revenue streams from the recovered energy. These revenues were subtracted from the annualized capital and operating and maintenance costs at each landfill in order to obtain a net cost estimate for each option in each year. The emission reduction and cost and revenue equations and assumptions are detailed in the docketed memoranda, ''Updated Methodology for Estimating Cost and Emission Impacts of MSW Landfills Regulations. 2015'' and ''Updated Methodology for Estimating Testing and Monitoring Costs for the MSW Landfill Regulations. 2015.''

C. What emissions and emission reduction programs are associated with existing MSW landfills?

The EPA estimates that the potential uncontrolled emissions from the approximately 1,800 landfills in its regulatory analysis dataset (as explained in section V.B of this preamble) are approximately 69,700 Mg NMOC and 11.0 million Mg methane (275 million $mtCO_2e$) in year 2014. In year 2025, the EPA estimates that the potential

[49] November 8, 1987, is the date on which permit programs were established under the Hazardous and Solid Waste Amendments of RCRA. This date was also selected as the regulatory cutoff in the emission guidelines for landfills no longer receiving wastes because the EPA judged states would be able to identify active facilities as of this date. The data available to EPA includes an open year without the month and so the analysis uses a cutoff year of 1988 for landfill closure year.

[50] July 17, 2014, is the proposed date of the revised NSPS for MSW landfills in 40 CFR part 60, subpart XXX. A landfill opening or commencing construction on its modification after this date would become subject to this new subpart and would not be subject to the revised emission guidelines. The EPA cannot predict the exact month a model landfill will open so the analysis uses a cutoff year of 2014.

uncontrolled emissions from the approximately 1,800 landfills in the dataset are approximately 71,400 Mg NMOC and 11.2 million Mg methane (281 million mtCO_2e). The majority of landfills in the dataset are expected to remain open through 2025, thus uncontrolled emissions are higher in 2025.

Looking beyond the modeled dataset, the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013 shows a growth in uncontrolled emissions from MSW landfills, from 205.4 teragrams (Tg) CO_2e in 1990 to 332.6 Tg CO_2e in 2013.[51] If controls are considered, emissions from landfills have decreased from 173.8 Tg CO_2e in 1990 to 97.5 Tg CO_2e in 2013 from both regulatory and voluntary programs as discussed below.[52]

1. Emission Reductions Due to Subparts Cc and WWW

To estimate the emission reductions, the EPA applied the current design capacity and NMOC emission rate thresholds in the MSW landfills regulations, and the time allowed for installing, expanding and removing the GCCS to the modeled emission estimates discussed in section V.B of this preamble.

Table 2 of this preamble summarizes the reductions anticipated to be achieved in 2025 as a result of 40 CFR part 60, subpart WWW and the federal and state plans implementing the Emission Guidelines. This table reflects the current baseline level of control at existing landfills: Landfills greater than or equal to 2.5 million Mg and 2.5 million m^3 must install a GCCS when NMOC emissions reach or exceed 50 Mg/yr. The table includes emission reductions for NMOC and methane.

TABLE 2—BASELINE EMISSION REDUCTIONS IN 2025 AT EXISTING LANDFILLS

Number of landfills affected	Number of landfills controlling	Number of landfills reporting but not controlling [a]	Annual net cost (million $2012) [b]	Annual NMOC Reductions (Mg/yr)	Annual methane reductions (million Mg/yr)	Annual CO_2e Reductions (million mt/yr)	NMOC cost effectiveness ($/Mg)	Methane cost effectiveness ($/Mg)	CO_2e cost effectiveness ($/mt)
989	574	211	299	57,300	9.0	226	5,090	32.3	1.3

[a] Excludes closed landfills from reporting count, because the closed landfills are not expected to have to submit reports in 2025. They would have already submitted their one-time reports under 40 CFR part 60, subpart WWW or the state or federal plan implementing 40 CFR part 60, subpart Cc, and because they are closed, they would also be expected to be done with NMOC reporting by 2025 because they are on the tail end of their gas curve and gas rates are declining.

[b] The annualized net cost ($299 million) is the difference between the average annualized revenue ($1,408 million) and the sum of annualized control cost ($1,700 million) and the average annualized testing and monitoring costs ($7.3 million).

The Emission Guidelines in the baseline are estimated to require control at 574 of the 989 affected landfills in 2025 and achieve reductions of 57,300 Mg/yr NMOC and 9.0 million Mg/yr methane (226 million mt/yr CO_2e). In the baseline, we estimate that 31 percent (574/1,839) of existing landfills will operate emission controls in 2025.

2. Other Programs Achieving Emission Reductions From Existing MSW Landfills

Landfill owners or operators collect LFG for a variety of reasons: To control odor, to minimize fire and explosion hazards, to recover LFG to be used for energy recovery, to sell carbon credits, and to comply with local, state, or federal air quality standards. This section of this proposed action discusses several non-EPA programs of which the EPA is aware. These reductions complement the reductions achieved by the current NSPS and Emission Guidelines framework.

a. State and Local Ordinances

The EPA is aware that some state or local ordinances require LFG combustion. The number of landfills controlling under these ordinances is unknown and is not factored into the incremental impacts analysis for this rule. The EPA is also aware that other states have rules regulating LFG combustion for odor control or safety reasons, which may be less comprehensive than the requirements of a GCCS operated in accordance with the NSPS and emission guideline requirements.

b. Market-Based Mechanisms

Many of these systems may have been installed to recover energy and generate revenue through the sale of electricity or LFG. Some landfills with voluntary systems may also receive revenues as a result of the creation of carbon credits. Data from the Climate Action Reserve indicates that more than 115 LFG capture projects in 36 states have been issued credits known as Climate Reserve Tonnes (CRTs).[53]

To estimate the number of landfills that may be controlling LFG emissions voluntarily, the EPA evaluated the most current data available and compared the list of landfills that are modeled to have installed a GCCS in 2014 in the NSPS/Emission Guidelines dataset to the list of landfills that are reported to have a GCCS installed in the LMOP or subpart HH GHGRP databases. While the NSPS/Emission Guidelines dataset estimates that approximately 620 landfills have installed controls to meet the requirements of the NSPS or an approved state plan or federal plan implementing the Emission Guidelines, the LMOP and GHGRP databases show approximately 330 additional landfills as having installed controls, resulting in approximately 950 landfills estimated to have a GCCS installed in 2014.[54] Approximately 55 percent of these 330 landfills exceed the design capacity of 2.5 million Mg,[55] but as of 2014, are not modeled to exceed the NMOC emission threshold that dictates when a GCCS must be installed. In some cases these GCCS may have been installed earlier than required by the time frames currently specified in the NSPS and Emission Guidelines. The LMOP database estimates that nearly 120 of the 330 landfills with voluntary systems have an energy recovery component. Among landfills with design capacities of 2.5 million Mg or greater, approximately 80 of the 180 landfills with a voluntary GCCS have an energy recovery component. These 330 landfills are estimated to reduce approximately 12 million Mg CO_2e in 2014. This is in addition to the 231 million Mg CO_2e reduction achieved by the current regulatory baseline. This

[51] U.S. EPA. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013. April 2015. Table 7–3. *http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.*

[52] Ibid, Annex 3.14, Table A–265.

[53] Climate Action Reserve. Issued List of CRTs as of January 7, 2015. *https://thereserve2.apx.com/myModule/rpt/myrpt.asp?r=112.*

[54] See sections V.B and V.C of this action for a detailed discussion of the modeling database and estimated reductions under the current federal regulatory framework.

[55] For the regulatory analysis, we approximated the number of landfills that would become subject to the regulation based on size using the reported design capacities, which were provided in units of megagrams. For purposes of rule applicability size is based on both mass (Mg) and volume (m^3).

represents an additional 5 percent reduction in year 2014 coming from systems installed for reasons other than compliance with the NSPS or state and federal plans implementing the Emission Guidelines.

D. What control options did the EPA consider?

The EPA considered several factors when determining which control options would represent BSER. This section of the preamble describes those control options, which include varying the design capacity threshold, varying the NMOC emission rate threshold, and varying the time allowed to install and then expand the GCCS. To examine these options, the EPA ran several permutations of various control options on the original dataset developed for the July 2014 NSPS proposal. Each regulatory option assessed variations in the design capacity and/or emission rate thresholds, as well as changes to the initial lag time and expansion lag time. The ''initial lag time'' is the time period between when the landfill exceeds the emission rate threshold and when controls are required to be installed and started up (30 months in 40 CFR part 60, subparts Cc and WWW). The ''expansion lag time'' is the amount of time allotted for the landfill to expand the GCCS into new areas of the landfill (5 years for active areas and 2 years for areas that are closed or at final grade in 40 CFR part 60, subpart WWW).

Some options adjusted a single threshold in isolation; for example, reducing the NMOC emission threshold to between 34 and 40 Mg/yr while keeping the design capacity threshold constant at 2.5 million Mg. Other options adjusted multiple control parameters simultaneously, taking into account the relationship between the parameters. For example, recognizing that NMOC emissions are a function of waste-in-place, some options that significantly reduced the NMOC emission threshold also reduced the design capacity thresholds to 2.0 million Mg to avoid situations where the NMOC emission threshold would be exceeded long before the design capacity threshold.

In addition to adjusting design capacity and emission control thresholds, other preliminary model runs varied the initial and/or expansion lag times. These variations estimated the impacts of requiring landfill owners or operators to install or expand gas collection systems more quickly after crossing each modeled NMOC emission threshold.

In 2013, the EPA presented different model runs during Federalism consultations and small entity outreach that represented the range of variation in both the threshold and lag time parameters. For the options presented, small entity representatives (SERs) and Federalism consultation participants provided feedback to the EPA, which included implementation concerns with varying certain parameters as part of the Emission Guidelines review, as discussed in the following sections. The EPA also received comments on varying certain parameters in response to its July 2014 NSPS proposal and ANPRM for Emission Guidelines at MSW landfills (79 FR 41772) and conducted a subsequent round of Federalism consultations and small entity outreach in 2015. The EPA considered these concerns and comments received on the July 2014 NSPS proposal and ANRPM when developing a revised set of regulatory options in this proposal.

1. What are the implementation considerations with changing the design capacity criteria?

For this proposal, the EPA considered two different design capacity thresholds: No change from the current regulatory baseline of 2.5 million Mg and 2.5 million m^3, and an option that reduced the design capacity to 2.0 million Mg and 2.0 million m^3. This section of the preamble describes the resulting potential burden to regulated entities, including small entities. Potential burden includes obtaining a title V permit and calculating an annual NMOC emission rate. This discussion also considers the size threshold associated with existing state regulations, as well as collection systems that are in place on a voluntary basis.

The EPA did not consider an option to remove the design capacity criteria for this proposal so that all landfills would be affected sources no matter their size, because of the burdens of permitting and reporting at small landfills as discussed below and at 79 FR 41782. If the EPA were to remove the design capacity threshold, a significant number of additional landfills would be subject to the rule. Out of the approximately 1,800 existing landfills in the revised dataset, approximately 850 have a design capacity of less than 2.5 million Mg. Without a design capacity threshold, the NMOC emission rate would be the only criterion for installing controls. Thus, these 850 landfills would be required to begin calculating and reporting their NMOC emission rate. They would also be required to obtain a Title V permit. This would present a significant burden on both regulated landfills and delegated permitting authorities, which must be evaluated in light of potential emissions reductions.

The EPA did not analyze control options for landfills with landfill design capacities less than 2.0 million Mg in the model. Based on the revised dataset, 571 of the 623 closed landfills (91.6 percent) have a design capacity less than 2.0 million Mg. Lowering the design capacity below 2.0 million Mg would cause a large number of closed landfills to become subject to regulatory requirements including annual NMOC reporting requirements and Title V permitting requirements. Additionally depending on NMOC emission rates, a number of these landfills may also be required to install GCCS despite the fact that many of these landfills have been closed for many years and are on the downside of their gas production curve. The EPA concludes lowering the design capacity threshold below 2.0 million Mg would add regulatory requirements with minimal environmental benefit. The EPA also notes that closed landfills may have limited access to additional revenue because they are no longer collecting tipping fees and the cost for GCCS and regulatory compliance were not factored into their closure plans, they may have poor or incomplete records for estimating landfill gas emissions, and they are less likely to be permitted.

Several commenters from state agencies expressed concerns with the permitting and reporting burdens on smaller landfills and advised the EPA to retain the current design capacity threshold. Another state agency noted that MSW landfills with a design capacity greater than 0.38 million m^3 (roughly 15 percent of the current design capacity threshold in the Emission Guidelines) are required to install GCCSs under the state's HAP rule. In practice, the smallest landfills controlling under the state regulation have design capacities as low as 0.6 million Mg and 0.4 million m^3. The commenter noted that the state rule has control requirements similar to those in the Emission Guidelines, but does relax some of the monitoring requirements given the lower gas quality and smaller emission potential at older and smaller landfills.

Two commenters advocated for reducing or eliminating the design capacity criteria, referencing the state of California Landfill Methane Rule [56] (CA LMR), which requires all landfills with

[56] California Code of Regulations, title 17, subchapter 10, article 4, subarticle 6, sections 95460 to 95476, Methane Emissions from Municipal Solid Waste.

at least 450,000 tons of waste-in-place to assess whether or not GCCS is required based on other criteria, including estimated heat input capacity from the landfill gas and surface emissions monitoring data.

Based on a review of GCCS data reported in its dataset, the EPA estimates that over 900 landfills in its revised dataset have installed a GCCS for either voluntary or regulatory reasons. Of these, 17 percent of landfills with a capacity less than 2.0 Million Mg report having a GCCS installed; 47 percent of landfills with a capacity between 2.0 million Mg and 2.5 million Mg have a GCCS installed; and 76 percent of landfills with a capacity of 2.5 Million Mg or greater have a GCCS installed.[57] Thus, it appears that a significant number of landfills have installed GCCS even in the absence of federal regulation of these smaller sources, based on site-specific circumstances such as gas quality and age of waste in the landfill or areas of the landfill, access to capital, and energy recovery opportunities.

When the EPA promulgated the 2.5 million Mg and 2.5 million m^3 design capacity threshold in 1996, we considered the impact on small entities based on public comment (61 FR 9918, March 12, 1996). Today, small private entities and municipalities still tend to own smaller sized landfills, whereas larger private entities tend to own larger regional landfills. One commenter noted that reducing the design capacity may disproportionately affect local governments and small entities. Based on the ownership data reported in the revised dataset, 78 percent of landfills with a design capacity less than 2.0 million Mg are publicly owned and a similarly strong majority (71 percent) of landfills between 2.0 million Mg and 2.5 million Mg are publicly owned. For landfills with a design capacity of 2.5 million Mg or greater, the share of public ownership drops to 48 percent of landfills. Further, small entity ownership represents only approximately 8.7 percent of the landfills required to control under a state or federal plan implementing subpart Cc. If the EPA were to reduce the design capacity to 2.0 million Mg and 2.0 million m^3, approximately 730 landfills would be subject to control requirements and 70 (9.8 percent) of those are classified as small entities. If the EPA were to eliminate the design capacity criteria, approximately 749 additional existing landfills with a design capacity below 2.0 million Mg (50 percent) would become subject to the rule, of which 379 are classified as small entities, with many of these being required to install controls depending on the NMOC level selected. Further, the cost burden for installing a collection and control system is more significant for small landfills, which are more often owned by small entities, compared to larger landfills. Because certain costs to construct the gas collection system (*e.g.*, flat fees for drill rig mobilization, and monitoring and construction costs) remain relatively constant regardless of the size of the landfill, the per-acre costs to control a small landfill are more expensive than the per-acre costs to control a large landfill.

Assuming an NMOC emission threshold level of 34 Mg/yr, reducing the design capacity from 2.5 million Mg and 2.5 million m^3 to 2.0 million Mg and 2.0 million m^3 would require controls at an additional 20 landfills that have a design capacity between 2.0 million and 2.5 million Mg, as shown in Table 3 of this preamble. Requiring controls at landfills in the 2.0 million to 2.5 million Mg size range would be less cost effective because these landfills have a smaller emission reduction potential in later years. This is apparent when considering the percent changes in net control costs and corresponding emission reductions: net control costs increase by approximately 1.5 percent, while emission reductions increase by only 0.5 percent in year 2025.

The EPA does not believe that the additional burden on small entities and the disproportionate impact on publicly-owned landfills can be justified in light of the limited additional reduction in overall emissions and is, therefore, not proposing any changes to the current design capacity threshold of 2.5 million Mg and 2.5 million m^3.

2. What are the implementation considerations with reducing the NMOC threshold?

For this proposal, the EPA considered two alternative NMOC emission thresholds: 40 Mg/yr and 34 Mg/yr. The EPA recognizes that NMOC emissions are site specific, varying widely from landfill to landfill and understands that a majority of landfills currently affected by the federal and state plans implementing the Emission Guidelines conduct Tier 2 testing in order to refine their NMOC emission estimates before installing a GCCS. This proposal also allows a new site-specific Tier 4 alternative to determine when a landfill must install a GCCS, as discussed in sections IV.C and VII.A of this preamble.

Despite these variations in NMOC emissions, results from the model show that a lower NMOC emissions threshold could accelerate the schedule for installing GCCS at existing landfills and also increase the number of existing landfills required to install controls, thereby achieving additional reductions of NMOC emissions.

The EPA proposed on July 17, 2014 a lower NMOC emission threshold in the NSPS (40 Mg/yr) and discussed this alternative in the ANPRM (79 FR 41772) and several nongovernmental organizations (NGOs) and a local government entity commented in support of a reduction in the NMOC emission threshold. One state agency also provided examples of existing landfills controlling emissions in its state with estimated NMOC emission rates as low as 8.1 Mg/yr.

Two commenters expressed concern about whether landfills planning to install controls based on the current threshold of 50 Mg/yr would be financially ready to install controls at an earlier time. Other commenters expressed concern about whether landfills that have closed and decommissioned their GCCS should be pulled back into control requirements if their emissions fall between the current 50 Mg/yr threshold and a more stringent NMOC emission threshold. These commenters recommended that EPA exempt these landfills from more stringent control requirements. One of the commenters added that it would be costly to re-install or refurbish a previously shutdown system and noted that the system would likely operate for only a few more years before it once again fell below the more stringent NMOC emission threshold.

Other commenters expressed concerns that lowering the NMOC threshold would jeopardize carbon credit revenues expected from landfills emitting between 40 and 50 Mg/yr NMOC that were planning on voluntarily installing a GCCS. A state agency also expressed concern about the additional burden to delegated authorities of managing a larger group of landfills. Another state agency expressed concerns that landfills in arid areas will have difficulty continuously operating a flare at landfills with lower quality gas that emit between 40 and 50 Mg/yr. Another commenter indicated that older and closed landfills will struggle to maintain continuous operation of their flare at a lower NMOC emission threshold and will need to operate the flare with a supplemental fossil fuel.

[57] See Docket Item ''Modeling Database Containing Inputs and Impacts for Proposed Review of the MSW Emission Guidelines. 2015.''

Because of concerns with GCCS operations at landfills that have closed, the EPA evaluated whether the lower NMOC thresholds of 34 and 40 Mg/yr should apply to this subset of landfills, as discussed in section VIII.A of this preamble and presented in Table 3 of this preamble. Because of concerns about areas with low gas quality, the EPA is proposing changes to address closed or low-gas-quality areas, including changes to the criteria for capping or removing a GCCS, and providing for the use of site-specific surface emissions monitoring measurements to indicate area-specific LFG emissions, as discussed in section VIII.B of this preamble.

As shown in Table 3 of this preamble, the incremental cost to control NMOC at open landfills at a threshold of 34 Mg/yr NMOC is $17,000/Mg NMOC and $4.3/mtCO$_2$e, compared with $19,300/Mg NMOC and $4.9/mtCO$_2$e to control at both open and closed landfills. As discussed in section V.H of this preamble, an NMOC threshold of 34 Mg/yr at open landfills would achieve reductions of 2,770 Mg/year NMOC and 436,100 Mg/year methane (10.9 million mtCO$_2$e) compared to the baseline in year 2025. Based on these considerations, the EPA is proposing to reduce the NMOC emission threshold from 50 Mg/yr to 34 Mg/yr at open landfills. The EPA is proposing a separate subcategory for landfills that closed on or before August 27, 2015, as discussed in section VIII.A of this preamble.

3. What are the implementation concerns with shortening the initial or expansion lag times?

In its revised regulatory options analysis for this proposal, the EPA did not model the impacts from any regulatory options that reduced the initial or expansion lag times. To a great extent, this decision was based on our consideration of the numerous implementation and cost concerns raised by SERs and Federalism consultation participants as discussed at 79 FR 41807,[58] as well as in comments received on the 2014 MSW landfills NSPS proposal and ANPRM for Emission Guidelines (79 FR 41772). Those concerns are summarized below. The initial lag time is the time period between when the landfill exceeds the emission rate threshold and when controls are required to be installed and started, and the expansion lag time is the amount of time allotted for the landfill to expand the GCCS into new areas of the landfill.

One state agency commented that shortening the current initial lag time would not allow sufficient time to develop and approve the GCCS design plan, obtain the necessary permit, and construct the GCCS. The commenter added that one unintended consequence of shortening the initial lag time could be the inhibition of the beneficial reuse of landfill gas, since a shorter lag time may not allow time to design and approve a more complex landfill gas energy recovery system. Commenters representing affected landfills also expressed concerns that current administrative and construction lead times would make shorter lag times difficult.

Several landfill owners or operators and a state authority agreed with costs and operational and safety concerns described at 79 FR 41807 associated with increasing the number of wells in active areas as a result of shorter initial or expansion lag times. One commenter provided detailed information on costs to install and repair wells in active areas, which the commenter estimated to be between two and three times more expensive than wells installed in areas at final grade. This commenter added that 43 percent of the wells installed during 2014 were replacement wells that had to be installed as a result of damage to existing wells resulting from ongoing activities in active areas and noted that shortened lag times would only increase the number of replacement wells required. In addition to the damage to wells from filling operations, one commenter added that vertical wells in active areas require additional lateral collection pipes to be installed on rather flat slopes that are susceptible to condensate blockage and must also be replaced more frequently. Similarly, two commenters were concerned whether horizontal collectors could universally meet the need for shorter lag times in light of the susceptibility of flooding of the horizontal designs and the inability to dewater these wells with pumps.

Several commenters recognized the benefit of earlier GCCS installation, but these commenters also discussed aerobic conditions in active areas and other factors affecting gas quality that in turn create exceedances of wellhead monitoring requirements for pressure, temperature, and oxygen/nitrogen. They noted that few states have accommodated flexible monitoring alternatives for early collection systems. One state authority believed that site-specific factors other than the regulatory-driven lag times, such as safety or odor control, are already achieving earlier installation of GCCS. Three other commenters urged EPA to include early collection requirements in the proposed Emission Guidelines. One of these commenters indicated that the requirement to promote early collection could be flexible instead of a rigid adjustment to the lag times. For the reasons presented in this section as well as those detailed at 79 FR 41807, the EPA is not proposing to shorten the initial or expansion lag times in the revised Emission Guidelines. However, the EPA is requesting comment on whether the regulation should require that the GCCS design plan contain a description of early gas collection measures or best management practices, in order for the reviewing professional engineer or the Administrator to ensure that emissions are minimized. The EPA is also taking comment on whether the monitoring in the rule should be strengthened to require GCCS to be expanded in a site-specific manner as long as surface emission monitoring limits in all areas of the landfill were maintained at all times, similar to the approach taken in the California Landfill Methane Rule (LMR).

E. How did we select the proposed options?

When determining which control options would represent BSER, the EPA considered several factors: The implementation considerations identified earlier in this section of this preamble; and the incremental emission reductions, cost, and co-benefits that would be achieved beyond the baseline.

The EPA compared the annualized net cost and emission impacts in 2025 of three different regulatory options to the annualized net costs and emission impacts in 2025 of the baseline. The EPA analyzed numerous iterations of alternate control and reporting thresholds and presented potential control options to SERs and Federalism consultation participants, as described in section V.D of this preamble. After considering feedback from the SERs and Federalism consultation participants, as well as comments received on the July 2014 NSPS proposal and ANPRM (79 FR 41772), the EPA selected for consideration three regulatory alternatives as presented in Table 3 of this preamble. Table 3 summarizes the incremental impacts of each control option, when compared to the baseline. The table shows the NMOC and methane emission reductions and

[58] See also the docketed report ''Summary of Small Entity Outreach. 2014.'' (Docket Item: EPA–HQ–OAR–2003–0215–0051) and the Final Report of the Small Business Advocacy Review Panel on EPA's Planned Proposed Rules Standards of Performance for Municipal Solid Waste Landfills and Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills, July 2015.

corresponding annualized net costs, when using a 7 percent discount rate, in 2025.

TABLE 3—EMISSION REDUCTIONS AND COSTS FOR CONTROL OPTIONS IN YEAR 2025 AT EXISTING LANDFILLS
[2012$]

Option	Landfills affected by proposed option [a]	Number of landfills affected [b]	Number of landfills controlling	Number of landfills reporting but not controlling	Annual net cost (million $2012)	Annual NMOC reductions (Mg/yr)	Annual methane reductions (million Mg/yr)	Annual CO_2e reductions (million mt/yr) [c]	NMOC cost effectiveness ($/Mg)	Methane cost effectiveness ($/Mg)	CO_2e cost effectiveness ($/mt) [c]
Baseline											
Baseline (2.5 million Mg design capacity/50 Mg/yr NMOC).	All	989	574	211	299	57,300	9.0	226	5,100	32.3	1.3
Incremental values vs. the Baseline											
Option (2.5 million Mg design capacity/40 Mg/yr NMOC).	Open	0	62	−62	27.0	1,720	0.27	6.8	15,800	100	4.0
	All	0	84	120	48.1	2,500	0.39	9.9	19,200	122	4.9
Option (2.5 million Mg design capacity/34 Mg/yr NMOC).	Open	0	106	−106	46.8	2,770	0.44	10.9	17,000	108	4.3
	All	0	142	62	77.6	4,030	0.64	15.9	19,300	122	4.9
Option (2.0 million Mg design capacity/34 Mg/yr NMOC).	Open	101	122	−75	51.0	3,040	0.48	12.0	16,800	107	4.3
	All	101	162	143	83.5	4,360	0.69	17.2	19,200	122	4.9

[a] Options in this table show the impacts of reducing the design capacity and/or NMOC emission threshold below baseline levels on open landfills only, and retaining the NMOC threshold of 50 Mg/yr for the closed landfill subcategory as well as reducing the design capacity and/or NMOC emission thresholds for all landfills (open and closed).
[b] Landfills are affected by the landfills Emission Guidelines based on design capacity. Once affected, they calculate and report emissions until they exceed the NMOC threshold, which triggers control requirements.
[c] Results do not include secondary CO_2 impacts.

Regulatory options. The EPA considered three regulatory options more stringent than the baseline, as presented in Table 3 of this preamble. The first option reduces the NMOC emission threshold to 40 Mg/yr. The second option further reduces the NMOC threshold to 34 Mg/yr. The third option reduces both the NMOC emission threshold to 34 Mg/yr and the design capacity threshold to 2.0 million Mg and 2.0 million m^3. We analyzed the impacts of applying each of these three more stringent thresholds to only open landfills as well as all (open and closed) landfills.

Based on the characteristics of the landfills, between approximately 60 and 160 additional landfills would be required to install controls in 2025. In addition to increasing the total number of landfills that would control their emissions, the schedule for installing controls would be accelerated for many landfills in years prior to 2025 because the landfill would exceed the lower thresholds of 34 or 40 Mg/yr NMOC earlier than the baseline, and in turn begin collecting and destroying landfill gas emissions earlier.

Emission reductions. If the EPA were to reduce the NMOC emission threshold to 34 Mg/yr at open landfills while retaining the 2.5 million Mg and 2.5 million m^3 design capacity threshold (option 2.5/34) as proposed in this rule, the corresponding emission reductions in 2025 would be 2,770 Mg/year NMOC and 436,100 Mg/year methane (10.9 million $mtCO_2e$) compared to the baseline, which represents a 4.8 percent reduction in emissions beyond the baseline. If EPA were to apply this threshold to all landfills (open and closed), the corresponding emission reductions in 2025 would be 4,030 Mg/year NMOC and 635,100 Mg/year methane (15.9 million $mtCO_2e$) compared to the baseline. Additional reductions could be achieved if the EPA combined the NMOC emission threshold of 34 Mg/yr with a lower design capacity threshold of 2.0 million Mg and 2.0 million m^3 (option 2.0/34). The corresponding emission reductions for open landfills in 2025 would be 3,040 Mg/yr NMOC and 479,100 Mg/yr methane (12 million $mtCO_2e$) compared to the baseline for open landfills, representing a 5.3 percent reduction in emissions beyond the baseline. If the EPA were to apply this lower threshold for both design capacity and NMOC to all landfills (open and closed), the corresponding emission reductions in 2025 would be 4,360 Mg/year NMOC and 687,100 Mg/year methane (17.2 million $mtCO_2e$) when compared to the baseline.

If the EPA were to reduce the NMOC threshold to 40 Mg/yr at open landfills while retaining a 2.5 million Mg and 2.5 million m^3 design capacity threshold (option 2.5/40), the emission reductions in 2025 would be 1,720 Mg/year NMOC and 270,700 Mg/year methane (6.8 million $mtCO_2e$) compared to the baseline. An emission threshold of 40 Mg/yr NMOC with a 2.5 million Mg and 2.5 million m^3 design capacity threshold represents approximately a 3 percent reduction in emissions beyond the baseline. If the EPA were to apply the 40 Mg/yr NMOC threshold to all landfills (open and closed), the corresponding emission reductions in 2025 would be 2,500 Mg/year NMOC, 270,000 Mg/year methane (6.8 million $mtCO_2e$) compared to the baseline.

The wide range in the magnitude of emission reductions among pollutants is due to the composition of landfill gas: NMOC represents less than 1 percent of landfill gas, while methane represents approximately 50 percent. CO_2e is an expression of methane in terms of the CO_2 equivalents, given the methane GWP of 25.[59]

Cost. In terms of control costs in 2025, option 2.5/34 represents an approximately 16 percent increase in control costs compared to the baseline if the threshold were reduced for open landfills only, and a 26 percent increase in control costs compared to the baseline if the threshold were reduced for all landfills (open and closed). If the EPA adopted a lower NMOC threshold of 34 Mg/yr NMOC along with a reduction in design capacity to 2.0 million Mg and 2.5 million m^3, the net cost would increase by 17 percent above the baseline if applying more stringent controls only at open landfills, and 28 percent for more stringent control of all landfills (open and closed). If the EPA adopted an NMOC threshold of 40 Mg/yr NMOC but retained a design capacity of 2.5 million Mg and 2.5 million m^3, the net cost would be 9 percent above the baseline for open landfills and a 16 percent increase for all landfills.

In terms of cost effectiveness, the overall dollar-per-Mg cost for NMOC reductions under the baseline is $5,100 per Mg NMOC and $32.3 per Mg methane as presented in Table 3 of this

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

preamble. Under option 2.5/34, the cost effectiveness is $17,000 for controlling open landfills and $19,300 for all landfills. If the EPA adopted a lower NMOC threshold of 34 Mg/yr NMOC along with a reduction in design capacity to 2.0 million Mg and 2.0 million m^3 (option 2.0/34), the cost effectiveness is $16,800 for open landfills and $19,200 for all landfills, although the EPA recognizes that this lower cost effectiveness does not incorporate costs related to additional permitting needs for sources between 2.0 and 2.5 million Mg and m^3. Under option 2.5/40, the incremental dollar-per-Mg control cost for NMOC reductions is approximately $15,800 per Mg NMOC for open landfills and $19,200 for all landfills. The EPA welcomes additional data and comment on the issue of costs.

Proposed Option 2.5/34. Based on the emission reduction and cost discussions above and consistent with the President's Methane Strategy and the potential to achieve a near-term beneficial impact in mitigating global climate change as discussed in section III of this preamble, the EPA is proposing to reduce the NMOC threshold to 34 Mg/yr at open landfills but retain the current design capacity threshold of 2.5 million Mg and 2.5 million m^3. Lowering the NMOC threshold would result in earlier GCCS installations at landfills already subject to the rule based on their design capacity, thereby achieving additional reductions of NMOC and methane. This lowered threshold achieves reductions without adjusting the initial and expansion lag times and incurring the associated costs and implementation concerns.

Reducing the NMOC threshold from the baseline-level of 50 Mg/yr to 34 Mg/yr at open landfills would affect 106 more landfills in 2025 and would achieve an estimated 4.8 percent additional reduction in emissions of NMOC and methane compared to the baseline. These additional reductions can be achieved at very similar cost effectiveness to an NMOC threshold of 40 Mg/yr, but a level of 34 Mg/yr would achieve almost 60 percent more reductions than a level of 40 Mg/yr. In addition, the proposal is expected to result in the net reduction of 238,000 Mg CO_2, due to reduced demand for electricity from the grid as landfills generate electricity from landfill gas. Reducing the NMOC threshold to 34 Mg/yr results in an incremental reduction of methane that is equivalent to approximately 10.9 million $mtCO_2e$ per year, which compares to 19 to 33 million $mtCO_2e$ reductions from the April 16, 2012 regulations for the oil and gas industry (77 FR 49490). In addition, as discussed in section XI.G of this preamble, a level of 34 Mg/yr NMOC also results in climate-related benefits associated with methane reductions. The 2025 methane benefits vary by discount rate and range from about $310 million to approximately $1.7 billion; the mean $SC–CH_4$ at the 3-percent discount rate results in an estimate of about $660 million in 2025.

Further, this proposal would tighten the control device removal criteria, requiring that the controls would have to stay on until three successive tests for NMOC emissions were below the NMOC emission threshold of 34 Mg/yr instead of 50 Mg/yr, unless the landfill can demonstrate that its surface emissions are low, as discussed in section VIII.B of this preamble. Depending on the waste-in-place of the landfill at closure and other site-specific factors (*e.g.,* waste composition, climate), it may take 15 to 45 years after closure for a large modern landfill to emit less than the NMOC emission threshold, and in turn qualify for capping or removing the GCCS. Although the emission reductions associated with these later years in the landfills' lifetimes are not incorporated in the environmental and economic impacts of the baseline and options under consideration in year 2025, the lower threshold associated with this proposal would require controls to be installed for a longer period than the baseline.

Reducing the NMOC threshold also recognizes the opportunity to build upon progress to date and achieve even more reductions of landfill gas and its components, consistent with the President's Methane Strategy as discussed in section III of this preamble. Landfill gas generated from established waste (waste that has been in place for at least a year) is typically composed of roughly 50 percent methane and 50 percent CO_2 by volume, with less than 1 percent NMOC. Because the components of landfill gas are associated with substantial health, welfare, and climate effects, additional reductions of landfill gas would improve air quality and reduce health and welfare effects associated with exposure to landfill gas emissions. Note that in 2013, landfills continued to be the third largest source of human-related methane emissions in the U.S., representing 15.3 percent of total methane emissions.[60] Methane emissions represent 9.5 percent of all GHG emissions (in CO_2e) in the U.S.[61]

The EPA is not proposing to reduce the design capacity in conjunction with a reduction in the NMOC emission threshold. As discussed in section VI.E of this preamble, this option achieves only modest additional reductions (less than one percent more than the proposed option 2.5/34), but has a disproportionate impact on small entity- and municipally-owned sites, and closed landfills that are on the downward trend of generating landfill gas. Reducing the design capacity would also pose substantial burden on delegated authorities because these small entity- and municipally- owned landfills are not affected by the currently promulgated NSPS or Emission Guidelines.

Alternative Option 2.5/40. The EPA recognizes that the ownership, operating status, and other technical characteristics of individual landfills can affect the site-specific cost effectiveness of achieving additional reductions of NMOC and methane and ability to sustain the operation of GCCS that may not be readily apparent when selecting a control option based on the national aggregate values shown in Table 3 of this preamble. The EPA is soliciting comment on whether an NMOC threshold higher than 34 Mg/yr may be appropriate for all, or a subset of the existing landfills affected by this proposal, in addition to retaining the current threshold of 50 Mg/yr for the closed landfill subcategory, as proposed and discussed in section VIII.A of this preamble.

VI. Rationale for the Proposed Changes to Monitoring, Recordkeeping, and Reporting

A. Surface Emissions Monitoring Requirements

The intent of the surface monitoring provision in the existing Emission Guidelines is to maintain a tight cover that minimizes the migration of emissions through the landfill surface. Quarterly surface emissions monitoring indicates whether the cover and gas collection system are working properly. In addition to the proposed surface emission provisions discussed here, the EPA is also seeking comment on additional enhancements to surface emissions monitoring in section X.B of this preamble.

Every Cover Penetration. The EPA proposes that all surface penetrations must be monitored for existing landfills.

[60] U.S. EPA. 2013. ''Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013. Executive Summary, ES–8.'' Available at *http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.*

[61] Ibid.

Proposed 40 CFR part 60, subpart Cf specifies that the landfill must ''operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator must conduct surface monitoring around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations.''

Commenters both supported and opposed monitoring every cover penetration. Several commenters, including two state/local agencies and one environmental organization supported monitoring every cover penetration. The state agency noted that seals around penetrations can be compromised as a result of settlement, separation from the barrier layers or boot materials, and cracking of cover soils tied into penetrations, thus, leading to detections of landfill gas during surface monitoring as reported by field staff. Several commenters opposed the requirement to monitor every cover penetration, citing significant additional cost with no or limited environmental benefit. In proposed 40 CFR part 60, subpart Cf, we are reiterating the position in the current regulation that landfills must monitor all cover penetrations and openings within the area of the landfill where waste has been placed and a gas collection system is required. Specifically, landfill owners or operators must conduct surface monitoring at 30-meter intervals and where visual observations indicate elevated concentrations of landfill gas. The EPA maintains that cover penetrations can be observed visually and are clearly a place where gas would be escaping from the cover, so monitoring of them is required by the regulatory language. The regulatory language gives distressed vegetation and cracks as an example of a visual indication that gas may be escaping, but this example does not limit the places that should be monitored by landfill staff or by enforcement agency inspectors. Thus, consistent with the EPA's historical intent and interpretation, the landfill owner or operator must monitor any openings that are within an area of the landfill where waste has been placed and a gas collection system is required.

More Precise Location Data. The EPA is proposing more specific requirements for reporting the locations where measured methane surface emissions are 500 parts per million above background. Since the Emission Guidelines were originally promulgated in 1996, EPA is aware of new, relatively inexpensive monitoring technologies that incorporate GPS technologies to more precisely identify the location of exceedances. The EPA is aware of several landfills that have been using GPS to more accurately track the location of measurements and store these data in databases. The EPA is proposing to require landfills to report the latitude and longitude coordinates of each exceedance using an instrument with an accuracy of at least 3 meters. Coordinates must be in decimal degrees with at least five decimal places. This level of accuracy and precision is consistent with the requirements proposed in Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards (79 FR 36880). This precision will also provide more transparency to inspectors reviewing site records on the location of surface emission leaks, and confirming areas of the landfill where surface monitoring activities were skipped, which may assist with targeting inspections to problem areas of the landfill. In addition, this precision will allow the landfill to overlay the coordinates of surface exceedances against maps of the GCCS to determine spatial and temporal patterns of exceedances relative to GCCS components. This specificity for location data is also being required for landfills using the Tier 4 site-specific measurement approach, as discussed in section VII.A of this preamble.

B. Wellhead Monitoring Requirements

The operational standards of the current Emission Guidelines are to operate each interior wellhead in the collection system with a negative pressure (vacuum), a landfill gas temperature less than 55 °C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. Since 1996, when the rules were originally promulgated, the EPA has heard concerns from both regulated entities and implementing authorities regarding the implementation of the operational standards for temperature and oxygen/nitrogen at wellheads. The EPA received feedback during 2013 and 2014 from SERs and Federalism consultation participants expressing concern that the wellhead standards were overly prescriptive. In the July 17, 2014 proposed NSPS (79 FR 41821) and the ANPRM for the Emission Guidelines (79 FR 41788), the EPA discussed whether these parameters should be adjusted in order to provide monitoring flexibility for landfills while also ensuring that the GCCS were well operated. The EPA also requested comment on what types of landfills may be eligible for adjustments to these wellhead standards; for example, the EPA asked whether only small entities, or landfills with energy recovery projects should benefit from this flexible monitoring.

In response to the July 2014 proposed NSPS (79 FR 41796) and ANPRM (79 FR 41772), many commenters questioned the need for the current wellhead operating standards for monitoring pressure, temperature, and oxygen or nitrogen to assess whether the GCCS was operating effectively.

Fire. Industry commenters recognized that the wellhead operational standards were intended to ensure the landfill gas collection system is operating properly and to avoid propagation of a subsurface fire or inhibit anaerobic decomposition, but they asserted that the standards achieve neither of the latter objectives.

Commenters asserted that the wellhead monitoring parameters are poor indicators of landfill fires or inhibited decomposition and impede proper operation of the collection system without providing any of the expected benefits. They also explained that landfill operators typically respond to high temperature and oxygen/nitrogen readings by reducing flow from the well or expanding the gas collection system. They explained that both approaches can have unintended and harmful consequences, including exacerbating a fire, and reducing the collection efficiency of the GCCS. In addition, they asserted that expanding a GCCS in an area with poor gas quality or quantity does not assist with achieving additional reductions. Commenters emphasized the difficulty of meeting the wellhead standards in areas of the landfill with declining gas flowrates or gas quality, which is more common in older or closed areas of the landfill. Several commenters stated that landfill owners already have inherent incentives to minimize fire risks in order to protect significant investments in GCCS and energy recovery infrastructure.

Flooding. Commenters both agreed and disagreed that surface emission monitoring and monthly monitoring of pressure at the wellhead are sufficient to determine if the well is inoperable or functioning below expected capacity as a result of flooding. Commenters suggested that landfill gas flowrate measurement is an established technology to assess well performance and can be measured without removing

the wellhead (unlike measurement of liquid levels) and added that flow rate measurement is required for landfills affected by the Wisconsin landfills regulations. The EPA recognizes that this parameter can be measured using the same equipment used to monitor other wellhead parameters and it is taking comment on whether to monitor this parameter in section X of this preamble.

Wellhead Monitoring and BMPs. In response to the July 17, 2014 ANPRM (79 FR 41772) and NSPS proposal, the EPA received input indicating that the currently required wellhead operating parameters (particularly oxygen/nitrogen and temperature), are barriers to, rather than a part of, a ''well operated'' GCCS and prevent proactive LFG collection practices such as connecting the GCCS to the leachate collection system and installing horizontal or other early gas collectors. Specifically, the EPA received information explaining that leachate systems are not designed to be air tight and are not constructed in refuse. The information also indicated that when leachate collection systems contain liquids, the piping that conveys the leachate may be unable to collect enough gas until the liquid is removed and that as a result, when a vacuum is applied, ambient air can be pulled in as well, leading to elevated oxygen concentrations. Accordingly, an alternative operating procedure would be needed to accommodate these higher oxygen levels. The information received indicates that regulatory agencies have been reluctant to grant these alternatives.

It was also pointed out that gas quality and quantity can vary widely from different systems and at different times within the same system, which is why horizontal collectors and leachate system components are not designed to meet the 40 CR part 60, subpart Cc and WWW operating parameters for pressure, temperature, and nitrogen/oxygen concentration. Information from a state agency indicated that some intake of ambient air is likely with leachate collectors and suggested that operators should have flexibility to decide the balance between gas flow and oxygen intake and on whether to cease extracting landfill gas or use another method. The information provided further indicated that the time delay associated with modifying a GCCS design plan or getting approval for higher operating values (HOVs) is problematic when applied to collector pipes used for seep and odor control, since operators must make these changes more quickly for safety reasons.

The EPA also received input explaining the benefits of early gas collection, such as fewer emissions and reduced odors.

Corrective Action Concerns. Under the current rules, if a landfill exceeds a wellhead operating parameter, the landfill owner or operator must initiate corrective action within 5 days and follow the timeline in 40 CFR part 60, subparts WWW and Cc for correcting the exceedance. If the exceedance cannot be corrected within the specified timeframe, the landfill owner or operator should prepare to expand the GCCS. As commenters note above, exceedances involving elevated temperature and oxygen/nitrogen concentration are often not solved by expanding the GCCS, especially in older areas. Several industry commenters, as well as a state regulatory agency, noted that wellhead corrective action often requires very site-specific and technical solutions other than expanding a GCCS and it is not reasonable to develop these actions and have them approved within the narrow timeframes allowed in the current rules. A trade association noted that most landfills have occasional exceedances of wellhead standards and that requests for HOVs are among the top five paperwork items submitted for landfill GCCS operations. Given the numerous landfills subject to control requirements as well as the fact that many landfills could have more than 100 wells installed, the trade association also noted that the prescriptive review and approval processes for HOV of wellhead operating standards present a significant burden for both the landfill and the delegated authority without an environmental benefit.

Commenters representing industry, state government, the SBA Office of Advocacy, and a trade organization called on the EPA to remove temperature and oxygen/nitrogen wellhead operating parameters from Emission Guidelines for all landfills. These commenters were all in agreement that negative pressure and surface monitoring can assure proper GCCS operation. One commenter noted that landfills with energy recovery projects will continue to monitor wellhead parameters to ensure proper equipment operation and maximize revenue from energy sales, without requiring the monitoring and reporting of these parameters under the Emission Guidelines. Another commenter noted that the regulations should provide some flexibility to accommodate declining gas generation that facilities will experience as a result of local diversion initiatives.

Two state agencies requested that the wellhead operating parameters of temperature and oxygen/nitrogen merely serve as guidance to provide flexibility, particularly to small entities. One of the commenters provided an example of monitoring requirements in its state regulation, which exempts supplemental and/or temporary odor and gas control system components (*e.g.,* leachate cleanouts, leachate recirculation, early collectors) from pressure, temperature, and oxygen/nitrogen limits. In this case, the state does not impose limits for these parameters, but it does require the landfill to monitor those parameters.

Two commenters requested that temperature and oxygen/nitrogen monitoring requirements be continued while maintaining current surface methane monitoring methods. A state agency noted that wellhead monitoring can identify subsurface biological and chemical reactions that can present a safety hazard and cannot be detected by surface emission monitoring only. An environmental organization explained that wellhead monitoring provides indicators of conditions that could lead to subsurface fires, release massive volumes of HAP, and cause terrible odors and was concerned that removing these requirements prevents the landfill and the implementing authorities from identifying early indicators of potential problems. The commenter explained that landfill owners may have difficulty meeting the requirements due to improper site management and failure to maintain tight seals, leading to too much air intake. One city also advocated for more stringent monitoring in order to more proactively identify odors or other operational concerns with a GCCS.

Based on public comments, input from small entities, and our own analysis of available information, the EPA is proposing to remove the requirement to meet operational standards for temperature and nitrogen/oxygen at wellheads and is thus also proposing to remove the corresponding requirement for corrective action for exceedances of these parameters. To ensure a well-designed and well-operated GCCS that minimizes surface emissions, the EPA is proposing to use a combination of GCCS design and approval requirements as discussed in section VI.C of this preamble, landfill surface emission monitoring requirements as discussed in section VI.A of this preamble, and continued maintenance of negative pressure at wellheads. Based on the feedback provided by commenters and our analysis of available information, the

EPA believes these adjustments provide more flexibility to landfills, can result in additional reductions of LFG emissions from other GCCS components, and will reduce the burden of corrective action on both the landfill owner or operator and the implementing authority. Based on public input, the EPA expects that eliminating the operational standards for oxygen/nitrogen and temperature will drastically reduce the number of requests for HOVs and alternative timelines for making corrections while ensuring that the GCCS continues to operate properly. The procedures for approving HOVs for wellheads not demonstrating compliance with the negative pressure standard are discussed in section VI.D of this preamble.

While the EPA is proposing to remove the requirement to meet operational standards for temperature and nitrogen/oxygen, the EPA is proposing that landfill owners or operators continue monthly monitoring and recordkeeping of the wellhead temperature and oxygen/nitrogen values, consistent with operational guidance documents and best practices for operating a GCCS in a safe and efficient manner.[62] [63] Based on our evaluation of commenters' concern that the oxygen/nitrogen and temperature operational standards can be a limiting factor in promoting earlier and more robust collection of LFG, the EPA is proposing to no longer require the landfill to take corrective action if the monitoring of these parameters demonstrates that a particular value or values is/are exceeded. The EPA is proposing that landfill owners or operators continue monitoring these parameters because, as several industry commenters and regulatory agencies stated, the measurement of these parameters can still serve as useful guidance for landfill operators and landfill gas energy project operators because they assess GCCS performance and thus help to periodically adjust or ''tune'' the GCCS to minimize LFG emissions and maintain safe operating conditions at the landfill. The equipment used to monitor wellheads commonly includes these parameters, so these parameters can be measured at the same time the technician monitors wellhead pressure without imposing additional burden. The results of this monthly wellhead monitoring will now be kept as records on site because the EPA continues to believe these data will be useful for implementing authorities when approving modifications to the original GCCS design plan, or when conducting inspections of the site.

The requirement to maintain negative pressure at each wellhead ensures that gas is being routed to a GCCS that was designed and built in accordance with a GCCS design plan that has been approved by a professional engineer. The EPA believes these wellhead standards, together with the surface emission monitoring requirements, are effective and limit the possibility of surface emissions of LFG. This approach also allows landfills and state regulators the time and flexibility to determine the appropriate response for adjusting wellfield operations, as needed, without imposing overly prescriptive requirements. This approach also provides increased flexibility for landfills to install supplemental and temporary gas collection components to achieve additional reductions of LFG without the risk of exceeding oxygen/nitrogen or temperature operational standards.

C. Requirements for Updating the Design Plan

The EPA is proposing criteria for when an affected source must update its design plan and submit it to the implementing authority for approval. We are proposing that a revised design plan must be submitted as follows: (1) Within 90 days of expanding operations to an area not covered by the previously approved design plan, and (2) prior to installing or expanding the gas collection system in a manner other than as described in a previously approved design plan.

The EPA is proposing site-specific design plan review and approval procedures that recognize the unique site-specific topography, climate, and other factors affecting the design of the GCCS. However, the EPA solicits comment on ways to streamline the design plan submission and approval procedures as part of its review of the Emission Guidelines. Examples of streamlining may include the potential development of a process by which approved alternative operating parameters could be automatically linked to updates of design plans or development of a process by which alternative operating parameters and updated design plans could be approved on a similar schedule.

D. Submitting Corrective Action Timeline Requests

We have included provisions in proposed 40 CFR part 60, subpart Cf (40 CFR 60.36f(a)(3)) to clarify our intent that agency approval of corrective action timelines is required only if a landfill does not fix an exceedance in 15 days and is unable to or does not plan to expand the gas collection system within 120 days. The EPA is clarifying that ''expansion'' of the GCCS means a permanent change that increases the capacity of the GCCS, such as increasing the size of header pipes, increasing the blower sizes and capacity, and increasing the number of wells. Excluding system expansion, all other types of corrective actions expected to exceed 15 calendar days should be submitted to the agency for approval of an alternate timeline. In addition, if a landfill owner or operator expects the system expansion to exceed the 120-day allowance period, it should submit a request and justification for an alternative timeline. We have not proposed a specific schedule for submitting these requests for alternative corrective action timelines because investigating and determining the appropriate corrective action, as well as the schedule for implementing the corrective action, will be site specific and depend on the reason for the exceedance. We clarify that a landfill should submit an alternative timeline request as soon as possible (*i.e.,* as soon as the owner or operator knows that it would not be able to correct the exceedance in 15 days or expand the system in 120 days) to avoid being in violation of the rule. If the landfill were to wait until 120 days after the exceedance to submit an alternative timeline, then by the time the regulatory agency has the chance to review the timeline and determine if it is approvable, the landfill will already be in violation of the requirement to expand the system within 120 days. After submitting the alternative timeline request, the landfill should work with its permitting authority to communicate the reasons for the exceedances, status of the investigation, and schedule for corrective action.

To address implementation concerns associated with the time allowed for corrective action, the EPA requests comment on an alternative that extends the requirement for notification from 15 days to as soon as practicable, but no later than 60 days from when an exceedance is identified. Many requests for an alternative compliance timeline express the need for additional time to make necessary repairs to a well that requires significant construction activities. Extending the time period to as soon as practicable, but no later than 60 days, may reduce the burden associated with the approval of an alternative timeline and ensure

[62] *http://www.epa.ohio.gov/portals/27/engineer/eguides/guide78.pdf.*

[63] *http://www.nrel.gov/docs/legosti/fy97/23070.pdf.*

sufficient time for correction without significant environmental detriment. If the EPA were to extend the time period to as soon as practicable, but no later than 60 days, then the EPA is also considering the removal of the provision to submit an alternative timeline for correcting the exceedance. Thus, by no later than day 60, the landfill would have to either have completed the adjustments and repairs necessary to correct the exceedance, or be prepared to have the system expansion completed by day 120. The EPA is also requesting input on whether 60 days is the appropriate amount of time to allow owners or operators to make the necessary repairs.

E. Electronic Reporting

In this proposal, the EPA is describing a process to increase the ease and efficiency of performance test data submittal while improving data accessibility. Specifically, the EPA is proposing that owners or operators of MSW landfills submit electronic copies of required performance test and performance evaluation reports by direct computer-to-computer electronic transfer using the EPA-provided software. The direct computer-to-computer electronic transfer is accomplished through the EPA's Central Data Exchange (CDX) using the Compliance and Emissions Data Reporting Interface (CEDRI). The CDX is the EPA's portal for submittal of electronic data. The EPA-provided software is called the Electronic Reporting Tool (ERT), which is used to generate electronic reports of performance tests and evaluations. The ERT generates an electronic report package that will be submitted using the CEDRI. The submitted report package will be stored in the CDX archive (the official copy of record) and the EPA's public database called WebFIRE. All stakeholders will have access to all reports and data in WebFIRE and accessing these reports and data will be very straightforward and easy (see the WebFIRE Report Search and Retrieval link at *http://cfpub.epa.gov/webfire/index.cfm?action=fire.searchERTSubmission*). A description and instructions for use of the ERT can be found at *http://www.epa.gov/ttn/chief/ert/index.html,* and CEDRI can be accessed through the CDX Web site at *www.epa.gov/cdx.* A description of the WebFIRE database is available at *http://cfpub.epa.gov/oarweb/index.cfm?action=fire.main.*

The proposal to submit performance test data electronically to the EPA applies only to those performance tests conducted using test methods that are supported by the ERT. The ERT supports most of the commonly used EPA reference methods. A listing of the pollutants and test methods supported by the ERT is available at *http://www.epa.gov/ttn/chief/ert/index.html.*

We believe that industry would benefit from this proposed approach to electronic data submittal. Specifically, by using this approach, industry will save time in the performance test submittal process. Additionally, the standardized format that the ERT uses allows sources to create a more complete test report resulting in less time spent on data backfilling if a source failed to include all data elements required to be submitted. Also through this proposal, industry may only need to submit a report once to meet the requirements of the applicable subpart because stakeholders can readily access these reports from the WebFIRE database. This also benefits industry by cutting back on recordkeeping costs as the performance test reports that are submitted to the EPA using CEDRI are no longer required to be retained in hard copy, thereby, reducing staff time needed to coordinate these records.

Since the EPA will already have performance test data in hand, another benefit to industry is that fewer or less substantial data collection requests in conjunction with prospective required residual risk assessments or technology reviews will be needed. This would result in a decrease in staff time needed to respond to data collection requests.

State, local, and tribal air pollution control agencies will also benefit from having electronic versions of the reports they are now receiving because they will be able to conduct a more streamlined and accurate review of electronic data submitted to them. For example, the ERT would allow for an electronic review process, rather than a manual data assessment, making review and evaluation of the source provided data and calculations easier and more efficient. In addition, the public will also benefit from electronic reporting of emissions data because the electronic data will be easier for the public to access. How the air emissions data are collected, accessed, and reviewed will be more transparent for all stakeholders.

One major advantage of the proposed submittal of performance test data through the ERT is a standardized method to compile and store much of the documentation required to be reported by this rule. The ERT clearly states what testing information would be required by the test method and has the ability to house additional data elements that might be required by a delegated authority.

In addition, the EPA must have performance test data to conduct effective reviews of CAA section 111 standards, as well as for many other purposes, including compliance determinations, emission factor development, and annual emission rate determinations. In conducting these required reviews, the EPA has found it ineffective and time consuming, not only for us, but also for regulatory agencies and source owners or operators, to locate, collect, and submit performance test data. In recent years, stack testing firms have typically collected performance test data in electronic format, making it possible to move to an electronic data submittal system that would increase the ease and efficiency of data submittal and improve data accessibility.

A common complaint from industry and regulators is that emission factors are outdated or not representative of a particular source category. With timely receipt and incorporation of data from most performance tests, the EPA would be able to ensure that emission factors, when updated, represent the most current range of operational practices. Finally, another benefit of the proposed data submittal to WebFIRE electronically is that these data would greatly improve the overall quality of existing and new emissions factors by supplementing the pool of emissions test data for establishing emissions factors

In summary, in addition to supporting regulation development, control strategy development, and other air pollution control activities, having an electronic database populated with performance test data would save industry, state/local/tribal agencies, and the EPA significant time, money, and effort while also improving the quality of emission inventories, air quality regulations, and enhancing the public's access to this important information.

VII. Rationale for Proposed Alternative Emission Threshold Determination Techniques

The EPA is proposing an emission threshold determination based on site-specific surface emissions monitoring (SEM) that provides flexibility for when a landfill must install and operate a GCCS. If the owner or operator limits landfill surface methane emissions and can demonstrate that those emissions are below 500 ppm methane for 4 consecutive quarters, then the requirement to install a GCCS is not triggered even though estimates using Tiers 1, 2, and/or 3 may show that the landfill's annual NMOC emissions have exceeded the regulatory threshold. In

addition, the Tier 4 surface emission approach could also be used as one of the criteria for determining when a GCCS can be removed or partially removed or decommissioned at closed landfills or closed areas of active landfills, as discussed in sections IV.D and VIII.C of this preamble.

The idea to measure site-specific surface emissions to help determine the timing of GCCS installation was presented while the EPA was conducting outreach with small entities during its review of the landfills regulations in 2014. Small entities recommended a new Tier 4 surface emission demonstration to allow increased flexibility for landfills that exceed modeled NMOC emission rates to demonstrate that site-specific methane emissions are actually low prior to being required to install a GCCS. In addition, the Environmental Defense Fund (EDF) presented the idea of a surface concentration threshold as one of many potential alternatives to increase emission reductions from landfills in its January 2013 whitepaper.[64] The EPA presented and solicited comments on potential Tier 4 procedures in both the NSPS proposal for new landfills and the ANPRM for existing landfills (79 FR 41772).

Many commenters, representing both industry and environmental interests, supported the Tier 4 SEM approach for determining when a GCCS must be installed. These commenters stated that the option to conduct site-specific measurements using SEM is a more accurate indication of when gas collection is necessary to reduce emissions, compared to modeled emission rates. However, one commenter on the NSPS proposed rule opposed the inclusion of a Tier 4 option for new landfills, stating that it allows a subset of new landfills to delay methane capture requirements when these landfills will be required to install a GCCS in the future and should have a GCCS designed and installed during landfill construction. Other commenters expressed concern about state agencies lack of experience and time to determine whether Tier 4 monitoring requires a GCCS to be installed and requested guidance for Tier 4 implementation procedures.

Many commenters identified the potential benefits of a Tier 4 option. Commenters representing both industry and environmental interests noted that the SEM option will encourage landfill owners and operators to implement methane reduction practices, such as the use of oxidative landfill covers, organic waste diversion, and interim gas control measures (horizontal gas collectors, connecting a leachate collection recovery system into a GCCS), noting that such practices can be implemented more quickly and more cost-effectively than a GCCS installed in accordance with the design plan requirements of the current Emission Guidelines. Commenters indicated that a SEM method reflects actual site-specific emissions data that account for gas generation differentials attributed to climate variations, waste acceptance rates, and cover soil materials that vary between landfills in different regions of the U.S. One commenter indicated that the use of SEM in determining the need to install a GCCS would reduce costs and energy consumption for landfills otherwise required to install controls, that would not generate a sufficient amount of gas to support a collection system but would remain below surface emission thresholds based on site-specific measurements. Another commenter added that a Tier 4 approach grants additional flexibility and a potential cost savings compared to the Tier 2 method, but cautioned that a surface monitoring methodology needs to be developed that is functional during windy conditions.

Commenters also considered how to implement a Tier 4 approach, including the hierarchy of the new tier relative to the existing tiers, procedures for conducting the SEM, the level of the appropriate exceedance, and what to do upon an exceedance. Several commenters suggested that Tier 4 could be employed at any point following a Tier 1 or Tier 2 test where the calculated NMOC emission rate is greater than the NMOC threshold for installing a GCCS. These same commenters suggested that landfill owners and operators have the option to perform Tier 4 SEM testing in the same areas and using the same methods currently established in 40 CFR part 60, subpart WWW. These commenters recommended that if an exceedance occurs during Tier 4 SEM testing, then landfill owners or operators should follow the same procedures and timelines for remediation and re-monitoring as outlined in subpart WWW. These commenters further suggested that if an exceedance cannot be remediated under the existing subpart WWW procedures, then the landfill would be required to prepare a GCCS design plan within 1 year of the initial exceedance and install a GCCS within the monitored area within 30 months of the initial exceedance. These commenters further suggested that if during the initial monitoring event methane surface emissions do not exceed 500 ppm over background, then the installation of a GCCS is not required and routine SEM should be performed until the landfill or area of the landfill is closed. One commenter requested that the EPA propose a surface concentration level of 200 ppm and indicated that this level provides empirical confirmation that the landfill is ready to install a GCCS.

After considering public comments and input from small entity outreach, the EPA is proposing Tier 4 SEM procedures for determining when a landfill must install a GCCS. Tier 4 allows landfill owners or operators to demonstrate that site-specific surface methane emissions are low. Under Tier 4, as proposed in this proposed rule, if the site-specific surface methane emissions are below 500 ppm for 4 consecutive quarters, then the requirement to install and operate a GCCS has not been triggered even in circumstances where emission estimates using Tiers 1, 2, and/or 3 are above the regulatory threshold. However, any quarterly surface emissions value over 500 ppm would trigger the requirement to install and begin operating a GCCS. If the landfill opts to use Tier 4 for its emission threshold determination and there is any measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must install a GCCS, and it cannot go back to using Tiers 1, 2 or 3. The landfill owner or operator would be required to submit a design plan within 1 year of reporting the surface emissions value over 500 ppm to the implementing authority in an annual report and would be required to install and start up a GCCS within 30 months of reporting the surface emissions value over 500 ppm.

The SEM demonstration would be conducted using the SEM procedures described in sections IV.B and VI.A of this preamble. SEM would be conducted around the perimeter of the landfill and the required traverse every 30 meters for the entire landfill. Note that the EPA is requesting comment on enhanced surface monitoring, including the 30 meter traverse pattern, in section X.B of this preamble. The Tier 4 provisions can be utilized by any landfill that has exceeded the design capacity threshold. The Tier 4 provisions provide an incentive for a landfill owner or operator to keep surface emissions low as described later in this section.

Under this proposal, if a landfill exceeds the modeled NMOC emission

[64] Environmental Defense Fund. Recommendations and Considerations for EPA's Forthcoming Revisions to Section 111 Standards for MSW Landfills. January 2, 2013. See EPA–HQ–OAR–2003–0215–0050.

rate under Tier 1, then the landfill may choose to estimate the NMOC emission rate by using the Tier 2 or 3 procedures or measure actual surface emissions using Tier 4. If a landfill failed a Tier 4 test, the landfill would trigger the requirement to submit a design plan and to install and operate a GCCS. However, if a landfill failed a Tier 2 or 3 test, proposed 40 CFR part 60, subpart Cf allows the landfill to test using a ''higher'' tier, including Tier 4. For example, if a landfill exceeds the proposed NMOC emission rate of 34 Mg/yr using Tier 2, then the landfill may choose to calculate the NMOC emission rate using Tier 3, or the landfill may choose to demonstrate that site-specific surface methane emissions are below 500 ppm using Tier 4. Tier 1 is the most conservative method for estimating NMOC emissions and models NMOC emissions based on default values for methane generation rate (k), methane generation potential (Lo), and NMOC concentration (C_{NMOC}). Tier 1 takes the least effort and expense to conduct, but tends to overestimate NMOC emissions given the conservative default parameters. A landfill would likely use Tier 1 for its initial estimate of NMOC emissions. Tier 2 models NMOC emissions based on the same default values for methane generation rate and methane generation potential, which are in turn based on waste composition and climate data, but allows the landfill owner or operator to determine a site-specific NMOC concentration. Under Tier 2, landfills would incur a more substantial cost to determine the site-specific NMOC concentration. Tier 3 also models NMOC emissions, but adds another site-specific measurement for a methane generation rate using Method 2E. Under Tier 3, landfills would incur a substantial cost to determine the site-specific methane generation rate. Industry experience and public comments indicate that sites do not frequently use Tier 3 because of the expense. Commenters stated that the Tier 3 test is extremely rare because of the high cost and the fact that in many geographical areas the ''k'' factor (methane generation rate constant) is not reduced via testing. There are a significant number of landfills reporting under the Tier 2 method, which allows the site to measure a site-specific NMOC concentration instead of using the higher default NMOC concentrations required under the Tier 1 calculations, however, Tier 3 is not widely used. Thus, we are proposing to allow landfills to conduct Tier 4 testing after a failed Tier 1, Tier 2, or Tier 3 test.

A landfill owner or operator may undertake Tier 4 SEM testing upon submitting an annual NMOC emission rate report that shows an NMOC emission rate greater than 34 Mg/yr using Tier 1, 2, or 3 procedures. If the landfill owner or operator chooses to undertake Tier 4 SEM instead of submitting a design plan and installing and operating a GCCS or estimating the NMOC emission rate using the next higher tier, then the landfill owner or operator would begin keeping records of all Tier 4 SEM readings and submit a ''Tier 4 SEM report'' as its next annual report. The report would include and identify the number of SEM readings above 500 ppm. If the report shows any SEM readings above 500 ppm methane, then the landfill would be required to submit a GCCS design plan within one year and install and begin operating a GCCS within 30 months. (The landfill could not take corrective action to correct the Tier 4 exceedance and could not estimate the annual NMOC emission rate using Tiers 1, 2, or 3.)

If the Tier 4 SEM report shows no SEM readings above 500 ppm for 4 consecutive quarters, then the landfill may continue Tier 4 monitoring at a reduced semi-annual frequency or return to Tier 1, 2, or 3. This approach allows owners or operators some flexibility to select the tier that is most applicable to their landfill, based on the point each landfill is in its lifecycle, and other site-specific factors. Note that a landfill can recalculate NMOC using Tiers 1, 2, or 3 only if it has 4 consecutive quarters with no SEM readings above 500 ppm.

The EPA selected a 500 ppm threshold for Tier 4 because it is consistent with the level the EPA determined to be appropriate to demonstrate that a GCCS is well-designed and well operated. In other words, when conducted properly, SEM is a good indicator of how well a GCCS is operating overall. For landfills without a GCCS (including those that may be using other LFG mitigation strategies), the level of 500 will demonstrate that site-specific surface methane emissions are as low as those allowed at a landfill with a well-operated and well-designed GCCS in place. See the docketed memorandum ''Establishing a Site-Specific Emission Threshold Alternative for MSW Landfills, 2015.'' Therefore the EPA believes this alternative site-specific concentration threshold will achieve the goal of minimizing methane emissions to the atmosphere. The EPA is aware that the surface emission threshold for installing a GCCS under the CA LMR is 200 ppm. However, the EPA also notes that CA LMR retains the 500 ppm level as an appropriate level for instantaneous SEM readings for areas already controlled by a GCCS. California ARB initially proposed a 200 ppm SEM threshold for both GCCS installation and for GCCS operation in its regulation, but finalized 500 ppm for GCCS operation because a lower threshold could cause an operator to overdraw the vacuum on the GCCS (to avoid a surface exceedance), which in turn could draw in too much oxygen and possibly cause fires. The EPA recognizes the concerns with setting the threshold too low, which may cause operators of voluntary GCCS to overdraw the vacuum on the GCCS, and has proposed a level of 500 ppm. The EPA requests comment on whether a level between 200 and 500 ppm is appropriate for the Tier 4 provisions, and whether setting the level below a specific point in this range poses fire or other safety concerns for operating a GCCS. The EPA also requests data that might support a different surface emissions threshold.

The EPA requests comments on whether landfill owners or operators should provide notification to EPA when conducting Tier 4 surface emissions monitoring. Such notification would be similar to the performance test notification required by 40 CFR 60.8(d), wherein the owner or operator of an affected facility provides the Administrator at least 30 days prior notice of any performance test to afford the Administrator the opportunity to have an observer present.

As noted earlier in this section, commenters representing both industry and environmental interests noted that the Tier 4 SEM option would encourage landfill owners or operators to implement alternative methane reduction practices, such as the use of oxidative landfill covers, interim gas control measures, and organic waste diversion. The EPA agrees. Such measures can directly affect surface emissions and when employed would help a landfill ensure that surface emissions are low, enabling a landfill to delay the regulatory requirement to install a GCCS without a significant negative impact on public health or the environment. Section V.A of this preamble discusses alternative methane reduction practices, such as the use of oxidative landfill covers, interim gas control measures, and organic waste diversion.

VIII. Proposed Changes To Address Closed or Non-Producing Areas

The EPA recognizes that many landfills or landfill areas are closed or

have inactive areas that do not produce as much LFG. The production of LFG naturally declines over time as an area stops accepting waste and the amount of degradable organic content declines. In the ANPRM for the Emission Guidelines (79 FR 41772), the EPA requested input on ways to ensure emissions are minimized in the later stages of a landfill's lifecycle (79 FR 41783). Specifically, the EPA sought input on whether the current criteria for capping or removing a GCCS are appropriate: (1) The landfill is closed, (2) the GCCS has been in operation for 15 years, and (3) three successive tests for NMOC emissions are below the NMOC emission threshold. We also sought input on alternative approaches to determining when it is appropriate to cap or remove a GCCS, such as consecutive quarterly measurements that would demonstrate that surface emissions are low.

A. Subcategory for Closed Landfills

The EPA notes that many existing landfills in our dataset closed at various points since 1987, including landfills that closed as many as 18 years prior to this proposed action. In the ANPRM, the EPA presented the distribution of existing landfills by closure date (see Table 3, 79 FR 41792). These data showed that nearly 80 percent of the existing landfills with a design capacity of at least 2.5 million Mg and 2.5 million m^3 were active landfills as of 2014. Similarly, 77 percent of the cumulative waste disposed in these existing landfills were at active landfills. The EPA recognizes that these active landfills are the most significant sources of LFG emissions at existing landfills.

The EPA evaluated the costs and benefits of controlling emissions at a level between 34 Mg/yr and 40 Mg/yr at both open and closed landfills. Table 3 of section V.E of this preamble presents the number of landfills affected and the corresponding emission reductions and costs. The EPA also considered how closed landfills would be affected by this proposal. We are considering ''closed'' landfills to be those that closed after 1987 but on or before the date of this proposal.

At the baseline NMOC emission threshold of 50 Mg/yr, the EPA estimates that 29 of the 233 closed landfills with a design capacity of at least 2.5 million Mg and 2.5 million m^3 would be required to install controls. At an NMOC emission threshold of 40 Mg/yr, the EPA estimates that an additional 22 landfills beyond the baseline would be required to install controls, resulting in controls at approximately 51[65] closed landfills in 2025. The LFG controlled at these 51 closed landfills represents approximately 6 percent of the total emission reductions achieved from all active and closed landfills expected to control emissions at a level of 40 Mg/yr NMOC in year 2025. At the proposed NMOC emission threshold of 34 Mg/yr, the EPA estimates that an additional 36 landfills beyond the baseline would be required to install controls, resulting in controls at approximately 65[66] closed landfills in 2025. The LFG controlled at these 65 closed landfills represents less than 7 percent of the total emission reductions achieved from all active and closed landfills expected to control emissions at a level of 34 Mg/yr NMOC in year 2025.

An NMOC emission rate threshold of 34 Mg/yr NMOC at closed landfills would achieve an additional 1,260 Mg NMOC and 5 million $mtCO_2e$ as compared to retaining the threshold of 50 Mg/yr NMOC for these closed sites. These reductions would be achieved at an incremental control cost effectiveness of $23,700 per Mg NMOC and $6 per $mtCO_2e$ for closed landfills in 2025 (excluding additional testing and monitoring costs).

See the docketed memorandum ''Revised Cost and Emission Impacts Resulting from the Landfill EG Review (2015)'' for additional detail on the impacts on closed landfills. In addition to these control costs, the EPA estimates that 160 closed landfills that are not controlling in 2025 would be required to estimate and report NMOC emissions under the proposed option because they have a design capacity of at least 2.5 million Mg and 2.5 million m^3.

After closure, the gas flows at landfills decline and the ability to achieve additional reductions also declines. The EPA received input from SERs that many closed landfills supplement their flare with pilot (fossil) fuels in order to maintain flare operation despite declining gas quantities and quality. These SERs were concerned that a lower threshold at these closed landfills would extend the amount of pilot fuel necessary for flame stability. The EPA notes that closed landfills may have limited access to additional revenue because they are no longer collecting tipping fees and the cost for GCCS and regulatory compliance were not factored into their closure plans. Further, many SERs expressed concerns that many compliance costs are fixed cost items, regardless of the operating status of the landfill, such as permitting fees, drill rig mobilization fees, and others, as discussed in section V.D.1 of this preamble. Many SERs also expressed concerns about staffing limitations at closed landfills, who may have limited staff to oversee extended GCCS design, operations, maintenance, and compliance. For landfills that closed after August 27, 2015, the EPA understands that gas quality will remain a concern and it has provided an alternative set of GCCS removal criteria based on site-specific emissions, as discussed in section VIII.B of this preamble.

Commenters expressed concern about whether landfills that have closed and decommissioned their GCCS should be pulled back into control requirements if their emissions fall between the current 50 Mg/yr threshold and a more stringent NMOC emission threshold. These commenters recommended that the EPA exempt these landfills from more stringent control requirements. One commenter added that it would be costly to re-install or refurbish a previously shutdown system and noted that the system would likely operate for only a few more years before the landfill fell below the more stringent NMOC emission threshold. For example, the proposed reduction of the NMOC emission rate threshold to 34 Mg/yr NMOC could affect landfills that installed a GCCS to comply with the 50 Mg/yr NMOC emissions threshold in 40 CFR part 60, subpart WWW (or the state plans or federal plan implementing 40 CFR part 60, subpart Cc), but whose emissions are still above the EPA's proposed 34 Mg/yr NMOC threshold. These landfills could have declining gas flows, could be closed, or could have met the 40 CFR part 60, subpart WWW criteria for capping or removing the GCCS.

To address concerns about closed landfills, the EPA is proposing to create a subcategory of closed landfills, to which an NMOC emission rate threshold of 50 Mg/yr would apply, instead of an NMOC emission rate of 34 Mg/yr. The subcategory of closed landfills is proposed to be defined as a landfill that has submitted a closure report as specified in 40 CFR 60.38f(f) on or before August 27, 2015. As noted above, the emissions associated with the 65 closed landfills represents less than 7 percent of the total emission reductions achieved from all active and closed landfills expected to control emissions at a level of 34 Mg/yr NMOC in year 2025. The EPA believes this proposed subcategory for closed landfills alleviates concerns with lowering the threshold for closed

[65] 22 closed landfills plus 29 closed landfills.

[66] 36 closed landfills plus 29 closed landfills.

landfills, while focusing the proposed changes to the regulatory framework on emission reductions from the existing landfills contributing most significantly to methane emissions from MSW landfills.

The EPA is requesting input on whether the proposed subcategory for closed landfills is the most appropriate method for controlling emissions and addressing concerns with closed landfills, or whether the EPA should consider exempting closed landfills from the proposed subpart Cf entirely. The EPA is also requesting comments on whether additional provisions should be considered for closed landfills when establishing the revised Emission Guidelines, including whether the closed landfill subcategory should be expanded to include landfills that closed within 13 months after publication of the Emission Guidelines in the **Federal Register.**

B. Criteria for Capping or Removing a GCCS

Several commenters requested that the EPA reconsider the 15-year criteria for capping or removing a GCCS and one commenter stated that the 15-year period should be longer, rather than shorter. Commenters supported the use of Tier 4 SEM procedures to help determine the removal or decommissioning of existing GCCS. Commenters supported the use of SEM to allow the flexibility to confirm when a closed landfill or closed area of a landfill no longer producing gas in significant quantities can remove or decommission all or a portion of the GCCS. Several of these commenters referenced a rationale similar to the one they provided for supporting the use of Tier 4 SEM for determining GCCS installation as discussed in section VII.A of this preamble. Several commenters requested that the EPA provide a ''step-down'' procedure for scaling down GCCS operations in non-producing areas and allowing a GCCS to be removed from rule applicability.

The EPA is proposing two sets of criteria for capping and removing the GCCS. The first set of criteria is similar to the criteria in subpart Cc, but has been adjusted to reflect the new NMOC emission threshold proposed in this proposal: (1) The landfill is closed, (2) the GCCS has been in operation for 15 years, and (3) three successive tests for NMOC emissions are below the proposed NMOC emission threshold of 34 Mg/yr for open landfills and 50 Mg/yr NMOC for closed landfills. The EPA is also proposing an alternative set of criteria for capping or removing the GCCS that employs a SEM demonstration: (1) The landfill, or an area of an active landfill, is closed, (2) the GCCS has operated for at least 15 years or the landfill owner or operator can demonstrate that the GCCS will be unable to operate for 15 years due to declining gas flows, and (3) the owner or operator demonstrates for 4 consecutive quarters that there are no surface emissions of 500 ppm or greater from the landfill or closed area. The EPA selected a level of 500 ppm to be consistent with the operational standard for operating a GCCS. The operational standard is the surface emissions level that cannot be exceeded once a GCCS has been installed.

The EPA proposes the use of SEM procedures in section VI.A of this preamble for determining when to decommission wells and for when the landfill can cap or remove a GCCS. If a landfill owner or operator can demonstrate that surface emissions in the closed area of an open landfill or a closed landfill are below 500 ppm for 4 consecutive quarters, then they would be able to stop collecting gas from that area or the landfill as a whole. After 4 consecutive quarters of no exceedances, the landfill continues to monitor the closed area annually for surface emission exceedances of 500 ppm or greater. If exceedances are found, the landfill must restart the GCCS in the closed area and the GCCS would be required to operate according to proposed 40 CFR part 60, subpart Cf.

As discussed in section VII.A of this preamble, surface emissions monitoring more closely reflects the site's actual emissions and accounts for differences in gas generation due to waste composition and local conditions. As discussed in section VII.A of this preamble, sites will have the incentive to employ various technologies or practices to minimize surface emissions, thus giving the owner or operator flexibility at both the installation and removal stages of LFG collection and control. With these rule provisions, the EPA can ensure environmental protection is demonstrated through low surface emissions and landfill owners or operators will have the flexibility to cap or remove the GCCS based on site-specific surface emission readings.

C. Non-Producing Areas and Wellhead Standards

Commenters have identified the difficulty of operating a GCCS in ''non-producing'' areas and meeting the wellhead operational standards for the GCCS. They have also contended that the corrective action—expanding the GCCS, is counter to a ''well-operated'' GCCS. Several commenters requested that the EPA provide flexibility to meet the wellhead and other requirements in ''non-producing'' areas. Commenters generally consider a ''non-producing'' area as one with declining LFG generation and gas flow, which in turn make it difficult to continuously meet the operational standards for a GCCS. One commenter stated that when landfill gas production decreases significantly, even small amounts of vacuum can draw air into the waste mass causing exceedances of the wellhead oxygen parameter. The commenter added that the landfill owner or operator may address the oxygen exceedance by reducing the vacuum to a very low level, but then may not be able to maintain negative pressure. Another commenter stated that LFG wells in old waste can be very sensitive to vacuum adjustments, easily exceeding the 5 percent oxygen standard not due to excessive air infiltration, but rather due to low LFG volume. Other commenters noted that the difficulty of meeting the wellhead oxygen/nitrogen operational standards could be exacerbated if the EPA were to reduce the NMOC emissions threshold below 50 Mg/yr.

As discussed in section VI.B of this preamble, the EPA proposes to remove the requirement to meet wellhead operating standards for temperature and nitrogen/oxygen. Removing these two standards will not only promote earlier and more robust collection of LFG as discussed in section VI.B of this preamble, but will also give owners or operators flexibility to operate the GCCS in non-producing or closed areas without the risk of exceeding the oxygen/nitrogen operating standards. Removing the requirement to meet the oxygen/nitrogen operating standards and the need for corrective action, including expanding the GCCS, will reduce the burden on both the landfill owner or operator and the implementing authority. As discussed in section VIII.B of this preamble, the EPA is also providing flexibility for temporary decommissioning of wells in closed landfills or closed areas of active landfills to provide flexibility for meeting negative pressure in areas that can demonstrate low surface emissions.

IX. Rationale for the Other Proposed Changes

A. Landfill Gas Treatment

The EPA is proposing a definition of treated landfill gas and treatment system. A *Treatment system* would be defined as a system that filters, de-waters, and compresses landfill gas to levels determined by the landfill owner

or operator based on the beneficial end use of the gas. The EPA is proposing this definition to provide compliance flexibility and to promote the beneficial use of LFG. The approach works in conjunction with the EPA's proposed expansion of the use of treated landfill gas beyond use as a fuel for a stationary combustion device to include other beneficial uses such as vehicle fuel, production of high-Btu gas for pipeline injection, and use as a raw material in a chemical manufacturing process. This definition would be available for all MSW landfill owners or operators.

The approach is consistent with public comments received on previous landfills documents (67 FR 36475, May 23, 2002; 71 FR 53271, September 8, 2006; 79 FR 41796, July 17, 2014; 79 FR 41772, July 17, 2014), as well as input from participants in small entity outreach, who stated that the extent of filtration, de-watering, and compression can be site- and equipment-dependent, and that different sites require different levels of gas treatment to protect the combustion devices that use treated LFG as a fuel and ensure good combustion.

Commenters on the proposed NSPS (79 FR 41796) and ANPRM (79 FR 41772) supported the expanded use of treated LFG. Commenters including state/local agencies, a large landfill owner or operator, and an industry trade association supported the expanded beneficial use of LFG to include uses beyond subsequent sale or use and agreed that a broader definition is appropriate. No commenters opposed the expanded use.

Many commenters on the July 17, 2014 proposed NSPS (79 FR 41796) and ANPRM (79 FR 41772) opposed a definition of LFG treatment based on specific numerical values for filtration and de-watering. Numerous commenters disagreed with a requirement to meet specific absolute filtration and dew point suppression values and contended that a ''one-size-fits-all'' approach was not appropriate, and would not reduce emissions. One commenter specifically noted the impact that the costs of these requirements would have on small entities.

Commenters estimated costs to comply with the dew point reduction. Based on experience, commenters estimated that chillers alone would cost $500,000 each. Commenters estimated that instrumentation, monitoring, and controls would cost an additional $150,000 per chiller, plus up to $60,000 for annual maintenance, monitoring, and operation. These commenters also expressed concerns about the timeframe for installing chillers. Plus, many commenters also expressed concern that the numerical requirements would be detrimental to existing and potential beneficial use projects, including potentially shutting down existing beneficial use projects and preventing future ones.

On the other hand, many commenters supported the more flexible definition of treatment system that allows the level of treatment to be tailored to the type and design of the specific project equipment. Commenters pointed out that owners and operators of combustion equipment are already motivated to treat landfill gas to manufacturer specifications to protect equipment and maintain warranties. Commenters added that compliance with a site-specific definition of treatment can be tracked using a preventative maintenance plan.

The EPA recognizes that the landfill industry continues to develop new LFG beneficial use projects and the EPA continues to support the recovery and use of LFG as an energy source. Thus, the EPA is proposing a simplified definition of treatment as filtering, de-watering, and compressing landfill gas, but is retaining as alternative a definition of LFG treatment based on specific numerical values for filtration and de-watering.

The simplified definition of treatment, combined with site- and equipment-specific monitoring, is expected to provide compliance flexibility, ensure environmental protection, and promote the beneficial use of LFG. The proposed definition would allow the level of filtration, dewatering, and compression to be tailored to the type and design of the specific equipment in which the LFG is used. Owners or operators would need to identify monitoring parameters, be able to demonstrate that such parameters effectively monitor filtration, de-watering or compression system performance necessary for the end use of the treated LFG and keep records to demonstrate that the parameters are being met.

Owners or operators would also need to develop a site-specific treatment system monitoring plan that would not only accommodate site-specific and end-use specific treatment requirements for different energy recovery technologies, but would also ensure environmental protection. A well-operated system with a level of treatment specific to the site and end-use equipment would prevent equipment disruptions and limit emissions resulting during shutdowns or malfunctions. A treatment approach that can be tailored to the end use of the gas would also promote wider use of LFG energy recovery, by limiting the compliance burden for those landfills opting to include an energy recovery component. Landfill gas energy recovery protects the environment by not only controlling LFG and its components, but also by offsetting conventional sources of energy with a renewable resource for heating, electricity, vehicle fuel, or other innovative end uses. The EPA also notes that landfills complying with a treatment compliance option are also subject to the surface emissions monitoring requirements discussed in section VI.A of this preamble to ensure that the GCCS is well operated and surface emissions are minimized. Preparing the monitoring plan would document procedures that landfills are likely already following to ensure that the LFG has been adequately treated for its intended use and provide verifiable records of proper operation to the EPA or other implementing authorities.

The plan would be required to include monitoring parameters addressing all three elements of treatment (filtration, de-watering, and compression) to ensure the treatment system is operating properly for the intended end use of the treated LFG. The plan would be required to include monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for the intended end use of the treated LFG. Documentation of the monitoring methods and ranges, along with justification for their use, would need to be included in the site-specific monitoring plan. In the plan, the owner or operator would also need to identify who is responsible (by job title) for data collection, explain the processes and methods used to collect the necessary data, and describe the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems.

The owner or operator would be required to revise the monitoring plan to reflect changes in processes, monitoring instrumentation, and quality assurance procedures; or to improve procedures for the maintenance and repair of monitoring systems to reduce the frequency of monitoring equipment downtime.

Promote the Beneficial Use of LFG. Technical assistance is available to landfill owners and operators who want to beneficially use LFG. The EPA LMOP is a voluntary assistance program that encourages recovery and beneficial use of landfill gas, and in turn, helps to reduce methane emissions from landfills. LMOP has developed many

publications and tools to assist stakeholders interested in developing LFG energy projects or promote landfill gas energy recovery to various audiences. LMOP also provides customized, direct assistance to individual Partners to address their needs, such as preliminary analyses to estimate landfill gas energy project feasibility or responses to technical questions about particular issues or barriers involved with project development. LMOP's Web site has become one of the main modes of providing LMOP Partners, others in the industry, and the public with basic information and keeping them abreast of the latest LFG energy–related advances and opportunities (*http://www.epa.gov/lmop/*). Many LMOP resources and tools are available on the Web site including a Project Development Handbook, a preliminary economic assessment model, and a database of LFG energy recovery projects.

B. Startup, Shutdown, and Malfunction

In its 2008 decision in *Sierra Club* v. *EPA,* 551 F.3d 1019 (D.C. Cir. 2008), the U.S. Court of Appeals for the District of Columbia Circuit vacated portions of two provisions in the EPA's CAA section 112 regulations governing the emissions of HAP during periods of SSM. Specifically, the court vacated the SSM exemption contained in 40 CFR 63.6(f)(1) and 40 CFR 63.6(h)(1), holding that under section 302(k) of the CAA, emissions standards or limitations must be continuous in nature and that the SSM exemption violates the CAA's requirement that some section 112 standards apply continuously.

Periods of Startup or Shutdown. Consistent with *Sierra Club* v. *EPA,* the EPA is proposing standards in 40 CFR part 60, subpart Cf that apply at all times. In proposing the standards in this rule, the EPA has taken into account startup and shutdown periods and, for the reasons explained below, has not proposed alternate standards for those periods.

The part 60 general provisions, which define startup, shutdown, and malfunction, were written for typical industrial or manufacturing sources and associated processes. Many of these sources and processes may, at times, be shut down entirely for clean-out, maintenance, or repairs, and then restarted. Applying the standards at all times, including periods of startup and shutdown, is intended to minimize excess emissions when the source or process ceases operation or commences operation, or during malfunctions. Landfill emissions, however, are produced by a continuous biological process that cannot be stopped or restarted. For landfills, the primary SSM concern is with malfunction of the landfill GCCS and associated monitoring equipment, not with the startup or shutdown of the entire source. Thus, SSM provisions in the 40 CFR part 60, subpart Cf focus primarily on malfunction of the gas collection system, gas control system, and gas treatment system, which is part of the gas control system.

Periods of Malfunction. Periods of startup, normal operations, and shutdown are all predictable and routine aspects of a source's operations. Malfunctions, in contrast, are neither predictable nor routine. Instead they are, by definition sudden, infrequent and not reasonably preventable failures of emissions control, process or monitoring equipment. (40 CFR 60.2). The EPA interprets CAA section 111 as not requiring emissions that occur during periods of malfunction to be factored into development of CAA section 111 standards. Nothing in CAA section 111 or in case law requires that the EPA consider malfunctions when determining what standards of performance reflect the degree of emission limitation achievable through ''the application of the best system of emission reduction'' that the EPA determines is adequately demonstrated. While the EPA accounts for variability in setting emissions standards, nothing in CAA section 111 requires the agency to consider malfunctions as part of that analysis. A malfunction should not be treated in the same manner as the type of variation in performance that occurs during routine operations of a source. A malfunction is a failure of the source to perform in a ''normal or usual manner'' and no statutory language compels EPA to consider such events in setting CAA section 111 standards of performance.

Further, accounting for malfunctions in setting emission standards would be difficult, if not impossible, given the myriad different types of malfunctions that can occur across all sources in the category and given the difficulties associated with predicting or accounting for the frequency, degree, and duration of various malfunctions that might occur. As such, the performance of units that are malfunctioning is not ''reasonably'' foreseeable. See, *e.g., Sierra Club* v. *EPA,* 167 F.3d 658, 662 (D.C. Cir. 1999) (''The EPA typically has wide latitude in determining the extent of data-gathering necessary to solve a problem. We generally defer to an agency's decision to proceed on the basis of imperfect scientific information, rather than to 'invest the resources to conduct the perfect study.' '') See also, *Weyerhaeuser* v. *Costle,* 590 F.2d 1011, 1058 (D.C. Cir. 1978) (''In the nature of things, no general limit, individual permit, or even any upset provision can anticipate all upset situations. After a certain point, the transgression of regulatory limits caused by 'uncontrollable acts of third parties,' such as strikes, sabotage, operator intoxication or insanity, and a variety of other eventualities, must be a matter for the administrative exercise of case-by-case enforcement discretion, not for specification in advance by regulation.''). In addition, emissions during a malfunction event can be significantly higher than emissions at any other time of source operation. For example, if an air pollution control device with 99 percent removal goes off-line as a result of a malfunction (as might happen if, for example, the bags in a baghouse catch fire) and the emission unit is a steady state type unit that would take days to shut down, the source would go from 99 percent control to zero control until the control device was repaired. The source's emissions during the malfunction would be 100 times higher than during normal operations. As such, the emissions over a 4-day malfunction period would exceed the annual emissions of the source during normal operations. As this example illustrates, accounting for malfunctions could lead to standards that are not reflective of (and significantly less stringent than) levels that are achieved by a well-performing non-malfunctioning source. It is reasonable to interpret CAA section 111 to avoid such a result. The EPA's approach to malfunctions is consistent with CAA section 111 and is a reasonable interpretation of the statute.

In the event that a source fails to comply with the applicable CAA section 111 standards as a result of a malfunction event, the EPA would determine an appropriate response based on, among other things, the good faith efforts of the source to minimize emissions during malfunction periods, including preventative and corrective actions, as well as root cause analyses to ascertain and rectify excess emissions. The EPA would also consider whether the source's failure to comply with the CAA section 111 standard was, in fact, sudden, infrequent, not reasonably preventable and was not instead caused in part by poor maintenance or careless operation (40 CFR 60.2 (definition of malfunction)).

If the EPA determines in a particular case that an enforcement action against a source for violation of an emission standard is warranted, the source can

raise any and all defenses in that enforcement action and the federal district court will determine what, if any, relief is appropriate. The same is true for citizen enforcement actions. Similarly, the presiding officer in an administrative proceeding can consider any defense raised and determine whether administrative penalties are appropriate.

In summary, the EPA interpretation of the CAA and, in particular, CAA section 111 is reasonable and encourages practices that will avoid malfunctions. Administrative and judicial procedures for addressing exceedances of the standards fully recognize that violations may occur despite good faith efforts to comply and can accommodate those situations.

In several prior rules, the EPA had included an affirmative defense to civil penalties for violations caused by malfunctions in an effort to create a system that incorporates some flexibility, recognizing that there is a tension, inherent in many types of air regulation, to ensure adequate compliance while simultaneously recognizing that despite the most diligent of efforts, emission standards may be violated under circumstances entirely beyond the control of the source. Although the EPA recognized that its case-by-case enforcement discretion provides sufficient flexibility in these circumstances, it included the affirmative defense to provide a more formalized approach and more regulatory clarity. See *Weyerhaeuser Co.* v. *Costle,* 590 F.2d 1011, 1057–58 (D.C. Cir. 1978) (holding that an informal case-by-case enforcement discretion approach is adequate); but see *Marathon Oil Co.* v. *EPA,* 564 F.2d 1253, 1272–73 (9th Cir. 1977) (requiring a more formalized approach to consideration of ''upsets beyond the control of the permit holder''). Under the EPA's regulatory affirmative defense provisions, if a source could demonstrate in a judicial or administrative proceeding that it had met the requirements of the affirmative defense in the regulation, civil penalties would not be assessed. Recently, the U.S. Court of Appeals for the District of Columbia Circuit vacated an affirmative defense in one of the EPA's CAA section 112 regulations. *NRDC* v. *EPA,* 749 F.3d 1055 (D.C. Cir. 2014) (vacating affirmative defense provisions in the CAA section 112 rule establishing emission standards for Portland cement kilns). The court found that the EPA lacked authority to establish an affirmative defense for private civil suits and held that under the CAA, the authority to determine civil penalty amounts in such cases lies exclusively with the courts, not the EPA. Specifically, the court found: ''As the language of the statute makes clear, the courts determine, on a case-by-case basis, whether civil penalties are 'appropriate.' '' See *NRDC* at 1063 (''[U]nder this statute, deciding whether penalties are 'appropriate' in a given private civil suit is a job for the courts, not EPA.''). In light of *NRDC* v. *EPA,* the EPA is not including a regulatory affirmative defense provision in this rulemaking. As explained above, if a source is unable to comply with emissions standards as a result of a malfunction, the EPA may use its case-by-case enforcement discretion to provide flexibility, as appropriate. Further, as the U.S. Court of Appeals for the District of Columbia Circuit recognized, in an EPA or citizen enforcement action, the court has the discretion to consider any defense raised and determine whether penalties are appropriate. *Cf. NRDC,* at 1064 (arguments that violation were caused by unavoidable technology failure can be made to the courts in future civil cases when the issue arises). The same is true for the presiding officer in EPA administrative enforcement actions.[67]

Limit on SSM duration. Subpart WWW of 40 CFR part 60 limits the duration of SSM events for MSW landfills to 5 days for the landfill gas collection system and 1 hour for treatment or control devices. Proposed 40 CFR part 60, subpart Cf does not include the 5-day and 1-hour time limitations because some malfunctions cannot be corrected within these timeframes. Excluding these provisions is consistent with *Sierra Club* v. *EPA* (551 F.3d 1019 (D.C. Cir. 2008)), which concluded that that emission standards apply at all times, including periods of SSM, and 40 CFR 60.11(d), which states that at all times, including periods of startup, shutdown and malfunction, owners or operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. The proposed revisions clarify that the NSPS standards continue to apply during periods of SSM.

To prevent free venting of landfill gas to the atmosphere during control device malfunctions, we propose to include a requirement in subpart Cf (40 CFR 60.34f(e)) that states that in the event the collection or control system is not operating, the gas mover system must be shut down and all valves in the collection and control system contributing to venting of gas to the atmosphere must be closed within 1 hour. The EPA proposes to use the term ''not operating,'' which includes periods when the gas collection or control system is not operating for whatever reason, including when the gas collection or control system is inoperable. The EPA requests comment on the technical feasibility of this approach as well as alternate ways to prevent free venting of landfill gas to the atmosphere during control device malfunctions.

Shutting down the gas mover equipment and all valves contributing to venting of gas to the atmosphere minimizes emissions from the landfill while the control system is not operating and is being repaired. Compliance with proposed 40 CFR 60.34f(e) does not constitute compliance with the applicable standards in proposed 40 CFR 60.36f; however, as a practical matter it is unlikely that there would be a violation since no gas would be flowing to the control device. Compliance with proposed 40 CFR 60.34f(e) is necessary to demonstrate compliance with the general duty to minimize emissions in 40 CFR 60.11(d) during control or collection system malfunctions.

Under proposed 40 CFR part 60, subpart Cf, landfill owners or operators must keep records of combustion temperature, bypass flow, and periods when the flare flame or the flare pilot flame is out. However, without additional provisions, the EPA would have no way to gauge the severity of an emissions exceedance that may occur when these operating parameters are not being met or when the control device is not operating. Therefore, the EPA is proposing to include provisions for landfill owners or operators to estimate NMOC emissions when the control device or collection system is not operating. The landfill owners or operators may use whatever information is available to estimate NMOC emissions during the period, including but not limited to, landfill gas flow to or bypass of the control device, the concentration of NMOC (from the most recent performance test or from AP–42), and the amount of time the control

[67] Although the *NRDC* case does not address the EPA's authority to establish an affirmative defense to penalties that is available in administrative enforcement actions, EPA is not including such an affirmative defense in the proposed rule. As explained above, such an affirmative defense is not necessary. Moreover, assessment of penalties for violations caused by malfunctions in administrative proceedings and judicial proceedings should be consistent. *Cf.* CAA section 113(e) (requiring both the Administrator and the court to take specified criteria into account when assessing penalties).

device is not operating. Landfill owners or operators would keep records of the estimated emissions and would report the information in the annual compliance report.

As discussed above, malfunctions are by definition sudden, infrequent and not reasonably preventable failures of emissions control, process or monitoring equipment. Further, there are myriad different types of malfunctions that can occur and there are significant difficulties associated with predicting or accounting for the frequency, degree, and duration of various malfunctions that might occur. As a result, the EPA believes that it is generally not technically feasible to establish an alternative emission standard that would apply during periods of malfunction. The EPA also believes that it would be difficult to defend an alternative standard that does not achieve a level of emission reduction comparable to that required by the standard that applies during periods of normal operation in circumstances where there are steps that an owner or operator could take to achieve such reductions such as shutting down the process or having a second control device. In the immediate case, by shutting down the flow to the flare or other control device a source is unlikely to be in violation of the 98 percent emission reduction requirement since there will be no gas flowing to the control device. We are, however, interested in comment on whether there are alternative ways in which the emission limit could be complied with when the control device malfunctions.

C. Definitions and Other Rule Changes

We propose to include definitions of ''household waste'' and ''segregated yard waste'' in proposed 40 CFR part 60, subpart Cf to clarify our intent regarding the applicability of proposed subpart Cf to landfills that do not accept household waste, but accept segregated yard waste. We also proposed to exclude construction and demolition waste from the definition of household waste. We intend for subpart Cf to apply to MSW landfills that accept general household waste (including garbage, trash, sanitary waste), as indicated in the definitions. We do not intend the landfills rules to apply to landfills that accept only segregated yard waste or a combination of segregated yard waste and non-household waste such as construction and demolition waste.

X. Request for Comment on Specific Provisions

A. Defining Closed Areas of Open Landfills

In the ANPRM for the Emission Guidelines (79 FR 41772), the EPA requested input on how non-producing areas of the landfill, *i.e.,* areas that are no longer generating landfill gas, could be excluded from gas collection requirements when designing a GCCS (79 FR 41792). The EPA also sought input on whether the current criteria for capping or removing a GCCS are appropriate, one of which requires that the landfill be closed (79 FR 41783). As discussed in section VIII.B of this preamble, we are proposing a second set of alternative criteria for capping or removing the GCCS at closed landfills or closed areas of active landfills, based on surface emissions monitoring.

Commenters expressed concern with the requirement for closed areas to be physically separated in order to be excluded from GCCS requirements, noting that many closed areas of active landfills are non-producing but remain physically connected to other areas of the landfill.

To help address the difficulty of controlling landfill gas in low-producing areas, the EPA is proposing an alternative set of criteria for capping or removing the GCCS that employs a SEM demonstration: (1) The landfill is closed or an area of an active landfill is closed, (2) the GCCS has operated for at least 15 years or the landfill owner or operator can demonstrate that the GCCS will be unable to operate for 15 years due to declining gas flows, and (3) the landfill or closed area demonstrates for 4 consecutive quarters that there are no surface emissions of 500 ppm or greater. The EPA is also requesting comment on whether owners or operators of physically separated, closed areas of landfills may model NMOC emission rates, or may determine the flow rate of landfill gas using actual measurements, to determine NMOC emissions in order to identify areas that can be excluded from gas collection. The EPA considers areas to be physically separated if they have separate liners and gas cannot migrate between the separate areas.

To further address non-producing areas, proposed 40 CFR part 60, subpart Cf contains procedures for excluding areas from gas collection and control. Owners or operators of landfills with physically separated, closed areas may demonstrate that the quantity of NMOC emissions from the area is less than 1 percent of the total NMOC emissions from the entire landfill, and thus exclude the area from control. Under proposed 40 CFR part 60, subpart Cf, owners or operators of landfills with physically separated, closed areas may model NMOC emission rates, or may determine the flow rate of landfill gas using actual measurements, to determine NMOC emissions. Using actual flow measurements would yield a more precise measurement of NMOC emissions for purposes of demonstrating the closed area represents less than 1 percent of the landfills total NMOC emissions.

Because both of these topics rely on defining a closed area of a landfill, the EPA requests comment on how to define closed areas of open landfills.

B. Enhanced Surface Emissions Monitoring

The proposed 40 CFR part 60, subpart Cf collection and control requirements are intended to ensure that landfills maintain a tight cover that minimizes any emissions of landfill gas through the surface. The surface emissions monitoring procedures in proposed 40 CFR part 60, subpart Cf are consistent with 40 CFR part 60, subpart WWW and require quarterly surface emissions monitoring to demonstrate that the cover and gas collection system are working properly. However, we are also considering and requesting additional public input on a potential alternative approach to surface emissions monitoring.

The alternative surface monitoring approach includes changing the walking pattern that traverses the landfill from 30 meters (98 ft) to 25 ft and adding a methane concentration limit of 25 ppm as determined by integrated surface emissions monitoring. This would be in addition to the 500 ppm emission concentration as determined by instantaneous surface emissions monitoring. Integrated surface emissions monitoring provides an average surface emission concentration across a specified area. For integrated surface emissions monitoring, the specified area would be individually identified 50,000 square ft grids. A tighter walking pattern and the addition of an integrated methane concentration limit would more thoroughly ensure that the collection system is being operated properly, that the landfill cover and cover material are adequate, and that methane emissions from the landfill surface are minimized in all types of climates. As part of these potential changes, the EPA is also considering not allowing surface monitoring when the average wind speed exceeds 5 miles per hour (mph) or the instantaneous wind speed exceeds 10 mph because air movement can affect whether the

monitor is accurately reading the methane concentration during surface monitoring. We are considering this change because conducting surface emissions monitoring during windy periods may not yield readings that are representative of the emissions. The EPA requested public comment on this same enhanced approach in the landfills NSPS (79 FR 41822) and ANPRM (79 FR 41789).

Many commenters supported the enhanced surface monitoring provisions for detecting surface emissions. A state agency supported reducing the traverse pattern to 25 feet, stating that the tighter traverse pattern would increase the chance of detecting exceedances. An environmental organization supported all elements of the enhanced surface monitoring and contended that the current monitoring at 30 meter intervals leaves most areas of the landfill unmonitored. Both these commenters suggested that the walking pattern be varied each quarter (*i.e.,* offset by 10 meters) to monitor additional areas over time. The environmental organization supported an integrated reading because it would be a better indicator of GCCS performance and they contended that the additional costs were not unreasonable.

Many commenters opposed the enhanced surface monitoring provisions. Commenters that opposed the enhanced surface monitoring provisions primarily cited the additional costs and contended that the additional expense was not warranted because of limited environmental benefits. Two commenters commissioned a study to compare the level of effort and monitoring results of the CA LMR to the SEM requirements under the current NSPS (40 CFR part 60, subpart WWW). The CA LMR utilizes a 25 ft traverse pattern, an instantaneous as well as integrated reading, and prevents sampling during windy conditions (greater than 5 mph average and greater than 10 mph instantaneous).

The study examined monitoring results for eight quarters of NSPS surface monitoring at 42 California landfills, encompassing 27,140 acres. Those results were compared to CA LMR surface monitoring for 10 quarters at 72 California landfills, including the 42 landfills conducting NSPS surface monitoring, encompassing a total of 57,151 acres. Among other observations, the study concludes that although the CA LMR surface emission monitoring requirements detected 2.1 percent more exceedances than NSPS surface emission monitoring requirements, detecting these additional exceedances is not cost effective. The study also concluded that under the NSPS monitoring, only one landfill was required to expand its GCCS, while under the CA LMR monitoring, only three landfills were required to expand the GCCS. The two commenters that commissioned the study contended that the additional cost to conduct enhanced surface monitoring, estimated by the EPA to be seven times more expensive than NSPS monitoring, was an extraordinary amount of money to spend detecting exceedances at merely an additional 2.8 percent of acres monitored, while increasing gas collection at only one landfill.

The EPA examined the data supporting the study as provided by one of the commenters. The data allowed for direct comparison of exceedance data from 29 landfills, although for different time periods. The study and supporting data provide evidence of greater exceedances under the California approach than the current approach. However, the EPA was unable to determine the magnitude of emission reductions that might result from the greater exceedances under the California approach. See the docketed memorandum entitled ''Analysis of Surface Exceedances from California Landfills under the New Source Performance Standards and the California Landfill Methane Rule.''

Many commenters, including many state agencies, opposed limiting surface monitoring during windy conditions, stating that the wind restrictions would be a significant inhibitor to completing the required monitoring in many regions of the country due to typical windy conditions. Commenters also stated that it would be difficult to schedule and reschedule dedicated sampling crews and conditions could change quickly during sampling events, causing crews to stop monitoring.

For proposed 40 CFR part 60, subpart Cf, the EPA estimated the costs associated with both the proposed subpart Cf surface monitoring requirements (which are the same as the surface monitoring requirements in 40 CFR part 60, subpart WWW) and potential changes to the surface monitoring provisions under the proposed 2.5/34 option and the proposed 2.5/40 option and applied them to the set of existing landfills that would be subject to control requirements under the respective option. To determine the costs, the EPA used the following assumptions: Most landfills will hire a contractor to conduct the quarterly monitoring. The landfill will incur labor costs based on the time it takes to walk the traverse (hours per acre), the size of the landfill (acres), and a labor rate (dollars per hour). The landfill will also incur an equipment rental rate (dollars per hour) as well as a flat fee for purchasing calibration gases and hydrogen to fuel the equipment. Equipment rental rates are dollar per day/week/month, depending on the size of the landfill and time to traverse the acreage during each quarterly period. See the docketed memo, ''Updated Methodology for Estimating Testing and Monitoring Costs for the MSW Landfill Regulations. 2015,'' which contains the details for determining the costs that a landfill would incur to conduct enhanced surface monitoring.

Using the techniques discussed in section V.B of this preamble, the EPA estimated the number of landfills that are expected to install controls under the baseline, as well as the proposed option 2.5/34 and option 2.5/40. Then, the EPA applied surface monitoring costs to the respective set of landfills because landfills that must install controls must also conduct surface monitoring. Table 4 of this preamble compares the enhanced surface monitoring costs that would be incurred for new landfills under the baseline and proposed option 2.5/34 and proposed option 2.5/40.

TABLE 4—COMPARISON OF BASELINE SURFACE MONITORING VERSUS ENHANCED SURFACE MONITORING IN 2025

Control option	Surface monitoring type	Number of landfills controlling	Annual cost	Incremental cost	Total cost per controlled landfill	Incremental cost per controlled landfill
Baseline 2.5/50 (2.5 million Mg design capacity/50 Mg/yr NMOC).	No change (30 meter traverse).	574	6,327,000	NA	11,000	NA
	Enhanced (25-foot traverse, integrated sample).	.....	43,831,000	37,504,000	76,400	65,300

TABLE 4—COMPARISON OF BASELINE SURFACE MONITORING VERSUS ENHANCED SURFACE MONITORING IN 2025—Continued

Control option	Surface monitoring type	Number of landfills controlling	Annual cost	Incremental cost	Total cost per controlled landfill	Incremental cost per controlled landfill
Option 2.5/40 (2.5 million Mg design capacity/40 Mg/yr NMOC).	No change (30 meter traverse).	636	6,741,000	414,000	10,600	700
	Enhanced (25-foot traverse, integrated sample).	.....	46,746,000	40,419,000	73,500	63,600
Proposed Option 2.5/34 (2.5 million Mg design capacity/34 Mg/yr NMOC).	No change (30 meter traverse).	680	7,062,000	735,000	10,400	1,100
	Enhanced (25-foot traverse, integrated sample).	.....	49,037,000	42,710,000	72,100	62,800

Several factors contribute to the cost of enhanced surface monitoring. Monitoring along a traverse with a 25 ft. interval would increase monitoring time, and thus the labor costs, compared to monitoring along a 30 meter (98 ft.) interval. Monitoring along the tighter traverse pattern would take approximately 4 times as long, because the distance is approximately 4 times greater. For a landfill to conduct the integrated surface emissions monitoring, the EPA assumed the landfill would rent a handheld portable vapor analyzer with a data logger. The data logger is necessary to obtain an integrated reading over a single 50,000 square foot grid. However, the EPA does not expect that requiring an integrated methane concentration would add significant cost because landfills could use the same instrument that they currently use for the instantaneous readings and these instruments can be programmed to provide an integrated value as well as an instantaneous value.

The EPA recognizes that these provisions could reduce surface emissions and that these emissions reductions are difficult to quantify. The EPA also understands that there are potential implementation concerns with these enhanced procedures. Surface monitoring is a labor intensive process and tightening the grid pattern would increase costs. Of the 574 landfills expected to be controlling in 2025 under the baseline, it would take these landfills over 42 hours, on average, to complete each quarterly traverse pattern. Tightening the traverse pattern to 25 ft instead of 30 meters would require over 165 hours per quarter, or nearly 500 additional hours per year, per landfill, compared to the current 30-meter traverse pattern.

At this time, the EPA is not proposing surface monitoring provisions that differ from those outlined in 40 CFR part 60, subpart WWW, but we are soliciting comment on the various elements of enhanced surface emissions monitoring (the width of the traverse pattern, offsetting the walking pattern each quarter (*i.e.,* offset by 10 meters), an integrated reading of 25 ppm, and restrictions during windy conditions), as well as techniques and data to estimate the emission reductions associated with enhanced surface monitoring.

C. Wet Landfills

In the ANPRM (79 FR 41784), we solicited input on separate thresholds for wet landfills and how wet landfills might be defined. Among other concerns, we received feedback from commenters expressing concern on potential overlap between wet landfills handled under the Emission Guidelines and bioreactor landfills handled under 40 CFR part 63, subpart AAAA (National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills). A landfill is defined as a bioreactor under 40 CFR part 63, subpart AAAA if it has added liquids other than leachate into the waste mass in a controlled fashion;[68] such bioreactor landfills are required to install and operate a GCCS on an accelerated schedule compared to non-bioreactor landfills. Once a landfill is required to install and operate a GCCS under either 40 CFR part 63, subpart AAAA, or 40 CFR part 60, subparts WWW and Cc, the GCCS requirements are the same. In addition to bioreactors as defined under 40 CFR part 63, subpart AAAA, the EPA is aware of 31 bioreactor projects permitted under the research, development, and demonstration (RD&D) rule in 11 states and one project on tribal lands.[69] These bioreactor landfills generally do not meet the 40 percent by weight moisture component of the bioreactor definition in 40 CFR part 63, subpart AAAA. Based on the options analyzed and presented in Table 3 of this preamble, proposed option 2.5/34 is estimated to achieve reductions of NMOC and methane emissions at 651 existing open landfills in year 2025. Of these 651 landfills, 18 are identified as having RD&D permits, which permit liquids addition; 343 are located in areas receiving greater than 40 inches of precipitation each year; and an additional 16 landfills report leachate recirculation activities and a k value of 0.057 $year^{-1}$ or greater to subpart HH of the GHGRP, but are not located in areas receiving 40 inches of precipitation or more, for a total of 377 ''wet'' landfills out of those required to control emissions.

Collectively, reductions from these 377 wet landfills constitute approximately 50 percent of the incremental reductions achieved by the proposed option 2.5/34. Nearly all of these incremental reductions are coming from the 343 landfills that are located in areas receiving 40 inches of precipitation or more. Based on this analysis, the NMOC threshold of 34 Mg/yr in this proposal achieves significant reduction in emissions from wet landfills.

The EPA conducted a preliminary analysis to determine the additional reductions that could be achieved if the initial lag time was shortened by 1 year and the expansion lag time was shortened by 2 years and applied to open wet landfills in addition to the lower NMOC emission threshold of 34 Mg/yr. The results of this analysis show

[68] Under 40 CFR part 63, subpart AAAA, bioreactor means a MSW landfill or portion of a MSW landfill where any liquid other than leachate (leachate includes landfill gas condensate) is added in a controlled fashion into the waste mass (often in combination with recirculating leachate) to reach a minimum average moisture content of at least 40 percent by weight to accelerate or enhance the anaerobic (without oxygen) biodegradation of the waste.

[69] EPA/600/R–14/335. Permitting of Landfill Bioreactor Operations: Ten Years after the RD&D Rule.

that an additional approximately 220 Mg/yr of reductions in NMOC emissions and 35,200 Mg/yr of reductions in methane (879,000 $mtCO_2e$/yr) could be achieved from these 377 wet landfills in 2025.

It is important to note that the impacts of the options in Table 3 as well as this preliminary analysis of wet landfills were conducted using a k value of 0.04 for any landfill that is located in an area with at least 25 inches of rainfall, consistent with the analysis discussed at 79 FR 41805. This modeling parameter was used for all but nine of the 377 wet landfills discussed above. Those nine landfills, which are either RD&D landfills or reported significant leachate recirculation to subpart HH of the GHGRP were modeled using a k value of 0.02 because they were located in arid areas.

The results of the impacts analyses presented in Table 3 of this preamble and above could differ significantly if alternative modeling parameters (k and/or L^o) were used to model emissions from this group of wet landfills. For example, subpart HH of the GHGRP uses a k value of 0.057 for landfills that exceed 40 inches per year when considering both leachate recirculation and precipitation. The EPA also identified a study containing alternative k values for five different bioreactor landfills.[70] One commenter urged the EPA to consider more representative k values when calculating emission reductions from wet landfills, and cited several studies for EPA review.[71] [72] [73] This commenter also requested that the EPA adopt shorter lag times for these wet landfills. Another commenter urged the EPA to finalize the changes proposed in 2009 to AP–42 emission factors for MSW landfills, which included a much higher k value of 0.3 for wet landfills, among other changes.[74] Another commenter provided input that leachate recirculation will have negligible impact on the total precipitation value that ultimately dictates which k value to use. This commenter also referenced its prior comments expressing concerns that the draft AP–42 k value for wet landfills was too high, and provided several studies containing alternative k values for wet landfills.[75] [76] [77]

Given the additional emission reductions that could be achieved from shortening the lag times at wet landfills and in consideration of the President's Methane Strategy, the EPA is soliciting input on whether the wet landfills not subject to the requirements in 40 CFR part 63, subpart AAAA should be subject to different schedules for installing and expanding their GCCS under the Emission Guidelines. Additionally, the EPA requests comment on how these wet landfills that are not bioreactors (as defined in subpart AAAA) might be defined. Finally, recognizing the wide range of k values used to model emissions at wet landfills (0.057 to 0.3), the EPA requests comment and data to support revising the k value used for assessing the impacts on wet landfills, as well as the k value landfills should use in Tier 1 and Tier 2 emission threshold determinations. The EPA also requests comment on whether revisions to the k value for wet landfills would require changes to the Lo modeling parameter for wet landfills.

D. Monitoring Wellhead Flowrate

Based on comments received and discussed in section VI.B of this preamble, as well as the proposal to eliminate the operating standards for oxygen/nitrogen and temperature, the EPA is requesting input on whether it should add a requirement to monitor wellhead flowrate to help ensure a well-operated GCCS. Monitoring wellhead flow rate would allow the landfill owner or operator to detect low gas flow and whether a well is waterlogged, clogged, or pinched. The EPA is also requesting comment on any other wellhead monitoring parameters that would help ensure a well-operated GCCS.

E. Third-Party Design Plan Certification Program

In the ANPRM for existing landfills (79 FR 41784, July 17, 2014), the EPA solicited input on the possibility of establishing a third-party design plan certification program and provided examples of several rules and programs with third-party verification components. The third-party program would supplement or replace the current approach of requiring EPA or state review and approval of site-specific design plans and plan revisions with a program whereby independent third parties would review the design plans, determine whether they conform to applicable regulatory criteria, and report their findings to the approved state programs or the EPA (for states without approved programs). The process of approving site-specific design plans and plan revisions can be extremely resource-intensive for regulators and regulated entities alike. The EPA believes modifying the regulations to provide for the review and approval of the plans by competent and independent third parties could reduce these burdens. Such an independent program would need to be designed to ensure that, among other things, the third parties are competent, accurate, independent, and appropriately accredited. The program would also need to ensure that the reviews are thorough, independent, and conducted pursuant to clear and objective design plan review criteria. Finally, the program would need to ensure that the system is transparent, including requiring appropriate public disclosures, and that there is regular and effective oversight of the third-party system. Some criteria for auditor competence, independence, reporting, and oversight requirements provisions might include the following:

- Engaging a third-party inspection team (team) and submitting the members' resumes and qualifications to EPA;
- Requiring the team to have at least one person with landfill industry expertise acceptable to the EPA, one expert in environmental compliance auditing, and one expert in chemical process safety management;
- Restricting team members to those who have not previously performed work for the respondents;
- Restricting team members from working for the respondents or any of the respondents' officers for 5 years after completion of inspections;
- After giving the respondents notice of the first upcoming inspection, restricting the team from

[70] Barlaz, Morton et al., Performance of North American Bioreactor Landfills II: Chemical and Biological Characteristics. Journal of Environmental Engineering. Volume 136, No. 8. August 2010.

[71] Xiaoming Wang et al., *Using Observed Data to Improve Estimated Methane Collection From Select U.S. Landfills,* Environ. Sci. Technol. 3251, 3256 (2013).

[72] Hamid R. Amini et al., Comparison of First-Order Decay Modeled and Actual Field Measured Municipal Solid Waste Landfill Methane Data, 33 Waste Management 2720, 2725 (2013).

[73] *Barlaz* et al., Controls on Landfill Gas Collection Efficiency: Instantaneous and Lifetime Performance *59 J. Air & Waste Mgmt. Ass'n 1399, 1402–03 (Dec. 2009).*

[74] U.S. EPA AP 42, Fifth Edition, Volume I, Chapter 2, Draft Section 2.4: Solid Waste Disposal *http://www.epa.gov/ttn/chief/ap42/ch02/draft/d02s04.pdf.*

[75] Staley, B.F. and M.A. Barlaz, 2009, ''Composition of Municipal Solid Waste in the U.S. and Implications for Carbon Sequestration and Methane Yield,'' Journal of Environmental Engineering, Vol. 135, No. 10, October 1, 2009.

[76] U.S. EPA, Landfill Bioreactor Performance, Second Interim Report; EPN600/R–07/060, Office of Research and Development, National Risk Management Laboratory: Cincinnati, OH, 2006.

[77] Tolaymat, T.M., Green, R.B., Hater, G.R., Barlaz, M.A., Black, P., Bronston, D., and J. Powell, ''Evaluation of Landfill Gas Decay Constant for Municipal Solid Waste Landfills Operated as Bioreactors.'' Submitted to the Journal of the Air & Waste Management Association. 2009.

communicating with its respondents unless EPA is copied on the communication (communications during on-site inspections are excepted);

- Unannounced follow-up inspections with no notice to respondents but advance notice to the EPA;
- Restricting respondents from having control over the timing of any of the follow-up inspections;
- Having the EPA or the delegated authority retain the right to accompany the team on any inspection;
- Within 15 days of each inspection, requiring the team to simultaneously submit to the EPA and the respondents an inspection report, photographs, and digital video of the inspection;
- Denying the opportunity to review any draft or final inspection report before its submittal.

The EPA developed the above provisions based on the theoretical and empirical research for best practices for independent third-party audits.

Commenters on the ANPRM generally did not support a third-party design plan certification program and cited several reasons. Commenters noted that the ANPRM (79 FR 41772) discussion of the program was overly general and that the EPA did not adequately describe the possible design features. One commenter expressed concerns that the examples of third-party certification presented in the ANPRM are neither comparable nor relevant to the review of MSW landfill GCCS design plans. One commenter acknowledged that a third-party reviewer system could reduce the burden and backlog experienced by reviewing agencies, but expressed concern that the costs of verification would be significant. Another commenter indicated the EPA did not present any economic and implementation impacts concerning such a program in the ANPRM and requested that EPA provide more details. Commenters also expressed concern about finding consultants that would be free of conflicts of interest given the consolidated nature of the MSW landfill industry. One commenter noted that cost and potential conflicts of interest were cited as reasons that the EPA did not adopt a third-party certification program for the GHGRP. Another commenter agreed that there was the potential for conflicts of interest and stated that design plan review is an essential government oversight and should not be delegated. Commenters also urged the EPA to thoroughly review the many issues that could arise with a third-party certification program and urged the EPA to take further notice and comment before promulgating such a program.

Several commenters on the ANPRM (79 FR 41772) solicited additional details on components of a proposed third-party certification program, and the EPA is providing further details in this proposal. In this document, the EPA is also seeking additional input on the possibility of establishing a third-party design certification program. This preamble discussion provides notice of the key features the EPA is considering in such a program to ensure the integrity of such a program, including the use of effective auditors and audits. See the docketed memorandum ''Using Third-Party Audits to Improve Compliance'' for additional specificity regarding such third-party design features with supporting studies, articles, and reports.

1. Definition and Characteristics of Independent Third-Party Compliance Verification

Third-party compliance verification occurs when an independent third party verifies to a regulator that a regulated entity is meeting or conforming to one or more compliance obligations (in the literature and other regulations, the terms ''certifier,'' ''auditor,'' or ''inspector'' are also used to describe such verifiers). Independent third-party programs are distinct from programs whereby regulated sources employ contractors or consultants, even if they are separate legal entities from the regulated facilities and are highly qualified. When contractors or consultants report to facilities directly, have other non-audit business or relationships with the facilities, and/or the facilities are able to control or influence the audit reports' form and/or content, this is not independent third-party verification but rather enhanced self-auditing.

2. Third-Party Audit Program Considerations and Characteristics

Based on careful review of the literature,[78] the EPA believes independent third-party programs can be effective, but only if properly designed and overseen. The most critical considerations in designing successful third-party auditing programs are building in provisions and procedures for ensuring auditors are competent and independent. The EPA seeks comment on the suitability of an independent third-party verification program for landfills that includes the following design elements to ensure its effectiveness and integrity: The use of competent and independent auditors; accurate audits; public transparency; and effective regulatory oversight. See also the docketed memorandum ''Using Third-Party Audits to Improve Compliance'' for a review of additional design features the EPA is considering and more detailed information on the features listed below:

a. A requirement that the auditing (verifying) firm, including any corporate parent and/or subsidiaries and the actual persons responsible for the audit, neither have had any prior business or family relationship with the firm being audited in the past five years, nor have worked on the development or implementation of the project/process subject to the audit.

b. A requirement that the auditing firm (including its corporate parent and/or subsidiaries, if any) is prohibited from engaging in any business transactions with the firm it is auditing for at least five years after the audit is completed.

c. A requirement that the verifying entity and the specific auditors hold appropriate professional and educational credentials issued by either the government entity that would otherwise review the plan or an independent professional organization (accreditation board) neither funded nor associated with the regulated sector.

d. A requirement that the auditing firm share all drafts and the final version of its audits with the government entity before, or at the same time, as it shares them with the regulated entity.

e. A requirement that appropriate auditing standards and protocols be spelled out, including, if possible, by reference to identified standards established by outside entities, *e.g.,* International Organization for Standardization (ISO), American National Standards Institute (ANSI), ASTM International (ASTM), etc.

f. A requirement that audit reports, including names of key persons involved in the audits, be made accessible to the public subject to protecting confidential business information (CBI) and national security information

g. Requirements to ensure that the verifying firms operate with integrity, competence, and independence and that the regulator audit, *i.e.,* review or ''backcheck,'' including some number of on-site inspections, a significant percentage (*e.g.,* 10 percent) of the auditing firms and their audit reports.

The EPA is requesting comments regarding the appropriate professional and educational credentials

[78] Lesley K. McAllister, Regulation by Third-Party Verification, 53 Boston C. L Rev. 1, 21–26 (Jan. 2012).

requirements for auditors. For example, should auditors be licensed professional engineers? In addition based upon comments received, the EPA also requests information concerning the costs associated with third-party certification design plans.

The EPA is also considering defining more specifically what it means for an auditor to be independent, *i.e.,* what potential conflicts of interest such as being employees of parent company, affiliates, or vendors/contractors that are currently working in the landfill industry, could exclude an auditor from qualifying as independent. Criteria for, and research on, competence and independence are discussed further below.

The EPA is also considering allowing a person at the facility who is a registered professional engineer to conduct the audit at the facility, *i.e.,* first party/self-auditing, instead of requiring independent third-party audits. If self-auditing is authorized, the EPA seeks comment on how best to structure it to maximize auditor independence and accurate auditing outcomes. Under the *U.S. CARB* v. *Hyundai Motor Company, et al.* consent decree, for example, until the consent decrees corrective measures are fully implemented, the defendants must audit their fleets to ensure that vehicles sold to the public conform to the vehicles' certification. The consent decree provides that the audit team will be in the United States, will be independent from the group that performed the original certification work, and must perform their audits without access to or knowledge of the defendants' original certification test data, which the consent decree-required audits are intended to backcheck.[79] The EPA seeks comment as to whether similar restrictions should be placed on any self-auditing conducted under the MSW landfills Emission Guidelines.

As another alternative approach, the EPA could require auditors to have accreditation by a recognized accrediting body. Several of the examples that have already been provided of existing or proposed federal or state independent third-party auditing programs in rules use this approach. The EPA thus seeks comment on whether third-party auditors should be required to receive accreditation by a recognized accrediting body. The EPA also seeks comment on the standards such accrediting bodies should be required to meet, *e.g.,* International Organization for Standardization (ISO)/IEC 17011:2004(E), Conformity Assessments—General Requirements for Accreditation Bodies Accrediting Conformity Assessments Bodies (First Edition).

There are advantages to third-party auditing, particularly with strong auditor competence and independence criteria. According to the Center for Chemical Process Safety (CCPS), ''Third-party auditors (typically, consulting companies who can provide experienced auditors) potentially provide the highest degree of objectivity.'' [80] The Administrative Conference of the United States (ACUS), in its *Recommendation on Agency Use of Third-Party Programs to Assess Regulatory Compliance* (December 6, 2012), found that, when well-designed and implemented per the Recommendation, ''[s]everal broad reasons support the growing use of third-party programs in federal regulation.'' Specifically, ACUS found that ''. . . federal regulatory agencies are faced with assuring the compliance of an increasing number of entities and products without a corresponding growth in agency resources. Third-party programs may leverage private resources and expertise in ways that make regulation more effective and less costly. In comparison with other regulatory approaches, third-party programs may also enable more frequent compliance assessment and more complete and reliable compliance data'' [81] A leading scholar on regulatory third-party programs likewise found that, when well-designed and implemented, ''third-party verification could furnish more and better data about regulatory compliance'' while providing additional compliance and resource savings benefits.[82]

All independent third-party compliance verification programs establish criteria and standards for auditor competence. Typically, such criteria and standards combine specified minimum levels of education, knowledge, experience, and training. Auditors should be knowledgeable and experienced with the facility type and processes being audited. The applicable recognized and generally accepted good engineering practices, trained or certified in proper third-party auditing techniques, and licensed professional engineers should be employed where appropriate. The EPA seeks comment on whether these criteria are appropriate and sufficient to ensure that auditors are competent to perform high-quality auditing.

3. Public Disclosure/Transparency

It is EPA policy that both the government and the public have appropriate access to information about regulated entities and their compliance status. This includes relevant information on the operation of any independent third-party programs. The EPA seeks comment on what information associated with such a program for landfills should be publicly disclosed and how to disclose it.

4. E-Reporting of Audit Reports and Certifications

Pursuant to EPA's Policy Statement on E-Reporting in EPA Regulations (September 30, 2013), ''[t]he Policy of the [EPA] is to [b]egin the regulatory development process with the assumption that all reporting will be electronic, unless there is a compelling reason to use paper reporting. Consistent with that policy, the EPA is requesting comment on requiring independent third-party auditors to provide their audit reports and associated certification statements (see discussion below) to EPA electronically and seeks comment on how to best design the e-reporting system to facilitate its use by the regulated facilities and third-party auditors.

5. Facility and Third-Party Auditor Certification Statements

EPA's experience shows that requiring a responsible corporate or third-party official to attest to self-monitoring, reporting, and third-party auditing can help ensure that appropriate officials are personally familiar with the reported information and reminds them of the penalties associated with knowingly submitting false information. The EPA intends to require such language for any third-party audit reports under these emission guidelines and requests comment on its wording. The EPA also requests comment on whether the Agency should, for this rule, require regulated facilities and/or third-party auditors to

[79] Press Release: *http://yosemite.epa.gov/OPA/ADMPRESS.NSF/d0cf6618525a9efb85257359003fb69d/15519081fbf4002285257d8500477615!OpenDocument*; Detailed settlement info.: *http://www2.epa.gov/enforcement/hyundai-and-kia-clean-air-act-settlement*; *Consent Decree: http://www2.epa.gov/sites/production/files/2014-11/documents/hyundai-kia-cd.pdf.*

[80] Guidelines for Risk Based Process Safety, March 2007. CCPS. *http://www.aiche.org/ccps/resources/publications/books/guidelines-risk-based-process-safety.*

[81] Administrative Conference of the United States (ACUS); Administrative Conference Recommendation 2012–7; Agency Use of Third-Party Programs to Assess Regulatory Compliance (Adopted December 6, 2012) at 3–4. *https://www.acus.gov/recommendation/agency-use-third-party-programs-assess-regulatory-compliance.*

[82] Lesley K. McAllister, Regulation by Third-Party Verification, 53 Boston C. L Rev. 1, 21–26 (Jan. 2012).

publicly post their certifications to their qualifications to conduct the audit and/or the accuracy and completeness of the audit reports.

6. Examples of Independent Third-Party Programs in Other Rules

Third-party audits or other forms of compliance verification are also required by a variety of final or proposed EPA programs to promote compliance with regulatory standards. Examples of proposed or final federal environmental regulatory programs with built-in third-party verification include the following rules and rulemakings:

- EPA CAA Renewable Fuel Standard (RFS) program: The RFS regulations include requirements for obligated parties to: (1) Meet annual attest engagement requirements using independent certified public accountants (the purpose of attest engagements is to provide regulated parties an independent review of their compliance with both the fuels requirements themselves as well as the regulated party's internal systems to monitor and document compliance); (2) submit independent third-party engineering reviews to the EPA before generating Renewable Identification Numbers.[83]
- EPA CAA wood stoves rule: Residential wood heaters (which include stoves) contribute significantly to particulate air pollution. Wood stove model lines that are in compliance with the wood stoves rule are referred to as EPA-certified wood stoves. The EPA's certification process requires manufacturers to verify that each of their wood stove model lines meet a specific particulate emission limit by undergoing emission testing at an EPA-accredited laboratory.[84]

F. Use of Portable Analyzers for Monitoring Oxygen

In the proposed NSPS (79 FR 41796), as well as 40 CFR 60.37f(a)(2) of the proposed Emission Guidelines, landfill owners or operators must use Method 3A or Method 3C when monitoring the oxygen and nitrogen levels at the wellhead, unless an alternative test method is established. Several commenters on the proposed NSPS requested that the EPA specify that portable gas composition analyzers are an acceptable alternative to Methods 3A or 3C, and noted that these devices are commonly used in practice to measure wellhead parameters and calibrated according to the manufacturer's specifications. Currently, approval of these analyzers are done on a case-by-case basis. In proposed 40 CFR part 60, subpart Cf, the EPA has not listed portable gas composition analyzers for determining oxygen or nitrogen levels. The EPA did not receive any data supporting these comments as to why the analyzers could not be calibrated according to Method 3A and maintains that proper calibration of portable gas composition analyzers is important for generating accurate results. The EPA is requesting data or information on the use of a portable gas composition analyzer according to Method 3A. The EPA is also requesting data on other reference methods used for calibrating these analyzers.

XI. Impacts of Proposed Revisions

For most Emission Guidelines, the EPA analyzes the impacts in the year the standard is implemented. Assuming the Emission Guidelines are promulgated in the summer of 2016, states have 9 months to prepare a state plan implementing the guidelines (March 2017) and the EPA has 4 months to review the plan (July 2017). If necessary, the state has an additional 2 months to revise and submit a corrected plan based on any comments from the EPA (September 2017). Concurrently, the EPA must promulgate a federal plan within 6 months after the state plan is due, consistent with 60.27(d), or March 2018. So, the EPA-approved state plan and updated federal plan implementing the Emission Guidelines are expected to become effective in March 2018. While 2018 is the estimated implementation year, the proposed reporting and control timeframe allows 3 months to submit the first NMOC emission report and then 30 months after exceeding the NMOC emission threshold before the GCCS is required to be installed. So, the first year of controls under the proposed revisions would be 2021.

The EPA is assessing impacts in year 2025 as a representative year for the landfills Emission Guidelines. While the year 2025 differs somewhat from the expected first year of implementation for the Emission Guidelines (year 2018), the number of existing landfills required to install controls under the proposed 2.5/34 option in year 2025 is comparable (within 2 percent of those required to control in the estimated first year of implementation. Further, year 2025 represents a year in which several of the landfills subject to control requirements have had to expand their GCCS according the expansion lag times set forth in proposed subpart Cf. The methodology for estimating the impacts of the Emission Guidelines is discussed in section V.B of this preamble and in the docketed memorandum ''Revised Methodology for Cost and Emission Impacts of Landfill Regulations (2015).'' The results of applying this methodology to the population of existing landfills potentially subject to each of the regulatory options are in the docketed memorandum ''Revised Cost and Emission Impacts Resulting from the Landfill EG Review (2015).'' Table 3 of this preamble summarizes the emission reductions and costs associated with the control options considered.

A. What are the air quality impacts?

This proposal would achieve nearly an additional 5 percent reduction in NMOC from existing landfills, or 2,770 Mg/yr, when compared to the baseline, as shown in Table 5 of this preamble. The proposal would also achieve substantial reductions in methane emissions. These reductions are achieved by reducing the NMOC threshold from 50 Mg/yr to 34 Mg/yr as proposed at open landfills.

TABLE 5—EMISSION REDUCTIONS IN 2025 FOR EXISTING LANDFILLS SUBJECT TO ADDITIONAL CONTROLS UNDER PROPOSED OPTION 2.5/34

Parameter	Quantity
Baseline NMOC Emission Reductions(Mg) [a]	57,300.
Proposed Incremental NMOC Emission Reductions (Mg)	2,770.
Baseline Methane Emission Reductions (Mg) [a]	9,035,000.
Proposed Incremental Methane Emission Reductions (Mg)	436,100.
Baseline Methane Emission Reductions (million $mtCO_2e$) [a]	226.

[83] EPA, Renewable Fuel Standards (RFS), *http://www.epa.gov/OTAQ/fuels/renewablefuels/.*

[84] EPA, Wood Heater Compliance Monitoring Program, *https://www.federalregister.gov/articles/2015/03/16/2015-03733/standards-of-performance-for-new-residential-wood-heaters-new-residential-hydronic-heaters-and.*

TABLE 5—EMISSION REDUCTIONS IN 2025 FOR EXISTING LANDFILLS SUBJECT TO ADDITIONAL CONTROLS UNDER PROPOSED OPTION 2.5/34—Continued

Parameter	Quantity
Proposed Incremental Methane Emission Reductions (million mtCO_2e)	10.9.
% Emission Reduction from Proposal	5% below baseline.

[a] These are the reductions that would be achieved from existing landfills if 40 CFR part 60, subpart Cf retained the same gas collection and control requirements that are in 40 CFR part 60, subparts WWW and Cc.

B. What are the water quality and solid waste impacts?

Leachate is the liquid that passes through the landfilled waste and strips contaminants from the waste as the leachate percolates. Precipitation generates the vast majority of leachate volume. Installation of a gas collection system will generate additional liquid, in the form of gas condensate, and it will be routed to the same leachate treatment mechanisms in place for controlling precipitation-based leachate. Collected leachate can be treated on site or transported off site to wastewater treatment facilities. Some landfills have received permits allowing for recirculation of leachate in the landfill, which may further reduce the volume of leachate requiring treatment. Additional liquid generated from gas condensate is not expected to be significant and insufficient data are available to estimate the increases in leachate resulting from expanded gas collection and control requirements.

The additional GCCS components required by this proposal have finite lifetimes (approximately 15 years) and these pipes and wells will be capped or disposed of at the end of their useful life. There are insufficient data to quantify the solid waste resulting from disposal of this control infrastructure.

Further, the incremental costs of control for the proposal are not expected to have an appreciable market effect on the waste disposal costs, tipping fees, or the amount of solid waste disposed in landfills because the costs for gas collection represent a small portion of the overall costs to design, construct, and operate a landfill. There is insufficient information to quantify the effect increased gas control costs might have on the amount of solid waste disposed of in landfills versus other disposal mechanisms such as recycling, waste-to-energy, or composting. Note that elements of this proposed rule—notably lowering the NMOC threshold to 34 Mg/yr—provide additional incentives to separate waste.

C. What are the secondary air impacts?

Secondary air impacts may include grid emissions from purchasing electricity to operate the GCCS components, by-product emissions from combustion of LFG in flares or energy recovery devices, and offsets to conventional grid emissions from new LFG energy supply.

The secondary air impacts are presented as net impacts, considering both the energy demand and energy supply resulting from the proposal. The methodology used to prepare the estimated secondary impacts for this preamble is discussed in the docketed memorandum ''Estimating Secondary Impacts of the Landfills Emission Guidelines Review. 2015.''

While we do expect NO_X and sulfur dioxide (SO_2) emission changes as a result of these guidelines, we expect these changes to be small and these changes have not been estimated. The net impacts were computed for CO_2e. After considering the offsets from LFG electricity, the impacts of the proposal are expected to reduce CO_2 emissions by 238,000 metric tons per year. These CO_2 emission reductions are in addition to the methane emission reductions achieved from the direct destruction of methane in flares or engines presented in Table 3 of this preamble.

D. What are the energy impacts?

The proposal is expected to have a very minimal impact on energy supply and consumption. Active gas collection systems require energy to operate the blowers and pumps and the proposal will increase the volume of landfill gas collected. When the least cost control is a flare, energy may be purchased from the grid to operate the blowers of the landfill gas collection system. However, when the least cost control option is an engine, the engine may provide this energy to the gas control system and then sell the excess to the grid. Considering the balance of energy generated and demanded from the estimated least cost controls, the proposal is estimated to supply 0.4 million megawatt hours (MWh) of additional energy per year.

E. What are the cost impacts?

To meet the proposed control requirements, a landfill is expected to install the least cost control for combusting the landfill gas. The cost estimates (described in sections V of this preamble) evaluated each landfill to determine whether a gas collection and flare or a gas collection with flare and engine equipment would be least cost, after considering local power buyback rates and whether the quantity of landfill gas was sufficient to generate electricity. The control costs include the costs to install and operate gas collection infrastructure such as wells, header pipes, blowers, and an enclosed flare. For landfills where the least cost control option was an engine, the costs also include the cost to install and operate one or more reciprocating internal combustion engines to convert the landfill gas into electricity. Revenue from electricity sales was incorporated into the net control costs using state-specific data on wholesale purchase prices, where engines were deemed to be the least cost control option. Testing and monitoring costs at controlled landfills include the cost to conduct initial performance tests on the enclosed flare or engine control equipment, quarterly surface monitoring, continuous combustion monitoring, and monthly wellhead monitoring. At uncontrolled landfills, the testing and monitoring costs include calculation and reporting of NMOC emission rates.

The nationwide incremental annualized net cost for the proposal is $46.8 million, when using a 7 percent discount rate, of which $0.7 million is testing and monitoring costs. Table 6 of this preamble presents the costs.

TABLE 6—INCREMENTAL COST IMPACTS IN 2025 FOR EXISTING LANDFILLS SUBJECT TO ADDITIONAL CONTROLS UNDER THE PROPOSAL

Option	Total number of landfills incurring cost [a]	Annualized control cost	Average annualized revenue	Average annualized testing and monitoring cost	Average net total annualized cost
Total Costs of Baseline ($2012)					
Baseline 2.5/50 (2.5 million Mg design capacity/50 Mg/yr NMOC)	785	1,700	1,408	7.3	299
Incremental Costs Above Baseline ($2012)					
Proposed Option 2.5/34 (2.5 million Mg design capacity/34 Mg/yr NMOC)	0	101	55.3	0.7	46.8

[a] At the baseline, 574 of the landfills are controlling in 2025 and an additional 211 landfills are expected to submit NMOC emission reports, but are not yet controlling for a total of 785. In the proposed option, the total landfills incurring cost are also 785, but the proposal is estimated to require controls at 680 landfills and the remaining 105 landfills are expected to submit NMOC emission reports, but are not yet controlling.

F. What are the economic impacts?

Because of the relatively low net cost of the proposed option compared to the overall size of the MSW industry, as well as the lack of appropriate economic parameters or model, the EPA is unable to estimate the impacts of the options on the supply and demand for MSW landfill services. However, because of the relatively low incremental costs of the proposal, the EPA does not believe the proposal would lead to substantial changes in supply and demand for landfill services or waste disposal costs, tipping fees, or the amount of waste disposed in landfills. Hence, the overall economic impact of the proposal should be minimal on the affected industries and their consumers.

G. What are the benefits?

The proposal is expected to result in significant emissions reductions from existing MSW landfills. By lowering the NMOC emissions threshold to 34 Mg/yr, the proposal would achieve reductions of 2,770 Mg/yr NMOC and 436,100 Mg/yr methane (10.9 million $mtCO_2e$/yr). In addition, the proposal is expected to result in the net reduction of 238,000 Mg CO_2, due to reduced demand for electricity from the grid as landfills generate electricity from landfill gas.

This rule is expected to result in significant health and welfare benefits resulting from the climate benefits due to anticipated methane and CO_2 reductions. Methane is a potent GHG that, once emitted into the atmosphere, absorbs terrestrial infrared radiation that contributes to increased global warming and continuing climate change. Methane reacts in the atmosphere to form tropospheric ozone and stratospheric water vapor, both of which also contribute to global warming. When accounting for the impacts of changing methane, tropospheric ozone, and stratospheric water vapor concentrations, the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report (2013) found that historical emissions of methane accounted for about 30 percent of the total current warming influence (radiative forcing) due to historical emissions of greenhouse gases. Methane is therefore a major contributor to the climate change impacts described in section III.B of this preamble. The remainder of this section discusses the methane reductions expected from this proposed rule and the associated monetized benefits.

As discussed in section IV of this preamble, this rulemaking proposes several changes to the Emission Guidelines for MSW landfills that would decrease methane emissions from this sector. Specifically, the proposed changes are expected to reduce methane emissions from all landfills annually by about 436,100 metric tons of methane.

We estimate the global social benefits of these methane emission reductions using estimates of the social cost of methane (SC-CH_4), a metric that estimates the monetary value of impacts associated with marginal changes in methane emissions in a given year. The SC-CH_4 estimates applied in this analysis were developed by Marten et al. (2014) and are discussed in greater detail below.

A similar metric, the social cost of CO_2 (SC-CO_2), provides important context for understanding the Marten et al. SC-CH_4 estimates.[85] The SC-CO_2 is a metric that estimates the monetary value of impacts associated with marginal changes in CO_2 emissions in a given year. It includes a wide range of anticipated climate impacts, such as net changes in agricultural productivity and human health, property damage from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. Estimates of the SC-CO_2 have been used by the EPA and other federal agencies to value the impacts of CO_2 emissions changes in benefit cost analysis for GHG-related rulemakings since 2008.

The SC-CO_2 estimates were developed over many years, using the best science available, and with input from the public. Specifically, an interagency working group (IWG) that included the EPA and other executive branch agencies and offices used three integrated assessment models (IAMs) to develop the SC-CO_2 estimates and recommended four global values for use in regulatory analyses. The SC-CO_2 estimates were first released in February 2010 and updated in 2013 using new versions of each IAM.

The 2010 SC-CO_2 Technical Support Document (TSD) provides a complete discussion of the methods used to develop these estimates and the current SC-CO_2 TSD presents and discusses the 2013 update (including recent minor technical corrections to the estimates).[86]

The SC-CO_2 TSDs discuss a number of limitations to the SC-CO_2 analysis, including the incomplete way in which the IAMs capture catastrophic and non-catastrophic impacts, their incomplete treatment of adaptation and technological change, uncertainty in the

[85] Previous analyses have commonly referred to the social cost of carbon dioxide emissions as the social cost of carbon or SCC. To more easily facilitate the inclusion of non-CO_2 GHGs in the discussion and analysis the more specific SC-CO_2 nomenclature is used to refer to the social cost of CO_2 emissions.

[86] Both the 2010 SC-CO_2 TSD and the current TSD are available at: *https://www.whitehouse.gov/omb/oira/social-cost-of-carbon.*

extrapolation of damages to high temperatures, and assumptions regarding risk aversion. Current IAMs do not assign value to all of the important physical, ecological, and economic impacts of climate change recognized in the climate change literature due to a lack of precise information on the nature of damages and because the science incorporated into these models understandably lags behind the most recent research. Nonetheless, these estimates and the discussion of their limitations represent the best available information about the social benefits of CO_2 reductions to inform benefit-cost analysis. The EPA and other agencies continue to engage in research on modeling and valuation of climate impacts with the goal to improve these estimates, and continue to consider feedback on the SC-CO_2 estimates from stakeholders through a range of channels, including public comments received on Agency rulemakings, a separate recent OMB public comment solicitation, and through regular interactions with stakeholders and research analysts implementing the SC-CO_2 methodology. See the docketed Regulatory Impacts Analysis (RIA) for additional details.

A challenge particularly relevant to this proposal is that the IWG did not estimate the social costs of non-CO_2 GHG emissions at the time the SC-CO_2 estimates were developed. In addition, the directly modeled estimates of the social costs of non-CO_2 GHG emissions previously found in the published literature were few in number and varied considerably in terms of the models and input assumptions they employed [87] (EPA 2012). As a result, benefit-cost analyses informing U.S. federal rulemakings to date have not fully considered the monetized benefits associated with CH_4 emissions mitigation. To understand the potential importance of monetizing non-CO_2 GHG emissions changes, the EPA has conducted sensitivity analysis in some of its past regulatory analyses using an estimate of the GWP of CH_4 to convert emission impacts to CO_2 equivalents, which can then be valued using the SC-CO_2 estimates. This approach approximates the social cost of methane (SC-CH_4) using estimates of the SC-CO_2 and the GWP of CH_4.

The published literature documents a variety of reasons that directly modeled estimates of SC-CH_4 are an analytical improvement over the estimates from the GWP approximation approach. Specifically, several recent studies found that GWP-weighted benefit estimates for CH_4 are likely to be lower than the estimates derived using directly modeled social cost estimates for these gases.[88] The GWP reflects only the relative integrated radiative forcing of a gas over 100 years in comparison to CO_2. The directly modeled social cost estimates differ from the GWP-scaled SC-CO_2 because the relative differences in timing and magnitude of the warming between gases are explicitly modeled, the non-linear effects of temperature change on economic damages are included, and rather than treating all impacts over a hundred years equally, the modeled damages over the time horizon considered (2300 in this case) are discounted to present value terms. A detailed discussion of the limitations of the GWP approach can be found in the RIA.

In general, the commenters on previous rulemakings strongly encouraged the EPA to incorporate the monetized value of non-CO_2 GHG impacts into the benefit cost analysis. However they noted the challenges associated with the GWP approach, as discussed above, and encouraged the use of directly modeled estimates of the SC-CH_4 to overcome those challenges.

Since these previous rulemakings, a paper by Marten et al. (2014) has provided the first set of published SC-CH_4 and social cost of nitrous oxide (SC-N_2O) estimates in the peer-reviewed literature that are consistent with the modeling assumptions underlying the SC-CO_2 estimates.[89] Specifically, the estimation approach of Marten et al. used the same set of three IAMs, five socioeconomic-emissions scenarios, equilibrium climate sensitivity distribution, three constant discount rates, and aggregation approach used to develop the SC-CO_2 estimates.

The SC-CH_4 estimates from Marten, et al. (2014) are presented in Table 7 of this preamble. More detailed discussion of the methodology, results, and a comparison to other published estimates can be found in the RIA and in Marten, et al.

TABLE 7—SOCIAL COST OF CH_4, 2012–2050 [a]

[In 2012$ per metric ton; (Source: Marten et al., 2014 [b])]

Year	SC-CH_4			
	5% Average	3% Average	2.5% Average	3% 95th percentile
2012	$430	$1000	$1400	$2800
2015	490	1100	1500	3000
2020	580	1300	1700	3500
2025	700	1500	1900	4000
2030	820	1700	2200	4500
2035	970	1900	2500	5300
2040	1100	2200	2800	5900
2045	1300	2500	3000	6600
2050	1400	2700	3300	7200

[a] The values are emissions-year specific. Estimates using several discount rates are included because the literature shows that estimates of the SC-CO_2 (and SC-CH_4) are sensitive to assumptions about the discount rate, and because no consensus exists on the appropriate rate to use in an intergenerational context (where costs and benefits are incurred by different generations). The fourth value is the 95th percentile of the SC-CH_4 estimates across three models using a 3 percent discount rate. It is included to represent higher-than-expected impacts from temperature change further out in the tails of the SC-CH_4 distribution.

[b] The estimates in this table have been adjusted to reflect the recent minor technical corrections to the SC-CO_2 estimates described above. See the RIA for more details.

[87] U.S. EPA. 2012. Regulatory Impact Analysis Final New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry. Office of Air Quality Planning and Standards, Health and Environmental Impacts Division. April. *http://www.epa.gov/ttn/ecas/regdata/RIAs/oil_natural_gas_final_neshap_nsps_ria.pdf.* Accessed March 30, 2015.

[88] See Waldhoff et al (2011); Marten and Newbold (2012); and Marten et al. (2014).

[89] Marten, A.L., E.A. Kopits, C.W. Griffiths, S.C. Newbold & A. Wolverton (2014). Incremental CH_4 and N_2O mitigation benefits consistent with the U.S. Government's SC-CO_2 estimates, Climate Policy, DOI: 10.1080/14693062.2014.912981.

The application of these directly modeled SC-CH_4 estimates from Marten *et al.* (2014) in a benefit-cost analysis of a regulatory action is analogous to the use of the SC-CO_2 estimates. In addition, the limitations for the SC-CO_2 estimates discussed above likewise apply to the SC-CH_4 estimates, given the consistency in the methodology.

The EPA recently conducted a peer review of the application of the Marten, et al. (2014) non-CO_2 social cost estimates in regulatory analysis and received responses that supported this application. See the RIA for a detailed discussion.

In light of the favorable peer review and past comments urging the EPA to value non-CO_2 GHG impacts in its rulemakings, the agency has used the Marten et al. (2014) SC-CH_4 estimates to value methane impacts expected from this proposed rulemaking and has included those benefits in the main benefits analysis. The EPA seeks comments on the use of these directly modeled estimates, from the peer-reviewed literature, for the social cost of non-CO_2 GHGs in this rulemaking.

The CH_4 benefits based on Marten *et al.* (2014) are presented for the year 2025. Applying this approach to the methane reductions estimated for this proposal, the 2025 methane benefits vary by discount rate and range from about $310 million to approximately $1.7 billion; the mean SC-CH_4 at the 3-percent discount rate results in an estimate of about $660 million in 2025, as presented in Table 8 of this preamble.

TABLE 8—ESTIMATED GLOBAL BENEFITS OF CH_4 REDUCTIONS IN 2025

[In millions, 2012$]

Million metric tons CH_4	Discount rate and statistic			
	5% Average	3% Average	2.5% Average	3% 95th percentile
0.44	$310	$660	$850	$1,700

The vast majority of this proposal's climate-related benefits are associated with methane reductions. Additional climate-related benefits are expected from the proposal's secondary air impacts, specifically, a net reduction in CO_2 emissions. Monetizing the net CO_2 reductions with the SC-CO_2 estimates described in this section yields benefits of $12 million in the year 2025 (average SC-CO_2, 3 percent discount rate). See the RIA for more details.

In addition to the limitation discussed above, and the referenced documents, there are additional impacts of individual GHGs that are not currently captured in the IAMs used in the directly modeled approach of Marten et al. (2014), and therefore not quantified for the rule. For example, the NMOC portion of LFG can contain a variety of air pollutants, including VOC and various organic HAP. VOC emissions are precursors to both $PM_{2.5}$ and ozone formation, while methane is a GHG and a precursor to global ozone formation. These pollutants are associated with substantial health effects, welfare effects, and climate effects, which are discussed in section III.B of this preamble. The ozone generated by methane, has important non-climate impacts on agriculture, ecosystems, and human health. The RIA describes the specific impacts of methane as an ozone precursor in more detail and discusses studies that have estimated monetized benefits of these methane generated ozone effects. The EPA continues to monitor developments in this area of research and seeks comment on the potential inclusion of health impacts of ozone generated by methane in future regulatory analysis.

Finally, this proposal is also expected to result in improvements in air quality and resulting benefits to human health. With the data available, we are not able to provide health benefit estimates for the reduction in exposure to HAP, ozone, and $PM_{2.5}$ for this rule. This is not to imply that there are no benefits of the rules; rather, it is a reflection of the difficulties in modeling the direct and indirect impacts of the reductions in emissions for this sector with the data currently available.[90] In addition to health improvements, there will be improvements in visibility effects, ecosystem effects, and climate effects.

Although we do not have sufficient information or modeling available to provide quantitative estimates of the health benefits associated with HAP, ozone, and $PM_{2.5}$ reductions, we include a qualitative assessment of the health effects associated with exposure to HAP, ozone, and $PM_{2.5}$ in the RIA for this rule. These qualitative impact assessments are briefly summarized in section III.B of this preamble, but for more detailed information, please refer to the RIA, which is available in the docket.

[90] Previous studies have estimated the monetized benefits-per-ton of reducing VOC emissions associated with the effect that those emissions have on ambient $PM_{2.5}$ levels and the health effects associated with $PM_{2.5}$ exposure (Fann, Fulcher, and Hubbell, 2009). While these ranges of benefit-per-ton estimates can provide useful context, the geographic distribution of VOC emissions from the MSW landfills sector are not consistent with emissions modeled in Fann, Fulcher, and Hubbell (2009). In addition, the benefit-per-ton estimates for VOC emission reductions in that study are derived from total VOC emissions across all sectors. Coupled with the larger uncertainties about the relationship between VOC emissions and $PM_{2.5}$ and the highly localized nature of air quality responses associated with HAP and VOC reductions, these factors lead us to conclude that the available VOC benefit-per-ton estimates are not appropriate to calculate monetized benefits of these rules, even as a bounding exercise.

XII. Statutory and Executive Order Reviews

Additional information about these statues and Executive Orders can be found at *http://www2.epa.gov/laws-regulations/laws-and-executive-orders.*

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

This action is an economically significant regulatory action that was submitted to OMB for review. Any changes made in response to OMB recommendations have been documented in the docket. The EPA prepared an economic analysis of the potential costs and benefits associated with the proposed Emission Guidelines. The analysis is documented in the RIA, which is available in docket EPA–HQ–OAR–2014–0451 and is briefly summarized in section V.E of this preamble.

B. Paperwork Reduction Act

The information collection requirements in the proposed Emission Guidelines have been submitted for approval to OMB under the PRA. The Information Collection Request (ICR) document that the EPA prepared for the proposed Emission Guidelines has been assigned EPA ICR number [2522.01]. You can find a copy of the ICR in the

docket for this rule, and it is briefly summarized here.

The information required to be collected is necessary to identify the regulated entities subject to the proposed rule and to ensure their compliance with the proposed Emission Guidelines. The recordkeeping and reporting requirements are mandatory and are being established under authority of CAA section 114 (42 U.S.C. 7414). All information other than emissions data submitted as part of a report to the agency for which a claim of confidentiality is made will be safeguarded according to CAA section 114(c) and the EPA's implementing regulations at 40 CFR part 2, subpart B.

Respondents/affected entities: MSW landfills that accepted waste after November 8, 1987 and commenced construction, reconstruction, or modification on or before July 17, 2014.

Respondent's obligation to respond: Mandatory (40 CFR part 60, subpart Cf).

Estimated number of respondents: 989 MSW landfills.

Frequency of response: Initially, occasionally and annually.

Total estimated burden: 621,947 hours (per year) for the responding facilities and 16,054 hours (per year) for the agency. These are estimates for the average annual burden for the first 3 years after the rule is final. Burden is defined at 5 CFR 1320.3(b).

Total estimated cost: $41,755,793 (per year), which includes annualized capital or operation and maintenance costs, for the responding facilities and $1,029,658 (per year) for the agency. These are estimates for the average annual cost for the first 3 years after the rule is final.

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

Submit your comments on the agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the EPA using the docket identified at the beginning of this rule. You may also send your ICR-related comments to OMB's Office of Information and Regulatory Affairs via email to *oira_submissions@omb.eop.gov*, Attention: Desk Officer for the EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after receipt, OMB must receive comments no later than September 28, 2015. The EPA will respond to any ICR-related comments in the final rule.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. This action will not impose any requirements on small entities. Specifically, Emission Guidelines established under CAA section 111(d) do not impose any requirements on regulated entities and, thus, will not have a significant economic impact upon a substantial number of small entities. After Emission Guidelines are promulgated, states and U.S. territories establish standards on existing sources, and it is those state requirements that could potentially impact small entities.

Our analysis here is consistent with the analysis of the analogous situation arising when the EPA establishes National Ambient Air Quality Standards (NAAQS), which do not impose any requirements on regulated entities. As here, any impact of a NAAQS on small entities would only arise when states take subsequent action to maintain and/or achieve the NAAQS through their state implementation plans. See American Trucking Assoc. v. EPA, 175 F.3d 1029, 1043–45 (D.C. Cir. 1999) (NAAQS do not have significant impacts upon small entities because NAAQS themselves impose no regulations upon small entities).

Nevertheless, the EPA is aware that there is substantial interest in the rule among small entities. The EPA has conducted stakeholder outreach as detailed in section XI.C and XI.E of the preamble to the proposed Standards of Performance for MSW Landfills (79 FR 41828–41829; July 17, 2014) and in sections XII.D and XII.E of this preamble. The EPA convened a Small Business Advocacy Review (SBAR) Panel in 2013 for the landfills rulemaking. The EPA originally planned a review of the Emission Guidelines and NSPS in one action, but the actions were subsequently divided into separate rulemakings. The SBAR Panel evaluated the assembled materials and small-entity comments on issues related to the rule's potential effects and significant alternative regulatory approaches. A copy of the Summary of Small Entity Outreach is available in the rulemaking docket EPA–HQ–OAR–2014–0451. While formulating the provisions of the rule, the EPA considered the input provided over the course of the stakeholder outreach as well as the input provided in the many public comments, and we have incorporated many of the suggestions in this proposal.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain any unfunded mandate of $100 million or more as described in UMRA, 2 U.S.C. 1531–1538. The proposed Emission Guidelines apply to landfills that were constructed, modified, or reconstructed after November 8, 1987, and that commenced construction, reconstruction, or modification on or before July 17, 2014. Impacts resulting from the proposed Emission Guidelines are below the applicable threshold.

We note however, that the proposed Emission Guidelines may significantly or uniquely affect small governments because small governments operate landfills. The EPA consulted with small governments concerning the regulatory requirements that might significantly or uniquely affect them. In developing this rule, the EPA consulted with small governments pursuant to a plan established under section 203 of the UMRA to address impacts of regulatory requirements in the rule that might significantly or uniquely affect small governments. The EPA also held meetings as discussed in section XII.E of this preamble under Federalism consultations.

E. Executive Order 13132: Federalism

The EPA has concluded that the proposed Emission Guidelines have federalism implications, because the rule imposes substantial direct compliance costs on state or local governments, and the federal government will not provide the funds necessary to pay those costs.

The EPA conducted a Federalism Consultation Outreach Meeting on September 10, 2013. Due to interest in that meeting, additional outreach meetings were held on November 7, 2013 and November 14, 2013. With the pending proposal of these Emission Guidelines, an additional Federalism outreach meeting was conducted on April 15, 2015. Participants included the National Governors' Association, the National Conference of State Legislatures, the Council of State Governments, the National League of Cities, the U.S. Conference of Mayors, the National Association of Counties, the International City/County Management Association, the National Association of Towns and Townships, the County Executives of America, the Environmental Council of States, National Association of Clean Air Agencies, Association of State and Territorial Solid Waste Management Officials, environmental agency representatives from 43 states, and

approximately 60 representatives from city and county governments. Concerns raised during the consultations include: Implementation concerns associated with shortening of gas collection system installation and/or expansion timeframes, concerns regarding significant lowering of the design capacity or emission thresholds, the need for clarifications associated with wellhead operating parameters and the need for consistent, clear and rigorous surface monitoring requirements.

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

This action has tribal implications. However, it will neither impose substantial direct compliance costs on federally recognized tribal governments, nor preempt tribal law. The database used to estimate impacts of the proposed 40 CFR part 60, subpart Cf identified one tribe, the Salt River Pima-Maricopa Indian Community, which owns three landfills potentially subject to the proposed Emission Guidelines. One of these landfills is open, the Salt River Landfill, and is already controlling emissions under the current NSPS/EG framework, so while subject to this subpart, the costs of this proposal are not substantial. The two other landfills are closed and anticipated to meet the definition of the closed landfill subcategory. One of the closed landfills, the Tri Cities Landfill, is already controlling emissions under the current NSPS/EG framework and will not incur substantial additional compliance costs under Cf. The other landfill, North Center Street Landfill, is not estimated to install controls under the current NSPS/EG framework.

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

The EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that the EPA has reason to believe may disproportionately affect children, per the definition of ''covered regulatory action'' in section 2–202 of the Executive Order. The proposed Emission Guidelines are not subject to Executive Order 13045 because they do not concern an environmental health risk or safety risk. We also note that the methane and NMOC reductions expected from the proposed Emission Guidelines will have positive health effects including for children as previously discussed in section XII.G of this preamble.

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

This action is not a ''significant energy action'' because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Further, we have concluded that the proposed Emission Guidelines are not likely to have any adverse energy effects because the energy demanded to operate these control systems will be offset by additional energy supply from landfill gas energy projects.

I. National Technology Transfer and Advancement Act

The proposed Emission Guidelines involve technical standards. For the proposed Emission Guidelines, the EPA has decided to use EPA Methods 2, 2E, 3, 3A, 3C, 21, 25, 25A, and 25C of 40 CFR part 60, appendix A. While the EPA identified 10 VCS as being potentially applicable (ANSI/ASME PTC 19–10–1981 Part 10, ASME B133.9–1994 (2001), ISO 10396:1993 (2007), ISO 12039:2001, ASTM D5835–95 (2013), ASTM D6522–11, CAN/CSA Z223.2–M86 (1999), ASTM D6060–96 (2009), ISO 14965:2000(E), EN 12619(1999)), the agency decided not to use these methods. The EPA determined that the 10 candidate VCS identified for measuring emissions of pollutants or their surrogates subject to emission standards in the rule would not be practical due to lack of equivalency, documentation, validation data, and other important technical and policy considerations. The agency identified no such standards for Methods 2E, 21, and 25C. The EPA's review, including review of comments for these 10 methods, is documented in the memorandum, ''Voluntary Consensus Standard Results for Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills'' in the docket for this rulemaking (EPA–HQ–OAR–2014–0451).

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

The EPA believes the human health or environmental risk addressed by the proposed Emission Guidelines will not have potential disproportionately high and adverse human health or environmental effects on minority, low-income, or indigenous populations because the proposed subpart would reduce emissions of landfill gas, which contains both nonmethane organic compounds and methane. These avoided emissions will improve air quality and reduce public health and welfare effects associated with exposure to landfill gas emissions. The results of the proximity analysis conducted for the proposed Emission Guidelines are located in the April 22, 2015 document entitled, ''2015 Environmental Justice Screening Report for Municipal Solid Waste Landfills,'' a copy of which is available in the docket (Docket ID No. EPA–HQ–OAR–2003–0215).

List of Subjects in 40 CFR Part 60

Environmental protection, Administrative practice and procedure, Air pollution control, Reporting and recordkeeping requirements.

Dated: August 14, 2015.

Gina McCarthy,

Administrator.

For the reasons set forth in the preamble, the EPA proposes to amend 40 CFR part 60 as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

■ 1. The authority citation for part 60 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

■ 2. Part 60 is amended by adding Subpart Cf to read as follows:

Subpart Cf—Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills

Sec

Subpart Cf—Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills

§ 60.30f Scope and delegated authorities.

This subpart establishes Emission Guidelines and compliance times for the control of designated pollutants from certain designated municipal solid waste (MSW) landfills in accordance with section 111(d) of the Clean Air Act and subpart B of this part.

(a) If you are the Administrator of an air quality program in a State or United States protectorate with one or more existing MSW landfills that commenced construction, modification, or

reconstruction on or before July 17, 2014, you must submit a State plan to the U.S. Environmental Protection Agency (EPA) that implements the Emission Guidelines contained in this subpart. The requirements for State plans are specified in subpart B of this part.

(b) You must submit a State plan to EPA by [date 9 months after the final rule is published in the **Federal Register**].

(c) The following authorities will not be delegated to state, local, or tribal agencies:

(1) Approval of alternative methods to determine the NMOC concentration or a site-specific methane generation rate constant (k).

(2) [Reserved]

§ 60.31f Designated facilities.

(a) The designated facility to which these Emission Guidelines apply is each existing MSW landfill for which construction, reconstruction, or modification was commenced on or before July 17, 2014.

(b) Physical or operational changes made to an existing MSW landfill solely to comply with an emission guideline are not considered a modification or reconstruction and would not subject an existing MSW landfill to the requirements of a standard of performance for new MSW landfills.

(c) For purposes of obtaining an operating permit under title V of the Clean Air Act, the owner or operator of an MSW landfill subject to this subpart with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters is not subject to the requirement to obtain an operating permit for the landfill under part 70 or 71 of this chapter, unless the landfill is otherwise subject to either part 70 or 71. For purposes of submitting a timely application for an operating permit under part 70 or 71, the owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters on the effective date of EPA approval of the State's program under section 111(d) of the Clean Air Act, and not otherwise subject to either part 70 or 71, becomes subject to the requirements of §§ 70.5(a)(1)(i) or 71.5(a)(1)(i) of this chapter 90 days after the effective date of such section 111(d) program approval, even if the design capacity report is submitted earlier.

(d) When an MSW landfill subject to this subpart is closed as defined in this subpart, the owner or operator is no longer subject to the requirement to maintain an operating permit under part 70 or 71 of this chapter for the landfill if the landfill is not otherwise subject to the requirements of either part 70 or 71 and if either of the following conditions are met:

(1) The landfill was never subject to the requirement to install and operate a gas collection and control system under § 60.33f; or

(2) The landfill meets the conditions for control system removal specified in § 60.33f(f).

(e) When an MSW landfill subject to this subpart is in the closed landfill subcategory, the owner or operator is not subject to the following reports of this subpart, provided the owner or operator submitted these reports under the provisions of 40 CFR part 60, subpart WWW; 40 CFR part 62, subpart GGG; or a state plan implementing 40 CFR part 60, subpart Cc on or before August 27, 2015:

(1) Initial design capacity report specified in §§ 60.33f(d) and 60.38f(a)

(2) Initial or subsequent NMOC emission rate report specified in §§ 60.33f(e) and 60.38f(c), provided that the most recent NMOC emission rate report indicated the NMOC emissions were below 50 Mg/yr.

(3) Collection and control system design plan specified in § 60.38f(d).

(4) Closure report specified in § 60.38f(f).

(5) Equipment removal specified in § 60.38f(g).

(6) Initial annual report specified in § 60.38f(h).

(7) Initial performance test report in § 60.38f(i).

§ 60.32f Compliance times.

Planning, awarding of contracts, installing, and starting up MSW landfill air emission collection and control equipment that is capable of meeting the Emission Guidelines under § 60.33f must be completed within 30 months after the date an NMOC emission rate report shows NMOC emissions equal or exceed 34 megagrams per year (50 megagrams per year for the closed landfill subcategory) or within 30 months after the date Tier 4 surface emissions monitoring shows a surface emission concentration of 500 parts per million methane or greater.

§ 60.33f Emission Guidelines for municipal solid waste landfill emissions.

(a) *Landfills.* For approval, a State plan must require each owner or operator of an MSW landfill having a design capacity greater than or equal to 2.5 million megagrams by mass and 2.5 million cubic meters by volume to collect and control MSW landfill emissions at each MSW landfill that meets the following conditions:

(1) The landfill has accepted waste at any time since November 8, 1987, or has additional design capacity available for future waste deposition.

(2) The landfill commenced construction, reconstruction, or modification on or before July 17, 2014.

(3) The landfill has an NMOC emission rate greater than or equal to 34 megagrams per year or the Tier 4 surface emissions report shows a surface emission concentration of 500 parts per million methane or greater.

(4) A landfill in the closed landfill subcategory that has an NMOC emission rate greater than or equal to 50 megagrams per year or the Tier 4 surface emissions report shows a surface emission concentration of 500 parts per million methane or greater.

(b) *Collection system.* For approval, a State plan must include provisions for the installation of a collection and control system meeting the requirements in paragraphs (b)(1) through (3) and (c) of this section at each MSW landfill meeting the conditions in paragraph (a) of this section.

(1) Install and start up a collection and control system that captures the gas generated within the landfill within 30 months after:

(i) The first annual report in which the emission rate equals or exceeds 34 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the emission rate is less than 34 megagrams per year, as specified in § 60.38f(c)(5)(i) or (ii),

(ii) The emission rate at a landfill in the closed landfill subcategory equals or exceeds 50 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the emission rate is less than 50 megagrams per year, as specified in § 60.38f(c)(5)(iv)(A) or (B), or

(iii) The Tier 4 surface emissions report shows that surface methane emissions are below 500 parts per million methane for four consecutive quarters, as specified in § 60.38f(c)(5)(iii).

(2) An active collection system must:

(i) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment.

(ii) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade.

(iii) Collect gas at a sufficient extraction rate.

(iv) Be designed to minimize offsite migration of subsurface gas.

(3) A passive collection system must:

(i) Comply with the provisions specified in paragraphs (b)(2)(i), (ii), and (iv) of this section.

(ii) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required under § 258.40.

(c) *Control system.* For approval, a State plan must include provisions for the control of the gas collected from within the landfill through the use of control devices meeting the following requirements, except as provided in § 60.24.

(1) A non-enclosed flare designed and operated in accordance with the parameters established in § 60.18 except as noted in § 60.37f(c); or

(2) A control system designed and operated to reduce NMOC by 98 weight percent; or when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen or less. The reduction efficiency or concentration in parts per million by volume must be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in § 60.35f(d). The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this subpart.

(i) If a boiler or process heater is used as the control device, the landfill gas stream must be introduced into the flame zone.

(ii) The control device must be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in § 60.37f.

(iii) For the closed landfill subcategory, the initial or most recent performance test conducted to comply with 40 CFR part 60, subpart WWW; 40 CFR part 62, subpart GGG; or a state plan implementing subpart Cc of this part on or before August 27, 2015 is sufficient for compliance with this subpart.

(3) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or beneficial use such as fuel for combustion, production of vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process. Venting of treated landfill gas to the ambient air or combustion in a flare is not allowed under this option. (If flares are used, they must meet the requirements in paragraphs (c)(1) or (2) of this section.)

(4) All emissions from any atmospheric vent from the gas treatment system are subject to the requirements of paragraph (b) or (c) of this section. For purposes of this subpart, atmospheric vents located on the condensate storage tank are not part of the treatment system and are exempt from the requirements of paragraph (b) or (c) of this section.

(d) *Design capacity.* For approval, a State plan must require each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume to submit an initial design capacity report to the Administrator as provided in § 60.38f(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions must be documented and submitted with the report. Submittal of the initial design capacity report fulfills the requirements of this subpart except as provided in paragraphs (d)(1) and (2) of this section.

(1) The owner or operator must submit an amended design capacity report as provided in § 60.38f(b). [Guidance: Note that if the design capacity increase is the result of a modification, as defined in this subpart, that was commenced after July 17, 2014, the landfill will become subject to subpart XXX of this part instead of this subpart. If the design capacity increase is the result of a change in operating practices, density, or some other change that is not a modification as defined in this subpart, then the landfill remains subject to this subpart.]

(2) When an increase in the maximum design capacity of a landfill with an initial design capacity less than 2.5 million megagrams or 2.5 million cubic meters results in a revised maximum design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, the owner or operator must comply with paragraph (e) of this section.

(e) *Emissions.* For approval, a State plan must require each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters to either install a collection and control system as provided in paragraphs (b) and (c) of this section or calculate an initial NMOC emission rate for the landfill using the procedures specified in § 60.35f(a). The NMOC emission rate must be recalculated annually, except as provided in § 60.38f(c)(3).

(1) If the calculated NMOC emission rate is less than 34 megagrams per year, the owner or operator must:

(i) Submit an annual NMOC emission rate report according to § 60.38f(c); and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in § 60.35f(a) until such time as the calculated NMOC emission rate is equal to or greater than 34 megagrams per year, or the landfill is closed.

(A) If the NMOC emission rate, upon initial calculation or annual recalculation, is equal to or greater than 34 megagrams per year, the owner or operator must either: submit a gas collection and control system design plan as specified in § 60.38f(d) and install a collection and control system as provided in paragraphs (b) and (c) of this section; calculate NMOC emissions using the next higher tier in § 60.35f; or conduct a surface emission monitoring demonstration using the procedures specified in § 60.35f(a)(6).

(B) If the landfill is permanently closed, a closure report must be submitted to the Administrator as provided in § 60.38f(f), except for exemptions allowed under § 60.31f(e)(4).

(C) For the closed landfill subcategory, if the most recently calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator must either: submit a gas collection and control system design plan as specified in § 60.38f(d), except for exemptions allowed under 60.31f(e)(3), and install a collection and control system as provided in paragraphs (b) and (c) of this section; calculate NMOC emissions using the next higher tier in § 60.35f; or conduct a surface emission monitoring demonstration using the procedures specified in § 60.35f(a)(6).

(2) If the calculated NMOC emission rate is equal to or greater than 34 megagrams per year using Tier 1, 2, or 3 procedures, the owner or operator must either: submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year as specified in § 60.38f(d); calculate NMOC emissions using a higher tier in § 60.35f; or conduct a surface emission monitoring demonstration using the procedures specified in § 60.35f(a)(6).

(3) For the closed landfill subcategory, if the calculated NMOC emission rate is equal to or greater than 50 megagrams per year using Tier 1, 2, or 3 procedures,

the owner or operator must either: submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year as specified in § 60.38f(d), except for exemptions allowed under 60.31f(e)(3); calculate NMOC emissions using a higher tier in § 60.35f; or conduct a surface emission monitoring demonstration using the procedures specified in § 60.35f(a)(6).

(f) *Removal criteria.* The collection and control system may be capped or removed if the criteria in paragraph (f)(1), (f)(2), and either (f)(3), (f)(4), or (f)(5) of this section are met:

(1) The landfill is closed or an area of an open landfill is closed as defined in § 60.41f. A closure report must be submitted to the Administrator as provided in § 60.38f(f);

(2) The collection and control system must have been in operation a minimum of 15 years or the landfill owner or operator must demonstrate that the GCCS will be unable to operate for 15 years due to declining gas flow; and

(3) The landfill or closed area demonstrates for four consecutive quarters that there are no surface emissions of 500 parts per million or greater as determined using procedures specified in § 60.36f(d);

(4) Following the procedures specified in § 60.35f(b), the calculated NMOC emission rate at the landfill must be less than 34 megagrams per year on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart; or

(5) For the closed landfill subcategory, following the procedures specified in § 60.35f(b), the calculated NMOC emission rate at the landfill must be less than 50 megagrams per year on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart.

§ 60.34f Operational standards.

For approval, a State plan must include provisions for the operational standards in this section for an MSW landfill with a gas collection and control system used to comply with the provisions of § 60.33f(b) and (c). Each owner or operator of an MSW landfill with a gas collection and control system used to comply with the provisions of § 60.33f(b) must:

(a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade;

(b) Operate the collection system with negative pressure at each wellhead except under the following conditions:

(1) A fire or increased well temperature. The owner or operator must record instances when positive pressure occurs in efforts to avoid a fire. These records must be submitted with the annual reports as provided in § 60.38f(h)(1);

(2) Use of a geomembrane or synthetic cover. The owner or operator must develop acceptable pressure limits in the design plan;

(3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes must be approved by the Administrator as specified in § 60.38f(d);

(c) [Reserved]

(d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator must conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at no more than 30-meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations. Thus, the owner or operator must monitor any openings that are within an area of the landfill where waste has been placed and a gas collection system is required. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan must be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30-meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with § 60.33f(c). In the event the collection or control system is not operating, the gas mover system must be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere must be closed within 1 hour; and

(f) Operate the control system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirements in paragraphs (b) or (d) of this section are not met, corrective action must be taken as specified in § 60.36f(a)(3) through (4) or § 60.36f(c). If corrective actions are taken as specified in § 60.36f, the monitored exceedance is not a violation of the operational requirements in this section.

§ 60.35f Test methods and procedures.

For approval, a State plan must include provisions in this section to calculate the landfill NMOC emission rate or to conduct a surface emission monitoring demonstration.

(a)(1) The landfill owner or operator must calculate the NMOC emission rate using either the equation provided in paragraph (a)(1)(i) of this section or the equation provided in paragraph (a)(1)(ii) of this section. Both equations may be used if the actual year-to-year solid waste acceptance rate is known, as specified in paragraph (a)(1)(i) of this section, for part of the life of the landfill and the actual year-to-year solid waste acceptance rate is unknown, as specified in paragraph (a)(1)(ii) of this section, for part of the life of the landfill. The values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for Lo, and 4,000 parts per million by volume as hexane for the CNMOC. For landfills located in geographical areas with a 30-year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorologic site, the k value to be used is 0.02 per year.

(i)(A) The following equation must be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{NMOC} = \sum_{i=1}^{n} 2\,k\,L_o M_i (e^{-kt_i})(C_{NMOC})(3.6\,x\,10^{-9})$$

Where:

M_{NMOC} = Total NMOC emission rate from the landfill, megagrams per year.

k = Methane generation rate constant, year -1.

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of solid waste in the ith section, megagrams.

t_i = Age of the ith section, years.

CNMOC = Concentration of NMOC, parts per million by volume as hexane.
$3.6 \times 10 - 9$ = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for Mi if documentation of the nature and amount of such wastes is maintained.

(ii)(A) The following equation must be used if the actual year-to-year solid waste acceptance rate is unknown.

$M_{NMOC} = 2L_oR (e - kc - e - kt) C_{NMOC}(3.6 \times 10 - 9)$

Where:

M_{NMOC} = Mass emission rate of NMOC, megagrams per year.
L_o = Methane generation potential, cubic meters per megagram solid waste.
R = Average annual acceptance rate, megagrams per year.
k = Methane generation rate constant, year $- 1$.
t = Age of landfill, years.
C_{NMOC} = Concentration of NMOC, parts per million by volume as hexane.
c = Time since closure, years; for an active landfill c = 0 and $e - kc = 1$.
$3.6 \times 10 - 9$ = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value of R, if documentation of the nature and amount of such wastes is maintained.

(2) *Tier 1.* The owner or operator must compare the calculated NMOC mass emission rate to the standard of 34 megagrams per year.

(i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 34 megagrams per year, then the owner or operator must submit an NMOC emission rate report according to § 60.38f(c), and must recalculate the NMOC mass emission rate annually as required under § 60.33f(e).

(ii) If the NMOC emission rate calculated in paragraph (a)(1) of this section is equal to or greater than 34 megagrams per year, then the landfill owner or operator must either:

(A) Submit a gas collection and control system design plan as specified in § 60.38f(d) within 1 year and install and operate a gas collection and control system according to § 60.33f(b) and (c) within 30 months;

(B) Determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the Tier 2 procedures provided in paragraph (a)(3) of this section;

(C) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the Tier 3 procedures provided in paragraph (a)(4) of this section; or

(D) Conduct a surface emission monitoring demonstration using the Tier 4 procedures specified in paragraph (a)(6) of this section.

(3) *Tier 2.* The landfill owner or operator must determine the site-specific NMOC concentration using the following sampling procedure. The landfill owner or operator must install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator must collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25 or 25C of appendix A of this part. Taking composite samples from different probes into a single cylinder is allowed; however, equal sample volumes must be taken from each probe. For each composite, the sampling rate, collection times, beginning and ending cylinder vacuums, or alternative volume measurements must be recorded to verify that composite volumes are equal. Composite sample volumes should not be less than one liter unless evidence can be provided to substantiate the accuracy of smaller volumes. Terminate compositing before the cylinder approaches ambient pressure where measurement accuracy diminishes. If more than the required number of samples is taken, all samples must be used in the analysis. The landfill owner or operator must divide the NMOC concentration from Method 25 or 25C of appendix A of this part by six to convert from CNMOC as carbon to CNMOC as hexane. If the landfill has an active or passive gas removal system in place, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active collection systems, samples may be collected from the common header pipe. The sample location on the common header pipe must be before any gas moving, condensate removal, or treatment system equipment. For active collection systems, a minimum of three samples must be collected from the header pipe.

(i) Within 60 days after the date of determining the NMOC concentration and corresponding NMOC emission rate, the owner or operator must submit the results according to § 60.38f(j).

(ii) The landfill owner or operator must recalculate the NMOC mass emission rate using the equations provided in paragraph (a)(1)(i) or (a)(1)(ii) of this section using the average site-specific NMOC concentration from the collected samples instead of the default value provided in paragraph (a)(1) of this section.

(iii) If the NMOC mass emission rate is less than 34 megagrams per year, then the owner or operator must submit an NMOC emission rate report according to § 60.38f(c), and must recalculate the NMOC mass emission rate annually as required under § 60.33f(e). The site-specific NMOC concentration must be retested every 5 years using the methods specified in this section.

(iv) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration is equal to or greater than 34 megagrams per year, the owner or operator must either:

(A) Submit a gas collection and control system design plan as specified in § 60.38f(d) within 1 year and install and operate a gas collection and control system according to § 60.33f(b) and (c) within 30 months;

(B) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the Tier 3 procedures specified in paragraph (a)(4) of this section; or

(C) Conduct a surface emission monitoring demonstration using the Tier 4 procedures specified in paragraph (a)(6) of this section.

(4) *Tier 3.* The site-specific methane generation rate constant must be determined using the procedures provided in Method 2E of appendix A of this part. The landfill owner or operator must estimate the NMOC mass emission rate using the equations in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using a site-specific methane generation rate constant, and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator must compare the resulting NMOC mass emission rate to the standard of 34 megagrams per year.

(i) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration and Tier 3 site-specific methane generation rate is equal to or greater than 34 megagrams per year, the owner or operator must either:

(A) Submit a gas collection and control system design plan as specified in § 60.38f(d) within 1 year and install and operate a gas collection and control

system according to § 60.33f(b) and (c) within 30 months; or

(B) Conduct a surface emission monitoring demonstration using the Tier 4 procedures specified in paragraph (a)(6) of this section.

(ii) If the NMOC mass emission rate is less than 34 megagrams per year, then the owner or operator must recalculate the NMOC mass emission rate annually using the equations in paragraph (a)(1) of this section and using the site-specific Tier 2 NMOC concentration and Tier 3 methane generation rate constant and submit a periodic emission rate report as provided in § 60.38f(c). The calculation of the methane generation rate constant is performed only once, and the value obtained from this test must be used in all subsequent annual NMOC emission rate calculations.

(5) The owner or operator may use other methods to determine the NMOC concentration or a site-specific methane generation rate constant as an alternative to the methods required in paragraphs (a)(3) and (a)(4) of this section if the method has been approved by the Administrator.

(6) *Tier 4.* The landfill owner or operator may demonstrate that surface methane emissions are below 500 parts per million by conducting surface emission monitoring on a quarterly basis using the following procedures.

(i) The owner or operator must measure surface concentrations of methane along the entire perimeter of the landfill and along a pattern that traverses the landfill at no more than 30-meter intervals using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (a)(6)(iv) of this section.

(ii) The background concentration must be determined by moving the probe inlet upwind and downwind at least 30 meters from the waste mass boundary of the landfill.

(iii) Surface emission monitoring must be performed in accordance with section 8.3.1 of Method 21 of appendix A of this part, except that the probe inlet must be placed within 5 to 10 centimeters of the landfill surface. Monitoring must be performed during typical meteorological conditions.

(A) Surface emission monitoring must be terminated when the average wind speed exceeds 5 miles per hour or the instantaneous wind speed exceeds 10 miles per hour. The Administrator may approve alternatives to this wind speed surface monitoring termination for landfills consistently having measured winds in excess of these specified limits. Average wind speed must be determined on a 15-minute average using an onsite anemometer with a continuous recorder for the entire duration of the monitoring event.

(B) Landfill surface areas where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover, and all cover penetrations must also be monitored using a device meeting the specifications provided in paragraph (a)(6)(iv) of this section.

(iv) Each owner or operator seeking to comply with the provisions in paragraph (a)(6) of this section must comply with the following instrumentation specifications and procedures for surface emission monitoring devices.

(A) The portable analyzer must meet the instrument specifications provided in section 3 of Method 21 of appendix A of this part, except that ''methane'' replaces all references to ''VOC''.

(B) The calibration gas is methane, diluted to a nominal concentration of 500 parts per million in air.

(C) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part must be used.

(D) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part must be followed immediately before commencing a surface monitoring survey.

(v) Each owner or operator seeking to comply with the Tier 4 provisions in paragraph (a)(6) of this section must maintain records of surface emission monitoring as provided in § 60.39f(g) and submit a Tier 4 surface emissions report as provided in § 60.38f(c)(5)(iii).

(vi) If there is any measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must submit a gas collection and control system design plan within 1 year of the first measured concentration of methane of 500 parts per million or greater from the surface of the landfill according to § 60.38f(d) and install and operate a gas collection and control system according to § 60.33f(b) and (c) within 30 months of the first measured concentration of methane of 500 parts per million or greater from the surface of the landfill.

(vii) If after four consecutive quarterly monitoring periods there is no measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must either conduct semi-annual surface emission monitoring using the methods specified in this section or recalculate the NMOC mass emission rate annually as provided in § 60.33f(e).

(A) If conducting semi-annual surface emissions monitoring and there is any measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must submit a gas collection and control system design plan within 1 year of the first measured concentration of methane of 500 parts per million or greater from the surface of the landfill according to § 60.38f(d) and install and operate a gas collection and control system according to § 60.33f(b) and (c) within 30 months of the first measured concentration of methane of 500 parts per million or greater from the surface of the landfill.

(B) [Reserved]

(b) After the installation and startup of a collection and control system in compliance with this subpart, the owner or operator must calculate the NMOC emission rate for purposes of determining when the system can be capped or removed as provided in § 60.33f(f), using the following equation:

$$M_{NMOC} = 1.89 \times 10 - 3Q_{LFG}C_{NMOC}$$

Where:

M_{NMOC} = Mass emission rate of NMOC, megagrams per year.

Q_{LFG} = Flow rate of landfill gas, cubic meters per minute.

C_{NMOC} = NMOC concentration, parts per million by volume as hexane.

(1) The flow rate of landfill gas, Q_{LFG}, must be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control system using a gas flow measuring device calibrated according to the provisions of section 4 of Method 2E of appendix A of this part.

(2) The average NMOC concentration, C_{NMOC}, must be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25 or Method 25C of appendix A of this part. The sample location on the common header pipe must be before any condensate removal or other gas refining units. The landfill owner or operator must divide the NMOC concentration from Method 25 or Method 25C of appendix A of this part by six to convert from CNMOC as carbon to C_{NMOC} as hexane.

(3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Administrator.

(i) Within 60 days after the date of calculating the NMOC emission rate for purposes of determining when the

system can be capped or removed, the owner or operator must submit the results according to § 60.38f(j).

(ii) [Reserved]

(c) When calculating emissions for Prevention of Significant Deterioration (PSD) purposes, the owner or operator of each MSW landfill subject to the provisions of this subpart must estimate the NMOC emission rate for comparison to the PSD major source and significance levels in §§ 51.166 or 52.21 of this chapter using Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources (AP–42) or other approved measurement procedures.

(d) For the performance test required in § 60.33f(c)(1), the net heating value of the combusted landfill gas as determined in § 60.18(f)(3) is calculated from the concentration of methane in the landfill gas as measured by Method 3C. A minimum of three 30-minute Method 3C samples are determined. The measurement of other organic components, hydrogen, and carbon monoxide is not applicable. Method 3C may be used to determine the landfill gas molecular weight for calculating the flare gas exit velocity under § 60.18(f)(4).

(1) Within 60 days after the date of completing each performance test (as defined in § 60.8), the owner or operator must submit the results of the performance tests required by § 60.35f(b) or (d), including any associated fuel analyses, according to § 60.38f(j).

(2) [Reserved]

(e) For the performance test required in § 60.33f(c)(2), Method 25 or 25C (Method 25C may be used at the inlet only) of appendix A of this part must be used to determine compliance with the 98 weight-percent efficiency or the 20 parts per million by volume outlet NMOC concentration level, unless another method to demonstrate compliance has been approved by the Administrator as provided by § 60.38f(d). Method 3 or 3A must be used to determine oxygen for correcting the NMOC concentration as hexane to 3 percent. In cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane), Method 25A should be used in place of Method 25. The following equation must be used to calculate efficiency:

Control Efficiency = ($NMOC_{in}$ − $NMOC_{out}$)/($NMOC_{in}$)

Where:

$NMOC_{in}$ = Mass of NMOC entering control device.

$NMOC_{out}$ = Mass of NMOC exiting control device.

(1) Within 60 days after the date of completing each performance test (as defined in § 60.8), the owner or operator must submit the results of the performance tests, including any associated fuel analyses, according to § 60.38f(j).

(2) [Reserved]

§ 60.36f Compliance provisions.

For approval, a State plan must include the compliance provisions in this section.

(a) Except as provided in § 60.38f(d)(2), the specified methods in paragraphs (a)(1) through (6) of this section must be used to determine whether the gas collection system is in compliance with § 60.33f(b)(2).

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with § 60.33f(b)(2)(i), one of the following equations must be used. The k and Lo kinetic factors should be those published in the most recent AP–42 or other site-specific values demonstrated to be appropriate and approved by the Administrator. If k has been determined as specified in § 60.35f(a)(4), the value of k determined from the test must be used. A value of no more than 15 years must be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

(i) For sites with unknown year-to-year solid waste acceptance rate:

$Qm = 2LoR\ (e - kc - e - kt)$

Where:

Qm = Maximum expected gas generation flow rate, cubic meters per year.

Lo = Methane generation potential, cubic meters per megagram solid waste.

R = Average annual acceptance rate, megagrams per year.

k = Methane generation rate constant, year − 1.

t = Age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years.

c = Time since closure, years (for an active landfill c = 0 and e − kc = 1).

(ii) For sites with known year-to-year solid waste acceptance rate:

$$Q_{M=} \sum_{i=1}^{n} 2kL_oM_i(e^{-kt_i})$$

Where:

Q_M = Maximum expected gas generation flow rate, cubic meters per year.

k = Methane generation rate constant, year − 1.

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of solid waste in the ith section, megagrams.

t_i = Age of the ith section, years.

(iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations in paragraphs (a)(1)(i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in paragraphs (a)(1)(i) or (ii) of this section or other methods must be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

(2) For the purposes of determining sufficient density of gas collectors for compliance with § 60.33f(b)(2)(ii), the owner or operator must design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

(3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 60.33f(b)(2)(iii), the owner or operator must measure gauge pressure in the gas collection header applied to each individual well monthly. If a positive pressure exists, action must be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under § 60.34f(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system must be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure must not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Administrator for approval.

(4) Owners or operators are not required to expand the system as required in paragraph (a)(3) of this section during the first 180 days after gas collection system startup.

(5) [Reserved]

(6) An owner or operator seeking to demonstrate compliance with § 60.33f(b)(2)(iv) through the use of a collection system not conforming to the specifications provided in § 60.40f must provide information satisfactory to the Administrator as specified in

§ 60.38f(d)(3) demonstrating that offsite migration is being controlled.

(b) For purposes of compliance with § 60.34f(a), each owner or operator of a controlled landfill must place each well or design component as specified in the approved design plan as provided in § 60.38f(d). Each well must be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade.

(c) The following procedures must be used for compliance with the surface methane operational standard as provided in § 60.34f(d):

(1) After installation and startup of the gas collection system, the owner or operator must monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at no more than 30-meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in § 60.36f(d).

(2) The background concentration must be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring must be performed in accordance with section 8.3.1 of Method 21 of appendix A of this part, except that the probe inlet must be placed within 5 to 10 centimeters of the ground. Monitoring must be performed during typical meteorological conditions.

(4) Any reading of 500 parts per million or more above background at any location must be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4)(i) through (v) of this section must be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 60.34f(d).

(i) The location of each monitored exceedance must be marked and the location and concentration recorded. For location, you must determine the latitude and longitude coordinates using an instrument with an accuracy of at least 3 meters. Your coordinates must be in decimal degrees with at least five decimal places.

(ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance must be made and the location must be re-monitored within 10 calendar days of detecting the exceedance.

(iii) If the re-monitoring of the location shows a second exceedance, additional corrective action must be taken and the location must be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (c)(4)(v) of this section must be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) of this section has been taken.

(iv) Any location that initially showed an exceedance but has a methane concentration less than 500 parts per million methane above background at the 10-day re-monitoring specified in paragraph (c)(4)(ii) or (iii) of this section must be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the actions specified in paragraph (c)(4)(iii) or (v) of this section must be taken.

(v) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device must be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval.

(5) The owner or operator must implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section must comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(1) The portable analyzer must meet the instrument specifications provided in section 3 of Method 21 of appendix A of this part, except that ''methane'' must replace all references to ''VOC''.

(2) The calibration gas must be methane, diluted to a nominal concentration of 500 parts per million in air.

(3) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part must be used.

(4) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part must be followed immediately before commencing a surface monitoring survey.

(e) The provisions of this subpart apply at all times, including periods of startup, shutdown or malfunction.

§ 60.37f Monitoring of operations.

For approval, a State plan must include the monitoring provisions in this section, except as provided in § 60.38f(d)(2).

(a) Each owner or operator seeking to comply with § 60.33f(b)(2) for an active gas collection system must install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:

(1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 60.36f(a)(3); and

(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as follows:

(i) The nitrogen level must be determined using Method 3C, unless an alternative test method is established as allowed by § 60.38f(d)(2).

(ii) Unless an alternative test method is established as allowed by § 60.38f(d)(2), the oxygen must be determined by an oxygen meter using Method 3A or 3C except that:

(A) The span must be set between 10 and 12 percent oxygen;

(B) A data recorder is not required;

(C) Only two calibration gases are required, a zero and span;

(D) A calibration error check is not required;

(E) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

(3) Monitor temperature of the landfill gas on a monthly basis. The temperature measuring device must be calibrated annually using the procedure in 40 CFR part 60, Appendix A–1, Method 2, Section 10.3.

(b) Each owner or operator seeking to comply with § 60.33f(c) using an enclosed combustor must calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment:

(1) A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ±1 percent of the temperature being measured expressed in degrees Celsius or ±0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or

process heaters with design heat input capacity equal to or greater than 44 megawatts.

(2) A device that records flow to or bypass of the control device. The owner or operator must:

(i) Install, calibrate, and maintain a gas flow rate measuring device that must record the flow to the control device at least every 15 minutes; and

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(c) Each owner or operator seeking to comply with § 60.33f(c) using a non-enclosed flare must install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

(1) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.

(2) A device that records flow to or bypass of the flare. The owner or operator must:

(i) Install, calibrate, and maintain a gas flow rate measuring device that must record the flow to the control device at least every 15 minutes; and

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(d) Each owner or operator seeking to demonstrate compliance with § 60.33f(c) using a device other than a non-enclosed flare or an enclosed combustor or a treatment system must provide information satisfactory to the Administrator as provided in § 60.38f(d)(2) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator must review the information and either approve it, or request that additional information be submitted. The Administrator may specify additional appropriate monitoring procedures.

(e) Each owner or operator seeking to install a collection system that does not meet the specifications in § 60.40f or seeking to monitor alternative parameters to those required by § 60.34f through § 60.37f must provide information satisfactory to the Administrator as provided in § 60.38f(d)(2) and (3) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator may specify additional appropriate monitoring procedures.

(f) Each owner or operator seeking to demonstrate compliance with the 500 parts per million surface methane operational standard in § 60.34f(d) must monitor surface concentrations of methane according to the procedures provided in § 60.36f(c) and the instrument specifications in § 60.36f(d). Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 parts per million or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

(g) Each owner or operator seeking to demonstrate compliance with the control system requirements in § 60.33f(c) using a landfill gas treatment system must calibrate, maintain, and operate according to the manufacturer's specifications a device that records flow to or bypass of the treatment system. The owner or operator must:

(1) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the treatment system at least every 15 minutes; and

(2) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

§ 60.38f Reporting guidelines.

For approval, a State plan must include the reporting provisions listed in this section, as applicable, except as provided under §§ 60.24 and 60.38f(d)(2).

(a) *Design capacity report.* For existing MSW landfills subject to this subpart, the initial design capacity report must be submitted no later than 90 days after the effective date of EPA approval of the State's plan under section 111(d) of the Clean Air Act. The initial design capacity report must contain the following information:

(1) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the permit issued by the state, local, or tribal agency responsible for regulating the landfill.

(2) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the permit issued by the state, local, or tribal agency responsible for regulating the landfill, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity must be calculated using good engineering practices. The calculations must be provided, along with the relevant parameters as part of the report. The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site-specific density, which must be recalculated annually. Any density conversions must be documented and submitted with the design capacity report. The state, local, or tribal agency or the Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(b) *Amended design capacity report.* An amended design capacity report must be submitted providing notification of an increase in the design capacity of the landfill, within 90 days of an increase in the maximum design capacity of the landfill to or above 2.5 million megagrams and 2.5 million cubic meters. This increase in design capacity may result from an increase in the permitted volume of the landfill or an increase in the density as documented in the annual recalculation required in § 60.39f(f).

(c) *NMOC emission rate report.* For existing MSW landfills covered by this subpart with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, the NMOC emission rate report must be submitted following the procedure specified in paragraph (j) of this section no later than 90 days after the effective date of EPA approval of the State's plan under section 111(d) of the Clean Air Act. The NMOC emission rate report must be submitted annually following the procedure specified in paragraph (j) of this section, except as provided for in paragraph (c)(3) of this section. The Administrator may request such

additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report must contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in § 60.35f(a).

(2) The NMOC emission rate report must include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.

(3) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 34 megagrams per year in each of the next 5 consecutive years, the owner or operator may elect to submit, following the procedure specified in paragraph (j) of this section, an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate must include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based must be provided to the Administrator. This estimate must be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate must be submitted to the Administrator. The revised estimate must cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(4) Each owner or operator subject to the requirements of this subpart is exempted from the requirements to submit an NMOC emission rate report, after installing a collection and control system that complies with § 60.33f(b) and (c), during such time as the collection and control system is in operation and in compliance with §§ 60.34f and 60.36f.

(5) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters must submit a collection and control system design plan to the Administrator within 1 year of the first NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year, except as follows:

(i) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in § 60.35f(a)(3) and the resulting rate is less than 34 megagrams per year, annual periodic reporting must be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than 34 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, must be submitted, following the procedure specified in paragraph (j) of this section, within 180 days of the first calculated exceedance of 34 megagrams per year.

(ii) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate constant k, as provided in Tier 3 in § 60.35f(a)(4), and the resulting NMOC emission rate is less than 34 megagrams per year, annual periodic reporting must be resumed. The resulting site-specific methane generation rate constant k must be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of § 60.35f(a)(4) and the resulting site-specific methane generation rate constant k must be submitted, following the procedure specified in paragraph (j) of this section, to the Administrator within 1 year of the first calculated NMOC emission rate equaling or exceeding 34 megagrams per year.

(iii) If the owner or operator elects to demonstrate that site-specific surface methane emissions are below 500 parts per million methane, then the owner or operator must submit annually a Tier 4 surface emissions report as specified in this paragraph following the procedure specified in paragraph (j) of this section. If the Tier 4 surface emissions report shows no surface emissions readings of 500 parts per million methane or greater for four consecutive quarters, then the landfill may continue Tier 4 monitoring at a reduced semi-annual frequency or return to Tier 1, 2, or 3. An owner or operator may elect to recalculate NMOC using Tier 1, 2, or 3 only if it has four consecutive quarters with no surface emissions monitoring readings of 500 parts per million or greater. The NMOC emission rate report must be submitted annually, following the procedure specified in paragraph (j) of this section, except as provided for in paragraph (c)(3) of this section. The Administrator may request such additional information as may be necessary to verify the reported instantaneous surface emission readings. The Tier 4 surface emissions report must clearly identify the location, date, and reading (in parts per million) of any value 500 parts per million methane or greater, other than non-repeatable, momentary readings. For location, you must determine the latitude and longitude coordinates using an instrument with an accuracy of at least 3 meters. Your coordinates must be in decimal degrees with at least five decimal places.

(iv) If the landfill is in the closed landfill subcategory, the owner or operator must submit a collection and control system design plan to the Administrator within 1 year of the first NMOC emission rate report in which the NMOC emission rate equals or exceeds 50 megagrams per year, except as follows:

(A) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in § 60.35f(a)(3) and the resulting rate is less than 50 megagrams per year, annual periodic reporting must be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than 50 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, must be submitted, following the procedure specified in paragraph (j) of this section, within 180 days of the first calculated exceedance of 50 megagrams per year.

(B) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate constant k, as provided in Tier 3 in § 60.35f(a)(4), and the resulting NMOC emission rate is less than 50 megagrams per year, annual periodic reporting must be resumed. The resulting site-specific methane generation rate constant k must be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of § 60.35f(a)(4) and the resulting site-specific methane generation rate constant k must be submitted, following the procedure specified in paragraph (j) of this section, to the Administrator within 1 year of the first calculated NMOC emission rate equaling or exceeding 50 megagrams per year.

(C) The landfill owner or operator elects to demonstrate surface emissions are low, consistent with the provisions in § 60.38(c)(5)(iii).

(D) The landfill has already submitted a gas collection and control system design plan consistent with the provisions of subpart WWW of this part; 40 CFR part 62, subpart GGG; or a state plan implementing subpart Cc of this part.

(d) *Collection and control system design plan.* The State plan must include a process for state review and approval of the site-specific design plan for each gas collection and control system. The collection and control system design plan must meet the following requirements:

(1) The collection and control system as described in the design plan must meet the design requirements in § 60.33f(b) and (c).

(2) The collection and control system design plan must include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping, or reporting provisions of §§ 60.34f through 60.39f proposed by the owner or operator.

(3) The collection and control system design plan must either conform to specifications for active collection systems in § 60.40f or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to § 60.40f.

(4) If the owner or operator chooses to demonstrate compliance with the emission control requirements of this subpart using a treatment system as defined in this subpart, then the owner or operator must prepare a site-specific treatment system monitoring plan as specified in § 60.39f(b)(5)(ii).

(5) The Administrator must review the information submitted under paragraphs (d)(1) through (4) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.

(e) *Revised design plan.* The owner or operator who has already been required to submit a design plan under paragraph (d) of this section, or under subpart WWW of this part; 40 CFR part 62, subpart GGG; or a state plan implementing subpart Cc of this part, must submit a revised design plan to the Administrator for approval as follows:

(1) Within 90 days of expanding operations to an area not covered by the previously approved design plan.

(2) Prior to installing or expanding the gas collection system in a way that is not consistent with the design plan that was submitted to the Administrator according to paragraph (d) of this section.

(f) *Closure report.* Each owner or operator of a controlled landfill must submit a closure report to the Administrator within 30 days of ceasing waste acceptance. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 60.7(a)(4).

(g) *Equipment removal report.* Each owner or operator of a controlled landfill must submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment.

(1) The equipment removal report must contain the following items:

(i) A copy of the closure report submitted in accordance with paragraph (f) of this section; and

(ii) A copy of the initial performance test report demonstrating that the 15-year minimum control period has expired, unless the report of the results of the performance test has been submitted to the EPA via the EPA's CDX, or information that demonstrates that the GCCS will be unable to operate for 15 years due to declining gas flows. In the equipment removal report, the process unit(s) tested, the pollutant(s) tested, and the date that such performance test was conducted may be submitted in lieu of the performance test report if the report has been previously submitted to the EPA's CDX; and

(iii) Dated records of surface emissions monitoring data of the landfill or closed area that demonstrates that there are no surface emissions of 500 parts per million or greater for four consecutive quarters, unless the reports have been submitted to the EPA via the EPA's CDX. If the surface emissions monitoring reports have been previously submitted to the EPA's CDX, a statement that the reports have been submitted electronically and the dates that the reports were submitted to the EPA's CDX may be submitted in the equipment removal report in lieu of the surface emissions monitoring reports; or

(iv) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 34 megagrams or greater of NMOC per year; or

(v) For the closed landfill subcategory, dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.

(2) The Administrator may request such additional information as may be necessary to verify that all of the conditions for removal in § 60.33f(f) have been met.

(h) *Annual report.* The owner or operator of a landfill seeking to comply with § 60.33f(e)(2) using an active collection system designed in accordance with § 60.33f(b) must submit to the Administrator, following the procedures specified in paragraph (j) of this section, an annual report of the recorded information in paragraphs (h)(1) through (6) of this section. The initial annual report must be submitted within 180 days of installation and startup of the collection and control system. The initial annual report must include the following information pertaining to the initial performance test report required under § 60.8: The process unit(s) tested, the pollutant(s) tested, and the date that such performance test was conducted. The initial performance test report must be submitted, following the procedure specified in § 60.8(j), no later than the date that the initial annual report is submitted. For enclosed combustion devices, flares, and treatment systems reportable exceedances are defined under § 60.39f(c)(1).

(1) Value and length of time for exceedance of applicable parameters monitored under § 60.37f(a)(1), (b), (c), (d), and (g).

(2) Description and duration of all periods when the gas stream is diverted from the control device or treatment system through a bypass line or the indication of bypass flow as specified under § 60.37f.

(3) Description and duration of all periods when the control device or treatment system was not operating and length of time the control device or treatment system was not operating.

(4) All periods when the collection system was not operating.

(5) The location of each exceedance of the 500 parts per million methane concentration as provided in § 60.34f(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month. For location, you must determine the latitude and longitude coordinates using an instrument with an accuracy of at least 3 meters. Your coordinates must be in decimal degrees with at least five decimal places.

(6) The date of installation and the location of each well or collection system expansion added pursuant to § 60.36f(a)(3), (b), and (c)(4).

(i) *Initial performance test report.* Each owner or operator seeking to comply with § 60.33f(c) must include

the following information with the initial performance test report required under § 60.8:

(1) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;

(2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;

(3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;

(4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;

(5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and

(6) The provisions for the control of offsite migration.

(j) *Electronic reporting.* The owner or operator must submit the results of each performance test according to the following procedures:

(1) For data collected using test methods supported by the EPA's Electronic Reporting Tool (ERT) as listed on the EPA's ERT Web site (*http://www.epa.gov/ttn/chief/ert/index.html*), you must submit the results of the performance test to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). CEDRI can be accessed through the EPA's Central Data Exchange (CDX) (*http://cdx.epa.gov/epa_home.asp*). Performance test data must be submitted in a file format generated through the use of the EPA's ERT. Alternatively, you may submit performance test data in an electronic file format consistent with the extensible markup language (XML) schema listed on the EPA's ERT Web site, once the XML schema is available. If you claim that some of the performance test information being submitted is confidential business information (CBI), you must submit a complete file generated through the use of the EPA's ERT or an alternate electronic file consistent with the XML schema listed on the EPA's ERT Web site, including information claimed to be CBI, on a compact disc, flash drive, or other commonly used electronic storage media to the EPA. The electronic media must be clearly marked as CBI and mailed to U.S. EPA/OAPQS/CORE CBI Office, Attention: Group Leader, Measurement Policy Group, MD C404–02, 4930 Old Page Rd., Durham, NC 27703. The same ERT or alternate file with the CBI omitted must be submitted to the EPA via the EPA's CDX as described earlier in this paragraph.

(2) For data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT Web site, you must submit the results of the performance test to the Administrator at the appropriate address listed in § 60.4.

§ 60.39f Recordkeeping guidelines.

For approval, a State plan must include the recordkeeping provisions in this section.

(a) Except as provided in § 60.38f(d)(2), each owner or operator of an MSW landfill subject to the provisions of § 60.33f(e) must keep for at least 5 years up-to-date, readily accessible, onsite records of the design capacity report that triggered § 60.33f(e), the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Offsite records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Except as provided in § 60.38f(d)(2), each owner or operator of a controlled landfill must keep up-to-date, readily accessible records for the life of the control system equipment of the data listed in paragraphs (b)(1) through (b)(5) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring must be maintained for a minimum of 5 years. Records of the control device vendor specifications must be maintained until removal.

(1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.33f(b):

(i) The maximum expected gas generation flow rate as calculated in § 60.36f(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator.

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 60.40f(a)(1).

(2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.33f(c) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity equal to or greater than 44 megawatts:

(i) The average temperature measured at least every 15 minutes and averaged over the same time period of the performance test.

(ii) The percent reduction of NMOC determined as specified in § 60.33f(c)(2) achieved by the control device.

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.33f(c)(2)(i) through use of a boiler or process heater of any size: a description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.33f(c)(1) through use of a non-enclosed flare, the flare type (*i.e.,* steam-assisted, air-assisted, or non-assisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 60.18; and continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame or the flare flame is absent.

(5) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.33f(c)(3) through use of a landfill gas treatment system:

(i) Bypass records. Records of the flow of landfill gas to, and bypass of, the treatment system.

(ii) Site-specific treatment monitoring plan, to include:

(A) Records of filtration, de-watering, and compression parameters that ensure the treatment system is operating properly for the intended end use of the treated landfill gas.

(B) Monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for the intended end use of the treated landfill gas.

(C) Documentation of the monitoring methods and ranges, along with justification for their use.

(D) Identify who is responsible (by job title) for data collection.

(E) Processes and methods used to collect the necessary data.

(F) Description of the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems.

(c) Except as provided in § 60.38f(d)(2), each owner or operator of a controlled landfill subject to the provisions of this subpart must keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.37f as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

(1) The following constitute exceedances that must be recorded and reported under § 60.38f:

(i) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal unit per hour) or greater, all 3-hour periods of operation during which the average temperature was more than 28 °C below the average combustion temperature during the most recent performance test at which compliance with § 60.33f(c) was determined.

(ii) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (b)(3) of this section.

(2) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible continuous records of the indication of flow to the control system and the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under § 60.37f.

(3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with § 60.33f(c) must keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other state, local, tribal, or federal regulatory requirements.)

(4) Each owner or operator seeking to comply with the provisions of this subpart by use of a non-enclosed flare must keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under § 60.37f(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

(5) Each owner or operator of a landfill seeking to comply with § 60.33f(e) using an active collection system designed in accordance with § 60.33f(b) must keep records of estimates of NMOC emissions for periods when the collection system or control device is not operating.

(d) Except as provided in § 60.38f(d)(2), each owner or operator subject to the provisions of this subpart must keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label on each collector that matches the labeling on the plot map.

(1) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 60.36f(b).

(2) Each owner or operator subject to the provisions of this subpart must keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 60.40f(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 60.40f(a)(3)(ii).

(e) Except as provided in § 60.38f(d)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in § 60.34f, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

(f) Landfill owners or operators who convert design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, as provided in the definition of ''design capacity'', must keep readily accessible, onsite records of the annual recalculation of site-specific density, design capacity, and the supporting documentation. Offsite records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(g) Landfill owners or operators seeking to demonstrate that site-specific surface methane emissions are below 500 parts per million by conducting surface emission monitoring under the Tier 4 procedures specified in § 60.35f(a)(6) must keep for at least 5 years up-to-date, readily accessible records of all surface emissions monitoring and information related to monitoring instrument calibrations conducted according to sections 8.1.2 and 10 of Method 21 of Appendix A of this part including all of the following items:

(1) Calibration records.

(i) Date of calibration and initials of operator performing the calibration.

(ii) Calibration gas cylinder identification, certification date, and certified concentration.

(iii) Instrument scale(s) used.

(iv) A description of any corrective action taken if the meter readout could not be adjusted to correspond to the calibration gas value.

(v) If an owner or operator makes their own calibration gas, a description of the procedure used.

(2) Timestamp of each surface scan reading, to the nearest minute.

(3) Location of each surface scan reading. The owner or operator must determine the coordinates using an instrument with an accuracy of at least 3 meters. Coordinates must be in decimal degrees with at least five decimal places.

(4) Monitored methane concentration (parts per million) of each reading.

(5) Background methane concentration (parts per million) after each instrument calibration test.

(6) Adjusted methane concentration using most recent calibration (parts per million).

(7) For readings taken at each surface penetration, the unique identification location label matching the label specified in § 60.39f(d).

(h) Except as provided in § 60.38f(d)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of all collection and control system monitoring data for parameters measured in § 60.37f(a)(2) and (3).

(i) Any records required to be maintained by this subpart that are submitted electronically via the EPA's CDX may be maintained in electronic format.

§ 60.40f Specifications for active collection systems.

For approval, a State plan must include the specifications for active collection systems in this section.

(a) Each owner or operator seeking to comply with § 60.33f(b) must site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Administrator.

(1) The collection devices within the interior must be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues must be addressed in the design: Depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, resistance to the refuse decomposition heat, and ability to isolate individual components or sections for repair or troubleshooting without shutting down entire collection system.

(2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section must address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

(3) The placement of gas collection devices determined in paragraph (a)(1) of this section must control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (ii) of this section.

(i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under § 60.39f(d). The documentation must provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and must be provided to the Administrator upon request.

(ii) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material must be documented and provided to the Administrator upon request. A separate NMOC emissions estimate must be made for each section proposed for exclusion, and the sum of all such sections must be compared to the NMOC emissions estimate for the entire landfill.

(A) The NMOC emissions from each section proposed for exclusion must be computed using the following equation:

$$Q_i = 2kL_oM_i(e^{-kt_i})(C_{NMOC})(3.6\ x\ 10^{-9})$$

Where:

Q_i = NMOC emission rate from the ith section, megagrams per year.

k = Methane generation rate constant, year − 1.

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of the degradable solid waste in the ith section, megagram.

t_i = Age of the solid waste in the ith section, years.

C_{NMOC} = Concentration of NMOC, parts per million by volume.

3.6×10^{-9} = Conversion factor.

(B) If the owner or operator is proposing to exclude, or cease gas collection and control from, nonproductive physically separated (*e.g.,* separately lined) closed areas that already have gas collection systems, NMOC emissions from each physically separated closed area must be computed using either the equation in § 60.35f or the equation in paragraph (a)(3)(ii)(A) of this section.

(iii) The values for k and CNMOC determined in field testing must be used if field testing has been performed in determining the NMOC emission rate or the radii of influence (the distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero). If field testing has not been performed, the default values for k, Lo, and CNMOC provided in § 60.35f or the alternative values from § 60.35f must be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

(b) Each owner or operator seeking to comply with § 60.33f(b) must construct the gas collection devices using the following equipment or procedures:

(1) The landfill gas extraction components must be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: Convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system must extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations must be situated with regard to the need to prevent excessive air infiltration.

(2) Vertical wells must be placed so as not to endanger underlying liners and must address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors must be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices must be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly must include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices must be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(c) Each owner or operator seeking to comply with § 60.33f(c) must convey the landfill gas to a control system in compliance with § 60.33f(c) through the collection header pipe(s). The gas mover equipment must be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

(1) For existing collection systems, the flow data must be used to project the maximum flow rate. If no flow data exist, the procedures in paragraph (c)(2) of this section must be used.

(2) For new collection systems, the maximum flow rate must be in accordance with § 60.36f(a)(1).

§ 60.41f Definitions.

Terms used but not defined in this subpart have the meaning given them in the Clean Air Act and in subparts A and B of this part.

Active collection system means a gas collection system that uses gas mover equipment.

Active landfill means a landfill in which solid waste is being placed or a

landfill that is planned to accept waste in the future.

Administrator means the Administrator of the U.S. Environmental Protection Agency or his/her authorized representative or the Administrator of a State Air Pollution Control Agency.

Closed landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under § 60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed.

Closed landfill subcategory means a closed landfill that has submitted a closure report as specified in § 60.38f(f) on or before August 27, 2015.

Closure means that point in time when a landfill becomes a closed landfill.

Commercial solid waste means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes.

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the NMOC emission rate. The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with § 60.33f(e)(2).

Design capacity means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the state, local, or tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit.

Disposal facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

Emission rate cutoff means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

Enclosed combustor means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

Flare means an open combustor without enclosure or shroud.

Gas mover equipment means the equipment (*i.e.,* fan, blower, compressor) used to transport landfill gas through the header system.

Household waste means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas). Household waste does not include fully segregated yard waste. Segregated yard waste means vegetative matter resulting exclusively from the cutting of grass, the pruning and/or removal of bushes, shrubs, and trees, the weeding of gardens, and other landscaping maintenance activities. Household waste does not include construction, renovation, or demolition wastes.

Industrial solid waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, parts 264 and 265 of this chapter. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: Electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Interior well means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under § 257.2 of this title.

Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

Modification means an increase in the permitted volume design capacity of the landfill by either lateral or vertical expansion based on its permitted design capacity as of July 17, 2014. Modification does not occur until the owner or operator commences construction on the lateral or vertical expansion.

Municipal solid waste landfill or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§ 257.2 of this title) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

Municipal solid waste landfill emissions or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

NMOC means nonmethane organic compounds, as measured according to the provisions of § 60.35f.

Nondegradable waste means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

Passive collection system means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

Protectorate means American Samoa, the Commonwealth of Puerto Rico, the District of Columbia, Guam, the Northern Mariana Islands, and the Virgin Islands.

Sludge means the term sludge as defined in 40 CFR 258.2.

Solid waste means the term solid waste as defined in 40 CFR 258.2.

State means any of the 50 United States and the protectorates of the United States.

State plan means a plan submitted pursuant to section 111(d) of the Clean Air Act and subpart B of this part that implements and enforces subpart Cf of this part.

Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

Sufficient extraction rate means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

Treated landfill gas means landfill gas processed in a treatment system as defined in this subpart.

Treatment system means a system that filters, de-waters, and compresses landfill gas for sale or beneficial use.

Untreated landfill gas means any landfill gas that is not treated landfill gas.

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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[EPA–HQ–OAR–2003–0215; FRL–9928–96–OAR]

RIN 2060–AM08

Standards of Performance for Municipal Solid Waste Landfills

AGENCY: Environmental Protection Agency (EPA).

ACTION: Supplemental proposal.

SUMMARY: The Environmental Protection Agency (EPA) is issuing this supplemental proposal for the Standards of Performance for Municipal Solid Waste (MSW) Landfills to address the nonmethane organic compound (NMOC) emission rate threshold at which an affected MSW landfill must install controls. The EPA is in the process of reviewing the Standards of Performance for MSW Landfills based on changes in the landfills industry since the standards were promulgated in 1996 and issued a proposed rulemaking on July 17, 2014. The EPA's review of the Standards of Performance for MSW Landfills (also referred to as the New Source Performance Standards or NSPS for MSW Landfills) applies to landfills that commenced construction, reconstruction, or modification after July 17, 2014.

This document proposes to achieve additional reductions of landfill gas (LFG) and its components, including methane, through a lower emission threshold at which MSW landfills must install and operate a gas collection and control system (GCCS). This document supplements the proposed July 17, 2014, rulemaking by further lowering, from 40 megagrams per year (Mg/yr) to 34 Mg/yr, the proposed NMOC emissions threshold at which controls would be required. This change to the 2014 proposed threshold is based on additional data we have reviewed that indicate greater potential for reductions in methane emissions from these sources than we originally estimated that can be achieved at reasonable cost. Accordingly, the EPA is proposing to establish the NMOC emission rate threshold for installing a GCCS at 34 Mg/yr and is requesting comment specifically on whether this is appropriate. The EPA is also soliciting comment on the number of facilities that might ultimately become subject to proposed new subpart XXX. The EPA intends to consider the information received in response to this supplemental proposal prior to finalizing revised Standards of Performance for MSW Landfills. The EPA is seeking comment only on the two issues addressed by this supplemental proposal and the supplemental proposal does not otherwise reopen the comment period for the July 17, 2014, proposed rule.

DATES: *Comments.* Comments must be received on or before October 26, 2015. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before September 28, 2015.

Public Hearing. If anyone contacts the EPA requesting a public hearing by September 1, 2015, the EPA will hold a public hearing on September 11, 2015 from 1:00 p.m. (Eastern Standard Time) to 5:00 p.m. (Eastern Standard Time) at the location in the **ADDRESSES** section. If no one contacts the EPA requesting a public hearing to be held concerning this proposed rule by September 1, 2015, a public hearing will not take place. Information regarding whether or not a hearing will be held will be posted on the rule's Web site located at *http://www.epa.gov/ttnatw01/landfill/landflpg.htm.* Please contact Ms. Aimee St. Clair at (919) 541–1063 or at *stclair.aimee@epa.gov* to register to speak at the hearing. The last day to pre-register to speak at the hearing will be September 8, 2015.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2003–0215, to the *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or withdrawn. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.,* on the web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *http://www2.epa.gov/dockets/commenting-epa-dockets.*

Public Hearing. If a public hearing is held, it will be at the U.S. Environmental Protection Agency building located at 109 T.W. Alexander Drive, Research Triangle Park, NC 27711. Information regarding whether or not a hearing will be held will be posted on the rule's Web site located at *http://www.epa.gov/ttnatw01/landfill/landflpg.htm.*

Please see section I.C of the Supplementary Information for detailed information on the public hearing.

Docket: All documents in the docket are listed in the *http://www.regulations.gov* index. Although listed in the index, some information is not publicly available, *e.g.,* CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *http://www.regulations.gov* or in hard copy at the EPA Docket Center (EPA/DC), EPA WJC West Building, Room 3334, 1301 Constitution Ave. NW., Washington, DC. The Docket Center is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: For information concerning this supplemental proposal, contact Ms. Hillary Ward, Fuels and Incineration Group, Sector Policies and Programs Division, Office of Air Quality Planning and Standards (E143–05), Environmental Protection Agency, Research Triangle Park, NC 27711; telephone number: (919) 541–3154; fax