

# ***European Emissions Trading Scheme***

## ***Manual No. 1***

### ***Guide on Monitoring and Reporting***

***Version 1.0 (October 2005)***

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## Preface

This manual has been prepared in the framework of the project:

**Capacity Building for the Implementation of the EU Emissions Trading Directive in new EU Member States  
(EU Ref. no ENV.C.2/SER/2004/0071)**

The project's objectives have been defined as to "improve the capacity of relevant competent authorities to fulfil the requirements of the Emission Trading Directive and its supporting legislation" and "to improve the knowledge and awareness of the requirements of the Emissions Trading Directive among operators of installations and other stakeholders".

This Manual No.1 - Guide to Monitoring and Reporting – is mainly addressed to operators and is supplemented by two other manuals:

- Manual No. 2: Guide on Verification  
(mainly addressed to verifiers)
- Manual No. 3: Guide on Accreditation  
(mainly addressed to competent authorities)

All three manuals are used as background material for workshops to be held in the new EU Member States from October to December 2005. The findings and results of these workshops and the further development of the implementation of the EU legal framework to national law as well as the implementation of the EU and national legal requirement to practise will be considered in a final version of all three manuals prepared in December 2005 and issued in January 2006.

It should be expressively noted that this manual is meant as an instrument to systematically set up annual emission reports. However, there might be specific circumstances which are not covered by this manual. In any case EU and national laws have to be considered and are always prevalent.

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## Part I: Introduction

Within this manual various templates will be presented. Similar to the Manual No.2 (“Guide on Verification”) the following symbols are used to make these descriptions more transparent, to make appropriate references to the legal framework and to flag controversial interpretations of the legal requirements:



This symbol indicates an explanatory example.  
*(400 MW condensation power station)*



This symbol indicates a reference to a legal text *(only EU- and not any national legal framework)*



This symbol indicates necessary clarifications, potential misinterpretations and/or inconsistencies in legal framework  
*(to be discussed with the competent authority)*

The objective of this manual is to give support to operators of installations covered by the EU ETS for the issue of their annual emissions report and to guide operators through the requirements according to the EU regulations<sup>1), 2)</sup>.

The annual emission report which is mandatory required by Article 14(3) of the ETS Directive shall be in line with the MRG.

1) DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme of greenhouse gas emission allowances trading within the Community and amending Council Directive 96/61/EC, OJL 25.10.2003, L275/32-46

2) COMMISSION DECISION of 29 January 2004 establishing guidelines for the monitoring and reporting of greenhouse gas emissions (notified under document number C(2004) 130), 2004/156/EC, OJL 26.2.2004, L 59/1-74

EU Member States shall ensure that no installation covered by the ETS Directive undertakes any activity resulting in CO<sub>2</sub>-emissions unless its operator holds a greenhouse gas emissions permit issued by a competent authority.

An application of the operator to the competent authority for such a permit shall include a description of:

- the installation and its activities including the technology used and including a non-technical summary of the details,
- the raw and auxiliary materials, the use of which is likely to lead to CO<sub>2</sub>-emissions,
- the sources of CO<sub>2</sub>-emissions from the installation,
- the measures planned to monitor and report CO<sub>2</sub>-emissions in accordance with the MRG.

A greenhouse gas emissions permit issued by the competent authority shall contain among others the following requirements:

- name and address of the operator
- a description of the activities and emissions from the installation
- monitoring requirements, specifying monitoring methodology and frequency,
- reporting requirements,
- an obligation to surrender allowances equal to the total emissions of the installation in each calendar year as verified in accordance with Article 15, within four months following the end of that year.

The monitoring methodology is the methodology used for the determination of CO<sub>2</sub> emissions and summarises all procedures necessary for the preparation and issue of the annual emission report which each operator of an installation covered by the ETS Directive has to write annually.

Thus the monitoring methodology is also a core element of the mandatory annual verification of the emission report. It defines the basis for claim within the target performance comparison of the verifier.

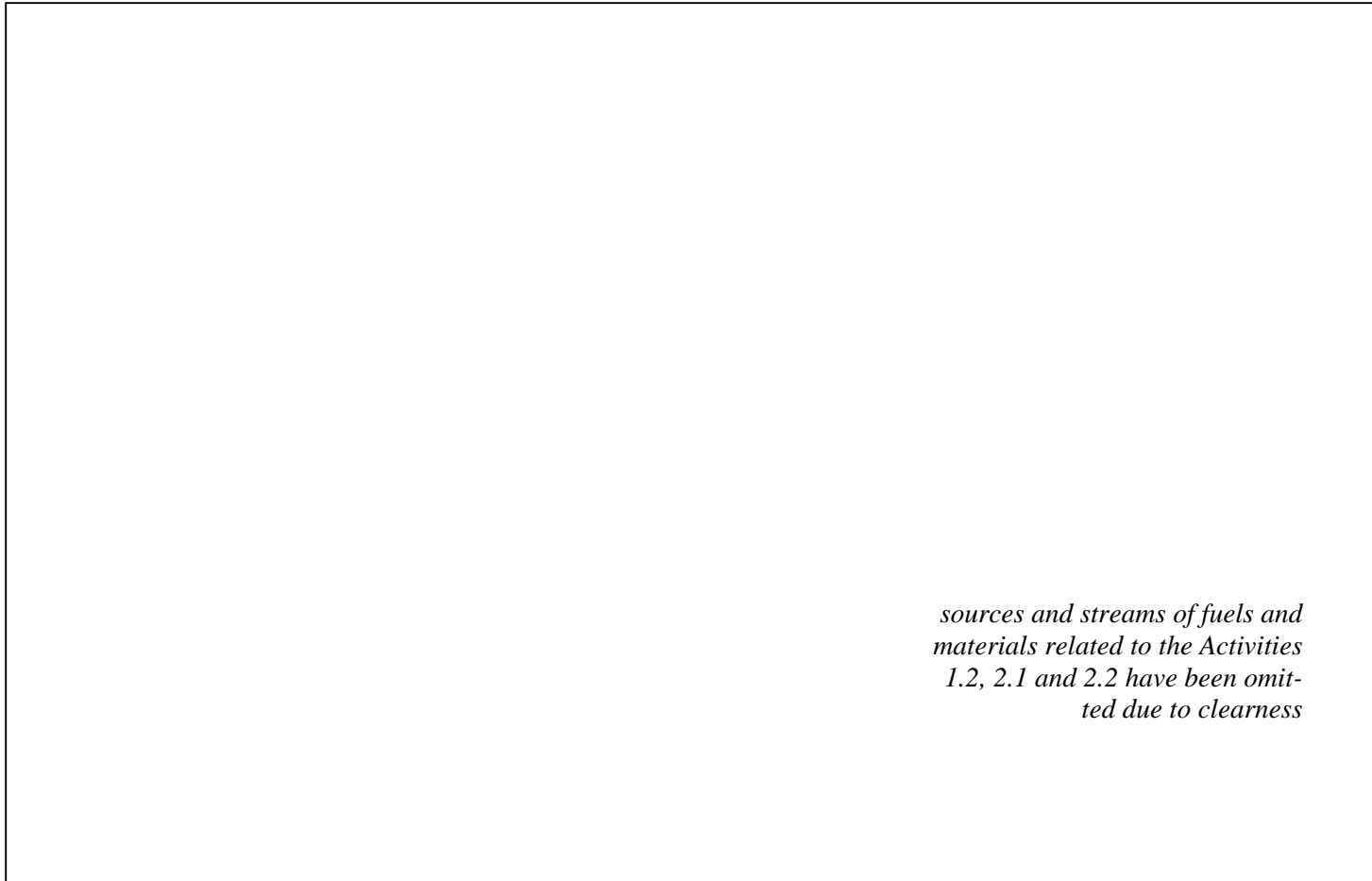
Concrete monitoring requirements will be presented and clarified in Part II of this manual in reference to the legal framework (§) and in reference to a case study (📖). Due to the fact that the majority of activities covered by the ETS Directive are combustion installations (about 70% - 80%), the case study has been selected from this category of activity.

**Key terms** essential for the allocation of CO<sub>2</sub>-emissions are defined in the following table.

Term	Definition	Example
Installations	Stationary technical units where one or more activities listed in Annex I of the ETS Directive are carried out and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution (Source: List of definitions in the ETS Directive)	<ul style="list-style-type: none"> <li>• Integrated steel works</li> <li>• Cement factory</li> <li>• Power station</li> <li>• etc.</li> </ul>
Categories of Activities	Indirect definition given in in Annex I of ETS Directive (Remark: only 4 categories)	<ol style="list-style-type: none"> <li>1. Energy activities</li> <li>2. Production and processing of ferrous metals</li> <li>3. Mineral Industry</li> <li>4. Other activities</li> </ol>
Activities	Means the activities listed in Annex I to the ETS Directive; (Source: List of definitions in the MRG) (Remark: only 10 activities)	<ol style="list-style-type: none"> <li>1. Combustion installation</li> <li>2. Coke ovens</li> <li>3. Refineries</li> <li>4. Metal ore roasting or sintering installations</li> <li>5. Installations for the production of pig iron or steel</li> <li>6. Installations for the production of cement clinker or lime</li> <li>7. Installation for the manufacture of glass</li> <li>8. Installations for the manufacture of ceramic products</li> <li>9. Industrial plants for the production of pulp</li> <li>10. Industrial plants for the production of paper</li> </ol>
Sources	Separately identifiable points or processes in an installation from which greenhouse gases are emitted (Source: List of definitions in the MRG)	<ul style="list-style-type: none"> <li>• Combustion process or combustion chamber</li> <li>• Flue gas cleaning or flue gas scrubber</li> <li>• etc.</li> </ul>
Streams of fuels or materials	Indirect definition given in the MRG (e.g. see chapter 4.2.2.1.4 page 12)	<ul style="list-style-type: none"> <li>• Coal</li> <li>• Limestone</li> <li>• etc.</li> </ul>



The following figure allocates the key terms of the preceding table to a complex installation (integrated steel works).



*sources and streams of fuels and  
materials related to the Activities  
1.2, 2.1 and 2.2 have been omit-  
ted due to clearness*

## Part II: Monitoring

The MRG list eleven monitoring requirements summarized as the monitoring methodology.



### ***Annex 1, chapter 4.2 of MRG***

The monitoring methodology description shall contain:

1. the exact definition of the installation and activities carried out by the installation to be monitored,
2. information on responsibilities for monitoring and reporting within the installation,
3. a list of fuel and material streams to be monitored for each activity,
4. a list of sources for each activity carried out within the installation,
5. a list of tiers to be applied for activity data, emission factors, oxidation and conversion factors for each of the activities and fuels types/materials,
6. a description of the type, specification and exact location of the metering devices to be used for each of the sources and fuels types/materials,
7. a description of the approach to be used for the sampling of fuel and materials for the determination of net calorific value, carbon content, emission factors, and biomass content for each of the sources and fuel types/materials,
8. a description of the intended sources or analytical approaches for the determination of the net calorific values, carbon content or biomass fraction for each of the sources and fuels types/materials,
9. a description of continuous emission measurement systems to be used for the monitoring of a source, i.e. the points of measurement, frequency of measurements, equipment used, calibration procedures and data collection and storage procedures (if applicable),
10. a description of the quality assurance and quality control procedures for data management,
11. where applicable, information on relevant links with activities undertaken under the Community eco management and audit scheme (EMAS).

The operator of an installation covered by the ETS Directive has to comply with these requirements. However, a concrete guideline does not exist and thus operators are free in complying with these requirements.

In this manual two kind of templates will be presented:

- formats/forms and
- procedural and work descriptions

Part II-A of this manual summarizes first of all possible formats/forms according to the MRG-requirements. These formats/forms have been established following the monitoring methodology published by the German competent authority (see [www.dehst.de](http://www.dehst.de)). Of course there exist some other formats that can be also used by the operator (e.g. defra forms see References). Thus Part II-A is only a recommendation to implement the MRG-requirements. All eleven requirements are addressed here in in separate sub-chapters and always completed for the case study (400 MW power station) .

Some of MRG-requirements can be entirely achieved with these formats/forms. Others need additional explanations in terms of procedural and/or work descriptions (see Annex 1). A template for these procedural and work description is given in Part II-B of this manual following the approach given in well known quality assurance standards (ISO 90001).

## Part II-A: Formats and forms

### 1. Exact definition of the installation and activities carried out by the installation to be monitored

The specification of the installation covered by the ETS Directive consists of four parts:

- A. Data of the installation
- B. Non-technical summary of the details of the installation
- C. Process flow sheet of the installation
- D. CO<sub>2</sub>-emissions of the installation

#### **A: Data of the installation**

##### **A1 Installation**



condensation power station

##### **A2 Category of activity<sup>1</sup>**



Energy activities

##### **A3 Activity<sup>1</sup>**



Combustion installation

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<sup>1</sup> According to Annex I of ETS Directive

**A4** Installed, respectively approved capacity (according to the units given in Annex I of the ETS Directive for the different kinds of activities)



400 MW

**A5** IPPC - Code<sup>2</sup>



Combustion installation with an approved rated thermal input exceeding 50 WM (IPPC – Code 1.1)

**A6** CRF-Category according to IPCC<sup>3</sup>



Public power generation (IPCC 1A1a1)

**A7** Permit

- according to the national implementation of the IPPC-Directive (code / date)
- according to the national implementation of the ETS Directive (code. / date)



IPPC Permit (code : 345-DU / date : 13.09.1996)  
ETS Permit (code : NRW 1346 / date : 20.10.2004)

**A8** NAP-Code<sup>4</sup>



IPPC Permit (code : NAP-2005)

<sup>2</sup> Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, Annex I (respectively national implementation of the IPPC Directive)

<sup>3</sup> IPCC reporting format according to UNFCCC guidelines on annual inventories [UNFCCC (1999): FCCC/CP/1999/7]

<sup>4</sup> according to the list of installations given in the National Allocation Plan (NAP)

## **B: Non-technical summary of the details of the installation**

A non-technical summary of the details of the installation can be derived/copied from the (existing) IPPC permit, as this permit already requires a mandatory non-technical summary (among others).



### ***Article 6 (1) of the IPPC-Directive***

- Member States shall take the necessary measures to ensure that an application to the competent authority for a permit includes a description of:
  - the installation and its activities,
  - the raw and auxiliary materials, other substances and the energy used in or generated by the installation,
  - the sources of emissions from the installation,
  - the conditions of the site of the installation,
  - the nature and quantities of foreseeable emissions from the installation into each medium as well as the identification of significant effects of the emissions on the environment,
  - the proposed technology and other techniques for preventing or, where this not possible, reducing emissions from the installation,
  - where necessary, measures for the prevention and recovery of waste generated by the installation
  - further measures planned to comply with the general principles of the basic obligations of the operator as provided for in Article 3,
  - measures planned to monitor emissions into the environment.
  
- An application for a permit shall also include a non-technical summary of the details referred to in the above indents.

If the installation covered by the ETS Directive is interconnected with other installations or part of a bigger installation then the different installations and their interconnection shall be described by the operator.



### **Non technical description of condensation power station**

The combustion installation belongs to the energy activities (category of activity as listed in Annex I of the ETS Directive). The combustion installation is a 400 MW stand alone coal fired condensation power station. Lignite coke is the regular fuel. However, matured timber can be used as a fuel too. The generated power is supplied to the public grid. No heat is used for internal and external purposes. The sources which emit CO<sub>2</sub> are the combustion process (source 1) and the flue gas cleaning process (source 2). Source 1 is fed by the two fuel streams lignite coke (1.1) and matured timber (1.2), which both are responsible for CO<sub>2</sub>-emissions (combustion emissions). However, fuel stream 1.2 (matured timber) is a pure biomass stream with zero CO<sub>2</sub> emissions according to the perceptions of the ETS Directive and the MRG. Fuel stream 1.1. is metered continuously by a belt scale (M1.1). Samples are collected (S1.1) to analyse the carbon content (A1.1.1) and the net calorific value (A1.1.2).

The timber which is pure biomass is delivered by trucks which are registered by a truck scale without exception.

The flue gas cleaning equipment (Source 2) is fed with limestone (2.1) to reduce SO<sub>2</sub>-content in the flue gas. So additional CO<sub>2</sub>-emissions are generated as process emissions. The amount of limestone is metered by a belt scale (M2), which is part of the computer-aided process control system.

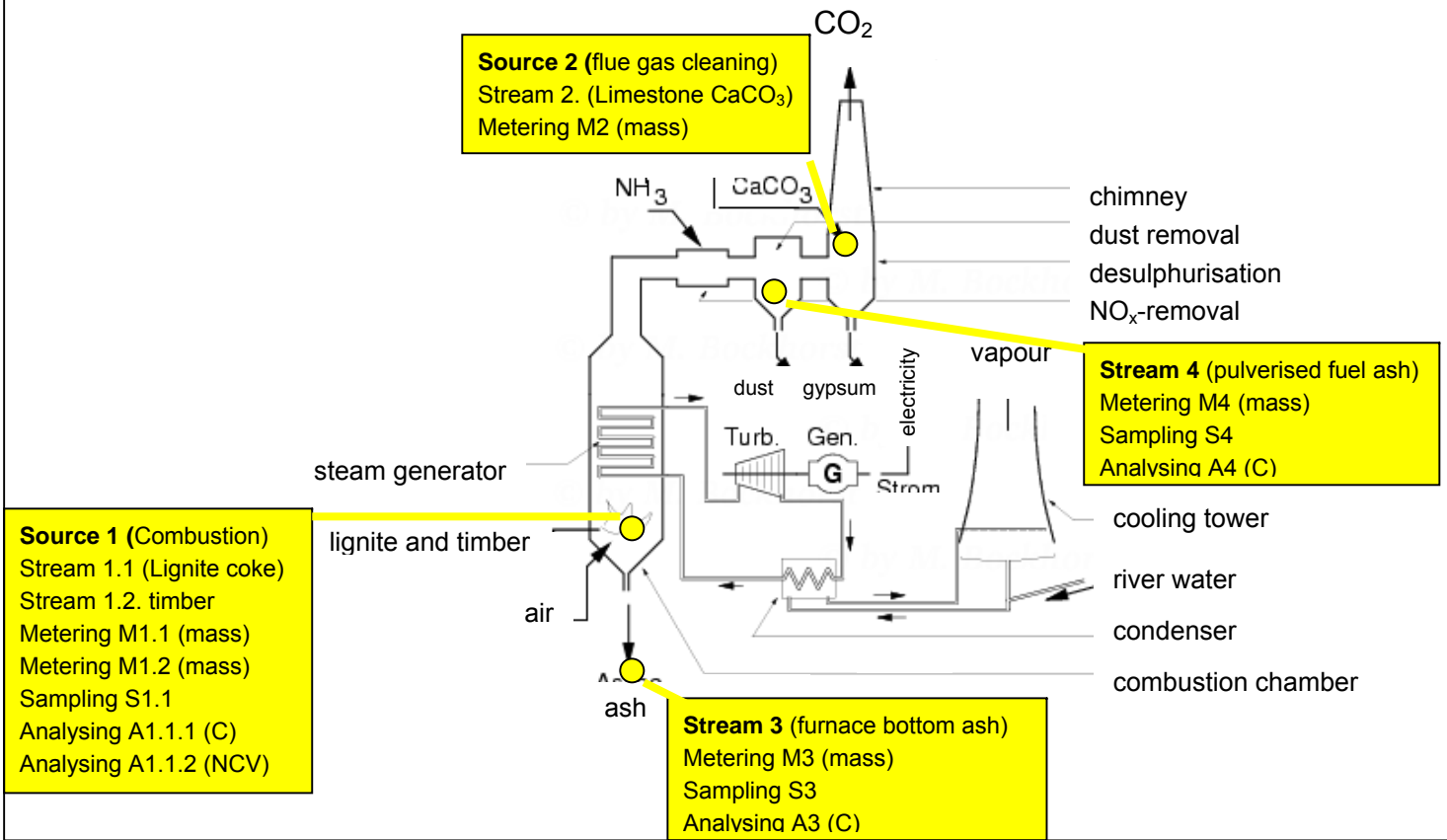
The ash is accumulated in a bunker and is periodically discharged by train to the surface mining area. Samples are collected from the bunker (S3) in order to analyse the Carbon content (A3).

### C: Process flow sheet of the installation

The process flow sheet shall distinctly disclose all CO<sub>2</sub>-emitting sources, all CO<sub>2</sub>-relevant fuel and material streams and all measuring points (metering, sampling, analysing) of each activity of the installation covered by the ETS Directive. Names and codes shall coincide with the process description and with the forms.



process flow sheet of a condensation power station

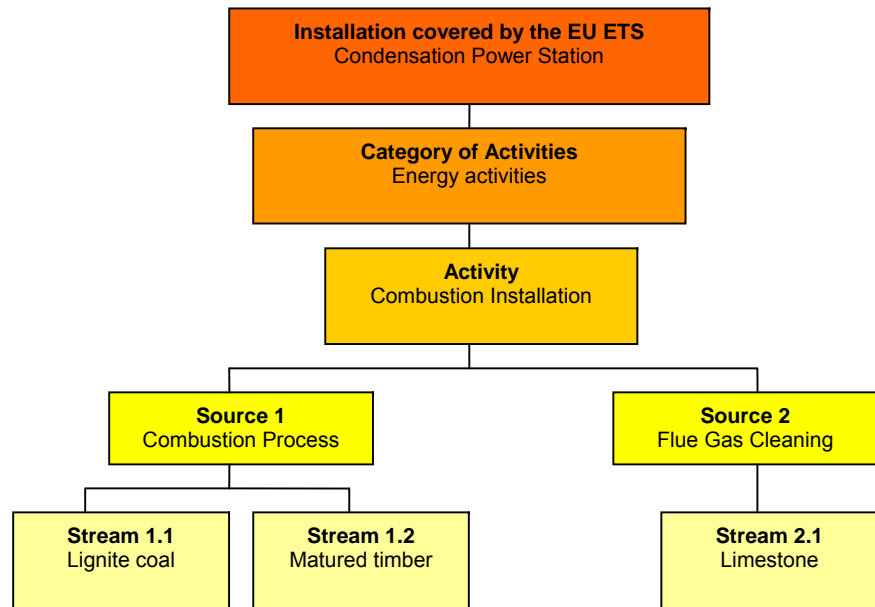


**REMARK**  
Streams 3 and 4 contain a certain amount of carbon, which has to be considered in the calculation of total CO<sub>2</sub> emissions of the installation as oxidation factor! Therefore streams 3 and 4 are considered in the list of fuel and material streams, however, they do not contribute to any CO<sub>2</sub> emission.

The process flow sheet shall correlate the metering (M) and sampling (S) to the corresponding streams of fuels and materials, which shall be clearly linked to sources. The analysed parameters are disclosed (A). The consecutive numbering starts always at the level where more than only 1 element exists, e.g. at the level of categories of activities where more than one category of activity takes place in an installation. The simplest numbering is within an installation with only one source and only one fuel stream.



Structure of the condensation power station with different streams and sources



1. **Installation:** condensation power station
2. **Category of activity:** Energy activities
3. **Activity:** combustion installation  
(here activity  $\equiv$  category of activity  $\equiv$  installation)
4. **Sources:** Source 1 is the combustion chamber (point) or the combustion (process). Source 2 is the flue gas cleaning equipment (point) or the flue gas cleaning (process)
5. **Fuel and material streams:** Source 1 is linked to two fuel streams: lignite coke (1.1) and matured timber (1.2). Source 2 is identical with the material stream 2.1 (limestone)

## D: CO<sub>2</sub>-Emissions of the installation

The following table indicates the average of the annually available allowances which is identical to 1/3 of the allocated amount of allowances, the expected CO<sub>2</sub>-emissions and the real, ex post determined CO<sub>2</sub> emissions of the installation during the Years 2005 to 2007.

<b>Amount [t/a]</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
- of allocated allowances (annual average)			
- of expected CO <sub>2</sub> -emissions			
- of ex post determined CO <sub>2</sub> -emissions			



Total CO<sub>2</sub>-emissions of a condensation power station (annual report 2005)

<b>Amount [t/a]</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
- of allocated allowances (annual average)	700,000	700,000	700,000
- of expected CO <sub>2</sub> -emissions	710,000	720,000	730,000
- of ex post determined CO <sub>2</sub> -emissions	709,579	n.a.	n.a



Total CO<sub>2</sub>-emissions of a condensation power station (annual report 2006)

<b>Amount [t/a]</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
- of allocated allowances (annual average)	700,000	700,000	700,000
- of expected CO <sub>2</sub> -emissions	710,000	720,000	730,000
- of ex post determined CO <sub>2</sub> -emissions	709,579	715,333	n.a

## 2. Information on responsibilities for monitoring and reporting within the installation

### A. Operator of the installation according to Article 4 of the ETS Directive

A1 Name

A2 Street

A3 Postcode / City

A4 Phone

A5 Fax

A6 E-mail

### B. Address of the site

B1 Street

B2 Postcode / City

**C. Contact person for monitoring & reporting and verification of annual reports**

**C1 Name**

**C2 Company**

**C3 Street**

**C4 Postcode / City**

**C5 Phone**

**C6 Fax**

**C7 E-mail**

**D. Competent authority according to Article 5 of the ETS Directive**

**D1 Name**

**D2 Contact person**

**D3 Street**

**D4 Postcode / City**

**D5 Phone**

**D6 Fax**

**D7 E-mail**

### 3. List of fuel and material streams to be monitored for each activity



REMARK: The terms „fuel and material streams“ (chapter 3 of this manual) and „sources“ (chapter 4 of this manual) are used in the MRG in a contradictory way: they are used as synonyms and they are used according to the definitions given in this manual in chapter I (Introduction). In case of any problem in defining and distinguishing „fuel and material streams“ and „sources“ the operator shall clarify this with the Competent Authority.

According to the MRG a list of fuel and material streams (normally input-streams) to be monitored for each activity has to be established by the operator. Carbon containing output-streams have to be considered, too, although they do not contribute to any CO<sub>2</sub> emission. However they have an impact on oxidation and conversion factor.

If there are several activities or several categories of activities within the installation covered by the ETS Directive the following form has to be duplicated accordingly. The code of the fuel and material streams has to be identical with the code given in the process description and the process flow chart (see chapter 1 of part II of this manual).

<b>Activity: [Activity according to ANNEX 1 of the ETS Directive]</b>								
Total CO <sub>2</sub> -emissions of the activity including biomass streams:							t CO <sub>2</sub> /a	
Total CO <sub>2</sub> -emissions of the activity without biomass streams:							t CO <sub>2</sub> /a	
Total CO <sub>2</sub> -emissions of the activity's biomass streams:							t CO <sub>2</sub> /a	
Code	Name	Amount [m <sup>3</sup> /a], [t/a]	Biomass [%]	CO <sub>2</sub> -Emissions				
				Amount [t/a]	Origin		Determination	
					Combustion emissions	Process emissions	Calculation	Measurement



List of fuel and material streams of a condensation power station including total CO<sub>2</sub>-emissions

**Activity: Combustion installation**

Total CO<sub>2</sub>-emissions of the activity including biomass streams: 774,618 t CO<sub>2</sub>/a

Total CO<sub>2</sub>-emissions of the activity without biomass streams: 709,579 t CO<sub>2</sub>/a

Total CO<sub>2</sub>-emissions of the activity's biomass streams: 65,039 t CO<sub>2</sub>/a

Code	Name	Amount [m <sup>3</sup> /a], [t/a]	Biomass [%]	CO <sub>2</sub> -Emissions				
				Amount [t/a]	Origin		Determination	
					Combustion emissions	Process emissions	Calculation	Measurement
1.1	Lignite coke	824,666 [t/a]	0	701,867	X		X	
1.2	Timber	39,543 [t/a]	100	65,039	X		X	
2.1	Limestone	17,540 [t/a]	0	7,712		X	X	
3	Ash (FBA)	7,020 [t/a]	0	Output-stream with no impact on CO <sub>2</sub> emission but on oxidation factor of fuel 1.1				
4	Ash (PFA)	28,074 [t/a]	0	Output-stream with no impact on CO <sub>2</sub> emission but on oxidation factor of fuel 1.1				

#### 4. List of sources for each activity carried out within the installation



##### REMARKS:

1. This chapter can be skipped, if tiers (see chapter 5) are exclusively allocated to streams of fuels and materials (see chapter 3) and not to sources and if this approach has been approved by the competent authority.
2. The terms sources and „fuel and material streams“ are used in the MRG contradictory: they are used as synonyms and they are used according to the definitions given in this manual in chapter I (Introduction).
3. However, according to the definitions given in the ETS Directive and the MRG there is always a difference according to monitoring requirements if a source is fed with more than one stream of fuel or material.

In case of any problem in defining and distinguishing „fuel and material streams“ and „sources“ the operator should clarify this with the Competent Authority”.



##### ***Annex 1, chapter 2, figure q) of MRG***

- ‘source’ means a separately identifiable point or process in an installation from which greenhouse gases are emitted;



##### Sources of a condensation power station

- source 1: combustion chamber (point) or combustion (process)
- source 2: flue gas purification equipment (point) or flue gas cleaning (process)

According to the MRG a list of sources for each activity carried out within the installation has to be established by the operator. If there are several activities or several categories of activities within the installation covered by the ETS Directive the form has to be completed accordingly. The code of the sources has to be identical with the code given in the process description and flow chart (see chapter 1 of part II of this manual).

The CO<sub>2</sub> emissions of biomass streams are given at the “stream-level” (last column in the following table) as a memo item (see also line 4). However, these figures should not be added to the CO<sub>2</sub> emissions of the source.

<b>Activity: [Activity according to ANNEX 1 of the ETS Directive]</b>							
Total CO <sub>2</sub> -emissions of the activity including biomass streams:							t CO <sub>2</sub> /a
Total CO <sub>2</sub> -emissions of the activity without biomass streams:							t CO <sub>2</sub> /a
Total CO <sub>2</sub> -emissions of the activity's biomass streams:							t CO <sub>2</sub> /a
Source			Stream of fuel and material				
Code	Name	CO <sub>2</sub> -emissions without biomass [t CO <sub>2</sub> /a]	Code	Name	Amount [m <sup>3</sup> /a], [t/a]	CO <sub>2</sub> -emissions	
						[t CO <sub>2</sub> /a]	Biomass



List of sources of a condensation power station including total CO<sub>2</sub>-emissions

<b>Activity: Combustion installation</b>							
Total CO <sub>2</sub> -emissions of the activity including biomass streams:						774,618 t CO <sub>2</sub> /a	
Total CO <sub>2</sub> -emissions of the activity without biomass streams:						709,579 t CO <sub>2</sub> /a	
Total CO <sub>2</sub> -emissions of the activity's biomass streams:						65,039 t CO <sub>2</sub> /a	
Source			Stream of fuel and material				
Code	Name	CO <sub>2</sub> -emissions without biomass [t CO <sub>2</sub> /a]	Code	Name	Amount [m <sup>3</sup> /a], [t/a]	CO <sub>2</sub> -emissions	
						[t CO <sub>2</sub> /a]	Biomass
1	Combustion	701,867	1.1	Lignite coke	824,666 [t/a]	701,867	No
			1.2	Timber	39,543 [t/a]	65,039	Yes
2	Flue gas cleaning	7,712	2.1	Limestone	17,540 [t/a]	7,712	No

## 5. List of tiers to be applied for activity data, emission factors, oxidation and conversion factors for each of the activities and fuel types/materials

The specific methodologies/approaches for determining the variables (1) activity data, (2) emission factors, (3) oxidation or (4) conversion factors are referred to as tiers (see Annex II to XI of the MRG). The word tier is always combined with a number (e.g. tier 1 or tier 2), where an increasing number represents an increasing accuracy. Different tiers on the same level of accuracy are indicated with the additional indices a and b (e.g. tier 2a, tier 2b). Generally, the operator has to choose always the highest accuracy, i.e. the highest tiers for the calculation of CO<sub>2</sub>-emission data represented (see Annex II to XI of the MRG). Only two exceptions from this mandatory requirement are possible:



### **MRG Annex I Chapter 4.2.2.1.4**

The highest tier approach shall be used by all operators to determine all variables for all sources within an installation for monitoring and reporting purposes. Only if it is shown to the satisfaction of the competent authority that the highest tier approach

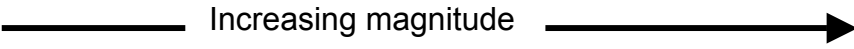
- is technically not feasible or
  - will lead to unreasonably high costs,
- may a next lower tier be used for that variable within a monitoring methodology.

However, during the period 2005 to 2007 the MRG allow a lower accuracy subject to the total (1) CO<sub>2</sub>-emissions of the installation, (2) CO<sub>2</sub>-emissions of the sources and (3) CO<sub>2</sub>-emissions of the streams of fuels and materials. Therefore these reference parameters have to be classified accordingly.

The classification can generally be performed on all available levels, i.e. on

- Installation level,
- Category of activity level
- Category level
- Source level
- Stream level

However, relevant for the annual emission report are only the levels installation, source and stream, as only these three parameters are classified in the MRG in three classes as follows:

			
<b>Level</b>	<b>Class 1</b>	<b>Class 2</b>	<b>Class 3</b>
Stream	de minimis	minor	major
Source	de minimis	minor	major
Activity	not classified		
Category of Activity	not classified		
Installation	A	B	C



Fuel and material streams and sources are classified according to the same rule! (see chapters 5.1 and 5.2)

## **5.1 Classification of fuel and material streams**

Fuel and material streams have to be classified as follows:

- major fuel and material streams
- minor fuel and material streams
- “de minimis” fuel and material streams

According to the MRG two different criteria have to be considered independently to classify streams of fuels and materials:

1. the absolute amount of CO<sub>2</sub> emission of the streams
2. the relative amount of CO<sub>2</sub> emission of the streams given as percentage of the total amount of CO<sub>2</sub> of the installation



### **Chapter 4.2.2.1.4 of the MRG**

- Major sources, including major streams of fuels and materials are those which, if ranked in order of their decreasing magnitude, cumulatively contribute at least 95 % to the total annual emissions of the installation.
- Minor sources are those emitting 2,5 ktonnes or less per year or that contribute 5 % or less to the total annual emissions of an installation, whichever is the highest in terms of absolute emissions.
- For those minor sources jointly emitting 0,5 ktonnes or less per year or that contribute less than 1 % of total annual emissions of that installation, whichever is the highest in terms of absolute emissions, the operator of an installation may apply a *de minimis* approach for monitoring and reporting using his own no-tier estimation method, subject to the approval of the competent authority.



**ATTENTION:**

- 1) Contradictions are possible, e.g. three fossil streams with 94.5%, 4.5% and 1.0% contribution to the total CO<sub>2</sub>-emission. The 4.5%-stream is a major stream according to the first bullet point although the CO<sub>2</sub>-emissions are ≤ 5%.
- 2) It has to be clarified with the competent authority whether CO<sub>2</sub>-emissions of biomass streams have to be considered or not! Generally biomass has an emission factor of zero and thus does not contribute to any CO<sub>2</sub>-emissions. However, this might be problematic in case of biomass dominated installations, where a small fossil stream represents 100% of the CO<sub>2</sub> emissions and thus is a major stream according to the first bullet point.

According to these definitions given in the MRG the thresholds of minor (“de minimis”) streams of fuels or materials can be determined as absolute CO<sub>2</sub>-value in dependence of the total CO<sub>2</sub>-emission of the installation as follows:

<b>Installation: [as indicated in chapter 1 of this part]</b>		
<b>Total annual CO<sub>2</sub>-emissions of the installation without biomass</b>	<b>Threshold for minor streams of fuels and materials</b>	<b>Threshold for “de minimis” streams of fuels and materials</b>
≤ 50,000 t CO <sub>2</sub> /a	2,500 t CO <sub>2</sub> /a	500 t CO <sub>2</sub> /a
> 50,000 t CO <sub>2</sub> /a	5 % , i.e. > 2,500 t CO <sub>2</sub> /a	1 % , i.e. > 500 t CO <sub>2</sub> /a

With these installation specific thresholds and the list of fuel and material streams already given in chapter 3 a list of minor and “de minimis” non-biomass streams can be directly established according to criteria 1 (absolute amount of CO<sub>2</sub>-emission):

<b>Activity: [Activity according to ANNEX 1 of the ETS Directive]</b>						
No.	Name	Amount [m <sup>3</sup> /a], [t/a]	Biomass [%]	CO <sub>2</sub> -Emissions		
				Amount [t/a]	Minor streams ≤ installation specific threshold	“de minimis” streams ≤ installation specific threshold



Thresholds for minor and “de minimis” streams of fuel and material including a classification of streams of a condensation power station as a function of these thresholds

<b>Installation: condensation power station</b>		
Total annual CO <sub>2</sub> -emissions of the installation without biomass	Threshold for minor streams of fuels and materials	Threshold for “de minimis” streams of fuels and materials
709,579 t CO <sub>2</sub> /a	35,479 t CO <sub>2</sub> /a	7,096 t CO <sub>2</sub> /a

<b>Activity: Combustion Installation</b>						
No.	Name	Amount [m <sup>3</sup> /a], [t/a]	Biomass [%]	CO <sub>2</sub> -Emissions		
				Amount [t/a]	Minor stream ≤ 35,479 t CO <sub>2</sub> /a	“de minimis” stream ≤ 7,096 t CO <sub>2</sub> /a
1.1	Lignite coke	824,666 [t/a]	0	701,867	No	No
2.1	Limestone	17,540 [t/a]	0	7,712	Yes	No

Again from the list fuel and material streams given in chapter 3, the non-biomass streams can be classified according to criterion 2:

Activity: name according to Annex I of the ETS Directive and amount of CO <sub>2</sub> -emissions			CO <sub>2</sub> -Emissions		
<b>Major streams</b> of fuels and materials, listed in decreasing magnitude	Streams of fuel and material		Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
	No.	Name			
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no minor or “de minimis” streams</b> )					
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ and at the same time $\geq 99\%$					
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ but still $< 99\%$					
<b>Minor streams</b> of fuels and materials, listed in decreasing magnitude	Streams of fuel and material		CO <sub>2</sub> -Emissions		
	No.	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
Sum of percentages of total annual emissions is for the first time $\geq 99\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no “de minimis” streams</b> )					
Sum of percentages of total annual emissions is for the first time $\geq 99\%$ but still $< 100\%$					
<b>„de minimis“ streams</b> of fuels and materials, listed in decreasing magnitude	Streams of fuel and material		CO <sub>2</sub> -Emissions		
	No.	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
<b>Sum of percentages of total annual emissions = 100</b>					



## Classification of non-biomass fuel and material streams of a condensation power station (criteria 2)

Activity: Combustion Installation with 709,579 t CO <sub>2</sub> /a			CO <sub>2</sub> -Emissions		
<b>Major streams</b> of fuels and materials, listed in decreasing magnitude	Streams of fuel and material		Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
	No.	Name			
	1.1	Lignite coke	701,867	98.9	98.9
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no minor or “de minimis” streams</b> )					
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ and at the same time $\geq 99\%$					
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ but still $< 99\%$					
<b>Minor streams</b> of fuels and materials, listed in decreasing magnitude	Streams of fuel and material		CO <sub>2</sub> -Emissions		
	No.	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
	2.1	Limestone			
Sum of percentages of total annual emissions is for the first time $\geq 99\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no “de minimis” streams</b> )					
Sum of percentages of total annual emissions is for the first time $\geq 99\%$ but still $< 100\%$					
<b>„de minimis“ streams</b> of fuels and materials, listed in decreasing magnitude	Streams of fuel and material		CO <sub>2</sub> -Emissions		
	No.	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
<b>Sum of percentages of total annual emissions = 100</b>					

## **5.2 Classification of sources**

Sources have to be classified as follows:

- major sources
- minor sources
- “de minimis” sources



Sources and fuel and material streams are classified according to the same algorithm! (see chapter 5.1)

According to the MRG two different criteria have to be considered independently to classify the sources:

1. the absolute amount of CO<sub>2</sub> emissions of the source
2. the relative amount of CO<sub>2</sub> emissions of the source given as percentage of the total amount of CO<sub>2</sub> of the installation



### **Chapter 4.2.2.1.4 of the MRG**

- Major sources, (including major streams of fuels and materials) are those which, if ranked in order of their decreasing magnitude, cumulatively contribute at least 95 % to the total annual emissions of the installation.
- Minor sources are those emitting 2,5 ktonnes or less per year or that contribute 5 % or less to the total annual emissions of an installation, whichever is the highest in terms of absolute emissions.
- For those minor sources jointly emitting 0,5 ktonnes or less per year or that contribute less than 1 % of total annual emissions of that installation, whichever is the highest in terms of absolute emissions, the operator of an installation may apply a *de minimis* approach for monitoring and reporting using his own no-tier estimation method, subject to the approval of the competent authority.



**ATTENTION:**

- 3) Contradictions are possible, e.g. three fossil sources with 94.5%, 4.5% and 1.0% contribution to total CO<sub>2</sub>-emission. The 4.5%-source is a major source according to the first bullet point, although the CO<sub>2</sub>-emissions are  $\leq 5\%$ .
- 4) It has to be clarified with the competent authority whether CO<sub>2</sub>-emissions of biomass sources have to be considered or not! Generally biomass has an emission factor of zero and thus does not contribute to any CO<sub>2</sub>-emissions. However, this might be problematic in case of biomass dominated installation, where a small fossil source represents 100% and thus is a major source according to the first bullet point.

According to these definitions given in the MRG the thresholds of minor (“de minimis”) sources can be determined as absolute CO<sub>2</sub>-value as a function of the total CO<sub>2</sub>-emission of the installation as follows:

<b>Installation: [as indicated in chapter 1 of this part]</b>		
<b>Total annual CO<sub>2</sub>-emissions of the installation without biomass</b>	<b>Threshold for minor sources</b>	<b>Threshold for “de minimis” sources</b>
$\leq 50,000 \text{ t CO}_2/\text{a}$	2,500 t CO <sub>2</sub> /a	500 t CO <sub>2</sub> /a
$> 50,000 \text{ t CO}_2/\text{a}$	5 % , i.e. $> 2,500 \text{ t CO}_2/\text{a}$	1 % , i.e. $> 500 \text{ t CO}_2/\text{a}$

With these installation specific thresholds and the list of sources already given in chapter 4.1 a list of minor and “de minimis” non-biomass sources can be directly established according to criterion 1 (absolute amount of CO<sub>2</sub>-emission):

<b>Activity: [Activity according to ANNEX 1 of the ETS Directive]</b>				
Code	Name	CO <sub>2</sub> -Emissions		
		Amount [t/a]	Minor source ≤ installation specific threshold	“de minimis” source ≤ installation specific threshold



Thresholds for minor and “de minimis” sources and classification of sources of a condensation power station

<b>Installation: condensation power station</b>		
Total annual CO <sub>2</sub> -emissions of the installation without biomass	Threshold for minor sources	Threshold for “de minimis” sources
709,579 t CO <sub>2</sub> /a	35,479 t CO <sub>2</sub> /a	7,096 t CO <sub>2</sub> /a

<b>Activity: [Activity according to ANNEX 1 of the ETS Directive]</b>				
Code	Name	CO <sub>2</sub> -Emissions		
		Amount [t/a]	Minor source ≤ 35,479 t CO <sub>2</sub> /a	“de minimis” source ≤ 7,096 t CO <sub>2</sub> /a
1	combustion	701,867	No	No
2	flue gas cleaning	7,712	Yes	No

Again from the list of non-biomass sources given in chapter 3.1 the sources can be classified according to criterion 2:

Activity: name according to Annex I of the ETS Directive and amount of CO <sub>2</sub> -emissions			CO <sub>2</sub> -Emissions		
<b>Major sources</b> listed in decreasing magnitude	Sources		Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
	Code	Name			
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no minor or “de minimis” streams</b> )					
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ and at the same time $\geq 99\%$					
Sum of percentages of total annual emissions is for the first time $\geq 95\%$ but still $< 99\%$					
<b>Minor sources</b> listed in decreasing magnitude	Sources		CO <sub>2</sub> -Emissions		
	Code	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
Sum of percentages of total annual emissions is for the first time $\geq 99\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no “de minimis” streams</b> )					
Sum of percentages of total annual emissions is for the first time $\geq 99\%$ but still $< 100\%$					
<b>„de minimis“ sources</b> listed in decreasing magnitude	Streams of fuel and material		CO <sub>2</sub> -Emissions		
	Code	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
<b>Sum of percentages of total annual emissions = 100</b>					



Classification of non-biomass sources of a condensation power station with 709,579 t CO<sub>2</sub>/a (criterion 2)

Activity: Combustion Installation			CO <sub>2</sub> -Emissions		
<b>Major source</b> listed in decreasing magnitude	Streams of fuel and material		Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
	Code	Name			
	1	Combustion	701,867	98,9	98,9
Sum of percentages of total annual emissions is, for the first time, $\geq 95\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no minor or "de minimis" streams</b> )					
Sum of percentages of total annual emissions is, for the first time, $\geq 95\%$ and at the same time $\geq 99\%$					
Sum of percentages of total annual emissions is, for the first time, $\geq 95\%$ but still $< 99\%$					
<b>Minor source</b> listed in decreasing magnitude	Streams of fuel and material		CO <sub>2</sub> -Emissions		
	Code	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
	2	Flue gas cleaning			
Sum of percentages of total annual emissions is, for the first time, $\geq 99\%$ and at the same time equal to 100% ( $\Rightarrow$ <b>no "de minimis" streams</b> )					
Sum of percentages of total annual emissions is, for the first time, $\geq 99\%$ but still $< 100\%$					
<b>"de minimis" source</b> listed in decreasing magnitude	Streams of fuel and material		CO <sub>2</sub> -Emissions		
	No.	Name	Amount [t/a]	Percentage of total annual emissions [%]	Sum of percentages of total annual emissions [%]
<b>Sum of percentages of total annual emissions = 100</b>					

### **5.3 Classification of installations**

All fuel and material streams of an installation are, finally, linked via a source, an activity and a category of activity to the installation covered by the ETS Directive. So the CO<sub>2</sub>-emissions of the fuel and material streams can be linked to a source, to an activity, to a category of activity and finally to the installation according to the following table.

<b>Installation</b>	<b>Categories of activity</b>		<b>Activities</b>		<b>Sources</b>		<b>Streams</b>	
t CO <sub>2</sub> /a	Code	t CO <sub>2</sub> /a	Code	t CO <sub>2</sub> /a	Code	t CO <sub>2</sub> /a	Code	t CO <sub>2</sub> /a
	1		1.1		1.1.1		1.1.1.1	
							1.1.1.z	
			1.1.y		1.1.y.1			
					1.1.y.z			
			1.x		1.x.1.1			
					1.x.1.z			
	1.x.y	1.x.y.1						
		1.x.y.z						
	2		2.1		2.1.1		2.1.1.1	
							2.1.1.z	
			2.1.y		2.1.y.1			
					2.1.y.z			
			2.x		2.x.1.1			
					2.x.1.z			
2.x.y	2.x.y.1							
	2.x.y.z							

The summarized values of CO<sub>2</sub>-emissions of streams, sources, category of sources must be identical to the total amount of CO<sub>2</sub>-emissions already given in chapter 3 (List of streams of fuel and material).

Biomass streams do not contribute to the CO<sub>2</sub> emissions of the installation according to the EU ETS and the MRG. Thus in the preceding table CO<sub>2</sub> emissions of biomass streams are considered in the last column of the table only as a memo item marked as values in brackets. In case of a mixture of fossil fuel and biomass within one single stream there shall be two values in this column: one without brackets for the fossil fraction, one within brackets for the biomass fraction. All biomass CO<sub>2</sub> emissions will not be considered on the source-level and all other levels.

The total amount of CO<sub>2</sub>-emission of the installation is the parameter that classifies the installation as follows:

- Category A: total annual emissions ≤ 50 kt
- Category B: 50 kt < total annual emissions ≤ 500 kt
- Category C: total annual emissions > 500 kt



Fuel and material streams of a condensation power station linked to sources, activities and categories of activities

Installation	Categories of activity		Activities		Sources		Streams	
	t CO <sub>2</sub> /a	Code	t CO <sub>2</sub> /a	Code	t CO <sub>2</sub> /a	Code	t CO <sub>2</sub> /a	
709,579	n.a.	709,579	n.a.	709,579	1	701,867	1.1	701,867
							1.2	(65,039)
					2	7,712	2.1	7,712

The installation is allocated to class C (total annual emissions > 500 kt)

## 5.4 Requirements for tier-selection for classified sources and streams of fuel and material



### **ATTENTION:**

Tiers can generally be allocated to sources and to streams of fuels and materials. The results are in general different, as in general the CO<sub>2</sub> emissions linked to sources and linked to streams differ, e.g.:

- Sources might be fed by several streams (e.g. combustion is fed by a coal- and oil-stream).
- One single stream of fuel or material might be correlated to several sources (e.g. natural gas metered by the supplier is used as a fuel stream in a gas turbine and in a boiler).

The operator shall clarify with the competent authority whether streams or sources are subject to a classification for the choice of tiers.

For **major** sources or streams of fuels and materials deviations from the highest applicable methodologies/approaches (“tiers”) for determining the variables activity data, emission factors, oxidation or conversion factors are possible only during the first trading period.



### **MRG Annex I Chapter 4.2.2.1.4**

During the period 2005 to 2007, Member State should apply as a minimum the tiers as set out in table 1 (*of Annex I*).

Instead of using the highest applicable tiers, the operator can choose the tiers given in table 1 of Annex 1 of the MRG in dependence of the total annual CO<sub>2</sub> emission of the installation (category A, B or C). The concrete requirements according to these tiers can be found in the activity specific annexes of the MRG (Annex II to XI).

For **minor** sources or streams of fuels and materials the operator can choose a lower accuracy which means he can select another tier approach than the one given in table 1 of Annex I of the MRG.



**MRG Annex I Chapter 4.2.2.1.4**

- With the approval of the competent authority, the operator may apply lower tiers for the variables used to calculate emissions from minor sources, including minor streams of fuels or materials than the tiers applied for the variables used to calculate emissions from major sources or major streams of fuels or materials within an installation.

For **“de minimis”** sources or **“de minimis”** streams of fuels and materials the operator may apply his own approach for monitoring and reporting, e.g. using a no-tier estimation method, subject to the approval of the competent authority.

For **pure biomass** sources respectively **pure biomass** streams of fuels and materials (which are all not classified according to major, minor or “de minimis”) the operator can choose under certain circumstances without any approval of the competent authority his own approach.



**MRG Annex I Chapter 4.2.2.1.4**

- For pure biomass fuels, lower tier approaches may be applied unless the respective calculated emissions are to be used for the subtraction of biomass carbon from carbon dioxide emissions derived by means of continuous emission measurement.

The following table summarizes the tier approaches for major streams of fuels and materials according to Table 1 of Annex 1 of the MRG. The streams are linked to a source. In case of more than one fuel and material stream per source, respectively in case of more than one source per activity, the corresponding fields in the following table have to be duplicated accordingly.

Total emission of the installation				Category according to Table 1 of Annex 1 of the MRG <sup>5</sup>
• excluding biomass emissions:		t CO <sub>2</sub> /a		A: total annual emissions ≤ 50 kt ( )
• including biomass emissions:		t CO <sub>2</sub> /a		B: 50 kt < total annual emissions ≤ 500 kt ( )
• biomass		t CO <sub>2</sub> /a		C: total annual emissions > 500 kt ( )
<b>Code of the activity:</b>				<b>Name of the activity:</b>
Code of the source:				Name of the source:
Code of the fuel or material stream:				Name of the fuel or material stream:
	Required Tier <sup>6</sup>	Selected Tier	Values and units	Statement concerning any deviation between required and selected tier (e.g. technical not feasible or unreasonable high costs) <sup>7</sup>
Activity data				
Net calorific value				
Emission factor				
Composition data				
Oxidation factor				
Conversion factor				

<sup>5</sup> Please tick the relevant category

<sup>6</sup> Minimum requirement during the period 2005 to 2007 according to Table 1 of Annex 1 of the MRG

<sup>7</sup> Attach plausible proof for statement



List of tiers to be applied for major streams of fuels and materials of a condensation power station

Total emission of the installation				Category according to Table 1 of Annex 1 of the MRG <sup>8</sup>
<ul style="list-style-type: none"> <li>• excluding biomass emissions: 709,579 t CO<sub>2</sub>/a</li> <li>• including biomass emissions: 774,618 t CO<sub>2</sub>/a</li> <li>• biomass 65,039 t CO<sub>2</sub>/a</li> </ul>				A: total annual emissions ≤ 50 kt ( ) B: 50 kt < total annual emissions ≤ 500 kt ( ) C: total annual emissions > 500 kt (X)
<b>Code of the activity: n.a.</b>				<b>Name of the activity: combustion installation</b>
Code of the source: 1				Name of the source: Combustion
Code of the fuel or material stream: 1.1				Name of the fuel or material stream: Lignite coke
	Required Tier <sup>9</sup>	Selected Tier	Values and units	Statement concerning any nonconformity between required and selected tier (e.g. technical not feasible or unreasonable high costs) <sup>10</sup>
Activity data	3a/3b	3a	824,666 t/a	No nonconformity
Net calorific value	3	3	8,41 TJ/kt	No nonconformity
Emission factor	3	3	101,2 t CO <sub>2</sub> /TJ	No nonconformity
Composition data	n.a.	n.a.	n.a.	n.a.
Oxidation factor	2	2	0,99	No nonconformity
Conversion factor	n.a.	n.a.	n.a.	n.a.
Code of the fuel or material stream: 1.2				Name of the fuel or material stream: Matured timber
	Required Tier <sup>11</sup>	Selected Tier	Values and units	Statement concerning any nonconformity between required and selected tier (e.g. technical not feasible or unreasonable high costs)
Activity data	n.a.	2b	39,543 t/a	Fuel stream 1.2 is a pure biomass stream. No tier requirements according to Table 1 of Annex I of the MRG. Indicated values are considered for the calculation of the CO <sub>2</sub> emissions as memo item.
Net calorific value	n.a.	1	15.3 TJ/kt	
Emission factor	n.a.	1	0 (107,5 CO <sub>2</sub> /TJ)	
Composition data	n.a.	n.a.	n.a.	
Oxidation factor	n.a.	1	0,99	
Conversion factor	n.a.	n.a.	n.a.	

<sup>8</sup> Please tick the relevant category

<sup>9</sup> Minimum requirement during the period 2005 to 2007 according to Table 1 of Annex 1 of the MRG

<sup>10</sup> Attach plausible proof for statement

<sup>11</sup> According to Table 1 of Annex 1 of the MRG

The following table summarizes the tier approaches for minor streams of fuels and materials. Tiers can be selected from table 1 in Annex I of the MRG, however, also other approaches can be used. In case of more than one fuel and material stream per source, respectively in case of more than one source per activity, the corresponding fields in the following table have to be duplicated accordingly.

Total emission of the installation				Category according to Table 1 of Annex 1 of the MRG <sup>12</sup>
• excluding biomass emissions:		t CO <sub>2</sub> /a		A: total annual emissions ≤ 50 kt ( )
• including biomass emissions:		t CO <sub>2</sub> /a		B: 50 kt < total annual emissions ≤ 500 kt ( )
• biomass		t CO <sub>2</sub> /a		C: total annual emissions > 500 kt ( )
<b>Code of the activity:</b>				<b>Name of the activity:</b>
Code of the source:				Name of the source:
Code of the fuel or material stream:				Name of the fuel or material stream: limestone
	Selected Tier <sup>13</sup>	Other Approach <sup>14</sup>	Values and units	Statement concerning selected tier or other approach <sup>15</sup>
Activity data				
Net calorific value				
Emission factor				
Composition data				
Oxidation factor				
Conversion factor				

<sup>12</sup> Please tick the relevant category

<sup>13</sup> According to Table 1 of Annex 1 of the MRG

<sup>14</sup> Please specify

<sup>15</sup> Attach plausible proof for statement



List of tier approaches to be applied for minor streams of fuels and material in a condensation power station

Total emission of the installation				Category according to Table 1 of Annex 1 of the MRG <sup>16</sup>
• excluding biomass emissions:		709,579 t CO <sub>2</sub> /a		A: total annual emissions ≤ 50 kt ( )
• including biomass emissions:		774,618 t CO <sub>2</sub> /a		B: 50 kt < total annual emissions ≤ 500 kt ( )
• biomass		65,039 t CO <sub>2</sub> /a		C: total annual emissions > 500 kt (X)
<b>Code of the activity: n.a.</b>				<b>Name of the activity: combustion installation</b>
Code of the source: 2				Name of the source: flue gas cleaning
Code of the fuel or material stream: 2.1				Name of the fuel or material stream: limestone
	Selected Tier <sup>17</sup>	Other Approach <sup>18</sup>	Values and units	Statement concerning selected tier or other approach <sup>19</sup>
Activity data	1		17,540 t/a	
Net calorific value	n.a.		---	
Emission factor	1		0,44 t CO <sub>2</sub> /t	
Composition data	n.a.		---	
Oxidation factor	n.a.		---	
Conversion factor	1		1,0	

<sup>16</sup> Please tick the relevant category

<sup>17</sup> According to Table 1 of Annex 1 of the MRG

<sup>18</sup> Please specify

<sup>19</sup> Attach plausible proof for statement

The following table summarizes the tier or non-tier approaches for “de minimis” streams of fuels and materials. In case of more than one fuel and material stream per source, respectively in case of more than one source per activity, the corresponding fields in the following table have to be duplicated accordingly.

Total emission of the installation				Category according to Table 1 of Annex 1 of the MRG <sup>20</sup>
• excluding biomass emissions:		t CO <sub>2</sub> /a		A: total annual emissions ≤ 50 kt ( )
• including biomass emissions:		t CO <sub>2</sub> /a		B: 50 kt < total annual emissions ≤ 500 kt ( )
• biomass		t CO <sub>2</sub> /a		C: total annual emissions > 500 kt ( )
<b>Code of the activity: n.a.</b>				<b>Name of the activity:</b>
Code of the source:				Name of the source:
Code of the fuel or material stream:				Name of the fuel or material stream: limestone
	Selected Tier <sup>21</sup>	Other approach <sup>22</sup>	Values and units	Statement concerning selected tier or other approach <sup>23</sup>
Activity data				
Net calorific value				
Emission factor				
Composition data				
Oxidation factor				
Conversion factor				



List of tiers or approaches to be applied for “de minimis” streams of fuels and materials of a condensation power station  
**No “de minimis” streams of fuels and materials appear!**

<sup>20</sup> Please tick the relevant category

<sup>21</sup> According to Table 1 of Annex 1 of the MRG

<sup>22</sup> please specify

<sup>23</sup> Attach plausible proof for statement

## 6. Description of the type, specification and exact location of the metering devices to be used for each of the sources and fuel types/materials

The following table gives detailed information about the metering devices for the determination of the activity data (mass or volume per unit of time) of each stream of fuel and material. The streams of fuels and materials are linked to a source. If there are several streams of fuels and materials linked to the source and if there are several sources linked to the activity, the corresponding fields of this form have to be duplicated accordingly. If there is more than one activity within the installation covered by the ETS Directive the form has to be copied completely according to the number of activities.

<b>Code of the activity:</b>				<b>Name of the activity:</b>				
Code of the source:				Name of the source:				
Code of the fuel or material stream:				Name of the fuel or material stream:				
<b>METERING DEVICE</b>								
Code	measurement problem	measurement method	make, type, producer	measurement range	typical operating range	measurement uncertainty	Calibration	
							last date	interval
<u>Further details and information about the measuring device:</u> (e.g. location or applied CEN/ISO standards)								
<u>Attachments:</u> (e.g. calibration protocol or measurement report)								



Description of the type, specification and exact location of the metering devices to be used for each of the sources and fuels types/materials in a condensation power station

<b>Code of the activity: n.a.</b>				<b>Name of the activity: combustion installation</b>				
Code of the source: 1				Name of the source: combustion				
Code of the fuel or material stream: 1.1				Name of the fuel or material stream: lignite coal				
<b>METERING DEVICE</b>								
Code	measurement problem	measurement method	make, type, producer	measurement range	typical operating range	measurement uncertainty	Calibration	
							last date	interval
M 1.1	Measurement of lignite coke flow	Belt scale with integrator	ABC123 Belt Weigher Ltd.	3 – 300 t/h	50 – 150 t/h	± 1,5%	13.3.05	2 years
<p><u>Further details and information about the measuring device:</u></p> <p>The belt scale is combined to a conveyer belt of a surface mining area. The total amount of lignite is fed via the belt scale to the combustion chamber. In case of revisions and other interruptions the conveyer belt will turned off. No storage takes place at the site of the installation.</p>								
<p><u>Attachments:</u></p> <p>Calibration protocol of March 13<sup>th</sup>, 2005</p>								

Continuation on next page!

Code of the fuel or material stream: 1.2				Name of the fuel or material stream: matured timber				
<b>METERING DEVICE</b>								
Code	measurement problem	measurement method	make, type, producer	measurement range	typical operating range	measurement uncertainty	Calibration	
							last date	interval
M 1.2	Measurement of matured timber	Truck scale	DEF456 Truck Weigher Ltd.	0,5 – 30 t	5 – 20 t	± 2,5%	14.4.05	2 years
<u>Further details and information about the measuring device:</u>								
The truck scale is located at the entrance of the site. The load of each truck is metered and used for issuing an invoice. The total amount of matured timber is registered by that scale. A small storage area ( max. 100 t) is located near the combustion installation. The matured timber is fed to the combustion chamber in non-regular intervals. The storage at the begin and end of the year is assumed to be the same (max. error 0,25%). This stream is a pure biomass stream with an emission factor of zero!								
<u>Attachments:</u>								
Calibration protocol of April 14 <sup>th</sup> , 2005								
Code of the fuel or material stream: 2.1				Name of the fuel or material stream: lime stone				
<b>METERING DEVICE</b>								
Code	measurement problem	measurement method	make, type, producer	measurement range	typical operating range	measurement uncertainty	Calibration	
							last date	interval
M 2	Measurement of limestone	Belt scale	GHI 789 Belt Weigher Ltd.	0,5 – 30 t	1 – 10 t	± 2,5%	15.5.05	2 years
<u>Further details and information about the measuring device:</u>								
The belt scale is located near the storage of the limestone. The total amount of limestone is fed via the belt scale to the flue gas cleaning equipment and registered continuously.								
<u>Attachments:</u>								
Calibration protocol of Mai 15 <sup>th</sup> , 2005								

Code of the fuel or material stream: 3				Name of the fuel or material stream: furnace bottom ash (FBA)				
<b>METERING DEVICE</b>								
Code	measurement problem	measurement method	make, type, producer	measurement range	typical operating range	measurement uncertainty	Calibration	
							last date	interval
M 3	Measurement of ash	Truck scale	DEF456 Truck Weigher Ltd.	0,5 – 30 t	5 – 20 t	± 2,5%	14.4.05	2 years
<u>Further details and information about the measuring device:</u>								
The truck scale is located at the entrance of the site. The load of each truck is metered and used for issuing an invoice. The total amount of ash (FBA) is registered by that scale. A small storage area for FBA ( max. 100 t) is located near the combustion installation. The storage at the begin and end of the year is assumed to be the same (max. error 0,25%).								
<u>Attachments:</u>								
Calibration protocol of April 14 <sup>th</sup> , 2005								
Code of the fuel or material stream: 4				Name of the fuel or material stream: pulverised fuel ash (PFA)				
<b>METERING DEVICE</b>								
Code	measurement problem	measurement method	make, type, producer	measurement range	typical operating range	measurement uncertainty	Calibration	
							last date	interval
M 4	Measurement of ash	Truck scale	DEF456 Truck Weigher Ltd.	0,5 – 30 t	5 – 20 t	± 2,5%	14.4.05	2 years
<u>Further details and information about the measuring device:</u>								
The truck scale is located at the entrance of the site. The load of each truck is metered and used for issuing an invoice. The total amount of ash (PFA) is registered by that scale. A small storage area for PFA ( max. 100 t) is located near the combustion installation. The storage at the begin and end of the year is assumed to be the same (max. error 0,25%).								
<u>Attachments:</u>								
Calibration protocol of April 14 <sup>th</sup> , 2005								

## 7. Description of the approach to be used for the sampling of fuels and materials for the determination of net calorific value, carbon content, emission factors, and biomass content for each of the sources and fuel types/materials

The following table summarizes the approaches to be used for taking samples from fuel and material streams. The streams are linked to a source or a “non-source”, if samples with relevance for the CO<sub>2</sub> calculation have been taken at a “non-source” (e.g. samples of ashes for the determination of the carbon content).

If there are several streams of fuel and material linked to the source and if there are several sources linked to the activity the corresponding fields of this form have to be duplicated. If there is more than one activity within the installation covered by the ETS Directive the form has to be copied completely according to the number of activities.

<b>Code of the activity:</b>				<b>Name of the activity:</b>		
Code of the source:				Name of the source:		
Code of the fuel or material stream:				Name of the fuel or material stream:		
<b>SAMPLING</b>						
Code	Purpose	Method	Sampler	Qualification	Frequency	Amount sample/retain sample
<u>Further details and information about the sampling procedure:</u> (e.g. location or CEN/ISO standards)						
<u>Attachments:</u> (e.g. sampling protocol, ISO 17025 certificate of the sampler)						



Description of the approach to be used for sampling of fuel and material streams of a condensation power station

<b>Code of the activity: n.a.</b>			<b>Name of the activity: combustion installation</b>			
Code of the source: 1.1			Name of the source: combustion			
Code of the fuel or material stream: 1.1			Name of the fuel or material stream: lignite coke			
<b>SAMPLING</b>						
Code	Purpose	Method	Sampler	Qualification	Frequency	Amount sample/retain sample
S 1.1	Determination of net calorific value	ISO 5069-1, 2	External lab	ISO 17025	weekly	10 kg / 5 kg
<u>Further details and information about the sampling procedure:</u> <ul style="list-style-type: none"> <li>ISO 5069 Brown coal and lignite – principles of sampling Part 1: Sampling for determination of moisture content and general analysis Part 2: Sampling for determination of moisture content and general analysis</li> </ul>						
<u>Attachments:</u> <ul style="list-style-type: none"> <li>ISO 17025 certificate according to applied sampling method</li> </ul>						
<i>Continuation of table see next page</i>						

Continuation of table						
Code of the source: n.a.				Name of the source: n.a.		
Code of the fuel or material stream: 3				Name of the fuel or material stream: furnace bottom ash (FBA)		
SAMPLING						
Code	Purpose	Method	Sampler	Qualification	Frequency	Amount sample/retain sample
S 3	Determination of carbon content	ISO 5069-1, 2	External lab	ISO 17025	weekly	10 kg / 5 kg
<u>Further details and information about the sampling procedure:</u>						
ISO 5069 Brown coal and lignite – principles of sampling [Part 1: Sampling for determination of moisture content and general analysis; Part 2: Sampling for determination of moisture content and general analysis]						
<u>Attachments:</u> ISO 17025 certificate according to applied sampling method						
Code of the source: n.a.				Name of the source: n.a.		
Code of the fuel or material stream: 4				Name of the fuel or material stream: pulverised fuel ash (PFA)		
SAMPLING						
Code	Purpose	Method	Sampler	Qualification	Frequency	Amount sample/retain sample
S 4	Determination of carbon content	ISO 5069-1, 2	External lab	ISO 17025	weekly	10 kg / 5 kg
<u>Further details and information about the sampling procedure:</u>						
ISO 5069 Brown coal and lignite – principles of sampling [Part 1: Sampling for determination of moisture content and general analysis; Part 2: Sampling for determination of moisture content and general analysis]						
<u>Attachments:</u> ISO 17025 certificate according to applied sampling method						

## 8. Description of the intended sources or analytical approaches for the determination of the net calorific values, carbon content or biomass fraction for each of the sources and fuels types/materials

The following table summarises the sources and approaches for the determination of analytical parameters with relevance to CO<sub>2</sub> emission and with reference to the corresponding streams of fuels and materials. The streams are linked to a source or a “non-source”, if samples with relevance to the CO<sub>2</sub> calculation have been taken at a “non-source” (e.g. samples of ashes for the determination of the carbon content). If there are several streams of fuel and material linked to the source and if there are several sources linked to the activity the corresponding fields of this form have to be duplicated. If there is more than one activity within the installation covered by the ETS Directive the form has to be copied completely according to the number of activities.

<b>Code of the activity: n.a.</b>				<b>Name of the activity: combustion installation</b>		
Code of the source: 1				Name of the source: combustion		
Code of the fuel or material stream: 1.1				Name of the fuel or material stream: lignite coke		
<b>ANALYSIS</b>						
Code	Parameter	Method	Sampler	Qualification	Frequency	Uncertainty
<u>Further details and information about the determination of analytical parameters:</u> (e.g. literary source - if not analysed, used standards)						
<u>Attachments:</u> (e.g. sampling protocol, ISO 17025 certificate of the sampler)						



Description of the approaches for the determination of analytical parameter of fuel and material streams of a condensation power station

<b>Code of the activity: n.a.</b>				<b>Name of the activity: combustion installation</b>		
Code of the source: 1				Name of the source: combustion		
Code of the fuel or material stream: 1.1				Name of the fuel or material stream: lignite coke		
<b>ANALYSIS</b>						
Code	Parameter	Method	Sampler	Qualification	Frequency	Uncertainty
A 1.1.1	Net calorific value	DIN 51900-1:2000	External lab	ISO 17025	weekly	0,2%
<u>Further details and information about the determination of analytical parameters:</u> DIN 51900-1:2000 Determination of gross calorific value by the bomb calorimeter and calculation of the net calorific value Part 1: Principles, apparatus, method						
<u>Attachments:</u> ISO 17025 certificate according to applied sampling method						
A 1.1.2	Carbon content	ISO 625:2000	External lab	ISO 17025	weekly	0,2%
<u>Further details and information about the determination of analytical parameters:</u> ISO 925:1996 Solid mineral fuels – determination of carbon and hydrogen – Liebig method						
<u>Attachments:</u> ISO 17025 certificate according to applied sampling method						
<i>Continuation of table see next page</i>						

Continuation of table

<b>Code of the activity: n.a.</b>	<b>Name of the activity: combustion installation</b>
Code of the source: n.a.	Name of the source: n.a.
Code of the fuel or material stream: 3	Name of the fuel or material stream: furnace bottom ash (FBA)

**ANALYSIS**

Code	Parameter	Method	Sampler	Qualification	Frequency	Uncertainty
A 3	Carbon content	ISO 625:2000	External lab	ISO 17025	weekly	0,2%

Further details and information about the determination of analytical parameters:

ISO 925:1996 Solid mineral fuels – determination of carbon and hydrogen – Liebig method

Attachments:

ISO 17025 certificate according to applied sampling method

Code of the source: n.a.	Name of the source: n.a.
Code of the fuel or material stream: 4	Name of the fuel or material stream: pulverised fuel ash (PFA)

**ANALYSIS**

Code	Parameter	Method	Sampler	Qualification	Frequency	Uncertainty
A 3	Carbon content	ISO 625:2000	External lab	ISO 17025	weekly	0,2%

Further details and information about the determination of analytical parameters:

ISO 925:1996 Solid mineral fuels – determination of carbon and hydrogen – Liebig method

Attachments:

ISO 17025 certificate according to applied sampling method

## 9. Description of continuous emission measurement (CEM) systems to be used for the monitoring of a source, i.e. the points of measurement, frequency of measurements, equipment used, calibration procedures and data collection and storage procedures

Generally, CO<sub>2</sub>-emissions can be calculated or measured. However, the measurement is linked, according to the MRG, to stringent conditions: approval by competent authority, corroboration by supporting calculation, consideration of accepted standards and compliance with additional QA/QC requirements.

### § Chapter 4.2.3.1 and chapter 7.2 of the MRG

- Approval by the competent Authority

Greenhouse gas emissions may be determined using continuous emission measurement systems (CEMS) from each source using standardised or accepted methods once the operator has received approval from the competent authority before the reporting period that using a CEMS achieves greater accuracy than the calculation of emissions using the most accurate tier approach.

- Corroboration by supporting calculation

For each reporting period thereafter, emissions determined using CEMS shall be corroborated by a supporting calculation of emissions, with the rules for the selection of the tiers being the same as those applied for a calculation approach.

- Consideration of accepted standards

Measurement procedures for CO<sub>2</sub> concentrations as well as for the mass or volume flow of off-gases through each stack shall use relevant CEN standards as soon as they are available. If CEN standards are not available, ISO standards or national standards shall apply. Where no applicable standards exist, procedures can be carried out where possible in accordance with draft standards or industry best practice guidelines.

- Additional QA/QS requirements

The operator shall comply with the orders of the EN 14181 ('Stationary source emissions — Quality assurance of automated measuring systems') and of the EN ISO 14956:2002 ('Air quality — Evaluation of the suitability of a measurement procedure by comparison with a required uncertainty') for the instruments and the operator.

If continuous monitoring measurements (CEM) are used the points of measurement, the frequency of measurements, the equipment used, the calibration procedures, the type approval and the functional tests, the data collection and the data storage procedures have to be described by the operator under consideration of EN 14181.

<b>Code of the activity:</b>			<b>Name of the activity:</b>				
Code of the source:			Name of the source:				
Code of the fuel or material stream:			Name of the fuel or material stream:				
Code	<b>CEM system</b>						
	measuring point	measurement method	measurement range		typical operating range		uncertainty
	Make, type, producer	Type approval QAL 1	Calibration QAL 2		Maintenance QAL 3		Functional Test AST
		Date	Date	Interval	Date	Interval	Date    interval
	<b>CEM system</b>						
	measuring point	measurement method	measurement range		typical operating range		uncertainty
	Make, type, producer	Type approval QAL 1	Calibration QAL 2		Maintenance QAL 3		Functional Test AST
	Date	Date	Interval	Date	Interval	Date    interval	

Continuation of form							
CEM computer							
Make, type, producer	Type approval	Calibration		Maintenance		Functional Test	
	QAL 1	QAL 2		QAL 3		AST	
	Date	Date	Interval	Date	Interval	Date	interval
Further details and information about the CEM							
e.g. protection against manipulation, storage of data							

CEM systems are used only under special boundary conditions (e.g. co incineration a various process gases of unknown and alternating composition in a power station). Also the described cases study does not determine the CO2 emissions by measurement but by calculation. The corresponding tier approaches have been described in the former chapters.

Nevertheless, information of a potential CEM system are given in the following table.



A potential CEM system for the condensation power station might look as follows:

<b>Code of the activity: n.a.</b>				<b>Name of the activity: combustion installation</b>				
Code of the source: 1				Name of the source: combustion				
Code of the fuel or material stream: 1.1 and 1.2				Name of the fuel or material stream: lignite coke and matured timber				
Code CEM 1	<b>CEM system [CO<sub>2</sub>-measurement]</b>							
	measuring point	measurement method	measurement range	typical operating range		uncertainty		
	Chimney of power station	FTIR	0 – 25 Vol.%	10 – 15 Vol.%		0,5 Vol.%		
	Make, type, producer	Type approval QAL 1	Calibration QAL 2		Maintenance QAL 3		Functional Test AST	
	ABC Ltd.	Date	Date	Interval	Date	Interval	Date	interval
		25.01.2002	13.03.2005	3 years	05.10.2005	1 – 12 weeks	20.03.2005	1 year
	<b>CEM system [Volume measurement]</b>							
	measuring point	measurement method	measurement range	typical operating range		uncertainty		
	Chimney of power station	Differential pressure	2 – 25 m/s	10 – 15 m/s		5%		
	Make, type, producer	Type approval QAL 1	Calibration QAL 2		Maintenance QAL 3		Functional Test AST	
	ABC Ltd	Date	Date	Interval	Date	Interval	Date	interval
		13.12.2001	13.03.2005	3 years	05.10.2005	4 weeks	20.03.2005	1 year

Continuation of form							
CEM computer							
Make, type, producer	Type approval	Calibration		Maintenance		Functional Test	
	QAL 1	QAL 2		QAL 3		AST	
ABC Ltd.	Date	Date	Interval	Date	Interval	Date	interval
		12.1.2002	14.03.2005	3 years	23.07.2003	on demand	21.03.2005
Further details and information about the CEM							
e.g. protection against manipulation, storage of data							



**ATTENTION:**

Continuous emission monitoring systems have some disadvantages:

- CEM do not distinguish between fossil CO<sub>2</sub> and non-fossil CO<sub>2</sub>.
- The metering of the flue gas volume flow is – especially in case of higher cross section of the flue gas channel - combined with relatively high uncertainties, very often between 5 and 15%. This results, in combination with the CO<sub>2</sub>-concentration measurement, in total uncertainties which are higher than the permitted uncertainty (5% according to the total amount of CO<sub>2</sub>). So CEM should only be used under special boundary conditions.

## 10. Description of the quality assurance and quality control procedures for data management

One core element of quality assurance (QA) and quality control (QC) is the implementation and maintenance of the monitoring methodology described in the previous sections. Supporting procedures can be implemented.



### **Chapter 7.1 of the MRG**

Quality assurance and control procedures shall address the procedures needed for monitoring and reporting of greenhouse gases and the application of these procedures within the installation and shall include, *inter alia*:

- identification of greenhouse gas sources covered by the scheme under Annex I to the Directive,
- the sequence and interaction of monitoring and reporting processes,
- responsibilities and competence,
- the methods of calculations or measurement which are used,
- the measuring equipment used (if applicable),
- reporting and records,
- internal reviews of both reported data and the quality system,
- corrective and preventive action.

The operational and organisational structure might be described in a procedural description supported by corresponding work descriptions. Operators who have implemented management systems according to ISO and/or EU-standards (see chapter 11) are familiar with these procedures. In this case the procedural and work description might be a part of the existing structures. In **ANNEX 1** an example is given for procedural and work descriptions concerning QA and QC issues.

Procedures to assure and control data management can be one part of this procedural description.

**§ Chapter 7.3 of the MRG**

The operator shall perform data management quality assurance and control processes on its data to prevent omissions, misrepresentations and errors. Such processes shall be designed by the operator based on the complexity of the data set. The data management quality assurance and control processes shall be recorded and made available to the verifier.

The MRG recommend very simple measure to support and to control the data management: vertical and horizontal comparison.

**§ Chapter 7.3 of the MRG**

- A vertical approach compares emissions data monitored for the same installation in different years. A monitoring error is probable if differences between annual data cannot be explained by:
  - changes in activity levels,
  - changes concerning fuels or input material,
  - changes concerning the emitting processes (e.g. energy efficiency improvements).



### **Chapter 7.3 of the MRG**

- A horizontal approach compares values resulting from different operational data collection systems, including:
  - comparison of data on fuel or input material consumed by specific sources with fuel purchasing data and data on stock changes,
  - comparison of total data on fuel or input material consumption data with fuel purchasing data and data on stock changes,
  - comparison of emission factors that have been calculated or obtained from the fuel supplier, to national or international reference emission factors of comparable fuels,
  - comparison of emission factors based on fuel analyses to national or international reference emission factors of comparable fuels,
  - comparison of measured and calculated emissions.

## 11. Information on relevant links with activities undertaken under the Community ecomanagement and audit scheme (EMAS)

The operator should declare whether he has implemented a quality or environmental management system according to the listed standards:

<b>System</b>	<b>since</b>	<b>valid until</b>	<b>last audit</b>
ISO 9001			
ISO 14001			
EMAS			

If the operator has implemented such a certified management system he should give information on relevant links.

Links to management systems:

## Part II-B: Procedural and work descriptions

This Annex will give, complementary to the forms presented in Part II of this manual, additional support to the operator to establish a monitoring methodology and an annual emission report in line with the legal framework (ETS Directive and MRG). The chosen approach for these additional support are templates for

- procedural descriptions (PD 00X) and
- work descriptions (WD 00X).

mainly describing procedures and workings for data management and quality assurance & control (QA, QC). These procedures are generally very installation-specific and have to be prepared by each operator according to his unique boundary conditions (e.g. infrastructure, manning, complexity of the installation covered by the ETS Directive). The number and kind of procedural and working descriptions shall consider these unique boundary conditions. However, Annex 1 will focus on the main procedures and workings and will guide the operator in preparing and issuing documents supporting monitoring and reporting and in completing the forms given in Part II.

It is recommended that the operator will have a look to standard guidelines for the preparation of quality management systems in order to get some background information about necessary documentation for auditing processes

- Quality management systems - Fundamentals and vocabulary (ISO 9000:2000);
- Quality management systems – Requirements (ISO 9001:2000);
- Quality management systems - Guidelines for performance improvements (ISO 9004:2000);

<b>PROCEDURAL DESCRIPTION PD 001</b> Quality Assurance, Quality Control and Data Management	Page 1 of 16 Revision 001		<b>PROCEDURAL DESCRIPTION PD 001</b> Quality Assurance, Quality Control and Data Management	Page 2 of 16 Revision 001
<b>Content</b> <ol style="list-style-type: none"> <li>1. <b>Objective</b></li> <li>2. <b>Scope</b></li> <li>3. <b>Terms and definitions</b></li> <li>4. <b>Responsibilities</b> <ol style="list-style-type: none"> <li>4.1 The operator</li> <li>4.2 The authorized person (“CO<sub>2</sub> manager”)</li> </ol> </li> <li>5. <b>Procedures</b></li> <li>6. <b>Document control</b></li> <li>7. <b>Register of records</b></li> <li>8. <b>Internal Audits</b></li> <li>9. <b>Link to management systems</b></li> </ol>			<ol style="list-style-type: none"> <li>1. <b>Objective</b>  This procedural description addresses all responsibilities and measures to assure and control the quality of procedures for the monitoring and reporting of CO<sub>2</sub> emissions.  The activities and responsibilities and the interfaces within the organisations will be defined and reproducibly documented in written form.</li> <li>2. <b>Scope</b>  This procedural description PD 001 is addressed to all persons / organisational units within the company, that are involved in monitoring and reporting of CO<sub>2</sub> emissions of the installation covered by the ETS Directive. Especially addressed are: <ul style="list-style-type: none"> <li>• the management board (operator)</li> <li>• the environmental protection department (“CO<sub>2</sub> manager”)</li> </ul> </li> </ol>	
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<p><b>3. Terms and definitions</b></p> <p>(a) ‘activities’ means the activities listed in Annex I to the ETS Directive;</p> <p>(b) ‘activity-specific’ means specific to an activity as carried out at one specific installation;</p> <p>(c) ‘batch’ means an amount of fuel or material transferred as one shipment or continuously over a specific period. It shall be representatively sampled and characterised in respect of its average energy and carbon content and other relevant aspects of its chemical composition;</p> <p>(d) ‘biomass’ means non-fossilised and biodegradable organic material originating from plants, animals and micro organisms. This shall also include products, by-products, residues and waste from agriculture, forestry and related industries as well as the non-fossilised and biodegradable organic fractions of industrial and municipal wastes. Biomass also includes gases and liquids recovered from the decomposition of non-fossilised and biodegradable organic material. When burned for energy purposes biomass is referred to as biomass fuel;</p> <p>(e) ‘combustion emissions’ means greenhouse gas emissions occurring during the exothermic reaction of a fuel with oxygen;</p> <p>(f) ‘competent authority’ means the appropriate competent authority or authorities for the implementation of the provisions set out in the MRG, designated in accordance with Article 18 of the ETS Directive;</p>		<p>(g) ‘emissions’ means the release of greenhouse gases into the atmosphere from sources in an installation, as defined in the ETS Directive;</p> <p>(h) ‘greenhouse gas’ means CO<sub>2</sub></p> <p>(i) ‘greenhouse gas emissions permit’ or ‘permit’ means a permit as referred to in Article 4 of the ETS Directive and issued in accordance with Articles 5 and 6 of the ETS Directive;</p> <p>(j) ‘installation’ means a stationary technical unit where one or more activities listed in Annex I to the Directive are carried out and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution, as defined in the ETS Directive;</p> <p>(k) ‘level of assurance’ means the degree to which the verifier is confident in the verification conclusions that it has been proved whether or not the information reported for an installation taken as a whole is free from material misstatement;</p> <p>(l) ‘materiality’ means the professional judgment of the verifier as to whether an individual or aggregation of omissions, misrepresentations or errors that affects the information reported for an installation will reasonably influence the intended users’ decisions. As a broad guide, a verifier will tend to class a misstatement in the total emissions figure as being material if it leads to aggregate omissions, misrepresentations or errors in the total emissions figure being greater than five percent;</p>	
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<p>(m) 'monitoring methodology' means the methodology used for the determination of emissions, including the choice between calculation or measurement and the choice of tiers;</p> <p>(n) 'operator' means any person who operates or controls an installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated</p> <p>(o) 'process emissions' means greenhouse gas emissions other than 'combustion emissions' occurring as a result of intentional and unintentional reactions between substances or their transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances, and the formation of substances for use as product or feedstock;</p> <p>(p) 'reporting period' means the time period for which emissions have to be monitored and reported as set out in Article 14(3) of the EU ETS Directive, being a calendar year;</p> <p>(q) 'source' means a separately identifiable point or process in an installation from which greenhouse gases are emitted;</p> <p>(r) 'tier' means a specific methodology for determining activity data, emission factors and oxidation or conversion factors. Several tiers form a hierarchy of methodologies from which a selection shall be made in accordance with these guidelines;</p>		<p>(s) 'verifier' means a competent, independent, accredited verification body with responsibility for performing and reporting on the verification process, in accordance with the detailed requirements established by the Member State pursuant to Annex V to the ETS Directive.</p>	
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<p><b>4. Responsibilities</b> (see also WD 003)</p> <p><b>4.1 The operator</b></p> <p>The operator is responsible for the preparation and issue of the verifiable annual emission report that documents the annual CO<sub>2</sub> emission of the installation and its monitoring.</p> <p>The operator may appoint an authorized person (“CO<sub>2</sub> manager”), responsible for delegated activities. This appointment has to be made in written form and the certificate of the appointment shall define the</p> <ul style="list-style-type: none"> <li>• authorized person</li> <li>• delegation period</li> <li>• delegated activities</li> </ul> <p>The appointment shall be part of the annual emission report.</p> <p>The operator shall support the CO<sub>2</sub> manager in his monitoring and reporting activities and shall provide him with the necessary personnel and material resources (rooms, equipment, devices, etc.). He is responsible for the qualification of the “CO<sub>2</sub> manager” and shall agree to all necessary training measures.</p> <p>The operator shall coordinate and control all delegated activities.</p>		<p><b>4.2 The authorized person (“CO<sub>2</sub>-manager”)</b></p> <p>The “CO<sub>2</sub> manager” shall be appointed by a certificate with the signature of the operator of the installation covered by the EU ETS Directive. Part of this certificate is a detailed workplace and job description.</p> <p>The CO<sub>2</sub> manager reports directly to the operator and he is not bound to any other instruction. The CO<sub>2</sub> manager is responsible for all delegated activities according to his workplace and job description, even if he delegates activities to third persons. If such a further delegation takes place, then the “CO<sub>2</sub> manager” is responsible for</p> <ul style="list-style-type: none"> <li>• the qualification and competence of the third person</li> <li>• the concrete description of the delegated activity</li> </ul> <p>The CO<sub>2</sub> manager shall coordinate and control all delegated activities.</p>	
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<p><b>5. Procedures</b></p> <p>The operator of the installation covered by the EU ETS Directive performs data management, quality assurance and control processes on its data to prevent omissions, misrepresentations and errors. Quality assurance and control processes are recorded and all relevant data, including assumptions, references, activity data, emission factors, oxidations factors and conversion factors, made available to the verifier and the competent authority.</p> <p>In particular, the operator establishes documents and implements and maintains an effective data management system for the monitoring and reporting of greenhouse gas to provide verification of the reported greenhouse gas emissions. This documentation includes the following quality assurance and control procedures needed for monitoring and reporting of greenhouse gases and the application of these procedures within the installation:</p> <ul style="list-style-type: none"> <li>• identification of greenhouse gas sources covered by the scheme under Annex I to the Directive, (see Work Description WD 01)</li> <li>• the sequence and interaction of monitoring and reporting processes, (see Work Description WD 02)</li> <li>• responsibilities and competence, (see chapter 4 and Work Description WD 03)</li> <li>• the methods of calculations or measurement which are used, (see Work Description WD 04)</li> </ul>		<ul style="list-style-type: none"> <li>• the measuring equipment used (if applicable), (see Work Description WD 05)</li> <li>• reporting and records, (see chapter 6 and 7 and Work Description WD 06)</li> <li>• internal reviews of both, reported data and the quality system (see chapter 8 and Work Description WD 07)</li> <li>• corrective and preventive action. (see Work Description WD 08)</li> </ul> <p>To allow reproducibility of the determination of emissions by the competent authority, the verifier or another third party, the operator shall retain the following for at least ten years after the submission of the annual emission report:</p> <ul style="list-style-type: none"> <li>• the list of all fuel and material streams and sources monitored,</li> <li>• the activity data used for any calculation of the emissions for each source of greenhouse gases,</li> <li>• documents justifying the selection of the monitoring methodology and the respective proofs of the reasons and any temporal or non-temporal changes of monitoring methodologies and tiers approved by the competent authority,</li> <li>• documentation of the monitoring methodology and results from the development of activity specific emission factors and biomass fractions for specific fuels, and oxidation or conversion factors, and respective proofs of approval from the competent authority,</li> </ul>	
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<ul style="list-style-type: none"> <li>• documentation of the process of collection of activity data for the installation,</li> <li>• the activity data, emission, oxidation or conversion factors submitted to the competent authority for the national allocation plan for years preceding the time period covered by the trading scheme,</li> <li>• documentation of the responsibilities in connection to the emissions monitoring,</li> <li>• the annual emission report</li> <li>• and any other information that is identified as required for the verification of the annual emissions report.</li> </ul>		<p><b>6. Document control</b></p> <p>The operator shall define and maintain a procedure for the control of all documents required in the context of monitoring and reporting of CO<sub>2</sub> emissions with a view to ensuring that:</p> <ul style="list-style-type: none"> <li>• documents can be localized,</li> <li>• documents are periodically reviewed, revised as necessary and approved by an authorized member of staff,</li> <li>• current versions of relevant documents are available at all relevant locations,</li> <li>• documents are retained for the specified periods</li> <li>• all copies of superseded documents are immediately withdrawn to prevent their erroneous use,</li> <li>• documents are accessible for external auditing purposes</li> </ul>	
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<p><b>7. Register of records</b></p> <p>The operator shall maintain at least two registers for the installation:</p> <ul style="list-style-type: none"> <li>• register of operational records</li> <li>• register of quality records</li> </ul> <p>The register of operational records should contain all records according to the sequence of interaction of monitoring and reporting processes (see WD 02). Additionally this register shall relate to the following:</p> <ul style="list-style-type: none"> <li>• monitoring equipment and faults and failures</li> <li>• abnormal operating conditions</li> <li>• temporarily and permanent changes in the monitoring methodology and correspondence about this with the competent authority</li> <li>• audit reports from third party inspection or authority inspection</li> <li>• annual emission reports</li> </ul>		<p>The register or operational records should start with an overview addressing the following information:</p> <ul style="list-style-type: none"> <li>• name of each record</li> <li>• associated procedural or work description</li> <li>• location of the record</li> </ul> <p>The register of quality records should contain the following:</p> <ul style="list-style-type: none"> <li>• plan of internal audit</li> <li>• report of internal audit</li> <li>• Record of corrective and preventive measures</li> </ul> <p>All records shall be retained for ten years from the date of the approval of the corresponding annual emission report by the competent authority. Backup registers should be available.</p>	
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<p><b>8. Internal audits</b></p> <p>The internal audit procedures should be in line with the requirements of accepted standards (e.g. ISO 9001-2000 or ISO 14001-2004 or EMAS). If the company already operates a functional management system, the audits may be incorporated within this system.</p> <p>The operator shall draw up an audit plan for each calendar year describing the internal audit procedures according to the established procedural and work descriptions documented in the monitoring methodology.</p> <p>In the year 2005 (the first monitoring and reporting period) a special audit should be performed to assess the correct and regular implementation of the monitoring methodology. Here all elements of the monitoring methodology have to be checked.</p> <p>Thereafter each element of the monitoring methodology might be audited during a longer time period.</p>		<p><b>9. Links to management systems</b></p> <p>The required quality assurance and control procedures may be implemented in the context of the EU Eco-Management and Audit Scheme (EMAS) or in the context of ISO 14001:2004 (Environmental management systems - Requirements with guidance for use) or in the context of other equivalent management systems, e.g. ISO 9001:2000 (Quality management systems – Requirements).</p>	
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<b>WORK DESCRIPTION WD 001</b> Identification of greenhouse gas sources	Page 1 of 4 Revision 001	<b>WORK DESCRIPTION WD 001</b> Identification of greenhouse gas sources	Page 2 of 4 Revision 001
<b>Content</b> <ol style="list-style-type: none"> <li>1. <b>Definition</b></li> <li>2. <b>List of fuel and material streams</b></li> <li>3. <b>Changes in operation</b></li> <li>4. <b>Declaration of completeness</b></li> </ol>		<b>1. Definition</b> During the first trading period (2005-07) greenhouse gas means CO <sub>2</sub> only. However, there might be additional greenhouse gases that have to be considered in the future, respectively upon special request by the competent authority (see national legal framework). Potential additional gases might be: <ul style="list-style-type: none"> <li>• Methane (CH<sub>4</sub>)</li> <li>• Nitrous oxide (N<sub>2</sub>O)</li> <li>• Sulphur hexafluoride (SF<sub>6</sub>)</li> <li>• Hydro fluorocarbons (HFCs)</li> <li>• Per fluorocarbons (PFCs)</li> </ul> Source means, according to the MRG, a separately identifiable point or process in an installation from which greenhouse gases are emitted. However, causal responsible for the greenhouse gas emissions are the fuel and material streams linked to these sources. So, in case of CO <sub>2</sub> emissions, the identification of sources can performed by checking all carbon containing streams linked to the installation.	
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<p><b>2. List of fuel and material streams</b></p> <p>A list of all fuel and material streams linked to the installation shall be already part of the existing permit according to the IPPC Directive (input and output streams).</p> <p>A list of fuel and material input streams linked to the installation and relevant to CO<sub>2</sub> emissions shall be already part of the existing permit according to the ETS Directive.</p> <p>So, both lists are the basis for identifying sources of CO<sub>2</sub> emissions as part of the mentioned permits.</p> <p>The operator shall indicate whether all permitted fuels and materials have really been used during the monitoring period. Those which are possible, but haven't been used, shall be listed. This "exclusion" list has to be signed by the operator (see also chapter 4).</p> <p>Beside fuel and material streams that are directly responsible for CO<sub>2</sub> emissions, it is necessary to monitor fuel and material output streams and to calculate oxidation and conversion factors (e.g. slag and ash in coal fired power stations).</p>		<p><b>3. Changes in operation</b></p> <p>The plant manager shall inform the "CO<sub>2</sub> manager" annually, whether</p> <ul style="list-style-type: none"> <li>• there are any permanent and non-permanent changes in the plant with relevance to CO<sub>2</sub> emissions and/or whether</li> <li>• fuel and material streams have been used that have not been used during the preceding period (year)</li> </ul> <p>This information shall be given as early as possible, in any case before the change has taken place. This is mandatory for the plant manager.</p> <p><b>4. Declaration of completeness</b></p> <p>The list of all used fuel and material streams, which is a mandatory part of the annual emission report, has to be signed by the operator separately with a commitment that this list is complete concerning the kind and amount of fuel and material stream.</p>	
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<b>WORK DESCRIPTION WD 002</b> Sequence and interaction of monitoring and reporting processes	Page 1 of 6 Revision 001	<b>WORK DESCRIPTION WD 002</b> Sequence and interaction of monitoring and reporting processes	Page 2 of 6 Revision 001
<b>Content</b> <ol style="list-style-type: none"> <li>1. Monitoring requirements</li> <li>2. Determination of CO<sub>2</sub> emission for each source</li> <li>3. First-line check by operator</li> <li>4. Calculation of CO<sub>2</sub> emissions</li> <li>5. Preparing the annual emission report</li> <li>6. Verification of the annual emission report</li> <li>7. Submission of the annual emission report</li> </ol>		<ol style="list-style-type: none"> <li>1. <b>Determination of CO<sub>2</sub> emission for each source</b>  The monitoring requirements of the monitoring methodology and the green house gas permit have to be considered by the operator (see Part II of this manual) are</li> <li>2. <b>Determination of CO<sub>2</sub> emission for each source</b>  According to the identified sources with the associated fuel and material streams (see WD 001), this work description shall, with a link to the corresponding fuel and material stream, define: <ul style="list-style-type: none"> <li>• Metering procedure</li> <li>• Sampling procedure</li> <li>• Analysing procedure</li> <li>• Responsibilities and qualification</li> </ul> Forms in Part II of the Manual “Monitoring and Reporting” will summarize the results. The measured and analysed data should be recorded immediately following its generation. The work description should state how CO<sub>2</sub> emissions loads are to be determined in the </li> </ol>	
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<p>event of monitoring equipment failure and what additional action should be taken under such circumstances.</p> <p><b>3. First line check by operator</b></p> <p>The operator shall check all primary measured data in the following sequence:</p> <ul style="list-style-type: none"> <li>• Verifying whether data obtained is complete and correct.</li> <li>• Recording the outcome of this verification</li> <li>• Specifying, recording and follow up of corrective actions.</li> </ul> <p>This first-line check of the measured data should make sure that the measured values are not implausible (see vertical and horizontal comparison in the MRG).</p> <p><b>4. Calculation of CO<sub>2</sub> emissions</b></p> <p>The operator has to describe the procedure for determining the CO<sub>2</sub> emissions (e.g. first step: calculation or measurement). In case of calculation he has to present a reproducible calculation meth-</p>		<p>od starting with the measured and recorded data and ending with the CO<sub>2</sub> emissions of the source.</p> <p><i>CO<sub>2</sub> emissions = activity data x emission factor x oxidation factor</i></p> <p>Activity data are generally directly metered (see chapter 1).</p> <p>Emission factors [t CO<sub>2</sub>/TJ] are determined by the ratio of the analysed carbon content of the fuel [t C/t fuel] and the analysed net calorific value [TJ/t fuel] multiplied with the mass ratio of CO<sub>2</sub> and C [44/12].</p> <p>Oxidation factors have to be determined by the ratio of carbon content in the fuel and in all related output streams (solid, liquid, gaseous). Here again the metered mass of the fuel stream and of the other streams and the analysed carbon content of the corresponding streams are the basis for the calculation.</p> <p>The CO<sub>2</sub> emissions of all sources have to be added to the total CO<sub>2</sub> emission of the installation covered by the ETS Directive.</p>	
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<p><b>5. Preparing the annual emission report</b></p> <p>The operator has to describe the steps involved in the preparation of the annual emission report that meets all mandatory requirements (EU requirements and national requirements given by the competent authority). Part of this description shall be the checking of the calculated CO<sub>2</sub> emissions for the installation as a whole.</p> <p><b>6. Verifying the annual emission report</b></p> <p>The annual emission report has to be verified by independent third parties (accredited verifier). The operator has to assign an accredited verifier with the approved sectoral scope competence.</p> <p>A list of accredited verifiers is or will be available by the competent authority.</p>		<p><b>7. Submission of the annual emission report</b></p> <p>The verified annual report has to be duly sent to the competent authority. Duly means according to the ETS Directive latest on March 31<sup>st</sup> every year.</p> <p>However, there might be national requirements that oblige the operator to launch his annual report earlier, e.g. end of February.</p> <p>The mandatory date for the submission of the annual emission report has to be clarified with the competent authority.</p>	
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<b>WORK DESCRIPTION WD 003</b> Responsibilities and competence	Page 1 of 4 Revision 001		<b>WORK DESCRIPTION WD 003</b> Responsibilities and competence	Page 2 of 4 Revision 001
<b>Content</b> <b>1. Responsibilities</b> <b>2. Matrix of responsibilities</b>			<b>1. Responsibilities</b> <p>The operator listed in the green house gas permit is responsible for all monitoring and reporting activities. However, he can delegate certain tasks by corresponding task/work description, e.g. to a CO<sub>2</sub> manager or a plant manager.</p> <p>The operator is responsible for the qualification of his personnel involved in the preparation and issue of the annual emission report and the necessary training and education. He has to establish a procedure to determine the need for any improvement activities (e.g. seminars, in house training, workshops).</p> <p>To get an overview about the responsibilities for certain activities a matrix shall be designed with the names of the persons and the corresponding duties</p>	
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<b>2. Matrix of responsibilities</b>								
	QA/QC	Commis- sioning (e.g. verifier)	Contact to CA	Issue of report	Internal audit	Recording	Data man- agement	Measuring devices
Operator	<b>A</b>	<b>R</b>						
CO <sub>2</sub> manager	<b>R</b>	<b>A</b>	<b>R</b>		<b>R</b>			
Assistant CO <sub>2</sub> manager			<b>A</b>	<b>R</b>		<b>R</b>	<b>R</b>	
Plant manager				<b>A</b>	<b>A</b>		<b>A</b>	<b>R</b>
Maintenance manager				<b>A</b>				<b>A</b>
Manager purchase department				<b>A</b>			<b>A</b>	
N.N.								
N.N.								
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**R = Responsible**

**A = Assistance**

<b>WORK DESCRIPTION WD 004</b> Methods of calculation or measurement	Page 1 of 4 Revision 001	<b>WORK DESCRIPTION WD 004</b> Methods of calculation or measurement	Page 2 of 4 Revision 001
<b>Content</b> <b>1. Calculation</b> <b>2. Measurement</b>		<b>1. Calculation of CO<sub>2</sub> emissions</b> <p>The operator can generally choose between calculation and measurement of CO<sub>2</sub> emissions. In case of a measurement the operator has to explain, why he has chosen this approach in how he will perform an accompanying calculation.</p> <p>In case of calculation the operator has to present a reproducible calculation method starting with the measured and recorded data and ending with the CO<sub>2</sub> emissions of the source. He has to distinguish between combustion and process emissions.</p> <p><i>Combustion emissions</i></p> <p>Activity data shall be based on fuel consumption. The quantity of fuel used shall be expressed in terms of energy content as TJ. The emission factor shall be expressed as tCO<sub>2</sub>/TJ. When energy is consumed not all of the carbon in the fuel oxidises to CO<sub>2</sub>. Incomplete oxidation occurs due to inefficiencies in the combustion process that leave some of the carbon unburned or partly oxidised as soot or ash.</p>	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 004</b> Methods of calculation or measurement	Page 3of 4 Revision 001	<b>WORK DESCRIPTION WD 004</b> Methods of calculation or measurement	Page 4 of 4 Revision 001
<p>Unoxidised carbon is taken into account in the oxidation factor which shall be expressed as a fraction. In the event that the oxidation factor is taken into account in the emission factor, a separate oxidation factor shall not be applied. The oxidation factor shall be expressed as a percentage. The resulting calculation formula is:</p> <p>CO<sub>2</sub> emissions = activity data x emission factor x oxidation factor</p> <p><i>Process emissions</i></p> <p>Activity data shall be based on material consumption, throughput or production output and expressed in t or m<sup>3</sup>. The emission factor shall be expressed in [t CO<sub>2</sub>/t or t CO<sub>2</sub>/m<sup>3</sup>]. Carbon contained in input materials which is not converted to CO<sub>2</sub> during the process, is taken into account in the conversion factor which shall be expressed as a fraction. In the event that a conversion factor is taken into account in the emission factor, a separate conversion factor shall not be applied. The quantity of input material used shall be expressed in terms of mass or volume [t or m<sup>3</sup>]. The resulting calculation formula is:</p>		<p>CO<sub>2</sub> emissions = activity data x emission factor x conversion factor</p> <p>The CO<sub>2</sub> emissions of all sources have to be added to the total CO<sub>2</sub> emission of the installation covered by the ETS Directive.</p> <p><b>2. Measurement of CO<sub>2</sub> emissions</b></p> <p>Greenhouse gas emissions may be determined using continuous emission measurement systems (CEMS) from each source using standardised or accepted methods once the operator has received approval from the competent authority before the reporting period that using a CEMS achieves greater accuracy than the calculation of emissions using the most accurate tier approach. For each reporting period thereafter, emissions determined using CEMS shall be corroborated by a supporting calculation of emissions, with the rules for the selection of the tiers being the same as those applied for a calculation approach.</p>	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 005</b> Measuring equipment	Page 1 of 4 Revision 001	<b>WORK DESCRIPTION WD 005</b> Measuring equipment	Page 2 of 4 Revision 001
<b>Content</b> <b>1. Control of monitoring and measuring devices</b> <b>2. Measurement, analysis and improvement</b> <b>3. Analysis of data</b>		<b>1. Control of monitoring and measuring devices</b> The operator shall determine the monitoring and measurement to be undertaken and the monitoring and measuring devices needed to provide conformity of the annual emission report to the legal requirements given in the ETS Directive, the MRG and in national requirements. The operator shall establish processes to ensure that monitoring and measurement can be carried out and are carried out in a manner that is consistent with the monitoring and measurement requirements. Where necessary to ensure valid results, measuring equipment shall a) be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or verification shall be recorded; b) be adjusted or re-adjusted as necessary; c) be identified to enable the calibration status to be determined; d) be safeguarded from adjustments that would invalidate the measurement result; e) be protected from damage and deterioration during handling, maintenance and storage.	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 005</b> Measuring equipment	Page 3 of 4 Revision 001	<b>WORK DESCRIPTION WD 005</b> Measuring equipment	Page 4 of 4 Revision 001
<p>In addition, the operator shall assess and record the validity of the previous measuring results when the equipment is found not to conform to requirements.</p> <p>The operator shall take appropriate action on the equipment and the monitoring and reporting procedures affected. Records of the results of calibration and verification shall be maintained for at least 10 years.</p> <p>When used in the monitoring and measurement of specified requirements, the ability of computer software to satisfy the intended application shall be confirmed. This shall be undertaken prior to initial use and reconfirmed as necessary.</p> <p>NOTE See ISO 10012-1 and ISO 10012-2 for further guidance.</p> <p><b>2. Measurement, analysis and improvement</b></p> <p>The operator shall plan and implement the monitoring, measurement, analysis and improvement processes needed</p> <ul style="list-style-type: none"> <li>a) to demonstrate conformity of the annual emission report to the legal requirements,</li> <li>b) to ensure conformity of the monitoring and reporting procedures, and</li> <li>c) to continually improve the effectiveness of the monitoring and reporting</li> </ul>		<p>This shall include determination of applicable methods, including statistical techniques, and the extent of their use.</p> <p><b>3. Analysis of data</b></p> <p>The operator shall determine, collect and analyse appropriate data to demonstrate the suitability and effectiveness of the monitoring and reporting procedures and to evaluate where continual improvement of the effectiveness of monitoring and reporting can be made. This shall include data generated as a result of monitoring and measurement and from other relevant sources. The analysis of data shall provide information relating to</p> <ul style="list-style-type: none"> <li>a) verifier a competent authority satisfaction,</li> <li>b) conformity to annual emission report requirements,</li> <li>c) characteristics and trends of processes including opportunities for preventive action, and</li> <li>d) suppliers.</li> </ul>	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 006</b> Reporting and records	Page 1 of 4 Revision 001		<b>WORK DESCRIPTION WD 006</b> Reporting and records	Page 2 of 4 Revision 001
<b>Content</b> 1. <b>General Documentation Requirements</b> 2. <b>Records</b> 3. <b>Reporting</b>			<b>1. General Documentation Requirements</b> The monitoring and reporting documentation shall include <ol style="list-style-type: none"> <li>a) the greenhouse gas permit including monitoring requirements specifying monitoring methodology and frequency</li> <li>b) any correspondence with the competent authority</li> <li>c) documented procedures required by the MRG,</li> <li>d) documented procedures required by the operator to ensure the effective planning, operation and control of its monitoring and reporting processes,</li> <li>e) records required by the MRG,</li> <li>f) records required by the operator to ensure the effective planning, operation and control of its monitoring and reporting processes,</li> <li>g) the annual emission reports,</li> <li>h) the verification report.</li> </ol> <p>The term “documented procedure” means that the procedure is established, documented, implemented and maintained.</p>	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]			Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]			Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 006</b> Reporting and records	Page 3 of 4 Revision 001	<b>WORK DESCRIPTION WD 006</b> Reporting and records	Page 4 of 4 Revision 001
<p>The extent of the documentation can differ from one organization to another due to</p> <ul style="list-style-type: none"> <li>a) the size of organization and type of activities,</li> <li>b) the complexity of processes and their interactions, and</li> <li>c) the competence of personnel.</li> </ul> <p>The documentation can be in any form or type of medium.</p> <p>The organization should establish and maintain a monitoring &amp; reporting manual that includes all general elements (see chapter 1).</p> <p>Documents required for monitoring and reporting shall be controlled.</p> <p>A documented procedure shall be established to define the controls needed</p> <ul style="list-style-type: none"> <li>a) to approve documents for adequacy prior to issue,</li> <li>b) to review and update as necessary and re-approve documents,</li> <li>c) to ensure that changes and the current revision status of documents are identified,</li> <li>d) to ensure that relevant versions of applicable documents are available at points of use,</li> <li>e) to ensure that documents remain legible and readily identifiable</li> </ul>		<ul style="list-style-type: none"> <li>f) to ensure that documents of external origin are identified and their distribution controlled, and</li> <li>g) to prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any purpose.</li> </ul> <p><b>2. Records</b></p> <p>Records shall be established and maintained to provide evidence of conformity to requirements and of the effective operation of monitoring and reporting. Records shall remain legible, readily identifiable and retrievable.</p> <p>A documented procedure shall be established to define the controls needed for the identification, storage, protection, retrieval, retention time and disposition of records.</p> <p><b>3. Reporting</b></p> <p>Reporting is based on the documents and records and has to be in line with the requirements of the MRG and in line with any special national requirement (e.g. electronic reporting system). The competent authorities will present mandatory reporting formats prior to the dead line for submitting the annual report.</p>	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 007</b> Internal review	Page 1 of 4 Revision 001		<b>WORK DESCRIPTION WD 007</b> Internal review	Page 2 of 4 Revision 001
<b>Content</b> <b>1. Internal Audit</b> <b>2. Management Review</b>			<b>1. Internal Audit</b> The operator shall conduct internal audits at planned intervals to determine whether monitoring and reporting <ul style="list-style-type: none"> <li>a) conforms to the approved monitoring methodology, and</li> <li>b) is effectively implemented and maintained.</li> </ul> An audit programme shall be planned, taking into consideration the status and importance of the processes and areas to be audited, as well as the results of previous audits. The audit criteria, scope, frequency and methods shall be defined. Selection of auditors and conduct of audits shall ensure objectivity and impartiality of the audit process. Auditors shall not audit their own work. The responsibilities and requirements for planning and conducting audits, and for reporting results and maintaining records shall be defined in a documented procedure. The management responsible for the installation covered by the EU ETS Directive shall ensure that actions are taken without undue delay to eliminate detected nonconformities and their causes. Follow-up activities shall include the verification of the actions taken and the reporting of verification results . NOTE See ISO 10011-1, ISO 10011-2 and ISO 10011-3 for further guidance.	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]			Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]			Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 007</b> Internal review	Page 3 of 4 Revision 001		<b>WORK DESCRIPTION WD 007</b> Internal review	Page 4 of 4 Revision 001
<p><b>Management Review</b></p> <p>Top management shall review monitoring and reporting procedures at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. This review shall include assessing opportunities for improvement and the need for changes with the approval of the competent authority. Records from management reviews shall be maintained for 10 years.</p> <p>The input to management review shall include information on</p> <ul style="list-style-type: none"> <li>a) results of internal audits,</li> <li>b) feedback from verifier (e.g. verification report and/or opinion),</li> <li>c) feedback from competent authority,</li> <li>d) legal compliance (process performance and monitoring &amp; reporting conformity),</li> <li>e) status of preventive and corrective actions,</li> <li>f) follow-up actions from previous management reviews,</li> <li>g) changes that could affect the monitoring and reporting, and</li> <li>h) recommendations for improvement (e.g. further minimization of greenhouse gas emissions).</li> </ul>			<p>The output from the management review shall include any decisions and actions related to</p> <ul style="list-style-type: none"> <li>a) further reduction of greenhouse gas emissions</li> <li>b) compliance strategies (e.g. “make or buy”)</li> <li>c) improvement of the effectiveness of monitoring and reporting and its processes,</li> <li>d) improvement of annual emission report related to legal requirements, and</li> <li>e) resource needs.</li> </ul> <p>The organization shall determine and provide the resources needed</p> <ul style="list-style-type: none"> <li>a) to implement and maintain monitoring and reporting and continually improve its effectiveness, and</li> <li>b) to enhance effectiveness of greenhouse gas management by meeting legal requirements.</li> </ul>	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]			Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]			Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 008</b> Corrective and preventive action	Page 1 of 3 Revision 001	<b>WORK DESCRIPTION WD 008</b> Corrective and preventive action	Page 2 of 3 Revision 001
<b>Content</b> <b>1. Continual improvement</b> <b>2. Corrective action</b> <b>3. Preventive Action</b>		<b>1. Continual improvement</b> The operator shall continually improve the effectiveness of monitoring and reporting through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions.  <b>2. Corrective action</b> The operator shall take action to eliminate the cause of nonconformities in order to prevent recurrence. Corrective actions shall be appropriate to the effects of the nonconformities encountered. A documented procedure shall be established to define requirements for <ul style="list-style-type: none"> <li>a) reviewing nonconformities (including complaints by the verifier and/or the competent authority),</li> <li>b) determining the causes of nonconformities,</li> <li>c) evaluating the need for action to ensure that nonconformities do not recur,</li> <li>d) determining and implementing action needed,</li> <li>e) records of the results of action taken (see 4.2.4), and</li> <li>f) reviewing corrective action taken.</li> </ul>	
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]	
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]		Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]	

<b>WORK DESCRIPTION WD 008</b> Corrective and preventive action	Page 3 of 3 Revision 001			
<p><b>3 Preventive action</b></p> <p>The organization shall determine action to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions shall be appropriate to the effects of the potential problems. A documented procedure shall be established to define requirements for</p> <ul style="list-style-type: none"> <li>a) determining potential nonconformities and their causes,</li> <li>b) evaluating the need for action to prevent occurrence of nonconformities,</li> <li>c) determining and implementing action needed,</li> <li>d) records of results of action taken, and</li> <li>e) reviewing preventive action taken.</li> </ul>				
Issued: [John Q. Public/ December 15 <sup>th</sup> , 2004]				
Released: [John Q. Public/ December 15 <sup>th</sup> , 2004]				

## Part III: Reporting

General requirements according the annual emission report is already given in the ETS Directive:



### ***Annex IV of ETS Directive***

Each operator shall include the following information in the report for an installation:

1. Data identifying the installation, including:
  - Name of the installation;
  - Its address, including postcode and country;
  - Type and number of Annex I activities carried out in the installation;
  - Address, telephone, fax and email details for a contact person; and
  - Name of the owner of the installation, and of any parent company.
2. For each Annex I activity carried out on the site for which emissions are calculated:
  - Activity data;
  - Emission factors;
  - Oxidation factors;
  - Total emissions; and
  - Uncertainty.
3. For each Annex I activity carried out on the site for which emissions are measured:
  - Total emissions;
  - Information on the reliability of measurement methods; and
  - Uncertainty.
4. For emissions from combustion, the report shall also include the oxidation factor, unless oxidation has already been taken into account in the development of an activity-specific emission factor.

No special formats are recommended or even mandated by the ETS Directive.

More detailed requirements according the annual emission report can be found in the MRG

## § **Chapter 5 of the MRG**

Each operator shall include the following information in the report for an installation:

1. data identifying the installation, as specified in Annex IV to the Directive, and its unique permit number;
2. for all sources the emission totals, chosen approach (measurement or calculation), chosen tiers and method (if applicable), activity data, emission factors, and oxidation/conversion factors. If a mass balance is applied operators shall report the mass flow, carbon and energy content for each fuel and material stream into and out of the installation and their stocks;
3. temporal or permanent changes of tiers, reasons for these changes, starting date for changes, and starting and ending dates of temporal changes;
4. any other changes in the installation during the reporting period that may be relevant for the emissions report.

The following items, which are not accounted for in terms of emissions, shall be reported as memo items:

5. amounts of biomass combusted [TJ] or employed in processes [t or m<sup>3</sup>],
6. CO<sub>2</sub> emissions [t CO<sub>2</sub>] from biomass where measurement is used to determine emissions,
7. CO<sub>2</sub> transferred from an installation [t CO<sub>2</sub>], and in what type of compounds it was transferred.

The reporting format set out in chapter 11 of Annex I of the MRG shall be used as a basis for reporting of the quantitative data. Information to be provided under points 3 and 4 and supplementary information regarding point 2 shall be included in the annual report as plain text.

Fuels shall be reported using the IPCC standard fuel categories (<http://www.ipcc-nggip.iges.or.jp/public/gl/invs4.htm>) which are based on definitions of the International Energy Agency. In the event that the Member State relevant to the operator has published a list of fuel categories including definitions and emission factors consistent with its latest national inventory submitted to the Secretariat of the United Nations Framework Convention on Climate Change, these categories and their emissions factors shall be used if approved under the relevant monitoring methodology.

In addition, waste types and emissions resulting from their use as fuels or input materials shall be reported. The waste types shall be reported using the classification of the 'European List of Wastes' (Commission Decision 2000/532/EC of 3 May 2000 establishing a list of wastes and Council Decision 94/904/EC establishing a list of hazardous waste). For more details see: <http://europa.eu.int/comm/environment/waste/legislation/a.htm>. The respective six-digit codes shall be added to the names of the relevant waste types used in the installation.

Emissions shall be reported as rounded tonnes of CO<sub>2</sub> (for example 1 245 978 tonnes). Activity data, emission factors and oxidation or conversion factors shall be rounded to include only significant digits both for emission calculations and reporting purposes, for example, only a total of five digits (e.g. 1,2369) for a value which exhibits an uncertainty of  $\pm 0,01$  %. In order to achieve consistency between data reported under the Directive and data reported by Member States under the UN Framework Convention on Climate Change and other emission data reported for the European pollutant emission register (EPER), each activity carried out by an installation shall be labelled applying the codes from the following two reporting schemes:

- (1) the common reporting format for national greenhouse gas inventory systems as approved by the respective bodies of the United Nations Framework Convention on Climate Change;
- (2) the IPCC code of Annex A3 of the European pollutant emission register (EPER).

**ATTENTION:**

Most EU Member States are working on an electronic system covering the preparation, issuing, verification and storage of the annual emission reports. Some EU Member States have already gathered experience during the application of EU allowances. It cannot be expected that a harmonized electronic software solution for all 12,000 installations, covered by the EU ETS will become available. Keeping this in mind the following recommendations are given:

- (1) The operator should duly and in regular intervals consult the competent authority for any mandatory electronic or non-electronic format for reporting.
- (2) As most of the reporting requirements are covered by the monitoring methodology, the formats presented in Part II of this manual might be used as templates for an EXCEL or WORD based solution as an intermediate step, if the competent authority cannot offer any official format.
- (3) EXCEL sheets presented in the context of emissions trading might be used without any change (e.g. SEPA form ETS-2 with corresponding guideline and sector templates)

## Annex 1: References

### (A) ISO Standards

ISO/IEC Guide 65 First edition 1996	General requirements for bodies operating product certification systems
ISO 589 Third edition 2003-11-15	Hard coal — Determination of total moisture
ISO 5069-1: 1983	Brown coals and lignites – Principles of sampling – Part 1: Sampling for determination of moisture and for general analysis
ISO 5069-2: 1983	Brown coals and lignites – Principles of sampling – Part 2: Sampling preparation for determination of moisture and for general analysis
ISO 9000: 2000	Quality management systems — Fundamentals and vocabulary
ISO 9001: 2000	Quality management systems — Requirements
ISO 9004: 2000	Quality management systems — Guidelines for performance improvements
ISO 10012-1: 1992	Quality assurance requirements for measuring equipment; Part 1: Metrological confirmation system for measuring equipment
ISO 13909-1	Hard coal and coke – Mechanical Sampling – Part 1: General introduction
ISO 13909-8	Hard coal and coke – Mechanical Sampling – Part 8: Methods for testing of bias
ISO 14001 Second edition 2004-11-15	Environmental management systems — Requirements with guidance for use
ISO/IEC 17025 Second edition 2005-05-15	General requirements for the competence of testing and calibration laboratories
ISO/DIS 14064-1: 2005	Greenhouse gases – Part 1: Specification with guidance at the organisational level for quantification and reporting of greenhouse gas emissions and removals
ISO/DIS 14064-2: 2005	Greenhouse gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements
ISO/DIS 14064-3: 2005	Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions
ISO 19011: 2001	Guidelines for quality and/or environmental management auditing

(B) EU Standards

Official Journal of the European Union 25.10.2003 L 275/32-46	DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC
Official Journal of the European Union 26.2.2004 L 59/1-74	COMMISSION DECISION of 29 January 2004 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council <i>(notified under document number C(2004) 130)</i>
Official Journal of the European Union 13.11.2004 L 338/18-23	DIRECTIVE 2004/101/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 2004 amending the Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms

(C) Reports, Manuals, Guidelines, etc.

Department of Environment, Food and Rural Affairs (defra), 30 January 2004	EU Emissions Trading Scheme Guidance on inclusion
Department of Environment, Food and Rural Affairs (defra), 14 May 2004	EU Emissions Trading Scheme Guidance on baseline data verification
Scottish Environmental Protection Agency (SEPA), 27 May 2004	Competent Authority Guide to the Commission Decision of 29 <sup>th</sup> January 2004 establishing Guidelines for Monitoring and Reporting in accordance with the EU ETS
Scottish Environmental Protection Agency (SEPA), 27 May 2004	Competent Authority Appraisal of Uncertainty Analysis Requirements in connection with EU ETS Monitoring and Reporting
Scottish Environmental Protection Agency (SEPA), June 2004	Guidance for the Monitoring and Reporting of CO2 emissions from power Stations
Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Coal fired Power Station
Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Gas fired Power Station
Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Oil fired Power Station
Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Small Scale Combustion
Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Iron and Steel
Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Cement
Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Glass

Scottish Environmental Protection Agency (SEPA), June 2004	Greenhouse Gas Emissions Trading Example for the Completion of ETS2 Monitoring and Reporting Plan Template: Pulp and Paper
Scottish Environmental Protection Agency (SEPA), 9 June 2004	Greenhouse Gas Emissions Trading Guidance on the Completion of ETS2 Monitoring and Reporting Plan Template
PriceWaterhouseCoopers, Royal Haskoning, 16 June 2004	Manual – Application for a greenhouse gas emission permit
European Co-operation for Accreditation March 2005	EA-6/03: EA Guidance for the Recognition of Verification Bodies under EU ETS Directive
PriceWaterhouseCoopers, 2005	Verification – Assuring the credibility of the European Emission Trading Scheme
Department of Environment, Food and Rural Affairs (defra), 24 May 2005	EU Emissions Trading Scheme Guidance to Operators on the requirements for installations to achieve the highest applicable monitoring tiers (as defined within Commission Decision 2004/156/EC – Monitoring and Reporting Guidelines)
Department of Environment, Food and Rural Affairs (defra), 5 August 2005	EU Emissions Trading Scheme Guidance on Annual Verification
Department of Environment, Food and Rural Affairs (defra), 12 August 2005	EU Emissions Trading Scheme – Annual Emission Report Guidance to Operators for the Completion of Form ETS/
International Emission Trading Association (IETA), 6 September 2005	IETA-Verification Protocol, version 2.0 (2005) Verification of Annual Emission Reports of installations engaged in EU emission trading

## Annex 2: Glossary

Term	Definition	Source
Accuracy	means the degree of precision and/or margin of error in reported information that is required by users in order to be able to make decisions with a high level of assurance. Note: the characteristics that determine accuracy vary depending on the type of information.	ISO/WD 14064-3.1, 3.1
Activities	means the activities listed in Annex I to the ETS Directive	MRG
Activity data	means historic data and information about fuel use rates, production rates, material use rates and fuel types that have been used to calculate CO <sub>2</sub> emissions from combustion and processes	defra guidance on verification
Activity factor	means the numeric value representing any action or operation that causes or influences the release of greenhouse gas emissions (e.g., amount of fuel consumed or counts of emission sources); absolute greenhouse gas emissions result when related to the rate of emissions from the action	defra guidance on verification
Activity specific	means specific to an activity as carried out at one specific installation	MRG
Allowance	means an allowance to emit one tonne of carbon dioxide equivalent during a specified period, which shall be valid only for the purposes of meeting the requirements of this Directive and shall be transferable in accordance with the provisions of this Directive	ETS Directive
Assurance, high level of	refers to the [verifier] having obtained sufficient appropriate evidence to conclude that the emission report] conforms in all material respects with identified suitable criteria. In rare circumstances, the [verifier] may be able to provide absolute assurance, for example, where the evidence available is conclusive and reliable because the [emission report] is determinate, the criteria definitive and the process applied comprehensive. However, because of the limitations of the engagement process, a high level of assurance is ordinarily less than absolute. The [verifier] designs the engagement to reduce to a low level the risk of an inappropriate conclusion that the [emission report] conforms in all material respects with identified suitable criteria.	Guidelines for financial audits, NIVRA
Audit	The objective of an audit (of the information being verified) is to enable the verifier to express an opinion on whether the information is in accordance with an identified framework for drawing up emission reports.	defra guidance on verification

Term	Definition	Source
Audit	The objective of an audit [of the information being verified] is to enable the [verifier] to express an opinion on whether [the information] is prepared, in all material respects, in accordance with an identified reporting framework The phrases used to express the [verifier's] opinion are "give a true and fair view" [...] or "present fairly, in all material respects," which are equivalent terms. A similar objective applies to the audit of financial or other information prepared in accordance with appropriate criteria.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Audit evidence	is the information obtained by the [verifier] in arriving at the conclusions on which the audit opinion is based. Audit evidence will comprise source documents and accounting records underlying [the emission report] and corroborating information from other sources.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Audit plan	The [verifier] must draw up an audit plan in which the likely scope and approach of the audit are laid down. These should be conveyed in sufficient detail to provide a sound basis for the design of the audit program.	Guidelines for financial audits, NIVRA
Audit program	sets out the nature, timing and extent of planned audit procedures required to implement the overall audit plan. The audit program serves as a set of instructions to assistants involved in the audit and as a means to control the proper execution of the work.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Audit risk	is the risk that the [verifier] gives an inappropriate audit opinion when the [emission report] is materially misstated. Audit risk has three components: inherent risk, control risk, detection risk	Handbook of International Auditing, Assurance, and Ethics, IFAC
Batch	means an amount of fuel or material transferred as one shipment or continuously over a specific period of time. It shall be representatively sampled and characterised in respect of its average energy and carbon content and other relevant aspects of its chemical composition	MRG

Term	Definition	Source
Biomass	means non-fossilised and biodegradable organic material originating from plants, animals and micro-organisms. This shall also include products, by-products, residues and waste from agriculture, forestry and related industries as well as the non-fossilised and biodegradable organic fractions of industrial and municipal wastes. Biomass also includes gases and liquids recovered from the decomposition of non-fossilised and biodegradable organic material. When burned for energy purposes biomass is referred to as biomass fuel	MRG
Combustion emissions	means greenhouse gas emissions occurring during the exothermic reaction of a fuel with oxygen	MRG
Combustion installation	means a stationary technical unit which burns fuel for the production of an energy product. The energy product could be electricity, heat or mechanical power. Where energy is produced as heat it may be transferred using different media such as steam, hot oil, hot water, and hot air. If the energy is produced and used within the same technical unit such that the main product of the unit is not the energy product (electricity or heat) then the technical unit is not considered to fall within the definition of “combustion installation”	defra guidance on verification
Competent authority	means the appropriate competent authority or authorities for the implementation of the provisions set out in this Decision, designated in accordance with Article 18 of the ETS Directive	MRG
Competent authority	means a body or institution which has the authority to enforce Commission legislation	defra guidance on verification
Conversion factor	means a factor expressing the fraction of carbon contained in input materials that is converted to CO <sub>2</sub> during a process	defra guidance on verification
Detection risk	is the risk that the [verifier’s] substantive procedures will not detect a misstatement that exist in [emission report] that could be material, individually or when aggregated with misstatements in other balances or classes.	Handbook of International Auditing, Assurance, and Ethics, IFAC
EA	means European Co-operation on Accreditation, who cover European conformity assessment activities	defra guidance on verification

<b>Term</b>	<b>Definition</b>	<b>Source</b>
Emission factor	means the emission rate for a particular emission source per unit of the source, when related to the activity data (e.g., amount of fuel consumed or counts of emission sources) results in absolute greenhouse gas emissions	defra guidance on verification
Emissions	means the release of greenhouse gases into the atmosphere from sources in an installation, as defined in the ETS Directive	MRG
Emissions	means the release of greenhouse gases into the atmosphere from sources in an installation	ETS Directive
Emissions	means emissions from a permitted installation, measured in tonnes of carbon dioxide. Calculations should only be rounded at the end when reporting the CO <sub>2</sub> in total number of tonnes with no decimal points.	defra guidance on verification
Error	refers to an unintentional misstatement in the [emission report]	Handbook of International Auditing, Assurance, and Ethics, IFAC
GHG	means greenhouse gas: A gas that absorbs and re-emits infrared radiation, warming the earth's surface and contributing to climate change. Each greenhouse gas has a different capacity to cause global warming. Greenhouse gases include water vapor, carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), hydrochlorofluorocarbons (HCFCs), ozone (O <sub>3</sub> ), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF <sub>6</sub> ).	defra guidance on verification
Greenhouse gas assertion	means declaration or factual and objective statement of performance made by the responsible party of actual or expected performance	ISO/DIS 14064-3
Greenhouse gas emissions permit	means a permit as referred to in Article 4 of the ETS Directive and issued in accordance with Articles 5 and 6 of the ETS Directive	MRG
Greenhouse gas emissions permit	means the permit issued in accordance with Articles 5 and 6 of the ETS Directive	ETS Directive
Greenhouse gas information system	means policies, processes and procedures to establish, manage and maintain greenhouse gas information	ISO/DIS 14064-3
Greenhouse gases	means the gases listed in Annex II to the ETS Directive	MRG

<b>Term</b>	<b>Definition</b>	<b>Source</b>
Greenhouse gases	means the gases listed in Annex I of the ETS Directive	ETS Directive
Inherent risk	is the susceptibility of a [parameter in the emission report] to misstatements that could be material, individually or when aggregated with misstatements in [other parameters], assuming that there were no related internal controls.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Installation	means a stationary technical unit where one or more activities listed in Annex I to the ETS Directive are carried out and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution, as defined in the ETS Directive	MRG
Installation	means a stationary technical unit where one or more activities listed in Annex I are carried out and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution	ETS Directive
Internal control risk	means the risk that a misstatement that could occur in a [parameter in the emission report] and that could be material, individually or when aggregated with misstatements in [other parameters, will not be prevented or detected and corrected on a timely basis by the accounting and internal control system.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Internal control system	consists of all the policies and procedures (internal controls) adopted by the management of an entity to assist in achieving management's objective of ensuring, as far as practicable, the orderly and efficient conduct of its business, including adherence to management policies, the safeguarding of assets, the prevention and detection of fraud and error, the accuracy and completeness of the accounting records, and the timely preparation of reliable [...] information. The internal control system extends beyond these matters which relate directly to the functions of the accounting system.	Handbook of International Auditing, Assurance, and Ethics, IFAC
ISO	means International Organisation for Standardisation.	defra guidance on verification
Level of assurance	means the degree to which the verifier is confident in the verification conclusions that it has been proved whether or not the information reported for an installation taken as a whole is free from material misstatement	MRG

<b>Term</b>	<b>Definition</b>	<b>Source</b>
Level of assurance	means degree of assurance the intended user requires in a validation or verification statement	ISO/DIS 14064-3
M&R plan	means Monitoring and Reporting Plan: M&R Plans outline the monitoring and reporting that will be carried out by an installation in the EU ETS. It is prepared by operators and must be approved by regulators. Many of the M&R Plans may now form part of the installation's GHG Permit conditions.	defra guidance on verification
Materiality	means the professional judgment of the verifier as to whether an individual or aggregation of omissions, misrepresentations or errors that affects the information reported for an installation will reasonably influence the intended users' decisions. As a broad guide, a verifier will tend to class a misstatement in the total emissions figure as being material if it leads to aggregate omissions, misrepresentations or errors in the total emissions figure being greater than five percent	MRG
Materiality	means an expression of the relative significance of any individual matter (error, misstatement, missing record etc) in the context of an installation's annual emissions data.	defra guidance on verification
Materiality	Information is material if its omission or misstatement could influence the economic decisions of users taken on the basis of the information. Materiality depends on the size of the item or error judged in the particular circumstances of its omission or misstatement. Thus, materiality provides a threshold or cut-off point rather than being a primary qualitative characteristic which information must have if it is to be useful.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Materiality	means concept that individual or the aggregation of errors, omissions and misrepresentations may affect the GHG assertion and could influence the intended user's decision.	ISO/DIS 14064-3
Monitoring	means continuous or periodic assessment of GHG emissions and removals or other GHG-related data	ISO/DIS 14064-3
Monitoring methodology	means the methodology used for the determination of emissions, including the choice between calculation or measurement and the choice of tiers	MRG

Term	Definition	Source
New entrant	means any installation carrying out one or more of the activities indicated in Annex I of the ETS Directive, which has obtained a greenhouse gas emissions permit or an update of its greenhouse gas emissions permit because of a change in the nature or functioning or an extension of the installation, subsequent to the notification to the Commission of the national allocation plan	ETS Directive
Operator	means any person who operates or controls an installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated, as defined in the ETS Directive	MRG
Operator	means any person who operates or controls an installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated	ETS Directive
Operator	means a person who operates or manages an installation, if provided for under national legislation, who has been given the authority to make economic decisions concerning technical operations.	defra guidance on verification
Opinion	The auditor's report contains a clear written expression of opinion on the [emission report] as a whole. An unqualified opinion is expressed when the auditor concludes that the financial statements give a true and fair view (or are presented fairly, in all material respects,) in accordance with the [Monitoring Methodology].	Handbook of International Auditing, Assurance, and Ethics, IFAC
Oxidation factor	means a factor representing the proportion of carbon that is not oxidised during combustion.	defra guidance on verification
Person	means any natural or legal person	ETS Directive
Process emissions	means greenhouse gas emissions other than 'combustion emissions' occurring as a result of intentional and unintentional reactions between substances or their transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances, and the formation of substances for use as product or feedstock	MRG

Term	Definition	Source
Reasonable assurance	In an audit engagement, the auditor provides a high, but not absolute, level of assurance, expressed positively in the auditor's report as reasonable assurance, that the information subject to audit is free of material misstatement.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Reasonable Assurance	In an audit engagement, the [verifier] provides a high, but not absolute, level of assurance, expressed positively in the audit report as reasonable assurance, that the information subject to audit is free of material misstatement.	Handbook of International Auditing, Assurance, and Ethics, IFAC
Registry	allows account holders to hold, transfer, or acquire EU allowances and Kyoto units. They also enable regulators and nominated competent authorities to manage regulated industries (those with legal emissions reduction targets), and monitor national compliance and performance against international emissions reductions obligations. Computerised registries are key components of the EU Emissions Trading Scheme.	defra guidance on verification
Reliability	<p>implies a guarantee of truthfulness, measurement and/or completeness. More precisely it can be defined in terms of the following aspects of faithfulness:</p> <ul style="list-style-type: none"> <li>• Existence: an asset or liability exists at a given date.</li> <li>• Completeness: there are no unrecorded assets, liabilities, transactions or events, or undisclosed items.</li> <li>• Rights and obligations: an asset or liability pertains to the entity at a given date.</li> <li>• Occurrence: a transaction or event took place which pertains to the entity during the period.</li> <li>• Measurement: a transaction or event is recorded at an appropriate carrying value.</li> </ul>	Guidelines for financial audits, NIVRA
Reporting period	means the time period for which emissions have to be monitored and reported as set out in Article 14(3) of the Directive, being a calendar year	MRG
Risk assessment	means an assessment carried out by a verifier to identify potential risks in the data that could lead to material errors or misstatements. This is used to direct and plan the verification process.	defra guidance on verification

<b>Term</b>	<b>Definition</b>	<b>Source</b>
Source	means a separately identifiable point or process in an installation from which greenhouse gases are emitted	MRG
The public	means one or more persons and, in accordance with national legislation or practice, associations, organisations or groups of persons	ETS Directive
Tier	means a specific methodology for determining activity data, emission factors and oxidation or conversion factors. Several tiers form a hierarchy of methodologies from which a selection shall be made in accordance with these guidelines	MRG
Tier	means a specific methodology for determining activity data, emission factors and oxidation or conversion factors. Several tiers from a hierarchy of methodologies from which a selection shall be made in accordance with the Commission's M&R Decision.	defra guidance on verification
Tonne of carbon dioxide equivalent	means one metric tonne of carbon dioxide (CO <sub>2</sub> ) or an amount of any other greenhouse gas listed in Annex II with an equivalent global-warming potential	ETS Directive
Uncertainty	means parameter associated with the result of quantification which characterises the dispersion of the values that could be reasonable attributed to the quantified amount	ISO/DIS 14064-3
Validation / verification	means systematic independent and documented process for the evaluation of a proposed GHG assertion against agreed validation / verification criteria.	ISO/DIS 14064-3
Validation / verification statement	means formal written declaration to the intended user that provide assurance on the statements in the responsible party's GHG assertion.	ISO/DIS 14064-3
Verification	means systematic, independent and documented assessment and/or identification performed at regular intervals by a verification body of the greenhouse gas emissions, emission reductions and/or storage of greenhouse gas emissions by an installation in the EU ETS.	defra guidance on verification
Verification plan	means description of the activities and arrangements for the verification process.	defra guidance on verification
Verifier	means a competent, independent, accredited verification body with responsibility for performing and reporting on the verification process, in accordance with the detailed requirements established by the Member State pursuant to Annex V to the ETS Directive	MRG
Verifier	means the accredited team leader or member of the verification team responsible for carrying out the verification process and drawing up a report.	defra guidance on verification

Term	Definition	Source
Verifier	means competent and independent person or persons with responsibility for performing and reporting on the verification process. This term can be used to refer to a verification body.	ISO/DIS 14064-3
VOS	means Verification Opinion Statement	defra guidance on verification
Walk-through test	involves tracing certain [reported emission data] through the [emission registration system].	Handbook of International Auditing, Assurance, and Ethics, IFAC