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*Unofficial electronic compilation of the
U.S. EPA Final Rule on Mandatory Reporting of Greenhouse Gases
incorporated by reference in California's Regulation for the
Mandatory Reporting of Greenhouse Gas Emissions*

Unofficial Electronic Compilation

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ARB's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (title 17, California Code of Regulations (CCR), sections 95100-95157) incorporated by reference certain requirements promulgated by the United States Environmental Protection Agency (U.S. EPA) in its Final Rule on Mandatory Reporting of Greenhouse Gases (Title 40, Code of Federal Regulations (CFR), Part 98). Specifically, section 95100(c) of ARB's regulation incorporated those requirements promulgated by U.S. EPA as published in the Federal Register on October 30, 2009, July 12, 2010, September 22, 2010, October 28, 2010, November 30, 2010, December 17, 2010, and April 25, 2011.

This compilation combines the various incorporated Federal Register versions into one document for the reader's convenience; however, this compilation is not an official edition of either the CFR or the CCR. While reasonable steps have been taken to make this unofficial compilation accurate, the officially published requirements, found within the incorporated Federal Register notices with the dates listed above, take precedence if there are any discrepancies.

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The official legal versions of the incorporated CFR provisions from the Federal Register are available, with the incorporated Federal Register notice and date, at <http://www.epa.gov/climatechange/emissions/subpart.html>.

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40 CFR Part 98
Subpart AA
Mandatory Reporting of Greenhouse Gases

PART 98—MANDATORY GREENHOUSE GAS REPORTING

Subpart AA—Pulp and Paper Manufacturing

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§98.270 Definition of Source Category.

(a) The pulp and paper manufacturing source category consists of facilities that produce market pulp (i.e., stand-alone pulp facilities), manufacture pulp and paper (i.e., integrated facilities), produce paper products from purchased pulp, produce secondary fiber from recycled paper, convert paper into paperboard products (e.g., containers), or operate coating and laminating processes.

(b) The emission units for which GHG emissions must be reported are listed in paragraphs (b)(1) through (b)(5) of this section:

- (1) Chemical recovery furnaces at kraft and soda mills (including recovery furnaces that burn spent pulping liquor produced by both the kraft and semichemical process).
- (2) Chemical recovery combustion units at sulfite facilities.
- (3) Chemical recovery combustion units at stand-alone semichemical facilities.
- (4) Pulp mill lime kilns at kraft and soda facilities.
- (5) Systems for adding makeup chemicals (CaCO₃, Na₂CO₃) in the chemical recovery areas of chemical pulp mills.

§98.271 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains a pulp and paper manufacturing process and the facility meets the requirements of either §98.2(a)(1) or (a)(2).

§98.272 GHGs to report.

You must report the emissions listed in paragraphs (a) through (f) of this section:

- (a) CO₂, biogenic CO₂, CH₄, and N₂O emissions from each kraft or soda chemical recovery furnace.
- (b) CO₂, biogenic CO₂, CH₄, and N₂O emissions from each sulfite chemical recovery combustion unit.
- (c) CO₂, biogenic CO₂, CH₄, and N₂O emissions from each stand-alone semichemical chemical recovery combustion unit.
- (d) CO₂, biogenic CO₂, CH₄, and N₂O emissions from each kraft or soda pulp mill lime kiln.
- (e) CO₂ emissions from addition of makeup chemicals (CaCO₃, Na₂CO₃) in the chemical recovery areas of chemical pulp mills.
- (f) CO₂, CH₄, and N₂O combustion emissions from each stationary combustion unit. You must calculate and report these emissions under subpart C of this part (General Stationary Fuel Combustion Sources) by following the requirements of subpart C.

§98.273 Calculating GHG emissions.

(a) For each chemical recovery furnace located at a kraft or soda facility, you must determine CO₂, biogenic CO₂, CH₄, and N₂O emissions using the procedures in paragraphs (a)(1) through (a)(3) of this section. CH₄ and N₂O emissions must be calculated as the sum of emissions from combustion of fossil fuels and combustion of biomass in spent liquor solids.

- (1) Calculate fossil fuel-based CO₂ emissions from direct measurement of fossil fuels consumed and default emissions factors according to the Tier 1 methodology for stationary combustion sources in §98.33(a)(1). A higher tier from §98.33(a) may be used to calculate fossil fuel-based CO₂ emissions if the respective monitoring and QA/QC requirements described in §98.34 are met.
- (2) Calculate fossil fuel-based CH₄ and N₂O emissions from direct measurement of fossil fuels consumed, default or site-specific HHV, and default emissions factors and convert to metric tons of CO₂ equivalent according to the methodology for stationary combustion sources in §98.33(c).
- (3) Calculate biogenic CO₂ emissions and emissions of CH₄ and N₂O from biomass using measured quantities of spent liquor solids fired, site-specific HHV, and default or site-specific emissions factors, according to Equation AA-1 of this section:

$$CO_2, CH_4, \text{ or } N_2O \text{ from biomass} = (0.907 .18) * Solids * HHV * EF \quad (\text{Eq.AA-1})$$

Where:

- CO₂, CH₄, or N₂O, from Biomass = Biogenic CO₂ emissions or emissions of CH₄ or N₂O from spent liquor solids combustion (metric tons per year).
- Solids = Mass of spent liquor solids combusted (short tons per year) determined according to §98.274(b).
- HHV = Annual high heat value of the spent liquor solids (mmBtu per kilogram) determined according to 98.274(b).
- EF = Default or site-specific emission factor for CO₂, CH₄, or N₂O, from Table AA-1 of this subpart (kg CO₂, CH₄, or N₂O per mmBtu).

0.90718 = Conversion factor from short tons to metric tons.

(b) For each chemical recovery combustion unit located at a sulfite or stand-alone semichemical facility, you must determine CO₂, CH₄, and N₂O emissions using the procedures in paragraphs (b)(1) through (b)(4) of this section:

(1) Calculate fossil CO₂ emissions from fossil fuels from direct measurement of fossil fuels consumed and default emissions factors according to the Tier 1 Calculation Methodology for stationary combustion sources in §98.33(a)(1). A higher tier from §98.33(a) may be used to calculate fossil fuel-based CO₂ emissions if the respective monitoring and QA/QC requirements described in §98.34 are met.

(2) Calculate CH₄ and N₂O emissions from fossil fuels from direct measurement of fossil fuels consumed, default or site-specific HHV, and default emissions factors and convert to metric tons of CO₂ equivalent according to the methodology for stationary combustion sources in §98.33(c).

(3) Calculate biogenic CO₂ emissions using measured quantities of spent liquor solids fired and the carbon content of the spent liquor solids, according to Equation AA-2 of this section:

$$\text{Biogenic CO}_2 = \frac{44}{12} * \text{Solids} * \text{CC} * (0.90718) \quad (\text{Eq. AA-2})$$

Where:

Biogenic CO₂ = Annual CO₂ mass emissions for spent liquor solids combustion (metric tons per year).

Solids = Mass of the spent liquor solids combusted (short tons per year) determined according to §98.274(b).

CC = Annual carbon content of the spent liquor solids, determined according to §98.274(b) (percent by weight, expressed as a decimal fraction, e.g., 95% = 0.95).

44/12 = Ratio of molecular weights, CO₂ to carbon.

0.90718 = Conversion from short tons to metric tons

(4) Calculate CH₄ and N₂O emissions from biomass using Equation AA-1 of this section and the default CH₄ and N₂O emissions factors for kraft facilities in Table AA-1 of this subpart and convert the CH₄ or N₂O emissions to metric tons of CO₂ equivalent by multiplying each annual CH₄ and N₂O emissions total by the appropriate global warming potential (GWP) factor from Table A-1 of subpart A of this part.

(c) For each pulp mill lime kiln located at a kraft or soda facility, you must determine CO₂, CH₄, and N₂O emissions using the procedures in paragraphs (c)(1) through (c)(3) of this section:

(1) Calculate CO₂ emissions from fossil fuel from direct measurement of fossil fuels consumed and default HHV and default emissions factors, according to the Tier 1 Calculation Methodology for stationary combustion sources in §98.33(a)(1). A higher tier from §98.33(a) may be used to calculate fossil fuel-based CO₂ emissions if the respective monitoring and QA/QC requirements described in §98.34 are met.

(2) Calculate CH₄ and N₂O emissions from fossil fuel from direct measurement of fossil fuels consumed, default of site-specific HHV, and default emissions factors and convert to metric tons of CO₂ equivalent according to the methodology for stationary combustion

sources in §98.33(c); use the default HHV listed in Table C-1 of subpart C and the default CH₄ and N₂O emissions factors listed in Table AA-2 of this subpart.

(3) Biogenic CO₂ emissions from conversion of CaCO₃ to CaO are included in the biogenic CO₂ estimates calculated for the chemical recovery furnace in paragraph (a)(3) of this section.

(d) For makeup chemical use, you must calculate CO₂ emissions by using direct or indirect measurement of the quantity of chemicals added and ratios of the molecular weights of CO₂ and the makeup chemicals, according to Equation AA-3 of this section:

$$CO_2 = \left[M_{(CaCO_3)} * \frac{44}{100} + M_{(Na_2CO_3)} \frac{44}{105.99} \right] * 1000 \text{ kg / metric ton} \quad (\text{Eq. AA-3})$$

Where:

CO₂ = CO₂ mass emissions from makeup chemicals (kilograms/yr).

M (CaCO₃) = Make-up quantity of CaCO₃ used for the reporting year (metric tons per year).

M (NaCO₃) = Make-up quantity of Na₂CO₃ used for the reporting year (metric tons per year).

44 = Molecular weight of CO₂.

100 = Molecular weight of CaCO₃.

105.99 = Molecular weight of Na₂CO₃.

§98.274 Monitoring and QA/QC requirements.

(a) Each facility subject to this subpart must quality assure the GHG emissions data according to the applicable requirements in §98.34. All QA/QC data must be available for inspection upon request.

(b) Fuel properties needed to perform the calculations in Equations AA-1 and AA-2 of this subpart must be determined according to paragraphs (b)(1) through (b)(3) of this section.

(1) High heat values of black liquor must be determined no less than annually using T684 om-06 Gross Heating Value of Black Liquor, TAPPI (incorporated by reference, see §98.7). If measurements are performed more frequently than annually, then the high heat value used in Equation AA-1 of this subpart must be based on the average of the representative measurements made during the year.

(2) The annual mass of spent liquor solids must be determined using either of the methods specified in paragraph (b)(2)(i) or (b)(2)(ii).

(i) Measure the mass of spent liquor solids annually (or more frequently) using T-650 om-05 Solids Content of Black Liquor, TAPPI (incorporated by reference in §98.7). If measurements are performed more frequently than annually, then the mass of spent liquor solids used in Equation AA-1 of this subpart must be based on the average of the representative measurements made during the year.

(ii) Determine the annual mass of spent liquor solids based on records of measurements made with an online measurement system that determines the mass of spent liquor solids fired in a chemical recovery furnace or chemical recovery combustion unit.

(3) Carbon analyses for spent pulping liquor must be determined no less than annually using ASTM D5373-08 Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Laboratory Samples of Coal (incorporated by reference, see

§98.7). If measurements using ASTM D5373-08 are performed more frequently than annually, then the spent pulping liquor carbon content used in Equation AA-2 of this subpart must be based on the average of the representative measurements made during the year.

(c) Each facility must keep records that include a detailed explanation of how company records of measurements are used to estimate GHG emissions. The owner or operator must also document the procedures used to ensure the accuracy of the measurements of fuel, spent liquor solids, and makeup chemical usage, including, but not limited to calibration of weighing equipment, fuel flow meters, and other measurement devices. The estimated accuracy of measurements made with these devices must be recorded and the technical basis for these estimates must be provided. The procedures used to convert spent pulping liquor flow rates to units of mass (i.e., spent liquor solids firing rates) also must be documented.

(d) Records must be made available upon request for verification of the calculations and measurements.

§98.275 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations is required. Therefore, whenever a quality-assured value of a required parameter is unavailable (e.g., if a meter malfunctions during unit operation or if a required sample is not taken), a substitute data value for the missing parameter shall be used in the calculations, according to the requirements of paragraphs (a) through (c) of this section:

(a) There are no missing data procedures for measurements of heat content and carbon content of spent pulping liquor. A re-test must be performed if the data from any annual measurements are determined to be invalid.

(b) For missing measurements of the mass of spent liquor solids or spent pulping liquor flow rates, use the lesser value of either the maximum mass or fuel flow rate for the combustion unit, or the maximum mass or flow rate that the fuel meter can measure.

(c) For the use of makeup chemicals (carbonates), the substitute data value shall be the best available estimate of makeup chemical consumption, based on available data (e.g., past accounting records, production rates). The owner or operator shall document and keep records of the procedures used for all such estimates.

§98.276 Data reporting requirements.

In addition to the information required by §98.3(c) and the applicable information required by §98.36, each annual report must contain the information in paragraphs (a) through (k) of this section as applicable:

(a) Annual emissions of CO₂, biogenic CO₂, CH₄, biogenic CH₄, N₂O, and biogenic N₂O (metric tons per year).

(b) Annual quantities fossil fuels by type used in chemical recovery furnaces and chemical recovery combustion units in short tons for solid fuels, gallons for liquid fuels and scf for gaseous fuels.

(c) Annual mass of the spent liquor solids combusted (short tons per year), and basis for determining the annual mass of the spent liquor solids combusted (whether based on T650 om-05 Solids Content of Black Liquor, TAPPI (incorporated by reference, see §98.7) or an online measurement system).

(d) The high heat value (HHV) of the spent liquor solids used in Equation AA-1 of this subpart (mmBtu per kilogram).

(e) The default or site-specific emission factor for CO₂, CH₄, or N₂O, used in Equation AA-1 of this subpart (kg CO₂, CH₄, or N₂O per mmBtu).

(f) The carbon content (CC) of the spent liquor solids, used in Equation AA-2 of this subpart (percent by weight, expressed as a decimal fraction, e.g., 95% = 0.95).

(g) Annual quantities of fossil fuels by type used in pulp mill lime kilns in short tons for solid fuels, gallons for liquid fuels and scf for gaseous fuels.

(h) Make-up quantity of CaCO₃ used for the reporting year (metric tons per year) used in Equation AA-3 of this subpart.

(i) Make-up quantity of Na₂CO₃ used for the reporting year (metric tons per year) used in Equation AA-3 of this subpart.

(j) Annual steam purchases(pounds of steam per year).

(k) Annual production of pulp and/or paper products produced (metric tons).

§98.277 Records that must be retained.

In addition to the information required by §98.3(g), you must retain the records in paragraphs (a) through (f) of this section.

(a) GHG emission estimates (including separate estimates of biogenic CO₂) for each emissions source listed under §98.270(b).

(b) Annual analyses of spent pulping liquor HHV for each chemical recovery furnace at kraft and soda facilities.

(c) Annual analyses of spent pulping liquor carbon content for each chemical recovery combustion unit at a sulfite or semichemical pulp facility.

(d) Annual quantity of spent liquor solids combusted in each chemical recovery furnace and chemical recovery combustion unit, and the basis for determining the annual quantity of the spent liquor solids combusted (whether based on T650 om-05 Solids Content of Black Liquor, TAPPI (incorporated by reference, see §98.7) or an online measurement system). If an online measurement system is used, you must retain records of the calculations used to determine the annual quantity of spent liquor solids combusted from the continuous measurements.

(e) Annual steam purchases.

(f) Annual quantities of makeup chemicals used.

§98.278 Definitions.

All terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

Table AA-1 of Subpart AA—Kraft Pulping Liquor Emissions Factors for Biomass-Based CO₂, CH₄, and N₂O.

Wood Furnish	Biomass-Based Emissions Factors (kg/mmBtu HHV)		
	CO ₂ ^a	CH ₄	N ₂ O
North American Softwood	94.4	0.030	0.005
North American Hardwood	93.7		
Bagasse	95.5		
Bamboo	93.7		
Straw	95.1		

^a Includes emissions from both the recovery furnace and pulp mill lime kiln.

Table AA-2 to Subpart AA—Kraft Lime Kiln and Calciner Emissions Factors for Fossil Fuel-Based CH₄ and N₂O

Fuel	Fossil fuel-based emissions factors (kg/mmBtu HHV)			
	Kraft Lime Kilns		Kraft Calciners	
	CH ₄	N ₂ O	CH ₄	N ₂ O
Residual Oil	0.0003
Distillate Oil	0.0027	0.0004
Natural Gas	0.0027	0.0001
Biogas	0.0001
Petroleum Coke	NA	^a NA

^a Emission factors for kraft calciners are not available.