

FINAL NEW ENTRANT/CHP VERIFICATION REPORT

NE2-013-R2/CHP2-005-R2- FINAL

This report has been re-issued by the Technical Committee of the EPA and replaces NE2-013-R1/CHP2-005-R1 as issued by the EPA to the Operator on 23 January 2012.

Reason for Revision:

Technical Committee's consideration of the objection received from the Operator on 6 February 2012. The objection and supporting information and the Technical Committee's report are available on public file from the EPA offices.

New Entrant /CHP Register Number	Verified NESA Priority ¹	Verified CHPSA Priority
NE2-013/CHP2-005	011	005

Date: 26 March 2012

RE: Application for a free allocation of EU allowances from Ireland's New Entrant Set Aside (2008-2012)

Application Details

Operator name:	FMC Manufacturing Ltd
Installation name:	FMC International
Installation address:	Wallingstown, Little Island Co Cork
GHG permit Register number:	IE-GHG168-01
Class of activity:	Combustion installations with a rated thermal input exceeding 20 MW (except hazardous or municipal waste installations)
Initial NESA application documents received:	10 October 2011
Assigned Priority Date NESA:	27 October 2011
Assigned Priority Date CHPSA:	25 November 2011
Letter (RFI) issued:	28 October 2011
Further information received:	8, 21, 25, 28, 30 November 2011 and 16 January 2012.
Site Inspection:	27 October 2011
New entrant Historical Start date:	4 May 2010 is the start date for the Niro 2 Dryer. From this date the combustion installation exceeded the 20 MW thermal input capacity.
Proposed New Entrant Report published:	23 January 2012
Objection Received:	6 February 2012

¹ The verified priority may change if applications currently ahead on the list are removed/ their priority changed.

Description of the development:

The new entrant application, which is a late entrant, is in relation to FMC Manufacturing Ltd, which manufactures a range of excipients which are derived from cellulosic materials. This is an existing installation which exceeded the 20 MW thermal input capacity threshold in Schedule 1 of the European Communities (Greenhouse Gas Emissions Trading) Regulations (See SI 437 of 2004 and amendments) on the 04 May 2010 when an additional Niro Dryer of 8.26 MW thermal input capacity was commissioned on site. In addition to the Niro 2 Dryer there are 3 other dryers and 2 boilers with a total thermal input capacity of 18.51 MW and a CHP plant of 5.36 MW thermal input capacity and 2.074 MW electrical output capacity.

Consents submitted:**Planning permission:**

Planning Register No. 095217: On 14 July 2009, Cork County Council granted planning permission to FMC International for the construction of a new dryer, associated equipment, platform, electrical equipment room and screen room.

Planning Register No. S/99/2742: On the 25 August 1999, Cork County Council granted planning permission to FMC International for an extension to the production building and warehouse & erection of a dryer.

Planning Register No. S/204/86: On the 30 April 1986 Cork County Council granted Planning Permission to Irish Industrial Gases Ltd for the Construction of combined heat and power plant. This is the CHP that is now within the site boundary operated by FMC Manufacturing Ltd and part of the FMC International installation.

Planning Register No. 546/82: On 15 April 1982 Cork County Council granted planning permission to FMC International for an extension to the factory.

Planning Register No. 1568/76: On 23 July 1976 Cork County Council granted planning permission to FMC Corporation for the erection of a factory (consisting of main production and warehouse buildings, offices, water pump house, effluent treatment plant and ancillaries).

Licence to construct:

The Commission for Energy Regulation issued an Authorisation to Construct (ref: Auth. 2001/07-02) on the 20 September 2001 in respect of the 2MW_e CHP plant at FMC Ireland, Wallingstown, Little Island, Co. Cork.

Grid Connection Agreement:

ESB Networks confirmed in a letter to FMC International dated 23 November 2011 that "The grid connection agreement in relation to the CHP facility located at FMC, Wallingstown, Little Island Co. Cork is not available on file due to the age of the agreement which predates the current ESB Networks files. The agreement was made in 1994. We can confirm that there is an agreement in place for the CHP. The site currently has a Maximum export capacity of 2.4MVA".

Site Inspection:

Date of Site Inspection: 27 October 2011.

Applicant Representatives: Mr John Devine, Maintenance Manager, Mr Kevin Fortune, Consultant (Fingleton White & Co. Ltd.)

EPA Representative: Ms Annette Prendergast

Basis for Priority on New Entrant Application Register:

For the NESA a complete valid application was received on the 27 October 2011. The applicant provided the EPA with a copy of the planning permission for the new Dryer on this date and this duly completed the application to the NESA.

For the CHPSA a duly completed application was received on the 25 November 2011, when an electronic copy of the ESB Networks' letter confirming the grid connection agreement was received.

Site Tour Observations: All of the emission sources including the dryers, boilers and CHP plant were observed to be in place and operational.

Documentation Examined:

(i) Substantiated Valid Business Reason:

This is an existing installation which has been in operation since 1977. A review of natural gas bills on-site shows that natural gas consumption has increased on site following the commissioning of the Niro 2 Dryer.

(ii) Substantiated New Entrant Start Date: 04 May 2010

A Performance test report on the Niro 2 Dryer examined during the site visit gives a date of 04 May 2010 for the combustion of fuel in the Niro 2 Dryer. The combustion installation exceeded the 20 MW thermal input capacity threshold with the commencement of this emission source, which has a thermal input capacity of 8.26 MW, on the 04 May 2010. The CHP plant is an existing emission source on the FMC International site since 1995.

(iii) Basis for Projections:

The applicant's projections are based on historic data on gas and gas oil consumption and billed electricity and heat generation from the CHP plant up to September 2011. From October 2011 the projections are based on forecast emissions.

Documentation Examined:

All gas invoices for total site gas consumption, CHP gas and other site gas were examined from January 2010 to September 2011. All CHP electricity and heat bills for that time period were also examined. Delivery dockets for gas oil consumption in the engineering block boiler were also examined. Documentation on independent confirmation of the electrical and heat output capacity of the CHP plant and thermal input capacity of the boilers and dryers was also examined.

Detailed Calculation of Projected Emissions

Applicant methodology for calculation of projected emissions:

Projected emissions for the installation were submitted on 30 November 2011 and the 16 January 2012.

CHP electricity and heat:

The projections are based on historic data up to December 2011. Gas electricity and heat are all metered independently from the CHP plant. Monthly electrical output for the CHP is divided by the BNE CCGT efficiency of 54.7%, converted to TJ and multiplied by the country specific emission factor for Natural Gas. The 2010 factor is used for 2010 emissions and the 2011 factor applied to 2011 emissions. In relation to projected emissions for 2012, July 2011 electricity consumption is applied for each month until December 2012 factored down for February and 30 day months.

The emissions associated with heat from the CHP up to December 2011 are calculated by converting the billed CHP heat to TJ and multiplying by the heat benchmark for phase 3 (based on an emission factor of 56.1 tCO₂/TJ and a boiler efficiency of 90%). In relation to projected emissions from January 2012, July 2011 heat consumption is applied for each month until December 2012 factored down for February and 30 day months.

Calculation for electricity

$tCO_2 = \text{Billed kWh}_e \text{ output} / \text{BNE Efficiency} \times 3.6 \times 10^{-6} \times \text{Natural Gas Emission Factor}$

Where:

BNE Efficiency = 54.7%

3.6×10^{-6} = conversion factor kWh to TJ

Natural Gas Emission factor = 56.873 tCO₂/TJ in 2010, 57.022 tCO₂/TJ in 2011 and 2012

2010 04 May to 31 December

Billed kWh_e = 10,679,786.23

Tonnes CO₂ = 3,997.46

2011 January to December

Billed kWh_e = 14,579,201

Tonnes CO₂ = 5,471.3

2012 January to December

Projected kWh_e = 17,510,266

Tonnes CO₂ = 6,571.28

Calculation for Heat

$tCO_2 = \text{Billed kWh heat output} \times 3.6 \times 10^{-6} \times \text{Phase III heat benchmark}$

Where

3.6×10^{-6} = conversion factor kWh to TJ

Phase III heat benchmark = 62.3 EUA/TJ (Emission factor 56.1 TCO₂/TJ/0.9 (boiler efficiency) = 62.3 TCO₂/TJ)

2010 04 May to 31 December

Billed kWh = 11,560,130

Tonnes CO₂ = 2,592.71

2011 January to December

Billed kWh = 18,100,527

Tonnes CO₂ = 4,059.59

2012 January to December

Projected kWh = 22,563,912

Tonnes CO₂ = 5,060.63

Emissions from Boilers and Dryers

The projections are based on historical emissions until December 2011. Gas to the boilers and dryers is metered and billed separately to CHP gas. Billed gas in gross kWh is converted to net calorific value, then TJ and the country specific emission factor for Natural Gas is applied to calculate tonnes CO₂. In relation to projected emissions from January 2012, July 2011 gas consumption is applied for each month until December 2012 factored down for February and 30 day months. *De-minimis* gas oil emissions are based on a year of invoiced gas oil for the gas oil boiler and an estimate of gas oil consumption based on run hours for the fire pumps. Gas oil consumption is converted to kilo-tonnes and multiplied by the country specific NCV and emission factor for gas oil.

Calculation for Boilers and Dryers Gas Combustion

$tCO_2 = \text{Billed kWh gas consumption (GCV)} \times 0.9028 \times 3.6 \times 10^{-6} \times \text{Natural Gas emission factor}$ Where
0.9028 = Conversion factor from GCV to NCV

3.6×10^{-6} = conversion factor kWh to TJ

Natural Gas Emission factor = 56.873 tCO₂/TJ in 2010, 57.022 tCO₂/TJ in 2011 and 2012

2010 04 May to 31 December

Billed kWh = 66,982,292
Tonnes CO₂ = 12,381.13

2011 January to December

Billed kWh = 134,585,362
Tonnes CO₂ = 24,942.18

2012 January to December

Projected kWh = 150,066,254
Tonnes CO₂ = 27,811

Calculation for Gas Oil combustion

Boiler

$tCO_2 = 0.015109Kt \times 43.31 \times 73.3 = 47.96 \text{ t CO}_2$

Fire Pump

0.344 t CO₂

Total Annual from Gas Oil = 48.31 t CO₂

2010 May to December = $48.31/365 \times 242 = 32 \text{ t CO}_2$

2012 Leap Year = $48.31/365 \times 366 = 48.44 \text{ t CO}_2$

The table below summarises the applicant's projected tonnes of CO₂ from the installation.

Applicant Estimated and Projected tonnes CO₂/annum:

Unit	2010	2011	2012
CHP Electricity	3,997.46	5,471.3	6,571.28
CHP Heat	2,592.71	4,059.59	5,060.63
Dryers and Boilers	12,381.13	24,942.18	27,811
Gas Oil	32.00	48.31	48.436
Total	19,003	34,521	39,491

EPA methodology for calculation of projected emissions:

CO₂ emissions from the CHP are calculated as follows:

In accordance with Appendix 3(2) t) of Ireland's National Allocation Plan for Emissions Trading 2008-2012 *Late Entrant* applications to the CHP set-aside will be treated similarly to *Late Entrant* applications to NESA. *Late Entrants* allocations will be calculated only from the assigned priority date forward. The assigned priority date for the CHP set-aside is 25 November 2011.

In relation to electricity generation the approach as recommended in the NAP, based on a "Best New Entrant" (BNE) CCGT power plant (CER 2007) has been deemed appropriate by the EPA. The basis for the projections has been determined as follows:

(Net electrical output MW/BNE efficiency for CCGT plant of 54.7%) x (number of hours per year) x (CER recommended capacity utilisation factor, 90.87%) x (Country Specific Emission factor for natural gas, (NCV)/ 277.778 (conversion factor MW to TJ)).

Where:

Net electrical output = 2.074 MW_e

Country Specific emission factor = 57.022 tCO₂/TJ in 2011

Calculation

2011

$2.074 \text{ MW}_e / 0.547 \text{ (BNE Efficiency)} \times 888 \text{ (No of hours from 25 November to 31 December)} \times 0.9087 \text{ (Capacity utilisation factor)} \times (57.022/277.778) \text{ (NG emission factor t CO}_2\text{/MW)} = 628.06 \text{ t CO}_2$

2012

$2.074 \text{ MW}_e / 0.547 \text{ (BNE Efficiency)} \times 8784 \text{ (No of hours in the year)} \times 0.9087 \text{ (Capacity utilisation factor)} \times (57.022/277.778) \text{ (NG emission factor t CO}_2\text{/MW)} = 6,212.68 \text{ CO}_2$

In relation to heat generation from the CHP plant, 2011 emissions are calculated based on EPA verified billed heat from 25 November to 31 December as follows:

Heat generated from 25 November to 31 December 2011 (2,060.4354 MWh) is divided by 0.9 (efficiency for a Natural Gas Boiler) x (Country Specific Emission factor for natural gas, (NCV)/ 277.778 (conversion factor MW to TJ))

Projected emissions for 2012 are calculated as follows:

The thermal output capacity of 2.7 MW is divided by 0.9 (efficiency for a Natural Gas Boiler) x (number of hours per year) x (CER recommended capacity utilisation factor, 90.87%) x (Country Specific Emission factor for natural gas, (NCV)/ 277.778 (conversion factor MW to TJ)).

Calculation

2011

$2,060.435 \text{ MWh (Heat generated 25 November to 31 December)} / 0.9 \text{ (Efficiency NG Boiler)} \times (57.022/277.778) \text{ (NG emission factor t CO}_2\text{/MW)} = 469.96 \text{ t CO}_2$

2012

$2.7 \text{ MW} / 0.9 \text{ (Efficiency NG Boiler)} \times 8,784 \text{ (No of hours in the year)} \times 0.9087 \text{ (Capacity utilisation factor)} \times (57.022/277.778) \text{ (NG emission factor t CO}_2\text{/MW)} = 4,915.62 \text{ t CO}_2$

CO₂ emissions from the rest of the site are calculated as follows:

In accordance with Appendix 3 (1) of Ireland's National Allocation Plan for Emissions Trading 2008-2012 *Late Entrant* allocations will be calculated only from the assigned priority date forward. The assigned priority date for the NESA is the 27 October 2011.

Monthly invoiced quantities of natural gas consumed in the boilers and dryers on-site were verified by the EPA up to December 2011. 2011 emissions are based on actual consumption from 27 October to 31 December 2011. A stepwise increase in natural gas consumption can be seen from July 2011 following some modifications to the New Dryer.

Projected emissions for 2012 are calculated as follows:

To determine projected emissions for 2012 following the Operator's objection of 6 February 2012 and decision of the Technical Committee, the July 2011 gas consumption figure (12,710,530 kWh GCV) was applied for each month of 2012. It was factored down for February and 30 day months to give a total Natural Gas consumption for 2012 of 150,066,254 kWh GCV.

The Technical Committee, to be consistent with the 2011 emissions, used the current published GCV to NCV conversion factor figure for gas of 0.9029 and not the figure of 0.9028 used by the Operator in its objection.

The revised figure was converted to kWh NCV using 0.9029 multiplied by 3.6×10^{-6} to convert to TJ and multiplied by the Natural Gas Emission factor 57.022 t CO₂/TJ to determine the revised 2012 figure as 27,814.27 tCO₂.

De-minimis gas oil consumed is based on delivery dockets for the boiler and an estimate based on run hours for the fire pumps. The country specific NCV and emission factor are applied to determine CO₂ emissions.

Calculation

2011 Natural Gas

24,901,312 kWh x 0.9029 (GCV to NCV) x 3.6×10^{-6} (convert from kWh to TJ) x 57.022 (NG emission factor) = 4,615.37 t CO₂

2011 Gas Oil

(0.01521724 ktonne/365 x 66) x 43.31 TJ/ktonne x 73.3t CO₂/TJ = 8.74 tCO₂

2012 Natural Gas

150,066,254 kWh x 0.9029 (GCV to NCV) x 3.6×10^{-6} (convert from kWh to TJ) x 57.022 (NG emission factor) = 27,814.27 t CO₂

2012 Gas Oil

0.01521724 ktonne x 43.31 TJ/ktonne x 73.3t CO₂/TJ = (48.31 tCO₂ /365 x 366) = 48.44 t CO₂

EPA total projected¹ tonnes CO₂/annum for the installation:

Unit	2010	2011	2012
CHP Electricity	0	628.06	6,212.68
CHP Heat	0	469.96	4,915.62
Dryers and Boilers	0	4,615.37	27,814.27
Gas Oil	0	8.74	48.44
Total	0	5,722	38,991

¹ Historical data have been used where appropriate

Recommendation

The New Entrant Set Aside application is found to have the necessary consents in place and to have a substantiated start date of 04 May 2010. In accordance with Appendix 3 (1) and (2) of Ireland's National Allocation Plan for Emissions Trading 2008-2012 *Late Entrant* allocations will be calculated only from the assigned priority date forward. The assigned priority date for the NESA is the 27 October 2011 and the assigned priority date for the CHPSA is 25 November 2011. The RE for NESA and CHPSA has been calculated from those dates.

The approach, as recommended in the NAP, and detailed in the EPA guidance for assessors on the validation of projections in set-aside applications for the trading period 2008-12 (*ETUPP6/01 22 April 2009*) has been deemed appropriate by the EPA for the calculation of emissions for CHP heat and electricityⁱ. The projections for Dryers, Boilers and Gas Oil usage are judged to be reasonable and are within the UK benchmark valuesⁱⁱ for other combustion plant. A valid business reason is available.

It is recommended that the new entrant set aside allocation be based on the following Relevant Emission (tonnes CO₂/annum):

	2008	2009	2010	2011	2012
RE NESA	0	0	0	4,624.11	27,862.71
RE CHPSA	0	0	0	1,098.02	11,128.3

The original report was prepared by Annette Prendergast, Inspector and approved by Dr Maria Martin, Senior Manager on 23 January 2012. This revised report is based on the recommendations of the EPA Technical Committee report by Marc Kierans and as approved by Micheál Ó Cinnéide, Director of the Office of Environmental Assessment following a review of the Operator's objection.

Signed:

Marc Kierans

Date: 26 March 2012

Marc Kierans

Inspector

Approved:

Maria Martin

Date: 26 March 2012

Dr Maria Martin

Acting Programme Manager

ⁱ Ireland's National Allocation Plan for Emissions Trading 2008-2012. Final Allocation Decision 4 March 2008.
<http://www.epa.ie/whatwedo/climate/etscheme/naps/>

ⁱⁱ Appendix D1: New Entrant Benchmark Spread sheet of EU Emissions Trading Scheme Approved Phase II NAP 2008-2012, DEFRA.