Coke Calciners

Subpart WW, Greenhouse Gas Reporting Program

OVERVIEW

Subpart WW of the Greenhouse Gas Reporting Program (GHGRP) (40 CFR 98.490 – 98.498) applies to any facility that uses coke calciners and meets the Subpart WW source category definition. Some subparts have thresholds that determine applicability for reporting, and some do not. To decide whether your facility must report under this subpart, please refer to 40 CFR 98.491 and the GHGRP Applicability Tool.

This Information Sheet is intended to help facilities reporting under Subpart WW understand how the source category is defined, what greenhouse gases (GHGs) must be reported, how GHG emissions must be calculated and shared with EPA, and where to find more information.

How is This Source Category Defined?

The Subpart WW source category applies to facilities that use coke calciners to heat petroleum coke to high temperatures and remove impurities or volatile substances in petroleum coke feedstock. Coke calciners are process units that include rotary kilns, rotary hearth furnaces, or similar process units used to calcine petroleum coke as well as afterburners, or other emission control systems, used to treat a coke calcining unit's process exhaust gas.

What GHGs Must Be Reported?

Under Subpart WW, facilities that use coke calciners must report:

- Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions from each coke calcining unit.

If multiple Greenhouse Gas Reporting Program (GHGRP) source categories are co-located at a facility, the facility may need to report greenhouse gas (GHG) emissions under a different subpart. Please refer to the relevant information sheet for a summary of the rule requirements for any other source categories located at the facility. For example, according to 40 CFR 98.492(b), facilities that use coke calciners must also report CO_2, CH_4, and N_2O emissions from auxiliary fuel used in each coke calcining unit and afterburner or other control systems used to treat the coke calcining unit's process off-gas under Subpart C (General Stationary Fuel Combustion Sources), found at 40 CFR 98.30 – 98.38.

How Must GHG Emissions Be Calculated?

Under Subpart WW, facilities that use coke calciners must calculate CO_2, CH_4, and N_2O emissions for each coke calcining unit, using the following methods:

- Calculate the CO_2 emissions from each coke calcining unit using one of two methods, as applicable:
    - Continuous Emissions Monitoring System (CEMS) Method. Operate and maintain a CEMS that measures CO_2 emissions according to Subpart C and calculate and report CO_2 emissions following the Tier 4 Calculation Methodology specified in Subpart C (found at 40 CFR

98.33(a)(4)) and all associated requirements for Tier 4 in Subpart C. Auxiliary fuel use CO_2 emissions should also be calculated in accordance with Subpart C and subtracted from the CO_2 CEMS emissions to determine process CO_2 emissions.

- If you currently operate and maintain a CEMS that measures CO_2 emissions according to Subpart C, then you must use this CEMS method.
- If you do not currently operate and maintain a CEMS that measures CO_2 emissions according to Subpart C, you may elect to install a CEMS that complies with the Tier 4 Calculation Methodology in Subpart C and use this CEMS method.

○ Mass Balance Method. If you are not required to or do not elect to use the CEMS method, calculate the CO_2 emissions from the coke calcining unit using monthly measurements and Equation 1 of WW:

Equation 1 of WW: $$CO_2 = \frac{44}{12} \times \sum_{m=1}^{12} \left(M_{in,m} \times CC_{GC,m} - \left(M_{out,m} + M_{dust,m}\right) \times CC_{MPC,m}\right)$$

CO_2 = Annual CO_2 emissions (metric tons CO_2/year).

m = Month index.

$M_{in,m}$ = Mass of green coke fed to the coke calcining unit in month "m" from facility records (metric tons/year).

$CC_{GC,m}$ = Mass fraction carbon (C) content of green coke fed to the coke calcining unit from facility measurement data in month "m" (metric tons C/metric tons green coke). If measurements are made more frequently than monthly, determine the monthly average as the arithmetic average for all measurements made during the calendar month.

$M_{out,m}$ = Mass of marketable petroleum coke produced by the coke calcining unit in month "m" from facility records (metric tons petroleum coke/year).

$M_{dust,m}$ = Mass of petroleum coke dust removed from the process through the dust collection system of the coke calcining unit in month "m" from facility records (metric tons petroleum coke dust/year). For coke calcining units that recycle the collected dust, the mass of coke dust removed from the process is the mass of coke dust collected less the mass of coke dust recycled to the process.

$CC_{MPC,m}$ = Mass fraction C content of marketable petroleum coke produced by the coke calcining unit in month "m" from facility measurement data (metric tons C/metric tons petroleum coke). If measurements are made more frequently than monthly, determine the monthly average as the arithmetic average for all measurements made during the calendar month.

44 = Molecular weight of CO_2 (kilogram/kilogram-mole (kg/kg-mole)).

12 = Atomic weight of C (kg/kg-mole).

- Calculate CH_4 emissions using Equation 2 of WW:

Equation 2 of WW: $$CH_4 = \left(CO_2 \times \frac{EmF_2}{EmF_1}\right)$$

CH_4 = Annual CH_4 emissions (metric tons CH_4/year).

CO_2 = Annual CO_2 emissions calculated above, as applicable (metric tons CO_2/year).

EmF_1 = Default CO_2 emission factor (EF) for petroleum coke from Table C-1 of Subpart C (kg CO_2/millions of British thermal units (mmBtu)).

EmF_2 = Default CH_4 EF for "Petroleum Products (All fuel types in Table C-1)" from Table C-2 of Subpart C (kg CH_4/mmBtu).

- Calculate N_2O emissions using Equation 3 of WW:

  Equation 3 of WW: $N_2O = \left(CO_2 \times \frac{EmF_3}{EmF_1}\right)$

  N_2O = Annual N_2O emissions (metric tons N_2O/year).

  CO_2 = Annual CO_2 emissions calculated above, as applicable (metric tons CO_2/year).

  EmF_1 = Default CO_2 EF for petroleum coke from Table C-1 of Subpart C (kg CO_2/mmBtu).

  EmF_3 = Default N_2O EF for "Petroleum Products (All fuel types in Table C-1)" from Table C-2 of Subpart C (kg N_2O/mmBtu).

Whenever a quality-assured value of a required parameter is unavailable (e.g., if a CEMS malfunctions during unit operation or if a required sample is not taken), a substitute data value for the missing parameter must be used in the calculations.

- For missing auxiliary fuel use data, use the missing data procedures in Subpart C, found at 40 CFR 98.35.
- For each missing value of mass or C content of coke, substitute the arithmetic average of the quality-assured values of that parameter immediately preceding and immediately following the missing data incident. If the "after" value is not obtained by the end of the reporting year, you may use the "before" value for the missing data substitution. If, for a particular parameter, no quality-assured data are available prior to the missing data incident, the substitute data value must be the first quality-assured value obtained after the missing data period.
- For missing CEMS data, you must use the missing data procedures in 40 CFR 98.35.

A checklist for data that must be monitored is available here: Subpart WW Monitoring Checklist.

What Information Must Be Reported?

In addition to the information required by the General Provisions in Subpart A, found at 40 CFR § 98.3(c), the following must be reported for each coke calcining unit:

- The unit ID number (if applicable).
- Maximum rated throughput of the unit, in metric tons coke calcined/stream day (metric tons coke calcined/sd).
- The calculated CO_2, CH_4, and N_2O annual process emissions, expressed in metric tons of each pollutant emitted.
- A description of the method used to calculate the CO_2 emissions for each unit (e.g., CEMS or Mass Balance (Equation 1 of WW, above)).
- Annual mass of green coke fed to the coke calcining unit from facility records (metric tons/year).
- Annual mass of marketable petroleum coke produced by the coke calcining unit from facility records (metric tons/year).
- Annual mass of petroleum coke dust removed from the process through the dust collection system of the coke calcining unit from facility records (metric tons/year) and an indication of whether coke dust is recycled to the unit (e.g., all dust is recycled, a portion of the dust is recycled, or none of the dust is recycled).
- Annual average mass fraction C content of green coke fed to the coke calcining unit from facility measurement data (metric tons C/metric tons green coke).
- Annual average mass fraction C content of marketable petroleum coke produced by the coke calcining unit from facility measurement data (metric tons C/metric tons petroleum coke).

- A complete record of all measured parameters used in the GHG emissions calculations is required (e.g., concentrations, flow rates, fuel heating values, C content values).

What Records Must Be Maintained?

Reporters are required to retain records that pertain to their annual GHGRP report for at least three years after the date the report is submitted. Please see the Subpart A Information Sheet and 40 CFR 98.3(g) for general recordkeeping requirements. Specific recordkeeping requirements for Subpart WW are listed at 40 CFR 98.497.

When and How Must Reports Be Submitted?

Reporters must submit their annual GHGRP reports for the previous calendar year to the EPA by March 31st, unless the 31st falls on a Saturday, Sunday, or federal holiday, in which case reports are due on the next business day. Annual reports must be submitted electronically using the electronic Greenhouse Gas Reporting Tool (e-GGRT), the GHGRP's online reporting system.

Additional information on setting up user accounts, registering a facility, and submitting annual reports is available on the GHGRP Help webpage.

When Can a Facility Stop Reporting?

A facility may discontinue reporting under several scenarios, which are summarized in Subpart A (found at 40 CFR 98.2(j)) and the Subpart A Information Sheet.

For More Information

For additional information on Subpart WW, please visit the Subpart WW webpage. For additional information on the GHGRP, please visit the GHGRP website, which includes additional information sheets, data previously reported to the GHGRP, training materials, and links to Frequently Asked Questions (FAQs). For questions that cannot be answered through the GHGRP website, please contact us at: GHGreporting@epa.gov.

This Information Sheet is provided solely for informational purposes. It does not replace the need to read and comply with the regulatory text contained in the rule. Rather, it is intended to help reporting facilities and suppliers understand key provisions of the GHGRP. It does not provide legal advice; have a legally binding effect; or expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits with regard to any person or entity.