National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2009 (No. 1)[1]

National Greenhouse and Energy Reporting Act 2007

I, PENELOPE YING YEN WONG, Minister for Climate Change and Water, make this Determination under subsection 10 (3) of the *National Greenhouse and Energy Reporting Act 2007*.

Dated 23 June 2009

PENELOPE YING YEN WONG
Minister for Climate Change and Water

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Contents

1   **Name of Determination**

This Determination is the *National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2009 (No. 1)*.

2   **Commencement**

This Determination commences on the day after it is registered.

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

Schedules 1, 2 and 3 amend the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*.

4   **Application**

The amendments made to the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* by Schedules 1, 2 and 3 apply in relation to the 2009–2010 financial year and to later financial years.

Schedule 1   General amendments

(section 3)

[1]   Section 1.8, after definition of *crude oil condensates*

insert

crude oil transport means the transportation of marketable crude oil to heavy oil upgraders and refineries by means that include the following:

(a)   pipelines;
(b)   marine tankers;
(c)   tank trucks;
(d)   rail cars.

[2]   Section 1.8, definition of *fuel*

substitute

fuel means a substance mentioned in column 2 of an item in Schedule 1 to the Regulations other than a substance mentioned in items 58 to 66.

[3]   Section 1.8, after definition of *gas bearing* strata

insert

gaseous fuel means a fuel mentioned in column 2 of items 17 to 30 of Schedule 1 to the Regulations.

[4]   Section 1.8, after definition of *incidental*

insert

independent expert, in relation to an operator of a landfill, means a person who:

(a)   is independent of the operator of the landfill; and
(b)   has relevant expertise in estimating or monitoring landfill surface gas.

[5]   Section 1.8, definition of *integrated steelworks*

substitute

integrated metalworks has the meaning given by subsection 4.64 (2).

[6]   Section 1.8, after definition of *ISO*

insert

liquid fuel means a fuel mentioned in column 2 of items 31 to 54 of Schedule 1 to the Regulations.

[7]   Section 1.8, after definition of *lower method*

insert

main electricity grid has the meaning given by subsection 7.2 (4).

marketable crude oil includes:

(a)   conventional crude oil; and

(b)   heavy crude oil; and

(c)   synthetic crude oil; and

(d)   bitumen.

[8]   Section 1.8, after definition of *Perfluorocarbon protocol*

insert

petroleum based greases has the meaning given by regulation 1.03 of the Regulations.

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

insert

raw sugar has the meaning given by Chapter 17 of Section IV of Schedule 3 to the *Customs Tariff Act 1995.*

[10]   Section 1.8, after definition of *sludge biogas*

insert

solid fuel means a fuel mentioned in column 2 of items 1 to 16 of Schedule 1 to the Regulations.

[11]   Section 1.8, definition of *source*

substitute

source has the meaning given by section 1.10.

[12]   **Section 1.8, after definition of *synthetic gas generating activities***

insert

technical guidelines means the document published by the Department and known as the *National Greenhouse Energy and Reporting (Measurement) Technical Guidelines 2009*.

uncertainty protocol means the publication known as the *GHG Uncertainty protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty* (September 2003) v1.0 issued by the World Resources Institute and the World Business Council for Sustainable Development.

[13]   **Subsection 1.9 (4)**

omit

   2008.

insert

   2009.

[14]   **Section 1.10**

substitute

1.10   Meaning of *source*

   (1)   A thing mentioned in column 3 of the following table is a ***source***.

Item	Category of source	Source of emissions
1	Fuel combustion	
1A		Fuel combustion
2	Fugitive emissions	
2A		Underground mines
2B		Open cut mines
2C		Decommissioned underground mines
2D		Oil or gas exploration
2E		Crude oil production
2F		Crude oil transport
2G		Crude oil refining
2H		Natural gas production or processing (other than emissions that are vented or flared)
2I		Natural gas transmission
2J		Natural gas distribution

Item	Category of source	Source of emissions
2K		Natural gas production or processing — flaring
2L		Natural gas production or processing — venting
2M		Carbon capture and storage
3	Industrial processes	
3A		Cement clinker production
3B		Lime production
3C		Use of carbonates for the production of a product other than cement clinker, lime or soda ash
3D		Soda ash use
3E		Soda ash production
3F		Ammonia production
3G		Nitric acid production
3H		Adipic acid production
3I		Carbide production
3J		Chemical or mineral production, other than carbide production, using a carbon reductant
3K		Iron, steel or other metal production using an integrated metalworks
3L		Ferroalloys production
3M		Aluminium production
3N		Other metals production
3O		Emissions of hydrofluorocarbons and sulphur hexafluoride gases
4	Waste	
4A		Solid waste disposal on land
4B		Wastewater handling (industrial)
4C		Wastewater handling (domestic or commercial)
4D		Waste incineration

(2) The extent of the source is as provided for in this Determination.

[15]   Paragraphs 1.28 (2) (a) to (d)

substitute

(a) volumetric flow rates estimated in accordance with section 1.31; or

(b) gas concentrations estimated in accordance with section 1.32; or

(c)   consumption of fuel or material input, estimated in accordance with Chapters 2 to 7; or

(d)   material produced, estimated in accordance with Chapters 2 to 7.

[16]   Subsection 2.3 (3)

omit

used.

insert

used for estimating emissions of carbon dioxide for the main fuel combusted from the operation of the facility.

[17]   Section 2.4, definition of EC_i

substitute

EC_i is the energy content factor of fuel type *(i)* estimated under section 6.5.

[18]   Subsection 2.5 (1), definition of EC_i

substitute

EC_i is the energy content factor of fuel type *(i)* estimated under section 6.5.

[19]   Subsection 2.5 (3), definition of C_{ar}

omit

fired

insert

combusted

[20]   Subsection 2.5 (4), definition of M_{ar}

omit

fired

insert

combusted

[21]   Subsection 2.5 (4), definition of A_{ar}

omit

fired

insert

combusted

[22]   Subsection 2.6 (1), definition of *EC_i*

substitute

EC_i is the energy content factor of fuel type *(i)* estimated under section 6.5.

[23]   Subsection 2.6 (3), definition of *C_{ar}*

omit

   fired

insert

   combusted

[24]   Subsection 2.6 (3), definition of *A_{ar}*

omit

   fired

insert

   combusted

[25]   Subsection 2.6 (4), definition of *M_{ar}*

omit

   fired

insert

   combusted

[26]   Subsection 2.6 (4), definition of *A_{ar}*

omit

   fired

insert

   combusted

[27]   Subsection 2.7 (4)

omit

   standard.

insert

   standard (if any).

[28]   Subsection 2.7 (4), note

substitute

Note An appropriate standard for most solid mineral fuels is AS 4264.4—1996 *Coal and coke — Sampling — Determination of precision and bias.*

[29]   Subsection 2.8 (3)

substitute

(3) Analysis must be undertaken by an accredited laboratory that meets the requirements equivalent to those in AS ISO/IEC 17025:2005. However, analysis may be undertaken by an on-line analyser if:

  (a) the analyser is calibrated in accordance with an appropriate standard; and

  (b) analysis undertaken to meet the standard is done by a laboratory that meets the requirements equivalent to those in AS ISO/IEC 17025:2005.

Note An appropriate standard is AS 1038.24—1998, *Coal and coke—Analysis and testing*, Part 24: *Guide to the evaluation of measurements made by on-line coal analysers.*

[30]   Section 2.9

after

   ignition

insert

   or a standard that is equivalent to those standards

[31]   Section 2.11, table, item 1, column 2

after

   AS 4323.2—1995

insert

   or in a standard that is equivalent to one of those standards

[32]   Section 2.14

omit

   For the purposes

insert

(1) For the purpose

[33] Section 2.14

omit everything after

estimated

insert

in accordance with this section.

[34] Section 2.14

insert

Acquisition involves commercial transaction

(2) If the acquisition of the solid fuel involves a commercial transaction, the quantity of fuel combusted must be estimated using one of the following criteria:

(a) the amount of the solid fuel delivered for the facility during the year as evidenced by invoices issued by the vendor of the fuel (*criterion A*);

(b) as provided in section 2.15 (*criterion AA*);

(c) as provided in section 2.16 (*criterion AAA*).

(3) If, during a year, criterion AA, or criterion AAA using paragraph 2.16 (2) (a), is used to estimate the quantity of fuel combusted, then, in each year following that year, only criterion AA, or criterion AAA using paragraph 2.16 (2) (a), (respectively) is to be used.

Acquisition does not involve commercial transaction

(4) If the acquisition of the solid fuel does not involve a commercial transaction, the quantity of fuel combusted must be estimated using one of the following criteria:

(a) as provided in paragraph 2.16 (2) (a) (*criterion AAA*);

(b) as provided in section 2.17 (*criterion BBB*).

[35] Section 2.17, except the note

omit everything after

if

insert

the equipment used to measure combustion of the fuel is not calibrated to a measurement requirement.

[36]   Subsection 2.19 (3)

omit

carbon dioxide

insert

emissions of carbon dioxide for the main fuel combusted from the operation of the facility

[37]   Subsection 2.20 (1), definition of *EC$_i$*

substitute

EC$_i$ is the energy content factor of fuel type *(i)* estimated under section 6.5.

[38]   Subsection 2.20 (2), except the note

omit

[39]   Subsection 2.21 (1), definition of *EC$_i$*

substitute

EC$_i$ is the energy content factor of fuel type *(i)* estimated under section 6.5.

[40]   Subsections 2.21 (2) and (3)

omit

[41]   Subsection 2.22 (4), definition of *EC$_i$*

substitute

EC$_i$ is the energy content factor of fuel type *(i)* obtained under section 2.21.

[42]   Subsection 2.22 (4), definition of *C$_i$*

omit

metre.

insert

metre as obtained under subsection 2.24 (4).

[43]   Subsection 2.29 (1)

omit everything after

estimated

insert

in accordance with this section.

[44]   Subsection 2.29 (2)

substitute

Acquisition involves commercial transaction

(2) If the acquisition of the gaseous fuel involves a commercial transaction, the quantity of fuel combusted must be estimated using one of the following criteria:

  (a) the amount of the gaseous fuel, expressed in cubic metres or gigajoules, delivered for the facility during the year as evidenced by invoices issued by the vendor of the fuel (*criterion A*);

  (b) as provided in section 2.30 (*criterion AA*);

  (c) as provided in section 2.31 (*criterion AAA*).

(3) If, during a year, criterion AA, or criterion AAA using paragraph 2.31 (3) (a), is used to estimate the quantity of fuel combusted, then, in each year following that year, only criterion AA, or criterion AAA using paragraph 2.31 (3) (a), (respectively) is to be used.

Acquisition does not involve commercial transaction

(4) If the acquisition of the gaseous fuel does not involve a commercial transaction, the quantity of fuel combusted must be estimated using one of the following criteria:

  (a) as provided in section 2.31 (*criterion AAA*);

  (b) as provided in section 2.38 (*criterion BBB*).

[45]   Subsection 2.32 (7)

substitute

(7) *Standard conditions* means, as measured on a dry gas basis:

  (a) air pressure of 101.325 kilopascals; and

  (b) air temperature of 15.0 degrees Celsius; and

  (c) air density of 1.225 kilograms per cubic metre.

[46]   Subsection 2.38 (1)

omit everything after

> if

insert

> the measuring equipment used to estimate consumption of the fuel does not meet the requirements of criterion AAA.

[47]   After section 2.39

insert

2.39A   Definition of *petroleum based oils* for Part 2.4

In this Part:

petroleum based oils means petroleum based oils (other than petroleum based oils used as fuel).

Subdivision 2.4.1.1   Liquid fuels — other than petroleum based oils and greases

[48]   Subsection 2.40 (1)

after

> fuel

insert

> , other than petroleum based oils and petroleum based greases,

[49]   After section 2.40

insert

Subdivision 2.4.1.2   Liquid fuels — petroleum based oils and greases

2.40A   Available methods

(1)   Subject to section 1.18, for estimating emissions of carbon dioxide released from the consumption, as lubricants, of petroleum based oils or petroleum based greases, consumed from the operation of a facility during a year, one of the following methods must be used:

   (a)   method 1 under section 2.48A;
   (b)   method 2 under section 2.48B;
   (c)   method 3 under section 2.48C.

(2) However, for incidental emissions, another method may be used that is consistent with the principles in section 1.13.

Note The consumption of petroleum based oils and greases, as lubricants, releases emissions of carbon dioxide. Emissions of methane and nitrous oxide are not estimated directly for this fuel type.

[50]   Division 2.4.2, heading

substitute

Division 2.4.2   Method 1 — emissions of carbon dioxide, methane and nitrous oxide from liquid fuels other than petroleum based oils or greases

[51]   Section 2.41

omit

For subparagraphs

insert

(1) For subparagraphs

[52]   Section 2.41, definition of *EC$_i$*

substitute

EC$_i$ is the energy content factor of fuel type *(i)* estimated under section 6.5.

[53]   Section 2.41, before the note

insert

(2) In this section:

stationary energy purposes means purposes for which fuel is combusted that do not involve transport energy purposes.

transport energy purposes includes purposes for which fuel is combusted that consist of:

(a) transport by vehicles registered for road use; and

(b) rail, marine navigation and air transport.

[54]   Division 2.4.3, heading

substitute

Division 2.4.3   Method 2 — emissions of carbon dioxide from liquid fuels other than petroleum based oils or greases

[55]   Subdivision 2.4.3.1, heading

substitute

Subdivision 2.4.3.1   Method 2 — emissions of carbon dioxide from liquid fuels other than petroleum based oils or greases

[56]   Subsection 2.42 (1), definition of EC_i

substitute

EC_i is the energy content factor of fuel type *(i)* estimated under section 6.5.

[57]   Subsection 2.43 (1), definition of C_a

omit

   fired

insert

   combusted

[58]   Subsection 2.43 (2), definition of EC_i

substitute

EC_i is the energy content factor of fuel type *(i)* estimated under subsection 2.42 (1).

[59]   Subsection 2.43 (2), definition of C_i

omit

   litres.

insert

   litres as obtained using a Standard set out in section 2.45.

[60]   Division 2.4.4, heading

substitute

Division 2.4.4   Method 3 — emissions of carbon dioxide from liquid fuels other than petroleum based oils or greases

[61]   Division 2.4.5, heading

substitute

Division 2.4.5   Method 2 — emissions of methane and nitrous oxide from liquid fuels other than petroleum based oils or greases

[62]   After Division 2.4.5

insert

Division 2.4.5A   Methods for estimating emissions of carbon dioxide from petroleum based oils or greases

2.48A   Method 1 — estimating emissions of carbon dioxide using an estimated oxidation factor

(1) For paragraph 2.40A (1) (a), method 1 for estimating emissions of carbon dioxide from the consumption of petroleum based oils or petroleum based greases using an estimated oxidation factor is:

$$E_{pogco2} = Q_{pog} \times EC_{pogco2} \times \frac{EF_{pogco2oxec}}{1\,000}$$

where:

E_{pogco2} is the emissions of carbon dioxide released from the consumption of petroleum based oils or petroleum based greases from the operation of the facility during the year measured in CO_2-e tonnes.

Q_{pog} is the quantity of petroleum based oils or petroleum based greases consumed from the operation of the facility for stationary energy purposes.

EC_{pogco2} is the energy content factor of petroleum based oils or petroleum based greases measured in gigajoules per kilolitre as mentioned in Part 3 of Schedule 1.

$EF_{pogco2oxec}$ has the meaning given in subsection (2).

(2) *EF$_{pogco2oxec}$* is:

    (a) the emission factor for carbon dioxide released from the operation of the facility during the year (which includes the effect of an oxidation factor) measured in kilograms CO_2-e per gigajoule of the petroleum based oils or petroleum based greases as mentioned in Part 3 of Schedule 1; or

    (b) to be estimated as follows:

$$EF_{pogco2oxec} = OF_{pog} \times EF_{pogco2ec}$$

where:

OF$_{pog}$ is the estimated oxidation factor for petroleum based oils or petroleum based greases.

EF$_{pogco2ec}$ is 69.9.

(3) For *OF$_{pog}$* in paragraph (2) (b), estimate as follows:

$$OF_{pog} = \frac{\left(C_{pog} - \text{Waste Oil}_{pog}\right)}{C_{pog}}$$

where:

C$_{pog}$ is the consumption of petroleum based oils or petroleum based greases estimated in accordance with Division 2.4.6.

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

2.48B Method 2 — estimating emissions of carbon dioxide using an estimated oxidation factor

For paragraph 2.40A (1) (b), method 2 is the same as method 1 but the emission factor *EF$_{pogco2ec}$* must be determined in accordance with Division 2.4.3.

2.48C Method 3 — estimating emissions of carbon dioxide using an estimated oxidation factor

For paragraph 2.40A (1) (c), method 3 is the same as method 1 but the emission factor *EF$_{pogco2ec}$* must be determined in accordance with Division 2.4.4.

[63]   Section 2.50

omit

For the purposes

insert

(1) For the purpose

[64]   Section 2.50

omit everything after

estimated

insert

in accordance with this section.

[65]   Section 2.50

insert

Acquisition involves commercial transaction

(2) If the acquisition of the liquid fuel involves a commercial transaction, the quantity of fuel combusted must be estimated using one of the following criteria:

(a) the amount of the liquid fuel delivered for the facility during the year as evidenced by invoices issued by the vendor of the fuel (*criterion A*);

(b) as provided in section 2.51 (*criterion AA*);

(c) as provided in section 2.52 (*criterion AAA*).

(3) If, during a year, criterion AA, or criterion AAA using paragraph 2.52 (2) (a), is used to estimate the quantity of fuel combusted then, in each year following that year, only criterion AA, or criterion AAA using paragraph 2.52 (2) (a), (respectively) may be used.

Acquisition does not involve commercial transaction

(4) If the acquisition of the liquid fuel does not involve a commercial transaction, the quantity of fuel combusted must be estimated using one of the following criteria:

(a) as provided in paragraph 2.52 (2) (a) (*criterion AAA*);

(b) as provided in section 2.53 (*criterion BBB*).

[66]   Section 2.53

omit everything after

if

insert

the equipment used to measure consumption of the fuel is not calibrated to a measurement requirement.

[67]   Subsection 2.58 (1)

omit

Part 4.3

insert

Part 4.4

[68]   Subparagraph 2.66 (1) (b) (ii)

omit

D 6866–06a

insert

D6866–08

[69]   Paragraph 2.67 (b)

omit

D6866—06a

insert

D6866—08

[70]   Subsection 3.4 (2), including the note

substitute

Methane from extraction of coal

(2)   Method 4 under section 3.6 must be used for estimating fugitive emissions of methane that result from the extraction of coal from the underground mine.

Note   There is no method 1, 2 or 3 for subsection (2).

[71]   Subsection 3.4 (3), except the note

substitute

Carbon dioxide from extraction of coal

(3)   Method 4 under section 3.6 must be used for estimating fugitive emissions of carbon dioxide that result from the extraction of coal from the underground mine.

[72]   Subsection 3.4 (8)

omit

[73]   Section 3.14, definition of *EF$_{ij}$*

omit

   tonnes

insert

   kilograms

[74]   Before section 3.41

insert in Division 3.3.1

3.40A   Definition of *natural gas* for Part 3.3

In this Part:

natural gas includes coal seam methane that is captured for combustion where the production of coal is not intended to occur.

[75]   Division 3.3.2, heading

substitute

Division 3.3.2   Oil or gas exploration

[76]   Section 3.44, heading

substitute

3.44   Method 1 — oil or gas exploration

[77]   Subsection 3.44 (1), definition of E_{ij}

omit
   oil and gas

insert
   oil or gas

[78]   Subsection 3.44 (1), definition of Q_i

omit
   oil and gas

insert
   oil or gas

[79]   Section 3.45, heading

substitute

3.45   Method 2 — oil or gas exploration

[80]   Section 3.46, heading

substitute

3.46   Method 3 — oil or gas exploration

[81]   Section 3.65, definition of E_i

after
   emissions

insert
   of carbon dioxide

[82]   Paragraph 3.81 (2) (c)

omit everything after
   material

insert
   using adjusted factors; or

[83]   After subsection 3.81 (2)

insert

(3)   In paragraph 3.81 (2) (c), a reference to ***factors adjusted*** is a reference to the factors in Table 5-3 of the publication entitled *Greenhouse Gas Emission Estimation Methodologies, Procedures and Guidelines for the Natural Gas Distribution Sector*, American Gas Association, April 2008, that are adjusted for variations in estimated gas composition in accordance with:

(a)   section 5.2.1 of that publication; and

(b)   Division 2.3.3.

[84]   Subsection 4.5 (2), definition F_{CaO}

omit

   oxide.

insert

   oxide derived from carbonate sources and produced from the operation of the facility.

[85]   Subsection 4.5 (2), definition of F_{MgO}

omit

   oxide.

insert

   oxide derived from carbonate sources and produced from the operation of the facility.

[86]   Section 4.11

omit

   ferrous

[87]   Division 4.2.3, heading

substitute

Division 4.2.3   Use of carbonates for production of a product other than cement clinker, lime or soda ash

[88]   Subsection 4.21 (1)

omit

calcination of carbonates

insert

calcination or any other use of carbonates that produces carbon dioxide

[89]   Section 4.22, heading

substitute

4.22   Method 1 — product other than cement clinker, lime or soda ash

[90]   Section 4.22

omit first mention of

calcined

insert

consumed

[91]   Section 4.22, definition of E_{ij}

omit

calcined

insert

consumed

[92]   Section 4.22, definition of Q_i

omit

the calcination process for

[93]   Section 4.22, definition of F_{cal}

omit

calcined

insert

consumed

[94]   Section 4.22, step 2

omit
  calcined

insert
  consumed

[95]   Section 4.23, heading

substitute

4.23   Method 3 — product other than cement clinker, lime or soda ash

[96]   Subsection 4.23 (1)

omit first mention of
  calcined

insert
  consumed

[97]   Subsection 4.23 (1), definition of E_{ij}

omit
  calcined

insert
  consumed

[98]   Subsection 4.23 (1), definition of Q_i

omit
  the calcination process for

[99]   Subsection 4.23 (1), definition of F_{cal}

omit
  calcined

insert
  consumed

[100]   Subsection 4.23 (1), step 2

omit

   calcined

insert

   consumed

[101]   Subsection 4.31 (1), definition of EC_i

substitute

EC_i is the energy content factor for fuel type *(i)* used as a feedstock or carbon reductant in the production of soda ash during the year, estimated under section 6.5.

[102]   Subsection 4.31 (2)

omit

[103]   Section 4.35

omit

   Quantities of

insert

(1) Quantities of

[104]   Section 4.35

omit everything after

   estimated

insert

   in accordance with this section.

[105]   Section 4.35

insert

Acquisition involves commercial transaction

(2) If the acquisition of the carbonates, or the dispatch of the products derived from carbonates, involves a commercial transaction, the quantity of the carbonates or products must be estimated using one of the following criteria:

   (a) the quantity of the carbonates acquired or products dispatched for the facility during the year as evidenced by invoices issued by the vendor of the carbonates or products (**criterion A**);

(b)   as provided in section 4.36 (*criterion AA*);

(c)   as provided in section 4.37 (*criterion AAA*).

(3)   If, during a year, criterion AA, or criterion AAA using paragraph 4.37 (2) (a), is used to estimate the quantity of carbonates acquired or products dispatched, then, in each year following that year, only criterion AA, or criterion AAA using paragraph 4.37 (2) (a), (respectively) is to be used.

Acquisition does not involve commercial transaction

(4)   If the acquisition of the carbonates or the dispatch of the products does not involve a commercial transaction, the quantity the carbonates or products must be estimated using one of the following criteria:

(a)   as provided in paragraph 4.37 (2) (a) (*criterion AAA*);

(b)   as provided in section 4.38 (*criterion BBB*).

[106]   Section 4.38

omit everything after

if

insert

the equipment used to measure consumption of the carbonates, or the products derived from carbonates, is not calibrated to a measurement requirement.

[107]   Subsection 4.42 (1), definition of EC_i

substitute

EC_i is the energy content factor for fuel type *(i)* used as a feedstock in the production of ammonia during the year, estimated under section 6.5.

[108]   Subsection 4.42 (1), definition of R

after

dioxide

insert

measured in tonnes

[109]   Subsection 4.42 (2)

omit

[110]   Division 4.3.5, heading

substitute

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

[111]   Subsection 4.54 (1)

omit

titanium dioxide:

insert

a chemical or mineral product:

[112]   Section 4.55, heading

substitute

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

[113]   Subsection 4.55 (1), definition of E_{ij}

substitute

E_{ij} is the emissions of carbon dioxide released from activities producing a chemical or mineral product, other than carbide production, using a carbon reductant, measured in CO_2-e tonnes.

[114]   Subsection 4.55 (1), definition of Q_i

omit

in the production of titanium dioxide from the production of titanium dioxide

insert

as a carbon reductant in the production of a chemical or mineral product

[115]   Subsection 4.55 (1), definition of EC_i

substitute

EC_i is the energy content factor for the fuel type *(i)* consumed as a carbon reductant in the production of a chemical or mineral product during the year, estimated under section 6.5.

[116]   Subsection 4.55 (1), definition of _EF_$_{ij}$

omit

titanium dioxide

insert

a chemical or mineral product

[117]   Subsection 4.55 (2)

omit

[118]   Section 4.56, heading

substitute

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

[119]   Paragraph 4.56 (a)

omit

production of titanium dioxide

insert

consumption of a carbon reductant in the production of a chemical or mineral product

[120]   Paragraph 4.56 (b)

omit

production of titanium dioxide

insert

consumption of a carbon reductant in the production of a chemical or mineral product

[121]   Paragraph 4.56 (c)

omit

production of titanium dioxide

insert

consumption of a carbon reductant in the production of a chemical or mineral product

[122]   Section 4.57, heading

substitute

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

[123]   Paragraph 4.57 (a)

omit

production of titanium dioxide

insert

consumption of a carbon reductant in the production of a chemical or mineral product

[124]   Paragraph 4.57 (b)

omit

production of titanium dioxide

insert

consumption of a carbon reductant in the production of a chemical or mineral product

[125]   Paragraph 4.57 (c)

omit

production of titanium dioxide

insert

consumption of a carbon reductant in the production of a chemical or mineral product

[126]   Division 4.3.6

omit

[127]   Division 4.4.1, heading

substitute

Division 4.4.1   Iron, steel or other metal production using an integrated metalworks

[128]   Subsections 4.64 (1) and (2)

substitute

(1)   This Division applies to determining emissions released during a year from the operation of a facility that is constituted by an activity that produces a metal, for example, an integrated metalworks.

(2)   An *integrated metalworks* means a metalworks that produces coke and a metal (for example, iron or steel).

[129]   Subsection 4.64 (3)

omit

iron and steel

insert

a metal

[130]   Subsection 4.64 (3)

omit

steelworks).

insert

metalworks).

[131]   Section 4.65, heading

substitute

4.65   Available methods for production of a metal from an integrated metalworks

[132]   Section 4.66, heading

substitute

4.66   Method 1 — production of a metal from an integrated metalworks

[133]   Section 4.67, heading

substitute

4.67   Method 2 — production of a metal from an integrated metalworks

[134]   Section 4.68, heading

substitute

4.68   Method 3 — production of a metal from an integrated metalworks

[135]   Division 4.4.2, heading

substitute

Division 4.4.2   Ferroalloys production

[136]   Subsection 4.71 (1), definition of *EC$_i$*

substitute

EC$_i$ is the energy content factor for the fuel type *(i)* consumed as a carbon reductant in the production of ferroalloy metal during the year, estimated under section 6.5.

[137]   Subsection 4.71 (2)

substitute

(2)   In subsection (1), for the factor ***EF$_{ij}$,*** the emission factor of each carbon reductant means the emission factor for that reductant as mentioned in Schedule 1.

[138]   Subsection 4.71 (3)

omit

[139]   Division 4.4.3, heading

substitute

Division 4.4.3   Aluminium production (carbon dioxide emissions)

[140]   Section 4.76, definition of *EF$_{ij}$*

omit

$$EF_{ij} = (NAC \times \left(\frac{100 - S_a - Ash_a}{100} \right) \times 3.664$$

insert

$$EF_{ij} = NAC \times \left(\frac{100 - S_a - Ash_a}{100} \right) \times 3.664$$

[141]   Section 4.76, definitions of *S$_a$* and *Ash$_a$*

substitute

S$_a$ is the mass of sulphur content in baked carbon anodes that is consumed in the production of aluminium during the year, expressed as a percentage of the mass of the baked carbon anodes, and is taken to be 2.

Ash$_a$ is the mass of ash content in baked carbon anodes that is consumed in the production of aluminium during the year, expressed as a percentage of the mass of the baked carbon anodes, and is taken to be 0.4.

[142]   After subsection 4.77 (2)

insert

(3)   However, in applying method 1 under section 4.76, the factor *S$_a$* may be the amount for the factor as mentioned in section 4.76.

(4)   If the amount for the factor *S$_a$* as mentioned in section 4.76 is not used, then *S$_a$* must be determined by sampling and analysing the fuel type *(i)* for sulphur content in accordance with subsection (2).

[143]   Section 4.80, formula

substitute

$$E_{ij} = \left(GA - Hw - BA - WT \right) \times 3.664 + \left(\frac{\sum Q_i}{BA} \times BA \times \frac{\left(100 - S_i - Ash_i \right)}{100} \right) \times 3.664$$

[144]   Section 4.80, definitions of *S$_i$* and *Ash$_i$*

substitute

S$_i$ is the mass of sulphur content in baked carbon anodes that is consumed in the production of aluminium during the year, expressed as a percentage of the mass of the baked carbon anodes, and is taken to be 2.

Ash$_i$ is the mass of ash content in baked carbon anodes that is consumed in the production of aluminium during the year, expressed as a percentage of the mass of the baked carbon anodes, and is taken to be 0.4.

Note   The default value for *H$_w$* is 0.5% of *GA*.

[145]   Division 4.4.4, heading

substitute

Division 4.4.4   Aluminium production (perfluoronated carbon compound emissions)

[146]   Paragraph 4.84 (1) (a)

omit

[147]   Subsection 4.84 (1), note

substitute

Note   There is no method 1 or 4 for this provision.

[148]   Paragraph 4.88 (1) (a)

omit

[149]   Subsection 4.88 (1), note

substitute

Note   There is no method 1 or 4 for this provision.

[150]   Division 4.4.5, heading

substitute

Division 4.4.5   Other metals production

[151]   Subsection 4.94 (1), formula

substitute

$$E_{ij} = \frac{Q_i \times EC_i \times EF_i}{1\,000}$$

[152]   Subsection 4.94 (1), definition of *EC_i*

substitute

EC_i is the energy content factor for the fuel type *(i)* consumed as a carbon reductant in the production of the metal during the year, estimated under section 6.5.

[153]   Subsection 4.94 (2)

substitute

(2) In subsection (1), for EF_i, the emission factor of each carbon reductant means the emission factor for that reductant as mentioned in Schedule 1.

[154]   Subsection 4.94 (3)

omit

[155]   Subsection 4.98 (1)

substitute

(1) Subject to section 1.18, for estimating emissions of hydrofluorocarbons or sulphur hexafluoride during a year from the operation of a facility that is constituted by synthetic gas generating activities, one of the following methods must be used:

(a) method 1 under section 4.102;

(b) method 2, for both hydrofluorocarbons and sulphur hexafluoride, under section 4.103;

(c) method 3:

(i) for hydrofluorocarbons under subsection 4.104 (1); and

(ii) for sulphur hexafluoride under subsection 4.104 (2).

[156]   Subsection 4.98 (2), note

substitute

Note   There is no method 4 for this Part.

[157]   Subsection 4.102 (2)

after

based on

insert

one of

[158]   After section 4.102

insert

4.103   Method 2

For paragraph 4.98 (1) (b), method 2 for estimating emissions of hydrofluorocarbons or sulphur hexafluoride during a year uses the tables in Appendix A of the publication entitled *ENA Industry Guideline for SF₆ Management*, Energy Networks Association, 2008.

4.104   Method 3

(1) For paragraph 4.98 (1) (c), method 3 for estimating emissions of hydrofluorocarbons uses the tables in Appendix B of the publication entitled *ENA Industry Guideline for SF₆ Management*, Energy Networks Association, 2008.

(2) For paragraph 4.98 (1) (c), method 3 for estimating emissions of sulphur hexafluoride during a year uses the Tier 3 method set out in section 6.3 of the publication mentioned in subsection (1).

[159]   Subsection 5.4 (1), definition of E_j

substitute

E_j is the emissions of methane released by the landfill during the year measured in CO_2-e tonnes.

[160]   Subsection 5.25 (5), definition of DC_w

omit

kilograms

insert

tonnes

[161]   Section 5.40

omit

(industrial).

insert

generated by the relevant industries.

[162]   Subsection 5.41 (1)

omit

(industrial)

insert

generated by the relevant industries

[163]   Subsection 5.42 (5), definition of $Prod_i$

substitute

$Prod_i$ has the meaning given by the table in subsection 5.42 (9).

[164]   Subsection 5.42 (5), after definition of F_{wan}

insert

Note   IPCC default fractions 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.

[165]   Subsection 5.42 (5), after definition of F_{slan}

insert

Note   IPCC default fractions 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.

[166]   Subsection 5.42 (8)

omit

   table:

insert

   table that is produced by the industry referred to by the ANZSIC code set
   out in column 2 for that item:

[167]   Subsection 5.42 (8), table

substitute

Item	Commodity and industry	$W_{gen,i}$ default value	$COD_{con,i}$ default value	F_{wan} default value
1	Dairy product (ANZSIC code 113)	5.7	0.9	0.4
2	Pulp, paper and paperboard (ANZSIC code 1510)	26.7	0.4	0.0
3	Meat and poultry (ANZSIC codes 1111 and 1112)	13.7	6.1	0.4
4	Organic chemicals (ANZSIC codes 18 and 19)	67.0	3.0	0.1
5	Raw sugar (ANZSIC code 1181)	0.4	3.8	0.3
6	Beer (ANZSIC code 1212)	5.3	6.0	0.5

Item	Commodity and industry	$W_{gen,i}$ default value	$COD_{con,i}$ default value	F_{wan} default value
7	Wine and other alcoholic beverage (ANZSIC code 1214)	23.0	1.5	0.0
8	Fruit and vegetable (ANZSIC code 1140)	20.0	0.2	1.0

[168]   After subsection 5.42 (8)

insert

(9) For subsection (5), ***Prod_i*** is the amount of any commodity set out in column 2 of an item in the following table, produced by the industry set out in column 2 for that item, and measured in accordance with the corresponding units of measurement set out in column 3 for that item.

Item	Commodity and industry	Units of measurement
1	Dairy product (ANZSIC code 113)	tonne of product
2	Pulp, paper and paperboard (ANZSIC code 1510)	tonne of paper produced
3	Meat and poultry (ANZSIC codes 1111 and 1112)	tonne of product (hot standard carcass weight or live weight basis)
4	Organic chemicals (ANZSIC codes 18 and 19)	tonne of product
5	Raw sugar (ANZSIC code 1181)	tonne of raw sugar produced (raw sugar equivalent)
6	Beer (ANZSIC code 1212)	tonne of product
7	Wine and other alcoholic beverage (ANZSIC code 1214)	tonne of product
8	Fruit and vegetable (ANZSIC code 1140)	tonne of product

[169]   Subsection 5.53 (1), definition of Q_i

omit

with Division 2.3.6.

insert

with:
(a) Division 2.2.5 for solid fuels; and
(b) Division 2.3.6 for gaseous fuels; and
(c) Division 2.4.6 for liquid fuels.

[170]   Subsection 5.53 (2)

omit

Schedule 1.

insert

Schedule 3.

[171]   Subsection 5.53 (3)

omit

0.25 for clinical waste may

insert

0.60 for clinical waste must

[172]   Subsection 5.53 (4)

omit

may

insert

for clinical waste must

[173]   Subsection 5.53 (5)

omit

may

insert

for clinical waste must

[174]   Paragraph 6.2 (1) (c)

omit

use in the operation

insert

use during the operation

[175]   Subparagraph 6.2 (1) (c) (ii)

omit

for use outside the network

insert

for use outside the operation of the facility

[176]   Paragraph 6.2 (1) (d)

after

facility

insert

other than for supply to an electricity transmission network or distribution network

[177]   Paragraph 6.2 (1) (e)

omit

supplied

insert

for use outside the operation of the facility for supply

[178]   Subsection 6.5 (1), definition of *EC$_i$*, except the note

substitute

EC$_i$, is the energy content factor of fuel type *(i)* and is:

(a)   for solid fuels, measured in gigajoules per tonne:

    (i)   as mentioned in Part 1 or Part 7 of Schedule 1; or

    (ii)   estimated by analysis of the fuel in accordance with the standard indicated for that energy content factor in Schedule 2 or an equivalent standard; or

(b)   for gaseous fuels, measured in gigajoules per cubic metre:

    (i)   as mentioned in Part 2 or Part 7 of Schedule 1; or

    (ii)   estimated by analysis under Subdivision 2.3.3.2; or

(c)   for gaseous fuels measured in gigajoules — equal to 1; or

(d)   for liquid fuels, measured in gigajoules per kilolitre:

    (i)   as mentioned in Part 3 or Part 7 of Schedule 1 for stationary energy purposes; or

    (ii)   as mentioned in Division 4.1 or Part 7 of Schedule 1 for transport energy purposes; or

    (iii)   estimated by analysis under Subdivision 2.4.3.2; or

(e)   for electricity measured in kilowatt hours — equal to 0.0036.

[179]   Subsection 6.5 (2)

substitute

(1A)   Despite subsection (1), if:

(a)   the kind of energy is one of the following:

    (i)   solar energy for electricity generation;

(ii) wind energy for electricity generation;

(iii) water energy for electricity generation;

(iv) geothermal energy for electricity generation; and

(b) the energy is consumed from the operation of the facility during the year; and

(c) from that consumption of energy, electricity is produced from the operation of the facility during the year;

then the energy content of the consumed energy is taken to be equal to the energy content of the electricity produced as estimated under Part 6.1.

(2) The amount of electricity consumed from the operation of the facility during the year must be:

(a) evidenced by invoices, contractual arrangements or industry metering records; or

(b) estimated in accordance with industry practice, if the evidence under paragraph (a) is unavailable.

(3) If, in relation to a year:

(a) a method used by a person requires the EC_i factor to be estimated under this section in relation to a particular fuel type (i); and

(b) a way of estimating is chosen for the fuel type as required by this section; and

(c) other methods used by the person for the same fuel type also require the EC_i factor to be estimated under this section;

then the chosen way of estimating, and the amount estimated, must also be applied in using the other methods for the fuel type in relation to that year.

[180]   Section 7.1

omit

electricity purchased from an electricity grid.

insert

purchased electricity.

[181]   Section 7.2, heading

substitute

7.2   Method 1 — purchase of electricity from main electricity grid in a State or Territory

[182]   Subsection 7.2 (1)

omit

an electricity grid

insert

the main electricity grid in a State or Territory

[183]   Subsection 7.2 (1), definition of *EF*

omit

State, Territory or electricity grid

insert

State or Territory

[184]   After subsection 7.2 (3)

insert

(4)   The *main electricity grid*, for a State or Territory, means:

(a)   for Western Australia — the Southwest Interconnected System; and

(b)   for each other State or Territory — the electricity grid that provides electricity to the largest percentage of the State's or Territory's population.

[185]   After section 7.2

insert

7.3   Method 1 — purchase of electricity from other sources

(1)   The following formula must be used for estimating scope 2 emissions released from electricity:

(a)   purchased from a grid other than the main electricity grid in a State or Territory; and

(b)   consumed from the operation of a facility during a year:

$$Y = Q \times \frac{EF}{1\,000}$$

where:

Y is the scope 2 emissions measured in CO_2-e tonnes during the year.

Q, subject to subsection (2), is the quantity of electricity purchased during the year and consumed from the operation of the facility, measured in kilowatt hours.

EF is the scope 2 emission factor, in kilograms of CO_2-e emissions per kilowatt hour, either:

(a)   provided by the supplier of the electricity; or

(b)   if that factor is not available, the emission factor for the Northern Territory as mentioned in Part 6 of Schedule 1.

   Note   There is no other method for this section.

(2)   For a facility the operation of which is constituted by an electricity transmission network or distribution network, *Q* is the quantity of electricity losses for that transmission network or distribution network during the year.

(3)   For *Q*, if the electricity purchased is measured in gigajoules, the quantity of kilowatt hours must be calculated by dividing the amount of gigajoules by 0.0036.

[186]   Chapter 8

substitute

Chapter 8   Assessment of uncertainty

Part 8.1   Preliminary

8.1   Outline of Chapter

(1)   This Chapter sets out rules about how uncertainty is to be assessed in working out estimates of scope 1 emissions for a source, a facility and a registered corporation.

(2)   Part 8.2 sets out general rules for assessing uncertainty of scope 1 emissions estimates.

(3)   Part 8.3 sets out how to assess the uncertainty of estimates of scope 1 emissions that have been estimated using method 1.

(4)   Part 8.4 sets out how to assess the uncertainty of estimates of scope 1 emissions that have been estimated using method 2, 3 or 4.

(5)   Emissions estimates for a source that are calculated using method 1, 2 or 3 are a function of a number of parameters. The uncertainty of the emissions estimates consists of the uncertainty associated with each of these parameters, which may include one or more of the following parameters:

(a)   energy content factor;

(b)   emissions factor;

(c)   activity data.

> *Note* In the case of fuel combustion, activity data refers to the quantity of fuel combusted. In the case of industrial processes, activity data refers to the quantity of product consumed or produced, as appropriate.

(6) Estimates of emissions need only provide for statistical uncertainty.

> *Note* The uncertainty protocol provides information about the assessment of uncertainty.

Part 8.2   General rules for assessing uncertainty

8.2   Range for emission estimates

Uncertainty must be assessed so that the range for an emissions estimate encompasses the actual amount of the emissions with 95% confidence.

8.3   Uncertainty to be assessed having regard to all facilities

(1) Uncertainty of estimates of scope 1 emissions for a registered corporation must be assessed in accordance with Part 8.3 or with the uncertainty protocol, as appropriate, having regard to all of the facilities under the operational control of the corporation.

(2) For corporations that have multiple sources of scope 1 emissions that are estimated using a variety of method 1, 2, 3 or 4, the uncertainty associated with the emissions must be aggregated in accordance with section 8 of the uncertainty protocol.

Part 8.3   How to assess uncertainty when using method 1

8.4   Purpose of Part

This Part sets out how to assess uncertainty of scope 1 emissions if method 1 is used to estimate:
(a) scope 1 emissions for a source; and
(b) scope 1 emissions for a facility; and
(c) scope 1 emissions for a registered corporation.

8.5   General rules about uncertainty estimates for emissions estimates using method 1

(1) The total uncertainty of scope 1 emissions estimates for a source in relation to a registered corporation is to be worked out by aggregating, as applicable, the uncertainty of the emissions factor, the energy content factor and the activity data for the source in accordance with the formula in section 8.11.

> *Note* This is generally referred to as the aggregated uncertainty for the source.

(2)   The total uncertainty of scope 1 emissions estimates for a facility is to be worked out by aggregating the total uncertainty for each source associated with the facility in accordance with the formula in section 8.12.

Note   This is generally referred to as the subtotal uncertainty for the facility.

(3)   The total uncertainty of scope 1 emissions estimates for a registered corporation is to be worked out by aggregating the total uncertainty for each facility under the operational control of the corporation in accordance with the formula in section 8.13.

Note   This is generally referred to as the total uncertainty for the corporation.

8.6   Assessment of uncertainty for estimates of carbon dioxide emissions from combustion of fuels

(1)   In assessing uncertainty of the estimates of carbon dioxide emissions estimated using method 1 for a source that involves the combustion of a fuel, the assessment must include the statistical uncertainty associated with the following parameters:

(a)   the energy content factor of the fuel (as specified in column 3 of the following table or as worked out in accordance with item 1, 2 or 3 of section 7 of the uncertainty protocol);

(b)   the carbon dioxide emission factor of the fuel (as specified in column 4 of the following table or as worked out in accordance with item 1, 2 or 3 of section 7 of the uncertainty protocol);

(c)   the quantity of fuel combusted (as worked out in accordance with subsection (2) or as worked out in accordance with item 1, 2 or 3 of section 7 of the uncertainty protocol).

Item	Fuel combusted	Energy content uncertainty level (%)	Carbon dioxide emission factor uncertainty level (%)
1	Black coal (other than used to produce coke)	28	5
2	Brown coal	50	12
3	Coking coal	12	7
4	Brown coal briquettes	40	11
5	Coke oven coke	9	11
6	Coal tar	50	17
7	Solid fossil fuels other than those mentioned in items 1 to 5	50	15
8	Industrial materials and tyres that are derived from fossil fuels, if recycled and combusted to produce heat or electricity	50	26

Item	Fuel combusted	Energy content uncertainty level (%)	Carbon dioxide emission factor uncertainty level (%)
9	Non-biomass municipal materials, if recycled and combusted to produce heat or electricity	50	26
10	Dry wood	50	NA
11	Green and air-dried wood	50	NA
12	Sulphite lyes	50	NA
13	Bagasse	50	NA
14	Biomass municipal and industrial materials, if recycled and combusted to produce heat or energy	50	NA
15	Charcoal	50	NA
16	Primary solid biomass fuels other than those mentioned in items 10 to 15	50	NA
17	Natural gas if distributed in a pipeline	4	4
18	Coal seam methane that is captured for combustion	4	4
19	Coal mine waste gas that is captured for combustion	4	4
20	Compressed natural gas that has reverted to standard conditions	4	4
21	Unprocessed natural gas	4	4
22	Ethane	4	10
23	Coke oven gas	50	19
24	Blast furnace gas	50	17
25	Town gas	4	4
26	Liquefied natural gas	7	4
27	Gaseous fossil fuels other than those mentioned in items 17 to 26	50	10
28	Landfill biogas that is captured for combustion (methane only)	50	NA
29	Sludge biogas that is captured for combustion (methane only)	50	NA
30	A biogas that is captured for combustion, other than those mentioned in items 28 and 29 (methane only)	50	NA
31	Petroleum based oils (other than petroleum based oils used as fuel)	11	2
32	Petroleum based greases	11	2
33	Crude oil including crude oil condensates	6	3

Item	Fuel combusted	Energy content uncertainty level (%)	Carbon dioxide emission factor uncertainty level (%)
34	Other natural gas liquids	7	9
35	Gasoline (other than for use as fuel in an aircraft)	3	4
36	Gasoline for use as fuel in an aircraft	3	4
37	Kerosene (other than for use as fuel in an aircraft)	3	2
38	Kerosene for use as fuel in an aircraft	3	3
39	Heating oil	5	2
40	Diesel oil	2	2
41	Fuel oil	2	2
42	Liquefied aromatic hydrocarbons	5	2
43	Solvents if mineral turpentine or white spirits	18	2
44	Liquid petroleum gas	8	3
45	Naphtha	5	5
46	Petroleum coke	19	17
47	Refinery gas and liquids	19	18
48	Refinery coke	19	17
49	Petroleum based products other than: (a) petroleum based oils and petroleum based greases mentioned in items 31 and 32; and (b) the petroleum based products mentioned in items 33 to 48	18	2
50	Biodiesel	50	NA
51	Ethanol for use as a fuel in an internal combustion engine	50	NA
52	Biofuels other than those mentioned in items 50 and 51	50	NA

(2) In the table in subsection (1), *NA* means not applicable.

(3) For a fuel type specified in column 2 of an item of the following table:

   (a) column 3 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion A in Chapter 2; and

   (b) column 4 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion AA in Chapter 2; and

   (c) column 5 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion AAA in Chapter 2; and

(d)   column 6 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion BBB in Chapter 2.

Note   Division 2.2.5 sets out the relevant criteria for solid fuels; Division 2.3.6 sets out the relevant criteria for gaseous fuels; and Division 2.4.6 sets out the relevant criteria for liquid fuels.

| | | Uncertainty levels for quantities of fuel combusted (%) | | | |
| | | Criterion used for estimation of quantity of fuel combusted | | | |
Item	Fuel type	A	AA	AAA	BBB
1	Solid fuel	2.5	2.5	1.5	7.5
2	Liquid fuel	1.5	1.5	1.5	7.5
3	Gaseous fuel	1.5	1.5	1.5	7.5

8.7   Assessment of uncertainty for estimates of methane and nitrous oxide emissions from combustion of fuels

(1)   In assessing uncertainty of the estimates of methane and nitrous oxide emissions estimated using method 1 for a source that involves the combustion of a fuel specified in column 2 of an item in the table in subsection 8.6 (1):

(a)   the uncertainty level of the energy content factor is as specified in column 3 for the item; and

(b)   the uncertainty level of the emissions factor is:

(i)   50%; or

(ii)   as worked out in accordance with section 7 of the uncertainty protocol.

(2)   In assessing uncertainty of the estimates of methane and nitrous oxide emissions estimated using method 1 for a source that involves the combustion of a fuel type specified in column 2 of an item in the table in subsection 8.6 (2):

(a)   column 3 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion A in Chapter 2; and

(b)   column 4 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion AA in Chapter 2; and

(c)   column 5 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion AAA in Chapter 2; and

(d)   column 6 for the item sets out the uncertainty level for the estimated quantities of fuel combusted using criterion BBB in Chapter 2.

Note   Division 2.2.5 sets out the relevant criteria for solid fuels; Division 2.3.6 sets out the relevant criteria for gaseous fuels; and Division 2.4.6 sets out the relevant criteria for liquid fuels.

8.8   Assessment of uncertainty for estimates of fugitive emissions

The aggregated uncertainty of the estimates of fugitive emissions estimated using method 1 for a source mentioned in column 2 of an item of the following table is:

(a)   as specified in column 3 for the item; or

(b)   as worked out in accordance with the uncertainty protocol.

Item	Sources	Aggregated uncertainty level (%)
1	Underground mines	50
2	Open cut mines	50
3	Decommissioned underground mines	50
4	Oil or gas exploration	50
5	Crude oil production	50
6	Crude oil transport	50
7	Crude oil refining	50
8	Natural gas production or processing (other than emissions that are vented or flared)	50
9	Natural gas transmission	50
10	Natural gas distribution	50
11	Natural gas production or processing — flaring	25

8.9   Assessment of uncertainty for estimates of emissions from industrial process sources

(1)   In assessing uncertainty of the estimates of emissions estimated using method 1 for the industrial process sources mentioned in column 2 of an item of the following table, the assessment must include the uncertainty level for the emission factor and activity data associated with the source:

(a)   as specified:

    (i)   for the emission factor — in column 3 for the item; and

    (ii)   for the activity data — in column 4 for the item; or

(b)   as worked out in accordance with the uncertainty protocol.

Item	Industrial process sources	Emission factor uncertainty level (%)	Activity data uncertainty (%)
1	Cement clinker production	6	1.5
2	Lime production	6	1.5
3	Soda ash use	5	1.5

Item	Industrial process sources	Emission factor uncertainty level (%)	Activity data uncertainty (%)
4	Use of carbonates for the production of a product other than cement clinker, lime or soda ash	5	1.5
5	Nitric acid production	40	1.5
6	Adipic acid production	10	1.5

(2) In assessing uncertainty of the estimates of emissions estimated using method 1 for industrial process sources mentioned in column 2 of an item of the following table, column 3 for the item sets out the aggregated uncertainty level associated with the source.

Item	Industrial process sources	Aggregated uncertainty level (%)
1	Emissions of hydrofluorocarbons and sulphur hexafluoride gas	30

(3) The uncertainty of estimates of emissions for industrial process sources that are not mentioned in subsections (1) or (2) must be assessed:

(a) if the industrial process source involves the combustion of fuel — in accordance with:

   (i) for carbon dioxide emissions — section 8.6; and

   (ii) for methane and nitrous oxide emissions — section 8.7; and

(b) if the industrial process source does not involve the combustion of fuel — in accordance with the uncertainty protocol.

8.10   Assessment of uncertainty for estimates of emissions from waste

In assessing uncertainty of the estimates of emissions from waste estimated using method 1 for the activities mentioned in column 2 of an item of the following table, the assessment must include the aggregated uncertainty level:

(a) as specified in column 3 for the item; or

(b) as worked out in accordance with the uncertainty protocol.

Item	Activities	Aggregated uncertainty level (%)
1	Solid waste disposal on land	35
2	Wastewater handling (industrial)	65
3	Wastewater handling (domestic or commercial)	40
4	Waste incineration	40

8.11   Assessing uncertainty of emissions estimates for a source by aggregating parameter uncertainties

(1)   For subsection 8.5 (1) and subject to subsections (2) and (3), in assessing uncertainty of the estimates of scope 1 emissions that are estimated using method 1 for a source, the aggregated uncertainty for emissions from the source is to be worked out in accordance with the following formula:

$$D = \pm\sqrt{A^2 + B^2 + C^2}$$

where:

D is the aggregated percentage uncertainty for the emission source.

A is the uncertainty associated with the emission factor for the source, expressed as a percentage.

B is the uncertainty associated with the energy content factor for the source, expressed as a percentage.

C is the uncertainty associated with the activity data for the source, expressed as a percentage.

(2)   If an assessment of uncertainty of emissions for the source does not require the use of emissions factor uncertainty, energy content factor uncertainty or activity data uncertainty, then A, B or C, as appropriate, in the formula in subsection (1) is taken to be zero.

Example

If energy content factor uncertainty is not required for an industrial process source, then B would be taken to be zero in the formula in subsection (1) when assessing the aggregated uncertainty for the source.

(3)   Subsection (1) does not apply to:

  (a)   estimates of fugitive emissions that are assessed by using the aggregated uncertainty level in column 3 of the table in section 8.8; or

  (b)   estimates of emissions from industrial processes that are assessed by using the aggregated uncertainty level in column 3 of the table in subsection 8.9 (2); or

  (c)   estimates of emissions from waste activities that are assessed by using the aggregated uncertainty level in column 3 of the table in section 8.10.

8.12   Assessing uncertainty of emissions estimates for a facility

For subsection 8.5 (2), in assessing uncertainty of estimates of scope 1 emissions for a facility that are estimated using method 1, the following formula must be used to aggregate the uncertainty of emissions estimates for all the sources associated with the facility:

$$U_{subtotal} = \frac{\pm\sqrt{(D_1 \times E_1)^2 + (D_2 \times E_2)^2 + ... + (D_n \times E_n)^2}}{E_1 + E_2 + ... + E_n}$$

where:

$U_{subtotal}$ is the percentage uncertainty for the subtotal of emissions for the facility.

$D_1 \rightarrow D_n$ are the percentage uncertainties associated with each emission estimate ($E_1 \rightarrow E_n$) for the facility.

$E_1 \rightarrow E_n$ are the estimated emissions from each facility under the operational control of the corporation measured in CO_2-e tonnes.

8.13   Assessing uncertainty of emissions estimates for a registered corporation

For subsection 8.5 (3), in assessing uncertainty of estimates of scope 1 emissions for a registered corporation that are estimated using method 1, the following formula must be used to aggregate the uncertainty of emissions estimates for all the facilities under the operational control of the corporation:

$$U_{total} = \frac{\pm\sqrt{(D_1 \times E_1)^2 + (D_2 \times E_2)^2 + ... + (D_n \times E_n)^2}}{E_1 + E_2 + ... + E_n}$$

where:

U_{total} is the percentage uncertainty for the total emissions for the registered corporation.

$D_1 \rightarrow D_n$ are the percentage uncertainties associated with each emission estimate ($E_1 \rightarrow E_n$) for the facility.

$E_1 \rightarrow E_n$ are the estimated emissions from each facility under the operational control of the corporation measured in CO_2-e tonnes.

Part 8.4   How to assess uncertainty levels when using method 2, 3 or 4

8.14   Purpose of Part

This Part sets out rules that apply in the assessment of uncertainty of scope 1 emissions from the operation of a facility that are estimated using method 2, 3 or 4.

8.15   Rules for assessment of uncertainty using method 2, 3 or 4

(1) Subject to this section, the uncertainty of scope 1 emissions estimates that are estimated using method 2, 3 or 4 must be assessed in accordance with the uncertainty protocol.

(2) Item 4 of Part 7 of the uncertainty protocol must not be used when emissions are estimated using method 2, 3 or 4.

(3) Estimates need only provide for statistical uncertainties in accordance with the uncertainty protocol.

[187]   Schedule 1, Part 1, item 9, column 2

omit

and industrial

[188]   Schedule 1, Part 1, note

omit

fired

insert

combusted

[189]   Schedule 1, Part 2, item 20, column 2

substitute

Compressed natural gas that has reverted to standard conditions

[190]   Schedule 1, Part 2, item 22, column 3

substitute

$62.9 \times 10\text{-}3$

[191]   Schedule 1, Part 6, table, column 3

substitute

Emission factor kg CO_2-e/kWh
0.89
1.22
0.89
0.77
0.84
0.23
0.68

[192]   Schedule 1, after Part 6

insert

Part 7   Fuel combustion — other fuels

Item	Fuel	Energy content factor (GJ/t unless otherwise indicated)
84	Uranium (U_3O_8)	470 000
85	Sulphur	4.9
86	Hydrogen	143

[193]   Schedule 3, Part 4, item 62, column 2

substitute

　　Styrene

[194]   Further amendments — incidental emissions

The following provisions are amended by omitting 'incidental emission source streams' and inserting 'incidental emissions':

- subsection 2.3 (2)
- subsection 2.19 (2)
- subsection 2.40 (3)
- subsection 2.60 (2)
- subsection 3.4 (7)
- subsection 3.19 (7)
- subsection 3.31 (5)
- subsection 3.43 (2)
- subsection 3.48 (2)
- subsection 3.51 (2)
- subsection 3.58 (2)
- subsection 3.62 (5)
- subsection 3.71 (2)
- subsection 3.75 (2)
- subsection 3.79 (2)
- subsection 3.83 (4)
- subsection 4.3 (2)
- subsection 4.12 (2)
- subsection 4.21 (2)
- subsection 4.28 (2)
- subsection 4.30 (2)
- subsection 4.41 (2)
- subsection 4.46 (2)
- subsection 4.50 (2)
- subsection 4.52 (2)
- subsection 4.54 (2)
- subsection 4.59 (2)
- subsection 4.65 (2)
- subsection 4.70 (2)
- subsection 4.75 (2)
- subsection 4.79 (2)
- subsection 4.84 (2)
- subsection 4.88 (2)
- subsection 4.93 (2)
- subsection 4.98 (2)
- subsection 5.3 (3)
- subsection 5.24 (3)
- subsection 5.41 (4).

Schedule 2   Amendments relating to waste
(section 3)

[1]   Chapter 5, heading

substitute

Chapter 5   Waste

[2]   Section 5.1

substitute

5.1   Outline of Chapter

This Chapter provides for emissions from the following sources:
(a)   solid waste disposal on land (see Part 5.2);
(b)   wastewater handling (domestic and commercial) (see Part 5.3);
(c)   wastewater handling (industrial) (see Part 5.4);
(d)   waste incineration (see Part 5.5).

[3]   Part 5.2, heading

substitute

Part 5.2   Solid waste disposal on land

[4]   Section 5.2

substitute

5.2   Application

(1) This Part applies to emissions released from:
    (a)   the decomposition of organic material from solid waste disposal in a landfill; and
    (b)   flaring of landfill gas.

(2) This Part does not apply to a landfill unless:
    (a)   the landfill was open for the acceptance of waste on and after 1 July 2008; and

(b)   during a year the landfill emits more than 10 000 tonnes of CO_2-e from solid waste disposal at the landfill.

[5]   Subsection 5.4 (1), definition of E_j

substitute

E_j is the emissions of methane released by the landfill during the year measured in CO_2-e tonnes.

[6]   Subsections 5.4 (2) and (3)

substitute

(2)   For subsection (1), if:

$$\frac{\gamma \, (Q_{cap} + Q_{flared} + Q_{tr})}{CH_{4gen}}$$

is less than or equal to 0.75, then:

$$CH_4^* = CH_{4gen}$$

where:

CH_{4gen} is the quantity of methane in landfill gas generation released from the landfill during the year estimated in accordance with subsection (5) and measured in CO_2-e tonnes.

(3)   For subsection (1), if:

$$\frac{\gamma \, (Q_{cap} + Q_{flared} + Q_{tr})}{CH_{4gen}}$$

is greater than 0.75, then:

$$CH_4^* = \gamma\left(Q_{cap} + Q_{flared} + Q_{tr}\right) \times \left(\frac{1}{0.75}\right)$$

where:

γ is the factor 6.784 x 10^{-4} x 21 converting cubic metres of methane at standard conditions to CO_2-e tonnes.

Q_{cap} is the quantity of methane in landfill gas captured for combustion from the landfill during the year and measured in cubic metres.

[7]   Subparagraphs 5.4 (5) (b) (i), (ii) and (iii)

omit

received at

insert

disposed of in

[8]   Section 5.5

omit

For subparagraph 5.4 (5) (b) (i),

insert

For the purpose of estimating the tonnage of waste disposed of in a landfill,

[9]   Subsection 5.9 (1)

omit

subsection 5.10 (2)

insert

subsection 5.10 (2) or (3)

[10]   Subsection 5.10 (1)

substitute

(1) For subsection 5.9 (1), the waste streams are as follows:
   (a)   municipal solid waste;
   (b)   commercial and industrial waste;
   (c)   construction and demolition waste.

[11]   Paragraphs 5.10 (2) (a) and (b)

substitute

   (a)   if the operator of the landfill is required, under a law of the State or Territory in which the landfill is located, to collect data on tonnage of waste received at the landfill according to the waste streams set out in column 2 of the following table — by using that data; or
   (b)   if paragraph (a) does not apply and there is no restriction on the waste streams that can be received at the landfill — by using the percentage values in columns 3 to 10 of an item in the following table for each waste stream in column 2 for the item for the State or Territory in which the landfill is located.

[12]   After subsection 5.10 (2), including the table

insert

(3) For subsection 5.9 (1), if the landfill is permitted to receive only:

(a) non-putrescible waste; or

(b) commercial and industrial waste and construction and demolition waste;

the waste may be assumed to consist of only commercial and industrial waste and construction and demolition waste.

(4) If subsection (3) applies, the tonnage of each waste stream must be estimated by using the percentage values in columns 3 to 10 of an item in the following table for each waste stream in column 2 for the item for the State or Territory in which the landfill is located.

Item	Waste stream	NSW (%)	VIC (%)	QLD (%)	WA (%)	SA (%)	TAS (%)	ACT (%)	NT (%)
1	Commercial and industrial waste	61	38	25	23	30	77	74	25
2	Construction and demolition waste	39	62	75	77	70	23	26	75

[13]   Paragraph 5.11 (1) (i)

substitute

(i) inert waste (including concrete, metal, plastic and glass).

[14]   Subsection 5.11 (2), including the table

substitute

(2) The percentage of the total waste tonnage for each waste mix type mentioned in column 2 of an item in the following table must be estimated by using:

(a) sampling techniques specified in:

(i) waste audit guidelines issued by the State or Territory in which the landfill is located; or

(ii) if no guidelines have been issued by the State or Territory in which the landfill is located — ASTM D 5231–92 (Reapproved 2008) or an equivalent Australian or international standard; or

(b) the tonnage of each waste mix type received at the landfill estimated in accordance with the criteria set out in section 5.5; or

(c) subject to subsection 5.11 (3), the default waste stream percentages in columns 3, 4 and 5 for the item for each waste mix type.

Item	Waste mix type	Municipal solid waste default (%)	Commercial and industrial waste default (%)	Construction and demolition waste default (%)
1	Food	35	21.5	0
2	Paper and paper board	13	15.5	3
3	Garden and park	16.5	4	2
4	Wood and wood waste	1	12.5	6
5	Textiles	1.5	4	0
6	Sludge	0	1.5	0
7	Nappies	4	0	0
8	Rubber and Leather	1	3.5	0
9	Inert waste (including concrete, metal, plastic and glass)	28	37.5	89

(3) If the licence or other authorisation authorising the operation of the landfill restricts the waste mix types (*restricted waste mix type*) that may be received at the landfill, the percentage of the total waste volume for each waste mix type mentioned in column 2 of an item of the following table (appearing immediately before the example) must be estimated:

(a) for a restricted waste mix type — by using the maximum permitted tonnage of the restricted waste mix type received at the landfill, as a percentage of the total waste received at the landfill; and

(b) for each waste mix type that is not a restricted waste mix type (*unrestricted waste mix type*) — by adjusting the default percentages in columns 3, 4 and 5 of the following table for the item for each unrestricted waste mix type, in accordance with the following formula:

$$W_{mtuadj} = W_{mtu} + \frac{(W_{mtr} - W_{mtrmax}) \times W_{mtu}}{\sum W_{mtu}}$$

where:

W_{mtuadj} is the adjusted percentage for each unrestricted waste mix type.

W_{mtu} is the default percentage for each unrestricted waste mix type in columns 3, 4 and 5 of the table appearing immediately before the example.

W_{mtr} is the default percentage for each restricted waste mix type in columns 3, 4 and 5 of the table appearing immediately before the example.

W_{mtrmax} is the maximum percentage for each restricted waste mix type.

$\sum$ means sum the results for each unrestricted waste mix type.

Item	Waste mix type	Municipal solid waste default (%)	Commercial and industrial waste default (%)	Construction and demolition waste default (%)
1	Food	35	21.5	0
2	Paper and paper board	13	15.5	3
3	Garden and park	16.5	4	2
4	Wood and wood waste	1	12.5	6
5	Textiles	1.5	4	0
6	Sludge	0	1.5	0
7	Nappies	4	0	0
8	Rubber and leather	1	3.5	0
9	Inert waste (including concrete, metal, plastic and glass)	28	37.5	89

Example

A landfill in a State is licensed only to receive commercial and industrial waste. A condition of the licence is that the landfill is restricted to receiving no more than 5% (W_{mtrmax} = 5%) food waste in its deliveries. The landfill operator accounts for this restriction by using the formula for each unrestricted waste type (W_{mtu}) in the table above. So, for paper and paper board waste, the calculation is:

$$W_{mtuadj} = 15.5 + \frac{(21.5 - 5) \times 15.5}{(15.5 + 4 + 12.5 + 4 + 1.5 + 3.5 + 37.5)}$$

$$= 18.8$$

The operator would continue to use the formula for each unrestricted waste mix type. For the restricted waste mix type the percentage used is W_{mtrmax}.

The following table sets out all the relevant variables and results for this example.

Item	Waste mix type	W_{mtu} (%)	W_{mtr} (%)	W_{mtrmax} (%)	Wmt_{adj} (%)
1	Food		21.5	5.0	
2	Paper and paper board	15.5			18.8
3	Garden and park	4.0			4.8
4	Wood and wood waste	12.5			15.1
5	Textiles	4.0			4.8
6	Sludge	1.5			1.8
7	Nappies	0.0			0.0
8	Rubber and leather	3.5			4.2
9	Inert waste (including concrete, metal, plastic and glass)	37.5			45.4

[15]   After section 5.11

insert

5.11A   Certain waste to be deducted from waste received at landfill when estimating waste disposed in landfill

When estimating the tonnage of waste by waste mix type disposed of in a landfill, the tonnage of the following waste is to be deducted from the estimates of waste received at the landfill:

(a)   waste that is taken from the landfill for recycling or biological treatment;

(b)   waste that is received at the landfill for recycling or biological treatment at the landfill site;

(c)   inert waste that is used at the landfill for construction purposes, daily cover purposes, intermediate cover purposes or final capping and cover purposes.

[16]   Section 5.13

omit

For

insert

(1)   For

[17]   Paragraph 5.13 (a)

omit

waste mix type) received at

insert

waste mix type and estimated in accordance with section 5.5) disposed of in

[18]   Subparagraph 5.13 (b) (ii)

substitute

(ii)   the estimated annual tonnage of solid waste disposed of in the landfill over the lifetime of the landfill until the start of the first reporting period for the landfill, worked out in accordance with subsection (2);

[19]   Section 5.13

insert

(2) For subparagraph (1) (b) (ii), the estimated annual tonnage of waste is to be worked out:

(a) by using the average annual tonnage of solid waste disposed of in the landfill for the years for which data is available; or

(b) by conducting a volumetric survey of the landfill in accordance with subsections (3) and (4).

(3) For paragraph (2) (b), the survey:

(a) must be a ground-based survey or an aerial survey; and

(b) must be conducted by a qualified surveyor.

(4) For the volumetric survey, the volume of waste is to be converted to mass by using one of the following volume-to-mass conversion factors:

(a) the landfill volume-to-mass conversion factors that were used during the most recent reporting year in order to comply with a landfill reporting requirement of the State or Territory in which the landfill is located;

(b) if the factors mentioned in paragraph (a) were not used during the most recent reporting year in order to comply with a landfill reporting requirement of the State or Territory in which the landfill is located — the volume-to-mass conversion factors specified in column 3 of an item in the following table for a waste stream specified in column 2 of the item.

Item	Waste stream	Volume-to-mass conversion factor
1	Municipal solid waste	1.1 tonnes per cubic metre
2	Commercial and industrial waste	1.1 tonnes per cubic metre
3	Construction and demolition waste	1.1 tonnes per cubic metre

[20]   Subsections 5.15 (2), (3) and (4)

substitute

(2) For subsection (1), CH_{4gen} must be calculated using the Tier 2 first order decay model (the ***Tier 2 FOD mode**l*) in Volume 5, Chapter 3, of the 2006 IPCC Guidelines.

(3) In calculating CH_{4gen} for the purposes of subsection (2), the methane generation constant (k) must be estimated by:

(a) selecting a representative zone at the landfill, in accordance with sections 5.16 to 5.17B, from which estimates of methane generation are to be obtained; and

(b) using the formula in section 5.17L.

[21]   Subdivision 5.2.3.2

substitute

Subdivision 5.2.3.2   Requirements for calculating the methane generation constant (*k*)

5.16   Procedures for selecting representative zone

For paragraph 5.13 (3) (a), the operator of the landfill must select a representative zone in accordance with sections 5.17 to 5.17B for the purpose of estimating the methane generated from the landfill.

5.17   Preparation of site plan

(1)   Before selecting a representative zone, the operator must prepare a site plan of the landfill.

(2)   The site plan must be consistent with the provisions of the technical guidelines relating to landfill site plans.

5.17A   Representative zone

(1)   After preparing a site plan, the operator of the landfill must select a representative zone at the landfill.

(2)   The representative zone must be a single, contiguous area within the landfill and the methane generated from the representative zone must be representative of the methane that is generated at the landfill.

(3)   The representative zone must cover an area of at least 1 hectare and must contain a sufficient number of operating gas collection wells to enable accurate and representative estimates to be obtained of the methane being generated from the zone.

(4)   The representative zone must contain only waste that has been undisturbed:

(a)   for at least 12 months before any methane generation is measured under section 5.17H; or

(b)   in the case of a representative zone that is on landfill that recirculates leachate or adds moisture through the waste to promote methane generation — for the period determined by an independent expert.

(5)   The following characteristics of the representative zone must be representative of the landfill:

(a)   the depth of waste in the zone;

(b)   moisture levels in the zone;

(c)   the composition of waste mix types in the zone.

5.17B   Independent verification

(1) After selecting a representative zone, the operator must arrange for an independent expert to certify, in writing, that:

   (a) the representative zone is representative of the landfill; and

   (b) the boundaries of the zone are appropriate for the purpose of obtaining accurate and representative estimates of the methane being generated from the zone.

(2) The independent expert must also prepare a written report for the zone.

(3) The report must include the details specified in the technical guidelines in relation to expert reports.

5.17C   Estimation of waste and degradable organic content in representative zone

The amount of waste, and the amount of degradable organic content in the waste, disposed of in the representative zone must be estimated in accordance with sections 5.5 to 5.12 for each reporting year that waste is disposed of in the representative zone.

5.17D   Estimation of gas collected at the representative zone

(1) The operator of the landfill must estimate the total amount, and concentration, of landfill gas (measured in tonnes of methane per year) collected by all of the landfill gas collection wells located within the representative zone.

(2) Measurement of the landfill gas flow rate for each well must be undertaken in accordance Division 2.3.6.

(3) The methane concentration of the landfill gas from the representative zone:

   (a) may be estimated from measurements of landfill gas obtained at each gas collection well located within the representative zone using industry standard landfill gas analysers that are calibrated to the manufacturer's specifications; or

   (b) may be assumed to be the methane concentration for the landfill as analysed under Subdivision 2.3.3.2.

(4) Data about the methane gas flow rates at each well in the representative zone must be:

   (a) the data used for operational purposes; and

   (b) recorded at least once a week for a period of at least 12 months.

(5) Fuel flow meter equipment and gas composition monitoring equipment used to measure and analyse the landfill gas must be calibrated in accordance with:

   (a) a standard specified in section 2.24 or an equivalent standard; or

(b) the calibration procedures specified, and at the frequencies recommended, by the manufacturer of the equipment.

(6) Fuel flow meter equipment and gas composition monitoring equipment must be recalibrated:

(a) at the frequency specified by the manufacturer of the equipment; or

(b) if the manufacturer does not specify a recalibration period for the equipment — annually.

(7) Estimates of gas flow must be converted from cubic metres to mass by using the formula in subsection 1.21 (1).

5.17E   Estimating methane generated but not collected in the representative zone

(1) The operator must estimate the amount of emissions of methane in the representative zone that is not collected by the collection wells in the zone.

(2) Estimates must be obtained by using the procedures in sections 5.17F to 5.17H.

5.17F   Walkover survey

(1) The operator of the landfill must arrange for an independent expert to conduct a walkover survey of the representative zone using a portable gas measurement device in order to:

(a) determine the near surface gas concentrations in the representative zone and in the immediately surrounding area; and

(b) identify locations within the representative zone:

(i) that have high methane emissions; and

(ii) where flux boxes need to be installed in accordance with section 5.17G in order to obtain the most accurate and representative measurements of methane emissions.

(2) The portable gas measurement device must be capable of detecting hydrocarbons at 10 parts per million.

Note The publication entitled *Guidance on monitoring landfill gas surface emissions* published by the Environment Agency of the United Kingdom in September 2004 contains guidance on how to conduct a walkover survey.

5.17G   Installation of flux boxes in representative zone

(1) After the walkover survey has been completed, the operator of the landfill must arrange for the installation of flux boxes in the representative zone.

(2) The number of flux boxes must be at least the minimum number identified during the walkover survey.

(3)   The flux boxes must be installed at the locations identified in the walkover survey.

(4)   If the operator installs the flux boxes, the operator must ensure that an independent expert certifies, in writing, that the boxes have been correctly installed and located.

(5)   If the operator arranges for some other person to install the flux boxes, the other person must be an independent expert.

(6)   The minimum number of flux boxes is to be determined by using the following formula:

$$6 + 0.15 \times \sqrt{Z}$$

where:

Z is the size of the representative zone in square metres.

Note   AS/NZS 4323.4—2009 and the publication entitled *Guidance on monitoring landfill gas surface emissions* published by the Environment Agency of the United Kingdom in September 2004 contain guidance on how to design and install flux boxes.

5.17H   Flux box measurements

(1)   After the flux boxes have been installed in the representative zone, the operator must:

(a)   measure the flow of methane in each flux box and arrange for an independent expert to certify, in writing, that the measurements are accurate and were correctly measured; or

(b)   arrange for an independent expert to take the measurements.

Note   AS/NZS 4323.4—2009 and the publication entitled *Guidance on monitoring landfill gas surface emissions* published by the Environment Agency of the United Kingdom in September 2004 contain guidance on how to take measurements in flux boxes.

(2)   The flow of methane from each flux box must be calculated in accordance with the following formula:

$$Q = \frac{V \times \left(\dfrac{dc}{dt}\right)}{A}$$

where:

Q is the flow density of the gas in the flux box, measured in milligrams of methane per square metre per second.

V is the volume of the flux box, measured in cubic metres.

$\dfrac{dc}{dt}$ is the rate of change of gas concentration in the flux boxes over time, measured in milligrams per cubic metre per second.

A is the area covered by the flux box, measured in square metres.

(3) The total gas flow rate for the representative zone is to be obtained by using geospatial interpolation techniques.

(4) The amount of methane generated, but not collected, in the representative zone must be estimated by dividing the total gas flow rate obtained in accordance with subsection (3) by:

$$1 - OF$$

where:

OF is the oxidation factor mentioned in subsection 5.15 (1).

(5) The measurement of methane obtained under the formula in subsection (2) must be converted from milligrams of methane per square metre per second to tonnes of methane for the surface area of the representative zone for the reporting year.

(6) Estimates of gas flow must be converted from cubic metres to mass by using the formula in subsection 1.21 (1).

5.17I When flux box measurements must be taken

(1) Flux box measurements must be taken during the normal operating times of the gas collection wells in the representative zone.

(2) The measurements must be completed within 3 days.

5.17J Restrictions on taking flux box measurements

(1) Flux box measurements must not be taken:
   (a) within 2 days of heavy rainfall over the representative area; or
   (b) if barometric pressure at the landfill site is rising or falling sharply; or
   (c) during frost conditions; or
   (d) in any other meteorological conditions that may significantly affect the accuracy of the measurements; or
   (e) in areas where there is standing water.

   Note AS/NZS 4323.4—2009 and the publication entitled *Guidance on monitoring landfill gas surface emissions* published by the Environment Agency of the United Kingdom in September 2004 contain guidance on good measurement practice.

(2) For subsection (1), there is **heavy rainfall** over a representative area on any day of a month if the amount of rain that is recorded:
   (a) at the landfill on that day; or
   (b) if rainfall is not recorded at the landfill — at the nearest Bureau of Meteorology weather station to the landfill on that day;

   exceeds the heavy rainfall benchmark, as calculated in accordance with the following formula:

$$HRF = 2 \times \frac{RF}{MRD}$$

where:

HRF is the heavy rainfall benchmark.

RF is the mean monthly rainfall for the month at the landfill or nearest Bureau of Meteorology weather station.

MRD is the mean rainfall days for the month at the nearest Bureau of Meteorology weather station as recorded in the publication published by the Bureau of Meteorology and known as *Climate statistics for Australian locations*.

5.17K   Frequency of measurement

The measurement of emissions by flux boxes must be undertaken on a quarterly basis for a period of at least 12 months.

5.17L   Calculating the methane generation constant (k)

(1) For paragraph 5.15 (3) (b), the formula for calculating the methane generation constant (**k**) is as follows:

$$Q_z - \left(k \times Q_{waste} \times L_0 \times e^{-k \times A_{avg}} \right) = 0$$

where:

Q_z is the gas flow rate for the representative zone, measured in tonnes per year, and is the sum of:

(a) the total amount of methane estimated under section 5.17D and collected at the collection wells in the representative zone; and

(b) the total amount of methane generated from the representative zone as obtained under subsection 5.17H (5).

k is the methane generation constant.

Q_{waste} is the total waste disposed of in the representative zone, measured in tonnes and estimated in accordance with section 5.17C.

L_o is the methane generation potential of the waste in the representative zone worked out under subsection (2) and measured in tonnes of methane per tonne of waste disposed.

e is the base number for natural logarithms (2.718).

A_{avg} is the average age of the waste in the representative zone, measured in years.

(2) For subsection (1), the methane generation potential (L_o) for waste disposed of in a representative zone of a landfill during a year is to be worked out using the following formula:

$$\left(\frac{C_a}{Q_{waste}} \right) \times DOC_F \times MCF \times F \times 1.336$$

where:

C_a is the is the quantity of degradable organic carbon in waste disposed of in the representative zone, measured in tonnes and estimated in accordance with section 5.17C.

Q_{waste} is the total waste disposed in the representative zone, measured in tonnes and estimated under section 5.17C.

DOC_F is the fraction of degradable organic carbon dissimilated and is equal to 0.5.

MCF is the methane correction factor for aerobic decomposition and is equal to 1.

F is the fraction by volume of methane in landfill gas as estimated in accordance with section 5.17D and collected from the representative zone.

1.336 is the factor to convert carbon to methane.

(3) For the formula in subsection (1), it is sufficient if the left-hand side of the formula is within ±0.001 of zero.

[22]   Subsection 5.18 (2)

substitute

(2) In applying method 2 under section 5.15:

    (a) paragraph 5.15 (3) (a) does not apply; and

    (b) the gas flow rate must be estimated from sampling undertaken during the year in accordance with USEPA Method 2E—*Determination of landfill gas production flow rate,* as set out in Appendix A–1 of Title 40, Part 60 of the Code of Federal Regulations, Unites States of America, or an equivalent Australian or international standard.

[23]   Subsections 5.25 (2) and (3)

substitute

(2) For subsection (1), if:

$$\frac{\gamma \, (Q_{cap} + Q_{flared} + Q_{tr})}{CH_{4gen}}$$

is less than or equal to 0.75, then:

$$CH_4^* = CH_{4gen}$$

where:

CH_{4gen} is the quantity of methane in sludge biogas produced by the plant during the year, estimated in accordance with subsection (5) and measured in CO_2-e tonnes.

(3) For subsection (1), if:

$$\frac{\gamma\,(Q_{cap} + Q_{flared} + Q_{tr})}{CH_{4gen}}$$

is greater than 0.75, then:

$$CH_4^* = \gamma\left(Q_{cap} + Q_{flared} + Q_{tr}\right) \times \left(\frac{1}{0.75}\right)$$

where:

γ is the factor $6.784 \times 10^{-4} \times 21$ converting cubic metres of methane at standard conditions to CO_2-e tonnes.

Q_{cap} is the quantity of methane in sludge biogas captured for combustion by the plant, measured in cubic metres in accordance with Division 2.3.6.

[24]   After subsection 5.26 (2)

insert

(2A) In applying method 1 under section 5.25, the reference to 0.75 in subsections 5.25 (2) and (3) is to read as a reference to 1.00.

[25]   Subsections 5.42 (2) and (3)

substitute

(2) For subsection (1), if:

$$\frac{\gamma\,(Q_{cap} + Q_{flared} + Q_{tr})}{CH_{4gen}}$$

is less than or equal to 0.75, then:

$$CH_4^* = CH_{4gen}$$

where:

CH_{4gen} is the quantity of methane in sludge biogas produced by the plant during the year, estimated in accordance with subsection (5) and measured in CO_2-e tonnes.

(3) For subsection (1), if:

$$\frac{\gamma\,(Q_{cap} + Q_{flared} + Q_{tr})}{CH_{4gen}}$$

is greater than 0.75, then:

$$CH_4^* = \gamma\left(Q_{cap} + Q_{flared} + Q_{tr}\right) \times \left(\frac{1}{0.75}\right)$$

where:

γ is the factor 6.784 x 10^{-4} x 21 converting cubic metres of methane at standard conditions to CO_2-e tonnes.

Q_{cap} is the quantity of methane in sludge biogas captured for combustion for the operation of the plant measured in cubic metres.

[26]   After subsection 5.43 (2)

insert

(2A) In applying method 1 under section 5.42, the reference to 0.75 in subsections 5.42 (2) and (3) is to read as a reference to 1.00.

Schedule 3   Amendments relating to UNFCCC categories
(section 3)

[1]   Subsection 1.3 (4)

substitute

(4) The categories of scope 1 emissions are:
   (a) fuel combustion, which deals with emissions released from fuel combustion (see Chapter 2); and
   (b) fugitive emissions from fuels, which deals with emissions mainly released from the extraction, production, processing and distribution of fossil fuels (see Chapter 3); and
   (c) industrial processes emissions, which deals with emissions released from the consumption of carbonates and the use of fuels as feedstock or as carbon reductants, and the emission of synthetic gases in particular cases (see Chapter 4); and
   (d) waste emissions, which deals with emissions mainly released from the decomposition of organic material in landfill or wastewater handling facilities (see Chapter 5).

[2]   Section 1.8, definition of *UNFCCC* or *United Nations Framework Convention on Climate Change*

omit

[3]   Chapter 2, heading

substitute

Chapter 2   Fuel combustion

[4]   Section 2.1

substitute

2.1   Outline of Chapter

This Chapter provides for the following matters:
   (a) emissions released from the following sources:
       (i) the combustion of solid fuels (see Part 2.2);
       (ii) the combustion of gaseous fuels (Part 2.3);

(iii)   the combustion of liquid fuels (Part 2.4);

(iv)   fuel use by certain industries (Part 2.5);

(b)   the measurement of fuels in blended fuels (Part 2.6);

(c)   the estimation of energy for certain purposes (Part 2.7).

[5]   Section 2.2

omit

UNFCCC Category 1.A —

[6]   Section 2.18

omit

UNFCCC category 1.A —

[7]   Section 2.39

omit

UNFCCC category 1.A —

[8]   Section 2.54

substitute

2.54   Application

This Part applies to emissions from petroleum refining, solid fuel transformation (coke ovens) and petrochemical production.

[9]   Section 2.55

omit

UNFCCC Category 1A.1.b —

[10]   Section 2.57

omit

UNFCCC Category 1A.1.c —

[11]   Subsection 2.58 (2)

substitute

(2)   These emissions are taken to be emissions from fuel combustion.

[12]   Section 2.59

omit

Source UNFCCC Category 1A.2.c —

[13]   Chapter 3, heading

substitute

Chapter 3   Fugitive emissions from fuels

[14]   Section 3.1, including the note

substitute

3.1   Outline of Chapter

This Chapter provides for fugitive emissions from fuels from the following:
(a)   coal mining (see Part 3.2);
(b)   oil and natural gas (see Part 3.3).

[15]   Part 3.2, heading

substitute

Part 3.2   Coal mining — fugitive emissions

[16]   Section 3.2

substitute

3.2   Outline of Part

This Part provides for fugitive emissions from coal mining, as follows:
(a)   underground mining activities (see Division 3.2.2);
(b)   open cut mining activities (see Division 3.2.3);
(c)   decommissioned underground mines (see Division 3.2.4).

[17]   Section 3.3

omit

UNFCCC Category 1.B.1.a.i —

[18]   Section 3.18

omit

   UNFCCC Category 1.B.1.a.ii —

[19]   Section 3.30

omit

   UNFCCC Category 1.B.1.c —

[20]   Section 3.41

substitute

3.41   Outline of Part

This Part provides for fugitive emissions from the following:
   (a)   oil or gas exploration (see Division 3.3.2);
   (b)   crude oil production (see Division 3.3.3);
   (c)   crude oil transport (see Division 3.3.4);
   (d)   crude oil refining (see Division 3.3.5);
   (e)   natural gas production or processing, other than emissions that are vented or flared (see Division 3.3.6);
   (f)   natural gas transmission (see Division 3.3.7);
   (g)   natural gas distribution (see Division 3.3.8);
   (h)   natural gas production or processing (emissions that are vented or flared) (see Division 3.3.9).

[21]   Section 3.42

substitute

3.42   Application

This Division applies to fugitive emissions from flaring from oil or gas exploration activities, including emissions from:
   (a)   oil well drilling; and
   (b)   gas well drilling; and
   (c)   drill stem testing; and
   (d)   well completions.

[22]   **Section 3.47**

substitute

3.47   Application

(1) This Division applies to fugitive emissions from crude oil production activities, including emissions from flaring, from:

    (a)   an oil wellhead; and

    (b)   well servicing; and

    (c)   oil sands mining; and

    (d)   shale oil mining; and

    (e)   the transportation of untreated production to treating or extraction plants; and

    (f)   activities at extraction plants or heavy oil upgrading plants, and gas reinjection systems and produced water disposal systems associated with the those plants; and

    (g)   activities at upgrading plants and associated gas reinjection systems and produced water disposal systems.

(2) For paragraph (1) (e), *untreated production* includes:

    (a)   well effluent; and

    (b)   emulsion; and

    (c)   oil shale; and

    (d)   oil sands.

[23]   **Section 3.57**

substitute

3.57   Application

This Division applies to fugitive emissions from crude oil transport activities, other than emissions that are flared.

[24]   **Section 3.61**

substitute

3.61   Application

This Division applies to fugitive emissions from crude oil refining activities, including emissions from flaring at petroleum refineries.

[25]   Division 3.3.6, heading

substitute

Division 3.3.6   Natural gas production or processing, other than emissions that are vented or flared

[26]   Section 3.70

substitute

3.70   Application

This Division applies to fugitive emissions from natural gas production or processing activities, other than emissions that are vented or flared, including emissions from:

(a)   a gas wellhead through to the inlet of gas processing plants; and

(b)   a gas wellhead through to the tie-in points on gas transmission systems, if processing of natural gas is not required; and

(c)   gas processing plants; and

(d)   well servicing; and

(e)   gas gathering; and

(f)   gas processing and associated waste water disposal and acid gas disposal activities.

[27]   Section 3.74

substitute

3.74   Application

This Division applies to fugitive emissions from natural gas transmission activities.

[28]   Section 3.78

substitute

3.78   Application

This Division applies to fugitive emissions from natural gas distribution activities.

[29]   Division 3.3.9, heading

substitute

Division 3.3.9   Natural gas production or processing (emissions that are vented or flared)

[30]   Section 3.82

substitute

3.82   Application

This Division applies to fugitive emissions from venting or flaring from natural gas production or processing activities, including emissions from:

(a)   the venting of natural gas; and

(b)   the venting of waste gas and vapour streams at facilities that are constituted by natural gas production or processing; and

(c)   the flaring of natural gas, waste gas and waste vapour streams at those facilities.

[31]   Chapter 4, heading

substitute

Chapter 4   Industrial processes emissions

[32]   Subsections 4.1 (1) and (2)

substitute

(1)   This Chapter provides for emissions from:

(a)   the consumption of carbonates; or

(b)   the use of fuels as:

(i)   feedstock; or

(ii)   carbon reductants;

from sources that are industrial processes mentioned in subsection (2).

(2)   For subsection (1), the industrial processes are as follows:

(a)   in Part 4.2:

(i)   producing cement clinker (see Division 4.2.1);

(ii)   producing lime (see Division 4.2.2);

(iii)   using carbonate for the production of a product other than cement clinker, lime or soda ash (see Division 4.2.3);

(iv)   using and producing soda ash (see Division 4.2.4);

(b)   in Part 4.3 — the production of:

(i)   ammonia (see Division 4.3.1);

(ii)   nitric acid (see Division 4.3.2);

(iii)   adipic acid (see Division 4.3.3);

(iv)   carbide (see Division 4.3.4);

(v)   a chemical or mineral product other than carbide using a carbon reductant (see Division 4.3.5);

(c)   in Part 4.4 — the production of:

(i)   iron and steel (see Division 4.4.1);

(ii)   ferroalloy metals (see Division 4.4.2);

(iii)   aluminium (see Divisions 4.4.3 and 4.4.4);

(iv)   other metals (see Division 4.4.5).

[33]   After subsection 4.1 (3)

insert

(4)   This Chapter does not apply to emissions from fuel combusted for energy production.

[34]   Section 4.2

omit

UNFCCC Category 2.A.1 —

[35]   Section 4.11

omit

UNFCCC Category 2.A.2 —

[36]   Section 4.20, including the note

substitute

4.20   Application

This Division applies to emissions from the use of carbonate for the production of a product other than cement clinker, lime or soda ash:

(a)   involving the consumption or any other use of carbonates; and

(b)   generating emissions of carbon dioxide.

Note Examples of activities involving the consumption of carbonates include the following:

* metallurgy
* glass manufacture, including fibreglass and mineral wools
* magnesia production
* agriculture
* construction
* environment pollution control
* use as a flux or slagging agent
* in-house production of lime in the metals industry.

[37]   Section 4.26

omit

UNFCCC Category 2.A.4 —

[38]   Section 4.40

omit

UNFCCC Category 2.B.1 —

[39]   Section 4.45

omit

UNFCCC Category 2.B.2 —

[40]   Section 4.49

omit

UNFCCC Category 2.B.3 —

[41]   Section 4.51

omit

UNFCCC Category 2.B.4 —

[42]   Section 4.53

substitute

4.53   Application

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

(a)   titanium dioxide;

(b)   synthetic rutile;

(c)   glass.

[43]   Section 4.63, including the note

substitute

4.63   Application

This Division applies to emissions from integrated metalworks.

[44]   Subsection 4.64 (4), including the note

substitute

(4)   However, the amount of emissions to be determined for this source is only the amount of emissions from the use of coke as a carbon reductant in the metal production estimated in accordance with section 2.69.

Note   The amount of emissions to be determined for other activities is as provided for in other provisions of this Determination.

[45]   Section 4.69

omit

UNFCCC Category 2.C.2 —

[46]   Section 4.74

omit

UNFCCC Category 2.C.3 —

[47]   Section 4.83

omit

UNFCCC Category 2.C.3 —

[48]   Section 4.92

substitute

4.92   Application

This Division applies to emissions from activities producing metals other than aluminium, ferroalloys, iron, steel or any other metal produced using an integrated metalworks.

[49]   Subsection 4.93 (1)

omit

other than aluminium, ferroalloys and iron and steel

insert

to which this Division applies

[50]   Section 4.97

omit

UNFCCC Category 2.F —

[51]   Part 5.3, heading

substitute

Part 5.3   Wastewater handling (domestic and commercial)

[52]   Section 5.23

substitute

5.23   Application

(1) This Part applies to emissions released from the decomposition of organic material, nitrification and denitrification processes, and flaring of sludge biogas, resulting from the handling of domestic or commercial wastewater through:

    (a) treatment in wastewater collection and treatment systems; or

    (b) discharge into surface waters.

(2) In this section, ***domestic or commercial wastewater*** means liquid wastes and sludge (including human waste) from housing or commercial premises.

[53]   Part 5.4, heading

Part 5.4   Wastewater handling (industrial)

[54]   Section 5.40

substitute

5.40   Application

(1) This Part applies to emissions released from the decomposition of organic material, nitrification and denitrification processes, and flaring of sludge biogas, resulting from handling of industrial wastewater through:

   (a)   treatment in wastewater systems; or

   (b)   discharge into surface waters.

(2) In this section, *industrial wastewater* means liquid wastes and sludge resulting from the production of a commodity, by an industry, mentioned in column 2 of an item of the table in subsection 5.42 (8).

[55]   Part 5.5, heading

substitute

Part 5.5   Waste incineration

[56]   Section 5.51

omit

   UNFCCC Category 6.C —

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.