

Petroleum Refineries and Coke Calciners Reporting Guidance
for California's Mandatory Greenhouse Gas Reporting Program

Introduction

This document provides guidance for operators of petroleum refineries and coke calciners for the reporting required by the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (title 17, California Code of Regulations, section 95100 *et seq.*) (MRR). Specifically, this guidance document covers the reporting of complexity weighted barrel (CWB) throughputs, calcined coke, refinery products, and petroleum products to support the Cost of Implementation Fee Regulation (COI); these data are required to be reported pursuant to sections 95113(l) and 95113(m) of MRR. Product data for refineries and calciners are reported via two spreadsheets that are uploaded to Subpart Y of the California Electronic Greenhouse Gas Reporting Tool (Cal e-GGRT) - one spreadsheet for CWB throughputs and another for calcined coke, refinery products, and COI products.

The current document contains revisions to clarify the following changes resulting from MRR amendments that go into effect for 2018 data reported in 2019:

- Refineries are no longer required to report the current Solomon Energy Intensity Index (EII®) value for the facility (section 2); and
- Refineries must report annual on-site production amounts for refinery products as described in the 2016 MRR (section 3).

A separate guidance document for hydrogen production reporting is available at the [MRR Reporting Guidance Documents webpage](#). For additional information about the requirement to exclude inaccurate data, the use of financial transaction meters, how product data are evaluated during verification for accuracy and conformance with the regulation, and other topics, refer to the [Covered Product Data General Reporting and Verification Guidance](#) document.

Unlike MRR, this guidance does not have the force of law, does not establish new mandatory requirements for greenhouse gas (GHG) reporting, and in no way supplants, replaces, or amends any of the legal requirements of the Regulation. Conversely, an omission or truncation of regulatory requirements in this guidance does not relieve operators of their legal obligation to fully comply with all requirements of MRR.

1 Covered Product Data

Covered product data are all product data used to allocate allowances under sections 95870, 95871, 95890, and 95891 of the Cap-and-Trade Regulation, regardless of whether the Cap-and-Trade Regulation imposes a compliance obligation for the data year. All covered product data are subject to material misstatement and conformance evaluation during the verification process. Total facility CWB, CWB throughputs, and calcined coke production are covered product data. Refinery products and COI data are not covered product data.

1.1 Complexity Weighted Barrel (CWB) Reporting

Section 95113(l)(3) of MRR requires petroleum refineries to report annual CWB throughputs for all relevant processes and to calculate and report a total facility CWB value.

1.1.1 Reporting Throughput Volumes at Standard Conditions

Section 95113(l)(3)(A) specifies that all throughput measurements must meet the full calibration and accuracy requirements provided in sections 95103(k)(1)-(10). To meet these accuracy requirements, liquid CWB throughput volumes must be reported at standard conditions of 60 °F and one atmosphere. For liquid hydrocarbons, the volume correction from nonstandard conditions may be calculated by the methods described in the American Petroleum Institute (API) Manual of Petroleum Measurement Standards Chapter 11 – Physical Properties Data (May 2004), the American Society of Testing and Materials Standard Guide for Use of the Petroleum Measurement Tables, ASTM D1250-08 (Reapproved 2013),¹ the API Technical Data Book - Petroleum Refining (Sixth Edition, April 1997),² or by comparable means that can be traced to a standard method. In instances where operating temperatures are outside of the range for which the volume correction equations were developed, use of the method beyond the intended temperature range is acceptable.

These calculation methods may be applied post-measurement to a volume metered at nonstandard conditions, or they may be incorporated into the design and function of the meter so that measurements at nonstandard conditions are automatically reported at standard conditions. Input values must be correctly averaged (e.g., when determining

¹ American Petroleum Institute Manual of Petroleum Measurement Standards, Chapter 11 - Physical Properties Data. Section 1 - Temperature and Pressure Volume Correction for Generalized Crude Oils, Refined Products, and Lubricating Oils. Adjunct to: ASTM D1250-04 and IP 200/04.

² American Petroleum Institute Technical Data Book - Petroleum Refining, Chapter 6.

the standard volume of a fluid measured at nonstandard conditions, the best weighted-average operating temperature and density of the measured volume must be determined from available information). Reporters must be able to demonstrate to verifiers that volume corrections were applied using the best available information (for example, by showing that the appropriate equations were selected and that the correct input temperatures and densities were used in the equations) and that the volume measurement meets the calibration and accuracy requirements in sections 95103(k)(1)-(10).

1.1.2 Reporting Coke-on-Catalyst Volume Percent

The annual coke-on-catalyst volume percent for fluid catalytic cracking (FCC) units must be calculated by the equation in section 95113(l)(3)(C). The mass of coke consumed may be calculated by the equation presented in 40 CFR Section 60.106(b)(3),³ or by a comparable measurement and mass-balance method. The volume of coke consumed should be calculated from the mass of coke consumed by the following equation:

$$\text{Volume of coke (barrels)} = \text{Mass of coke (lbs)} \times \left(\frac{17,655 \frac{\text{BTU}}{\text{lb}}}{6,050,000 \frac{\text{BTU}}{\text{Barrel}}} \right)$$

If an annual average coke heat content can be calculated from documented measurements, that value may be used in place of the default value of 17,655 Btu/lb that appears in this equation. The coke-on-catalyst volume percent must be reported as a percentage with two digits after the decimal point (e.g., 4.29%).

1.1.3 General CWB Reporting Requirements

- Beginning with 2017 data reported in 2018, sulfuric acid regeneration is no longer a CWB unit. A new benchmark for sulfuric acid regeneration has been added to Table 9-1 in section 95891 of the Cap-and-Trade Regulation that is separate from the CWB benchmark. Refineries that undertake sulfuric acid regeneration must report sulfuric acid covered product data (short tons produced) in Subpart A of the Cal e-GGRT reporting tool using the same methods that would be used to report the CWB throughput for the former sulfuric acid regeneration CWB unit.
- A process unit throughput may be reported under only one CWB unit (section 95113 (l)(3)(E)).

³ http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=44004c59c3ae3abc3c62ae2c250afae6&ty=HTML&h=L&r=PART&n=pt40.7.60#se40.7.60_1106

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- For all CWB throughputs that are process unit feeds, report only the fresh feed volume and exclude any recycled material (section 95113(l)(3)(A)), with the exception of reported throughputs for the CWB units “C4 Isomer Production” and “C5/C6 Isomer Production – including ISOSIV,” which may include recycled material.
- Classify processes within CWB units based on current function. Refer to the definitions in section 95102(c), the last column of Table 2-2 in section 95113, and Appendix D of the Solomon Associates CWB Report⁴ for information on the processes classified within each CWB unit.
- For CWB units where the reported throughput is an output, such as “Sulfur Recovery” and “Asphalt Production,” report only the amount that is actually produced on-site at the facility.
- Throughput for the “Special Fractionation” CWB unit may only include process units that meet the definition in section 95102(c) and are not reported under another CWB unit.
- For the “Fuel Gas Sales Treating & Compression” CWB unit, report the horsepower rating of the unit, not the total power utilized during the year.
- For inclusion in “Total Refinery Input,” a material must be brought onto the refinery site during the calendar year, but it need not be processed during the calendar year. “Total Refinery Input” must exclude hydrogen, natural gas, and any input to a hydrogen plant (section 95113(l)(3)(B) and section 95102(c)).
- The reported “Non-Crude Input” must exclude crude, hydrogen, natural gas, any input to a hydrogen plant, and any material that is not processed in a process unit during the calendar year, such as a non-processed blendstock (section 95113(l)(3)(B) and section 95102(c)).
- Report all CWB throughputs to, at most, two digits after the decimal point.

1.2 Calcined Coke Reporting

Section 95113(l)(2) of MRR requires the annual mass of calcined coke produced on-site during the data year to be reported in metric tons (*not* short tons, which is the case for most solid products). Calcined coke production is covered product data, but petroleum coke production is not. To report annual calcined coke production, annual sales data may be used, but the sales data must be adjusted by the change in inventory during the year to accurately reflect the amount of material actually produced during the year.

⁴ Solomon Associates, May 17, 2013. Report on CWT-CWB for California Regulatory Support. Available at: https://www.arb.ca.gov/cc/capandtrade/meetings/081313/cwt-cwb_backgrounddocument.pdf

2 Solomon Energy Intensity Index Reporting

Beginning with 2018 data reported in 2019, refineries are no longer required to report the current Solomon Energy Intensity Index (EII®) value for the facility.

3 Refinery Product Reporting

Section 95113(l)(1) of the 2016 version of MRR is applicable for 2018 data reported in 2019, and requires petroleum refineries to report the annual on-site production volume and volume produced elsewhere and brought on-site for each refinery product listed in Table 2-1 of MRR.

3.1 General Information for Refinery Product Reporting

Production data should be reported using the methods described in Part 5 of the U.S. Energy Information Agency's Monthly Refinery Report Instructions for Form EIA-810 (Revised 2013). When reporting annual production volumes, annual sales data may be used, but the sales data must be adjusted by the change in inventory during the year to reflect the volume of material actually produced during the year. When reporting the annual volume of a material produced elsewhere and brought on-site, annual sales data may be used.

Refinery products are not covered product data, and measurements do not need to meet the accuracy requirements of section 95103(k). The production volume of asphalt must be reported both as a refinery product pursuant to section 95113(l)(1) in the Subpart Y Additional Production Data workbook, and as a CWB throughput pursuant to section 95113(l)(3)(A) in the CWB Reporting Form. This dual reporting serves two separate purposes and is not viewed by CARB as double-counting. The mass of asphalt produced should be converted to volume by using a conversion factor of 5.5 barrels per short ton or by using the measured density, which must be determined at least once per calendar year.

3.2 Reporting On-Site Refinery Production and Amounts of Material Produced Elsewhere and Brought On-site

Figure 1 shows the main table in the [Subpart Y Additional Production Data spreadsheet](#) used to report refinery products. Cells requiring user input are blue. Reporters must report the annual production volume and the annual amount of refinery product produced elsewhere and brought on-site for each material listed in Table 2-1 of MRR. Amounts must be reported in standard cubic feet for gaseous products, barrels for liquid products, and short tons for solid products.

Figure 1. Example refinery product table from the Cal e-GGRT reporting spreadsheet.

Product	EIA Product Code	Unit of Measure	Annual On-site Production Amount ¹	Annual Amount Produced Elsewhere and Brought On-site ¹
Petroleum Coke, Marketable	21	short tons	10,000	0
Still Gas	45	scf	450,000	0
NGPL and LRG - Ethane/Ethylene, TOTAL (includes EIA Product Codes 631 and 641)	108	bbl	40,000	0
Finished Aviation Gasoline	111	bbl	10,000	0
Aviation Gasoline Blending Components	112	bbl	5,000	5,000

4 Primary Refinery Product and Finished Product Reporting

Beginning with 2018 data reported in 2019, reporters are no longer required to report the total annual production volume of primary refinery products and finished products. To clarify and streamline reporting, primary and finished refinery products are now reported as “Refinery Products” pursuant to section 95113(l)(1).

5 Product Reporting for the Cost of Implementation Fee Regulation

Section 95113(m) contains product reporting requirements to support the COI Fee Regulation. Petroleum refineries must report the annual volume of all CARBOB, finished California gasoline, and California diesel that exits the refinery gate and is intended for sale or use in California. These reported volumes will be used by CARB to calculate cost of implementation fees only; they will not be used to determine any compliance obligation under the Cap-and-Trade Program. The point of regulation for COI is at the refinery gate, so reported volumes should be the volumes exiting the refinery gate, not the volumes sold at the rack. Sales records may be used to report the product volumes exiting the refinery gate. Verifiers review this data for reasonableness and conformance with the requirements of MRR, subject to the verifier’s sampling plan.

6 Additional Information

Detailed training materials for reporting using Cal e-GGRT:

<https://ww2.arb.ca.gov/mrr-tool>.

The GHG Mandatory Reporting Regulation, with full requirements:

<https://ww2.arb.ca.gov/mrr-regulation>.

Contact the MRR helpdesk: ghgreport@arb.ca.gov.

For help with reporting or verification, please contact the appropriate staff member:

<https://ww2.arb.ca.gov/mrr-contacts>.