NOTICE OF RULEMAKING HEARING

Regarding establishing a new rule:

Regulation Number 31
5 CCR 1001-35

SUBJECT:
The Air Quality Control Commission will hold a rulemaking hearing to establish Regulation Number 31 to reduce methane emissions from municipal solid waste (MSW) landfills to help achieve Colorado's greenhouse gas (GHG) reduction goals, set out in section 25-7-102(2)(g), C.R.S.

All required documents for this rulemaking can be found on the Commission website at: https://cdphe.colorado.gov/aqcc

HEARING SCHEDULE

DATE: August 21, 2025
TIME: To begin at or after 9:00 a.m.
PLACE: The session will be held in hybrid fashion both in-person and via Zoom. Details related to participation and registration can be found at: https://cdphe.colorado.gov/aqcc

DATE: August 22, 2025
TIME: To begin at 9:00 a.m.
PLACE: The session will be held in hybrid fashion both in-person and via Zoom. Details related to participation and registration can be found at: https://cdphe.colorado.gov/aqcc

The hearing may be continued at such places and time as the Commission may announce. Any such changes will be noticed on the Commission's website. Interested parties may contact the Commission Office at cdphe.aqcc-comments@state.co.us to confirm meeting details.

PUBLIC COMMENT:
The Commission encourages input from the public, either orally during the public comment session or in writing prior to the hearing. However, oral public comment will generally not be permitted by persons who offer comment on behalf of an entity that is a party. Those persons may, however, submit written public comment.

Instructions for registering to provide oral public comment will be posted in the agenda on the Commission's website at https://cdphe.colorado.gov/aqcc.

The agenda will provide more specifics about the details of the hearing and when the public can expect the public comment session to take place.

Written comments should be submitted no later than **August 5th by 5 p.m.** by emailing cdphe.aqcc@state.co.us or mailing to:

Colorado Air Quality Control Commission
Colorado Department of Public Health and Environment

4300 Cherry Creek Drive South, EDO-AQCC-A5
Denver, Colorado 80246

IMPORTANT DATES AND DEADLINES:

PROCESS DESCRIPTION	DUE DATE & TIME
Request for Party Status	May 14, 2025 by 5:00 p.m.
Status Conference	May 19, 2025 at 3:00 p.m.
Alternate Proposal	July 1, 2025 by 5:00 p.m.
Prehearing Statement	July 1, 2025 by 5:00 p.m.
Prehearing Conference	July 10, 2025 at 9:00 a.m.
Rebuttal Statement	July 22, 2025 by 5:00 p.m.
Written Public Comments	August 5, 2025 by 5:00 p.m.

Submittals for this hearing should be emailed to cdphe.aqcc-comments@state.co.us unless an exception is granted pursuant to Part A, Subsection III.J.3. of the Commission's Procedural Rules (5 CCR § 1001-1).

REQUEST FOR PARTY STATUS:
A request for party status must:

1) identify the applicant (this could be a company and/or contact name);
2) provide the name, address, telephone and email address of the applicant's representative or counsel; and
3) briefly summarize what, if any, policy, factual, and legal issues the applicant has with the proposal(s) as of the time of filing the application.

In addition, requests for party status should indicate whether the applicant intends to file an alternate proposal and, if so, briefly describe the scope and nature of the alternate proposal.

The request for party status must be electronically mailed to:

- Air Quality Control Commission staff: cdphe.aqcc@state.co.us
- Air Quality Control Commission attorney: robyn.wille@coag.gov
- Air Pollution Control Division staff: timothya.taylor@state.co.us
- Air Pollution Control Division attorney: sarah.quigley@coag.gov

Requests received beyond the stated deadline shall only be considered upon a written motion for good cause shown. The Commission reserves the right to deny party status to anyone that does not comply with the Commission's Procedural Rules.

STATUS CONFERENCE:
Attendance at the status conference is mandatory for anyone who has requested party status, though each party need only have one representative present. The status conference is intended to ascertain and discuss the issues involved, and to ensure that parties are making all necessary efforts to discuss and resolve such issues prior to the submission of prehearing statements. Parties will be confirmed and a party list will be generated and distributed. The status conference will be held virtually via video conference. A registration link will be provided by the Commission's office prior to the status conference. Note that if the Hearing Officer deems the status conference unnecessary, the status conference may be cancelled.

ALTERNATE PROPOSAL:
Alternate proposals will be considered by the Commission "only if the subject matter of the alternative proposal is consistent with and fits within the scope of the notice." 5 CCR 1001-1, Part A. Section V..E.4b. The submittal of an alternate proposal must be accompanied by a separate electronic copy of the alternate proposed rule and statement of basis and purpose language and all other associated documents as required by the Commission's Procedural Rules, including an economic impact analysis. Alternate proposals and associated exhibits must be emailed to all persons listed on the party status list or otherwise provided through an approved method of electronic transmission.

PREHEARING STATEMENTS:
Each party must submit a prehearing statement. Exhibits to a prehearing statement must be submitted in a separate electronic transmission. Prehearing statements and associated exhibits must be emailed to all persons listed on the party status list or otherwise provided through an approved method of electronic transmission. Prehearing statements must contain all the necessary elements described in Part A, Section V.E.6.c of the Commission's Procedural Rules (5 CCR 1001-1).

PREHEARING CONFERENCE:
Attendance at the prehearing conference is mandatory for all parties to this hearing, though each party need only have one representative present. The prehearing conference will be held virtually, and registration information will be provided by the Commission's office prior to the prehearing conference.

REBUTTAL STATEMENTS:
Rebuttal statements may be submitted by the Division and any party to the hearing to respond to issues and arguments identified in prehearing statements. Rebuttal statements may not raise any issues, or be accompanied by alternate proposals, that could have been raised in the party's prehearing statement. Rebuttal statements and associated exhibits must be emailed to all persons listed on the party status list or otherwise provided through an approved method of electronic transmission. The filing of rebuttal statements is optional.

DELIBERATION AND FINAL ACTION:
The Commission intends to deliberate and take final action on the proposed changes to these Regulations at the conclusion of the testimony.

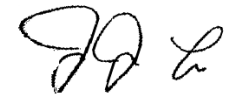
STATUTORY AUTHORITY FOR THE COMMISSION'S ACTIONS:

The Colorado Air Pollution Prevention and Control Act, specifically § 25-7-105(1), C.R.S., directs the Commission to promulgate such rules and regulations as are consistent with the legislative declaration set forth in § 25-7-102, C.R.S., and that are necessary for the proper implementation and administration of the Act. Section 25-7-106, C.R.S., provides the Commission maximum flexibility in developing an effective air quality program and promulgating such a combination of regulations as may be necessary or desirable to carry out that program. Section 25-7-102(g), C.R.S. sets statewide GHG emissions reduction targets. The Act provides the Commission with broad authority to regulate air pollutants, including greenhouse gas and its constituent gasses. Section 25-7-109(1), C.R.S. authorizes the Commission to adopt and promulgate emission control regulations that require the use of effective practical air pollution controls for each type of facility, process, or activity which produces or might produce significant emissions of air pollutants. Emission control regulations may pertain to any chemical compound including GHG pollution. Section 25-7-106(6) further authorizes the Commission to require owners and operators of any air pollution source, to monitor, record and report information.

The rulemaking hearing will be conducted in accordance with Sections 24-4-103 and 25-7-110, 25-7-110.5 and 25-7-110.8 C.R.S., as applicable and amended, the Commission's Procedural Rules, all other applicable rules and regulations, and as otherwise stated in this notice. This list of statutory authority is not intended as an exhaustive list of the Commission's statutory authority to act in this matter.

Dated this 18th day of April, 2025, at Denver, Colorado

Colorado Air Quality Control Commission



Jojo La, Administrator

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Air Quality Control Commission REGULATION

NUMBER 31

Control of Methane Emissions from Municipal Solid Waste Landfills

5 CCR 1001-35

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

Outline of Regulation

Pursuant to Colorado Revised Statutes § 24-4-103 (12.5), materials incorporated by reference are available for public inspection during normal business hours, or copies may be obtained at a reasonable cost from the Air Quality Control Commission (the Commission), 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530. Some material incorporated by reference is also available through the United States Government Printing Office, online at www.govinfo.gov. Materials incorporated by reference are those editions in existence as of the date indicated and do not include any later amendments.

PART A Applicability and Definitions

I. Purpose

I.A. This regulation establishes methane emission reduction requirements for municipal solid waste landfills in the State of Colorado. This regulation is intended to support greenhouse gas emission reductions identified in Colorado Revised Statutes, §25-7-102(2)(g).

II. Applicability

II.A. This regulation applies to all municipal solid waste landfills that have received solid waste after November 8, 1987, excluding those sources located on tribal lands that are not subject to regulation by the Commission.

II.B. The owner or operator of a municipal solid waste landfill that closed before November 8, 1987 and has a gas collection and control system installed must only comply with the requirement to install and operate a biofilter following the requirements of Part C, Sections III.C.1. - III.C.4., and III.D, upon removal or permanent shut down of the gas control device at the landfill.

III. Exemptions

III.A. This regulation does not apply to the following landfills:

III.A.1. Landfills that are regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle C or the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Chapter 103.

III.A.2. Landfills that receive only construction and demolition debris, inert material, or non-decomposable solid waste.

III.A.3. Municipal solid waste landfills with no gas collection and control system installed that closed before October 31, 1993 and have:

III.A.3.a. Less than 450,000 tons of waste-in-place; or

III.A.3.b. A design capacity of less than 2,750,000 tons (2.5 million megagrams) and 3,260,000 cubic yards (2.5 million cubic meters).

IV. Definitions

IV.A. “Active municipal solid waste (MSW) landfill" means a municipal solid waste landfill that is accepting or is permitted to accept municipal solid waste for disposal and has not been closed in accordance with applicable statutes, regulations, and local ordinances.

IV.B. “Biocover” means a material layer such as compost that has or promotes the growth of methanotrophs or methane-utilizing bacteria and is used as cover or incorporated into a cover at an MSW landfill to oxidize methane in landfill gas.

IV.C. “Biofilter” means a container with material layer(s) that have or promote the growth of methanotrophs or methane-utilizing bacteria that oxidize methane in landfill gas. A biofilter is connected to a gas collection system or gas venting system at an MSW landfill.

IV.D. “Bioreactor” means an MSW landfill or portion of an 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.

IV.E. “Closed municipal solid waste (MSW) landfill” means a municipal solid waste landfill that is no longer accepting solid waste for disposal and has documentation that the closure was conducted in accordance with the applicable statutes, regulations, and local ordinances in effect at the time of closure.

IV.F. “Component” means any equipment that is part of the gas collection and control system and that contains or contacts, or may contain, landfill gas including, but not limited to, collectors, wells, pipes, flanges, fittings, valves, flame arrestors, knock-out drums, sampling ports, blowers, compressors, connectors, and leachate cleanout risers.

IV.G. “Component leak” means any detection of methane from equipment or components that are part of a gas collection and control system using an approved monitoring method under this regulation.

IV.H. “Construction and demolition debris” means waste that is generated from construction, remodeling, repairs, or demolition of buildings, pavements, and other structures which includes but is not limited to, lumber, bricks, carpets, ceramics, sheetrock, metals, drywall, window glass, metal and plastic piping, paint and any other non-hazardous materials resulting from construction and demolition operations.

IV.I. “Continuous Operation” means that the gas collection and control system is always in operation, the existing gas collection wells are operating under vacuum while maintaining landfill gas flow, and the collected landfill gas is processed by a gas control system 24 hours per day.

IV.J. “Controlled municipal solid waste (MSW) landfill” means any MSW landfill at which a gas collection and control system is installed.

IV.K. “Corrective action analysis” means a description of all reasonable interim and long-term measures, if any, that are available, and an explanation of why the selected corrective action(s) is/are the best alternative(s), including, but not limited to, considerations of cost effectiveness, technical feasibility, safety, and secondary impacts.

IV.L. “Designated Representative” means an individual selected by an agreement binding on the owner or operator of an MSW landfill and acting in accordance with the certification statement in Part H, Section II.A.

IV.M. “Destruction efficiency” means a measure of the ability of a gas control device to combust, transform, or otherwise prevent emissions of methane from entering the atmosphere.

IV.N. “Disproportionately impacted community” means those communities that meet the definition contained in § 24-4-109(2)(b)(II)(A)-(D) and (F)-(G), C.R.S. (2023). These communities are identified as any census block group identified in the Disproportionately Impacted Community Map (November 2024) after selecting the criteria for "Mobile home communities", "Low-income population above 40%", "People of color population above 40%", "Housing cost-burdened population above 50%", "Linguistically isolated population above 20%", and "Colorado EnviroScreen Percentile score above 80”.

IV.O. "Enclosed combustion device" for purposes of this Regulation 31 means any combustion device where landfill gas is combusted in an enclosed chamber generally using a limited supply of combustion air. This may include, but is not limited to enclosed flares, steam-generating boilers, re-boilers, heaters, internal combustion engines, or gas turbines.

IV.P. "Energy recovery device" means any combustion device that uses landfill gas to recover energy in the form of steam or electricity including, but not limited to, gas turbines, internal combustion engines, boilers, and boiler-to-steam turbine systems.

IV.Q. “Final cover” means permanent cover placed over solid wastes at an MSW landfill that has been approved by the Colorado Hazardous Materials and Waste Management Division.

IV.R. “Gas control device” means any device used in a gas control system to dispose of or treat collected landfill gas, including, but not limited to, enclosed flares, internal combustion engines, boilers and boiler-to-steam turbine systems, fuel cells, and gas turbines.

IV.S. “Gas collection system” means any system that employs various gas collection wells and connected piping and gas mover equipment.

IV.T. “Gas collection and control system (GCCS)” means any system consisting of a gas collection system and a gas control system. Passive venting or carbon adsorption systems, which allow methane to escape untreated into the atmosphere at an MSW landfill, are not a gas collection and control system.

IV.U. “Gas control system” means any system that disposes of or treats collected landfill gas by one or more of the following means: combustion, gas treatment for subsequent sale, or sale for processing offsite, including for transportation fuel and injection into a natural gas pipeline.

IV.V. “Gas mover equipment” means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.

IV.W. “Inactive area” means a separate area of an MSW landfill in which solid waste is no longer being placed. The area must be separated from other areas of the landfill to ensure that the landfill gas does not migrate between active and inactive areas.

IV.X. “Inactive MSW landfill” means an MSW landfill that has not accepted waste for more than one year, is not yet closed, and is unattended due to inactivity, which has been documented by the owner or operator of the landfill.

IV.Y. "Inert material" means non-watersoluble and non-putrescible solids together with such minor amounts and types of other materials as will not significantly affect the inert nature of such solids. The term includes, but is not limited to, earth, sand, gravel rock, concrete which has been in a hardened state for at least sixty days, masonry, asphalt paving fragments, and other inert solids.

IV.Z. “Intermediate cover” means at least one foot (1') of earthen material or other suitable material placed over solid wastes in areas left temporarily unused for at least one month, but not finally closed, at an MSW landfill.

IV.AA. “Landfill gas” means any untreated, raw gas derived through a natural process from the decomposition of organic waste deposited in an MSW landfill, from the evolution of volatile species in the waste, or from chemical reactions of substances in the waste.

IV.BB. "Landfill surface" means the area of an MSW landfill under which decomposable solid waste has been placed, excluding the working face.

IV.CC. “Leachate” means liquid that has passed through or had contact with solid wastes at an MSW landfill and may contain soluble, miscible, or suspended constituents removed from the wastes.

IV.DD. “Leachate recirculation” means the practice of taking the leachate collected from the MSW landfill and reapplying it to the landfill by any one of a variety of methods, including pre-wetting of the waste, direct discharge into the working face, spraying, infiltration ponds, vertical injection wells, horizontal gravity distribution systems, and pressure distribution systems, as approved by the Colorado Hazardous Materials and Waste Management Division in the landfill’s Engineering Design and Operations Plan.

IV.EE. “Lower explosive limit” means the lowest percent, by volume, of a mixture of explosive gas or gases in air that will propagate a flame at 25ºC (77ºF) and at standard atmospheric pressure.

IV.FF. “Municipal solid waste” means solid waste from household, community, commercial and industrial sources that does not contain hazardous wastes as defined in Section 25-15-101(9) of the Colorado Hazardous Waste Act unless otherwise regulated by the Colorado Department of Public Health and Environment.

IV.GG. "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 Resource Conservation and Recovery Act Subtitle D wastes 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 by one or more entities. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

IV.HH. “Nondecomposable or nondegradable solid 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, metals, earth, rock, brick, glass, ceramics, clay products, inert material, slag waste, asbestos waste, and waste tire chips.

IV.II. “Nonrepeatable, momentary readings” means indications of the presence of methane, which persist for less than five seconds and do not recur while the methane monitoring device detector is monitoring the same location.

IV.JJ. “Open Flare” means a combustor that operates with an open flame without enclosure to combust landfill gas. For purposes of this definition, a shroud is not considered an enclosure.

IV.KK. “Operator” means any person or entity that:

IV.KK.1. Operates the MSW landfill and/or controls the operations of the MSW landfill.

IV.KK.2. Is responsible for complying with any federal, state, or local requirements relating to methane emissions from real property used for MSW landfill purposes and subject to this regulation.

IV.KK.3. Operates any stationary equipment for the collection of landfill gas at an MSW landfill.

IV.KK.4. Purchases landfill gas from an owner or operator of an MSW landfill and operates any stationary equipment for the treatment of landfill gas

IV.KK.5. Purchases untreated landfill gas from an owner or operator of an MSW landfill and operates any stationary equipment for the combustion of landfill gas, or

IV.KK.6. Is otherwise responsible for any part or all of the operation of an MSW landfill.

IV.LL. “Owner” means any person or entity that:

IV.LL.1. Holds title to the real property on which the MSW landfill is located, including but not limited to title held by joint tenancy, tenancy in common, community property, life estate, estate for years, lease, sublease, or assignment, except title held solely as security for a debt such as mortgage.

IV.LL.2. Is responsible for complying with any federal, state, or local requirements relating to methane emissions from real property used for MSW landfill purposes and subject to this regulation.

IV.LL.3. Owns any stationary equipment for the collection of landfill gas at an MSW landfill.

IV.LL.4. Purchases landfill gas from an owner or operator of an MSW landfill and operates any stationary equipment for the treatment of landfill gas.

IV.LL.5. Purchases untreated landfill gas from an owner or operator of an MSW landfill and operates any stationary equipment for the combustion of landfill gas, or

IV.LL.6. Otherwise owns an MSW landfill or part of an MSW landfill.

IV.MM. “Petroleum contaminated soils” means soils contaminated by leaking oil and gas storage tanks, as well as soils impacted by oil and gas operations and spills.

IV.NN. “Ppm-m” means parts per million meter. IV.OO.

“Ppmv” means parts per million by volume.

IV.PP. “Remote methane monitoring” means methane emissions monitoring of an MSW landfill conducted off-site from a landfill using a Division-approved technology for such a purpose, including on satellite, aircraft, or mobile monitoring platform, but not unmanned aerial systems or unmanned aerial vehicles.

IV.QQ. “Residential community” means an area where more than ten (10) residential building units are grouped together within a one (1) mile radius.

IV.RR. “Responsible Official” means the definition of that term found in the Air Quality Control Commission’s Common Provisions Regulation, 5 CCR 1001-2 (effective December 15, 2024).

IV.SS. “Root cause analysis” means an assessment conducted through a process of investigation to determine the primary cause, and any other contributing causes, of positive pressure or a temperature exceedance at a wellhead.

IV.TT. “Site boundary” means the outermost perimeter of a solid waste disposal site and facility, such as an MSW landfill, as designated pursuant to the Colorado Solid Waste Disposal Sites and Facilities Act, as amended.

IV.UU. “Solid waste” means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, air pollution control facility, or other discarded material; including solid, liquid, semisolid, or contained gaseous material resulting from industrial operations, commercial operations or community activities. “Solid waste” does not include any solid or dissolved materials in domestic sewage, or agricultural wastes, or solid or dissolved materials in irrigation return flows, or industrial discharges which are point sources subject to permits under the provisions of the "Colorado Water Quality Control Act", Title 25, Article 8, CRS or materials handled at facilities licensed pursuant to the provisions on “Radiation Control Act” in Title 25, Article 11, CRS. “Solid waste” does not include: (a) Materials handled at facilities licensed pursuant to the provisions on radiation control in Article 11 of Title 25, C.R.S.; or (b) Excluded scrap metal that is being recycled; or(c) Shredded circuit boards that are being recycled.

IV.VV. “Treatment system” means a system that filters, de-waters, and compresses landfill gas.

IV.WW. "Waste-in-place" means the total amount of solid waste placed in an MSW landfill estimated in short tons. The solid waste density is assumed to be 1,300 pounds per cubic yard, and the decomposable fraction is assumed to be 70 percent by weight, unless the Colorado Hazardous Materials and Waste Management Division and the local authority approves alternative values.

IV.XX. “Well Raising” means an MSW landfill activity where an existing gas collection well is temporarily disconnected from a vacuum source, and the non-perforated pipe attached to the well is

extended vertically to allow the addition of a new layer of solid waste or the final cover; or is extended horizontally to allow the horizontal extension of an existing layer of solid waste or cover material. The extended pipe (well extension) is then re-connected in order to continue collecting gas from that well.

IV.YY. "Working face" means that portion of an MSW landfill where solid wastes are actively unloaded, placed, compacted and covered, at any time of operation.

PART B Waste-in-Place Reporting and Gas Collection and Control System Determination

I. Waste-in-Place Reporting

I.A. Each owner or operator of an active, inactive, or closed MSW landfill must submit a waste-in-place report to the Division pursuant to Part H, Section II.A.1. no later than March 31, 2026. If the MSW landfill has more than one owner or operator, the waste-in-place report must be for all waste in the landfill.

I.A.1. If the reported waste-in-place is greater than or equal to 450,000 short tons, the owner or operator must comply with the requirements of Part B, Section II.A.

I.A.2. If the reported waste-in-place for an active or inactive MSW landfill is less than 450,000 tons, the owner or operator must track and record total waste-in-place at the landfill on a monthly basis and submit subsequent waste-in-place reports to the Division pursuant to Part H, Section II.A.1., by March 31 of each year for the period ending December 31 of the prior year. These reports must be submitted until either:

I.A.2.a. The MSW landfill's waste-in-place meets or exceeds 450,000 tons of waste-in-place upon which the owner or operator must submit a waste-in-place report pursuant to Part H, Section II.A.1., to the Division within 90 calendar days of the landfill meeting or exceeding 450,000 tons of waste-in-place and comply with the requirements of Part B, Section II.B.; or

I.A.2.b. The owner or operator of the MSW landfill submits a Closure Notification pursuant to Part H, Section II.A.17.

I.A.3. If the reported waste-in-place for a closed municipal solid waste landfill is less than 450,000 tons, no further waste-in-place reports must be submitted to the Division.

II. Methane Generation Rate and Gas Collection and Control System Determination

II.A. The owner or operator of an MSW landfill that reaches or exceeds 450,000 tons of waste-in-place on or before December 31, 2025 must calculate the landfill's methane generation rate based on the waste-in-place at the end of calendar year 2025 using the procedures in Part I, Section III., and submit a methane generation rate report to the Division pursuant to Part H, Section II.A.2., no later than March 31, 2026.

II.B. The owner or operator of an MSW landfill that reaches or exceeds 450,000 tons of waste-in-place after December 31, 2025 must calculate the landfill's methane generation rate using the procedures in Part I, Section III., based on waste-in-place at the end of the most recent full calendar year and submit a methane generation rate report to the Division pursuant to Part H, Section II.A.2., within 90 calendar days of the landfill reaching or exceeding 450,000 tons of waste-in-place, unless the landfill exceeds 450,000 tons of waste-in-place during the fourth quarter of a calendar year, in which case the owner or operator may complete the methane generation rate calculation at the end of the calendar year based on waste-in-place by the end of that year and submit the report by March 31 of the following year.

II.C. If the calculated methane generation rate is less than 664 metric tons (732 tons) per year, the owner or operator of the MSW landfill must:

II.C.1. Recalculate the methane generation rate based on the waste-in-place at the end of each calendar year using the procedures in Part I, Section III., and submit a methane generation rate report to the Division pursuant to Part H, Section II.A.2., by March 31 of the following calendar year until either of the following conditions is met:

II.C.1.a. The calculated methane generation rate is greater than or equal to 664 metric tons (732 tons) per year, or

II.C.1.b. The owner or operator submits a closure notification for the MSW landfill pursuant to Part H, Section II.A.17.

II.D. If the calculated methane generation rate is greater than or equal to 664 metric tons (732 tons) per year but less than 1,814 metric tons (2,000 tons) per year, the owner or operator of the MSW landfill must either:

II.D.1. Comply with the requirements of Part C to install and operate a gas collection and control system and meet all other applicable requirements of this regulation, or

II.D.2. Complete quarterly surface emissions monitoring beginning no later than 90 calendar days after the methane generation rate report is required to be submitted to the Division using an approved monitoring method in Part D, Sections I.A.1, I.A.2, or I.A.3., and following the requirements of Part D, Sections I.B., I.C., and I.D. The owner or operator must submit to the Division a surface emissions monitoring notification at least 30 calendar days prior to each quarterly monitoring event indicating the planned date for monitoring, and a surface emissions monitoring demonstration report within 30 calendar days after each monitoring event pursuant to Part H, Section II.A.3. The quarterly monitoring must be separated by at least 30 calendar days from one quarter to the next unless approved by the Division under Part G.

II.D.2.a. If any measured emissions meet or exceed the limits specified in Part D, Sections I.C.2. or I.D.2., the owner or operator of the MSW landfill must cease the quarterly monitoring, complete repair according to Part D, Sections I.C.2.c. or I.D.2.a., and comply with the requirements of Part C to install and operate a gas collection and control system and meet all other applicable requirements of this regulation.

II.D.2.b. If no measured emissions meet or exceed the limits specified in Part D, Sections I.C.2. or I.D.2., from the surface of an active or inactive MSW landfill after four consecutive quarterly periods of monitoring, the owner or operator of the MSW landfill must recalculate the landfill's methane generation rate using the procedures in Part I, Section III., based on waste-in-place at the end of the most recent full calendar year and submit a methane generation rate report to the Division pursuant to Part H, Section II.A.2., within 30 calendar days after the fourth consecutive quarterly monitoring event.

II.D.2.b.(i) If the recalculated methane generation rate is greater than 1,814 metric tons (2,000 tons) per year, the owner or operator must comply with the requirements of Part C to install and operate a gas collection and control system and meet all other applicable requirements of this regulation.

II.D.2.b.(ii) If the recalculated methane generation rate is less than 1,814 metric tons (2,000 tons) per year, the owner or operator must continue quarterly surface emission monitoring and follow the notification and reporting requirements of Section II.D. and the requirements of Sections II.D.2.a. or II.D.2.b.as applicable until a Closure Notification is submitted pursuant to Part H, Section II.A.17.

II.D.2.c. If no measured emissions meet or exceed the limits specified in Part D, Sections I.C.2. or I.D.2., from the surface of a closed MSW landfill after four consecutive quarterly periods of monitoring, the owner or operator of the MSW landfill must complete the following.

II.D.2.c.(i) Submit a Closure Notification pursuant to Part H, Section II.A.17 if one has not already been submitted; and,

II.D.2.c.(ii) Comply with only Part E and Part F requirements of this regulation.

II.E. If the calculated methane generation rate is greater than or equal to 1,814 metric tons (2,000 tons) per year, the owner or operator of the MSW landfill must comply with the requirements of Part C to install and operate a gas collection and control system and meet all other applicable requirements of this regulation.

II.F. If the owner or operator of a MSW landfill with more than 450,000 tons of waste-in-place adds any liquid, other than leachate in a controlled fashion, to the waste mass to reach a minimum average moisture content of at least 40 percent by weight to accelerate or enhance the anaerobic biodegradation of the waste as approved by the Colorado Hazardous Materials and Waste Management Division, the owner or operator must install and operate a gas collection and control system that meets the requirements in Part C in accordance with the following:

II.F.1. Install the gas collection and control system for the bioreactor before initiating liquids addition and extend the gas collection and control system into each new cell or area of the bioreactor prior to initiating liquids addition in that area;

II.F.2. Begin operating the gas collection and control system within 180 calendar days after initiating liquids addition or within 180 calendar days after achieving a moisture content of 40 percent by weight, whichever is later; and,

II.F.3. Calculate the bioreactor moisture content pursuant to Part I, Section VI.

PART C Gas Collection and Control System Requirements

I. Design Plan and Gas Collection and Control System Installation

I.A. Each owner or operator of an MSW landfill subject to the requirements of this regulation to install and operate a gas collection and control system at the MSW landfill must meet the Design Plan requirements of Section I.B.

I.A.1. The owner or operator of an MSW landfill must submit a Design Plan to the Division within 180 calendar days of meeting the requirement to install and operate a gas collection and control system under Part B, Sections II.D.1, II.D.2.a., II.D.2.b.(i), or II.E.

I.A.2. Owners or operators of an MSW landfill with an existing gas collection and control system that does not meet the requirements of Part C, Section II.A., and Sections II.B., II.C.

or II.E., or does not have an approved Design Plan that meets the requirements of Section I.B., must submit a new or an amended Design Plan to the Division to meet those requirements within 180 calendar days of becoming subject to the gas collection and control system requirements of this regulation.

I.A.3. Upon receipt of an initial or revised Design Plan, the Division must review the information required to be submitted under Section I.B. and either approve or disapprove the Design Plan, or request that additional information for the Design Plan be submitted by the owner or operator. If the Division does not approve or disapprove the Design Plan, or does not request that additional information be submitted within 90 days of receipt, then the owner or operator may continue with implementation of the Design Plan with the recognition that the owner or operator is proceeding at their own risk. In the event that the Design Plan is required to be modified to obtain approval by the Division, the owner or operator must take any steps necessary to conform any prior actions to the approved Design Plan.

I.B. The Design Plan must meet the following requirements:

I.B.1. Be prepared and certified by a Colorado Professional Engineer.

I.B.2. Address the following issues:

I.B.2.a. Depths of solid waste.

I.B.2.b. Solid waste gas generation rates and flow characteristics.

I.B.2.c. Cover properties.

I.B.2.d. Gas collection and control system expandability including well raising and installation of horizontal collectors and wells or caisson wells as applicable.

I.B.2.e. Leachate and condensate management.

I.B.2.f. Prevention of liquids intrusion or blockage in the gas collection and control system, as well as liquids management and removal.

I.B.2.g. Off-site and on-site migration of subsurface landfill gas.

I.B.2.h. Accessibility of the gas collection and control system.

I.B.2.i. Compatibility and integration with filling operations.

I.B.2.j. Integration with closure end use.

I.B.2.k. Air intrusion control in the gas collection and control system.

I.B.2.l. Corrosion resistance.

I.B.2.m. Fill settlement.

I.B.2.n. Resistance of the gas collection system to the solid waste decomposition heat.

I.B.2.o. The ability to isolate individual components or sections of the gas collection system for repair, troubleshooting, or expansion without shutting down the entire gas collection system.

I.B.3. Provide for the collection of landfill gas from each area, cell, or group of cells in the MSW landfill in which solid waste has been placed for a period of at least 12 months or more, as well as collection of landfill gas in new or active areas or cells if the requirement of Part C, Section I.H.2., applies, and the control of the collected landfill gas through the use of a gas collection and control system that meets the requirements of Part C, Section II.A. and Sections II.B., II.C., or II.E.

I.B.4. Demonstrate that the gas collection and control system is designed to handle the maximum expected gas generation flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment and that the gas control device(s) specifications are appropriate for the flow rate. The maximum expected gas generation flow rate must be calculated using the method in Part I, Section I., or an alternative method approved pursuant to Part I, Section VII.

I.B.5. Demonstrate how the gas collection system will meet the requirements of Part C, Sections II.A.7. - II.A.12.

I.B.6. Demonstrate that the gas collection and control system is designed to collect gas at an extraction rate to comply with the surface methane emission limits in Part D, Sections I.C.2. and I.D.2., minimize or prevent equipment and component leaks, and be sufficient to meet all operational and performance standards in this regulation.

I.B.7. Demonstrate that the gas collection and control system is designed 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. If a geomembrane or synthetic cover is used at the MSW landfill, the Design Plan must specify acceptable pressure limits for the wellheads if negative pressure is not met.

I.B.8 Identify the density of wells, horizontal collectors, surface collectors, or other gas extraction devices necessary to achieve compliance with Part C, Section I.C, and include a map of the MSW landfill showing where the gas collection and control system will be installed.

I.B.9. Identify gas collection and control system equipment maintenance, calibrations, and schedules, as well as vendor specifications.

I.B.10. Include any requests for open flare exemptions pursuant to Part C, Section II.D.5.a., as well as any proposed alternative compliance options pursuant to Part G and a justification of the need for the proposed alternatives.

I.B.11. Include a description of mitigation measures to be used to prevent the release of methane and other air pollutants into the atmosphere from the working face, such as minimizing the working face size based on the volume of incoming waste; during the installation, preparation, or expansion of wells, piping, or other equipment for the gas collection and control system; during repairs or the temporary shutdown of gas collection system components; when solid waste is to be excavated and moved as approved by the Colorado Hazardous Materials and Waste Management Division; during active mining activities as approved by the Colorado Hazardous Materials and Waste Management Division; or, when preventing or extinguishing landfill fires.

I.B.12. For active MSW landfills, identify areas of the landfill that are closed or inactive.

I.B.13. Identify any areas of the MSW landfill that contain only asbestos waste or non-decomposable solid waste that the owner or operator proposes to exclude from gas

collection. The Design Plan must contain documentation of the nature of the waste, date of deposition, and location and amount of asbestos waste or non-decomposable solid waste deposited in the area.

I.B.14. Include procedures for detecting and suppressing any internal landfill fires or thermal waste oxidation events that might occur within the waste, and for mitigating any damage that may have occurred to pollution control devices such as the MSW landfill's liner, leachate collection system, cap, or gas collection and control system as a result of the event.

I.B.15. For MSW landfills that route the collected landfill gas to a treatment system that processes the collected gas for subsequent sale or beneficial use, a site-specific treatment system monitoring plan pursuant to Part C, Section II.E.3.c.

I.C. The owner or operator of an active MSW landfill that is required to install and operate a new gas collection and control system as required by this regulation, must do so within 18 months after the submission deadline for the design plan unless an extension is approved by the Division according to the following requirements.

I.C.1. The Division may approve an extension to the installation deadline for a gas collection and control system to an owner or operator for good cause shown, such as, but not limited to, if the owner or operator timely applied for a permit but does not yet have an issued permit from the Division for installing the gas collection and control system.

I.C.2. An owner or operator must submit an extension request in writing to the Division at least 60 calendar days prior to the installation deadline that includes the basis for the extension request and a proposed deadline for installing the gas collection and control system, which must be approved in writing by the Division for the extension to be granted.

I.D. The owner or operator of an inactive or closed MSW landfill that is required to install and operate a new gas collection and control system as required by this regulation, must do so within 24 months after the submission deadline for the design plan unless an extension is approved by the Division according to the requirements of Sections I.C.1. and I.C.2.

I.E. The owner or operator of an MSW landfill required to install and operate a gas collection and control system must submit any necessary permit application(s) for the gas collection and control system to the Division no later than the due date for submitting the design plan.

I.F. The MSW landfill and its gas collection and control system must be operated, maintained, and expanded in accordance with the procedures and schedules in the approved design plan and applicable regulations.

I.G. The owner or operator of a controlled MSW landfill must place each well or design component of the gas collection and control system as specified in the approved design plan.

I.H. Following initial construction of a new gas collection and control system at an active MSW landfill, or for active MSW landfills with an existing gas collection and control system, the owner or operator of the landfill must install each new component of the gas collection and control system in each area, cell, or group of cells in the landfill where solid waste is or will be placed according to the following requirements.

I.H.1. For an MSW landfill with an actual solid waste acceptance rate of less than 200,000 tons per year, new components or expansion of existing components must be installed and operational such that landfill gas is collected from solid waste that has been in place for 12 months in an area, cell, or group of cells.

I.H.2. For an MSW landfill with an actual solid waste acceptance rate of 200,000 tons per year or greater, new components must be installed prior to solid waste being placed, such as the floor of a new area or cell, and as solid waste is being placed in an active area or cell. Such components installed in these areas or cells may include horizontal gas collectors and associated wells, or bottom-up collectors or caisson wells.

I.H.2.a. If horizontal gas collectors are used, they must be installed above or away from the leachate collection system or vacuum applied to the leachate collection risers, or both.

I.H.2.b. The operation of these components must begin after at least 15 vertical feet of solid waste has been placed over a horizontal collector or the bottom of a caisson well and then each corresponding section added to the caisson well, and either upon detection of landfill gas pressure as determined by pressure monitoring of the horizontal collector or caisson well conducted on a weekly basis, or when the solid waste has been in place for at least 12 months, whichever occurs first.

I.I. In addition to meeting the requirements of Section I.H., the owner or operator of an MSW landfill must install any additional components, such as conventional vertical wells, in active areas or cells, inactive areas or cells, or closed or final grade areas or cells of the landfill as necessary to achieve or maintain the requirements in Section I.B.3 and ensure continuous and long-term gas collection in these areas or cells. The installation and operation of such components must be completed on a schedule that ensures there is no delay in meeting or maintaining the requirements of Section I.B.3.

II. Gas Collection and Control System Operational Standards and Requirements

II.A. Each owner or operator of an MSW landfill required by this regulation to install and operate a gas collection and control system at the MSW landfill must meet the following requirements.

II.A.1. Route all collected landfill gas to a gas control device or devices or gas control system, and maintain continuous operation of the gas collection and control system except as provided in Part C, Sections II.J. and II.K.

II.A.2. Operate the gas collection and control system to comply with Part D, Section II.

II.A.3. Design and operate the gas collection system to draw all the landfill gas toward the gas control device or devices.

II.A.4. Design and operate the gas collection system to minimize off-site and on-site migration of subsurface landfill gas in compliance with 6 CCR 1007-2 (January 14, 2025).

II.A.5. The gas collection system must extend and be expanded as necessary to comply with emission and migration standards.

II.A.6. In the event the gas collection or control system is inoperable, the gas mover system must be shut down and all valves in the gas collection and control system contributing to venting of the gas to the atmosphere must be closed immediately using an automatic blower shutdown and valve closing. Efforts to repair the gas collection or control system must be initiated and completed in a manner such that downtime is kept to a minimum according to the requirements of Section II.K.4., and the gas collection and control system is returned to operation as expeditiously as practicable.

II.A.7. 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:

II.A.7.a. Convey projected amounts of landfill gases.

II.A.7.b. Withstand installation, static, and settlement forces.

II.A.7.c. Withstand planned overburden or traffic loads.

II.A.8. Gas collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss which may impair performance across the intended extent of control, and perforations must be situated with regard to the need to prevent excessive air infiltration.

II.A.9. Vertical or horizontal wells must be placed so as not to endanger underlying liners and must address the occurrence of liquids within the landfill.

II.A.9.a. 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.

II.A.9.b. Horizontal gas collectors must be properly sloped to drain accumulated liquids and be designed for uniform vacuum distribution and to withstand expected overburden pressures.

II.A.9.c. Installation of wells for horizontal collectors must be considered for both sides of a collector to minimize reduced gas collection from formation of low points in the collector.

II.A.9.d. Gas collection devices must be designed so as not to allow indirect short circuiting of air into the soil cover, into the municipal solid waste, or into the gas collection system, or gas into the air.

II.A.9.e. Any gravel used around pipe perforations must be of a dimension so as not to penetrate or block the perforations.

II.A.10. Gas collection devices may be connected to the collection header pipes below or above the landfill surface.

II.A.10.a. The connector assembly must include a positive closing throttle valve, any necessary seals and couplings, access couplings, and at least one sampling port.

II.A.10.b. The collection devices must be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

II.A.11. Landfill gas must be conveyed through the gas collection system header pipe(s) to a gas control device.

II.A.12. 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:

II.A.12.a. For existing collection systems, the flow data must be used to project the maximum flow rate, or if no flow data exists, the procedures in Part I, Section I., must be used.

II.A.12.b. For new collection systems, the maximum flow rate must be determined in accordance with Part I, Section I.

II.B. Each owner or operator of an MSW landfill subject to the requirements of this regulation who operates an enclosed flare to control landfill gas must route the collected landfill gas to an enclosed flare that achieves a methane destruction efficiency of at least 99 percent by weight and meets the following requirements:

II.B.1. The enclosed flare must be equipped with automatic dampers, an automatic shutdown device, and a flame arrester.

II.B.2. The enclosed flare must be installed, calibrated, operated and maintained in accordance with the manufacturer's instructions and specifications and operated within the parameter ranges established during the most recent performance test. The enclosed flare must be operated at an average temperature no more than 28ºC (or 50º F) below the average combustion temperature during the most recent performance test.

II.B.3. The enclosed flare must have a sufficient flow of propane, natural gas, or another fuel source approved by the Division to the pilot light for flare startup and restart to prevent unburned collected methane from being emitted to the atmosphere.

II.B.4. The enclosed flare must be equipped with a continuous recording temperature monitoring device that monitors temperature in the combustion zone of the flare with an accuracy of plus or minus (±) 1 percent of the temperature being measured expressed in degrees Celsius or Fahrenheit, or plus or minus (±) 0.5 degrees Celsius, whichever is greater. The temperature monitoring device must be installed, calibrated, operated, and maintained according to the manufacturer's specifications.

II.B.5. The enclosed flare must be equipped with a gas flow rate measuring device that is installed, calibrated, operated and maintained according to the manufacturer's specifications, and records flow to the flare at least every 15 minutes unless a valve in the line connecting the flare to the gas mover equipment has been manually secured in the closed position. Records of the date and time of valve position changes must be maintained by the owner or operator.

II.B.6. If there is a bypass line from the line connecting the flare to the gas mover equipment, the bypass line must be equipped with a gas flow rate measuring device that is installed, calibrated, operated and maintained according to the manufacturer's specifications and records bypass flow.

II.B.6.a. The bypass line valve must be secured in the closed position with a car seal or a lock-and-key type configuration.

II.B.6.b. 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.

II.C. Each owner or operator of an MSW landfill subject to the requirements of this regulation who operates an open flare to control landfill gas that is allowed pursuant to Part C, Section II.D., must route the collected landfill gas to an open flare that meets the requirements of 40 C.F.R. § 60.18 (December 22, 2008) and the following requirements:

II.C.1. The open flare must be installed, calibrated, operated and maintained in accordance with the manufacturer's instructions and specifications.

II.C.2. The open flare must be equipped with a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate and record the continuous presence of a flame.

II.C.3. The open flare must be equipped with a gas flow rate measuring device that is installed, calibrated, operated and maintained according to the manufacturer's specifications, and records flow to the flare at least every 15 minutes unless a valve in the line connecting the flare to the gas mover equipment has been manually secured in the closed position. Records of the date and time of valve position changes must be maintained by the owner or operator.

II.C.4. If there is a bypass line from the line connecting the flare to the gas mover equipment, the bypass line must be equipped with a gas flow rate measuring device that is installed, calibrated, operated and maintained according to the manufacturer's specifications and records bypass flow.

II.C.4.a. The bypass line valve for it must be secured in the closed position with a car-seal or a lock-and-key type configuration.

II.C.4.b. 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.

II.D. The operation of an open flare at an MSW landfill is prohibited on or after January 1, 2029 unless the owner or operator of the MSW landfill demonstrates that one of the conditions of Sections II.D.1 - II.D.4. apply and receives written approval from the Division to operate the open flare per Section II.D.5.

II.D.1. The methane generation rate is less than 664 metric tons (732 tons) per year in accordance with the applicable methods in Part I, Section III., and is insufficient to support the operation of an enclosed flare or other gas control device for the landfill gas on a continuous basis. In order to qualify for this exemption, the requirements of Part C, Sections III.B.1. and III.B.2., must be met.

II.D.2. The owner or operator is seeking to temporarily operate an open flare during the repair or maintenance of the gas control system if the open flare is not already approved as a backup or secondary control device pursuant to Section II.D.3., or while awaiting the installation of an enclosed flare or other gas control device, or to address offsite gas migration issues. An owner or operator must identify why the open flare is needed and the period of time it will be in temporary operation as part of meeting the requirement of Section II.D.5, and submit a notification to the Division in writing that the flare is no longer operating within 7 calendar days after the open flare ceases temporary operation.

II.D.3. The open flare is used as a backup or secondary gas control device to a gas control device that is not an open flare, unless the open flare is a secondary gas control device at an MSW landfill located in a disproportionately impacted community or the site boundary of the landfill is within 1 mile of a residential community within a disproportionately impacted community.

II.D.4. The open flare was installed between January 1, 2020 and January 1, 2025, in which case the open flare may continue to operate for no more than 10 years after its installation date if the landfill is not located in a disproportionately impacted community or

the site boundary of the landfill is not within 1 mile of a residential community located within a disproportionately impacted community. The open flare may also continue to operate if one of the conditions of Sections II.D.1., II.D.2., or II.D.3. are met.

II.D.5. An owner or operator seeking to operate an open flare in accordance with one of the requirements of Sections II.D.1. - II.D.4. must submit a written request to the Division demonstrating the requirements have been met, which must be approved in writing by the Division for the open flare to be used or continue operating.

II.D.5.a. If an owner or operator has an existing open flare for which an exemption under Sections II.D.1. - II.D.4. is being sought, the open flare request must be included with the gas collection and control system design plan submission required by Part B, Section I.A.

II.D.5.b. The operation of a new open flare at an MSW landfill is not allowed unless approved in writing by the Division or if the open flare is being installed pursuant to Part C, Section III.B.7. A new open flare may not be approved as a backup or secondary gas control device.

II.E. An owner or operator of a MSW landfill may operate a gas control device other than a flare to control landfill gas if the gas control device complies with one of the following requirements of Sections II.E.1. - II.E.3.

II.E.1. The collected landfill gas is routed to a boiler or process heater with a design heat input capacity equal to or greater than 44 megawatts per hour (150 MMBtu/hr), provided that the landfill gas stream is introduced into the flame zone of the boiler or process heater.

II.E.1.a. The boiler or process heater must be operated, monitored and maintained in accordance with written manufacturer instructions and specifications, which must be provided to the Division upon request.

II.E.1.b. The owner or operator must maintain records of appropriate monitoring procedures and operating parameters that would indicate proper performance of the boiler or process heater in accordance with Section II.E.1.a. The Division may also specify additional monitoring procedures to follow.

II.E.1.c. The boiler or process heater achieves a methane destruction efficiency of at least 99 percent by weight pursuant to Part I, Section II.

II.E.2. The collected landfill gas is routed to an energy recovery device, or series of devices that meet the following requirements.

II.E.2.a. Achieves a methane destruction efficiency of at least 99 percent by weight pursuant to Part I, Section II., except for lean-burn internal combustion engines, which must reduce the outlet methane concentration to less than 3,000 parts per million by volume, dry basis corrected to 15 percent oxygen.

II.E.2.b. The gas control device(s) operates within the parameter ranges established during the most recent performance test for methane destruction efficiency determined under Part I, Section II., or within engineering or manufacturer's established parameter ranges until a performance test is performed according to Part I, Section II.

II.E.2.c. The gas control device(s) is operated and maintained in accordance with written manufacturer instructions and specifications, which must be provided to the Division upon request.

II.E.2.d. The owner or operator must maintain records of appropriate monitoring procedures and operating parameters that would indicate proper performance of the gas control device(s) in accordance with Sections II.E.2.b. and II.E.2.c. The Division may also specify additional monitoring procedures to follow.

II.E.3. The collected landfill gas is routed to a treatment system that processes the collected gas for subsequent sale or beneficial use provided that:

II.E.3.a. The venting of landfill gas to the ambient air does not occur.

II.E.3.b. Any treated landfill gas that cannot be routed for subsequent sale or beneficial use must be controlled in accordance with the requirements of Part C, Sections II.B, II.C., II.E.1., or II.E.2., as applicable.

II.E.3.c. The owner or operator of the MSW landfill prepares and follows a site-specific treatment system monitoring plan, submitted with the gas collection and control system design plan, that includes all of the following:

II.E.3.c.(i) Monitoring parameters that will be recorded to ensure the treatment system is operating properly for each intended end use of the treated landfill gas that at a minimum includes filtration, de-watering, and compression parameters.

II.E.3.c.(ii) Monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for each intended end use of the treated landfill gas.

II.E.3.c.(iii) Documentation of the monitoring methods and ranges, along with justification for their use.

II.E.3.c.(iv) Processes and methods used to collect the necessary monitoring data.

II.E.3.c.(v) A description of the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems.

II.E.3.d. The treatment system must be equipped with a gas flow rate measuring device that is installed, calibrated, operated and maintained according to the manufacturer's specifications, and records flow to the treatment system at least every 15 minutes unless a valve in the line connecting the treatment system to the gas mover equipment has been manually secured in the closed position. Records of the date and time of valve position changes must be maintained by the owner or operator.

II.E.3.e. If there is a bypass line from the line connecting the treatment system to the gas mover equipment, the bypass line must be equipped with a gas flow rate measuring device that is installed, calibrated, operated and maintained according to the manufacturer's specifications and records bypass flow.

II.E.3.e.(i) The bypass line valve must be secured in the closed position with a car-seal or a lock-and-key type configuration.

II.E.3.e.(ii) 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.

II.F. Each owner or operator of an MSW landfill subject to the gas collection and control system requirements of this regulation who operates a gas control device(s) at the landfill must conduct performance tests of the device(s) using the applicable test methods identified in Part I, Section II., and according to the following requirements.

II.F.1. Conduct an initial performance test within 180 calendar days of start-up of the gas collection and control system.

II.F.2. Conduct the first performance test required under this regulation no later than June 30, 2026 for a gas control device that is already in operation as of December 31, 2025.

II.F.3. If the gas control device was previously tested on or after May 16, 2025 to meet applicable federal requirements, it may be tested no later than 45 calendar days following the 1-year anniversary date of the prior performance test, or within 4,000 hours of operation since the prior performance test if the gas control device is a backup control device, provided the performance test showed compliance with federal requirements.

II.F.4. Conduct subsequent annual performance tests required under this regulation no later than 45 calendar days following the 1-year anniversary date of the prior performance test, or within 4,000 hours of operation since the prior performance test for gas control devices that are backup control devices.

II.F.5. All performance testing must be approved by the Division prior to conducting the performance test and meet the requirements of 5-CCR-1001-2, Part II.C. (December 15, 2024).

II.F.6. Process information necessary to document operating conditions during the test must be recorded and include an explanation to support that such conditions represent normal operation, which must be provided to the Division upon request.

II.F.7. Performance tests may not be conducted during periods of malfunction.

II.F.8. If any three consecutive performance tests conducted pursuant to the applicable schedules outlined in Sections II.F.2 and II.F.3. demonstrate compliance with the requirements of this regulation, then performance testing may be conducted every three years, or every 12,000 operating hours for gas control devices that are backup control devices. If a subsequent performance test demonstrates noncompliance with the requirements of this regulation, the performance testing frequency must return to annual, or every 4,000 hours of operation for gas control devices that are backup control devices.

II.G. Each owner or operator of an MSW landfill subject to the gas collection and control system requirements of this regulation must operate the gas collection and control system under a vacuum or negative pressure, except as provided in Part C, Sections II.I. and II.J., or under any of the following conditions.

II.G.1. Use of a geomembrane or synthetic cover, upon which the owner or operator must develop acceptable pressure limits for the wellheads and include them in the Design Plan.

II.G.2. A decommissioned well for which vacuum or negative pressure will not apply.

II.G.3. A fire or increased well temperature. The owner or operator must record instances when positive pressure occurs in efforts to avoid a fire and these records must be submitted with the semi-annual reports as provided in Part H, Section II.A.12.

II.H. Each owner or operator of an MSW landfill subject to the gas collection and control system requirements of this regulation must operate each interior wellhead in the gas collection system with a landfill gas temperature less than 55 degrees Celsius (131 degrees Fahrenheit) unless a higher operating temperature is approved by the Division. The Division may approve an alternate temperature only where an owner or operator submits to the Division a request which uses supporting data to adequately demonstrate that the higher operating temperature value at a particular well will not cause a fire and not significantly inhibit anaerobic decomposition by killing methanogens.

II.I. Each owner or operator of an MSW landfill subject to the gas collection and control system requirements of this regulation must install a sampling port and measuring devices, or an access port for measuring devices, at each wellhead and comply with the following, using measuring devices that meet the requirements of Part I, Section IV.

II.I.1. Monitor and record nitrogen or oxygen concentration in the landfill gas on at least a weekly basis.

II.I.1.a. If measured nitrogen concentration is at or above 20% or oxygen concentration is at or above 5%, the owner or operator must evaluate whether action is needed to address the high readings and document any action(s) taken or an explanation for why no action was taken.

II.I.1.b. An owner or operator may request approval of an alternative nitrogen or oxygen concentration limit from the Division, which if approved must be used in place of the standard limits in Section II.I.1.a. with the same applicable requirements for exceedances.

II.I.2. Measure and record the gauge pressure in each wellhead on at least a weekly basis.

II.I.2.a. If there is any positive pressure reading other than as provided in Section II.G., the owner or operator must take the following actions while ensuring any attempted corrective measure does not cause an exceedance of other operational or performance standards.

II.I.2.a.(i) Initiate and complete corrective action within 5 calendar days of the positive pressure measurement.

II.I.2.a.(ii) If negative pressure cannot be achieved without excess infiltration within 5 calendar days of the date the positive pressure was first measured, the owner operator must conduct a root cause analysis that includes a thorough investigation of the landfill gas collection and control system to determine the primary cause, and any other contributing causes, of positive pressure at the wellhead, and identify each factor investigated, methods used, and alternative causes that were analyzed, and

complete corrective action(s) based on the results of the analysis.

II.I.2.a.(iii) If completion of corrective action(s) will take longer than 15 calendar days after the positive pressure measurement, the owner or operator must submit a notification of the situation and the root cause analysis to the Division within 15 calendar days of the positive pressure measurement. The Division may request additional information or action to address the positive pressure measurement from the owner or operator based on the root cause analysis.

II.I.2.a.(iv) If completion of corrective action(s) is expected to take longer than 30 calendar days after the positive pressure measurement, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable. The owner or operator must submit the corrective action analysis and proposed implementation schedule for corrective action(s) to the Division for approval within 30 calendar days of the positive pressure measurement.

II.I.3. Monitor and record the temperature of the landfill gas in each wellhead on at least a weekly basis.

II.I.3.a. If the operating parameter for temperature in Section II.H. is exceeded, the owner or operator must begin enhanced monitoring of the well according to Part I, Section V., and take the following actions while ensuring any attempted corrective measure does not cause an exceedance of other operational or performance standards.

II.I.3.a.(i) Initiate and complete corrective action within 5 calendar days of the measured temperature exceedance. If the measured landfill gas temperature is greater than or equal to 76.7ºC (170ºF) and the carbon monoxide concentration measured, according to the procedures in Part I, Section V.A.6., is greater than or equal to 1,000 ppmv, the corrective action(s) to achieve the temperature standard of less than 55ºC (131ºF) must be completed within 15 calendar days of the measured temperature exceedance and a high landfill gas temperature report must be submitted to the Division within 24 hours of the measurement, unless a higher operating temperature value for the well has been approved by the Division.

II.I.3.a.(ii) If the required operating temperature in Section II.H. cannot be achieved within 5 calendar days of the measured temperature exceedance, the owner or operator must conduct a root cause analysis that includes a thorough investigation of the landfill gas collection and control system to determine the primary cause, and any other contributing causes, of the temperature exceedance at the wellhead, and identify each factor investigated, methods used, and alternative causes that were analyzed, and complete corrective action(s) based on the results of the analysis.

II.I.3.a.(iii) If completion of corrective action(s) will take longer than 15 calendar days after the measure temperature exceedance, the owner or operator must submit a notification of the situation and the root cause analysis to the Division within 15 calendar days of the measured temperature exceedance. The Division may request additional information or action to address the temperature exceedance from the owner or operator based on the root cause analysis.

II.I.3.a.(iv) If completion of corrective action(s) is expected to take longer than 30 calendar days after the measured temperature exceedance, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable. The owner or operator must submit the corrective analysis and proposed implementation schedule for corrective action(s) to the Division for approval within 30 calendar days of the measured temperature exceedance.

II.J. Each owner or operator of an MSW landfill subject to the gas collection and control system requirements of this regulation is exempt from the conditions in Part C, Sections II.A.1., II.A.2., and II.G., for individual wells involved in well raising provided the following conditions are met.

II.J.1. All valves to the well are closed during well raising so it is isolated from the rest of the gas collection system and the well raising and reconnection to a vacuum source is completed within 5 calendar days. If additional time is needed to complete the well raising and reconnection to a vacuum source, the owner or operator must submit a notification to the Division with an estimated timeline for completing these activities, which must be approved in writing by the Division if the timeline exceeds 30 calendar days.

II.J.2. New fill is being actively added or compacted in the immediate vicinity around the well.

II.J.3. Once installed, a gas collection well extension is sealed and capped until the raised well is reconnected to a vacuum source.

II.J.4. The owner or operator must maintain records of when a well raising begins and is completed, when the raised well is reconnected to a vacuum source, the location of the affected well and its identification number, actions taken pursuant to the requirements of Sections II.J.2. and II.J.3., as well as the Division's approval for well raising and vacuum reconnection that takes longer than 30 calendar days to complete, if applicable.

II.K. Each owner or operator of an MSW landfill subject to the gas collection and control system requirements of this regulation is exempt from the conditions in Part C, Sections II.A.1., II.A.2., and II.G., for individual landfill gas collection system components that must be temporarily shut down to repair or modify components of the gas collection system, to connect new landfill gas collection system components to the existing system, to prevent or extinguish landfill fires, or to perform construction activities pursuant to Part D, Section I.E., provided the following requirements are met.

II.K.1. Methane emissions are minimized during shutdown pursuant to Part C, Section I.B.11., including providing backup power to ensure the gas collection and control system can continue to operate if there is a loss of line power.

II.K.2. All valves are closed to gas collection system components requiring repair or modification, or those components are disconnected from the gas collection system.

II.K.3. In the event the gas collection or control system is inoperable, the gas mover system must be shut down and all valves in the collection and control system contributing to venting of landfill gas to the atmosphere must be closed immediately using an automatic blower shutdown and valve closing.

II.K.4. Efforts to repair the gas collection or control system must be initiated and completed to minimize downtime, and the gas collection and control system must be returned to operation no more than 3 calendar days following initial shutdown.

II.K.4.a. In the event the gas collection and control system cannot be returned to operation in 3 calendar days following initial shutdown, the owner or operator must submit a notification to the Division describing the situation and actions being taken to return the gas collection and control system to operation along with an estimated timeline for doing so in accordance with the requirements of Part H, Section II.A.9.c.

II.K.4.b. The owner or operator must submit required shutdown notifications to the Division pursuant to Part H, Section II.A.9., and maintain records of all actions taken to minimize gas collection and control system downtime, including dates and times of actions taken, and make such records available to the Division upon request.

II.K.5. A shutdown notification is submitted to the Division pursuant to Part H, Section II.A.9. For planned shutdowns, a notification of the shutdown must be submitted to the Division at least 30 calendar days in advance of the shutdown that includes a justification for the shutdown, the system component(s) that will require shutdown, and the approximate timeline for the shutdown.

III. Requirement for Gas Control Device Removal, Biofilters, and Permanent Shutdown of the Gas Collection and Control System

III.A. A gas control device at a closed MSW landfill may be permanently shut down or removed after the gas collection and control system has been in operation for at least 15 years after the MSW landfill has closed and each of the requirements of Section III.B. have been met.

III.A.1. If the criteria and demonstration requirements specified in Section III.B.1. are met before the gas collection and control system has operated for 15 years after the landfill has closed, the owner or operator of the landfill must apply to the Division for approval of semi-continuous (batch) operation of the gas collection and control system following the requirements of Part G, Section I.A.1., and operate the gas control device until the requirements of this Part C, Sections III.B.3. - III.B.8. are met.

III.A.2. The owner or operator of an MSW landfill may operate an open flare that has been approved pursuant to the requirements of Part C, Section II.D.5., as the primary gas control device in place of an enclosed flare or other gas control device at the landfill if the landfill's methane generation rate is determined to be less than 664 metric tons (732 tons) per year and the methane concentration of collected gas is determined to be less than 30 percent on 3 successive test dates following the requirements of Sections III.B.1.a. - III.B.1.c.

III.B. An owner or operator of a closed MSW landfill with a gas collection and control system that has operated for at least 15 years after the landfill has closed must meet all of the following requirements to permanently shut down or remove a gas control device at the landfill.

III.B.1. The calculated or measured methane generation rate for the MSW landfill is less than 125 metric tons (138 tons) per year if the gas control device is an open flare or less than 664 metric tons (732 tons) per year if the gas control device is an enclosed flare or another enclosed combustion device based on 3 successive test dates; the methane concentration of collected gas is less than 30 percent on 3 successive test dates, and; the gas control device is unable to operate on a continuous basis while the gas collection system is in operation.

III.B.1.a. The methane generation rate must be calculated in accordance with Part H, Section III., and the methane concentration must be determined in accordance with Part I, Section V.A.5.

III.B.1.b. The second and third test dates for the methane generation rate and methane concentration of the landfill gas must occur at least 90 days but no more than 180 days after the previous test date.

III.B.1.c. The measurements of the landfill gas to determine the methane generation rate and methane concentration must be completed during normal operation of the gas collection and control system without any efforts being made to artificially impact the methane generation rate or methane concentration in the landfill gas, and must be conducted after the requirement of Section III.B.2. has been met.

III.B.2. The gas collection and control system has been comprehensively evaluated to determine it is functioning properly and there are no issues impacting its operational capabilities, and whether any modifications or actions can be taken to address issues that may be impacting the ability of the gas control device to operate continuously.

III.B.2.a. The results of the gas collection and control system evaluation must be documented by the owner or operator, and include what was evaluated and why, data used for the evaluation, any actions or modifications taken to address or correct any issues identified based on the evaluation, and the performance of the gas collection and control system after any corrective actions or modifications.

III.B.2.b. If the gas control device is unable to operate continuously after any issues identified though the evaluation have been addressed, the owner or operator must apply to the Division for approval of semi continuous (batch) operation of the gas collection and control system following the requirements of Part G, Section I.A.1, and operate the gas control device until the requirements of Sections III.B.3. - III.B.8. are met.

III.B.3. Upon approval of semi-continuous (batch) operation of a gas collection and control system, the owner or operator must operate the gas control device until the calculated or measured methane generation rate for the MSW landfill is less than 225 metric tons (248 tons) per year if the gas control device is an enclosed flare or another enclosed combustion device based on 3 successive test dates, and the methane concentration of collected gas is less than 20 percent based on 3 successive test dates.

III.B.3.a. The methane generation rate must be calculated in accordance with Part H, Section III., and the methane concentration must be determined in accordance with Part I, Section V.A.5.

III.B.3.b. The second and third test dates for the methane generation rate and methane concentration of the landfill gas must occur at least 90 days but no more than 180 days after the previous test date.

III.B.3.c. The measurement of the landfill gas to determine the methane generation rate and methane concentration must be completed during normal operation of the gas collection and control system without any efforts being made to artificially impact the methane generation rate or methane concentration in the landfill gas.

III.B.4. The landfill's surface methane concentration measurements do not meet or exceed the limits specified in Part D, Sections I.C.2. or I.D.2., for at least eight consecutive calendar quarters of surface emissions monitoring. These surface methane concentration measurements cannot begin until the methane generation rate and methane concentration tests that demonstrate compliance with Section III.B.3. begin.

III.B.5. The concentrations of methane gas at the MSW landfill do not exceed 25 percent of the lower explosive limit in facility structures at the landfill (excluding gas collection and control system components) or five percent of the lower explosive limit at the site boundary following monitoring requirements approved by the Colorado Hazardous Materials and Waste Management Division. These methane concentration measurements cannot be completed until the methane generation rate and methane concentration tests that demonstrate compliance with Section III.B.3. begin.

III.B.6. The owner or operator of the MSW landfill submits a gas collection and control system equipment removal or shutdown request to the Division in accordance with Part H, Section II.A.18., which must be approved in writing by the Division in order for the gas control device to be removed or permanently shut down.

III.B.7. The owner or operator of the MSW landfill obtains a modified permit from the Division that reflects the removal or permanent shut down of the gas control device.

III.B.8. The owner or operator of the MSW landfill replaces the gas control device with another gas control device sized to operate continuously without the use of supplemental fuel at the landfill's gas collection volumes and methane concentrations, which may include an open flare, or installs and operates a biofilter(s) at the landfill pursuant to the requirements of Section III.C. If a new gas control device or biofilter(s) will be installed, the existing gas control device may not be permanently shut down or removed until the new gas control device is permitted or the biofilter(s) is approved and ready to be operational.

III.C. If an owner or operator of an MSW landfill will install and operate a biofilter(s) at the landfill, the following requirements must be met:

III.C.1. A biofilter design and operation plan must be submitted to the Division and the Colorado Hazardous Materials and Waste Management Division for approval prior to installation of the biofilter(s), which must address the following:

III.C.1.a. The oxygen requirements, permeability, gas distribution, moisture content, and operating temperature range that averages at least 80ºF for the biofilter(s) necessary for the growth of methanotrophs and methanotrophic activity.

III.C.1.b. The landfill gas residence time in the biofilter(s), which must be greater than ten minutes.

III.C.1.c. The type of material layer(s) that will be used in the biofilter(s).

III.C.1.d. The number, capacity, and surface area of each biofilter needed at the MSW landfill based on the landfill's methane generation rate and volumes of collected gas, and where the biofilter(s) will be installed at the landfill.

III.C.1.e. The monitoring and maintenance procedures for the biofilter(s).

III.C.1.f. The material layer(s) replacement requirements and frequency in the biofilter(s).

III.C.1.g. The date(s) the biofilter(s) will be installed at the landfill and become operational.

III.C.2. The owner or operator must follow the biofilter design and operation plan and maintain records necessary to demonstrate compliance with the plan.

III.C.3. The biofilter(s) must reduce methane concentrations to 25% of the lower explosive limit measured at the surface or outlet of the biofilter(s) following monitoring requirements approved by the Colorado Hazardous Materials and Waste Management Division.

III.C.3.a. The monitoring must be conducted when there is a demonstrable inlet concentration of methane to the biofilter(s) and be completed on a quarterly basis.

III.C.3.b. If there are no measured exceedances of the lower explosive limit after any four consecutive quarterly monitoring periods, periodic monitoring may move to a semi-annual basis. If there are no measured exceedances after any two consecutive semi-annual monitoring periods, periodic monitoring may move to an annual basis. Any measured exceedances of the limits during the semi-annual or annual monitoring or a compliance inspection of the MSW landfill will result in a return to quarterly monitoring.

III.C.4. The owner or operator must submit an annual biofilter report to the Division pursuant to Part H, Section II.A.19., after the biofilters become operational and until they are permanently shut down or removed that includes a summary of how the requirements of the biofilter design and operation plan have been met and the records required to be maintained by Sections III.C.3.

III.C.5. The owner or operator must continue to follow the requirements of Part D, Sections I. and II., while the biofilter(s) are in operation at the MSW landfill.

III.D. The owner or operator of a closed MSW landfill with a biofilter(s) must operate the biofilter(s) until the methane concentration in the landfill gas is 10% or less or until the approved post-closure care plan for the landfill has been terminated by the Colorado Hazardous Materials and Waste Management Division, whichever occurs last. A landfill without a post-closure care plan or a landfill with a post-closure care plan that was terminated before the biofilter(s) were installed, must operate the biofilter(s) until the methane concentration in the landfill gas is 10% or less before the biofilter(s) can be permanently shut down or removed.

III.D.1. The methane concentration of the landfill gas must be measured on 3 successive dates, with individual test dates separated by at least 90 days from each test, and be determined in accordance with Part I, Section V.A.5.

III.D.2. The measurement of the landfill gas to determine methane concentration must be completed during normal operation of the gas collection and control system without any efforts being made to artificially impact the methane concentration in the landfill gas.

III.D.3. Upon meeting the requirements for removal or permanent shut down of the biofilter(s), the owner or operator must submit a biofilter removal notification to the Division.

PART D Surface Emissions Monitoring and Gas Collection and Control System Leak Inspection Requirements

I. Surface Emissions Monitoring Requirements

I.A. Each owner or operator of an MSW landfill complying with Part B, Section II.D.2., must complete quarterly surface emissions monitoring according to the requirements of Part B, Section II.D.2. Each owner of operator of an MSW landfill required to install and operate a gas collection and control system pursuant to Part B, Section II., must complete periodic surface emissions monitoring of the landfill beginning January 1, 2026 or upon commencing operation of a newly installed gas collection and control system at the landfill. The owner or operator must complete surface emissions monitoring utilizing one of the following approved monitoring methods and follow the requirements of Sections I.B., I.C., and I.D.

I.A.1. A gas detector instrument that meets the calibration, specifications, and performance criteria of the U.S. Environmental Protection Agency's (EPA) Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 CFR Part 60, Appendix A (as last amended 65 Fed.Reg. 61744 (October 17, 2000)), which is incorporated by reference herein, except "methane" replaces all references to volatile organic compounds (VOC) and the calibration gas must be methane, diluted to a nominal concentration of 200 parts per million in air. Surface emissions monitoring must be performed in accordance with section 8.3.1 of EPA Reference Method 21, except that the probe inlet must be placed within 2 inches of the landfill surface while monitoring is being performed.

I.A.2. The U.S. EPA's Other Test Method 51 (OTM-51) - UAS Application of Method 21 or Surface Emission Monitoring of Landfills. OTM-51 (December 14, 2022)

I.A.3. A handheld methane-specific tunable diode laser absorption spectroscopy (TDLAS) instrument that follows a Division-approved method for monitoring.

I.A.4. Any other alternative or other test method approved by the U.S. EPA for surface emissions monitoring of landfills.

I.A.5. A Division-approved alternative monitoring method or program.

I.A.5.a. A proposed alternative monitoring method or program may consist of the use of one or more emissions monitoring technologies, which must be identified in the proposed alternative monitoring method or program submitted to the Division.

I.A.5.a.(i) Only emission monitoring technologies that are commercially available for field deployment and have proven or demonstrated success in MSW landfill emissions detection will be considered for approval, including any technologies that meet the requirements of Sections I.A.1., I.A.2, I.A.3., or I.A.4.

I.A.5.b. A proposed alternative monitoring method or program may be submitted to the Division by an MSW landfill owner or operator or an emissions monitoring technology vendor.

I.A.5.c. A proposed alternative monitoring method or program submitted to the Division must address the following:

I.A.5.c.(i) The manufacturer name and specifications for the emissions monitoring technology or technologies included in the proposed alternative monitoring method or program.

I.A.5.c.(ii) The emissions detection capabilities, reliability, and limitations of the emissions monitoring technology or technologies included in the proposed alternative monitoring method or program including, but not limited to, the ability to identify specific emission sources or locations, detection limits, probability of detection, and any restrictions on use, as well as supporting data for technology performance.

I.A.5.c.(iii) The emissions quantification capabilities, if any, of the emissions monitoring technology or technologies included in the proposed alternative monitoring method or program, including how emissions are quantified, frequency of measurements, and what unit(s) of emissions measurement are used.

I.A.5.c.(iv) The frequency of emissions monitoring that will be performed of an MSW landfill, how the monitoring will be performed, and any requirements or criteria for performing emissions monitoring.

I.A.5.c.(v) Data collection, logging, management, and analysis, as well as data quality indicators, for the proposed alternative monitoring method or program.

I.A.5.c.(vi) Quality control and quality assurance procedures necessary to ensure proper or correct application of the proposed alternative monitoring method or program for an MSW landfill, including but not limited to any technology calibration or maintenance requirements, and technology or method training requirements.

I.A.5.c.(vii) Whether the proposed alternative instrument monitoring method or program, or the technology or technologies used in the method or program, has been approved for regulatory use for other emissions monitoring requirements or by other regulatory authorities.

I.A.5.c.(viii) A detailed description of how the proposed alternative monitoring method or program will work or be applied to an MSW landfill, including, but not limited to, emissions alerting criteria and timelines, and specific actions and work practices that will be followed for conducting emissions monitoring and responding to detected emissions.

I.A.5.c.(ix) Documentation (e.g., field or test data, modeling) adequate to demonstrate the proposed alternative monitoring method or program is capable of achieving emission reductions that are at least as effective as the emission reductions achieved by using the monitoring methods of Sections I.A.1., I.A.2, or I.A.3.

I.A.5.c.(x) The information required by Sections I.A.5.c.(i) - (vii) may be excluded for any monitoring technology included in the proposed alternative monitoring method or program that meets the requirements of Sections I.A.1., I.A.2, or I.A.3., provided that all other requirements that apply to the use of those technologies in this regulation are followed as part of the proposed alternative monitoring method or program.

I.A.5.d. The Division will issue a written approval for a proposed alternative monitoring method or program that outlines the conditions for compliance with the alternative monitoring method or program if the Division determines the requirements of Section I.A.5.c. have been met. An alternative monitoring method or program may not be used to meet the requirements of Part D, Sections I. and II., unless it has been approved by the Division.

I.B. The entire MSW landfill surface must be divided into individually identified 50,000 square foot grids that must be used for both instantaneous and integrated surface emissions monitoring performed on a quarterly basis per the requirements of Sections I.C. and I.D, or according to the requirements of an alternative monitoring method approved pursuant to Sections I.A.4. or I.A.5. The quarterly monitoring must be separated by at least 30 calendar days from one quarter to the next unless approved by the Division under Part G.

I.B.1. A surface emissions monitoring plan must be developed that includes a topographical map showing the site boundary and the location of the grids and the gas collection and control system as well as monitoring route(s) and any areas of the landfill the owner or operator requests to exclude from monitoring.

I.B.2. The monitoring pattern performed at the landfill must be no more than a 25-foot spacing interval and must traverse each monitoring grid.

I.B.3. All MSW landfill surface areas with cover penetrations, distressed vegetation, cracks, or seeps must also be monitored using an approved monitoring method.

I.B.4. If there are no measured exceedances of the limits specified in Part D, Sections I.C.2.or I.D.2., after any four consecutive quarterly monitoring periods at a closed or inactive MSW landfill, periodic monitoring at the landfill may move to a semi-annual basis. If there are no measured exceedances of the limits specified in Part D, Sections I.C.2.or I.D.2., after any two consecutive semi-annual monitoring periods at a closed or inactive MSW landfill, periodic monitoring at the landfill may move to an annual basis. Any measured exceedances of the limits specified in Part D, Sections I.C.2. or I.D.2., during the semi-annual or annual monitoring or a compliance inspection of a closed or inactive MSW landfill will result in a return to quarterly monitoring of the landfill.

I.B.5. Surface emissions monitoring must not be conducted when the average wind speed exceeds 6 miles per hour or the instantaneous wind speed exceeds 13 miles per hour.

I.B.5.a. The Division may approve alternatives to the wind speed limits for MSW landfills that consistently have measured winds in excess of the limits, or for approved alternative monitoring methods pursuant to Sections I.A.4. or I.A.5.

I.B.5.b. The wind speed must be recorded during the monitoring event and average wind speed determined on a 5-minute average using an on-site anemometer with a continuous recorder and data logger for the entire duration of the monitoring event.

I.B.5.c. A wind barrier must be used that surrounds the emissions monitor of a gas detector instrument being used for EPA Reference Method 21 if average wind speed exceeds 4 miles per hour or instantaneous wind speed exceeds 10 miles per hour, and the surface emissions monitoring is being performed pursuant to Part B, Section II.D.2.

I.B.6. Surface emissions monitoring must be conducted only when there has been no measurable precipitation at the MSW landfill in the preceding 72 hours.

I.B.7. Surface emissions monitoring must be conducted during average barometric pressure conditions at the MSW landfill to the extent possible, and barometric pressure must be recorded during the monitoring event.

I.C. Instantaneous surface emissions monitoring of the MSW landfill must be performed according to the following requirements.

I.C.1. All instantaneous surface emissions monitoring readings of methane 100 ppmv or greater if using the approved monitoring methods under Sections I.A.1., or I.A.2., or 100 ppm-m or greater if using the approved monitoring method under Section I.A.3, other than non-repeatable, momentary readings, must be recorded, along with their location.

I.C.1.a. Instantaneous surface emissions monitoring readings that meet the requirements of Section I.C.1. must be monitored in at least a five-foot radius around the emissions detection location to determine the extent of the methane leak.

I.C.2. Locations on the surface area of the MSW landfill that meet or exceed a methane concentration limit of 200 ppmv if using the approved monitoring methods under Sections I.A.1. or I.A.2., or 200 ppm-m if using the approved monitoring method under Section I.A.3., must be addressed through the following actions.

I.C.2.a. The location of each measured exceedance must be marked and the location and concentration recorded.

I.C.2.b. The location of each measured exceedance must be recorded using an instrument with an accuracy of at least 13 feet, and the location coordinates must be in decimal degrees with at least five decimal places.

I.C.2.c. Corrective action(s) to address the measured exceedance such as, but not limited to, cover maintenance or repair, and well vacuum adjustments must be initiated no later than 3 calendar days after the measured exceedance and completed no later than 5 calendar days after the measured exceedance.

I.C.2.d. The location of the measured exceedance and area around the location covering at least a five-foot radius must be monitored within 5 calendar days of a measured exceedance to verify the success of the corrective action(s).

I.C.2.d(i) If re-monitoring shows a second exceedance, follow the requirements of Sections I.C.2.c and I.C.2.d. If re-monitoring shows no exceedance, follow the requirements of Section I.C.2.e.

I.C.2.d(ii) If re-monitoring shows a third exceedance, a new or replacement gas collection well or device must be installed no later than 120 calendar days after the initial exceedance is detected and the Division must be notified of this in writing within 30 calendar days after the third 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 Division for approval within 30 calendar days after the third exceedance.

I.C.2.e. If the initial re-monitoring completed under Section I.C.2.d. results in a measurement below the methane concentration limit in Section I.C.2., the location of the initial measured exceedance and area around the location

covering at least a five-foot radius must be re-monitored within one month of the initial exceedance.

I.C.2.e(i) If the one-month re-monitoring results in a measurement below the methane concentration limit in Section I.C.2., no further monitoring of that location and affected area is required until the next required monitoring event.

I.C.2.e(ii) If the one-month re-monitoring results in a measurement at or above the methane concentration limit in Section I.C.2., follow the requirements of Sections I.C.2.c and I.C.2.d.

I.C.2.e(iii) If re-monitoring shows a third exceedance, follow the requirements of Section I.C.2.d.(ii).

I.D. Integrated surface emissions monitoring of the MSW landfill must be performed according to the following procedures and requirements.

I.D.1. All surface readings must be recorded and then averaged for each grid at the MSW landfill. The data recording frequency must be one reading per second of the emissions concentration and location coordinates in decimal degrees.

I.D.2. Individual monitoring grids that meet or exceed an average methane concentration limit of 25 ppmv if using the approved monitoring methods under Sections I.A.1. or I.A.2., or 25 ppm-m if using the approved monitoring method under Section I.A.3., must be addressed through the following actions.

I.D.2.a. Corrective action(s) to address the measured exceedance such as, but not limited to, cover maintenance or repair, and well vacuum adjustments must be initiated no later than 3 calendar days after the measured exceedance and completed no later than 5 calendar days after the measured exceedance.

I.D.2.b. The grid must be re-monitored within 5 calendar days of a measured exceedance.

I.D.2.b(i) If re-monitoring shows a second exceedance of the grid, the owner or operator must follow the requirements of Sections I.D.2.a. and I.D.2.b.

I.D.2.b(ii) If re-monitoring shows a third exceedance, a new or replacement gas collection well or device must be installed no later than 120 calendar days after the initial exceedance is detected. 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 Division for approval within 30 calendar days after the third exceedance.

I.E. The requirements of Sections I.C. and I.D. do not apply to the following areas as long as these areas are kept to the minimum size and time duration as possible for the specified activity and measures are taken to minimize methane emissions and other potential air quality impacts.

I.E.1. The working face of the MSW landfill if the size of the working face is minimized based on the volume of incoming waste at the landfill.

I.E.2. Areas of the MSW landfill surface where the landfill cover material has been removed for the purpose of installing, expanding, replacing, or repairing components of the landfill cover system, the landfill gas collection and control system, the leachate collection and removal system, or a landfill gas condensate collection and removal system, or in preparation for moving or expanding the working face if removing intermediate cover.

I.E.2.a. If surface emissions monitoring is or will not be not performed within 90 calendar days in an area of the landfill as a result of one of the activities in Section I.E.2., other than preparation for expanding the working face by removing intermediate cover, the owner or operator must provide a notification to the Division no later than 90 calendar days after the activity has begun indicating when the activity will be completed and surface emissions monitoring of the area will begin again.

I.E.2.b. If the activity is expected to take longer than 120 days to complete, the Division must approve the activity completion date and when surface emissions monitoring of the area will begin again.

I.E.3. Areas of the MSW landfill surface where the landfill cover material has been removed for law enforcement activities requiring excavation. The requirements of Sections I.E.2.a. and I.E.2.b. also apply for this activity.

II. Gas Collection and Control System Leak Inspection Requirements

II.A. Each owner or operator of an MSW landfill required to install and operate a gas collection and control system pursuant to Part B, Section II., must perform quarterly leak monitoring of all components, beginning January 1, 2026 or upon commencing operation of a newly installed gas collection and control system at the landfill. If no component leaks are detected after any four consecutive quarterly monitoring periods at a closed or inactive MSW landfill, periodic component leak monitoring may move to a semi-annual basis. If no leaks are detected after any two consecutive semi-annual monitoring periods at a closed or inactive MSW landfill, periodic component leak monitoring at the landfill may move to an annual basis. Any component leaks detected during the semi-annual or annual monitoring or a compliance inspection of a closed or inactive MSW landfill will result in a return to quarterly component leak monitoring.

II.A.1. The owner or operator must complete component leak monitoring utilizing one of the approved monitoring methods in Section I.A.

II.A.2. The owner or operator must include a component leak monitoring plan with the surface emissions monitoring plan required pursuant to Section I.B.1. The component leak monitoring plan must identify all equipment and components of the gas collection and control system that require leak monitoring with a sitemap showing the location of the equipment and components.

II.A.3. Component leak monitoring must not be conducted when the average wind speed exceeds 6 miles per hour or the instantaneous wind speed exceeds 13 miles per hour determined according to the requirements of Section I.B.5.a. The Division may approve alternatives to the wind speed limits for MSW landfills that consistently have measured winds in excess of the limits, or for approved alternative monitoring methods pursuant to Sections I.A.4. or I.A.5.

II.A.4. All component leaks must be tagged, recorded, and repaired.

II.A.4.a. First attempt to repair a leak must be made no later than 5 calendar days after discovery and completed no later than 15 calendar days after discovery, unless

parts or replacement equipment needed for repair are unavailable.

II.A.4.b. If parts or replacement equipment for repair are unavailable, they must be ordered promptly and the repair must be initiated within 5 calendar days of receipt of the parts or replacement equipment and completed within 15 calendar days of receipt of the parts or equipment.

II.A.4.c. Repaired leaks must be re-monitored within 5 calendar days of repair to verify that the repair was effective.

II.A.5. Component leak monitoring at MSW landfills which combust landfill gas for energy production, or which treat landfill gas for other beneficial uses, must be conducted prior to scheduled maintenance or planned outage periods if the maintenance or planned outage periods would conflict with the quarterly monitoring schedule.

PART E Remote Methane Monitoring Requirements

I. Remote Methane Monitoring Notifications and Responses

I.A. The Division may issue a notification to the owner or operator of an MSW landfill of a methane emissions detection(s) at or from the landfill that has been obtained from remote methane monitoring according to the following requirements.

I.A.1. The technology used for the remote methane monitoring has been approved by the Division or the technology has obtained third-party certification under the United States Environmental Protection Agency's (EPA) Methane Super Emitter Program pursuant to 40 CFR, § 60.5371b(b) (August 1, 2024).

I.A.2. The notification is sent electronically to the owner or operator of the MSW landfill within 7 business days of the Division receiving the monitoring data and contains the following information.

I.A.2.a. An emissions detection identification number.

I.A.2.b. The landfill's name and owner or operator.

I.A.2.c. The landfill's AIRS ID, if one has been assigned to it.

I.A.2.d. An estimate of the latitude and longitude coordinates where the emissions appear to be originating from at the landfill. This may just be the coordinates within the landfill surface if the specific location(s) of the detected emissions at or from the landfill cannot be determined.

I.A.2.e. A visualization of the detected emissions at or from the landfill and the estimated emissions rate.

I.A.2.f. Details of the emissions detection methodology used by the remote monitoring platform responsible for the emissions detection.

I.A.2.g. The date and time of the emissions detection(s).

I.B. The owner or operator of an MSW landfill must investigate a notification of methane emissions detection(s) at or from the landfill obtained from remote methane monitoring within 5 calendar days of receiving the notification from the Division according to the following requirements.

I.B.1. Review any activities at the landfill, including but not limited to construction, maintenance, repair, or process activities, and gas collection and control system operation and downtime, if applicable, that occurred starting from at least one week prior to the initial date of the emissions detection as identified in the notification until the date of investigation to determine if the activities indicate any potential source(s) or cause of the emissions.

I.B.2. Review all monitoring data or results required to be tracked and maintained under this regulation that the owner or operator is subject to for the period leading up to the initial date of the emissions detection identified in the notification until the date of investigation, to help determine any potential source(s) or cause of the emissions. Monitoring data reviewed must be for at least the most recent required monitoring that was performed under this regulation.

I.B.3. Unless the owner or operator of an MSW landfill with a gas collection and control system has records that can demonstrate the detected emissions are or were the result of a defined activity or situation that has ceased or been addressed or is being addressed pursuant to the requirements of Section I.A.1.e., the owner or operator must perform emissions monitoring of the grid(s) or area(s) of the landfill, including of any gas collection and control equipment located in those grid(s) or area(s), where the detected emissions originated from using an approved monitoring method under Part D, Section I.A.1., that is capable of localizing specific source(s) of emissions in order to perform any required mitigation measures pursuant to the requirements of Part D, Sections I.C.2., I.D.2., or II.A.2.

I.B.4. The owner or operator of an MSW landfill that has a methane generation rate greater than or equal to 664 metric tons (732 tons) per year but less than 1,814 metric tons (2,000 tons) per year, as determined using the procedures in Part I, Section III., that does not have a gas collection and control system installed at the landfill, including closed landfills that have met the requirements of Part B, Section II.D.2.c., must perform surface emissions monitoring of the landfill using an approved monitoring method in Part D, Sections I.A.1, I.A.2, or I.A.3., and following the requirements of Part D, Sections I.B., I.C., and I.D., unless Part E, Section I.C., is applicable.

I.B.4.a. Based on the monitoring results, the owner or operator must comply with the requirements of Part B, Section II.D.2.a., if applicable.

I.B.4.b. Owners or operators of MSW landfills complying with the requirement of Part B, Section II.D.2., may count the monitoring performed pursuant to Part E, Section I.B.4., as a required quarterly monitoring if monitoring has not yet been performed in that quarter and is more than 30 days since the last quarterly monitoring.

I.B.5. Perform any necessary corrective actions based on the investigation to address or mitigate the cause of the emissions.

I.C. The owner or operator of an MSW landfill that has a methane generation rate greater than or equal to 664 metric tons (732 tons) per year but less than 1,814 metric tons (2,000 tons) per year, as determined using the procedures in Part I, Section III., that does not have a gas collection and control system installed, must meet the requirements of Part B, Section II.D.1., for the landfill if the owner or operator receives a remote methane monitoring notification of detected emissions from the landfill of 207 kilograms per hour (kg/hr) or greater, unless the owner or operator can demonstrate the detected emissions resulted from solid waste excavation or mining activities at the landfill approved by the Colorado Hazardous Materials and Waste Management Division.

I.D. The owner or operator of an MSW landfill conducting an investigation pursuant to Section I.B. must report the results of the investigation and any corrective actions to the Division within 15 calendar days of receiving the notification using a Division-approved form. The report must include the following.

I.D.1. The information required under Sections I.A.2.a. - c.

I.D.2. A summary of the investigation and its findings, including all activities and monitoring data reviewed, and whether the source(s) of the detected emissions at the landfill were identified or confirmed, and if so, a description of the source(s). If no source(s) were identified or confirmed as the cause of the emissions, provide a summary of which sources(s) or activities may have contributed to the emissions based on the investigation.

I.D.3. All corrective actions or mitigation measures taken, when they were completed and their results, and how and when the results were verified.

I.D.4. If the detected emissions are ongoing at the time of submitting this report, a summary of corrective actions or mitigation measures that will be completed and the anticipated completion date(s).

I.D.5. A follow-up report must be submitted to the Division using a Division-approved form within 7 calendar days of the corrective actions or mitigation measures being completed that includes the information required under Sections I.D.1 and I.D.3.

I.E. In completing any corrective actions or mitigation measures to address a remote methane monitoring emissions detection, the owner or operator of the MSW landfill must comply with all applicable requirements of this regulation.

PART F Cover Requirements

I. Intermediate and Final Cover Requirements

I.A. The owner or operator of an active or inactive MSW landfill with or without a gas collection and control system must use a biocover or a cover that incorporates a biocover for intermediate cover that is or will be in place for longer than 180 calendar days at the landfill subject to approval as an alternative cover by the Colorado Hazardous Materials and Waste Management Division.

I.A.1. The intermediate cover containing or incorporating a biocover must also include a permeable gas distribution layer, such as gravel, sand, or crushed stone, below the biocover or methane oxidation layer subject to approval by the Colorado Hazardous Materials and Waste Management Division.

I.A.2. The request to use or include a biocover as intermediate cover submitted to the Colorado Hazardous Materials and Waste Management Division must address requirements necessary for the growth of methanotrophs and methanotrophic activity in the biocover, such as but not limited to oxygen requirements, permeability, temperature, moisture management, and biocover maintenance and replacement as necessary, which must be followed by the owner or operator when installing and operating the biocover upon approval from the Colorado Hazardous Materials and Waste Management Division.

I.B. The owner or operator of an MSW landfill is prohibited from using petroleum contaminated soils or soils containing volatile organic compounds for intermediate or final cover at the landfill.

II. Cover Integrity Requirements

II.A. The owner or operator of an active or inactive MSW landfill with waste-in-place greater than or equal to 450,000 tons must implement a program to monitor for cover integrity and implement cover repairs or maintenance as necessary on a monthly basis.

II.A.1. The cover integrity program must include protocols and procedures to identify and address issues such as, but not limited to, exposed waste, leachate breakouts, and erosion gullies.

II.A.2. The cover integrity program must conform with the cover requirements approved for the landfill by the Colorado Hazardous Materials and Waste Management Division.

PART G Alternative Compliance Options

I. Alternative Compliance Request Requirements

I.A. The owner or operator of an MSW landfill may request alternatives to the requirements of Parts C, D, or I of this regulation. Any alternative compliance options requested by the owner or operator must be submitted in writing to the Division for review and may not be implemented unless approved by the Division in writing. Alternative compliance option requests may include, but are not limited to, the following, except for proposed alternative monitoring methods or programs to meet the requirements of Part D, which must be considered according to the requirements of Part D, Section I.A.5.

I.A.1. Semi-continuous (batch) operation of the gas collection and control system without the use of supplemental fuel to operate the gas control device due to insufficient landfill gas flow rates and methane concentrations as determined according to Part C, Section III.B.1.

I.A.1.a. Prior to submitting a request, the owner or operator must conduct a comprehensive evaluation of the gas collection and control system to determine it is functioning properly and there no issues impacting its operational capabilities, and whether any modifications or actions can be taken to address issues that may be impacting the ability of the gas control device to operate continuously.

I.A.1.b. The results of the gas collection and control system evaluation must be documented by the owner or operator and include what was evaluated and why, data used for the evaluation, any actions or modifications taken to address or correct any issues identified based on the evaluation, and the performance of the gas collection and control system after any corrective actions or modifications.

I.A.1.c. The alternative compliance request must include the results of the evaluation required by Section I.A.1.b., along with a proposed process, including gas collection and control system operating parameters that will be used to determine the operation frequency of the gas collection and control system.

I.A.2. Alternative wind speed requirements for surface emissions monitoring and gas collection and control system leak inspections for MSW landfills consistently having winds in excess of the limits specified in Part D, Sections I.B.5 and II.A.3.

I.A.3. Alternative walking patterns for surface emissions monitoring to address potential safety and other issues, such as steep or slippery slopes, monitoring instrument obstructions, and physical obstructions.

I.A.4. Exclusion of construction areas and other dangerous areas, except for the working face, from landfill surface emissions monitoring.

I.A.5. Exclusion of paved roads on the landfill surface that do not have any cracks, potholes, or other penetrations from landfill surface emissions monitoring.

I.B. Alternative compliance requests submitted pursuant to Sections I.A.3 - I.A.5. must include a proposed alternative monitoring option for areas of the MSW landfill requested to be excluded from surface emissions monitoring. Requests submitted pursuant to Section I.A.4. may include proposed alternative investigation and corrective action emission thresholds.

I.C. The criteria that the Division may use to evaluate alternative compliance requests include, but are not limited to:

I.C.1. The MSW landfill's compliance history.

I.C.2. Documentation containing the MSW landfill gas flow rate and measured methane for individual gas collection wells or components.

I.C.3. Permits issued for the MSW landfill.

I.C.4. Surface emissions monitoring and gas collection and control system leak inspection results.

I.C.5. Gas collection and control system operation, maintenance, and inspection records.

I.C.6. Historical meteorological data.

I.C.7. Consistency with EPA-approved test methods and procedures.

I.D. The owner or operator of an MSW landfill seeking an alternative compliance option in accordance with the provisions of this regulation must provide information satisfactory to the Division demonstrating that:

I.D.1. Off-site migration of landfill gas is being, and will be, effectively controlled.

I.D.2. The proposed alternatives provide an equivalent or more stringent level of performance, enforceability, or methane emission control, as compared with the requirements of this regulation it seeks to replace.

PART H Recordkeeping and Reporting Requirements

I. Recordkeeping Requirements

I.A. The owner or operator of an MSW landfill subject to this regulation must maintain the following records for at least five years and provide them to the Division upon request.

I.A.1. The monthly solid waste acceptance rate for active MSW landfills or MSW landfills that have accepted waste within the last 5 years.

I.A.2. The current amount of waste-in-place and the waste composition with supporting documentation. Adequate supporting documentation must include the waste characterization procedures and recordkeeping format used, and is subject to Division review and approval.

I.A.3. For the owner or operator of an MSW landfill who converts waste-in-place from volume to mass, records of the annual recalculation of site-specific density, design capacity, and the supporting documentation.

I.A.4. The date of initial placement of waste in newly constructed landfill cells.

I.A.5. If a bioreactor is utilized, the bioreactor moisture content calculations, including the basis of any assumptions made to make such calculations.

I.A.6. If using EPA Method 21 to meet the requirements of Part B, Section II.D.2., records of all surface emissions monitoring completed pursuant to Section II.D.2., as well as the following information:

I.A.6.a. All monitoring instrument calibrations conducted according to sections 8 and 10 of EPA Method 21 of appendix A of 40 C.F.R. Part 60, including all of the following items:

I.A.6.a.(i) The date of each monitoring instrument calibration and the initials of the operator performing the calibration.

I.A.6.a.(ii) Calibration gas cylinder identification, certification date, and certified concentration.

I.A.6.a.(iii) Instrument scale(s) used.

I.A.6.a.(iv) A description of any corrective action taken if the meter readout could not be adjusted to correspond to the calibration gas value.

I.A.6.a.(v) If an owner or operator makes their own calibration gas, a description of the procedure(s) used.

I.A.6.b. Digital photographs of the instrument setup, including the wind barrier. The photographs must be accurately time and date-stamped and taken at the first sampling location prior to sampling and at the last sampling location after sampling at the end of each sampling day.

I.A.6.c. Timestamp of each surface scan reading which must be detailed to the nearest second, based on when the sample collection begins and log for the length of time each sample was taken using a stopwatch (e.g., the time the probe was held over the area).

I.A.6.d. Location coordinates of each surface scan reading. The owner or operator must determine the coordinates using an instrument with an accuracy of at least four meters. Coordinates must be in decimal degrees with at least five decimal places.

I.A.6.e. Monitored methane concentration (ppmv) of each reading.

I.A.6.f. Background methane concentration (ppmv) after each instrument calibration test.

I.A.6.g. For readings taken at each surface penetration, the unique identification location label matching the label specified in Section I.A.6.d.

I.A.6.h. Records of the operating hours of the gas collection system for each destruction device.

I.A.7. All gas collection system downtime including dates of downtime, individual well shutdown and disconnection times, the reason for the downtime, and any corrective actions conducted in response to the downtime.

I.A.8. All gas control system downtime, including the reason for the downtime, the start and length of time the gas control system was shutdown, and any corrective actions conducted in response to the downtime.

I.A.9. Records of the gas control system equipment operating parameters required to be monitored under Part C, Sections II.B., II.C. or II.E., as well as records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The records must also include the following information:

I.A.9.a. For enclosed flares, continuous temperature monitoring records and all three-hour periods of operation during which the average temperature was more than 28ºC (or 50º F) below the average combustion temperature during the most recent performance test.

I.A.9.b. For a boiler or process heater with a design heat input capacity of 44 megawatts (150 MMBtu/hr) or greater, all periods of operation of the boiler or process heater (e.g., steam use, fuel use, or monitoring data collected pursuant to other federal, State, local, or tribal regulatory requirements).

I.A.9.c. For boilers or process heaters, whenever there is a change in the location at which the landfill gas stream is introduced into the flame zone pursuant to Part C, Section II.E.1.

I.A.9.d. For open flares, continuous records of the flame or flare pilot flame monitoring, and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

I.A.9.e. For the gas control system, the indication of flow in standard cubic feet per minute to the control system, and the indication of bypass flow in standard cubic feet per minute or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines.

I.A.9.f. For enclosed or open flares and gas treatment systems, the date and time of any valve position changes in the line connecting the flare or gas treatment system to the gas mover equipment.

I.A.10. Records of the gas control system equipment calibration and maintenance in accordance with the requirements of Part C, Sections II.B., II.C., or II.E., including dates of calibration and maintenance, as well as the manufacturer's instructions and schedule.

I.A.11. Results of any performance tests conducted pursuant to Part C, Section II.F.

I.A.12. Nitrogen or oxygen concentration measurements in the landfill gas pursuant to Part C, Section II.I.1., including measurement dates and the well identification numbers for each measurement, as well as any actions taken to address concentrations at or above the applicable limits in Part C, Sections II.I.1.a. or II.I.1.b., or an explanation of why no actions were taken.

I.A.13. Wellhead gauge pressure measurements pursuant to Part C, Section II.I.2., including measurement dates and the well identification numbers for each measurement.

I.A.14. Wellhead landfill gas temperature measurements pursuant to Part C, Section II.I.3., including measurement dates and the well identification numbers for each measurement.

I.A.15. For wellhead gauge positive pressure measurements or wellhead temperature exceedances, the following information:

I.A.15.a. Date(s) and description(s) of corrective action(s) completed to address the exceedance.

I.A.15.b. The root cause analysis and corrective action analysis, if applicable.

I.A.15.c. The written final approval from the Division for corrective action(s) and the implementation schedule, if applicable, including any comments or revisions made by the Division to the proposed corrective action(s) and schedule from the owner or operator to obtain final approval.

I.A.16. The records required for individual well raising pursuant to Part C, Section II.J.4.

I.A.17. Descriptions of mitigation measures taken to prevent the release of methane or other emissions into the atmosphere from the MSW landfill, including meeting the requirements of Part C, Section II.K.., during the following activities:

I.A.17.a. When solid waste was brought to the surface during the installation or preparation of wells, piping, or other equipment.

I.a.17.b. During repairs or the temporary shutdown of the gas collection or control system.

IA.17.c. When solid waste was excavated and moved.

I.A.18. Records of requirements performed for a gas control device permanent shut down or removal as required by Part C, Sections III.A. and III.B.

I.A.19. Biofilter design and operation plan and monitoring records required by Part C, Sections III.C.2. and III.C.3., and records of requirements performed for a biofilter permanent shut down or removal as required by Part C, Section III.D.

I.A.20. All surface emissions monitoring and gas collection and control system leak monitoring records, including the following:

I.A.20.a. The type(s) of monitoring device used for each monitoring or re-monitoring event including the device manufacturer and model.

I.A.20.b. If utilizing EPA Reference Method 21, monitoring instrument calibrations conducted according to sections 8 and 10 of Method 21 of Appendix A of 40 CFR Part 60, including the date of calibration.

I.A.20.c. If utilizing EPA OTM-51, monitoring instrument calibrations conducted according to sections 8 and 10 of OTM-51, including the date of calibration.

I.A.20.d. If utilizing a monitoring method pursuant to Part D, Sections I.A.3., I.A.4., or I.A.5., any monitoring instrument or equipment calibrations as recommended by the manufacturer, including the date of calibration, as well as the approved monitoring method for the instrument(s) or device(s).

I.A.20.e. All instantaneous surface emissions monitoring readings of 100 ppmv or 100 ppm-m methane or greater, including their emission measurement rate and location.

I.A.20.f. All integrated surface emissions monitoring readings pursuant to Part D, Section I.D.1., including their emission measurement rate and location.

I.A.20.g. All exceedances of the surface emission limits in Part B, Section II.D.2. and Part D, Sections I.C.2. or I.D.2., including their emission measurement rate and location, and affected grid if applicable pursuant to Section I.D.2.

I.A.20.h. All gas collection and control systems leaks, including their emission measurement rate and location.

I.A.20.i. The date and time of all surface emissions monitoring and gas collection and control system leak monitoring measurements.

I.A.20.j. All action(s) taken to address a surface emissions exceedance or repair a gas collection and control system leak and the date(s) of corrective action(s) or repair.

I.A.20.k. The installation date and location of any gas collection well or device replacement, or equipment or component replacement.

I.A.20.l. Any required re-monitoring, including the date and time of re-monitoring, location of the re-monitoring following the requirement of Section I.A.6.d., and the re-monitored emissions measurement rate.

I.A.20.m. Wind speeds per the requirements of Part D, Sections I.B.7.a. and II.A.2.

I.A.20.n. Barometric pressure during surface emissions monitoring per the requirements of Part D, Section I.B.9.

I.A.21. Any activities conducted pursuant to Part D, Section I.E.2 or I.E.3. Records must contain the following information:

I.A.21.a. A description of the actions being taken, the areas of the landfill that will be affected by these actions, the reason the actions are required, and any landfill gas collection system components that will be affected by these actions.

I.A.21.b. Construction start and finish dates, projected equipment installation dates, and projected shut down times for individual gas collection system components.

I.A.21.c. A description of the mitigation measures taken to minimize methane emissions and other potential air quality impacts.

I.A.22. All remote monitoring notifications and results of follow-up investigations and any corrective actions pursuant to the requirements of Part E.

I.A.23. Records demonstrating compliance with the intermediate cover requirements of Part F, Section I.A., if applicable, including the type of biocover and permeable gas distribution layer used and when and where they were applied at the MSW landfill as shown on a map of the landfill, as well as the cover approval from the Colorado Hazardous Materials and Waste Management Division and any cover maintenance records.

I.A.24. Records demonstrating compliance with the cover integrity requirements of Part F, Section II., including a description of the monitoring program and records of activities completed under the program.

I.B. The owner or operator of an MSW landfill subject to this regulation must maintain the following records on a continuous basis as specified and provide them to the Division upon request.

I.B.1. The maximum design capacity of the MSW landfill.

I.B.2. The approved gas collection and control system design plan for the MSW landfill required by Part C, Section I.A., and the approved biofilter design and operation plan required by Part C, Section III.C.1.

I.B.3. The surface emissions monitoring plan and component leak monitoring plan required by Part D, Sections I.B.1. and II.A.2.

I.B.4. All expansions of the gas collection and control system including installation date(s) and location(s) of equipment added to the gas collection and control system and date(s) such equipment became operational.

I.B.5. For the life of the gas collection system, the following:

I.B.5.a. An up-to-date map showing each existing and planned gas collector in the gas collection system.

I.B.5.b. The installation date and location of all installed gas collectors.

I.B.5.c. The nature, location, amount, and date of deposition of non-decomposable waste for any areas of the MSW landfill excluded from the gas collection system.

I.B.6. For the life of the gas control system, the following:

I.B.6.a. The vendor specification for each gas control device.

I.B.6.b. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in Part C, Section I.B.7

I.B.6.c. The expected gas generation flow rate as calculated pursuant to Part I, Section I.

I.B.6.d. For an enclosed combustion device other than a boiler or process heater with a design heat input capacity equal to or greater than 44 megawatts per hour (150 million British thermal units per hour) being used to comply with the requirements of Part C, Section II., the following:

I.B.6.d.(i) The average temperature measured at least every 15 minutes during the initial performance test and during the most recent performance test.

I.B.6.d.(ii) The percent reduction of methane achieved by the control device determined pursuant to Part I, Section II.

I.B.6.e. For a boiler or process heater being used to comply with the requirements of Part C, Section II., the description of the location at which the collected landfill

gas stream is introduced into the boiler or process heater over the same time period of the initial performance test.

I.B.6.f. For an open flare being used to comply with the requirements of Part C, Section II., the following:

I.B.6.f.(i) The flare type (i.e., steam-assisted, air-assisted, or non-assisted).

I.B.6.f.(ii) 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 40 CFR §60.18 (December 22, 2008)

I.B.6.f.(iii) 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 made during the performance test as specified in 40 CFR §60.18 (December 22, 2008)

I.B.6.g. For a landfill gas treatment system being used to comply with the requirements of Part C, Section II., the following:

I.B.6.g.(i) Records of the flow of landfill gas to, and bypass of, the treatment system, including dates and times and quantities of gas for each in standard cubic feet per minute.

I.B.6.g.(ii) The site-specific treatment monitoring plan required under Part C, Section II.E.3.c.

II. Reporting Requirements

II.A. The owner or operator of an MSW landfill subject to this regulation must submit the following reports and information to the Division as specified using a Division-approved platform and forms if available. All reports or submitted information must identify the MSW landfill name, owner and operator, and address, as well as the landfill's AIRS ID if one has been assigned to it, and include a certification statement signed and dated by a responsible official, or their designated representative, that identifies the individual's title and contact information and attests that the report or information being submitted is true, accurate and complete to the best of the certifying individual's knowledge.

II.A.1. Waste-in-place reports pursuant to the requirements of Part B, Section I.A. or I.B., by the required due date, which must include the following information:

II.A.1.a. The landfill's status (active, inactive, or closed) and the total estimated waste-in-place, in tons, as of the end of the calendar year or end date for which the report is being submitted.

II.A.1.b. A description of the known and assumed waste composition in the MSW landfill, including ages of waste-in-place.

II.A.1.c. The most recent topographic map of the MSW landfill showing all types of cover (e.g., final, intermediate, daily), including final cover with and without a geomembrane, with corresponding percentages over the landfill surface.

II.A.2. Methane generation rate reports pursuant to the requirements of Part B, Sections II.A., II.B., II.C., or II.D., by the required due date, which must include the methane generation rate calculation completed according to Part I, Section III., along with relevant parameters used in the calculation.

II.A.3. Surface emissions monitoring notifications and demonstration reports pursuant to the requirements of Part B, Sections II.D.2., by the required due date. Surface emissions monitoring demonstration reports must include the following information:

II.A.3.a. All results of the surface emissions monitoring, clearly identifying the measurement rate, location, date and time (to nearest second), and average wind speeds including wind gusts for all emissions readings, as well as any corrective actions taken for detected emissions.

II.A.3.b. Emissions reading locations must be in latitude and and longitude coordinates determined using an instrument with an accuracy of at least 4 meters and the coordinates in decimal degrees with at least five decimal places. The location and spatial data must be provided in a GIS-supported format.

II.A.4. A gas collection and control system design plan pursuant to the requirements of Part C, Sections I.A.1. or I.A.2., by the required due date, which must include the information required for the design plan pursuant to Part C, Section I.B.

II.A.5. Reports for performance tests of gas control devices completed pursuant to the requirements of Part C, Section II.F., which must be submitted within 60 calendar days after completion of a performance test and include the following information. The information required under Sections II.A.5.e. - II.A.5.j. must only be included with the initial performance test report for the gas control device, which must be submitted to the Division within 180 days of startup of the device.

II.A.5.a. The Division air permit number for the gas control device that was tested if an air permit number has been assigned to it.

II.A.5.b. Process information and operating conditions recorded during testing pursuant to the requirements of Part C, Section II.F.3.a., including copies of all field data and laboratory data sheets.

II.A.5.c. A summary of the test methods used, including an explanation of any deviations encountered, and a list of all calculations used to arrive at the final test results showing the methane destruction efficiency of the gas control device.

II.A.5.d. Calibration data for all equipment, including the certification of any calibration gas used in the testing.

II.A.5.e. 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.

II.A.5.f. The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing is based.

II.A.5.g. The documentation of the presence of asbestos or nondecomposable material for each area from which collection wells have been excluded based on the presence of asbestos or nondecomposable material.

II.A.5.h. 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

II.A.5.i. 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.

II.A.5.j. The provisions for the control of off-site migration.

II.A.6. Notifications and reports for wellhead positive pressure and excess temperature measurements pursuant to the requirements of Part C, Sections II.I.2.a.(iii) - (iv) and II.I.3.a.(iii) - (iv), which must include the information identified in these requirements and be submitted by the required deadline(s). All notifications and reports must include the identification number for the affected well. For corrective actions expected to take longer than 30 calendar days after the initial exceedance, the owner or operator must receive written approval from the Division regarding the plan for corrective action and the corresponding implementation schedule.

II.A.7. A high landfill gas temperature report whenever the measured landfill gas temperature is greater than or equal to 76.7ºC (170ºF), and the carbon monoxide concentration measured is greater than or equal to 1,000 ppmv, unless a higher operating temperature value has been approved by the Division for the well. The report must be submitted within 24 hours of the measurement and include the measurement date and time, well identifier, temperature, and carbon monoxide reading.

II.A.8. Notifications for a well raising not completed within 5 calendar days and requests for well raising timeline approval, if applicable, in accordance with Part C, Section II.J.1.

II.A.9. Notifications for gas collection and control system repairs and temporary shutdown conducted in accordance with Part C, Section II.K., which must include the following information and be submitted according to the following requirements:

II.A.9.a. For planned shutdowns, a notification of the shutdown must be submitted to the Division at least 30 calendar days in advance of the shutdown that includes a justification for the shutdown, the system component(s) that will require shutdown, and the approximate timeline for the shutdown.

II.A.9.b. If a shutdown occurs due to catastrophic or other unplanned events as identified in Part C, Section II.K., the notification must be submitted to the Division within 7 calendar days after the shutdown.

II.A.9.c. If the gas collection and control system cannot be returned to operation in 3 calendar days following the shutdown, a notification must be submitted to the Division within 7 calendar days after the shutdown describing the situation and actions being taken to return the gas collection and control system to operation along with an estimated timeline for doing so.

II.A.10. Notifications by the required due date for a new or replacement gas collection well or device, or requests to implement an alternative remedy for surface emission re-

monitoring exceedances, pursuant to Part D, Sections I.C.2.d(ii), I.C.2.e(iii), or I.D.2.b(ii).

II.A.11. Notifications by the required due date for when surface emissions monitoring is or will not be not performed in an area of the MSW landfill within 90 days after one of the activities specified in Part D, Section I.E.2., other than removing intermediate cover to expand the working face, has begun. The notification must specify when the activity will be completed and surface emissions monitoring will begin again. If the activity is expected to take longer than 120 days to complete, the owner or operator must obtain written approval from the Division for the activity completion date and when surface emissions monitoring of the area will begin again.

II.A.12. Semi-annual reports for the periods of January 1 through June 30 and July 1 through December 31 of each year, unless different reporting periods are approved in writing by the Division. Semi-annual reports must be submitted to the Division no later than 30 days after the end of the reporting period, unless otherwise approved in writing by the Division. Semi-annual reports are only required for MSW landfills required to install and operate a gas collection and control system and must include the following information for each reporting period:

II.A.12.a. All instances when the gas collection and control system was not operating in compliance with the provisions of Part C, Section II., and when applicable monitoring parameters were exceeded or not monitored as required, including during periods of startup, shutdown, and malfunction.

II.A.12.a.(i) For each instance, report the date, time, and duration of each event or exceedance, as well as any corrective action(s) taken.

II.A.12.a.(ii) For wellhead gauge positive pressure measurements or temperature exceedances, include the well identification number for each measurement.

II.A.12.a.(iii) If an alternate landfill gas temperature has been approved by the Division pursuant to Part C, Section II.H., and has been exceeded, the approved alternate temperature and oxygen concentration must be identified along with any exceedances.

II.A.12.a.(iv) If a boiler or process heater, energy recovery device(s), or site-specific treatment system is being used pursuant to Part C, Sections II.E.1., II.E.2., or II.E.3., the specific monitoring parameters for the gas control device, energy recovery device(s), or treatment system must be identified for any parameters exceeded or not monitored.

II.A.12.b. All instances when the measured nitrogen or oxygen concentration was at or above the limits specified in Part C, Sections II.I.1.a. or II.I.1.b., and a description of any actions taken to address the high readings and when they occurred or an explanation for why no action was taken. If the Division has approved alternative limits under Part C, Section II.I.1.b., those must be specified.

II.A.12.c. For corrective actions for wellhead gauge positive pressure measurements or wellhead temperature exceedances that cannot be completed within 30 calendar days after the initial exceedance pursuant to the requirements of Part C, Sections II.I.2.a.(iv) or II.I.3.a.(iv), the following information:

II.A.12.c.(i) The well identification number, root cause analysis and corrective action analysis.

II.A.12.c.(ii) The date(s) corrective action(s) was completed pursuant to approval by the Division. If corrective action(s) was not completed during the semi-annual period based on the Division- approved implementation schedule, then the planned date(s) for completing corrective action(s) must be identified and once corrective action(s) is completed it must be reported for the semi-annual period in which it occurred.

II.A.12.d. A description and duration of all periods when the landfill gas stream was diverted from the gas control device or treatment system through a bypass line or there was an indication of bypass flow resulting from a visual inspection of the seal or closure mechanism. The description and duration must include the records required by Part H, Section I.B.3.g.(i).

II.A.12.e. A description and duration of all periods when the gas control device or treatment system was not operating, including the date(s) and time(s) the control device or treatment system was not operating, reason(s) for not operating, and any corrective action(s) taken. If there is a backup or secondary control device, that must be indicated including whether the backup or secondary control device was in operation when the main gas control device or treatment system was not operating, and if all collected landfill gas was being directed to the backup or secondary control device.

II.A.12.f. A description and duration of all periods when the gas collection system was not operating, including the date and time(s) the collection system was not operating, reason(s) for not operating, and any corrective action(s) taken.

II.A.12.g. For enclosed flares, all three-hour periods of operation during which the average temperature difference was more than 28ºC (or 50º F) below the average combustion temperature during the most recent performance test.

II.A.12.h. For boilers or process heaters, the location at which the landfill gas stream is introduced into the flame zone if it changed during the reporting period, including the date the change occurred.

II.A.12.i. Any gas control system equipment calibration and maintenance completed pursuant to the requirements of Part C, Sections II.B., II.C., or II.E., including dates of calibration and maintenance.

II.A.12.j. If well raising occurred during the reporting period, the records required by Part C, Section II.J.4.

II.A.12.k. If any activities identified in Part C, Section II.K. occurred during the reporting period, dates and descriptions of the activities, as well as mitigation measures taken to prevent the release of methane and other emissions into the atmosphere as a result of the activities, including meeting the requirements of Part C, Section II.K.2. - Section II.K.4., as applicable.

II.A.12.l. All known, prevented, or suspected subsurface landfill fire(s) along with potential causes and any efforts conducted to avoid or put out the fire(s), including any positive pressure readings that may have contributed to the known, prevented, or suspected fire.

II.A.12.m. All instantaneous surface emissions monitoring readings of methane 100 ppmv or greater if using the approved monitoring methods under Part D, Sections I.A.1. or I.A.2., or 100 ppm-m or greater if using the approved monitoring method under Section I.A.3., which must include the information in Sections II.A.9.m.(i) - (iii).

II.A.12.n. All measured emissions that meet or exceed the limits specified in Part D, Sections I.C.2. or I.D.2., and Section II.A.2., including:

II.A.11.n.(i) The location of the measured emissions (or affected grid).

II.A.12.n.(ii) The measured emissions rate.

II.A.12.n.(iii) The date and time of the emissions measurement.

II.A.12.n.(iv) The action(s) taken to address the emissions.

II.A.12.n.(v) The date of repair to address the emissions.

II.A.12.n.(vi) The date(s) and results of all re-monitoring to confirm repair of emissions.

II.A.12.n.(vii) Wind speed and barometric pressure during monitoring.

II.A.12.n.(viii) The installation date and location of each well or device installed or replaced as part of a gas collection system to address an exceedance.

II.A.12.o. All measured emissions that exceed the limits specified for follow-up or remediation under any approved alternative monitoring method pursuant to Part D, Sections I.A.4. or I.A.5., including all information specified in Part H, Sections II.A.9.m.(i) - (viii).

II.A.12.p. If required to conduct enhanced monitoring pursuant to Part I, Section V., for landfill gas temperatures exceeding 55ºC (131ºF), the results of all monitoring activities conducted during the reporting period.

II.A.12.q. The date of installation and the location of each new well or gas collection system expansion that occurred during the reporting period.

II.A.12.r. The date(s) any new well or gas collection system expansion equipment became operational that occurred during the reporting period.

II.A.12.s. The date of initial placement of waste in newly constructed landfill cells that occurred during the reporting period.

II.A.12.t. The results of investigations and any corrective actions for remote methane monitoring notifications that occurred during the reporting period pursuant to the requirements of Part E. If an investigation or corrective action(s) were not completed by the end of the reporting period for a notification that occurred during the reporting period, the results of the investigation and any corrective action(s) must be reported in the next semi-annual report.

II.A.13. Annual reports for each calendar year, or an alternate twelve-month reporting period if approved by the Division, if the owner or operator of an MSW landfill is required to install and operate a gas collection and control system at the landfill. Annual reports are due by

March 31 after the end of the calendar year, or within 90 calendar days after the end of an approved alternate reporting period, and must include the following information:

II.A.13.a. Total volume of landfill gas collected for the entire reporting period (reported in standard cubic yards).

II.A.13.b. Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume).

II.A.13.c. The date that the gas collection and control system was installed and in full operation.

II.A.13.d. Each gas control device installed at the MSW landfill, including its type, year of installation, rating, fuel type, total amount of landfill gas combusted over the reporting period, percent methane destruction efficiency, and type and amount of any supplemental fuels burned with the landfill gas in each device.

II.A.13.e. If applicable, the total volume of landfill gas shipped off-site or transferred to a third-party from the MSW landfill, including the composition of the landfill gas (reported in percent methane and percent carbon dioxide by volume), and the recipient of the landfill gas.

II.A.13.f. The most recent topographic map of the MSW landfill showing the ages of waste in place, the locations of gas collection system components, and all types of cover (e.g., final, intermediate, daily), including final cover with and without a geomembrane, with corresponding percentages over the landfill surface.

II.A.14. Bioreactor moisture content report if an MSW landfill owner or operator is utilizing a bioreactor at the landfill and calculates moisture content to establish the date the bioreactor is required to begin operating the gas collection and control system. The report must be submitted within 90 calendar days after the bioreactor achieves a 40-percent moisture content and include the following information:

II.A.14.a. The results of the moisture content calculation.

II.A.14.b. The date the bioreactor achieved 40-percent moisture content by weight.

II.A.14.c. The date the owner or operator will begin operating the gas collection and control system.

II.A.15. Leachate recirculation or liquids addition report if an MSW landfill owner or operator has employed leachate recirculation or added liquids based on a research, development, and demonstration permit for landfill operations (issued through Resource Conservation and Recovery Act, subtitle D, part 258) within the last 10 years. The report must be submitted for each calendar year with the annual report required under Section II.A.13., except the initial report must cover the prior ten-year period to the extent the required data is available, and include the following information:

II.A.15.a. The volume of leachate recirculated (gallons per year) and the reported basis of those estimates (records or engineering estimates).

II.A.15.b. The total volume of all other liquids added (gallons per year) and the reported basis of those estimates (records or engineering estimates).

II.A.15.c. The surface area (acres) over which the leachate is recirculated (or otherwise applied).

II.A.15.d. Surface area (acres) over which any other liquids are applied.

II.A.15.e. The total waste disposed (megagrams) in the areas with recirculated leachate, added liquids, or both, based on on-site records to the extent data are available, or engineering estimates and the reported basis of those estimates.

II.A.15.f. The annual waste acceptance rates (megagrams per year) in the areas with recirculated leachate, added liquids, or both, based on on-site records to the extent data are available, or engineering estimates.

II.A.16. An amended design capacity report, along with a permit modification request, if needed, when there is any change in the design capacity of the landfill, which must be submitted within 90 days of any design capacity change resulting from a recalculation of volume or mass, or as approved by the Colorado Hazardous Materials and Waste Management Division.

II.A.17. Closure notification for an MSW landfill that has permanently ceased accepting waste, which must be submitted no later than 30 calendar days after waste acceptance cessation and include the following information:

II.A.17.a. The last day solid waste was accepted, the anticipated closure date of the MSW landfill, the estimated waste-in-place at the landfill, and the most recent methane generation rate calculation.

II.A.17.b. The Division may request additional information as necessary to verify that permanent closure has taken place in accordance with the requirements of any applicable federal, State, or local regulations and ordinances in effect at the time of closure.

II.A.18. Gas collection and control system equipment removal or shutdown request, which must be approved in writing by the Division prior to completing any well capping, or removal or cessation of operation of a gas control device. The request must include the following information:

II.A.18.a. For individual well capping or decommissioning only, documentation of nonexistent or significantly declining gas flow rates for the well that are not attributable to malfunctions or inadequate maintenance of the well or gas collection system if the capped or decommissioned well will not be replaced with another well.

II.A.18.b. An application for a modified permit reflecting the permanent shutdown or removal of the gas control device.

II.A.18.c. A copy of the closure notification submitted in accordance with Part H, Section II.A.17., if applicable.

II.A.18.d. Documentation demonstrating that the gas collection and control system has operated at the MSW landfill for a minimum of 15 years after the landfill's closure.

II.A.18.e. Documentation demonstrating that the MSW landfill's methane generation rate is less than 125 metric tons (138 tons) per year if the gas control device is an open flare or less than 225metric tons (248 tons) per year if the gas control

device is an enclosed flare or another enclosed combustion device on 3 successive test dates.

II.A.18.f. Documentation demonstrating that the methane concentration of collected gas at the landfill is less than 20 percent on 3 successive test dates.

II.A.18.g. Surface emissions monitoring results verifying that landfill surface methane concentration measurements do not exceed the limits specified in Part D, Sections I.C.2. or I.D.2., for eight consecutive quarters of monitoring.

II.A.18.h. Records demonstrating the concentrations of methane gas at the MSW landfill do not exceed 25 percent of the lower explosive limit in facility structures at the landfill (excluding gas collection and control system components) or five percent of the lower explosive limit at the site boundary.

II.A.19. Biofilter design and operation plan submission pursuant to the requirements of Part C, Section III.C.1., if an MSW landfill owner or operator is installing a biofilter at the landfill, which must be submitted no later than when the gas control device removal request is submitted pursuant to Section II.A.18.

II.A.20. Biofilter annual report pursuant to Part C, Section III.C.4., which must be submitted by March 31 of each year and include the information required by Section III.C.4. for the previous calendar year.

II.A.21. Biofilter removal or permanent shutdown notification pursuant to the requirements of Part C, Section III.D.3., which must include documentation verifying that the methane concentration of collected gas at the landfill has been less than 10 percent on 3 successive test dates or that the post-closure plan for the landfill has been terminated by the Colorado Hazardous Materials and Waste Management Division, as applicable.

II.A.22. Remote methane monitoring investigation report, and follow-up report if applicable, pursuant to the requirements of Part E, Section I.D., by the required due date(s).

PART I Test Methods and Procedures

I. Expected Gas Generation Flow Rate Determination

I.A. The owner or operator of an MSW landfill must determine the expected gas generation flow rate from the landfill in accordance with 40 CFR §63.1960(a)(1) (February 14, 2022).

II. Gas Control Device Destruction Efficiency Determination

II.A. The following methods of analysis must be used by an owner or operator of an MSW landfill to determine the efficiency of the gas control device in reducing methane from the landfill:

II.A.1. For enclosed combustion devices, one of the following test methods must be used to determine the efficiency of the control device in reducing methane by at least 99 percent, or in reducing the outlet methane concentration for lean burn engines to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen:

II.A.1.a. U.S. EPA Reference Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography. 40 CFR Part 60, Appendix A-6, Method 18 (December 7, 2020).

II.A.1.b. U.S. EPA Reference Method 25, Determination of Total Gaseous Nonmethane Organic Emissions as Carbon.40 CFR Part 60, Appendix A-7, Method 25 (May 30, 2023).

II.A.1.c. U.S. EPA Reference Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer. 40 CFR Part 60, Appendix A-7, Method 25A (May 30, 2023).

II.A.1.d. U.S. EPA Reference Method 25C, Determination of Nonmethane Organic Compounds in Landfill Gases. 40 CFR Part 60, Appendix A-7, Method 25C (May 30, 2023).

II.A.2. The following equation must be used to calculate destruction efficiency:

II.A.2.a. Destruction Efficiency = [1 - (Mass of Methane - Outlet/Mass of Methane - Inlet)] x 100%.

II.B. Open flares must meet the requirements of 40 CFR §60.18 (December 22, 2008).

III. Methane Generation Rate Determination

III.A. All methane generation rate determinations by an owner or operator of an MSW landfill must include waste received at the landfill up to December 31 of the previous calendar year.

III.B. The following methods and procedures must be used by an owner or operator of an MSW landfill to determine the methane generation rate from an MSW landfill, as applicable:

III.B.1. For an MSW landfill without a carbon adsorption or passive venting system, the procedures specified in 40 CFR §98.343(a)(1)(January 1, 2025).

III.B.1.a. The Division may request additional information as may be necessary to verify the methane generation rate from the landfill and site-specific data may be substituted when available.

III.B.2. For an MSW landfill with a carbon adsorption system, by measuring the actual total landfill gas flow rate, in standard cubic feet per minute, using a flow meter or other flow measuring device such as a standard pitot tube and the methane concentration (in percent by volume) using a gas detector instrument that meets the requirements of Part D, Section I.A. or I.A.2.

III.B.2.a. The total landfill gas flow rate must be multiplied by the methane concentration to determine the methane generation rate.

III.B.3. For an MSW landfill with a passive venting system, by using the higher value determined through the following methods:

III.B.3.a. The procedures specified in 40 CFR §98.343(a)(1)(January 1, 2025).

III.B.3.b. The measured actual landfill gas flow rates, in standard cubic feet per minute, using a flow meter or other flow measuring device such as a standard pitot tube and the methane concentration (in percent by volume) using a gas detector instrument that meets the requirements of Part D, Section I.A. or I.A.2., from venting pipe that is within the waste mass.

III.B.3.b.(i) Each gas flow rate must be multiplied by its corresponding methane concentration to obtain the individual methane flow rate.

III.B.3.b.(ii) The individual methane flow rates must be added together to determine the methane generation rate.

IV. Wellhead Monitoring

IV.A. Landfill gas nitrogen levels at each wellhead must be determined by an owner or operator of an MSW landfill using EPA Reference Method 3C, Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources, 40 CFR Part 60, Appendix A-2, Method 3C (October 31, 2016), unless an alternative test method is approved by the Division.

IV.B. Landfill gas oxygen levels at each wellhead must be determined by an owner or operator of an MSW landfill through one of the following methods:

IV.B.1. An oxygen meter using EPA Reference Method 3A, Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure), 40 CFR Part 60, Appendix A-2, Method 3A (October 31, 2016) or EPA Reference Method 3C, Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources 40 CFR Part 60, Appendix A-2, Method 3C (October 31, 2016), or ASTM D6522-20 (October 28, 2024) , except that, if sample location is prior to combustion:

IV.B.1.a. The span must be set between 10 and 12 percent oxygen.

IV. B1.b. A data recorder is not required.

IV.B.1.c. Only two calibration gases are required, a zero and span.

IV.B.1.d. A calibration error check is not required.

IV.B.1.e. The allowable sample bias, zero drift, and calibration drift are ±10 percent.

IV.B.2. A portable gas composition analyzer provided that the analyzer is calibrated and the analyzer meets all quality assurance and quality control requirements of EPA Reference Method 3A, 40 CFR Part 60, Appendix A-2, Method 3A (October 31, 2016) or ASTM D6522-11 (June 19, 2020).

IV.B.3. An alternative test method approved by the Division.

IV.C. Wellhead gauge pressure must be determined by an owner or operator of an MSW landfill using a hand-held manometer, magnehelic gauge, or other pressure measuring device approved by the Division. The pressure measuring device must be calibrated and operated in accordance with the manufacturer's specifications.

IV.D. Wellhead temperature measuring devices must be calibrated annually by an owner or operator of an MSW landfill using the procedure in 40 CFR Part 60, Appendix A-1, Method 2, Section 10.3 (May 30, 2023), except that a minimum of two temperature points, bracket within 10 percent of all landfill absolute temperature measurements or two fixed points of ice bath and boiling water, corrected for barometric pressure, are used.

V. Enhanced Well Monitoring

V.A. The owner or operator of an MSW landfill must initiate enhanced monitoring at each well with landfill gas temperature measurement greater than 55ºC (131ºF) as follows:

V.A.1. Conduct visual observations for subsurface oxidation events (smoke, smoldering ash, damage to well) within the radius of influence of the well.

V.A.2. Monitor oxygen or nitrogen concentration in the landfill gas pursuant to Part C, Section II.I.1.

V.A.3. Monitor landfill gas temperature at the wellhead pursuant to Part C, Section II.I.3.

V.A.4. Monitor temperature of the landfill gas every 10 vertical feet of the well pursuant to Part C, Section II.I.3., and Part I, Section V.A.9.

V.A.5. Monitor the methane concentration with a methane meter using EPA Reference Method 3C, 40 CFR Part 60, Appendix A-2, Method 3C (October 31, 2016), EPA Reference Method 18, 40 CFR Part 60, Appendix A-6, Method 18 (December 7, 2020), or a portable gas composition analyzer to monitor the methane levels provided that the analyzer is calibrated and the analyzer meets all quality assurance and quality control requirements for EPA Reference Method 3C or EPA Reference Method 18.

V.A.6. Monitor carbon monoxide concentrations, as follows:

V.A.6.a. Collect the sample from the wellhead sampling port in a passivated canister or multi-layer foil gas sampling bag (such as the Cali-5-Bond Bag) and analyze that sample using EPA Reference Method 10, 40 CFR Part 60, Appendix A-4 (May 30, 2023), or an equivalent method with a detection limit of at least 100 ppmv of carbon monoxide in high concentrations of methane.

V.A.6.b. Collect and analyze the sample from the wellhead using EPA Reference Method 10, 40 CFR Part 60, Appendix A-4 (May 30, 2023) to measure carbon monoxide concentrations.

V.A.7. The enhanced monitoring must begin no later than 7 calendar days after the first measurement of landfill gas temperature greater than 55ºC (131ºF) and be conducted on a weekly basis.

V.A.7.a. If four consecutive weekly carbon monoxide readings are under 100 ppmv, then enhanced monitoring may be decreased to a monthly basis.

V.A.7.b. If monthly carbon monoxide readings exceed 100 ppmv, the MSW landfill must return to weekly monitoring.

V.A.8. The enhanced monitoring can be stopped once the measurement of landfill gas temperature at the wellhead is less than or equal to 55 ºC (131 ºF), or if a higher operating value is approved by the Division pursuant to Part C, Section II.H., at which time the monitoring provisions issued with the higher operating value must be followed.

V.A.9. For each wellhead with a measurement of landfill gas temperature greater than or equal to 73.9ºC (165ºF), annually monitor temperature of the landfill gas every 10 vertical feet of the well.

V.A.9.a. The temperature may be monitored using either a removable thermometer, or temporary or permanent thermocouples installed in the well.

VI. Bioreactor Moisture Content

VI.A. The owner or operator of an MSW landfill must consider the following for the bioreactor moisture content calculation:

VI.A.1. Waste mass.

VI.A.2. Moisture content of the incoming waste.

VI.A.3. Mass of water added to the waste including leachate recirculation and other liquids addition and precipitation.

VI.A.4. Mass of water removed through leachate or other water losses.

VI.A.5. Moisture level sampling or mass balances.

VI.A.6. Any other requirements specified by the Colorado Hazardous Materials and Waste Management Division.

VI.B. The owner or operator of an MSW landfill subject to the requirements in Part B, Section II.F. must document the calculations and the basis of any assumptions and keep the record of the calculations until liquids addition ceases.

VII. Alternative Test Methods

VII.A. The owner or operator of an MSW landfill may use alternative test methods for any of the test methods described in this regulation upon written approval by the Division.

PART J Severability

I. Severability

I.A. If any section, clause, phrase, or standard contained in this regulation is for any reason held to be inoperative, unconstitutional, void, or invalid, the validity of the remaining portions thereof will not be affected and the Commission declares that it severally passed and adopted these provisions separately and apart.

PART K Statements of Basis, Specific Statutory Authority and Purpose

I. Adopted: [date]

Promulgation of Regulation Number 31.

This Statement of Basis, Specific Statutory Authority, and Purpose complies with the requirements of the Colorado Administrative Procedure Act § 24-4-103, the Colorado Air Pollution Prevention and Control Act §§ 25-7-110 and 25-7-110.5, and the Air Quality Control Commission's (Commission) Procedural Rules.

Basis

In HB19-1261, now codified in part at §§ 25-7-102(2) and -105(1)(e), C.R.S, the General Assembly declared that "[c]limate change adversely affects Colorado's economy, air quality and public health, ecosystems, natural resources, and quality of life[,]" and acknowledged that "Colorado is already experiencing harmful climate impacts[,]" and that "[m]any of these impacts disproportionately affect" certain disadvantaged communities. § 25-7-102(2), C.R.S. The General Assembly also recognized that "[b]y reducing greenhouse gas pollution, Colorado will also reduce other harmful air pollutants, which will,

in turn, improve public health, reduce health care costs, improve air quality, and help sustain the environment." § 25-7-102(2)(d), C.R.S.

Consequently, the General Assembly updated Colorado's statewide greenhouse gas (GHG) pollution reduction goals so as to achieve a 26% reduction of statewide GHG by 2025; 50% reduction by 2030; 65% by 2035, 70% by 2040, 95% by 2045, and net-zero by 2050 as compared to 2005 levels. § 25-7-102(2)(g), C.R.S. Statewide GHG pollution is defined as "the total net statewide anthropogenic emissions of carbon dioxide [(CO_2)], methane [(CH_4)], nitrous oxide [(N_2O)], hydrofluorocarbons [(HFCs)], perfluorocarbons [(PFCs)], nitrogen trifluoride [(NF3)], and sulfur hexafluoride [(SF6)] expressed as carbon dioxide equivalent [(CO2e)] calculated using a methodology and data on radiative forcing and atmospheric persistence deemed appropriate by the commission." § 25-7-103(22.5), C.R.S.

§ 25-7-105(1)(e), C.R.S., sets forth the framework for developing GHG abatement rules consistent with the statewide GHG pollution reduction goals in § 25-7-102(2)(g), C.R.S. This provision grants the Commission broad authority to regulate GHG emissions toward accomplishing these goals.

Further, in February 2024, the Colorado GHG Roadmap 2.0 was released, which identifies reducing methane emissions from landfills as a near-term action to help achieve the statewide GHG reduction goals set out in § 25-7-102(g), C.R.S.. Landfills in Colorado are the third largest source of methane emissions in the state according to the state's most recent GHG Inventory published in 2023. Accordingly, the Commission is adopting a new Regulation Number 31, Control of Methane Emissions from Municipal Solid Waste Landfills, as part of satisfying the requirements of the General Assembly in § 25-7-102(g), C.R.S., and the goals and projections in the GHG Roadmap 2.0.

Specific Statutory Authority

The Colorado Air Pollution Prevention and Control Act, § 25-7-101, C.R.S. et seq. (the State Air Act or the Act), specifically § 25-7-105(1), directs the Commission to promulgate such rules and regulations as are consistent with the legislative declaration set forth in § 25-7-102 and that are necessary for the proper implementation and administration of the Act.

§ 25-7-102(g), C.R.S., directs Colorado to reduce GHG emissions by at least 26% by 2025, at least 50% by 2030; at least 65% by 2035; at least 75% by 2040; at least 90% by 2045; and net-zero GHG emissions by 2050 relative to 2005 statewide GHG emission levels. The Act provides the Commission broad authority to regulate air pollutants, including GHG and its constituent gasses.

§ 25-7-106, C.R.S. provides the Commission maximum flexibility in developing an effective air quality program, and authorizes the Commission to promulgate "[e]mission control regulations that are applicable to the entire state, that are applicable only within specified areas or zones of the state, or that are applicable only when a specified class of pollution is present." § 25-7-106(6), C.R.S., further authorizes the Commission to require owners and operators of any air pollution source to monitor, record and report information.

§ 25-7-109(1) authorizes the Commission to adopt and promulgate emission control regulations that require the use of effective practical air pollution controls for each type of facility, process, or activity which produces or might produce significant emissions of air pollutants. An "emission control regulation" may include "any regulation which by its terms is applicable to a specified type of facility, process, or activity for the purpose of controlling the extent, degree, or nature of pollution emitted from such type of facility, process, or activity.....", see § 25-7-103(11). Emission control regulations may pertain to any chemical compound including GHG pollution, see § 25-7-109(2)(c). Purpose

The following section sets forth the Commission's purpose in adopting Regulation Number 31 (Rule), and includes the technological and scientific rationale for the adoption of the Rule.

With this action, the Commission adopts emissions control requirements to reduce methane emissions from municipal solid waste ("MSW") landfills to help the state meet the GHG reduction goals set out in § 25-7-102(g), C.R.S.. Methane is a potent greenhouse gas produced by MSW landfills, with a global warming potential 28 times that of carbon dioxide. Colorado's Greenhouse Gas Pollution Reduction Roadmap 2.0 (GHG Roadmap 2.0) identifies reducing methane emissions from landfills as a near-term action to help achieve the state's climate goals. To further aid in addressing these emissions, in October 2024, the Commission adopted changes to the state's GHG reporting requirements that apply to MSW landfills under Regulation Number 22, Part A, which provides the Commission with additional data regarding the amount of emissions from the state's MSW landfills, including uncontrolled and controlled emissions. The landfill methane reduction requirements in this Regulation Number 31 will be reflected in the expanded GHG reporting requirements for MSW landfills adopted in Regulation Number 22, Part A, which is used for the state's GHG inventory and for tracking progress in achieving the statutory GHG reduction goals.

To demonstrate compliance with the landfill methane reduction rule, in this action the Commission adopts a compliance pathway requiring the installation and operation of Gas Collection and Control Systems (GCCS) for affected MSW landfills, which can include vertical and/or horizontal wells, enclosed flares, and landfill gas-to-energy projects; the use of biocovers and biofilters that contain methane-oxidizing bacteria to reduce methane, and; emissions monitoring, recordkeeping, and reporting requirements, which all demonstrate pre-existing, cost-effective, and technically feasible means of methane emission control at MSW landfills. The adoption of this Regulation Number 31 is the result of the Commission's consideration of other jurisdictions' existing or proposed landfill methane rules including California, Oregon, Washington, Maryland, Michigan, and Canada; the EPA White Paper Series: Municipal Solid Waste Landfills – Advancements in Technology and Operating Practices, U.S. EPA, Office of Air and Radiation, EPA-HQ-OAR-2024-0453-0003 ("EPA White Papers"); comments and discussion during the technical working group meetings for Regulation Number 31; stakeholder and party feedback, and; all other evidence presented to the Commission in this rulemaking action.

Applicability – MSW Landfills, Part A, Sections II – III

Regulation Number 31 applies to MSW landfills in the state that have received solid waste after November 8, 1987, which is the applicability date for MSW landfills in 40 CFR, part 60, Subpart Cf, incorporated by reference into the Commission's Regulation Number 6, and that meet or exceed certain thresholds. MSW landfills that closed before November 8, 1987, that have a GCCS at the landfill must only comply with the biofilter requirements of the Rule. The Commission understands that this will impact two MSW landfills in the state, which are the Rooney Road Landfill in Jefferson County and the County Line Landfill in Douglas County, and determines that applying the biofilter requirements of the Rule to these landfills is feasible and allows for greater emission reductions since a gas collection system is already in place at these landfills. Additionally, MSW landfills that closed before October 31, 1993, that have less than 450,000 short tons of waste-in-place or are below the federal design capacity threshold that applies for installation of a GCCS under EPA requirements, and do not have a GCCS installed, are exempt from the Rule. This exemption is meant to align with the effective date of Subpart D of the U.S. Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §6901 et seq, which applies to landfills that accept non-hazardous solid waste. A number of MSW landfills in the state closed before the effective date of Subpart D of RCRA and the Commission has determined if they are below the thresholds in Regulation Number 31 and under federal requirements, then they should not be subject to the Rule.

An MSW landfill is a type of landfill where one of the main waste streams accepted is municipal waste, which is solid waste from household, community, commercial, and industrial sources that does not contain hazardous waste. The Rule does not apply to landfills that are regulated under Subtitle C of RCRA, which applies to hazardous waste, or subject to the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Chapter 103, commonly known as "Superfund", or to landfills that receive only construction and demolition debris, inert materials, or non-decomposable solid waste.

Prior to the adoption of this Regulation Number 31, MSW landfills in the state were only subject to EPA's air pollution requirements for MSW landfills codified in 40 CFR part 60, Subparts Cf and XXX, and 40

CFR part 63, Subpart AAAA, incorporated by reference into the Commission's Regulations Number 6 and 8. This Regulation Number 31 is either as stringent, or more stringent than federal air pollution control regulations for MSW landfills, and will cover more MSW landfills than are currently covered under the federal regulations. The Commission determines that this additional applicability is appropriate and necessary for the state to reach its GHG reduction goals, and the projections of the GHG Roadmap 2.0.

The Commission is establishing different tiered thresholds that, if met or exceeded, will trigger certain requirements for those MSW landfills that meet or exceed the thresholds. The thresholds established are based on a culmination of relevant federal regulations, primarily found in 40 CFR Part 60, Subpart Cf and 40 CFR Part 63, Subpart AAAA; EPA's White Papers; other states' landfill methane rules, and comments during the technical working group meetings. In determining which requirements apply to the MSW landfill, the owner or operator must determine first, whether the landfill meets or exceeds the waste in place ("WIP") threshold, then, the owner or operator must determine whether the MSW landfill's methane generation rate meets or exceeds the thresholds established in the Rule.

Waste-in-Place (WIP) Threshold, Part B, Sections I-II

The first threshold is the WIP threshold established in Part B, Section I.A. with requirements based on that threshold found in Sections II.A. through II.F. WIP is the amount of solid waste that has been deposited at an MSW landfill. The Commission requires each owner or operator of an MSW landfill to submit a WIP report to the Division, wherein they will provide the amount of waste in place at the landfill. If an MSW landfill has more than one owner or operator, the total amount of waste in place at the entire landfill must be reported.

If the MSW landfill meets or exceeds the WIP threshold in the Rule of 450,000 short tons or greater, then the owner or operator must calculate and report to the Division the amount of methane being produced by the landfill, or the methane generation rate. The Commission expects that 37 of 82 MSW landfills, or approximately 45% of MSW landfills in the state subject to the WIP reporting requirements of the Rule, meet or exceed the WIP threshold of 450,000 short tons. The Commission considered evidence that the lowest WIP for an MSW landfill that is likely to trip the methane generation rate threshold is at around 450,000 short tons or greater. Accordingly, the Commission set the WIP threshold at a level that correlates as closely as possible with the methane generation rate threshold based on Colorado's climate/precipitation, which impacts methane production at MSW landfills.

Methane Generation Rate Threshold, Part B, Section II

If the MSW landfill's methane generation rate meets or exceeds the methane generation rate thresholds in the Rule as established in Part B, Sections II.C and II.D., the Commission requires that a landfill's owner or operator must either install and operate a gas collection and control system (GCCS) at the landfill to control emissions or conduct quarterly surface emissions monitoring (SEM) of the landfill to determine if a GCCS must be installed. However, if the MSW landfill meets or exceeds the methane generation rate threshold established in Part B, Section II.E., then the owner or operator must install a GCCS. The Commission set this higher methane generation rate threshold for the automatic installation of a GCCS to ensure MSW landfills with the highest emissions in the state achieve emission reductions sooner. The Commission determined a threshold using the methane generation rate instead of nonmethane organic compounds ("NMOC") (used in the federal regulations) is most appropriate as it is in line with the EPA White Papers' identification that "[c]ompared to NMOC emissions rates . . . methane generation rate more closely relate to a MSW landfill's waste-in-place, because methane gas (and thus its [heat input capacity]) is generated from the anaerobic breakdown of biodegradable components of MSW."
U.S. EPA, White Paper Series: Municipal Solid Waste Landfills – Advancements in Technology and Operating Practices, at 5 (Oct. 2024). The Commission expects the methane generation rate threshold to capture 28 of 82 MSW landfills or 34% of MSW landfills in the state subject to the WIP reporting requirements of Rule as of the effective date of the Rule. The Commission sets the methane generation rate in the Rule based on a conservative rate of methane produced by a landfill that is needed to operate an enclosed flare without supplemental fuel to control emissions.

PART C - Gas Collection and Control System (GCCS) Requirements

The Commission establishes GCCS requirements in this Rule as a flexible, technically feasible, and cost-effective means of achieving methane emission reductions at MSW landfills. A GCCS is equipment installed and operated at an MSW landfill for the purpose of capturing and reducing methane and other harmful air pollution, and is any system consisting of a gas collection system and a gas control system. A gas collection system under this Rule means any system that employs various gas collection wells and connected piping installed at an MSW landfill, as well as gas mover equipment, such as a blower, which requires that an active collection system must be used at an MSW landfill in Colorado. A gas control system is a system that disposes of or treats collected landfill gas by one or more of the following means: combustion, gas treatment for subsequent sale, or sale for processing offsite, including for transportation fuel and injection into a natural gas pipeline. Combustion typically involves the use of flare but can also include burning landfill gas in an engine, turbine, boiler, or heater to produce power or heat. Treating landfill gas for sale off site or to be used as a transportation fuel or injected into a natural gas pipeline may be able to generate recovered methane credits for the owner or operator of an MSW landfill under Regulation Number 22, Part C (Recovered Methane rule) if certain requirements are met. This Regulation Number 31 does not specify the type of gas control system that must be used at an MSW landfill; only that a gas control system must be employed as defined in the Rule. A GCCS, if operated in accordance with this Rule, is expected to significantly reduce methane emissions and result in reductions of other harmful air pollution from MSW landfills, satisfying § 25-7-105(1)(e)(II), C.R.S.

GCCS Design Plan, Part C, Sections I.A – I.B

Prior to installing a GCCS, the Commission is requiring an owner or operator of an MSW landfill who must install a GCCS at the landfill under the Rule to submit a Design Plan to the Division for approval, demonstrating how the owner or operator will install, operate, and expand the GCCS to ensure it is effective in controlling landfill gas emissions. The owner or operator of an MSW landfill that already has a GCCS installed voluntarily or according to federal requirements must also submit a Design Plan if one has not been submitted or update their existing Design Plan to meet the requirements in Regulation Number 31. The timing of the submission of a new or amended Design Plan is based on when an MSW landfill triggers the requirement to install a GCCS, or meets or exceeds the methane generation rate threshold if a GCCS is already installed at the landfill. In either case, the Design Plan must be submitted within 180 days after triggering the requirement to do so. For new Design Plans, the Commission encourages owners or operators that will have to install a new GCCS at their MSW landfill to begin thinking and planning for the development of the Design Plan before having to submit one to minimize the time between when a GCCS is required and ultimately installed. Once a Design Plan has been submitted to the Division, if the Division does not approve or disapprove the Design Plan or does not request additional information from the owner or operator within 90 days of receipt, the owner or operator may continue with the implementation of the Design Plan at their own risk. The Commission determines that 90 days ensures the Division's administrative burden is minimized and a GCCS can be installed as quickly as possible within a feasible timeframe to begin the control of methane and other harmful air pollutants from an MSW landfill. The Commission specifically identifies what must be included in the Design Plans in Part C, Section I.B. The items identified all serve to demonstrate to the Division that the GCCS will be installed, operated and expanded as intended.

GCCS Installation, Part C, Sections I.C-I.I

An owner or operator of an active MSW landfill required to install a GCCS must install and operate the GCCS within 18 months after the submission deadline for the Design Plan. Whereas the owner or operator of an inactive or closed MSW landfill required to install a GCCS must do so within 24 months after the submission deadline for the Design Plan. The Commission determines that the timelines are appropriate based on its consideration of the need to begin controlling methane emissions from MSW landfills quickly, and the feasibility and timing of obtaining the appropriate permits for and installation of the GCCS. The Commission is establishing the GCCS installation and operation due dates based on the analysis EPA completed for its New Source Performance Standards and Emission Guidelines for MSW landfills highlighted in the EPA White Papers that review of the Design Plans, which will be completed by

the Division's Compliance and Enforcement Program, will take 6 months and GCCS construction and installation will take owners or operators 12 months.

To accommodate situations when a GCCS may not be able to be installed by the required deadline, the Commission is providing an opportunity to extend the deadline if the owner or operator can demonstrate a good cause for the delay, such as having timely applied to the Division for a permit, but having not yet had a permit issued for the operation of the GCCS. To minimize potential delays resulting from permit issuance, the Commission is requiring the GCCS permit application to be submitted no later than when the Design Plan is due. The owner or operator seeking an extension must submit an extension request in writing to the Division at least 60 calendar days before the GCCS installation deadline that includes the basis for the extension request and a proposed deadline for installing the GCCS. The extension must be approved by the Division in writing to be a valid extension.

In addition to the installation deadline for a new GCCS, the Commission is also establishing in Part C, Section I.H., deadlines for the expansion of the GCCS at active MSW landfills where new waste has been or will be placed. These deadline requirements are cost-effective and feasible, and allow for earlier capture and control of methane and other harmful air pollution produced from new waste placed in a landfill than what is required by EPA. EPA estimates that organic waste, such as food waste, sent to MSW landfills accounts for the majority of methane emissions and that half of all food waste breaks down in the first three and half years after it is landfilled. This results in 61% of the total methane produced by the waste not being captured and controlled (EPA White Papers) since federal air pollution control regulations for MSW landfills do not require gas collection from waste until it has been in place for at least 5 years in an active area of the landfill. To address this, the Commission is requiring MSW landfills that have an actual (as opposed to permitted) solid waste acceptance rate of less than 200,000 short tons per year to install and begin operation of new components or expand existing components of the GCCS in areas of the landfill where solid waste has been in place for at least 12 months to ensure gas collection from that waste begins within the same timeframe. MSW landfills with actual waste acceptance rates of 200,000 short tons per year or greater will be required to install new GCCS components before waste is placed in a new area or cell of the landfill and as waste is being placed in active areas of the landfill. For MSW landfills with a waste acceptance rate of 200,000 short tons per year or greater, this will require the installation of horizontal collectors and wells, including floor horizontal collectors installed over the protective cover layer at the bottom of a cell before waste is placed, or caisson wells, also known as bottom-up collectors, that can expand or be raised over time as additional waste is placed around the well.

To begin the operation of new or expanded GCCS components there must be enough waste placed over the gas collectors to prevent air intrusion into the collectors that could contribute to ignition of landfill gas and cause a fire inside the landfill. Based on standard landfilling practices, the Commission has established a waste acceptance threshold that allows for a necessary amount of time for new waste to be placed over existing waste to prevent air intrusion for landfills with lower waste acceptance rates while ensuring that landfills with higher waste acceptance rates can begin operation of such components as soon as possible, but not more than a year after waste has been placed for all landfills. Because horizontal collectors may not allow for long-term gas collection over multiple decades due to damage they may sustain from the amount of waste placed over them and other factors (hence, horizontal collectors are often referred to as "sacrificial"), the Commission is also requiring the installation of additional GCCS components if necessary, such as conventional vertical wells, to ensure continuous and ongoing gas collection without delay where existing components such as horizontal collectors and wells may no longer be able to operate in an area of a landfill.

GCCS Operational Standards and Requirements, Part C, Section II

Those owners or operators required to install and operate a GCCS under this Rule must do so according to the Rule's operational standards and requirements. Each owner or operator of an MSW landfill required to operate a GCCS must route all collected landfill gas to a gas control device or devices such as a flare, and operate the GCCS continuously, to minimize any escape of methane or other emissions to the atmosphere. The system must also be operated in a manner to minimize off-site and on-site migration

of subsurface landfill gas and be expanded to meet emission and landfill gas migration standards. The Commission also includes requirements for an owner or operator to immediately shut down the gas mover equipment of a GCCS, such as the blower, and to close all valves in the GCCS if it becomes inoperable, to prevent the release of emissions to the atmosphere. The Commission is also requiring the repair of a GCCS to return it to operation within 3 days of it being shut down to minimize the potential for emissions to be released to the atmosphere through the surface of the landfill while the GCCS is inoperable and not collecting landfill gas. Should an owner or operator need more time to repair the GCCS, they must notify the Division of the situation and include a timeline for repair to be completed to ensure the Division is aware of the situation and can provide proper oversight.

The Commission also includes in this Rule detailed requirements regarding the materials that must be used for the gas extraction and collection components; installation and placement of horizontal and vertical wells; perforation requirements for gas collection devices to ensure proper gas collection without excess air infiltration, and; equipment sizing and connection requirements, all to ensure the GCCS is constructed in a manner so that it operates effectively to collect and reduce methane and other harmful air pollution from an MSW landfill to the maximum extent practicable. The Rule also includes wellhead operational and monitoring requirements to help achieve this goal, which includes those for landfill gas pressure and temperature, as well as oxygen and nitrogen content, all of which are indicators of proper operation or potential issues with the GCCS. The Commission is requiring weekly monitoring of these operational parameters to ensure any issues can be timely identified and addressed. If exceedances of pressure or temperature requirements occur, the owner or operator has a deadline for when those must be addressed and additional requirements, including Division review and approval of corrective actions if the timeline for completing corrective actions exceeds a certain period, to ensure corrective actions and any analysis needed for them are completed within a reasonable timeframe. The Rule also specifies situations where the wellhead pressure requirements do not apply, including for a decommissioned well, which means a well that has been permanently closed or is no longer in operation, and not one that is malfunctioning or inadequately maintained.

This Rule also includes specific requirements for gas control devices that can be used with a GCCS, such as flares, boilers or process heaters, energy recovery devices such as engines and turbines, and landfill gas treatment systems, to ensure their proper operation and control of emissions. All flares must be equipped with a continuous monitoring device to track their operation as well as gas flow rate measuring devices both to the flare and the flare bypass line, to track the amount of landfill gas going to the flare or being diverted from the flare. Other gas control devices like energy recovery devices and gas treatment systems have similar gas flow monitoring requirements. Enclosed flares must also be operated within a specified temperature range established during performance testing to ensure the destruction of emissions. All gas control devices, except open flares, are required to achieve at least a 99 percent methane destruction efficiency demonstrated through performance testing, which is feasible based on a similar requirement in other states' landfill methane rules where testing conducted in those states has shown such a requirement can be met. Federal air pollution control requirements for MSW landfills require a 98% destruction efficiency for NMOCs. Open flares do not have a methane destruction efficiency requirement in the Rule because they cannot be tested to verify their actual destruction efficiency. Open flares must only be verified to meet the design and operational requirements under 40 C.F.R. § 60.18 as a means to ensure emission reductions, which is considered a "test".

As noted, the Commission is establishing performance testing requirements for gas control devices used in a GCCS using the applicable EPA test methods identified in Part I., Section II, and according to the requirements of Part C, Sections II.F.1.-II.F.8, wherein an initial performance test must be conducted within 180 calendar days of start-up of the GCCS or by June 30, 2026, if the gas control device is already in operation as of December 31, 2025. If a gas control device was previously tested to meet federal emissions destruction efficiency requirements, it must still be tested by a certain deadline based on when the test for federal requirements occurred to ensure the device is meeting the more stringent emissions destruction efficiency requirements of this Rule. Since federal air pollution control requirements for MSW landfills only require a one-time performance test to demonstrate compliance, the Commission is establishing subsequent periodic testing in the Rule to ensure gas control devices continue to demonstrate they are achieving the required destruction efficiency throughout their operation.

Subsequent performance tests are required to be completed annually until three consecutive tests show compliance, upon which periodic testing can move to every three years unless any testing after that shows noncompliance, which will result in a return to annual testing. A gas control device that is used as a backup control device, meaning it is used to control emissions when the primary control device is unable to do so or is used temporarily for short periods in conjunction with the operation of the primary control device, can be tested every 4,000 hours of operation since it operates less frequently, while still having similar consecutive testing requirements as a primary gas control device. A secondary gas control device, which is a gas control device that operates the majority or all of the time alongside a primary gas control device, must meet the same performance testing requirements as a primary gas control device.

To ensure proper oversight of performance tests, the Commission is requiring that owners or operators notify the Division in advance of all planned testing and obtain Division approval for a performance test to move forward before it occurs. Additionally, all tests must be completed following requirements for performance testing established in the Commission's Common Provisions Regulation that includes conducting testing under representative or normal operating conditions for the source, which excludes periods of startup, shutdown, and malfunction unless otherwise specified by the Division.

Through this Rule, the Commission is also phasing out the use of open flares at MSW landfills. The operation of an open flare at an MSW landfill is prohibited on or after January 1, 2029, unless the owner or operator can demonstrate that certain exemption conditions apply and the proper documentation is submitted to and approved by the Division. Some exemptions are not allowed if the open flare is at an MSW landfill located in a disproportionately impacted community or the site boundary of the landfill is within 1 mile of a residential community within a disproportionately impacted community to ensure greater protections for such communities. The Commission is phasing out the use of open flares because performance tests cannot be conducted on open flares to verify their actual emissions destruction efficiency, and their emissions cannot be modeled for permitting purposes.

The Commission is also establishing requirements to minimize emissions during well raising, which is when an existing gas collection well is temporarily disconnected from the GCCS and is extended vertically or horizontally to allow for the addition or extension of a new or existing layer of solid waste or cover material, and to minimize emissions during the shut down of GCCS components or the entire GCCS. These requirements are meant to ensure that well raising is timely completed and that GCCS downtime is kept to a minimum to prevent landfill gas from escaping to the atmosphere ,while still providing a reasonable amount of flexibility to owners or operators to complete the necessary activity or corrective actions, and making the Division aware of the situation for proper oversight.

GCCS Removal and Biofilter Requirements, Part C, Section III

The Commission has also set forth requirements for the permanent shutdown or removal of a gas control device at an MSW landfill, as well as requirements for biofilters when an owner or operator of a landfill installs a biofilter upon shutdown or removal of a gas control device. In order for a gas control device to be permanently shut down or removed, certain criteria have to be met, including that the GCCS has operated for at least 15 years at the MSW landfill after the landfill has closed, and the methane generation rate at the landfill and methane concentration of the landfill gas has decreased below specified levels. Also, the GCCS must first transition from fulltime operation to semi-continuous operation before the gas control device can be considered for permanent shut down or removal to ensure the greatest amount of emission reductions can be achieved for as long as possible with the GCCS. The Commission considered data collected by the California Air Resources Board under its landfill methane rule, which has been in place since 2010 and has similar requirements as Regulation Number 31, that supports the gas control device shut down and removal requirements in the Rule.

To continue to achieve methane reductions from an MSW landfill after shutdown or removal of a gas control device, the Commission is requiring an owner or operator to either install another gas control device that is able to operate at the landfill's lower methane generation rate and methane concentration, or a biofilter. A biofilter is a demonstrated methane reduction method that can be utilized in conjunction with the existing gas collection system at a landfill. Biofilters are a passive method for mitigating landfill

gas emissions that rely on methanotrophs, which are bacteria that oxidize methane and convert it to carbon dioxide and water vapor, and can be connected to a landfill's existing gas collection system. Properly managed and maintained biofilters can achieve emission reduction efficiencies as high as 90 percent through oxidation, although the typical reduction efficiency is in the range of 20 to 40 percent. The Commission has included a requirement for an owner or operator to develop and implement a biofilter design and operation plan with specific requirements that must be met to ensure biofilters achieve an expected level of emission reductions. An owner or operator must operate a biofilter at an MSW landfill until the methane concentration in the landfill gas is at 10 percent or less or until the post-closure plan for the landfill has been terminated by the Solid Waste and Materials Management Program in the Colorado Hazardous Materials and Waste Management Division, whichever occurs last.

The Commission expects these GCCS operational standards and requirements will help ensure methane emissions from MSW landfills are properly controlled for a maximum and feasible length of time and will aid in meeting the state's statutory GHG emission reduction goals. The Commission also considers the operation of a GCCS according to the Rule's requirements, to be effective strategies for reducing other known harmful air pollutants from MSW landfills including hydrogen sulfide (H2S), benzene, toluene, xylenes, and others that may affect surrounding communities including disproportionately impacted communities consistent with § 25-7-105(1)(e)(II), C.R.S.

PART D, Section I - Surface Emission Monitoring

The Commission is requiring that owners and operators of MSW landfills who must install a GCCS under this Rule to conduct periodic surface emissions monitoring (SEM) of the landfill and GCCS leak monitoring using approved monitoring technologies or methods outlined in the Rule to ensure the GCCS is operating properly and emissions from the landfill are being controlled as required. The surface emissions monitoring must be completed beginning January 1, 2026, or upon commencing operation of a newly installed GCCS. A surface emissions monitoring plan must be developed and submitted to the Division with the owner or operator's Design Plan and include the items identified in Part D, Section I.B.1.

The Commission is providing the option to use EPA-approved monitoring methods as well as Division-approved monitoring methods or programs for SEM and GCCS leak monitoring. Currently, the only methods allowed for SEM for landfills subject to federal air pollution control requirements are the U.S. EPA's Method 21 and OTM-51. Method 21 relies on the use of a handheld monitoring device performed by an individual walking on the surface of the landfill. OTM-51 utilizes an Unmanned Aerial Vehicle (UAV) or drone to perform Method 21 and, as of the adoption date of the Rule, Sniffer Robotics is the only company certified to perform OTM-51 at a landfill. An owner or operator of an MSW landfill subject to federal air pollution control requirements must perform SEM using Method 21 or OTM-51 but cannot automatically switch back and forth between those two monitoring methods for SEM; rather, they must submit a written request to EPA for approval to switch between those methods. Under this Rule, owners or operators have additional options for performing SEM, including owners or operators subject to federal requirements that will still need to utilize Method 21 or OTM-51. Regulation Number 31 allows owners or operators to also use a handheld methane-specific tunable diode laser absorption spectroscopy (TDLAS) device that follows a Division-approved method for performing the monitoring with such a device, any other alternative method for SEM that may be approved by the EPA, and any Division-approved alternative method. The Division-approved alternative method will allow owners or operators or monitoring technology vendors to propose the use of other types of monitoring technologies for SEM that may be used alone or in combination with approved technologies such as Method 21, OTM-51, or a handheld TDLAS, provided certain requirements are met. The Commission encourages owners or operators to work with monitoring technology vendors to develop and submit proposed alternative monitoring methods together to the Division. Only emission monitoring technologies that are commercially available and have proven or demonstrated success in MSW landfill emissions detection will be considered for approval by the Division as an alternative monitoring method. If the owner or operator would like to use an alternative monitoring method, they must submit a proposal to the Division for approval that contains the information identified in Part D, Sections I.A.5.c.(i)- I.A.5.c.(x). The alternative monitoring method approval procedures in this Rule are similar to the Alternative Approved Instrument Monitoring Method ("AIMM") used for oil and gas operations in the state under the Commission's

Regulation Number 7 but have been modified based on what the Division and the Commission have learned through the existing Alternative AIMM review and approval process.

The Commission is establishing detailed requirements for conducting SEM, including how the surface of the landfill must be divided into individual grids for monitoring, the monitoring pattern or spacing, wind speed and meteorological requirements during monitoring, the frequency of monitoring, data gathering and recording during monitoring, thresholds and timelines for corrective action and re-monitoring as a result of detected emissions exceedances, as well as requirements for both instantaneous SEM and integrated SEM at a landfill. Instantaneous SEM involves individual detections of emissions on the surface of a landfill, while integrated SEM is the average of all emissions detections within a single grid on the surface of a landfill. Instantaneous SEM must be performed in compliance with Part D., Section I.C., which requires that any readings of methane 100 ppmv or greater if using EPA Method 21 or OTM-51., or 100 ppm-m or greater if using a handheld TDLAS, must be recorded, along with their location. Monitoring readings that meet any of the above must also be monitored in at least a five-foot radius around the emissions detection location to determine the extent of the methane leak. All instantaneous SEM detections of 200 ppmv or ppm-m or greater must be addressed and re-monitored within 5 days after detection with a similar requirement for monitoring at least a 5-foot radius around the detection location to ensure repair and that emissions did not migrate to another area near the original detection location after repair. Should re-monitoring show additional emission exceedances, an owner or operator will have to replace the gas collection well or other equipment for the area where the exceedance occurred after the third measured exceedance. The threshold for triggering corrective action with integrated SEM is an average methane concentration of 25 ppmv or ppm-m or greater from all emission detections in a grid with similar timelines as instantaneous SEM for performing corrective action and conducting re- monitoring, and having to replace equipment if re-monitoring shows exceedances.

The Commission requires the monitoring pattern for SEM to be 25-foot spacing at an MSW landfill as opposed to the 100-foot spacing required under federal regulations, so that the monitoring covers more of the surface area of the landfill to help ensure greater detection of leaks. The tighter monitoring spacing may also encourage MSW landfill owners or operators to utilize alternative monitoring methods. Under the Division-approved alternative method option for SEM, an owner or operator may propose an alternative monitoring method with a different monitoring spacing provided the alternative method can achieve comparable emission reductions as a standard or pre-approved method following the 25-foot spacing requirement. For example, the owner or operator of an MSW landfill subject to federal air pollution control requirements could propose the use of EPA Method 21 or OTM-51 at 100-foot spacing in combination with an alternative monitoring technology that ensures more comprehensive monitoring coverage of the landfill's surface.

The Commission has provided for a permanent exemption from the integrated and instantaneous SEM requirements in Part D, Sections I.C and I.D., for the working face of an MSW landfill so long as its size is minimized based on the amount of incoming waste to the landfill, and a temporary exemption for areas of the landfill where the cover material is removed to complete specified activities. To ensure completion of such activities so that SEM in an affected area may resume without significant delay, the Commission is requiring an owner or operator to notify the Division if the activity will result in SEM not occurring in the affected area within 90 days after the activity begins, and Division approval for the activity completion date, if it is longer than 120 days. The Commission is permanently excluding SEM from the working face of the landfill since it is an active area of the landfill with limited options to address detected emissions beyond existing cover requirements in solid waste regulations implemented by the Colorado Hazardous Materials and Waste Management Division and limiting the size of the working face. The Commission also intends for emissions from the working face to be minimized through earlier expansion of the gas collection and control system pursuant to the requirements of Part C, Section I.H.

PART D - Section II - Leak Inspection and Repair

The Commission is also establishing GCCS monitoring and repair requirements in this Rule to address emission leaks that may occur from the GCCS and associated equipment. Any owner or operator required to install and operate a GCCS under this Rule must perform quarterly leak monitoring of

equipment and components that contain or contact landfill gas, or may contain landfill gas, such as leachate removal risers. The quarterly monitoring must start on January 1, 2026, or upon commencing operation of a newly installed GCCS, and must be performed using an approved monitoring method set out in Part D., Section I.A., which is similar to what applies for SEM. A component leak monitoring plan must be included with the SEM plan submitted to the Division for approval. If a leak is detected, the owner or operator must tag, record, and repair the leak and re-monitor it to verify repair according to the steps set out in Part D., Section II.A.4.

PART E - Remote Methane Monitoring

In addition to SEM and GCCS leak monitoring, the Commission recognizes that remote methane monitoring is an effective means for identifying and addressing emissions from MSW landfills and has established requirements for it in the Rule. Recent studies, such as the most comprehensive direct monitoring evaluation of landfills to date conducted by the U.S. EPA and Carbon Mapper (Quantifying methane emissions from United States landfills, Cusworth et. al, March 28, 2024), and remote methane monitoring of landfills conducted by the California Air Resources Board (Summary Report of the 2020, 2021, and 2023 Airborne Methane Plume Mapping Studies, April 2024), have demonstrated the effectiveness of remote methane monitoring in identifying emissions from MSW landfills.

Under the Rule, remote methane monitoring is monitoring that is conducted offsite from an MSW landfill using a satellite, aircraft, or mobile monitoring platform, excluding unmanned aerial systems or unmanned aerial vehicles such as drones. Remote methane monitoring must be conducted by third-party monitoring entities approved by the Division to help identify and address methane emissions escaping from MSW landfills that may not be identified through SEM and GCCS leak monitoring performed at the landfills by owners or operators. Approved third-party monitoring entities may include monitoring technology operators or vendors the Division has contracted with to perform monitoring of landfills, or those that provide publicly-available monitoring data. Additionally, any technology that has obtained third-party certification under the U.S. E.P.A.'s Methane Super Emitter Program outlined in 40 CFR §60.5371b(b)(August 1, 2024), which at the time of this rulemaking only includes Carbon Mapper's Airborne Mobile Remote Sensing technology, can be used for remote methane monitoring under the Rule.

The Commission recognizes that not all remote methane monitoring results and data from an approved technology the Division may receive will be used under the Rule due to a variety of reasons, such as data quality or timing of receiving the data. Therefore, the Division will determine if a notification based upon such data from an approved technology will be sent to an owner or operator of an MSW landfill. The Rule establishes specific requirements for a notification when it is sent to an owner or operator, including providing a visualization or image of the detected emissions at the landfill, the approximate location of the emissions detection, and the details of the emissions detection methodology used by the remote methane monitoring platform.

The Rule also establishes specific requirements for an owner or operator to investigate, address, and respond to a remote methane monitoring notification from the Division, including reviewing activities at the landfill that occurred leading up to and at the time of the remote monitoring emissions detection that may have contributed to or caused the emissions, as well as data for all required monitoring that has to be performed under the Rule. The owner or operator must also conduct SEM and GCCS leak monitoring if necessary to identify the source of the emissions for remediation or corrective action. The owner or operator must submit an investigation report to the Division within 15 days after receiving the remote methane monitoring notification, which is the same reporting timeline the EPA has established under its Methane Super Emitter Program.

The Commission has also established a requirement that an owner or operator of an MSW landfill that meets the methane generation rate threshold in the Rule for determining if a GCCS must be installed through SEM (732 - 1,999 shorts tons per year) must install a GCCS if that has not happened yet already as a result of SEM results if the owner or operator receives a notification of a remote methane monitoring detection at the landfill of methane emissions of 207 kilograms per hour or greater. 207 kilograms per

hour is equivalent to 0.23 tons per hour or 2,000 tons per year, the latter of which is the threshold for automatic installation of a GCCS under Part B, Section II.E.

PART F - Cover Requirements

The Commission has included requirements for biocovers at MSW landfills in the Rule recognizing the emission reductions they can achieve similar to biofilters. Like a biofilter, a biocover consists of a material layer such as compost that contains methanotrophs to oxidize methane that can be used as cover placed over solid waste deposited at a landfill. Based on feedback the Division received from the Solid Waste and Materials Management Program in the Colorado Hazardous Materials and Waste Management Division, the Commission is only requiring use of biocover for intermediate cover at an MSW landfill when the intermediate cover will be in place for 180 days or longer at the landfill, which is subject to approval by the Solid Waste and Materials Management Program. Existing state solid waste regulations implemented by the Colorado Hazardous Materials and Waste Management Division (6 CCR 1007-2, Part 1)(January 14, 2025) have daily, intermediate, and final cover requirements for MSW landfills. Under those regulations, alternative covers like biocover must be approved by the Hazardous Materials and Waste Management Division to be used at a landfill. To support the effectiveness of a biocover in reducing emissions, the Commission has included requirements that must be addressed in the request for a biocover submitted to the Hazardous Materials and Waste Management Division, which must be followed by the owner or operator upon approval of the biocover by the Hazardous Materials and Waste Management Division

Through this Rule, the Commission is also prohibiting the use of petroleum contaminated soils (PCS) or soils containing volatile organic compounds (VOC) for intermediate or final cover at an MSW landfill, which is supported by the Colorado Hazardous Materials and Waste Management Division. Some MSW landfills in Colorado accept PCS, which contain VOC that can break down and produce methane. The VOC in PCS also contains hazardous air pollutants like benzene, toluene, ethylbenzene, and xylenes that can volatilize into the air and may affect surrounding communities including disproportionately impacted communities.

Finally, the Commission has included a requirement for the owner or operators of MSW landfills to implement a cover integrity program at their landfills, which is an existing requirement under federal air pollution control regulations for MSW landfills. The Commission has provided additional detail or requirements for the cover integrity program beyond what is required by the U.S. EPA. including having specific protocols and procedures that will be followed to identify and address cover integrity issues such as exposed waste, leachate breakouts, and erosion gullies.

PART G - Alternative Compliance Options

The Commission is providing alternative compliance options in this Rule for those owners or operators that may need this additional flexibility. An owner or operator may request alternatives to the requirements of Parts C., D., or I. of the Rule, by submitting a written request for approval by the Division.
The alternative compliance options include, but are not limited to, semi-continuous operation of the GCCS due to insufficient landfill gas flow rates and methane concentrations; alternative wind speed requirements for performing SEM and GCCS leak monitoring; and, alternative walking patterns for performing SEM or exclusion of certain areas of the landfill from SEM. For SEM alternative compliance requests where an owner or operator is requesting to exclude certain areas of the landfill from the standard SEM performed by the owner or operator, the owner or operator must propose an alternative monitoring option for those areas, which can include use of the monitoring methods identified in Part D, Section I.A.

The Division, in approving or disapproving an owner or operator's request for an alternative compliance option, will evaluate the request according to the criteria identified in Part G, Section I.C. as well as any other criteria the Division, in its discretion, deems appropriate to consider. Any proposed alternative compliance must be as stringent or more stringent than the requirement in the Rule it would replace.

PART H - Recordkeeping and Reporting

Recordkeeping requirements, Part H, Section I.

The Commission is establishing extensive yet feasible recordkeeping requirements in this Rule to support compliance verification and ensure the requirements of the Rule are being followed. All records an owner or operator is required to maintain must be provided to the Division upon request. The owner or operator of an MSW landfill subject to the Rule must maintain records consisting of the items identified in Part H, Section I.A., for at least five years, and include things such as waste-in-place and methane generation rate calculations for a landfill; GCCS downtime and corrective actions; gas control device operating parameters and performance test results; wellhead monitoring data; biofilter monitoring and maintenance; SEM and GCCS leak monitoring data; remote methane monitoring investigations; and, biocover and cover integrity program records.

In Part H., Section I.B., the Commission is also establishing requirements for records that the owner or operator must maintain on a continuous basis, many of which are requirements for continuous recordkeeping for the life of the GCCS under federal air pollution control regulations for MSW landfills. Those items are identified in Part H, Section I.B.1., and include things such as the design capacity of the landfill, GCCS design plan, SEM and GCCS leak monitoring plans, GCCS expansions and equipment installed, up-to-date maps of the GCCS system, flare monitoring data for the initial compliance test or demonstration, and the gas treatment system monitoring plan and flow monitoring data.

Reporting Requirements, Part H, Section II.

The Rule contains requirements for certain reports and notifications that must be submitted to the Division. Those reports are identified in Part H., Section II.A., and include any item identified in the Rule where the owner or operator is required to submit information to the Division, as well as periodic semi-annual and annual reports. The Commission has specified in Section II.A. that all reports and notifications submitted to the Division must include certain information and a certification statement signed and dated by a responsible official or designated representative for the MSW landfill verifying the truth, accuracy, and completeness of the information being submitted.

PART I - Test Methods and Procedures

The Commission is, in large part, incorporating by reference many of the testing methods from 40 CFR Part 60, Appendix A, for testing and calculations related to the gas generation flow rate determination and the gas control device destruction efficiency in the Rule. The outlined test methods and procedures in this part of the Rule involve calculating expected gas generation flow rate from an MSW landfill, determining the methane generation rate for an MSW landfill, conducting wellhead monitoring, performing enhanced well monitoring, and calculating bioreactor moisture content.

Additional Considerations

The Commission provides the following additional statement, consistent with §§ 25-7-110.5(5)(b) and 110.8, C.R.S.

(I) Any federal requirements that are applicable to this situation with a commentary on those requirements:

Certain federal requirements are applicable. Colorado was required to submit a state plan for complying with the MSW landfill new source performance standards (NSPS), in accordance with Section 111(d) of the Federal Clean Air Act. Colorado timely submitted a state plan, which was approved, and incorporates by reference 40 CFR Part 60, Subpart Cf into Regulation Number 6. Additionally, MSW landfills are required to report GHG emissions under existing federal regulations. The Mandatory Reporting Rule requires sources with annual emissions equal to or greater than 25,000 metric tons of CO2e per year to

report through the EPA's Greenhouse Gas Reporting Program. Some specific source types are considered "all in" and required to report GHG emissions even if they are under the 25,000 metric ton per year threshold.

(II) Whether the applicable federal requirements are performance-based or technology-based and whether there is any flexibility in those requirements, and if not, why not;

The Federal NSPS is performance based, as it sets forth standards of performance for MSW landfills. The NSPS provides flexibility to states and sources regarding how to reduce GHG emissions and otherwise meet the performance standards.

(III) Whether the applicable federal requirements specifically address the issues that are of concern to Colorado and whether data or information that would reasonably reflect Colorado's concern and situation was considered in the federal process that established the federal requirements;

Data regarding GHG emissions including methane emissions and control technologies was presumably considered in the federal process leading up to the NSPS. The federal GHG reporting program requirements provides data regarding methane emissions from certain MSW landfills in the state and the nation. The Commission concludes that the adopted Rule will provide reductions in Colorado methane emissions in a more appropriate and timely manner than the NSPS.

(IV) Whether the proposed requirement will improve the ability of the regulated community to comply in a more cost-effective way by clarifying confusing or potentially conflicting requirements (within or cross-media), increasing certainty, or preventing or reducing the need for costly retrofit to meet more stringent requirements later;

The adopted Rule will provide certainty to sources, by providing specified technology-based performance standards and clear timing requirements. The adopted Rule aids Colorado in achieving its GHG emissions reduction goals required in § 25-7-102(2)(g)(I),C.R.S., and provides regulated entities flexibility to identify and cost-effectively employ emissions control technologies to reduce methane emissions in the state.

(V) Whether there is a timing issue which might justify changing the time frame for implementation of federal requirements;

The state and federal rules have similar time frames for implementation, and this Rule allows regulated entities a reasonable time to comply with the reporting, installation of GCCS, monitoring, performance testing, and other requirements in the Rule, and allows opportunities for alternative compliance.

(VI) Whether the proposed requirement will assist in establishing and maintaining a reasonable margin for accommodation of uncertainty and future growth;

The adopted Rule will assist in establishing and maintaining a reasonable margin for accommodation of uncertainty and future growth. Part C, Sections I.A., I.C., I.D., regarding installation and operation of GCCS, affords MSW landfills reasonable time for meeting methane emissions control requirements. Furthermore, MSW landfills are afforded the ability to affect required emissions controls through alternative compliance measures where needed and established in Part G. Part C provides multiple pathways for MSW landfills to accomplish methane emissions controls including the use of open or closed flares, boilers, process heaters, vertical and/or horizontal wells, biocovers, and other GCCS options, providing sources flexibility to accommodate uncertainty and future growth.

(VII) Whether the proposed requirement establishes or maintains reasonable equity in the requirements for various sources;

The adopted Rule establishes reasonable equity for sources subject to the Rule by providing the same standards for similarly situated sources. All similarly situated covered MSW landfills are equally subject to the surface emissions monitoring and GCCS requirements. The applicability of the Rule depends on the size, WIP, methane generation rate and other qualifiers to determine the applicable requirements. All covered MSW landfills required to install GCCS have the option of using wells, vacuums, flares, or other compliance options.

(VIII) Whether others would face increased costs if a more stringent rule is not enacted;

If the state Rule were not adopted, public health and welfare and the environment could face increased costs associated with delays in installation of appropriate methane controls. The General Assembly has acknowledged that climate change impacts Colorado's economy and directed that GHG emissions should be reduced across all sectors of our economy. Colorado has established specific GHG reduction goals in § 25-7-102(2), C.R.S. The GHG Roadmap 2.0 identifies methane reductions from MSW landfills as a near term action that will help Colorado achieve the statutory GHG emissions reduction goals. Reductions not achieved in one sector will require measures in other sectors of the economy to achieve the state's GHG reduction goals.

(IX) Whether the proposed requirement includes procedural, reporting, or monitoring requirements that are different from applicable federal requirements and, if so, why and what the "compelling reason" is for different procedural, reporting, or monitoring requirements;

There are some different reporting and monitoring requirements in the state Rule provisions, which are necessary to demonstrate compliance with the state's technology-based performance standard. Regarding monitoring, the Rule establishes some additional and/or different monitoring requirements than the federal regulations in Part D. The Rule establishes some additional and/or different recordkeeping and reporting requirements in Part H, and additional and/or different procedural requirements throughout. All additions and/or differences from the federal regulations will ensure compliance of MSW landfills in Colorado, and will inform the state's strategies and future regulations to accomplish the statewide GHG pollution reduction goals and address the impacts of climate change set forth in § 25-7-102(2), C.R.S.

(X) Whether demonstrated technology is available to comply with the proposed requirement;

Demonstrated technology is available to control methane emissions. Part C does not require the use of specific technology for every step in the gas collection and control system, but instead allows the MSW landfill to choose the technology used so long as it meets the performance and operation requirements of the Rule. Many MSW landfills in the State are currently using many of the technology options under this Rule already. However, this Rule may require installation of updated technologies already in use. The Rule is based upon reasonably available, validated, reviewed, and sound scientific methodologies, and the Commission has considered all information submitted by interested parties.

(XI) Whether the proposed requirement will contribute to the prevention of pollution or address a potential problem and represent a more cost-effective environmental gain;

The adopted Rule will contribute to the prevention of pollution by reducing methane emissions and other harmful air pollution including H2S. The methane emissions and other emissions reductions from this Rule are expected to help Colorado achieve the statewide GHG pollution reduction goals in § 25-7-102(2)(g), C.R.S. Anticipated reductions in harmful air pollutants are expected to have positive health benefits for the people of Colorado.

(XII) Whether an alternative rule, including a no-action alternative, would address the required standard.

This Rule is consistent with the projected emissions reductions set out in the GHG Roadmap 2.0 needed to achieve the statewide GHG emissions reduction goals. Alternatives exist for how to accomplish these requirements, including different thresholds of applicability, the use of different GCCS equipment, as well

as different timing requirements for installation and operation of GCCS. The Commission determined that this Rule is necessary and will appropriately aid the state in achieving the statutory emissions reduction goals. A no action alternative would not address the required standard and could cause the Commission to be in conflict with the statutory mandate to reduce GHG emissions from all sectors consistent with the statutory goals.

Findings of Fact

To the extent that § 25-7-110.8, C.R.S. requirements apply to this rulemaking, and after considering all the information in the record, the Commission hereby makes the determination that:

(I) This Rule is based on reasonably available, validated, reviewed, and sound scientific methodologies and all validated, reviewed, and sound scientific methodologies and information made available by interested parties has been considered.

(II) Evidence in the record supports the finding that the Rule shall result in demonstrable reduction in methane emissions reductions and reductions in harmful air pollution and will enable the Commission to satisfy the requirements of §§ 25-7-102, -105(1)(e), -106, and/or -109, as applicable.

(III) Evidence in the record supports the finding that the Rule shall bring about reductions in risks to human health and the environment that will justify the costs to government, the regulated community, and to the public to implement and comply with the Rule.

(IV) The Rule is the most cost-effective means to achieve the necessary and desired results and reduction in air pollution.

(V) The Rule will maximize the air quality benefits of regulation in the most cost-effective manner.