



National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2011 (No.)

National Greenhouse and Energy Reporting Act 2007

I, GREG COMBET, Minister for Climate Change and Energy Efficiency, make this Determination under subsection 10 (3) of the *National Greenhouse and Energy Reporting Act 2007*.

Dated 2011

[DRAFT ONLY — NOT FOR SIGNATURE]
Minister for Climate Change and Energy Efficiency

1 Name of Determination

This Determination is the *National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2011 (No.)*.

2 Commencement

This Determination commences on 1 July 2011.

3 Amendment of *National Greenhouse and Energy Reporting (Measurement) Determination 2008*

Schedule 1 amends the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*.

CONSULTATION DRAFT

4 Application

The amendments made by Schedule 1 apply in relation to the 2011–2012 financial year and to later financial years.

Schedule 1 Amendments

(section 3)

[1] Section 1.8, after definition of *blended fuel*

insert

briquette means an agglomerate formed by compacting a particulate material in a briquette press, with or without added binder material.

[2] Section 1.8, after definition of *principal activity*

insert

pyrolysis of coal means the decomposition of coal by heat.

[3] Section 1.8, definition of *uncertainty protocol*

omit

GHG Uncertainty protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty

insert

GHG protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty

[4] Paragraph 1.13 (d)

substitute

(d) completeness — all identifiable emission sources mentioned in section 1.10 must be accounted for.

[5] Subsections 1.21 (5) and 1.27 (5)

omit

The

insert

If method 1 is available for the source, the

[6] Subparagraph 2.3 (1) (a) (iii)

omit
of

[7] Subsection 2.3 (3)

substitute

- (3) Method 1 must not be used for estimating emissions of carbon dioxide for the main fuel combusted from the operation of the facility, if:
- (a) the principal activity of the facility is electricity generation (ANZSIC industry classification and code 2611); and
 - (b) the generating unit:
 - (i) has the capacity to produce 30 MW or more of electricity; and
 - (ii) generates more than 50 000 000 kilowatt hours of electricity in a reporting year.

[8] Paragraph 2.10 (3) (b)

omit
conveyer.

insert
conveyer; or

[9] After paragraph 2.10 (3) (b)

insert

- (c) if it is not feasible to use one of the collection methods mentioned in paragraph (a) or (b) — by using another collection method that provides representative ash sampling.

[10] Section 2.11, table

substitute

Item	Procedure	Frequency
1	At the outlet of a boiler air heater or the inlet to a flue gas cleaning plant using the isokinetic sampling method specified in AS 4323.1—1995 and AS 4323.2—1995 or in a standard that is equivalent to one of those standards	At least every 2 years, or after significant changes in operating conditions

Item	Procedure	Frequency
2	By using standard industry ‘cegrit’ extraction equipment	At least every year, or after significant changes in operating conditions
3	By collecting fly ash from: <ul style="list-style-type: none"> (a) the fly ash collection hoppers of a flue gas cleaning plant; or (b) downstream of fly ash collection hoppers from ash silos or sluiceways 	At least once a year, or after significant changes in operating conditions
4	From on-line carbon in ash analysers using sample extraction probes and infrared analysers	At least every 2 years, or after significant changes in operating conditions

[11] Subsection 2.19 (3)

substitute

- (3) Method 1 must not be used for estimating emissions of carbon dioxide for the main fuel combusted from the operation of the facility, if:
- (a) the principal activity of the facility is electricity generation (ANZSIC industry classification and code 2611); and
 - (b) the generating unit:
 - (i) has the capacity to produce 30 MW or more of electricity; and
 - (ii) generates more than 50 000 000 kilowatt hours of electricity in a reporting year.

[12] Subsection 2.48A (1), definition of Q_{pog}

omit

facility for stationary energy purposes.

insert

facility, estimated in accordance with Division 2.4.6.

[13] Subsection 2.48A (3)

substitute

- (3) For OF_{pog} in paragraph (2) (b), estimate as follows:

$$OF_{pog} = \frac{(Q_{pog} - \text{Oil Transferred Offsite}_{pog})}{Q_{pog}}$$

where:

Q_{pog} is the quantity of petroleum based oils or petroleum based greases consumed from the operation of the facility, estimated in accordance with Division 2.4.6.

*Oil Transferred Offsite*_{pog} is the quantity of oils, derived from petroleum based oils or petroleum based greases, transferred outside the facility, and estimated in accordance with Division 2.4.6.

[14] Division 2.5.2, heading

substitute

Division 2.5.2 Energy — manufacture of solid fuels

[15] Section 2.57

omit

(coke ovens).

insert

through the pyrolysis of coal or coal briquette process.

[16] Subsection 2.58 (1)

substitute

- (1) The following methods must be used for estimating emissions during a year from combustion of fuels for energy in the manufacture of solid fuels:
 - (a) if a facility is constituted by the manufacture of solid fuel using coke ovens as part of an integrated metalworks — the methods provided in Part 4.4 must be used; and
 - (b) in all other cases — one of the following methods must be used:
 - (i) method 1 under subsection (3);
 - (ii) method 2 under subsections (4), (5), (6) and (7);
 - (iii) method 3 under subsections (8), (9) and (10);
 - (iv) method 4 under part 1.3.

[17] After subsection 2.58 (2)

Insert

Method 1

- (3) Method 1, based on a carbon mass balance approach, is:

Step 1 Work out the carbon content in fuel types (*i*) or carbonaceous input material delivered for the activity during the year measured in tonnes of carbon as follows:

$$\sum_i CCF_i \times Q_i$$

where:

\sum_i means sum the carbon content values obtained for all fuel types (*i*) or carbonaceous input material.

CCF_i is the carbon content factor mentioned in Schedule 3 measured in tonnes of carbon for each appropriate unit of fuel type (*i*) or carbonaceous input material consumed during the year from the operation of the activity.

Q_i is the quantity of fuel type (*i*) or carbonaceous input material delivered for the activity during the year measured in an appropriate unit and estimated in accordance with criterion A in Division 2.2.5, 2.3.6 and 2.4.6.

Step 2 Work out the carbon content in products (*p*) leaving the activity during the year measured in tonnes of carbon as follows:

$$\sum_p CCF_p \times A_p$$

where:

\sum_p means sum the carbon content values obtained for all product types (*p*).

CCF_p is the carbon content factor measured in tonnes of carbon for each tonne of product type (*p*) produced during the year.

A_p is the quantity of product types (*p*) produced leaving the activity during the year measured in tonnes.

Step 3 Work out the carbon content in waste by-product types (*r*) leaving the activity, other than as an emission of greenhouse gas, during the year, measured in tonnes of carbon, as follows:

$$\sum_r CCF_r \times Y_r$$

where:

\sum_r means sum the carbon content values obtained for all waste by-product types (*r*).

CCF_r is the carbon content factor measured in tonnes of carbon for each tonne of waste by-product types (*r*).

Y_r is the quantity of waste by-product types (*r*) leaving the activity during the year measured in tonnes.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr}$$

where:

\sum_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (*i*) for the activity and held within the boundary of the activity during the year measured in tonnes.

\sum_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (*p*) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

\sum_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (*r*) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

Step 5 Work out the emissions of carbon dioxide released from the operation of the activity during the year measured in CO₂-e tonnes as follows:

- (a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount (**amount A**);
- (b) subtract amount A from the amount worked out under step 1 to work out a new amount (**amount B**);
- (c) multiply amount B by 3.664 to work out the amount of emissions released from the operation of the activity during a year.

Method 2

- (4) Subject to subsections (5), (6) and (7), method 2 is the same as method 1 under subsection (3).
- (5) In applying method 1 as method 2, step 4 in subsection (3) is to be omitted and the following step 4 substituted.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr} + \alpha \gamma RCCS_{CO_2}$$

where:

Σ_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (i) for the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (p) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (r) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

α is the factor $\frac{1}{3.664}$ for converting the mass of carbon dioxide to a mass of carbon.

γ is the factor 1.861×10^{-3} for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to CO₂-e tonnes.

$RCCS_{CO_2}$ is carbon dioxide captured for permanent storage measured in cubic metres in accordance with Division 1.2.3.

- (6) If a fuel type (i) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (i) or carbonaceous input material must be carried out to determine its carbon content.
- (7) The sampling and analysis is to be carried out using the sampling and analysis provided for in Divisions 2.2.3, 2.3.3 and 2.4.3 that apply to the combustion of solid, liquid or gaseous fuels.

Method 3

- (8) Subject to subsections (9) and (10), method 3 is the same as method 2 under subsections (4), (5), (6) and (7).
- (9) If a fuel type (i) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (i) or carbonaceous input material must be carried out to determine its carbon content.

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- (10) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, liquid or gaseous fuels.

[18] Subsection 3.6 (1)

omit

For paragraph 3.4 (2) (b) and subsection 3.4 (3),

insert

For subsections 3.4 (2) and (3),

[19] Sections 3.15 and 3.16

substitute

3.15 Method 2 — coal mine waste gas flared

For subparagraph 3.4 (4) (a) (ii), method 2 is:

$$E_{ico_2} = \left(\frac{Q_j \times EC_i \times EF_j}{1000} \right) \times OF_i + QCO_2$$

where:

E_{ico_2} is the emissions of CO₂ released from coal mine waste gas (*i*) flared from the mine during the year, measured in CO₂-e tonnes.

Q_j is the quantity of methane (*j*) within the fuel type from the mine during the year, measured in cubic metres in accordance with Division 2.3.3.

EC_i is the energy content factor of coal mine waste gas (*i*) mentioned in item 19 of Schedule 1, measured in gigajoules per cubic metre.

EF_j is the emission factor for the methane (*j*) within the fuel type from the mine during the year, measured in kilograms of CO₂-e per gigajoule estimated in accordance with any of the standards in Division 2.3.3.

OF_i is 0.98/0.995, which is the correction factor for the oxidation of coal mine waste gas (*i*) flared.

QCO_2 is the quantity of carbon dioxide within the coal mine waste gas emitted from the mine during the year, measured in CO₂-e tonnes in accordance with Division 2.3.3.

3.16 Method 3 — coal mine waste gas flared

- (1) For subparagraph 3.4 (4) (a) (iii), method 3 is the same as method 2 under section 3.15.

-
- (2) In applying method 2 under section 3.15, the facility specific emission factor EF_h must be determined in accordance with the procedure for determining $EF_{iCO_{2ox,ec}}$ in Division 2.3.4.

[20] Subsection 3.43 (1)

substitute

- (1) Subject to section 1.18, for estimating emissions released by oil or gas flaring during a year from the operation of a facility that is constituted by oil or gas exploration:
- (a) if estimating emissions of carbon dioxide released — one of the following methods must be used:
- (i) method 1 under section 3.44;
 - (ii) method 2 under section 3.45;
 - (iii) method 3 under section 3.46; and
- (b) if estimating emissions of methane released — method 1 under section 3.44 must be used; and
- (c) if estimating emissions of nitrous oxide released — method 1 under section 3.44 must be used.

Note There is no method 4 under paragraph (a) and no methods 2, 3 or 4 under paragraphs (b) and (c).

[21] Sections 3.45 and 3.46

substitute

3.45 Method 2 — oil or gas exploration

Combustion of gaseous fuels (flared) emissions

- (1) For subparagraph 3.43 (1) (a) (ii), method 2 for combustion of gaseous fuels is:

$$E_{iCO_2} = (Q_h \times EF_h \times OF_i) + QCO_2$$

where:

E_{iCO_2} is the fugitive emissions of CO₂ from fuel type (*i*) flared in oil or gas exploration during the year, measured in CO₂-e tonnes.

Q_h is the total quantity of hydrocarbons (*h*) within the fuel type (*i*) in oil or gas exploration during the year, measured in CO₂-e tonnes in accordance with Division 2.3.3.

EF_h is the emission factor for the total hydrocarbons (*h*) within the fuel type (*i*) in oil or gas exploration during the year, measured in CO₂-e tonnes per

tonne of the fuel type (*i*) flared, estimated in accordance with Division 2.3.3.

OF_i is 0.98/0.995 which is the correction factor for the oxidation of fuel type (*i*) flared.

QCO_2 is the quantity of CO₂ within fuel type (*i*) in the oil or gas exploration during the year, measured in CO₂-e tonnes in accordance with Division 2.3.3.

Combustion of liquid fuels (flared) emissions

- (2) For subparagraph 3.43 (1) (a) (ii), method 2 for combustion of liquid fuels is the same as method 1 but the carbon dioxide emissions factor EF_h must be determined in accordance with method 2 specified in Division 2.4.3.

3.46 Method 3 — oil or gas exploration

Combustion of gaseous fuels (flared) emissions

- (1) For subparagraph 3.43 (1) (a) (iii), method 3 for the combustion of gaseous fuels is the same as method 2 but the carbon dioxide emissions factor EF_h must be determined in accordance with method 3 specified in Division 2.3.4.

Combustion of liquid fuels (flared) emissions

- (2) For subparagraph 3.43 (1) (a) (iii), method 3 for the combustion of liquid fuels is the same as method 2 but the carbon dioxide emissions factor EF_h must be determined in accordance with method 3 specified in Division 2.4.4.

[22] Paragraph 3.51 (1) (b)

substitute

- (b) if estimating emissions of methane released — method 1 under section 3.55 must be used; and

[23] Subsection 3.51 (1), note

substitute

Note There is no method 4 under paragraph (a) and no methods 2, 3 or 4 under paragraphs (b) and (c).

[24] **Sections 3.53 and 3.54**

substitute

3.53 Method 2 — crude oil production

Combustion of gaseous fuels (flared) emissions of carbon dioxide

- (1) For subparagraph 3.51 (1) (a) (ii), method 2 for combustion of gaseous fuels is:

$$E_{\text{ico}_2} = (Q_h \times EF_h \times OF_i) + QCO_2$$

where:

E_{ico_2} is the fugitive emissions of CO₂ from fuel type (*i*) flared in crude oil production during the year, measured in CO₂-e tonnes.

Q_h is the total quantity of hydrocarbons (*h*) within the fuel type (*i*) in crude oil production during the year, measured in CO₂-e tonnes in accordance with Division 2.3.3.

EF_h is the emission factor for the total hydrocarbons (*h*) within the fuel type (*i*) in crude oil production during the year, measured in CO₂-e tonnes per tonne of fuel type (*i*) flared, estimated in accordance with method 2 specified in Division 2.3.3.

OF_i is 0.98/0.995 which is the correction factor for the oxidation of fuel type (*i*) flared.

QCO_2 is the quantity of CO₂ within the fuel type (*i*) in crude oil production during the year, measured in CO₂-e tonnes in accordance with Division 2.3.3.

Combustion of liquid fuels (flared) emissions of carbon dioxide

- (2) For subparagraph 3.51 (1) (a) (ii), method 2 for combustion of liquid fuels is the same as method 1 but the carbon dioxide emissions factor EF_h must be determined in accordance with method 2 specified in Division 2.4.3.

3.54 Method 3 — crude oil production

Combustion of gaseous fuels (flared) emissions of carbon dioxide

- (1) For subparagraph 3.51 (1) (a) (iii), method 3 for the combustion of gaseous fuels is the same as method 2 but the carbon dioxide emissions factor EF_h must be determined in accordance with method 3 specified in Division 2.3.4.

Combustion of liquid fuels (flared) emissions of carbon dioxide

- (2) For subparagraph 3.51 (1) (a) (iii), method 3 for the combustion of liquid fuels is the same as method 2 but the carbon dioxide emissions factor EF_h must be determined in accordance with method 3 specified in Division 2.4.4.

[25] Section 3.55

after

provided for

insert

in

[26] Section 3.56

omit

[27] Paragraph 3.62 (4) (b)

substitute

- (b) method 1 under section 3.67 must be used for estimating emissions of methane released; and

[28] Subsection 3.62 (4), note

omit

There is no method 4 for emissions of carbon dioxide, no method 3 or 4 for emissions of methane and no method 2, 3 or 4 for emissions of nitrous oxide.

insert

There is no method 4 for emissions of carbon dioxide and no method 2, 3 or 4 for emissions of nitrous oxide or methane.

[29] Subsection 3.67 (2)

omit

EF_{ijk}

insert

EF_{ij}

[30] Section 3.68

substitute

3.68 Method 2 — gas flared from crude oil refining

For subparagraph 3.62 (4) (a) (ii), method 2 is:

$$E_{ico_2} = (Q_h \times EF_h \times OF_i) + QCO_2$$

where:

E_{ico_2} is the fugitive emissions of CO₂ from fuel type (*i*) flared in crude oil refining during the year, measured in CO₂-e tonnes.

Q_h is the total quantity of hydrocarbons (*h*) within the fuel type (*i*) in crude oil refining during the year, measured in tonnes.

EF_h is the emission factor for the total hydrocarbons (*h*) within the fuel type (*i*) in the crude oil refining during the year, measured in CO₂-e tonnes per tonne of fuel type (*i*) flared, estimated in accordance with Division 2.3.3.

OF_i is 0.98/0.995 which is the correction factor for the oxidation of fuel type (*i*) flared.

QCO_2 is the quantity of CO₂ within the fuel type (*i*) in the crude oil refining during the year, measured in CO₂-e tonnes in accordance with Division 2.3.3.

[31] Section 3.69

omit

Method 3 is the same as method 1 under section 3.67

insert

For subparagraph 3.62 (4) (a) (iii), method 3 is the same as method 2 under section 3.68

[32] Subsection 3.80 (1), formula

substitute

$$E_{jp} = S_p \times \%UAG_p \times 0.55 \times C_{jp}$$

[33] Subsection 3.80 (1), definitions of E_{ij} and S_p

substitute

E_{jp} is the fugitive emissions of gas type (*j*) that result from natural gas distribution through a system of pipelines with sales of gas in a state or territory (*p*) during the year, measured in CO₂-e tonnes.

S_p is the total sales during the year from the pipeline system in a state or territory (p) measured in terajoules.

[34] Subsection 3.80 (1), definition of $C_{i,p,j}$

substitute

C_{jp} is the natural gas composition factor for gas type (j) for the natural gas supplied from the pipeline system in a State or Territory (p) measured in CO₂-e tonnes per terajoule.

[35] Subsection 3.80 (3)

omit

$C_{i,p,j}$

insert

C_{jp}

[36] Paragraph 3.83 (3) (b)

substitute

(b) method 1 under section 3.85 must be used for estimating emissions of methane released; and

[37] Subsection 3.83 (3), note

omit

There is no method 4 for emissions of carbon dioxide, no method 3 or 4 for emissions of methane and no method 2, 3 or 4 for emissions of nitrous oxide.

insert

There is no method 4 for emissions of carbon dioxide and no method 2, 3 or 4 for emissions of nitrous oxide or methane.

[38] Section 3.86

substitute

3.86 Method 2 — gas flared from natural gas production and processing

For subparagraph 3.83 (3) (a) (ii), method 2 is:

$$E_{\text{ico}_2} = (Q_h \times EF_h \times OF_i) + Q\text{CO}_2$$

where:

E_{iCO_2} is the fugitive emissions of CO₂ from fuel type (*i*) flared in the natural gas production and processing during the year, measured in CO₂-e tonnes.

Q_h is the total quantity of hydrocarbons (*h*) within the fuel type (*i*) in the natural gas production and processing during the year, measured in tonnes.

EF_h is the emission factor for the total hydrocarbons (*h*) within the fuel type (*i*) in the natural gas production and processing during the year, measured in CO₂-e tonnes per tonne of fuel type (*i*) flared, estimated in accordance with Division 2.3.3.

OF_i is 0.98/0.995 which is the correction factor for the oxidation of fuel type (*i*) flared.

QCO_2 is the quantity of CO₂ within the fuel type (*i*) in the natural gas production and processing during the year, measured in CO₂-e tonnes in accordance with Division 2.3.3.

[39] Section 3.87

omit

Method 3 is the same as method 1

insert

For subparagraph 3.83 (3) (a) (iii), method 3 is the same as method 2 under section 3.86

[40] Sections 4.13 and 4.14

substitute

4.13 Method 1 — lime production

(1) Method 1 is:

$$E_{ij} = (A_i + A_{lkd} \times F_{lkd}) \times EF_{ij}$$

where:

E_{ij} is the emissions of carbon dioxide (*j*) released from the production of lime (*i*) during the year measured in CO₂-e tonnes.

A_i is the quantity of lime produced during the year measured in tonnes and estimated under Division 4.2.5.

A_{lkd} is the quantity of lime kiln dust produced as a result of the production of lime during the year, measured in tonnes and estimated under Division 4.2.5.

F_{lkd} is:

- (a) the degree of calcination of lime kiln dust produced as a result of the production of lime during the year, expressed as a decimal fraction; or

-
- (b) if the information mentioned in paragraph (a) is not available — the value 1.

EF_{ij} is the carbon dioxide (j) emission factor for lime measured in tonnes of emission of carbon dioxide per tonne of lime produced, as follows:

- (a) for commercial lime production — 0.675;
(b) for non-commercial lime production — 0.730;
(c) for magnesian lime and dolomitic lime production — 0.860.

- (2) In this section:

dolomitic lime is lime formed from limestone containing more than 35 % magnesium carbonate.

magnesian lime is lime formed from limestone containing 5-35 % magnesium carbonate.

4.14 Method 2 — lime production

- (1) Method 2 is:

$$E_{ij} = (A_i + A_{lkd} \times F_{lkd}) \times EF_{ij} - \gamma RCCS_{CO_2}$$

where:

E_{ij} is the emissions of carbon dioxide (j) released from the production of lime (i) during the year measured in CO₂-e tonnes.

A_i is the quantity of lime produced during the year measured in tonnes and estimated under Division 4.2.5.

A_{lkd} is the quantity of lime kiln dust lost in the production of lime during the year, measured in tonnes and estimated under Division 4.2.5.

F_{lkd} is:

- (a) the fraction of calcination achieved for lime kiln dust in the production of lime during the year; or
(b) if the data in paragraph (a) is not available — the value 1.

EF_{ij} is worked out using the following formula:

$$EF_{ij} = (F_{CaO} \times 0.785 + F_{MgO} \times 1.092)$$

where:

F_{CaO} is the estimated fraction of lime that is calcium oxide derived from carbonate sources and produced from the operation of the facility.

F_{MgO} is the estimated fraction of lime that is magnesium oxide derived from carbonate sources and produced from the operation of the facility.

γ is the factor 1.861×10^{-3} for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to CO₂-e tonnes.

$RCCS_{CO_2}$ is carbon dioxide captured for permanent storage measured in cubic metres in accordance with Division 1.2.3.

- (3) Method 2 requires lime to be sampled and analysed in accordance with sections 4.15 and 4.16.

[41] Subsection 4.15 (1)

insert

Note Appropriate standards for sampling are:

- ASTM C25-06 *Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime*; and
- ASTM C50-00 (2006) *Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products*.

[42] Section 4.20, examples, after paragraph 7

insert

- 8 Phosphoric acid production from phosphate rock containing carbonates.

[43] Subsection 4.33 (3)

omit

Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products.

insert

Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products.

[44] Division 4.3.5, heading

substitute

**Division 4.3.5 Chemical or mineral production, other than
carbide production, using a carbon
reductant or carbon anode**

[45] Section 4.53

substitute

4.53 Application

This Division applies to emissions of carbon dioxide from activities producing a chemical or mineral product (other than carbide production), using a carbon reductant or carbon anode, including the following products:

- (a) titanium dioxide;
- (b) synthetic rutile;
- (c) glass;
- (d) fused alumina;
- (e) fused magnesia;
- (f) fused zirconia.

Note Magnesia produced in a process which does not utilise an electric arc furnace must be reported under Division 4.2.3.

[46] Sections 4.55, 4.56 and 4.57

substitute

**4.55 Method 1 — chemical or mineral production, other than carbide
production, using a carbon reductant or carbon anode**

Method 1 is:

Step 1 Work out the carbon content in fuel types (*i*) or carbonaceous input material delivered for the activity during the year measured in tonnes of carbon as follows:

$$\sum_i CCF_i \times Q_i$$

where:

\sum_i means sum the carbon content values obtained for all fuel types (*i*) or carbonaceous input material.

CCF_i is the carbon content factor mentioned in Schedule 3 measured in tonnes of carbon for each appropriate unit of fuel type (*i*) or carbonaceous input material consumed during the year from the operation of the activity.

Q_i is the quantity of fuel type (*i*) or carbonaceous input material delivered for the activity during the year measured in an appropriate unit and estimated in accordance with criterion A in Division 2.2.5, 2.3.6 and 2.4.6.

Step 2 Work out the carbon content in products (*p*) leaving the activity during the year measured in tonnes of carbon as follows:

$$\sum_p CCF_p \times A_p$$

where:

\sum_p means sum the carbon content values obtained for all product types (*p*).

CCF_p is the carbon content factor measured in tonnes of carbon for each tonne of product type (*p*) produced during the year.

A_p is the quantity of product types (*p*) produced leaving the activity during the year measured in tonnes.

Step 3 Work out the carbon content in waste by-product types (*r*) leaving the activity, other than as an emission of greenhouse gas, during the year, measured in tonnes of carbon, as follows:

$$\sum_r CCF_r \times Y_r$$

where:

\sum_r means sum the carbon content values obtained for all waste by-product types (*r*).

CCF_r is the carbon content factor measured in tonnes of carbon for each tonne of waste by-product types (*r*).

Y_r is the quantity of waste by-product types (*r*) leaving the activity during the year measured in tonnes.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr}$$

where:

Σ_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (*i*) for the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (*p*) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (*r*) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

Step 5 Work out the emissions of carbon dioxide released from the operation of the activity during the year measured in CO₂-e tonnes as follows:

- (a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount (**amount A**);
- (b) subtract amount A from the amount worked out under step 1 to work out a new amount (**amount B**);
- (c) multiply amount B by 3.664 to work out the amount of emissions released from the operation of the activity during a year.

4.56 Method 2 — chemical or mineral production, other than carbide production, using a carbon reductant or carbon anode

- (1) Subject to this section, method 2 is the same as method 1 under section 4.55.
- (2) In applying method 1 as method 2, step 4 in section 4.55 is to be omitted and the following step 4 substituted.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr} + \alpha \gamma RCCS_{co_2}$$

where:

Σ_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (i) for the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (p) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (r) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

α is the factor $\frac{1}{3.664}$ for converting the mass of carbon dioxide to a mass of carbon.

γ is the factor 1.861×10^{-3} for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to CO₂-e tonnes.

$RCCS_{CO_2}$ is carbon dioxide captured for permanent storage measured in cubic metres in accordance with Division 1.2.3.

- (3) If a fuel type (i) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (i) or carbonaceous input material must be carried out to determine its carbon content.
- (4) The sampling and analysis is to be carried out using the sampling and analysis provided for in Divisions 2.2.3, 2.3.3 and 2.4.3 that apply to the combustion of solid, liquid or gaseous fuels.

4.57 Method 3 — chemical or mineral production, other than carbide production, using a carbon reductant or carbon anode

- (1) Subject to this section, method 3 is the same as method 2 under section 4.56.
- (2) If a fuel type (i) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (i) or carbonaceous input material must be carried out to determine its carbon content.

-
- (3) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, liquid or gaseous fuels:

[47] Section 4.63

substitute

This Division applies to emissions from production of the following:

- (a) iron;
- (b) steel;
- (c) any metals produced using integrated metalworks.

[48] Sections 4.71, 4.72 and 4.73

substitute

4.71 Method 1 — ferroalloy metal

Method 1, based on a carbon mass balance approach, is:

- Step 1* Work out the carbon content in fuel types (*i*) or carbonaceous input material delivered for the activity during the year measured in tonnes of carbon as follows:

$$\sum_i CCF_i \times Q_i$$

where:

\sum_i means sum the carbon content values obtained for all fuel types (*i*) or carbonaceous input material.

CCF_i is the carbon content factor mentioned in Schedule 3 measured in tonnes of carbon for each appropriate unit of fuel type (*i*) or carbonaceous input material consumed during the year from the operation of the activity.

Q_i is the quantity of fuel type (*i*) or carbonaceous input material delivered for the activity during the year measured in an appropriate unit and estimated in accordance with criterion A in Division 2.2.5, 2.3.6 and 2.4.6.

- Step 2* Work out the carbon content in products (*p*) leaving the activity during the year measured in tonnes of carbon as follows:

$$\sum_p CCF_p \times A_p$$

where:

Σ_p means sum the carbon content values obtained for all product types (p).

CCF_p is the carbon content factor measured in tonnes of carbon for each tonne of product type (p) produced during the year.

A_p is the quantity of product types (p) produced leaving the activity during the year measured in tonnes.

Step 3 Work out the carbon content in waste by-product types (r) leaving the activity, other than as an emission of greenhouse gas, during the year, measured in tonnes of carbon, as follows:

$$\Sigma_r CCF_r \times Y_r$$

where:

Σ_r means sum the carbon content values obtained for all waste by-product types (r).

CCF_r is the carbon content factor measured in tonnes of carbon for each tonne of waste by-product types (r).

Y_r is the quantity of waste by-product types (r) leaving the activity during the year measured in tonnes.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\Sigma_i CCF_i \times \Delta S_{qi} + \Sigma_p CCF_p \times \Delta S_{ap} + \Sigma_r CCF_r \times \Delta S_{yr}$$

where:

Σ_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (i) for the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (p) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (r) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

Step 5 Work out the emissions of carbon dioxide released from the operation of the activity during the year measured in CO₂-e tonnes as follows:

- (a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount (**amount A**);
- (b) subtract amount A from the amount worked out under step 1 to work out a new amount (**amount B**);
- (c) multiply amount B by 3.664 to work out the amount of emissions released from the operation of the activity during a year.

4.72 Method 2 — ferroalloy metal

- (1) Subject to this section, method 2 is the same as method 1 under section 4.71.
- (2) In applying method 1 as method 2, step 4 in section 4.71 is to be omitted and the following step 4 substituted.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr} + \alpha \gamma RCCS_{CO_2}$$

where:

Σ_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (*i*) for the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (*p*) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (*r*) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

α is the factor $\frac{1}{3.664}$ for converting the mass of carbon dioxide to a mass of carbon.

γ is the factor 1.861×10^{-3} for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to CO₂-e tonnes.

$RCCS_{CO_2}$ is carbon dioxide captured for permanent storage measured in cubic metres in accordance with Division 1.2.3.

- (3) If a fuel type (*i*) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (*i*) or carbonaceous input material must be carried out to determine its carbon content.
- (4) The sampling and analysis is to be carried out using the sampling and analysis provided for in Divisions 2.2.3, 2.3.3 and 2.4.3 that apply to the combustion of solid, liquid or gaseous fuels.

4.73 Method 3 — ferroalloy metal

- (1) Subject to this section, method 3 is the same as method 2 under section 4.72.
- (2) If a fuel type (*i*) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (*i*) or carbonaceous input material must be carried out to determine its carbon content.
- (3) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, liquid or gaseous fuels.

[49] Sections 4.94, 4.95 and 4.96

substitute

4.94 Method 1 — other metals

Method 1, based on a carbon mass balance approach, is:

Step 1 Work out the carbon content in fuel types (*i*) or carbonaceous input material delivered for the activity during the year measured in tonnes of carbon as follows:

$$\sum_i CCF_i \times Q_i$$

where:

Σ_i means sum the carbon content values obtained for all fuel types (*i*) or carbonaceous input material.

CCF_i is the carbon content factor mentioned in Schedule 3 measured in tonnes of carbon for each appropriate unit of fuel type (*i*) or carbonaceous input material consumed during the year from the operation of the activity.

Q_i is the quantity of fuel type (*i*) or carbonaceous input material delivered for the activity during the year measured in an appropriate unit and estimated in accordance with criterion A in Division 2.2.5, 2.3.6 and 2.4.6.

Step 2 Work out the carbon content in products (*p*) leaving the activity during the year measured in tonnes of carbon as follows:

$$\Sigma_p CCF_p \times A_p$$

where:

Σ_p means sum the carbon content values obtained for all product types (*p*).

CCF_p is the carbon content factor measured in tonnes of carbon for each tonne of product type (*p*) produced during the year.

A_p is the quantity of product types (*p*) produced leaving the activity during the year measured in tonnes.

Step 3 Work out the carbon content in waste by-product types (*r*) leaving the activity, other than as an emission of greenhouse gas, during the year, measured in tonnes of carbon, as follows:

$$\Sigma_r CCF_r \times Y_r$$

where:

Σ_r means sum the carbon content values obtained for all waste by-product types (*r*).

CCF_r is the carbon content factor measured in tonnes of carbon for each tonne of waste by-product types (*r*).

Y_r is the quantity of waste by-product types (*r*) leaving the activity during the year measured in tonnes.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr}$$

where:

Σ_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (*i*) for the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (*p*) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (*r*) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

Step 5 Work out the emissions of carbon dioxide released from the operation of the activity during the year measured in CO₂-e tonnes as follows:

- (a) add the amounts worked out under steps 2, 3 and 4 to work out a new amount (**amount A**);
- (b) subtract amount A from the amount worked out under step 1 to work out a new amount (**amount B**);
- (c) multiply amount B by 3.664 to work out the amount of emissions released from the operation of the activity during a year.

4.95 Method 2 — other metals

- (1) Subject to this section, method 2 is the same as method 1 under section 4.94.
- (2) In applying method 1 as method 2, step 4 in section 4.94 is to be omitted and the following step 4 substituted.

Step 4 Work out the carbon content in the amount of the increase in stocks of inputs, products and waste by-products held within the boundary of the activity during the year in tonnes of carbon as follows:

$$\sum_i CCF_i \times \Delta S_{qi} + \sum_p CCF_p \times \Delta S_{ap} + \sum_r CCF_r \times \Delta S_{yr} + \alpha \gamma \text{RCCS}_{\text{CO}_2}$$

where:

Σ_i has the same meaning as in step 1.

CCF_i has the same meaning as in step 1.

ΔS_{qi} is the increase in stocks of fuel type (i) for the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_p has the same meaning as in step 2.

CCF_p has the same meaning as in step 2.

ΔS_{ap} is the increase in stocks of product types (p) produced by the activity and held within the boundary of the activity during the year measured in tonnes.

Σ_r has the same meaning as in step 3.

CCF_r has the same meaning as in step 3.

ΔS_{yr} is the increase in stocks of waste by-product types (r) produced from the operation of the activity and held within the boundary of the activity during the year measured in tonnes.

α is the factor $\frac{1}{3.664}$ for converting the mass of carbon dioxide to a mass of carbon.

γ is the factor 1.861×10^{-3} for converting a quantity of carbon dioxide from cubic metres at standard conditions of pressure and temperature to CO₂-e tonnes.

$RCCS_{CO_2}$ is carbon dioxide captured for permanent storage measured in cubic metres in accordance with Division 1.2.3.

- (3) If a fuel type (i) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (i) or carbonaceous input material must be carried out to determine its carbon content.
- (4) The sampling and analysis is to be carried out using the sampling and analysis provided for in Divisions 2.2.3, 2.3.3 and 2.4.3 that apply to the combustion of solid, liquid or gaseous fuels.

4.96 Method 3 — other metals

- (1) Subject to this section, method 3 is the same as method 2 under section 4.95.
- (2) If a fuel type (i) or carbonaceous input material delivered for the activity during the year accounts for more than 5% of total carbon input for the activity based on a calculation using the factors specified in Schedule 3, sampling and analysis of fuel type (i) or carbonaceous input material must be carried out to determine its carbon content.

-
- (3) The sampling and analysis is to be carried out using the methods set out in Divisions 2.2.4, 2.3.4 and 2.4.4 that apply to the combustion of solid, liquid or gaseous fuels.

[50] Subparagraph 5.4 (5) (b) (v)

omit

5.14).

insert

5.14);

[51] After subparagraph 5.4 (5) (b) (v)

insert

- (vi) the fraction of degradable organic carbon dissimilated (DOC_F) (see section 5.13A).

[52] Division 5.2.2, after section 5.14

insert

5.14A Fraction of degradable organic carbon dissimilated (DOC_F)

For subparagraph 5.4 (5) (b) (vi), the fraction of organic carbon dissimilated (DOC_F) for a waste mix type mentioned in column 2 of the table is the value mentioned in column 3.

Item	Waste mix type	DOC_F value
1	Food	0.84
2	Paper and cardboard	0.49
3	Garden and green	0.47
4	Wood	0.23
5	Textiles	0.5
6	Sludge	0.5
7	Nappies	0.5
8	Rubber and leather	0.5
9	Inert waste, including concrete, metal, plastic and glass	0.0

[53] **Subsection 5.17L (2), definition of DOC_F**

substitute

DOC_F is the fraction of degradable organic carbon dissimilated mentioned in column 3 of the table in section 5.14A for a waste mix type mentioned in column 2.

[54] **Subsection 5.25 (5), formula**

substitute

$$\text{CH}_{4\text{gen}} = \left[(\text{COD}_w - \text{COD}_{\text{sl}} - \text{COD}_{\text{eff}}) \times \text{MCF}_{\text{ww}} \times \text{EF}_{\text{wij}} \right] \\ + \left[(\text{COD}_{\text{sl}} - \text{COD}_{\text{trl}} - \text{COD}_{\text{tro}}) \times \text{MCF}_{\text{sl}} \times \text{EF}_{\text{slij}} \right]$$

[55] **Subsection 5.25 (5), definition of F_{wan} , including the note**

substitute

MCF_{ww} is the methane correction factor for wastewater treated at the plant during the year.

Note IPCC default methane correction factors for various types of treatment are:

- managed aerobic treatment: 0
- unmanaged aerobic treatment: 0.3
- anaerobic digester/reactor: 0.8
- shallow anaerobic lagoon (<2 metres): 0.2
- deep anaerobic lagoon (>2 metres): 0.8.

[56] **Subsection 5.25 (5), definition of F_{slan} , including the note**

substitute

MCF_{sl} is the methane correction factor for sludge treated at the plant during the year.

Note IPCC default methane correction factors for various types of treatment are:

- managed aerobic treatment: 0
- unmanaged aerobic treatment: 0.3
- anaerobic digester/reactor: 0.8
- shallow anaerobic lagoon (<2 metres): 0.2
- deep anaerobic lagoon (>2 metres): 0.8.

[57] **Subsection 5.25 (9), before definition of *primary sludge***

insert

methane correction factor is the fraction of COD anaerobically treated.

[58] Subsection 5.31 (1)

substitute

- (1) For paragraph 5.24 (1) (b), method 1 is:

$$E_j = (N_{in} - N_{trl} - N_{tro} - N_{outdisij}) \times EF_{secij} + N_{outdisij} \times EF_{disij}$$

where:

E_j is the emissions of nitrous oxide released from human sewage treated by the plant during the year measured in tonnes of nitrous oxide and expressed in CO₂-e tonnes.

N_{in} is the quantity of nitrogen entering the plant during the year measured in tonnes of nitrogen, worked out as follows:

$$N_{in} = \text{Protein} \times \text{Frac}_{pr} \times P$$

where:

Protein is the annual per capita protein intake in tonnes per person during the year of the population served by the plant.

Frac_{pr} is the fraction of nitrogen in protein.

P is the population serviced by the plant during the year.

N_{trl} is the quantity of nitrogen in sludge transferred out of the plant and removed to landfill during the year, measured in tonnes of nitrogen, and worked out as follows:

$$N_{trl} = F_{Ntrl} \times M_{trl}$$

where:

F_{Ntrl} is the fraction of nitrogen in the sludge transferred out of the plant.

M_{trl} is the dry mass of sludge transferred out of the plant to landfill during the year, measured in tonnes.

N_{tro} is the quantity of nitrogen in sludge transferred out of the plant and removed to a site other than landfill during the year, measured in tonnes of nitrogen, and worked out as follows:

$$N_{tro} = F_{Ntro} \times M_{tro}$$

where:

F_{Ntro} is the fraction of nitrogen in the sludge transferred out of the plant to a site other than landfill.

M_{tro} is the dry mass of sludge transferred out of the plant to a site other than landfill during the year, measured in tonnes.

$N_{outdisij}$ is the quantity of nitrogen leaving the plant differentiated by discharge environment.

EF_{secij} is the emission factor for wastewater treatment.

EF_{disij} is the emission factor for nitrogen discharge differentiated by the discharge environment.

[59] Subsections 5.31 (2), (3), (4) and (5)

substitute

- (2) For **Protein** in subsection (1), the annual per capita protein intake is 0.036 tonnes per year.
- (3) For **Frac_{Pr}** in subsection (1), the factor is 0.16 tonnes of nitrogen per tonne of protein.
- (4) For **F_{NtrI}** and **F_{Ntro}** in subsection (1), the factor is 0.05.
- (5) For **N_{outdisij}** in subsection (1), discharge environments mentioned in column 2 of the table are defined in column 3.

Item	Discharge environment	Definition
1	Enclosed waters	All waters other than open coastal waters or estuarine waters
2	Estuarine waters	All waters (other than open coastal waters) that are: <ul style="list-style-type: none"> (a) ordinarily subject to tidal influence; and (b) enclosed by a straight line drawn between the low water marks of consecutive headlands
3	Open coastal waters	All waters of the Pacific Ocean, Southern Ocean and Indian Ocean, except those waters enclosed by a straight line drawn between the low water marks of consecutive headlands

- (6) For EF_{secij} in subsection (1), the emission factor is 4.9 tonnes of nitrous oxide measured CO₂-e per tonne of nitrogen produced.
- (7) For EF_{disij} in subsection (1), the emission factor in column 3 of the table must be used for the discharge environment in column 2.

Item	Discharge environment	EF_{disij}
1	Enclosed waters	4.9
2	Estuarine waters	1.2

3	Open coastal waters (ocean and deep ocean)	0
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[60] Subsection 5.40 (1)

substitute

- (1) This Part applies to emissions released from the decomposition of organic material and flaring of sludge biogas, resulting from the handling of domestic or commercial wastewater through treatment in wastewater collection and treatment systems.

[61] Subsection 5.42 (5), formula

substitute

$$\text{CH}_{4\text{gen}} = \left[\left(\sum_{w,i} \text{COD}_{wi} - \text{COD}_{sl} - \text{COD}_{\text{eff}} \right) \times \text{MCF}_{\text{ww}} \times \text{EF}_{\text{wij}} \right] + \left[\left(\text{COD}_{sl} - \text{COD}_{\text{trl}} - \text{COD}_{\text{tro}} \right) \times \text{MCF}_{sl} \times \text{EF}_{\text{slj}} \right]$$

[62] Subsection 5.42 (5), after definition of COD_{sl}

insert

COD_{eff} is the quantity of COD effluent leaving the plant during the year measured in tonnes.

[63] Subsection 5.42 (5), definition of F_{wan} , including the note

substitute

MCF_{ww} is the methane correction factor for wastewater treated at the plant during the year.

Note IPCC default methane correction factors for various types of treatment are:

- managed aerobic treatment: 0
- unmanaged aerobic treatment: 0.3
- anaerobic digester/reactor: 0.8
- shallow anaerobic lagoon (<2 metres): 0.2
- deep anaerobic lagoon (>2 metres): 0.8.

[64] Subsection 5.42 (5), definition of F_{slan} , including the note

substitute

MCF_{sl} is the methane correction factor for sludge treated at the plant during the year.

Note IPCC default methane correction factors for various types of treatment are:

-
- managed aerobic treatment: 0
 - unmanaged aerobic treatment: 0.3
 - anaerobic digester/reactor: 0.8
 - shallow anaerobic lagoon (<2 metres): 0.2
 - deep anaerobic lagoon (>2 metres): 0.8.

[65] Subsection 5.42 (8)

omit each mention of

F_{wan}

insert

MCF_{ww}

[66] After subsection 5.42 (9)

insert

(10) In this section:

methane correction factor is the fraction of COD anaerobically treated.

[67] Subsection 5.52 (1), including the note

substitute

(1) Subject to section 1.18, one of the following methods must be used for estimating emissions of carbon dioxide released from the operation of a facility that is constituted by waste incineration (the *plant*):

- (a) method 1 under section 5.53;
- (b) method 4 under Part 1.3.

Note There is no method 2 or 3 for this section.

[68] Paragraph 8.7 (1) (a)

substitute

(a) the uncertainty level of the energy content factor is:

- (i) as specified in column 3 for the item; or
- (ii) as worked out in accordance with section 7 of the uncertainty protocol.

[69] Paragraph 8.8 (b), table, item 8

omit

vented or

[70] Subsection 8.9 (1), table, after item 6

insert

7	Aluminium (carbon anode consumption)	5	1
8	Aluminium production (perfluorinated carbon compound emissions)	6	1

[71] Schedule 1, Part 1, Note

omit

Black coal represents coal for uses other than electricity and coking.

[72] Schedule 1, Part 4, after item 63

insert

63A	Liquefied natural gas (light duty vehicles)	25.3	51.2	5.5	0.3
63B	Liquefied natural gas (heavy duty vehicles)	25.3	51.2	2.1	0.3

[73] Schedule 1, Part 6, table

substitute

Item	State, Territory or grid description	Emission factor kg CO ₂ -e/kWh
77	New South Wales and Australian Capital Territory	0.89
78	Victoria	1.21
79	Queensland	0.88
80	South Australia	0.68
81	South West Interconnected System in Western Australia	0.80
82	Tasmania	0.30
83	Northern Territory	0.67

[74] Further amendments

<i>Provision</i>	<i>omit each mention of</i>	<i>insert</i>
Subsection 1.10 (1), table, item 3J	reductant	reductant or carbon anode
Subsection 2.12 (3), table, item 4	Brown coal briquettes	Coal briquettes
Subsection 2.12 (3), table, item 5	Coke oven coke	Coal coke
Subsection 2.15 (1)	2.14 (b)	2.14 (2) (b)

<i>Provision</i>	<i>omit each mention of</i>	<i>insert</i>
Subsection 2.16 (1)	2.14 (c)	2.14 (2) (c)
Section 2.30	2.29 (1) (b)	2.29 (2) (b)
Subsection 2.31 (1)	2.29 (1) (c)	2.29 (2) (c)
Subsection 2.38 (1)	2.29 (1) (d)	2.29 (4) (b)
Subparagraph 2.66 (1) (b) (ii) and paragraph 2.67 (b)	D6866-08	D6866-10
Subparagraph 4.1 (2) (b) (v)	reductant	reductant or carbon anode
Subsection 5.25 (6)	F_{wan}	MCF_{ww}
Subsection 5.42 (9), table, item 2, column 3	tonne of paper produced	tonne of product
Subsection 8.6 (1), table, item 4	Brown coal briquettes	Coal briquettes
Subsection 8.6 (1), table, item 5	Coke oven coke	Coal coke
Schedule 1, Part 1, item 4	Brown coal briquettes	Coal briquettes
Schedule 1, Part 1, item 5	Coke oven coke	Coal coke
Schedule 2, item 4	Brown coal briquettes	Coal briquettes
Schedule 2, item 5	Coke oven coke	Coal coke
Schedule 3, Part 1, item 4	Brown coal briquettes	Coal briquettes
Schedule 3, Part 1, item 5	Coke oven coke	Coal coke

Note

1. All legislative instruments and compilations are registered on the Federal Register of Legislative Instruments kept under the *Legislative Instruments Act 2003*. See <http://www.frli.gov.au>.