Subpart W Final Amendments Effective for RY 2025

U.S. Environmental Protection Agency

December 18, 2024

Overview

- Background on Greenhouse Gas Reporting Program
- Overview of Amendments to Petroleum and Natural Gas Systems (40 CFR Part 98, Subpart W)
- Detailed Discussion of Provisions that are Effective for Reporting Year 2025

Greenhouse Gas Reporting Program (GHGRP)

- Launched in response to Fiscal Year 2008 Consolidated Appropriations Act and codified at 40 CFR Part 98
- Annual reporting of greenhouse gas (GHG) data by 46 source categories
  - 37 types of direct emitters
  - 6 types of suppliers of fuel and industrial GHGs
  - 3 types of facilities that inject CO_2 underground
- For most subparts, including subpart W, facilities compare facility-level emissions to a 25,000 metric tons CO_2 equivalent (CO_2e) threshold to determine applicability
  - Currently, the GHGRP covers a subset of oil and gas facilities; for example, about half of onshore oil and gas producing wells are subject to the GHGRP
- Direct reporting to EPA electronically via EPA electronic GHG Reporting Tool (e-GGRT)
- EPA verification of GHG data

Subpart W Emissions Reporting

- Facilities are required to report under Subpart W if their annual emissions are more than 25,000 metric tons CO_2e from all applicable sources at the facility (e.g., Subpart W sources as well as combustion devices)
  - In general, a "facility" for purposes of the GHGRP means all co-located emission sources that are commonly owned or operated
  - However, certain industry segments have unique "facility" definitions, e.g., Onshore Production and Gathering and Boosting facilities report emissions at the basin level
- Facilities use methods specified by Part 98 to calculate GHG emissions, such as direct emissions measurement, engineering calculations with measurement of input parameters or emission factors derived from direct measurements published in scientific literature.
  - In many but not all cases, there is some flexibility in choice of emission calculation method
  - The specific sources subject to reporting differ by industry segment

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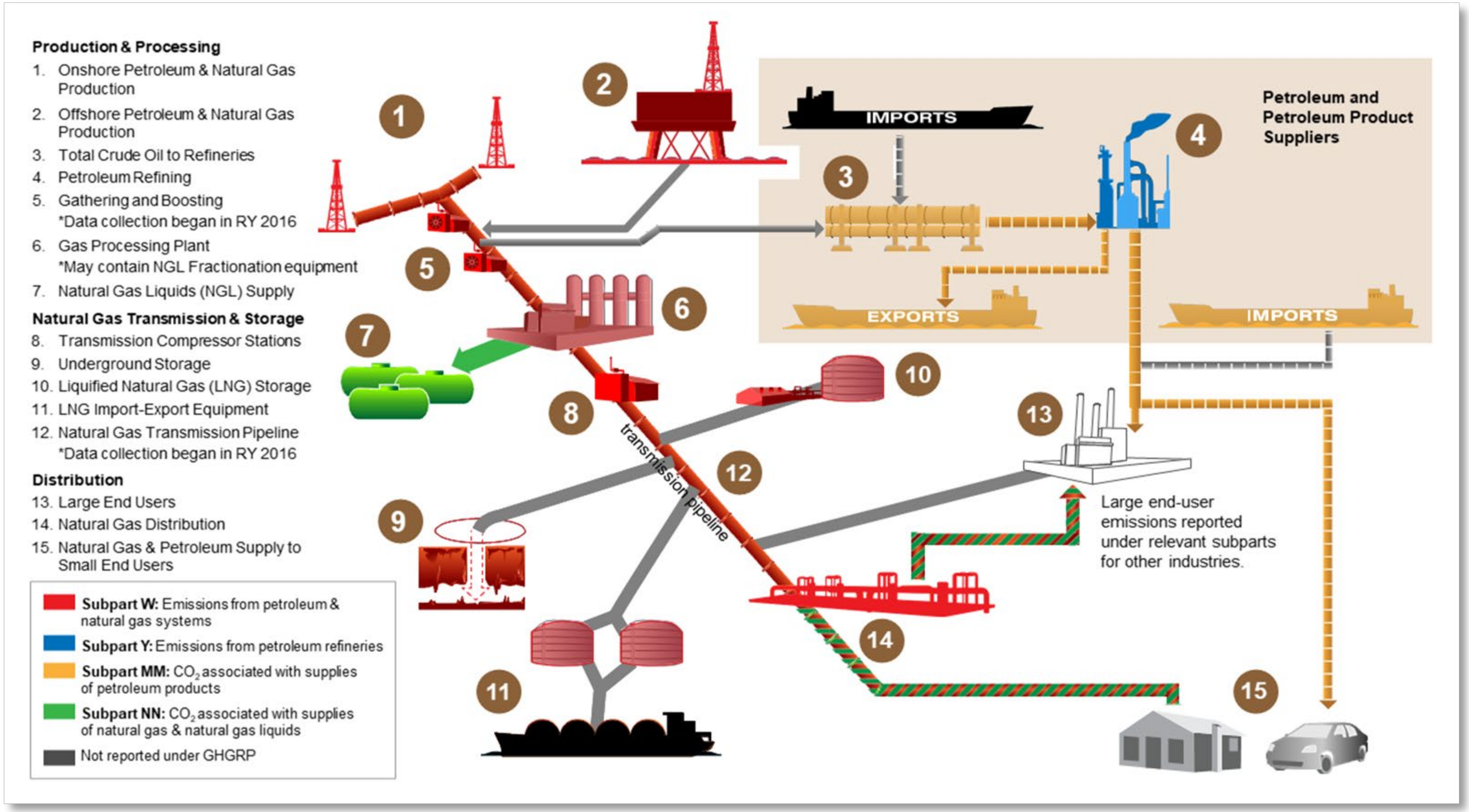
GHGRP Subpart W: Petroleum and Natural Gas Systems



Overview of the Inflation Reduction Act and the Types of Amendments Throughout Subpart W

Inflation Reduction Act: Clean Air Act Section 136 Methane Emissions Reduction Program

IRA provides new authorities under Clean Air Act Section 136 to reduce methane emissions from oil and gas

- **Creates an incentive program for financial and technical assistance.**
- **Establishes a waste emissions charge** for methane from applicable facilities that report more than 25,000 metric tons CO_2e per year to GHGRP Subpart W and that exceed statutorily-specified waste emissions thresholds.
  - Waste emissions charge starts at $900 per metric ton for 2024 emissions and increases to $1,200 for 2025 and $1,500 for 2026 and thereafter.
  - Includes certain exemptions and flexibilities related to the waste emissions charge.
- Final rule promulgating 40 CFR part 99 to facilitate compliance with the waste emissions charge was published November 18, 2024.

- **Directs EPA to revise requirements in subpart W**
  - To ensure reporting and calculation of charges are based on empirical data.
  - And to allow owners and operators to submit empirical emissions data, in a manner to be prescribed by the Administrator, to demonstrate the extent to which a charge is owed.
  - And to accurately reflect total methane and waste emissions.
  - By August 2024.
- Final rule amending subpart W was published May 14, 2024.

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Overview of Final Revisions

- EPA finalized revisions to ensure that emissions reporting under subpart W is based on empirical data and to allow owners and operators to submit appropriate empirical data to demonstrate the extent to which a charge is owed. Revisions include:
  - Additional direct measurement calculation methodologies, including optional use of relevant new calculation methodologies for reporting year 2024
  - Revisions to existing methodologies to require measurement of some related parameters, incorporate the latest data or improve the accuracy of emission calculations
  - Incorporation of data from remote sensing for other large release events
- EPA also finalized the addition of emission sources to ensure that subpart W reflects total methane emissions from the applicable facilities, including:
  - Adding entirely new sources (e.g., 'Other large release events')
  - Expanding reporting of existing sources to all relevant segments
- EPA also finalized revisions to improve data verification and transparency, including increasing the granularity of reporting for Onshore Petroleum & Natural Gas Production and Gathering & Boosting
  - Many data elements will be reported at the well, well-pad site or gathering and boosting site level
- This final rule also finalizes revisions to the general provisions (subpart A) and the general stationary fuel combustion (subpart C) source category of the Greenhouse Gas Reporting Rule

Final Revisions to Subpart W Effective for Reporting Year 2025

New Sources: Other large release events, mud degassing, crankcase venting, produced water tanks, nitrogen removal units

New reporting of existing sources under additional industry segments

New and revised calculation methods and reporting requirements for many sources, including new emissions (CH_4 from acid gas removal units and methane slip from combustion units)

New Emission Sources by Industry Segment
(Effective for RY 2025 and later)

Industry Segment	Mud Degassing	Produced Water Tanks	Nitrogen Removal Units	Crankcase Venting	Other Large Release Events
Offshore Production					✓
Onshore Production	✓	✓	✓	✓	✓
NG Processing		✓	✓	✓	✓
Transmission Compression				✓	✓
Underground Storage				✓	✓
LNG Storage			✓	✓	✓
LNG Import/ Export			✓	✓	✓
NG Distribution				✓	✓
Gathering & Boosting		✓	✓	✓	✓
Transmission Pipeline					✓

Other Large Release Events Amendments Effective for RY 2025

- Background:
  - Multiple studies asserting large, episodic releases as significant fraction of total emissions
- Final amendments:
  - Applies to all 10 industry segments
  - Defined, in part as, "any planned or unplanned uncontrolled release to the atmosphere of gas, liquids, or mixture thereof, from wells and/or other equipment that result in emissions for which there are no [*other*] methodologies [*in subpart W*] that appropriately estimate these emissions"
    - Does not include blowdowns (which is already covered under the blowdown source category).
  - Threshold of 100 kg/hr CH_4 emission rate, which, for sources that would otherwise report under subpart W, is an incremental threshold compared to the emissions as calculated using the source-specific calculation methodologies in subpart W.
  - Reporting includes location (lat/long coordinates) and information to improve verification and transparency
  - Duration of event is tied to monitoring or survey data, including data from advanced screening methods, if available; If not, must use a default start date of 91-days prior to identification
    - Monitoring data may include monitored process parameters, such as data available from SCADA systems, continuous monitoring systems or other advanced screening methods such as monitoring systems mounted on satellites or airplanes
  - Clarified methodology to avoid double counting of emissions during the timespan of the event when there is an associated source-specific calculation methodology in subpart W

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Reporting of GHG Emissions Associated with Super Emitter Program Notifications

- Other Large Release Events' source category is aligned with final New Source Performance Standards (NSPS)/Emission Guidelines (EG) super-emitter program, including reporting of NSPS/EG event ID (if applicable)
- All Super Emitter Program notifications associated with a subpart W facility must be reported in Greenhouse Gas Reporting Program annual reports under subpart W
- Emissions associated with each Super Emitter Program notification must be quantified and reported under subpart W, either under the 'other large release events' source category or another existing category, as appropriate, except in the following cases:
    - Owners and operators certify that the facility does not own or operate equipment at the location
    - Or EPA has determined that the notification contains a demonstrable error

Crankcase Venting Amendments Effective for RY 2025

- Background
  - Crankcase venting is the process of venting or removing blow-by from the void spaces of an internal combustion engine outside of the combustion cylinders to prevent excessive pressure build up within the engine. The source type does not include ingestive systems that vent blow-by into the engine or to another closed vent system.
- Final amendments:
  - Applies to each reciprocating internal combustion engine with a rated heat capacity greater than 1 mmBtu/hr (130 hp) in all industry segments except offshore production and transmission pipeline.
  - Facilities are required to calculate CH_4 emissions using either of two methods.
  - Under Calculation Method 1:
    - Determine volumetric flow from the crankcase vent at standard conditions using an appropriate meter, calibrated bag, or high-volume sampler per 40 CFR 98.234(b), (c), or (d) or
    - Screen for emissions using any method in 40 CFR 98.234(a)(1) – (3) and determine volumetric flow using a method in 40 CFR 98.234(b), (c), or (d) when emissions are detected. Determine emissions for any engine not operating at the time screening is conducted using Calculation Method 2.
    - Procedures for conducting measurement for a manifolded group of crankcase vent sources specified in 40 CFR 98.233(ee)(1)(iii). For example, if manifolded with compressor vent sources, follow the calculation methodology for compressor sources in 40 CFR 98.233(o) or (p).
  - Under Calculation Method 2, use default emission factor and operating hours for the engine.

Drilling Mud Degassing Amendments Effective for RY 2025

- Background:
  - As drilling mud circulates through the wellbore, natural gas and heavier hydrocarbons can become entrained in the mud. Drillers degas the mud for reuse.
- Final amendments:
  - Applies only to the Onshore Production Segment.
  - Facilities are required to calculate and report annual volumetric CH_4 emissions from the degassing of drilling mud using one of three calculation methods provided.
  - Calculation Method 1 is used to calculate CH_4 emissions for each well where drilling mud is circulated in the wellbore by applying an emissions rate derived from a representative well in the same sub-basin and within the equivalent stratigraphic interval.
    - Calculation Method 1 is required if you have taken mudlogging measurements from the representative well.
    - For the representative well, you must use mudlogging measurements, including gas trap derived gas concentration and mud pumping rate, taken during the reporting year or in the first reporting year, you may use prior year measurements if current year measurements are unavailable (equations W-41, W-42 & W-43).
  - Calculation Method 2 is used if mudlogging measurements were not taken, reporters must calculate CH_4 emissions using nationwide emission factors (equation W-44) which can be modified to account for local conditions.
  - Calculation Method 3 is a combination of Methods 1 and 2 when mudlogging measurements were taken at intermittent time intervals. Method 1 must be used for the cumulative amount of time measurements were taken and Method 2 for the cumulative amount of time measurements were not taken.

Additional Industry Segment Reporting for Previously Covered Source Types

* = These segments report combustion emissions under Subpart C

Green Check = new emissions source for the segment, effective for RY25

Industry Segment	Pneumatic Devices	Pneumatic Pumps	Acid Gas Removal	Dehydrators	Liquids Unloading	Completions & Workovers with HF	Completions & Workovers without HF	Blowdown Vents	Hydrocarbon Liquids Storage Tanks	Condensate Storage Tanks	Well Testing	Associated NG	Flare Stacks	Centrifugal Compressors	Reciprocating Compressors	Equipment Leaks	Offshore	EOR Injection Pumps	EOR CO2 in Hydrocarbon Liquids	Combustion Equipment
Offshore Production																	✓			*
Onshore Production	✓	✓	✓	✓	✓	✓	✓	✔	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
NG Processing	✔		✓	✓				✓	✔				✓	✓	✓	✓				*
Transmission Compression	✓			✔				✓		✓			✓	✓	✓	✓				*
Underground Storage	✓			✔				✔		✔			✓	✓	✓	✓				*
LNG Storage			✔					✔					✓	✓	✓	✓				*
LNG Import/ Export			✔					✓					✓	✓	✓	✓				*
NG Distribution	✔							✔								✓				✓
Gathering & Boosting	✓	✓	✓	✓				✓	✓				✓	✓	✓	✓				✓
Transmission Pipeline								✓								✔				

Subpart W Calculation Method Types for Existing Sources

	Pneumatic Devices	Pneumatic Pumps	Acid Gas Removal	Dehydrators	Liquids Unloading	Completions & Workovers with HF	Completions & Workovers without HF	Blowdown Vents	Hydrocarbon Liquids Storage Tanks	Condensate Storage Tanks	Well Testing	Associated NG	Flare Stacks	Centrifugal Compressors	Reciprocating Compressors	Equipment Leaks	EOR Injection Pumps	EOR CO_2 in Hydrocarbon Liquids	Combustion Equipment
Direct Emissions Measurement	✓	✓	✓					✓		✓		✓	✓	✓	✓	✓			✓
Measurement + Engineering Calculations			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓
Engineering Calculations			✓	✓	✓	✓		✓	✓		✓	✓	✓				✓		✓
Emission Factors	✓	✓		✓			✓		✓					✓	✓	✓			✓

EOR = Enhanced Oil Recovery; HF = Hydraulic Fracturing; NG = Natural Gas

Red check marks indicate that the final rule includes a calculation methodology in a new calculation method category for that source type (*e.g.*, final rule includes a direct measurement option where subpart W currently requires use of an emission factor).

Green check marks indicate that the final rule adds a second type of calculation methodology in this category (*e.g.*, adding a leaker emission factor option to the "Emission Factors" category for a source type that currently has population emission factors).

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Subpart W - Natural Gas Pneumatic Devices and Pumps Amendments Effective for RY2025

- Prior to the final amendments, subpart W required calculation of GHG emissions using default population emission factors multiplied by the number of devices and the average time those devices are "in-service" (i.e., supplied with natural gas).
- Amendments effective for reporting year 2025 (all provisions also were effective for reporting year 2024 and are unchanged for reporting year 2025, except where noted):
  - Added Calculation Method 1 (continuous flow meter on the natural gas supply line) for pneumatic devices and pumps, with associated reporting. Beginning in RY2025, reporters must use this method if a gas flow meter is present. *In RY2024, use of Calculation Method 1 is an option.*
  - Added Calculation Method 2 as an option (measure the volumetric flow rate of natural gas pneumatic devices and pumps venting directly to the atmosphere) for pneumatic devices and pumps, with associated reporting
  - For pneumatic devices:
    - Added Calculation Method 3 for pneumatic devices as an option applicable only for onshore petroleum and natural gas production and onshore petroleum and natural gas gathering and boosting facilities (monitor intermittent bleed pneumatic devices for malfunctions and either measure or use population emission factors for continuous high bleed and continuous low bleed pneumatic devices), with associated reporting
    - Retained the option to use default emission factors (now Calculation Method 4) for pneumatic devices.
    - Calculation Method 2 must exclude devices measured per Calculation Method 1. Calculation Method 3 may not be used for well-pad sites or gathering and boosting sites for which reporters elect to measure per Calculation Method 2 and must exclude devices elected to be measured per Calculation Method 1. Calculation Method 4 may not be used for devices for which reporters are required or elect to measure per Calculation Methods 1 through 3.
  - For pneumatic pumps:
    - Retained default emission factor method (now Calculation Method 3) for pneumatic pumps.
    - Calculation Method 2 and Calculation Method 3 must exclude pumps measured per Calculation Method 1. For all pumps that a reporter does not elect to measure using Calculation Method 1, either Calculation Method 2 or Calculation Method 3 must be used. Reporters may not use Calculation Method 2 for some pumps and Calculation Method 3 for other pumps.

Subpart W - Acid Gas Removal Vents Amendments Effective for RY2025

- Requirements prior to these final amendments:
  - CO_2 emissions from AGR vents are calculated using one of four calculation methodologies
  - AGR vents without a CEMS but with a vent meter installed must use Calculation Method 2
- Amendment changes effective reporting year 2025:
  - AGR vents without a CEMS but with a vent meter installed may elect to report using Calculation Method 4, modeling simulation via software. *
  - CH_4 emissions must be reported in addition to CO_2 emissions, using the same calculation method used to calculate CO_2 emissions (unless Calculation Method 1 (CEMS) is used for CO_2, then use Calculation Method 2 for CH_4).
    - For Calculation Method 3, revised the two existing equations and added a new equation
    - For Calculation Method 4, added parameters needed for CH_4
  - For Calculation Method 4:
    - Certain model inputs must be measured
    - Parameters used to characterize emissions should reflect operating conditions over the time period covered by the simulation

*First became effective in reporting year 2024 and remains in effect for reporting year 2025 and future reporting years.

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Subpart W – Nitrogen Removal Unit Amendments Effective for RY 2025

- Background:
  - Nitrogen removal units remove nitrogen from the raw natural gas stream to meet pipeline requirements and for compressing natural gas into LNG.
- Final amendments:
  - CH_4 emissions must be calculated and reported for facilities in the same industry segments that are required to report emissions from AGRs.
  - Methods for calculating CH_4 emissions from NRUs are the same as for calculating CH_4 emissions from AGRs, except that Calculation Method 2 must be used for any NRU with a vent meter installed; the new option allowing the use of Calculation Method 4 for AGRs with a vent meter does not apply to NRUs.

Subpart W – Glycol Dehydrator Vents Amendments Effective for RY2025

- Subpart W specifies two calculation methods for glycol dehydrators.
  - Calculation Method 1: Process simulation using software that utilizes the Peng-Robinson equation of state. Prior to the final amendments modeling parameters are best data engineering estimates.
  - Calculation Method 2: Population emission factors and dehydrator counts.

- Requirements prior to these final amendments:
  - Large glycol dehydrators (throughput ≥0.4 MMscf/d) were required to use Calculation Method 1, 40 CFR 98.233(e)(1).
  - Small glycol dehydrators (throughput <0.4 MMscf/d) were required to us Calculation Method 2, 40 CFR 98.233(e)(2).

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Subpart W – Glycol Dehydrator Vents Amendments Effective for RY2025 (continued)

- Amendment changes effective reporting year 2025:
  - For small glycol dehydrators, either Calculation Method 1 or Calculation Method 2 may be used.
  - Changes to requirements for Calculation Method 1:
    - A facility that is required to use a software program for compliance with federal or state regulations, air permit requirements or annual emissions inventory reporting that meets the requirements of 40 CFR 98.233(e)(1) must use Calculation Method 1 for reporting under subpart W.
    - Feed natural gas water content and wet natural gas temperature and pressure at the absorber inlet must be measured at least annually. Wet natural gas composition must be measured at least once every 5 years.
    - Feed natural gas flow rate must be determined based on measured data (e.g., measured outlet natural gas flow) or measured directly.
    - Facilities must report still vent emissions separately from flash tank emissions.
    - Combusted emissions from a regenerator firebox/fire tubes must be calculated using the combustion source equations W–39A, W–39B, and W–40 of 40 CFR 98.233(z)(3), not the equations for calculating flared emissions. These combusted emissions must be reported as dehydrator emissions under 40 CFR 98.236(e), but flared dehydrator emissions are to be reported as flare stack emissions under 40 CFR 98.236(n).
  - Revised definition of ''vapor recovery system'' in 40 CFR 98.6 to clarify that routing emissions from a dehydrator regenerator still vent or flash tank separator vent to the regenerator firebox/fire tubes does not qualify as vapor recovery for purposes of 40 CFR 98.2.

Subpart W - Completions and Workovers with Hydraulic Fracturing Amendments Effective for RY2025

- Completion and workover activities are separated into two periods, an initial period when flowback is routed to open pits or tanks and a subsequent period when gas content is sufficient to route the flowback to a separator or when the gas content is sufficient to allow measurement by the devices specified in paragraph 40 CFR 98.233 (g)(1), regardless of whether a separator is utilized.
- Amendment change effective reporting year 2025
  - Allow use of a multiphase flow meter from initiation of flowback to the beginning of the period of time when sufficient quantities of gas are present to enable separation, as an alternative to assuming the flowrate is one half the flow rate at the beginning of separation. Reporters may choose either option to calculate the produced gas volume during the initial separation stage. *For reporting year 2024, the use of a multiphase flow meter during the initial flowback period is also available to reporters.*

Subpart W - Blowdown Vent Stacks Amendments Effective for RY2025

- Requirements prior to these final amendments:
  - Subpart W allowed use of engineering estimates to determine the temperature and pressure of the unique physical volume for emergency blowdowns at onshore petroleum and natural gas gathering and boosting facilities when using equation W-14A, but not when using equation W-14B
  - Subpart W did not allow use of engineering estimates to determine the temperature and pressure of the unique physical volume for emergency blowdowns at onshore natural gas transmission pipeline facilities when using either equation W-14A or equation W-14B
- Amendment change effective reporting year 2025:
  - Allow use of engineering estimates based on best available information to determine the temperature and pressure of the unique physical volume for emergency blowdowns at onshore petroleum and natural gas gathering and boosting facilities and onshore natural gas transmission pipeline facilities when using either equation. The same provision is also allowed for facilities in the onshore petroleum and natural gas production and natural gas distribution industry segments that are subject to reporting for blowdown vent stacks beginning in reporting year 2025.
  - Unique physical volume reporting threshold is 500 cubic feet for blowdowns in the natural gas distribution industry segment.

Subpart W – Hydrocarbon Liquids Atmospheric Storage Tanks Amendments Effective for RY2025

- Requirements prior to these final amendments:
  - Calculation Method 1: Use process simulation emissions modeling software. This method was an option for hydrocarbon produced liquids streams from gas-liquid separators or gathering and boosting non-separator equipment with throughput ≥10 bbl/d. Use engineering estimates to determine modeling input parameter values.
  - Calculation Method 2: Sample and analyze composition of hydrocarbon liquids and assume all CH_4 and CO_2 in solution is emitted. This method was required for streams flowing directly to atmospheric storage tanks from wells with throughput ≥10 bbl/d, and it was an option for streams for which Calculation Method 1 is also an option.
  - Calculation Method 3: Use default population emission factor for streams with throughput <10 bbl/d.
- Amendment changes effective reporting year 2025:
  - Calculation Methods 1 and 2 are allowed for any hydrocarbon produced liquids stream. (These options are also allowed for reporting year 2024)
  - Must use Calculation Method 1 if the facility is required to use flash emissions modeling software for compliance with federal or state regulations, air permit requirements or annual emissions inventory reporting.
  - For Calculation Method 1, temperature, pressure, and production rate that are an input to the model must be measured at least annually. API gravity, composition, and Reid vapor pressure that are an input to the model must be measured every 5 years.
  - For Calculation Method 1 and Calculation Method 2, must either use a parametric monitor to detect periods when a gas-liquid separator dump valve is stuck open or conduct AVO inspections of the dump valve at least annually.
  - For all calculation methods: To determine periods when a thief hatch is open on controlled tanks, facilities must monitor using a thief hatch sensor or a tank pressure sensor or visually inspect the thief hatch at least annually.

Subpart W – Produced Water Atmospheric Storage Tank Amendments Effective for RY 2025

- Background
  - Produced water is defined as the water (brine) brought up from the hydrocarbon-bearing strata during the extraction of oil and gas, and can include formation water, injection water, and any chemicals added downhole or during the oil/water separation process.
- Final amendments:
  - Applies to facilities in the onshore production, gathering and boosting, and natural gas processing industry segments.
  - Facilities must calculate CH_4 emissions using one of three specified methods:
    - Calculation Method 1 requires facilities to calculate emissions with a software program that uses the Peng-Robinson equation of state, models flashing emissions, and speciates CH_4 emissions that will result when produced water from the well, separator, or non-separator equipment enters the atmospheric storage tank. Inputs to the model must be based on operating conditions in the well, last gas-liquid separator, or last non-separator equipment before liquid transfer to the storage tank. API 4697 E&P Tank may not be used.
    - Calculation Method 2 requires facilities to assume all CH_4 in solution at well, separator, or non-separator equipment temperature and pressure is emitted from the produced water sent to an atmospheric pressure storage tank.
    - Calculation Method 3 uses different default emission factors for three ranges of produced water pressure multiplied by the annual flow of produced water to the tank.
    - Same thief hatch monitoring requirements as for hydrocarbon liquid atmospheric storage tanks.

Subpart W – Condensate Storage Tanks Amendments Effective for RY 2025

- Requirements prior to these final amendments:
  - Source type applies to leaks past scrubber dump valves that allow gas to be routed to and vented from condensate storage tanks in the transmission compression industry segment.
  - Monitor tank vent stack annually for emissions. Either directly measure the volumetric flow from the vent for 5 minutes using flow meter, high volume sampler, or calibrated bag, or first screen for emissions using OGI or acoustic leak detection and then directly measure volumetric flow if leaks are detected (or quantify using procedures for acoustic leak detection devices in 40 CFR 98.234(a)(5)).
  - If the vent stack is routed to a flare, monitor vent stack (i.e., closed vent system to the flare) using any of the above methods that are applicable.
  - Report either vented emissions or source-specific flared emissions, as applicable.
- Amendment changes effective reporting year 2025:
  - Extended to condensate storage tanks in the underground natural gas storage industry segment.
  - Same as current requirements, except that source-specific flared emissions will no longer be reported. Instead, flared emissions from condensate storage tanks will be reported as part of the total emissions from the flare and will be included collectively with flared emissions from “other” source types for the purposes of reporting disaggregated flared emissions.

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Subpart W – Associated Gas Venting and Flaring Amendments Effective for RY2025

- Requirements prior to the final amendments:
  - Calculate emissions from venting and flaring associated gas using the gas-to-oil (GOR) equation, Equation W-18, a mass balance equation based on applying the average GOR ratio for produced liquid hydrocarbons to the total barrels of oil production to determine total annual natural gas production and then subtracting out the volume of gas sent to sales to calculate a net volume of natural gas sent to the vent or to a flare
- Amendment change effective reporting year 2025:
  - Reporters are required to use measurements of gas flow for gas routed to a vent if a continuous gas flow measurement device is present, and the corresponding reporting requirement of indicating whether a continuous flow monitor was used to measure flow rates and a continuous composition analyzer was used to measure CH_4 and CO_2 concentration. *For reporting year 2024, the use of gas flow measurements is optional if a continuous gas flow measurement device is present.*

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Subpart W – Flare Stack Amendments Effective for RY2025

- Requirements prior to the final amendments:
  - Assume combustion efficiency of 98% or use efficiency from manufacturer.
  - Determine flow from flow measurement device when a flow measurement device is used and determine flow using engineering calculations for flow not measured.
  - Determine composition from continuous gas composition analyzer if an analyzer is used; otherwise, determine composition as specified in 40 CFR 98.233(n)(2)(i) through (iii) (i.e., sample analysis or engineering calculation, depending on the type of stream and industry segment).
- Final revisions to flare calculation methodologies:
  - Revision to destruction/combustion efficiencies
    - Option to use advanced technologies to develop flare-specific efficiencies if an alternative test method is approved in accordance with NSPS OOOOb procedures
    - 98%/96.5% if implementing provisions consistent with NESHAP CC
    - 95%/93.5% if implementing provisions consistent with NSPS OOOOb
    - 92%/90.5% for all other flares
  - Requirement to determine presence of pilot flame or combustion flame via continuous monitoring or monthly visual inspection
  - Determinations of volume and composition of gas routed to the flare similar to current requirements
    - Finalized options that include measurement of volume via flow meter, continuous parameter monitoring or engineering calculations
    - Finalized options that include measuring composition via continuous gas composition analyzer, annual compositional analysis, or engineering calculations

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Subpart W –Reciprocating Compressor Amendments Effective for RY2025

- **Requirements prior to these final amendments:**
  - Use default population emission factors for compressors at an onshore petroleum and natural gas production facility or an onshore petroleum and natural gas gathering and boosting facility.
  - No requirement to measure rod packing vents in standby-pressurized mode.
- **Amendment change effective reporting year 2025:**
  - New default emission factors for reciprocating compressors at an onshore production facility or a G&B facility.
  - Added requirement to measure rod packing emissions for reciprocating compressors when found in the standby-pressurized mode in all industry segments.
  - Added requirement to use volumetric emissions measurement data derived from reciprocating compressor rod packing monitoring under NSPS OOOOb or an applicable state/federal plan to calculate emissions for compressors at an onshore production or a G&B facility, with associated reporting.
  - Added volumetric compressor measurement as an option at onshore production or G&B facilities that are not subject to NSPS OOOOb or a state/federal plan.

Subpart W – Centrifugal Compressor Amendments Effective for RY2025

- **Requirements prior to these final amendments:**
  - Use default population emission factors at an onshore production or a G&B facility.
  - Only allowed use of temporary or permanent flow meter to measure volumetric flow from wet seals.
  - No requirements for standby-pressurized mode or centrifugal compressor dry seals.
- **Amendment change effective reporting year 2025:**
  - Added use of calibrated bags and high volume samplers to measure volumetric flow from wet seals.
  - Specified that screening methods are not allowed to measure volumetric flow from wet seals.
  - Added a requirement to measure emissions in standby-pressurized mode.
  - Added requirements to measure emissions from dry seal vents when centrifugal compressor is found in operating-mode or standby-pressurized mode, with associated reporting.
  - Added requirement to use volumetric compressor emissions acquired under NSPS OOOOb or an applicable state/federal plan at an onshore production or a G&B facility, with associated reporting.
  - Added volumetric compressor measurement as an option at onshore production or G&B facilities that are not subject to NSPS OOOOb or a state/federal plan.

Subpart W – Equipment Leaks Amendments Effective for RY2025

- Requirements prior to these final amendments:
  - Depending on the industry segment, subject facilities must use the leaker method and/or the population count method to quantify emissions from equipment leaks.
  - *Leaker Method*
    - The leaker method requires the use of results from equipment leak surveys (i.e., count of leaking components) to quantify emissions. This calculation method used default component-level emission factors.
  - *Population Count Method*
    - The population count method requires an inventory or estimation of the number of components by service type to quantify emissions. The calculation method used default component-level emission factors.
- Amendments effective reporting year 2025:
  - *Methods Using Leak Surveys or Leaks Surveys with Measurements*
    - Added option to measure the volumetric flow rate of each leak identified during a leak survey.*
    - Added option to develop facility-specific component-level emission factors.*
    - Added undetected leak factor, "k", to the leaker method calculation to account for the quantity of emissions that remain undetected by the leak detection method.
    - Updated leaker emission factors by the leak detection methods in § 98.234(a).
    - Exempted equipment in vacuum service from survey and emission estimation requirements. *
  - *Population Count Method*
    - Updated population count emission factors for the onshore production, gathering and boosting and natural gas distribution industry segments.

*First became effective in reporting year 2024 and remains in effect for reporting year 2025 and future reporting years.

Subpart W – Offshore Production Reporting Amendments Effective for RY2025

- Requirements prior to these final amendments:
  - In years that overlap with the most recent BOEM (formerly BOEMRE) emissions study publication year, report the same emissions reported to BOEM or using BOEM emission calculation methods
  - In years that do not overlap with the most recent BOEM emissions study publication year, adjust emissions from the most recent study year using operating time for the facility.
- Amendments effective reporting year 2025:
  - The final amendments revise the operational hour scaling method to become 40 CFR 98.233(s)(1)(ii) and (s)(2)(ii) and also allow reporters to calculate their emissions each GHGRP reporting year following BOEM's methods per the new 40 CFR 98.233(s)(1)(i) or (s)(2)(i). Beginning with reporting year 2025 reporting, the operational hour scaling will only be allowed if the facility cannot follow BOEM's calculation methods.
  - If operational hour scaling is used, facilities must provide the hours of operation for the current reporting year and the hours of operation for the reference year.
  - Reporters must provide the BOEM Facility IDs that constitute their GHGRP facility.

Subpart W – Combustion Equipment Amendments Effective for RY2025

- Requirements prior to these final amendments for combustion of natural gas:
    - For pipeline quality natural gas with a minimum HHV of 950 Btu/scf, use any Tier (1, 2, 3, or 4) methodology in subpart C
    - For natural gas that has a minimum HHV of 950 Btu/scf, a maximum HHV of 1,100 Btu/scf, and a minimum CH4 content of 70 percent by volume, use Tier 2, 3, or 4 methodologies in subpart C
    - For natural gas that does not meet either of the above specifications (including field gas) use methodology in 40 CFR 98.233(z)(2)(i) through (vi) and determine composition using continuous gas composition analyzer, engineering estimates based on best available data, or industry segment-specific determination of gas produced or passing through the facility per 40 CFR 98.233(u)(2).
- Amendments effective reporting year 2025 for combustion of natural gas:
    - Revised combustion calculations for reciprocating internal combustion engines (RICE) and gas turbines (GT) to include methane slip.
        - For pipeline quality natural gas with a minimum HHV of 950 Btu/scf: use any Tier (1-4) methodology in subpart C, except each natural gas-fired RICE or GT must use one of the methods in paragraph 40 CFR 98.233(z)(4) to quantify a methane emission factor instead of using the natural gas methane emission factor from table C-2 from subpart C.
        - For natural gas with a minimum HHV of 950 Btu/scf, a maximum higher heating value of 1,100 Btu/scf, and a minimum CH_4 content of 70 percent by volume: use Tier (2-4) methodology in subpart C, except each natural gas-fired RICE or GT must use one of the methods in paragraph 40 CFR 98.233(z)(4) to quantify a methane emission factor instead of the natural gas methane emission factor from table C-2 from subpart C.
        - For natural gas that does not meet either of the above specifications (including field gas) use methodology in 40 CFR 98.233(z)(3)(ii)(A) through (G) and determine composition using continuous gas composition analyzer, engineering estimates based on best available data, or industry segment-specific determination of gas produced or passing through the facility per 40 CFR 98.233(u)(2). For RICE or GT, you may alternatively determine a methane emission factor by conducting a performance test following procedures in 40 CFR 98.234(i)
        - Emissions may be calculated for either each individual unit or groups of combustion units combusting the same fuel but must report engine type, method used to calculate average emission factor, and average emission factor.

Disaggregation for Certain Industry Segments

- Background:
  - Currently, emissions and activity data reported by each facility for the Onshore Production and Gathering and Boosting industry segments are aggregated to the basin, county/sub-basin, or unit level (depending upon the specific emission source)
  - Challenging to verify reported data and ensure data quality; limits data transparency
- Final amendments effective reporting year 2025 :
  - Additional reported data elements of Well-pad ID and Gathering and Boosting Site ID (depending upon industry segment)
  - Associated revisions to reporting requirements for emission sources to report by well, well-pad site or gathering and boosting site instead of currently aggregated reporting at the sub-basin / basin level
  - Five new definitions added to 40 CFR 98.238:
    - "Centralized oil production site," "gathering and boosting site," "gathering compressor station," "gathering pipeline site," and "well-pad site"
    - Definitions are used for purposes of implementing new calculation methods for pneumatic devices, pneumatic pumps, and equipment leaks beginning in reporting year 2024
    - Definitions are also used for purposes of disaggregated reporting beginning with reporting year 2025

Subpart W – Reporting of Throughput for Permanently Shut-in and Plugged Wells Effective for RY 2025

- Beginning with reporting year 2024 reporting, throughput quantities for each well permanently shut-in and plugged during the calendar year must be reported
- Onshore Production
    - 40 CFR 98.236(aa)(1)(iii)(C) - The quantity of natural gas produced that is sent to sale for each well permanently shut-in and plugged during the calendar year
    - 40 CFR 98.236(aa)(1)(iii)(D) - The quantity of crude oil and condensate produced that is sent to sale for each well permanently shut-in and plugged during the calendar year
- Offshore Production
    - 40 CFR 98.236(aa)(2)(iii) - The quantity of natural gas produced that is sent to sale for each well permanently shut-in and plugged during the calendar year
    - 40 CFR 98.236(aa)(2)(iv) - The quantity of crude oil and condensate produced that is sent to sale for each well permanently shut-in and plugged during the calendar year

Resources

- For more information on the GHGRP:
  - https://www.epa.gov/ghgreporting
- For more information on the Final Amendments to Subpart W:
  - https://www.epa.gov/ghgreporting/rulemaking-notices-ghg-reporting
  - The final rule and other background information is also available electronically at https://www.regulations.gov, EPA's electronic public docket and comment system (Docket ID No. EPA-HQ-OAR-2023-0234).
- For previous webinars on an overview of the May 14, 2024, amendments and the specific changes effective for reporting year 2024:
  - https://www.epa.gov/ghgreporting/ghgrp-events-and-training#webinars
- For responses to frequently asked questions regarding Subpart W:
  - https://ccdsupport.com/confluence/display/faq/Subpart+W.+Petroleum+and+Natural+Gas+Systems
- For more information on the Waste Emissions Charge:
  - https://www.epa.gov/inflation-reduction-act/waste-emissions-charge
- To ask questions that were not answered in today's webinar, contact the GHGRP Help Desk:
  - Email ghgreporting@epa.gov
  - https://www.epa.gov/ghgreporting/forms/contact-us-about-ghg-reporting

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