Lime Manufacturing

Subpart S, Greenhouse Gas Reporting Program

OVERVIEW

Subpart S of the Greenhouse Gas Reporting Program (GHGRP) (40 CFR 98.190 – 98.198) applies to any lime manufacturing plant (LMP) that meets the Subpart S 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 98.191 and the GHGRP Applicability Tool.

This Information Sheet is intended to help facilities reporting under Subpart S 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 lime manufacturing source category consists of each lime manufacturing plant (LMP) that produces a lime product from limestone, dolomite ($CaMg(CO_3)_2$), shells, or other calcareous substances by means of calcination, unless the LMP is located at a kraft pulp mill, soda pulp mill, sulfite (SO_3^{2-}) pulp mill, or only processes sludge containing calcium carbonate ($CaCO_3$) from water softening processes.

What GHGs Must Be Reported?

LMPs must report the following emissions:

- Carbon dioxide (CO_2) process emissions from all lime kilns combined.
- CO_2 emissions from fuel combustion at lime kilns.
- Nitrous oxide (N_2O) and methane (CH_4) emissions from fuel combustion at each lime kiln. Report these emissions under 40 CFR Part 98, Subpart C (General Stationary Fuel Combustion Sources) using the methodologies in Subpart C.
- CO_2, N_2O, and CH_4 emissions from any other stationary combustion units. Report these emissions under Subpart C (General Stationary Fuel Combustion Sources), found at 40 CFR 98.30 – 98.38. The Subpart C Information Sheet summarizes the rule requirements for calculating and reporting emissions from these units.

If multiple Greenhouse Gas Reporting Program (GHGRP) source categories are co-located at a facility, the facility may also 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.

How Must GHG Emissions Be Calculated?

Calculate CO_2 emissions from kilns by using one of the following methods, as appropriate:

- If all lime kilns meet the conditions given in 40 CFR 98.33(b)(4)(ii) or (iii) emissions must be determined using a continuous emission monitoring system (CEMS).
    - The Tier 4 Calculation Methodology of Subpart C (General Stationary Fuel Combustion Sources), found at 40 CFR 98.30 – 98.38 must be used to calculate the combined CO_2 emissions from calcination and fuel combustion and the facility must report these emissions under Subpart S.
- For kilns that are not required to monitor emissions using a CEMS, the reporter can either:
    - Calculate and report under Subpart S the combined process and combustion CO_2 emissions from all lime kilns by operating and maintaining a CEMS according to the Tier 4 Calculation Methodology specified in 40 CFR 98.33(a)(4) and all associated requirements for Tier 4 in Subpart C.
    - Calculate CO_2 process emissions from lime production using the following measurements:
        - A facility-wide emission factor (EF) calculated monthly for each lime type from monthly measurements of the calcium oxide (CaO) and magnesium oxide (MgO) content of the lime and stoichiometric ratios of CO_2 to each oxide in the lime.
        - An EF calculated monthly for each lime by-product/waste sold (such as lime kiln dust).
        - Annual emissions from unsold lime by-products/wastes (such as lime kiln dust and scrubber sludge).
        - Mass of each lime type produced monthly.
        - Mass of by-product/waste sold monthly.

A checklist for data that must be monitored is available here: Subpart S 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 under the circumstances indicated:

- If a CEMS is used to measure CO_2 emissions, then under Subpart S the relevant information required under Subpart C (General Stationary Fuel Combustion Sources), found at 40 CFR 98.30 – 98.38, for the Tier 4 Calculation Methodology and the following information must be reported:
    - Method used to determine the quantity of lime produced and sold.
    - Method used to determine the quantity of lime by-product/waste sold.
    - Beginning and end-of-year inventories for each lime product, by type.
    - Beginning and end-of-year inventories for lime by-products/wastes, by type.
    - Annual amount of lime product sold, by type (tons).
    - Annual amount of lime product not sold, by type.
    - Annual amount of lime by-product/waste sold, by type (tons).
    - Annual amount of lime by-product/waste not sold, by type (tons).
    - Annual arithmetic average of CaO content for each type of lime product produced (metric tons

CaO/metric tons lime).

- Annual arithmetic average of CaO content for each type of calcined lime by-product/waste sold (metric tons CaO/metric tons lime).
- Annual arithmetic average of CaO content for each type of calcined lime by-product/waste not sold (metric tons CaO/metric tons lime).
- Annual arithmetic average of MgO content for each type of lime product produced (metric tons MgO/metric tons lime).
- Annual arithmetic average of MgO content for each type of calcined lime by-product/waste sold (metric tons MgO/metric tons lime).
- Annual arithmetic average of MgO content for each type of calcined lime by-product/waste not sold (metric tons MgO/metric tons lime).

- If a CEMS is not used to measure emissions, then the following information must be reported:
  - Annual CO_2 process emissions from all kilns combined (metric tons).
  - Standard method used (American Society for Testing and Materials (ASTM) or National Lime Association (NLA) testing method) to determine chemical compositions of each lime type and lime by-product/waste type.
  - Method used to determine the quantity of lime produced and/or sold.
  - Method used to determine the quantity of lime by-product/waste sold.
  - Beginning and end-of-year inventories for each lime product.
  - Beginning and end-of-year inventories for lime by-products/wastes sold.
  - Annual lime production capacity (tons) per facility.
  - Number of times in the reporting year that missing data procedures were followed to measure lime production (months), or the chemical composition of lime products sold (months).
  - Indicate whether CO_2 was captured and used on-site (e.g., for use in a purification process, the manufacture of another product). If CO_2 was captured and used on-site, provide the annual amount of CO_2 captured for use in all on-site processes and the method used to determine the amount of CO_2 captured.
  - Annual quantity (tons) of lime product sold, by type.
  - Annual average EFs for each lime product type produced.
  - Annual average EFs for each calcined by-product/waste by lime type that is sold.
  - Annual average results of chemical composition analysis of each type of lime product produced and calcined by-product/waste sold.
  - Annual average results of chemical composition analysis of all lime by-products or wastes not sold.
  - Annual quantity (tons) of all lime by-products or wastes not sold.

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 S are listed at 40 CFR 98.197.

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(i)) and the Subpart A Information Sheet.

For More Information

For additional information on Subpart S, please visit the Subpart S 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.