



Climate Change (Stationary Energy and Industrial Processes) Regulations 2009

Rt Hon Sir Peter Blanchard, Administrator of the Government

Order in Council

At Wellington this 28th day of September 2009

Present:

His Excellency the Administrator of the Government in Council

Pursuant to section 163 of the Climate Change Response Act 2002, His Excellency the Administrator of the Government, acting on the advice and with the consent of the Executive Council and on the recommendation of the Minister for Climate Change Issues, makes the following regulations.

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Regulations

- 1 Title
- These regulations are the Climate Change (Stationary Energy and Industrial Processes) Regulations 2009.
- 2 Commencement
- These regulations come into force on 1 January 2010.

Part 1 Preliminary matters

- 3 Interpretation
- (1) In these regulations, unless the context otherwise requires,—
Act means the Climate Change Response Act 2002
Aluminium Sector Greenhouse Gas Protocol means the *Aluminium Sector Greenhouse Gas Protocol (Addendum to the WRI/WBCSD Greenhouse Gas Protocol): Greenhouse Gas Emissions Monitoring and Reporting by the Aluminium Industry* (October 2006) produced by the International Aluminium Institute
biomass means—
 - (a) a material or fuel in respect of which at least 97% (related to mass) of the total carbon content comes from non-fossilised and biodegradable organic material originating from plants, animals, or micro-organisms; and
 - (b) includes—
 - (i) non-fossilised and biodegradable organic fractions of industrial and municipal waste; and
 - (ii) gases and liquids recovered from the decomposition of non-fossilised and biodegradable organic material
bituminous coal has the meaning set out in Schedule 2
calorific value means the energy content of a fuel on a gross or high heating value basis, expressed in terajoules per tonne of fuel
category, in relation to coal, means,—
 - (a) if there is no unique emissions factor for fugitive coal seam gas in force in relation to the coal, a category specified in Part A of Table 3 of Schedule 2; or
 - (b) if a unique emissions factor for fugitive coal seam gas is in force in relation to the coal, the category of coal to which the unique emissions factor relates
chief executive means the chief executive of the department responsible for the administration of Part 4 of the Act
class has the meaning set out in regulation 4
coal miner means a person who is required to comply with regulations 10 and 11, or a wholly owned subsidiary of the person
customs point means the point where goods are entered for import under section 39 or export under section 49 of the Customs and Excise Act 1996

flare, in relation to natural gas, means dispose of by combusting in flares or burners during the production and processing of natural gas

gas miner means a person who is required to comply with regulations 16 and 17, or a wholly owned subsidiary of the person

lignite has the meaning set out in Schedule 2

LNG means liquefied natural gas

LPG means liquefied petroleum gas

mass fraction means the ratio of the mass of a component in a mixture to the total mass of the mixture

obligation coal—

- (a) means coal—
 - (i) imported on or after 1 January 2010 by a person who is required to comply with regulations 7 and 8; or
 - (ii) mined on or after 1 January 2010 by a person who is required to comply with regulations 10 and 11; and
- (b) includes a product (for example coke) derived from coal referred to in paragraph (a)

obligation fuel has the same meaning as in regulation 3 of the Climate Change (Liquid Fossil Fuels) Regulations 2008

obligation natural gas means natural gas—

- (a) imported on or after 1 January 2010 by a person who is required to comply with regulations 13 and 14; or
- (b) mined on or after 1 January 2010 by a person who is required to comply with regulations 16 and 17

opt-in coal participant means a person who is required to comply with regulations 46 and 47

opt-in natural gas participant means a person who is required to comply with regulations 49 and 50

own use, in relation to the combustion of mined natural gas, means combusted during production and processing operations for purposes that include heat generation, gas compression, or electricity generation

peat has the meaning set out in Schedule 2

point of sale, in relation to—

- (a) mining or purchasing coal, means the point at which the sale of coal is deemed to have occurred in accordance with generally accepted accounting practice;
- (b) mining or purchasing natural gas, means the first fiscal meter downstream of gas processing

sub-bituminous coal has the meaning set out in Schedule 2

subsidiary has the same meaning as in section 5 of the Companies Act 1993

unique emissions factor means a unique emissions factor that the chief executive has, under section 91 of the Act, approved a participant to use for the purpose of calculating emissions in accordance with these regulations

vent, in relation to natural gas, means release uncombusted gas into the atmosphere during the production and processing of natural gas.

(2) In a formula used in these regulations, the symbols in the first column have the meaning set out in the second column, as follows:

Σ	the summation of the calculated amounts that follow the symbol
Al	aluminium
C ₂ F ₆	hexafluoroethane
CF ₄	carbon tetrafluoromethane
CH ₄	methane
CO ₂	carbon dioxide
kg	kilogram
N ₂ O	nitrous oxide
t	tonnes

tCO₂e tonnes of carbon dioxide equivalent gases

TJ terajoules

(3) A reference to a test method containing an acronym listed in the first column in the following table means a standard, or test method related to an organisation, that is listed in the second column of the table:

Test method	Standard or organisation
ASTM	ASTM International
GPA	Gas Processing Association
ISO	International Organization for Standardization
USEPA	United States Environmental Protection Agency
VDI	The Association of German Engineers

(4) Unless the context otherwise requires, if a test method prescribed in these regulations provides for alternative methods, each method has equal standing, and any of the methods may be used.

(5) A unique emissions factor is in force for the purposes of these regulations if—

- (a) its use to calculate emissions has been approved by the chief executive under section 91(1) of the Act; and
- (b) the approval has not ceased to have effect under section 91(2) of the Act.

4 Meaning of class

- In these regulations, unless the context otherwise requires, **class**,—
 - (a) in relation to importing coal, means,—
 - (i) if there is no unique emissions factor in force in relation to the coal, a class of coal listed in the first column of Table 1 of Schedule 2:
 - (ii) if a unique emissions factor is in force in relation to the coal, the class of coal to which the unique emissions factor relates:
 - (b) in relation to mining coal and purchasing coal, means,—
 - (i) if there is no unique emissions factor in force in relation to the coal, a class of coal listed in the first column of Table 2 of Schedule 2:
 - (ii) if a unique emissions factor is in force in relation to the coal, the class of coal to which the unique emissions factor relates:
 - (c) in relation to importing natural gas, means any of the following:
 - (i) a class of natural gas listed in the first column of Table 4 of Schedule 2:
 - (ii) a commercially produced blend of LPG with a propane content other than 60% by volume:
 - (d) in relation to mining natural gas, means any of the following:
 - (i) a clearly defined stream of natural gas—
 - (A) whose properties are measured downstream of gas processing and prior to mixing with other streams of gas; and
 - (B) that passes through a single fiscal meter:
 - (ii) natural gas sent to the low temperature separation plant at Kapuni:
 - (iii) LPG:
 - (iv) propane:
 - (v) butane:
 - (e) in relation to purchasing natural gas, means,—
 - (i) if there is no unique emissions factor in force in relation to the natural gas,—
 - (A) a class of natural gas listed in paragraph (d); or
 - (B) a class of natural gas defined by reference to the field at which it is mined as specified in Table 10 of Schedule 2:
 - (ii) if a unique emissions factor is in force in relation to the natural gas, the class of natural gas to which the unique emissions factor relates:
 - (f) in relation to geothermal fluid, means,—

- (i) if there is no unique emissions factor in force in relation to the geothermal fluid, a class of geothermal fluid described in the first column of Part A or Part B of Table 6 of Schedule 2;
- (ii) if a unique emissions factor is in force in relation to the geothermal fluid, the class of geothermal fluid to which the unique emissions factor relates:
- (g) in relation to used oil, waste oil, used tyres, or waste, means,—
 - (i) if there is no unique emissions factor in force in relation to the used oil, waste oil, used tyres, or waste,—
 - (A) a class of used oil, waste oil, used tyres or waste listed in the first column of Table 7 of Schedule 2; or
 - (B) a subset of a class referred to in subsubparagraph (A), which is combusted in particular equipment:
 - (ii) if there is a unique emissions factor in force in relation to used oil, waste oil, used tyres, or waste, the class of used oil, waste oil, used tyres, or waste to which the unique emissions factor relates.

5 Chief executive may issue guidelines or standards

- (1) The chief executive may, by notice in the *Gazette*, issue guidelines or standards in relation to the information required to be collected by these regulations.
- (2) The chief executive may, by notice in the *Gazette*, amend or revoke a guideline or standard.
- (3) A participant who complies with a guideline or standard that is issued under this regulation, and is in force, is to be treated as complying with the requirements of these regulations to which the guideline or standard relates.

Part 2 Stationary energy participants

Importing coal

6 Application of regulations 7 and 8

- (1) A person must comply with regulations 7 and 8 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in Part 3 of Schedule 3 of the Act of importing coal.
- (2) Regulations 7 and 8 apply in relation to coal only if the coal is imported by the person on or after 1 January 2010.

7 Collection and recording of information for purpose of calculating emissions from importing coal

- (1) The following information must be collected and recorded in relation to each class of coal for the year:
 - (a) the total number of tonnes of the class of coal imported by the person in the year, as recorded at the customs point; and
 - (b) the calorific value of the coal referred to in paragraph (a); and
 - (c) the total number of tonnes of coal of the class exported by the person in the year, as recorded at the customs point; and
 - (d) the calorific value of the coal referred to in paragraph (c).
- (2) If the person wishes to include a stockpile adjustment in relation to a class of coal for the year under regulation 8(1), then the information specified in clause 3 of Schedule 1 must be collected and recorded.

8 Method of calculating emissions from importing coal

- (1) Emissions for the year in relation to each class of coal must be calculated in accordance with the following formula:

$$E = ((A \times CV_1) - (S \times CV_2) - (C \times CV_1)) \times EF$$

where—

A

is the total number of tonnes of the class of coal imported by the person in the year, as recorded under regulation 7(1)(a)

C

is the total number of tonnes of the class of coal exported by the person in the year as recorded under regulation 7(1)(c)

CV₁

is the weighted average calorific value of the coal of the class imported or exported, as the case may be, calculated by reference to the information recorded under regulation 7(1)(b) or (d)

CV₂

is—

- (a) the figure for CV₂ determined in accordance with Schedule 1 if the person—
 - (i) includes a stockpile adjustment for the class of coal; or
 - (ii) does not include a stockpile adjustment, but a stockpile adjustment was included when emissions from importing the class of coal were calculated and reported in the previous emissions return submitted for the activity; or
- (b) zero, if S is zero

E

is the emissions for the class of coal in tonnes

EF

is,—

- (a) in relation to a class of coal for which no unique emissions factor is in force, the emissions factor for the class of coal from Table 1 in Schedule 2;
- (b) in relation to a class of coal for which a unique emissions factor is in force, the unique emissions factor

S

is—

- (a) the figure determined in accordance with Schedule 1 if the person—
 - (i) includes a stockpile adjustment for the class of coal; or
 - (ii) does not include a stockpile adjustment, but a stockpile adjustment was included when emissions from importing the class of coal were calculated and reported in the previous emissions return submitted for the activity; or
- (b) zero, if the person does not include a stockpile adjustment for the class of coal and—
 - (i) it is the person's first emissions return for the activity; or
 - (ii) a stockpile adjustment was not included when emissions from importing the class of coal were calculated and reported in the previous emissions return submitted for the activity.

(2) An emissions return submitted by a person required to comply with this regulation must record the person's total emissions from the activity of importing coal in the relevant year, calculated by adding together the emissions for each class of coal calculated under subclause (1).

(3) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Mining coal

9 Application of regulations 10 and 11

- (1) A person must comply with regulations 10 and 11 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in Part 3 of Schedule 3 of the Act of mining coal where the volume of coal mined exceeds 2 000 tonnes in a year.
- (2) Regulations 10 and 11 apply in relation to mined coal only if the coal is mined by the person on or after 1 January 2010.

10 Collection and recording of information for purpose of calculating emissions from mining coal

- (1) The following information must be collected and recorded in relation to each class of mined coal for the year:
 - (a) the total number of tonnes of mined coal of the class sold by the person in the year (including for export) to persons other than opt-in coal participants, as recorded at the point of sale; and
 - (b) the calorific value of the coal referred to in paragraph (a); and
 - (c) the total number of tonnes of mined coal of the class exported by the person in the year, as recorded at the customs point; and
 - (d) the calorific value of the coal referred to in paragraph (c); and
 - (e) the total number of tonnes of mined coal of the class combusted by the person in the year; and
 - (f) the calorific value of the coal referred to in paragraph (e); and
 - (g) the total number of tonnes of mined coal of the class gifted or otherwise provided gratuitously to any person, including an employee, in the year; and
 - (h) the calorific value of the coal referred to in paragraph (g).
- (2) The following information must be collected and recorded in relation to all coal mined by the person in the year:
 - (a) the total number of tonnes of coal mined from each category in the year; and
 - (b) the total number of tonnes of methane flared, combusted for energy, or otherwise oxidised in the year.
- (3) For the purposes of subclause (1)(a), mined coal sold to opt-in coal participants includes coal that is sold by the person to a wholly owned subsidiary of the person, which is then on-sold by the subsidiary to an opt-in participant.

11 Method of calculating emissions from mining coal

- (1) Emissions for the year in relation to each class of mined coal must be calculated in accordance with the following formula:

$$E = ((A \times CV) + (C \times CV) + (D \times CV) - (B \times CV)) \times EF_1$$

where—

A

is the total number of tonnes of coal of the class sold by the person in the year, as recorded under regulation 10(1)(a)

B

is the total number of tonnes of the class of coal exported by the person in the year, as recorded under regulation 10(1)(c)

C

is the total number of tonnes of the class of coal combusted by the person in the year, as recorded under regulation 10(1)(e)

CV

is the weighted average calorific value of the class of coal sold, combusted, gifted, or otherwise provided gratuitously, as the case may be, calculated by reference to the information recorded under the relevant paragraph in regulation 10(1)

D

is the total number of tonnes of the class of coal gifted or otherwise provided gratuitously to any person, as recorded under regulation 10(1)(g)

E

is the emissions for the class of coal in tonnes

EF_1

is,—

- (a) in relation to a class of coal for which no unique emissions factor is in force, the emissions factor for the class of coal from Table 2 in Schedule 2;
- (b) in relation to a class of coal for which a unique emissions factor is in force, the unique emissions factor.

(2) Emissions for the year in relation to fugitive coal seam gas from each category of coal must be calculated in accordance with the following formula:

$$E_{\text{CSG}} = F \times EF_2$$

where—

E_{CSG}

is the emissions for fugitive coal seam gas from coal mined from the category of coal in tonnes

EF_2

is,—

- (a) in relation to a category of coal for which no unique emissions factor is in force, the emissions factor for fugitive coal seam gas for the category, as specified in Part A of Table 3 of Schedule 2:
- (b) in relation to a category of coal for which a unique emissions factor is in force, the unique emissions factor

F

is the total number of tonnes of coal from the category mined by the person in the year, as recorded under regulation 10(2)(a).

(3) An emissions return submitted by a person required to comply with this regulation must record the person's total emissions from the activity of mining coal in the relevant year, calculated as follows:

$$TE = \sum(E) + \sum(E_{\text{CSG}}) - (G \times EF_{\text{FLA}})$$

where—

E

is the emissions for each class of coal for the year, as calculated under subclause (1)

E_{CSG}

is the emissions from fugitive coal seam gas for each category of coal for the year, as calculated under subclause (2)

EF_{FLA}

is the emissions factor for flaring, combusting for energy, or otherwise oxidising specified in Part B of Table 3 of Schedule 2

G

is the total number of tonnes of methane flared, combusted for energy, or otherwise oxidised by the person in the year, as recorded under regulation 10(2)(b)

TE

is the total emissions for the activity of mining coal for the year in tonnes.

(4) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Importing natural gas

12 Application of regulations 13 and 14

- (1) A person must comply with regulations 13 and 14 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in Part 3 of Schedule 3 of the Act of importing natural gas where the volume of natural gas imported exceeds 10 000 litres in a year.
- (2) Regulations 13 and 14 apply only if the natural gas is imported by the person on or after 1 January 2010.
- (3) For the avoidance of doubt, a person who is required to comply with regulations 16 and 17 in relation to natural gas that is mined within the territorial limits of New Zealand, the exclusive economic zone, or in, on, or above the continental shelf, is not required to comply with regulations 13 and 14 in relation to the same natural gas.

13 Collection and recording of information for purpose of calculating emissions from importing natural gas

- (1) The following information must be collected and recorded in relation to each class of imported natural gas (other than LNG) for the year:
 - (a) the total number of tonnes of natural gas of the class imported by the person in the year, as recorded at the customs point; and
 - (b) the total number of tonnes of natural gas of the class exported by the person in the year, as recorded at the customs point.
- (2) Information must also be collected and recorded about—
 - (a) the total number of terajoules of LNG imported by the person in the year, as recorded at the customs point; and
 - (b) the total number of terajoules of LNG exported by the person in the year, as recorded at the customs point.
- (3) If the person wishes to include a storage adjustment in relation to LNG under regulation 14(4), then the following information must be collected and recorded:
 - (a) the total number of terajoules of LNG injected into a gas storage facility by the person in the year; and
 - (b) the total number of terajoules of LNG extracted from a gas storage facility by the person in the year.

14 Method of calculating emissions from importing natural gas

- (1) Emissions for the year in relation to each class of natural gas (other than LNG) must be calculated in accordance with the following formula:

$$E = (A - B) \times EF_1$$

where—

A

is the total number of tonnes of natural gas of the class imported by the person in the year, as recorded under regulation 13(1)(a)

B

is the total number of tonnes of natural gas of the class exported by the person in the year, as recorded under regulation 13(1)(b)

E

is the emissions for the class of natural gas in tonnes

EF_1

is,—

- (a) if the class of natural gas is a class of LPG with a propane content other than 60% by volume, the emissions factor for the class calculated in accordance with subclause (2); and
- (b) in any other case, the emissions factor for the class of natural gas from Table 4 in Schedule 2.

(2) For the purposes of subclause (1), the emissions factor for a class of LPG with a propane content other than 60% by volume must be calculated as follows:

$$EF = (OF_{GAS} \times EF_{LPG}) + EF_{M+N}$$

where—

EF

is the emissions factor for the class of LPG

EF_{LPG}

is the carbon dioxide emissions factor for LPG calculated as follows:

$$EF_{LPG} = 3.029 - \frac{(18.09 \times V_{PRO})}{572.6 - (65.9 \times V_{PRO})}$$

where—

V_{PRO}

is the volume fraction of propane in the LPG

EF_{M+N}

is the aggregate emission factor for CH_4 and N_2O emissions for natural gas expressed in tCO_2e/t from Table 5 in Schedule 2

OF_{GAS}

is the oxidation factor for gas (other than flared) from Table 5 in Schedule 2.

(3) Emissions for LNG for the year must be calculated in accordance with the following formula:

$$E_{\text{LNG}} = (C - D - S) \times EF_{\text{GAS}}$$

where—

C

is the total number of terajoules of LNG imported by the person in the year, as recorded under regulation 13(2)(a)

D

is the total number of terajoules of LNG exported by the person in the year, as recorded under regulation 13(2)(b)

EF_{GAS}

is the emissions factor for imported LNG from Table 4 in Schedule 2

E_{LNG}

is the emissions for LNG in tonnes

S

is—

- (a) the figure calculated under subclause (4), if the person includes a storage adjustment for LNG for the year; or
- (b) the figure for S used in the previous year's emissions return, if the person elects not to include a storage adjustment for LNG for the year but a storage adjustment was included when emissions from importing LNG were calculated and reported in the previous emissions return submitted by the person for the activity; or
- (c) zero, if the person does not include a storage adjustment and—
 - (i) it is the person's first emissions return for the activity; or
 - (ii) a storage adjustment for LNG was not included when emissions from importing natural gas were calculated and reported in the previous emissions return submitted by the person for the activity.

(4) For the purposes of subclause (3), a storage adjustment (if included) must be calculated as follows:

$$S = F - G$$

where—

F

is the total number of terajoules of LNG injected by the person into a gas storage facility in the year, as recorded under regulation 13(3)(a)

G

is the total number of terajoules of LNG extracted by the person from a gas storage facility in the year, as recorded under regulation 13(3)(b)

S

is the storage adjustment for LNG for the year.

(5) Total emissions from the activity of importing natural gas for the year must be calculated as follows:

$$TE = \sum(E) + E_{\text{LNG}}$$

where—

E

is the emissions from each class of imported natural gas for the year, as calculated under subclause (1)

E_{LNG}

is the emissions from LNG for the year, as calculated under subclause (3)

TE

is the total emissions for the activity of importing natural gas for the year in tonnes.

(6) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Mining natural gas

15 Application of regulations 16 and 17

- (1) A person must comply with regulations 16 and 17 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in Part 3 of Schedule 3 of the Act of mining natural gas other than for export.
- (2) Regulations 16 and 17 apply in relation to mined natural gas only if the natural gas is gas mined by the person on or after 1 January 2010.

16 Collection and recording of information for purpose of calculating emissions from natural gas mined other than for export

- (1) The following information must be collected and recorded in relation to mined natural gas for the year from each field listed in Table 10 in Schedule 2:
 - (a) the total number of tonnes of mined natural gas of each class sold by the person in the year (including for export) to persons (other than opt-in natural gas participants), as measured at the point of sale; and
 - (b) the total number of tonnes of mined natural gas of each class exported by the person in the year, as measured at the point of sale; and
 - (c) the total number of tonnes of mined natural gas combusted by the person for own use before the point of sale in the year; and
 - (d) the total number of tonnes of mined natural gas flared by the person before the point of sale in the year, that are not recorded under paragraph (c); and
 - (e) in respect of each of the quantities of mined natural gas referred to in paragraphs (a) to (d),—
 - (i) the mass fraction of carbon in the gas, as determined by reference to the results of the tests in subclause (3), or the accounting system referred to in subclause (4), as relevant; and
 - (ii) the total terajoules of the gas, as determined by reference to the results of the tests in subclause (3) or the accounting system referred to in subclause (4), as relevant.
- (2) The following information must be collected and recorded in relation to natural gas that is vented by the person in the year from each field listed in Table 10 in Schedule 2:
 - (a) the total number of tonnes of natural gas vented by the person before the point of sale in the year; and
 - (b) in respect of the natural gas referred to in paragraph (a),—
 - (i) the mass fraction of carbon dioxide in the gas, as determined by the accounting system referred to in subclause (4); and
 - (ii) the mass fraction of methane in the gas, as determined by the accounting system referred to in subclause (4).
- (3) To obtain the information required by subclause (1)(e) in respect of the natural gas referred to in subclause (1)(a) and (b),—
 - (a) the gas must be sampled with continuous monitoring equipment where available at least every 30 minutes, or, where this is not available, periodically with sufficient frequency to be representative of the information sought, but at least at intervals of not longer than 3 months, and in accordance with—
 - (i) GPA 2166:2005 (obtaining natural gas samples for analysis by gas chromatography, Parts 1–8); or
 - (ii) any equivalent standards or test methods related to an organisation that is listed in regulation 3(2) of the Climate Change (Unique Emissions Factors) Regulations 2009; and
 - (b) the samples must be tested, by a person or laboratory that is accredited as complying with ISO 17025:2005 by International Accreditation New Zealand, an overseas accreditation agency with whom International Accreditation New Zealand has a mutual recognition agreement, or an overseas accreditation agency recognised

under New Zealand's mutual recognition arrangements, using gas chromatography in accordance with—

- (i) ASTM D1945–03 (analysis of natural gas by gas chromatography); or
- (ii) any equivalent standards or test methods related to an organisation that is listed in regulation 3(2) of the Climate Change (Unique Emissions Factors) Regulations 2009.

(4) To obtain the information required by subclause (1)(e) (in respect of the natural gas referred to in subclause (1)(c) and (d)) and subclause (2)(b) (in respect of the natural gas referred to in subclause (2)(a)), the person must use a hydrocarbon accounting system.

(5) For the purposes of subclause (1)(a) and regulation 17(1)(a), mined natural gas sold to opt-in natural gas participants includes natural gas that is sold by the person to a wholly owned subsidiary of the person, which is then on-sold by the subsidiary to an opt-in participant.

17 Method of calculating emissions from natural gas mined other than for export

- (1) Emissions for the year in relation to each field listed in Table 10 in Schedule 2 must be calculated by calculating the emissions from each of the following quantities of mined natural gas in accordance with the formula in subclause (2) and adding them together under subclause (4):
 - (a) each class of mined natural gas from the field sold by the person in the year (including for export) to persons other than opt-in natural gas participants, as recorded under regulation 16(1)(a); and
 - (b) each class of mined natural gas from the field exported by the person in the year, as recorded under regulation 16(1)(b); and
 - (c) mined natural gas from the field combusted by the person for own use in the year, as recorded under regulation 16(1)(c); and
 - (d) mined natural gas from the field flared by the person before the point of sale in the year, as recorded under regulation 16(1)(d).

(2) The formula for the calculation of emissions for each quantity of gas under subclause (1) is—

$$E = (OF_{GAS} \times m_C \times EF_C \times C) + (D \times EF_{M+N})$$

where—

C

is the total number of tonnes of the quantity of natural gas for the year, as recorded under the relevant paragraph of regulation 16(1)(a) to (d)

D

is total terajoules of the quantity of natural gas for the year, as recorded under regulation 16(1)(e)(ii)

E

is the emissions from the quantity of natural gas in tonnes

EF_C

the emissions factor for carbon content listed in Table 9 of Schedule 2

EF_{M+N}

is the aggregate emissions factor for CH₄ and N₂O emissions for natural gas expressed in tCO₂e/TJ from Table 5 of Schedule 2

m_C

is the mass fraction of carbon in the quantity of gas as recorded under regulation 16(1)(e)(i)

OF_{GAS}

is an oxidation factor—

- (a) of 1.0 for any class of natural gas that is injected into a high-pressure transmission pipeline;
- (b) from Table 5 of Schedule 2 for any other class or quantity of gas.

(3) Emissions in relation to venting from each field listed in Table 10 of Schedule 2 by the person in the year must be calculated in accordance with the following formula:

$$V = (m_{CO_2} + (21 \times m_{CH_4})) \times C$$

where—

C

is the total number of tonnes of natural gas vented from the field for the year, as recorded under regulation 16(2)(a)

m_{CH_4}

is the mass fraction of methane in the natural gas vented, as recorded under regulation 16(2)(b)(ii)

m_{CO_2}

is the mass fraction of carbon dioxide in the natural gas vented, as recorded under regulation 16(2)(b)(i)

V

is the emissions from venting natural gas from the field in tonnes.

(4) Total emissions from each field for the year must be calculated as follows:

$$E_{\text{field}} = \sum(ES) + U + F + V - \sum(EE)$$

where—

E_{field}

is the total emissions for the field for the year in tonnes

EE

is the emissions from each class of mined natural gas from the field exported by the person in the year, as calculated under subclause (2)

F

is the emissions from flaring natural gas from the field by the person for the year, as calculated under subclause (2)

ES

is the emissions from each class of mined natural gas from the field sold by the person in the year, as calculated under subclause (2)

U

is the emissions from combusting natural gas from the field for own use before the point of sale by the person for the year, as calculated under subclause (2)

V

is the emissions from venting natural gas from the field for the year, as calculated under subclause (3).

(5) An emissions return submitted by a person required to comply with this regulation must record the person's total emissions from the activity of mining natural gas other than for export, calculated by adding together the emissions from each field calculated under subclause (4).

(6) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Using geothermal fluid

18 Application of regulations 19 and 20

- A person must comply with regulations 19 and 20 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in Part 3 of Schedule 3 of the Act of using geothermal fluid for the purpose of generating electricity or industrial heat.

19 Collection and recording of information for purpose of calculating emissions from using geothermal fluid

- (1) The following information must be collected and recorded in relation to each class of geothermal fluid used in the year for the purpose of generating electricity or industrial heat:
 - (a) for a class referred to in Part A of Table 6 of Schedule 2, or a class defined in a unique emissions factor approval that relates to a plant that uses, or makes a particular use of, geothermal steam, the total number of tonnes of geothermal production steam used by the person in the year; and

- (b) for a class referred to in Part B of Table 6 of Schedule 2, or a class defined in a unique emissions factor approval by reference to a plant that uses, or makes a particular use of, geothermal fluid that does not relate to steam production, the total number of tonnes of 2-phase geothermal fluid used by the person in the year.
- (2) For the purposes of subclause (1)(a), geothermal production steam used—
- (a) includes non-condensable gases and steam vented from system emergency vent facilities; but
 - (b) does not include—
 - (i) fugitive steam released during well testing or well bleeding; or
 - (ii) steam released from the disposal of spent geothermal fluid; or
 - (iii) steam released from unused but maintained production wells.

20 Method of calculating emissions from using geothermal fluid

- (1) Emissions in relation to each class of geothermal fluid referred to in regulation 19(1)(a) that is used for the purpose of generating electricity or industrial heat by the person in the year must be calculated in accordance with the following formula:

$$E = A \times EF$$

where—

A

is the number of tonnes of geothermal production steam of the class used by the person during the year, as recorded under regulation 19(1)(a)

E

is the emissions for the class of geothermal fluid used in tonnes

EF

is,—

- (a) in relation to a class of geothermal fluid listed in Part A of Table 6 in Schedule 2 for which no unique emissions factor is in force, the emissions factor for the class of geothermal fluid from that table; and
- (b) in relation to a class of geothermal fluid defined in an approval to use a unique emissions factor, the unique emissions factor for that class.

- (2) Emissions in relation to each class of geothermal fluid referred to in regulation 19(1)(b) used for the purpose of generating electricity or industrial heat by the person in the year must be calculated in accordance with the following formula:

$$E = A \times EF$$

where—

A

is the number of tonnes of 2-phase geothermal fluid of the class used by the person during the year, as recorded under regulation 19(1)(b)

E

is the emissions for the class of geothermal fluid used in tonnes

EF

is,—

- (a) in relation to a class of geothermal fluid listed in Part B of Table 6 in Schedule 2 for which no unique emissions factor is in force, the emissions factor for the class of geothermal fluid from that table; and
- (b) in relation to a class of geothermal fluid defined in an approval to use a unique emissions factor, the unique emissions factor for that class.

- (3) An emissions return submitted by a person who is required to comply with this regulation must record the person's total emissions from the activity of using geothermal fluid for the purpose of generating electricity or industrial heat in the relevant year, calculated by adding together the emissions for each class of geothermal fluid used, as calculated under subclauses (1) and (2).

- (4) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Combusting used oil, waste oil, used tyres, or waste

21 Application of regulations 22 to 26

- (1) A person who in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in Part 3 of Schedule 3 of the Act of combusting used oil, waste oil, used tyres, or waste for the purpose of generating electricity or industrial heat must—
 - (a) collect and record information and calculate emissions in respect of each class of used oil, waste oil, used tyres, or waste combusted by the person in the year in accordance with 1 of the following regulations:
 - (i) regulation 22 (standard method option 1):
 - (ii) regulation 23 (standard method option 2):
 - (iii) regulation 24 (continuous emissions monitoring method):
 - (iv) regulation 25 (periodic source testing method); and
 - (b) comply with regulation 26.
- (2) The person may—
 - (a) use different methods for calculating emissions for different classes of used oil, waste oil, used tyres, or waste; but
 - (b) use the methods referred to in subclause (1)(a)(ii), (iii), and (iv) only if the class of used oil, waste oil, used tyres, or waste is a class referred to in regulation 4(g)(i)(B) or a class referred to in regulation 4(g)(ii) that is defined by reference to being combusted in particular equipment.
- (3) If the person is required to submit an emissions return for a period other than a year, subclause (1) and regulations 22 to 26 apply with any necessary modifications.

22 Standard method for calculating emissions from combusting used oil, waste oil, used tyres, or waste—option 1

- A person who wishes to use the standard method option 1 to calculate emissions from a class of used oil, waste oil, used tyres, or waste, for a year must—
 - (a) collect and record the following information:
 - (i) the total number of tonnes of the class of used or waste oil, used tyres, or waste combusted by the person in the year, minus in the case of used or waste oil, the total number of tonnes of obligation fuel component of the used or waste oil; and
 - (ii) the calorific value of the used or waste oil, used tyres, or waste referred to in paragraph (a); and
 - (b) calculate emissions in relation to the class of used or waste oil, used tyres, or waste as follows:

$$E_1 = A \times CV \times EF$$

where—

A

is the total number of tonnes of the class of used or waste oil, used tyres, or waste combusted by the person in the year, as recorded under paragraph (a)(i)

CV

is the weighted average calorific value of the class of used or waste oil, used tyres, or waste calculated by reference to the information recorded under paragraph (a)(ii)

E_1

is the emissions for the class of used or waste oil, used tyres, or waste combusted in the year in tonnes

EF

is,—

- (a) in relation to a class of used or waste oil, used tyres, or waste for which no unique emissions factor is in force, the emissions factor for the class of used or waste oil, used tyres, or waste from Table 7 in Schedule 2:
- (b) in relation to a class of used or waste oil, used tyres, or waste for which a unique emissions factor is in force, the unique emissions factor.

23 Standard method for calculating emissions from combusting used oil, waste oil, used tyres, or waste—option 2

- A person who wishes to use the standard method option 2 to calculate emissions from a class of used oil, waste oil, used tyres, or waste, for a year must—
 - (a) collect and record the following information:
 - (i) the total energy output produced by the particular equipment through combusting the class of used or waste oil, used tyres, or waste in the year expressed in terajoules; and
 - (ii) the estimated efficiency, on a gross energy basis, of the particular equipment over the year; and
 - (iii) if the class relates to used or waste oil,—
 - (A) the total number of tonnes of the obligation fuel component of the class of used or waste oil combusted by the person in the year; and
 - (B) the calorific value of the used or waste oil; and
 - (b) calculate emissions from the class of used or waste oil, used tyres, or waste as follows:

$$E_2 = \left(\frac{D}{U} - B \times CV \right) \times EF$$

- where—
 - B is,—
 - (a) if the class relates to used or waste oil, the total number of tonnes of the obligation fuel component of the used or waste oil of the class combusted by the person in the year, as recorded under paragraph (a)(iii)(A); and
 - (b) in every other case, zero
 - CV is,—
 - (a) if the class relates to used or waste oil, the weighted average calorific value of the class of used or waste oil as calculated by reference to the information recorded under paragraph (a)(iii)(B); and
 - (b) in every other case, zero
 - D is the total energy output produced by the particular equipment through its combustion of the class of waste or used oil, used tyres, or waste in the year, as collected under paragraph (a)(i)
 - E_2 is the emissions for the class of used or waste oil, used tyres, or waste combusted in the particular equipment in the year in tonnes
 - EF is,—
 - (a) in relation to a class of used or waste oil, used tyres, or waste for which no unique emissions factor is in force, the emissions factor for the class of used or waste oil, used tyres, or waste from Table 7 in Schedule 2;
 - (b) in relation to a class of used or waste oil, used tyres, or waste for which a unique emissions factor is in force, the unique emissions factor
 - U is the gross estimated efficiency of the particular equipment over the course of the year, as collected under paragraph (a)(ii).

24 Continuous emissions monitoring method for calculating emissions from combusting used oil, waste oil, used tyres, or waste

- (1) A person who wishes to use the continuous emissions monitoring method to calculate emissions from a class of used oil, waste oil, used tyres, or waste must,—
 - (a) using continuous monitoring equipment, at least every 30 minutes during the operation of the monitoring equipment,—

- (i) measure in accordance with the procedures in ISO 10780:1994 or ISO 14164:1999 the volumetric flow rate for the stacks from which gases resulting from combustion of the class of used oil, waste oil, used tyres, or waste are emitted; and
- (ii) have tests to measure the CO₂, CH₄, and N₂O concentrations in the gas stream from the stacks carried out in accordance with one of the following standards by a person or laboratory that is accredited according to ISO 17025:2005 by International Accreditation New Zealand, an overseas accreditation agency with whom International Accreditation New Zealand has a mutual recognition agreement, or by an overseas accreditation agency recognised under New Zealand's mutual recognition arrangements to carry out the tests:
 - (A) ISO 12039:2001:
 - (B) USEPA—Method 3A—2006:
 - (C) USEPA—Method 3C—1996 (modified, if used for N₂O):
 - (D) VDI 2649–1 (measurement of nitrous oxide):
 - (E) ASTM D6348–03 (determination of gaseous compounds); and
- (b) at the time of each of the measurements in paragraph (a), also measure and record—
 - (i) the pressure of the gas stream in kilopascals:
 - (ii) the temperature, in Kelvin, of the gas stream; and
- (c) using each set of data obtained under paragraphs (a) and (b), calculate the rate of emissions of CO₂, CH₄, and N₂O from the stacks at the time of measurement in accordance with the following formula:

$$mr_{\text{gastype}} = \frac{mw_{\text{gastype}} \times P \times F \times C}{R \times T}$$

- where—
- C
- is the concentration by volume of CO₂, CH₄, or N₂O, as the case may be, in the gas stream at the time of measurement
- F
- is the flow rate of the gas stream in cubic metres per second, at the time of measurement
- mr_{gastype}
- is the rate of each of CO₂, CH₄, and N₂O emitted in tonnes of gas type released per second
- mw_{gastype}
- is the molecular mass of CO₂, CH₄, or N₂O, as the case may be, in tonnes per kilomole, where—
 - (a) CO₂ and N₂O values are 0.044; and
 - (b) CH₄ value is 0.016
- P
- is the pressure of the gas stream in kilopascals at the time of measurement
- R
- is 8.314, the universal gas constant when expressed in J/K.mol; and
- T
- is the temperature, in Kelvin, of the gas at the time of measurement; and
- (d) using the results of the calculations under paragraph (c), estimate a representative rate of emissions for each mr_{gastype} per hour; and
- (e) estimate total emissions for the year of each of CO₂, CH₄, and N₂O by adding together the emissions for each gas type for each hour of the year, in accordance with the following formula:

$$E_{\text{gastype year}} = \Sigma (mr_{\text{gastype hour}} \times t)$$

where—

$E_{\text{gastype year}}$

is the emissions of each of CO₂, CH₄, and N₂O emitted for the year in tonnes

$mr_{\text{gastype hour}}$

is the representative rate of each of CO₂, CH₄, and N₂O per hour for each hour of the year, as determined under paragraph (d)

t

is 3 600, the number of seconds in an hour; and

- (f) calculate the emissions for the class of waste or used oil, used tyres, or waste in accordance with the following formula:

$$E_3 = (E_{\text{CO}_2 \text{ year}} \times G) + (E_{\text{CH}_4 \text{ year}} \times 21) + (E_{\text{N}_2\text{O year}} \times 310)$$

where—

E_3

is the emissions for the class of used or waste oil, used tyres, or waste combusted in the particular equipment in the year in tonnes

$E_{\text{gastype year}}$

is the emissions of each of CO₂, CH₄ and N₂O for the year, as determined under paragraph (e)

G

is,—

- (a) if the fuel combusted contains biomass, the representative non-biomass fraction of $E_{\text{CO}_2 \text{ year}}$ determined in accordance with ASTM D6866–08; or
- (b) in every other case, 1.

(2) For the purposes of the tests in subclause (1)(a) and(b),—

- (a) the relevant monitoring equipment must operate for more than 90% of the time period over which emissions are monitored (excluding any period during which the equipment is not in operation because it is being calibrated); and
- (b) if part of the monitoring equipment is not operating for a period, readings taken during periods when the equipment was operating may be used to estimate data on a pro rata basis for the period that the equipment was not operating; and
- (c) the calibration gases used in characterisation of the monitoring equipment must be certified by a person or laboratory accredited to ISO 34:2000 by International Accreditation New Zealand, an overseas accreditation agency with whom International Accreditation New Zealand has a mutual recognition agreement, or an overseas accreditation agency recognised under New Zealand's mutual recognition arrangements, as being within 2% of the concentration specified on the cylinder label.

25 Periodic source testing method for calculating emissions from combusting used oil, waste oil, used tyres, or waste

- A person who wishes to use the periodic source testing method to calculate emissions from a class of used oil, waste oil, used tyres, or waste must—
 - (a) take the measurements and have the tests specified in regulation 24(1)(a) and (b) carried out over the period of a year at intervals that are sufficient to produce representative data that may be reliably extrapolated to provide estimates of emissions across the full range of operating conditions for that year; and
 - (b) using each set of data obtained under paragraph (a), calculate the rate of emissions of CO₂, CH₄, and N₂O from the relevant stacks at the time of measurement in accordance with the formula in regulation 24(1)(c); and
 - (c) estimate total tonnes of emissions for the year of each of CO₂, CH₄, and N₂O by reference to the results of the calculations under paragraph (b), the number of seconds during the year when the particular equipment was operating, and the full range of operating conditions for the year; and
 - (d) estimate total tonnes of emissions for the class of used or waste oil, used tyres, or waste, in accordance with the following formula:

$$E_4 = (E_{\text{CO}_2 \text{ year}} \times G) + (E_{\text{CH}_4 \text{ year}} \times 21) + (E_{\text{N}_2\text{O year}} \times 310)$$

where—

E_4

is the emissions for the class of used or waste oil, used tyres, or waste combusted in the particular equipment in the year in tonnes

$E_{\text{gastype year}}$

is the emissions for each of CO₂, CH₄, and N₂O for the year as determined under paragraph (c)

G

is,—

- (a) if the fuel combusted contains biomass, the representative non-biomass fraction of $E_{\text{CO}_2 \text{ year}}$ determined in accordance with ASTM D6866–08; or
- (b) in every other case, 1.

26 Calculating total emissions from combusting used oil, waste oil, used tyres, or waste

- An emissions return submitted by a person who is required to comply with this regulation must record the person's total emissions from the activity of combusting used oil, waste oil, used tyres, or waste for the purpose of generating electricity or industrial heat in the relevant year calculated by adding together the emissions for each class of used or waste oil, used tyres, or waste combusted in the year calculated under regulations 22 to 25.

Refining petroleum

27 Application of regulations 28 and 29

- A person must comply with regulations 28 and 29 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in Part 3 of Schedule 3 of the Act of refining petroleum where the refining involves the use of intermediate crude oil products for energy or feedstock purposes.

28 Collection and recording of information for purpose of calculating emissions from refining petroleum

- The following information must be collected and recorded in relation to intermediate crude oil products used for energy or feedstock purposes in petroleum refining in the year:
 - (a) the total number of tonnes of refinery asphalt used for combustion by the person in the year; and
 - (b) the total number of tonnes of refinery fuel oil used for combustion by the person in the year; and
 - (c) the total number of tonnes of refinery fuel gas used for combustion by the person in the year; and
 - (d) the total number of tonnes of CO₂ vented from manufacturing hydrogen by the person in the year, excluding CO₂ from obligation natural gas; and
 - (e) the total number of tonnes of refinery flare gas used for combustion by the person in the year; and
 - (f) the total number of tonnes of other intermediate crude oil products used for combustion or hydrogen manufacture by the person in the year.

29 Method of calculating emissions from refining petroleum

- (1) Emissions in relation to intermediate crude oil products used for energy or feedstock purposes in petroleum refining by the person in the year must be calculated in accordance with the following formula:

$$TE = (A \times EF) + (B \times EF) + (C \times EF) + D + (F \times EF) + (G \times EF)$$

where—

A

is the total number of tonnes of refinery asphalt used for combustion by the person in the year, as recorded under regulation 28(a)

B

is the total number of tonnes of refinery fuel oil used for combustion by the person in the year, as recorded under regulation 28(b)

C

is the total number of tonnes of refinery fuel gas used for combustion by the person in the year, as recorded under regulation 28(c)

D

is the the total number of tonnes of CO₂ vented from manufacturing hydrogen by the person in the year, as recorded under regulation 28(d)

EF

is the relevant emissions factor from Table 8 in Schedule 2

F

is the total number of tonnes of refinery flare gas used for combustion by the person in the year, as recorded under regulation 28(e)

G

is the total number of tonnes of other intermediate crude oil products used for combustion by the person in the year, as recorded under regulation 28(f)

TE

is the total emissions for the activity of refining petroleum for the year in tonnes.

(2) If a person required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Part 3

Industrial processes participants

Producing iron or steel

30 Application of regulations 31 and 32

- A person must comply with regulations 31 and 32 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in subpart 1 of Part 4 of Schedule 3 of the Act of producing iron or steel.

31 Collection and recording of information for purpose of calculating emissions from producing iron or steel

- The following information must be collected and recorded in relation to iron or steel produced:
 - (a) the total number of tonnes of uncalcined limestone used by the person in the year, expressed as tonnes of pure calcium carbonate; and
 - (b) the total number of tonnes of uncalcined dolomite used by the person in the year, expressed as tonnes of pure calcium magnesium carbonate; and
 - (c) the total number of tonnes of carbon in each type of carbon-containing input (other than obligation coal, or limestone or dolomite collected under paragraphs (a) and (b)) used in processing up to but not including the tapping of hot metal by the person in the year, expressed as tonnes of pure carbon.

32 Method of calculating emissions from producing iron or steel

- (1) Emissions in relation to iron or steel produced by the person in the year must be calculated in accordance with the following formula:

$$TE = (A \times EF_{LST}) + (B \times EF_{DOL}) + \Sigma(C \times EF_C)$$

where—

A

is the total number of tonnes of uncalcined limestone used by the person in the year, expressed in tonnes of pure calcium carbonate, as recorded under regulation 31(a)

B

is the total number of tonnes of uncalcined dolomite used by the person in the year, expressed in tonnes of pure calcium magnesium carbonate, as recorded under regulation 31(b)

C

is the total number of tonnes of carbon in each type of carbon-containing input, other than obligation coal, limestone, or dolomite, used by the person in the year, as recorded under regulation 31(c)

EF_C

is the emissions factor for carbon content from Table 9 in Schedule 2

EF_{DOL}

is the emissions factor for uncalcined dolomite from Table 9 in Schedule 2

EF_{LST}

is the emissions factor for uncalcined limestone from Table 9 in Schedule 2

TE

is the total emissions for the activity of producing iron or steel in the year in tonnes.

(2) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Producing aluminium

33 Application of regulations 34 and 35

- A person must comply with regulations 34 and 35 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in subpart 1 of Part 4 of Schedule 3 of the Act of producing aluminium, resulting in the consumption of anodes or the production of anode effects.

34 Collection and recording of information for purpose of calculating emissions from producing aluminium

- The following information must be collected and recorded in relation to aluminium produced in the year:
 - (a) the total number of tonnes of carbon dioxide resulting from baked anodes used by the person in the year, as calculated in accordance with the Aluminium Sector Greenhouse Gas Protocol; and
 - (b) the total number of tonnes of carbon dioxide resulting from pitch volatiles used by the person in the year, as calculated in accordance with the Aluminium Sector Greenhouse Gas Protocol; and
 - (c) the total number of tonnes of carbon dioxide resulting from packing material, other than obligation coal, used by the person in the year as calculated in accordance with the Aluminium Sector Greenhouse Gas Protocol; and
 - (d) the total number of tonnes of hot metal aluminium produced by the person in the year; and
 - (e) the anode effect minutes per cell-day (excluding non-steady state emissions and as defined in Appendix C of the Aluminium Sector Greenhouse Gas Protocol); and
 - (f) the slope coefficient for C_2F_6 (in kg C_2F_6/tAl) and for CF_4 (in kg CF_4/tAl), as provided by the Aluminium Sector Greenhouse Gas Protocol.

35 Method of calculating emissions from producing aluminium

- (1) Emissions in relation to aluminium produced by the person in the year must be calculated in accordance with the following formula:

$$TE = (A + B + C) + [D \times F \times \frac{(G \times H) + (I \times J)}{1000}]$$

- where—

- A

- is the total number of tonnes of carbon dioxide resulting from baked anodes used by the person in the year, as recorded under regulation 34(a)

- B

- is the total number of tonnes of carbon dioxide resulting from pitch volatiles used by the person in the year, as recorded under regulation 34(b)

- C
- is the total number of tonnes of carbon dioxide resulting from packing material used by the person in the year, as recorded under regulation 34(c)
- D
- is the total number of tonnes of hot metal aluminium produced in the year, as recorded under regulation 34(d)
- F
- is the anode effect minutes per cell-day, as recorded under regulation 34(e)
- G
- is the slope coefficient for C_2F_6 , as recorded under regulation 34(f)
- H
- is 9 200 (the global warming potential for C_2F_6)
- I
- is the slope coefficient for CF_4 , as recorded under regulation 34(f)
- J
- is 6 500 (the global warming potential for CF_4)
- TE
- is the total emissions for the activity of producing aluminium for the year in tonnes.
- (2) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Producing clinker or burnt lime

36 Application of regulations 37 and 38

- A person must comply with regulations 37 and 38 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in subpart 1 of Part 4 of Schedule 3 of the Act of producing clinker or burnt lime, resulting in calcination of limestone, or calcium carbonates.

37 Collection and recording of information for purpose of calculating emissions from producing clinker or burnt lime

- (1) The following information must be collected and recorded in relation to clinker and burnt lime produced in the year:
 - (a) the total number of tonnes of pure calcium oxide in clinker or burnt lime products derived from calcium carbonate calcined in a cement or lime kiln by the person in the year; and
 - (b) the total number of tonnes of pure magnesium oxide in clinker or burnt lime products derived from magnesium carbonate calcined in a cement or lime kiln by the person in the year and not recorded under paragraph (a); and
 - (c) the total number of tonnes of calcium oxide or magnesium oxide in cement kiln dust or lime kiln dust produced by the person in the year, excluding any dust that is recycled into a cement or lime kiln.
- (2) For the purposes of subclause (1)(a), up to 5% by weight of magnesium oxide, if present as an impurity, may be included and calculated as calcium oxide.

38 Method of calculating emissions from producing clinker or burnt lime

- (1) Emissions in relation to clinker and burnt lime produced by the person in the year must be calculated in accordance with the following formula:

$$TE = (A \times EF_{CAO}) + (B \times EF_{MGO}) + (C \times EF_{CAO})$$

where—

A

is the total number of tonnes of calcium oxide in clinker or burnt lime produced by the person in the year, as recorded under regulation 37(1)(a)

B

is the total number of tonnes of magnesium oxide in clinker or burnt lime produced by the person in the year, as recorded under regulation 37(1)(b)

C

is the total number of tonnes of calcium oxide and magnesium oxide in cement kiln dust or lime kiln dust produced by the person in the year, as recorded under regulation 37(1)(c)

EF_{CAO}

is the emissions factor for calcium oxide from Table 9 in Schedule 2

EF_{MGO}

is the emissions factor for magnesium oxide from Table 9 in Schedule 2

TE

is the total emissions for the activity of producing clinker or burnt lime for the year in tonnes.

(2) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Producing glass using soda ash

39 Application of regulations 40 and 41

- A person must comply with regulations 40 and 41 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in subpart 1 of Part 4 of Schedule 3 of the Act of producing glass using soda ash.

40 Collection and recording of information for purpose of calculating emissions from producing glass

- The following information must be collected and recorded in relation to the glass produced in the year:
 - (a) the total number of tonnes of soda ash used by the person in the year, expressed as tonnes of pure sodium carbonate; and
 - (b) the total number of tonnes of uncalcined limestone used by the person in the year, expressed as tonnes of pure calcium carbonate; and
 - (c) the total number of tonnes of uncalcined dolomite used by the person in the year, expressed as tonnes of pure calcium magnesium carbonate.

41 Method of calculating emissions from producing glass

- (1) Emissions in relation to the glass produced by the person in the year must be calculated in accordance with the following formula:

$$TE = (A \times EF_{SOA}) + (B \times EF_{LST}) + (C \times EF_{DOL})$$

where—

A

is the total number of tonnes of soda ash used by the person in the year, as recorded under regulation 40(a)

B

is the total number of tonnes of uncalcined limestone used by the person in the year, as recorded under regulation 40(b)

C

is the total number of tonnes of uncalcined dolomite used by the person in the year, as recorded under regulation 40(c)

EF_{DOL}

is the emissions factor for uncalcined dolomite from Table 9 in Schedule 2

EF_{LST}

is the emissions factor for uncalcined limestone from Table 9 in Schedule 2

EF_{SOA}

is the emissions factor for soda ash from Table 9 in Schedule 2

TE

is the total emissions for the activity of producing glass in the year in tonnes.

(2) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Producing gold

42 Application of regulations 43 and 44

- A person must comply with regulations 43 and 44 if the person, in any year, is a participant under section 54(1)(a) of the Act in respect of the activity in subpart 1 of Part 4 of Schedule 3 of the Act of producing gold.

43 Collection and recording of information for purpose of calculating emissions from producing gold

- The following information must be collected and recorded in relation to gold produced in the year:
 - (a) the total number of tonnes of uncalcined limestone reacted in use by the person in producing gold in the year, expressed as tonnes of pure calcium carbonate; and
 - (b) the total number of tonnes of uncalcined dolomite reacted in use by the person in producing gold in the year, expressed as tonnes of pure calcium magnesium carbonate.

44 Method of calculating emissions from producing gold

- (1) Emissions in relation to the gold produced by the person in the year must be calculated in accordance with the following formula:

$$TE = (A \times EF_{LST}) + (B \times EF_{DOL})$$

where—

A

is the total number of tonnes of uncalcined limestone reacted in use by the person in the year, as collected under regulation 43(a)

B

is the total number of tonnes of uncalcined dolomite reacted in use by the person in the year, as collected under regulation 43(b)

EF_{DOL}

is the emissions factor for uncalcined dolomite from Table 9 in Schedule 2

EF_{LST}

is the emissions factor for uncalcined limestone from Table 9 in Schedule 2

TE

is the total emissions for the activity of producing gold in the year in tonnes.

(2) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Part 4

Opt-in participants

Purchasing coal

45 Application of regulations 46 and 47

- (1) A person must comply with regulations 46 and 47 if the person, in any year, is a participant under section 54(1)(b) of the Act in respect of the activity in Part 4 of Schedule 4 of the Act of purchasing coal from 1 or more participants who mine coal where the total coal purchased exceeds 250 000 tonnes per year.
- (2) Regulations 46 and 47 apply only if the purchased coal is coal mined—
 - (a) on or after 1 January 2010; and
 - (b) by a person who is required to comply with regulations 10 and 11.

46 Collection and recording of information for purpose of calculating emissions from purchasing coal

- (1) The following information must be collected and recorded in relation to each class of coal for the year:
 - (a) the total number of tonnes of coal of the class purchased from each coal miner in the year, as recorded at the point of sale; and
 - (b) the calorific value of the coal referred to in paragraph (a); and
 - (c) the total number of tonnes of coal of the class purchased from a coal miner that are exported by the person in the year, as recorded at the customs point; and
 - (d) the calorific value of the coal referred to in paragraph (c).
- (2) If the person wishes to include a stockpile adjustment for the class of coal under regulation 47(1), then the person must also collect and record the information specified in clause 3 of Schedule 1.

47 Method of calculating emissions in relation to purchasing coal

- (1) Emissions for the year in relation to each class of coal must be calculated in accordance with the following formula:

$$E = ((A \times CV_1) - (S \times CV_2) - (C \times CV_1)) \times EF$$

where—

A

is the total number of tonnes of coal of the class purchased from coal miners in the year, as collected under regulation 46(1)(a)

C

is the total number of tonnes of coal of the class exported by the person in the year, as collected under regulation 46(1)(c)

CV₁

is the weighted average calorific value of the coal of the class purchased or exported, as the case may be, calculated by reference to the information collected under regulation 46(1)(b) or (d)

CV₂

is—

- (a) the figure for CV₂ determined in accordance with Schedule 1 if the person—
 - (i) includes a stockpile adjustment for the class of coal; or
 - (ii) does not include a stockpile adjustment, but a stockpile adjustment was included when emissions from importing the class of coal were calculated and reported in the previous emissions return submitted for the activity; or
- (b) zero, if S is zero

E

is the emissions in tonnes from the class of coal

EF

is,—

- (a) in relation to a class of coal for which no unique emissions factor is in force, the emissions factor for the class of coal from Table 2 in Schedule 2; or
- (b) in relation to a class of coal for which a unique emissions factor is in force, the unique emissions factor

S

is—

- (a) the figure determined in accordance with Schedule 1, if the person—
 - (i) includes a stockpile adjustment for the class of coal; or
 - (ii) does not include a stockpile adjustment, but a stockpile adjustment was included when emissions from purchasing the class of coal were calculated and reported in the previous emissions return submitted for the activity; or
- (b) zero, if the person does not include a stockpile adjustment for the class of coal and—
 - (i) it is the person's first emissions return for the activity; or

- (ii) a stockpile adjustment was not included when emissions from purchasing the class of coal were calculated and reported in the previous emissions return submitted for the activity.
- (2) An emissions return submitted by a person who is required to comply with this regulation must record the person's total emissions from the activity of purchasing coal in the relevant year, calculated by adding together the emissions for each class of coal purchased calculated under subclause (1).
- (3) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Purchasing natural gas

48 Application of regulations 49 and 50

- (1) A person must comply with regulations 49 and 50 if the person, in any year, is a participant under section 54(1)(b) of the Act in respect of the activity in Part 4 of Schedule 4 of the Act of purchasing natural gas from 1 or more participants who mine natural gas where the total natural gas purchased exceeds 2 petajoules in a year.
- (2) Regulations 49 and 50 apply only if the purchased natural gas (**opt-in natural gas**) is mined—
 - (a) on or after 1 January 2010; and
 - (b) by a person who is required to comply with regulations 16 and 17.

49 Collection and recording of information for purpose of calculating emissions from purchasing natural gas

- (1) The following information must be collected and recorded in relation to each class of opt-in natural gas for the year:
 - (a) the total number of tonnes of opt-in natural gas of the class purchased by the person from each gas miner in the year, as measured at the point of sale; and
 - (b) the total number of tonnes of opt-in natural gas of the class exported by the person in the year, as measured at the point of sale; and
 - (c) in respect of each of the quantities of opt-in natural gas referred to in paragraphs (a) and (b) (other than LPG butane or propane),—
 - (i) the total terajoules of the natural gas, as determined in accordance with subclause (2); and
 - (ii) if the standard emissions calculation formula in clause 50(3) is intended to be used, the mass fraction of carbon in the natural gas, as determined by reference to the tests in subclause (2)(b).
- (2) To obtain the information required by subclause (1)(c),—
 - (a) the opt-in natural gas must be sampled with continuous monitoring equipment where available at least every 30 minutes, or where this is not available, periodically with sufficient frequency to be representative of the information sought, but at least at intervals of no more than 3 months, and in accordance with—
 - (i) GPA 2166:2005 (obtaining natural gas samples for analysis by gas chromatography, Parts 1–8); or
 - (ii) any equivalent standard or test method related to an organisation that is listed in regulation 3(2) of the Climate Change (Unique Emissions Factors) Regulations 2009; and
 - (b) the samples must be tested, by a person or laboratory that is accredited as complying with ISO 17025:2005 by International Accreditation New Zealand, an overseas accreditation agency with whom International Accreditation New Zealand has a mutual recognition agreement, or an overseas accreditation agency recognised under New Zealand's mutual recognition arrangements, using gas chromatography in accordance with—
 - (i) ASTM D1945–03 (analysis of natural gas by gas chromatography); or

- (ii) any equivalent standard or test method related to an organisation that is listed in regulation 3(2) of the Climate Change (Unique Emissions Factors) Regulations 2009).

(3) In addition, if the person elects to include a storage adjustment under regulation 50(7), then the person must also collect and record the following information:

- (a) the total number of terajoules of opt-in natural gas injected in the year into a gas storage facility by the person; and
- (b) the total number of terajoules of opt-in natural gas extracted in the year from a gas storage facility by the person.

50 Method of calculating emissions in relation to purchasing natural gas

- (1) Emissions for the year in relation to each of the following quantities of opt-in natural gas must be calculated in accordance with either the standard formula in subclause (3) or the field specific formula in subclause (4):
 - (a) each class of natural gas (other than LPG, propane, or butane) purchased by the person in the year; and
 - (b) each class of natural gas (other than LPG, propane, or butane) exported by the person in the year.
- (2) Emissions for the year in relation to each of the following quantities of natural gas must be calculated in accordance with the formula in subclause (5):
 - (a) LPG, propane, or butane purchased by the person in the year; and
 - (b) LPG, propane, or butane exported by the person in the year.

(3) The standard formula for the calculation of emissions under this regulation is—

$$E = (m_C \times EF_C \times C) + (D \times EF_{M+N})$$

where—

C

is the total number of tonnes of the quantity of natural gas, as recorded under regulation 49(1)(a) or (b)

D

is the total terajoules of the quantity of natural gas, as recorded under regulation 49(1)(c)(i)

E

is the emissions from the quantity of natural gas

EF_C

is the emissions factor for carbon content from Table 9 in Schedule 2

EF_{M+N}

is,—

- (a) in relation to a class of natural gas for which no unique emissions factor is in force, the aggregate emissions factor for CH₄ and N₂O emissions for natural gas expressed in tCO₂e/TJ from Table 5 of Schedule 2:
- (b) in relation to a class of natural gas for which a unique emissions factor for CH₄ and N₂O is in force, the unique emissions factor

m_C

is the mass fraction of carbon in the quantity of gas as recorded under regulation 49(1)(c)(ii).

(4) A person may calculate emissions for a class of opt-in natural gas under the following field specific formula, if the field is listed in Table 10 in Schedule 2:

$$E = EF_{fieldn} \times D$$

where—

D

is the total terajoules of the quantity of natural gas, as recorded under regulation 49(1)(c)(i)

EF_{fieldn}

is the emissions factor for the relevant natural gas field from Table 10 in Schedule 2.

(5) Emissions for LPG, propane, or butane must be calculated in accordance with the following formula:

$$E = A \times EF$$

where—

A

is the total number of tonnes of natural gas of the class purchased by the person in the year, as collected under regulation 49(1)(a)

E

is the emissions for the class of natural gas in tonnes

EF

is,—

- (a) if the class of natural gas is a class of LPG with a propane content other than 60% by volume, the emissions factor for the class calculated in accordance with subclause (6); and
- (b) in any other case, the emissions factor for the class of natural gas from Table 4 in Schedule 2.

(6) For the purposes of subclause (5), the emissions factor for a class of LPG with a propane content other than 60% by volume, must be calculated as follows:

$$EF = (OF_{GAS} \times EF_{LPG}) + EF_{M+N}$$

where—

EF

is the emissions factor for the class of LPG in tCO₂e/t

EF_{LPG}

is the carbon dioxide emissions factor for LPG calculated as follows:

$$EF_{LPG} = 3.029 - \frac{(18.09 \times V_{PRO})}{572.6 - (65.9 \times V_{PRO})}$$

where—

V_{PRO}

is the volume fraction of propane in the LPG

EF_{M+N}

is the aggregate emissions factor for CH₄ and N₂O emissions for natural gas expressed in tCO₂e/t from Table 5 in Schedule 2

OF_{GAS}

is the oxidation factor for gas (other than flared) from Table 5 in Schedule 2.

(7) Total emissions from the activity of purchasing natural gas for the year must be calculated as follows:

$$TE = \Sigma(EP) - \Sigma(EE) - S$$

where—

EE

is the emissions from each class of opt-in natural gas exported by the person in the year, as calculated under subclause (3), (4), or (5)

EP

is the emissions from each class of opt-in natural gas purchased by the person in the year, as calculated under subclause (3), (4), or (5)

S

is,—

- (a) if the person elects to include a storage adjustment for natural gas for the year, the figure calculated as follows:

$$S = (G - H) \times EF_{\text{avge}}$$

where—

EF_{avge}

is the national average emissions factor for natural gas from Table 10 of Schedule 2

G

is the total number of terajoules of opt-in natural gas injected in the year by the person in the year into a gas storage facility, as collected under regulation 49(3)(a)

H

is the total number of terajoules of opt-in natural gas extracted in the year from a gas storage facility by the person, as recorded under regulation 49(3)(b); or

- (b) the figure for S used in the previous year's emissions return, if the person elects not to include a storage adjustment for opt-in natural gas purchased in the year but a storage adjustment was included when emissions from purchasing natural gas were calculated and reported in the previous emissions return submitted for the activity; or
- (c) zero, if the person does not include a storage adjustment for opt-in natural gas for the year and—
 - (i) it is the person's first emissions return for the activity; or
 - (ii) a storage adjustment was not included when emissions from purchasing natural gas were calculated and reported in the previous emissions return submitted for the activity

TE

is the total emissions for the activity of purchasing natural gas from 1 or more participants who mine natural gas where the total natural gas purchased exceeds 2 petajoules per year in tonnes.

(8) If a person who is required to comply with this regulation is required to submit an emissions return for a period other than a year, this regulation applies with any necessary modifications.

Schedule 1

Stockpile adjustments for activities of importing and purchasing coal

rr 7, 8,
46, 47

1 Interpretation

- In this schedule,—
 - amalgamated stockpile** means a stockpile—
 - (a) that has been formed by adding obligation coal to a base stockpile; and
 - (b) in respect of which the aggregate number of tonnes of coal removed from the stockpile has not, at 1 January in the year, exceeded the number of tonnes in the base stockpile
 - base date** means 1 January in the first stockpile adjustment year
 - base stockpile** means a stockpile of coal owned by the person at the base date
 - coal** includes coal that was imported or mined (in the case of purchased coal) before 1 January 2010
 - first stockpile adjustment year** means—
 - (a) the first year in respect of which a stockpile adjustment is claimed in relation to a stockpile of coal; or
 - (b) where a stockpile adjustment has not been claimed in respect of a year, the next year in respect of which a stockpile adjustment for the stockpile is claimed
 - mixed stockpile** means a stockpile that is made up of—
 - (a) imported coal of more than 1 class; or
 - (b) coal purchased from a coal miner of more than one class; or
 - (c) imported coal and coal purchased from a coal miner.

2 Status of examples

- (1) An example is only illustrative of the provision it relates to and does not limit the provision.
- (2) If an example and the provision it relates to are inconsistent, the provision prevails.

3 Information to be collected and recorded for purposes of stockpile adjustment

- (1) A person who wishes to include a stockpile adjustment in relation to a class of coal under regulation 8(1) or 47(1) must collect and record information about—
 - (a) the total number of tonnes of coal of the class added to the stockpile in the year; and
 - (b) the calorific value of the coal referred to in paragraph (a); and

- (c) the total number of tonnes of coal of the class removed from the stockpile in the year.
- (2) If a person wishes to include a stockpile adjustment in relation to a class of coal on a mixed stockpile, subclause (1)(c) must be read as referring to the total tonnes of coal removed from the mixed stockpile in the year.
- (3) If a person wishes to include a stockpile adjustment in relation to an amalgamated stockpile in a year, the person must collect and record the following information:
- (a) the total number of tonnes of the person's base stockpile; and
 - (b) the aggregate number of tonnes of coal removed from the amalgamated stockpile between the base date and 31 December in the year.

4 Calculating S where stockpile contains single class of imported coal or purchased coal

- (1) This clause applies where a person includes a stockpile adjustment in relation to a class of coal under regulation 8(1) or 47(1) and the stockpile contains only 1 class of imported coal or 1 class of purchased coal.
- (2) S in the formula in regulation 8(1) or 47(1) must be calculated in accordance with the following formula:

$$S = TC_{\text{added}} - TC_{\text{removed}}$$

where—

TC_{added}

is the total number of tonnes of coal of the class added to the stockpile during the year, as recorded under clause 3(1)(a)

TC_{removed}

is,—

- (a) if the stockpile is an amalgamated stockpile,—
 - (i) zero, for every year until the aggregate number of tonnes of coal removed from the stockpile as recorded under clause 3(3)(b) is greater than the total number of tonnes of the base stockpile as recorded under clause 3(3)(a); and
 - (ii) in the year that the aggregate number of tonnes of coal removed from the stockpile as collected under clause 3(3)(b) equals or exceeds the total number of tonnes of the base stockpile as recorded under clause 3(3)(a), the figure calculated in accordance with the following formula:

$$TC_{\text{removed}} = \text{TotCR} - \text{BS}$$

where—

BS

is the total number of tonnes of coal in the base stockpile, as recorded under clause 3(3)(a)

TotCR

is the total number of tonnes of coal removed from the stockpile between the base date and 31 December in the year as recorded under clause 3(3)(b):

- (b) if the stockpile is not, or is no longer, an amalgamated stockpile, the total number of tonnes of coal of the class removed from the stockpile during the year, as recorded under clause 3(1)(c).

Example

Year 1

Year 2

Year 3

Year 4

A participant has a base stockpile of 100 000 tonnes of imported lignite as at 1 January 2010 and intends to add coal to the stockpile and include a stockpile adjustment for that year. 1 January 2010 is thus the person's base date for the stockpile

During 2010, 40 000 tonnes of imported lignite are added to the base stockpile and 50 000 tonnes are removed. Paragraph (a)(i) of the definition of TC_{removed} applies. Compared to the base stockpile of 100 000 tonnes, 50 000 tonnes have been removed, so TC_{removed} is zero.

$$S = TC_{\text{added}} - TC_{\text{removed}} \\ 40\,000 - 0$$

$$= 40\,000 \text{ tonnes}$$

During 2011, 70 000 tonnes of imported lignite are added to the stockpile and 40 000 tonnes are removed. Paragraph (a)(i) of the definition of TC_{removed} continues to apply. Compared to the base stockpile of 100 000, 90 000 tonnes have been removed (50 000 in 2010 and 40 000 in 2011) so TC_{removed} remains zero.

$$\begin{aligned} S &= TC_{\text{added}} - TC_{\text{removed}} \\ &= 70\,000 - 0 \\ &= 70\,000 \text{ tonnes} \end{aligned}$$

During 2012, 50 000 tonnes of imported lignite are added to the stockpile and 80 000 tonnes are removed. Paragraph (a)(ii) of the definition of TC_{removed} now applies as the total tonnes removed exceeds the base stockpile during the year. Compared to the base stockpile of 100 000, 170 000 tonnes have been removed (50 000 in 2010, 40 000 in 2011, and 80,000 in 2012). TC_{removed} is 70 000 (170 000 – 100 000 = 70 000)

$$\begin{aligned} S &= TC_{\text{added}} - TC_{\text{removed}} \\ &= 50\,000 - 70\,000 \\ &= -20\,000 \text{ tonnes} \end{aligned}$$

During 2013, 40 000 tonnes of imported lignite are added to the stockpile and 30 000 tonnes are removed. Paragraph (b) of the definition of TC_{removed} applies because the total aggregate of coal removed from the stockpile has exceeded the base stockpile.

$$\begin{aligned} S &= TC_{\text{added}} - TC_{\text{removed}} \\ &= 40\,000 - 30\,000 \\ &= 10\,000 \text{ tonnes} \end{aligned}$$

5 Calculating S where stockpile of class of coal is mixed stockpile

- (1) This clause applies if a person includes a stockpile adjustment in relation to a class of coal under regulation 8(1) or 47(1) and the relevant stockpile is a mixed stockpile.
- (2) However, a person must not include a stockpile adjustment in relation to a class of coal on a mixed stockpile unless a stockpile adjustment is also included in relation to all other classes of coal on the stockpile.
- (3) S in the formula in regulation 8(1) or 47(1) must be calculated in accordance with the following formula:

$$S = TC_{\text{added}} - (TS_{\text{removed}} \times \frac{(SC_{\text{opening}} + TC_{\text{added}})}{TS})$$

where—

SC_{opening}

is,—

- (a) for the first stockpile adjustment year, zero; and
- (b) for any other year, $\sum(SY)$

where—

- SY is the figure used to claim a stockpile adjustment for the class of coal for each year since the base date

TC_{added}

is the total number of tonnes of coal of the class added to the stockpile during the year, as recorded under clause 3(1)(a)

TS

is the total tonnes of coal on or added to the stockpile during the year, as determined under subclause (4)

TS_{removed}

is,—

- (a) if the stockpile is an amalgamated stockpile,—
 - (i) zero, for every year until the aggregate number of tonnes of coal removed from the stockpile as collected under clause 3(3)(b) is greater than the total number of tonnes of the base stockpile as recorded under clause 3(3)(a); and

- (ii) in the year that the aggregate number of tonnes of coal removed from the stockpile as recorded under clause 3(3)(b) equals or exceeds the total number of tonnes of the base stockpile as recorded under clause 3(3)(a), the figure calculated in accordance with the following formula:

$$TS_{\text{removed}} = \text{TotCR} - \text{BS}$$

where—

BS

is the total number of tonnes of coal in the base stockpile, as recorded under clause 3(3)(a)

TotCR

is the total number of tonnes of coal removed from the stockpile between the base date and 31 December in the year, as recorded under clause 3(3)(b):

- (b) if the stockpile is not, or is no longer, an amalgamated stockpile, the total number of tonnes of coal removed from the stockpile during the year, as collected under clause 3(1)(c).

(4) TS must be calculated in accordance with the following formula:

$$TS = TS_{\text{opening}} + TS_{\text{added}}$$

where—

TS_{added}

is the total number of tonnes of coal added to the stockpile during the year, determined by adding together the figures for all classes of imported coal or purchased coal that were added to the stockpile during the year, as collected under clause 3(1)(a)

TS_{opening}

is,—

- (a) for the first stockpile adjustment year, zero; or
- (b) for any other year, the total number of tonnes of the stockpile of coal at 1 January determined by adding together the figures for SC_{opening} for all classes of imported coal or purchased coal that constitute the stockpile.

Example

Year 1

Imported coal of the class to which the default emissions factor applies

Imported coal of the class to which the unique emission factor applies

Purchased coal

Year 2

Imported coal of the class to which the default emissions factor applies

Imported coal of the class to which the unique emission factor applies

Purchased coal

A participant has a stockpile made up of imported and purchased lignite and decides to claim a stockpile adjustment. As at 1 January in the year, the stockpile contained 20 000 tonnes of mixed imported and purchased lignite. This is the base stockpile.

During the year 60 000 tonnes of imported lignite were added (40 000 of a new class to which a unique emissions factor applied, and 20 000 other tonnes) and 20 000 tonnes of purchased lignite were added. 50 000 tonnes of lignite were removed during the year.

Three calculations are necessary. Two to determine the stockpile adjustment for the two classes of imported coal and 1 for the class of purchased coal.

Paragraph (a)(ii) of the definition of TS_{removed} applies. Compared to the base stockpile of 20 000 tonnes, 50 000 tonnes have been removed. TS_{removed} is 30 000 (50 000 – 20 000).

$$\begin{aligned} S &= TC_{\text{added}} - (TS_{\text{removed}} \times ((SC_{\text{opening}} + TC_{\text{added}})/TS)) \\ &= 20\,000 - (30\,000 \times (0 + 20\,000) / (0 + 80\,000)) \\ &= 20\,000 - (30\,000 \times (20\,000 / 80\,000)) \\ &= 20\,000 - (30\,000 \times 0.25) \\ &= 20\,000 - 7\,500 \\ &= 12\,500 \text{ tonnes} \end{aligned}$$

$$\begin{aligned} S &= TC_{\text{added}} - (TS_{\text{removed}} \times ((SC_{\text{opening}} + TC_{\text{added}})/TS)) \\ &= 40\,000 - (30\,000 \times (0 + 40\,000) / (0 + 80\,000)) \end{aligned}$$

$$\begin{aligned}
&= 40\,000 - (30\,000 \times (40\,000 / 80\,000)) \\
&= 40\,000 - (30\,000 \times 0.5) \\
&= 40\,000 - 15\,000 \\
&= 25\,000 \text{ tonnes} \\
S &= TC_{\text{added}} - (TS_{\text{removed}} \times ((SC_{\text{opening}} + TC_{\text{added}})/TS)) \\
&= 20\,000 - (30\,000 \times (0 + 20\,000) / (0 + 80\,000)) \\
&= 20\,000 - (30\,000 \times (20\,000 / 80\,000)) \\
&= 20\,000 - (30\,000 \times 0.25) \\
&= 20\,000 - 7\,500 \\
&= 12\,500 \text{ tonnes}
\end{aligned}$$

During the year 20 000 tonnes of the class of imported lignite to which a unique emissions factor applied, 20 000 tonnes of imported lignite without a unique emissions factor, and 10 000 tonnes of purchased lignite were added. 50 000 tonnes of lignite were removed during the year.

Paragraph (b) of the definition of TS_{removed} applies because the total aggregate quantity of coal from the stockpile has exceeded the base stockpile.

$$\begin{aligned}
S &= TC_{\text{added}} - (TS_{\text{removed}} \times ((SC_{\text{opening}} + TC_{\text{added}})/TS)) \\
&= 20\,000 - (50\,000 \times (12\,500 + 20\,000) / (50\,000 + 50\,000)) \\
&= 20\,000 - (50\,000 \times (32\,500 / 100\,000)) \\
&= 20\,000 - (50\,000 \times 0.325) \\
&= 20\,000 - 16\,250 \\
&= 3\,750 \text{ tonnes}
\end{aligned}$$

$$\begin{aligned}
S &= TC_{\text{added}} - (TS_{\text{removed}} \times ((SC_{\text{opening}} + TC_{\text{added}})/TS)) \\
&= 20\,000 - (50\,000 \times (25\,000 + 20\,000) / (50\,000 + 50\,000)) \\
&= 20\,000 - (50\,000 \times (45\,000 / 100\,000)) \\
&= 20\,000 - (50\,000 \times 0.45) \\
&= 20\,000 - 22\,500 \\
&= -2\,500 \text{ tonnes}
\end{aligned}$$

$$\begin{aligned}
S &= TC_{\text{added}} - (TS_{\text{removed}} \times ((SC_{\text{opening}} + TC_{\text{added}})/TS)) \\
&= 10\,000 - (50\,000 \times (12\,500 + 10\,000) / (50\,000 + 50\,000)) \\
&= 10\,000 - (50\,000 \times (22\,500 / 100\,000)) \\
&= 10\,000 - (50\,000 \times 0.225) \\
&= 10\,000 - 11\,250 \\
&= -1\,250 \text{ tonnes}
\end{aligned}$$

6 Calculating S where stockpile adjustment is not included in year, but was included in previous emissions return for activity

- (1) This clause applies if a person does not include a stockpile adjustment for a class of coal, but a stockpile adjustment was included when emissions from the class of coal were calculated and reported in the previous emissions return submitted for the activity of importing coal or purchasing coal from a coal miner, as the case may be.
- (2) If this clause applies, S must be calculated in accordance with the following formula:

$$S = -1 \times \sum(SY)$$

where—

SY

is the figure for S used to claim a stockpile adjustment for the class of coal for each year since the base date.

Example

Imported coal of the class to which the default emissions factor applies

Imported coal of the class to which the unique emissions factor applies

Purchased coal

Using the figures from the example for clause 4, if the participant referred to in that example did not claim a stockpile adjustment in year 5, S for year 5 would be calculated as follows:

$$\begin{aligned} S &= -1 \times \sum(SY) \\ S &= -1 \times \sum(40\,000 + 70\,000 + -20\,000 + 10\,000) \\ S &= -1 \times 100\,000 \\ S &= -100\,000 \text{ tonnes} \end{aligned}$$

Using the figures from the example for clause 5, if the participant referred to in that example did not claim a stockpile adjustment in year 3, S for year 3 for each class would be calculated as follows:

$$\begin{aligned} S &= -1 \times \sum(SY) \\ S &= -1 \times \sum(12\,500 + 3\,750) \\ S &= -1 \times 16\,250 \\ S &= -16\,250 \text{ tonnes} \\ S &= -1 \times \sum(SY) \\ S &= -1 \times \sum(25\,000 + -2\,500) \\ S &= -1 \times 22\,500 \\ S &= -22\,500 \text{ tonnes} \\ S &= -1 \times \sum(SY) \\ S &= -1 \times \sum(12\,500 + -1\,250) \\ S &= -1 \times 11\,250 \\ S &= -11\,250 \text{ tonnes} \end{aligned}$$

7 Calculating CV₂ for purposes of regulation 8(1) or 47(1)

- (1) In regulation 8(1) or 47(1), if the person—
 - (a) is claiming a stockpile adjustment, CV₂ is the figure calculated under subclause (2):
 - (b) is not claiming a stockpile adjustment for the class of coal in the current year, but claimed a stockpile adjustment when emissions from the class of coal were calculated and reported in the previous emissions return for the activity, CV₂ is the figure that was used as CV₂ when calculating emissions for the stockpile of the class of coal in the previous year's emissions return.

(2) For the purposes of subclause (1)(a), CV₂ is the figure calculated in accordance with the following formula:

$$CV_2 = \frac{(SC_{\text{opening}} \times CV_{\text{opening}}) + (TC_{\text{added}} \times CVT_{\text{added}})}{SC_{\text{opening}} + TC_{\text{added}}}$$

where—

CV_{opening}
is—

- (a) in the first stockpile adjustment year, zero:
- (b) in every subsequent year, the figure of CV₂ from the previous year (as determined and recorded under this clause)

CVT_{added}

is the weighted average calorific value of the tonnes of the class of coal added, calculated by reference to the information recorded under clause 3(1)(b)

SC_{opening}
is—

- (a) in the first stockpile adjustment year, zero:
- (b) in every subsequent year, the figure determined in accordance with the following formula:

$$\sum(SY)$$

where—
SY

is the figure for S used to claim a stockpile adjustment for the class of coal for each year since the base date

TC_{added}

is the tonnes of the class of coal added, as collected under clause 3(1)(a).

Example

Year 1

Imported lignite

Purchased lignite

Year 2

Imported lignite

Purchased lignite

A participant has a stockpile of lignite. In the first stockpile adjustment year 20 000 tonnes of imported lignite with a calorific value of 0.01675 TJ/t and 15 000 tonnes of purchased lignite with a calorific value of 0.01695 TJ/t were added. No tonnes were removed. CV_2 for the first year is calculated in accordance with the following formula:

$$CV_2 = \frac{(SC_{\text{opening}} \times CV_{\text{opening}}) + (TC_{\text{added}} \times CV_{T_{\text{added}}})}{SC_{\text{opening}} + TC_{\text{added}}}$$

$$CV_2 = \frac{(0 \times 0) + (20\,000 \times 0.01675)}{0 + 20\,000}$$

$$CV_2 = 0.01675 \text{ TJ/t}$$

$$CV_2 = \frac{(0 \times 0) + (15\,000 \times 0.01695)}{0 + 15\,000}$$

$$CV_2 = 0.01695 \text{ TJ/t}$$

SC_{opening} for the next year is $\sum(SY)$. This was 20 000 for the imported lignite and 15 000 for the purchased lignite. During the year the participant adds the following:

- (a) 60 000 tonnes of imported lignite with CV of 0.01695 TJ/t;
- (b) 18 000 tonnes of purchased lignite with CV of 0.01675 TJ/t.

$$CV_2 = \frac{(20\,000 \times 0.01675) + (60\,000 \times 0.01695)}{20\,000 + 60\,000}$$

$$CV_2 = 0.01690 \text{ TJ/t}$$

$$CV_2 = \frac{(15\,000 \times 0.01695) + (18\,000 \times 0.01675)}{15\,000 + 18\,000}$$

$$CV_2 = 0.01684 \text{ TJ/t}$$

Schedule 2	rr 3, 8,
Emissions and oxidation factors	14, 17,
	20, 23,
	29, 32,
	38, 41,
	44, 47,
	50

In this schedule—

bituminous coal—

- (a) means coal—
 - (i) the gross calorific value of which is greater than 17.44 MJ/kg, measured on an ash free but bed (or in-ground) moist basis as defined by ISO 1170:1977 (Coal and coke—Calculation of analyses to different bases); and
 - (ii) the crucible swelling index of which is greater than zero as measured according to ISO 501:2003 (Hard coal—Determination of the crucible swelling number); and
- (b) includes anthracite

lignite means coal of which the gross calorific value is less than or equal to 17.44 MJ/kg, measured on an ash free but bed (or in-ground) moist basis as defined by ISO 1170:1977 (Coal and coke—Calculation of analyses to different bases)

peat means combustible, soft, porous, or compressed sedimentary deposit of plant origin with a high water content

sub-bituminous coal means coal—

- (a) the gross calorific value of which is greater than 17.44 MJ/kg, measured on an ash free but bed (or in-ground) moist basis as defined by ISO 1170:1977 (Coal and coke—Calculation of analyses to different bases); and
- (b) the crucible swelling index of which is zero as measured according to ISO 501:2003 (Hard coal—Determination of the crucible swelling number).

Table 1
Importing coal

Class	Emissions factor	Unit
Lignite or peat	94.79	tCO ₂ e/TJ
Sub-bituminous	90.64	tCO ₂ e/TJ
Bituminous	88.15	tCO ₂ e/TJ

Table 2
Mining or purchasing coal

Class	Emissions factor	Unit
Lignite—Waimumu and Roxburgh fields	91.95	tCO ₂ e/TJ
Lignite—all other fields, or peat	94.79	tCO ₂ e/TJ
Sub-bituminous	90.64	tCO ₂ e/TJ
Bituminous	88.15	tCO ₂ e/TJ

Table 3
Fugitive coal seam gas

Part A—Underground and surface mining

Category of coal	Emissions factor	Unit
Coal mined from surface mining	0.018	tCO ₂ e/t coal
Bituminous coal mined from underground mining	0.385	tCO ₂ e/t coal
Sub-bituminous coal mined from underground mining	0.288	tCO ₂ e/t coal

Part B—Flaring and combusting for energy

	Emissions factor	Unit
Flaring, combusting for energy, or otherwise oxidising coal seam gas	17.89	tCO ₂ e/t methane

Table 4
Importing or purchasing natural gas

Class	Emissions factor	Unit
Propane	2.988	tCO ₂ e/t
Butane	3.024	tCO ₂ e/t
LPG (P60:B40)	3.003	tCO ₂ e/t
LNG	53.64	tCO ₂ e/TJ

Table 5
Combustion of natural gas (mined or purchased)

	Class	Emissions factor	Unit
EF _{M+N}	Aggregate CH ₄ and N ₂ O	0.054	tCO ₂ e/TJ
	Aggregate CH ₄ and N ₂ O	0.0099	tCO ₂ e/t
OF _{GAS}	Oxidation factor for gas other than flared	0.995	n/a
	Oxidation factor for flared gas	0.980	n/a

Table 6
Geothermal fluid

Part A

	Class Geothermal fluid used by	Emissions factor	Unit
	Kawerau II	0.0275	tCO ₂ e/t steam
	Kawerau Industrial	0.0275	tCO ₂ e/t steam
	Kawerau KA24	0.0275	tCO ₂ e/t steam
	Mokai I and II	0.0069	tCO ₂ e/t steam
	Ngawha I and II	0.2120	tCO ₂ e/t steam
	Ohaaki	0.0575	tCO ₂ e/t steam
	Poihipi Road	0.0049	tCO ₂ e/t steam
	Rotokawa I	0.0214	tCO ₂ e/t steam
	Wairakei G14	0.0050	tCO ₂ e/t steam
	Wairakei A and B	0.0050	tCO ₂ e/t steam
	Any other plant or process using geothermal steam to produce electricity or industrial heat	0.0300	tCO ₂ e/t steam

Part B

	Class Geothermal fluid used by	Emissions factor	Unit
	Mokai Greenhouse	0.0000	tCO ₂ e/t2-phase fluid
	Tauhara Tenon	0.0008	tCO ₂ e/t2-phase fluid
	Any other plant or process using geothermal fluid to produce electricity or industrial heat through a process other than production of geothermal steam	0.0008	tCO ₂ e/t2-phase fluid

Table 7
Combusting used oil, waste oil, used tyres, and waste

Class	Emissions factor	Unit
Used or waste oil	78.35	tCO ₂ e/TJ
Used tyres	150.99	tCO ₂ e/TJ
Municipal waste—biomass	1.969	tCO ₂ e/TJ
Municipal waste—consisting of or containing non-biomass	97.53	tCO ₂ e/TJ

Table 8
Refining petroleum (Marsden Point Refinery)

Intermediate crude oil product	Emissions factor	Unit
Refinery fuel gas	2.848	tCO ₂ e/t
Refinery fuel oil	3.115	tCO ₂ e/t
Refinery asphalt	3.179	tCO ₂ e/t
Refinery flare gas	2.921	tCO ₂ e/t
Other intermediate crude oil products	3.179	tCO ₂ e/t

Table 9
Chemical ratios

Symbol	Emissions source	Emissions factor	Unit
EF _C	Carbon	3.6641	tCO ₂ e/t
EF _{CAO}	Calcium oxide	0.7848	tCO ₂ e/t
EF _{MGO}	Magnesium oxide	1.0919	tCO ₂ e/t
EF _{SOA}	Soda ash (Na ₂ CO ₃)	0.4152	tCO ₂ e/t
EF _{LST}	Uncalcined limestone (CaCO ₃)	0.4397	tCO ₂ e/t
EF _{DOL}	Uncalcined dolomite (CaMg(CO ₃) ₂)	0.4773	tCO ₂ e/t

Table 10
Mining or purchasing natural gas

Class	Emissions factor	Unit
Kaimiro	55.14	tCO ₂ e/TJ
Kapuni	53.09	tCO ₂ e/TJ
Kapuni LTS	84.15	tCO ₂ e/TJ
Mangahewa	57.45	tCO ₂ e/TJ
Maui	52.42	tCO ₂ e/TJ
McKee	54.35	tCO ₂ e/TJ
Ngatoro	53.12	tCO ₂ e/TJ
Pohokura	54.28	tCO ₂ e/TJ
Rimu/Kauri	51.91	tCO ₂ e/TJ
TAWN	54.91	tCO ₂ e/TJ
Turangi	54.72	tCO ₂ e/TJ
National average (2008 calendar year)	53.64	tCO ₂ e/TJ

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