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GUIDANCE DOCUMENT

on improving the collection and submission of data for deriving useful BAT conclusions during the review of the BREFs

SUMMARY

According to Article 17(2) of the IPPC Directive¹, the European Commission organises the information exchange on Best Available Techniques (BAT). In the last 10 years, the first complete series of 33 BAT Reference Documents (BREFs) has been finalised. Many lessons have been learned and ways to improve the process have been considered and developed with respect to the review of the BREFs. This mainly concerns the improvement of the collection and submission of data and is laid down in this **guidance document**.

In a first stage, the main gaps in the data collection process were identified. From this, and taking into account the need to have useful BAT conclusions in the BREFs, it was concluded that the principal areas for improvement of the information gathering process are to obtain better performance data (in particular consumption and emission levels) as well as other relevant information describing the techniques to consider in the determination of BAT.

Concerning the performance data, it is most important to provide relevant consumption and emission data on individual installation levels along with information to qualify the data (such as sampling, analysis and computation methods) and to adequately characterise the individual installations concerning the techniques being used. With respect to data qualification, reference is given to the Reference Document on the General Principles of Monitoring.

Concerning information on techniques to consider in the determination of BAT, clear recommendations are given in order to be able to have sound and comprehensive descriptions of such techniques following a certain structure. Also here, with respect to operational data, consumptions and emissions, reference is given to the Reference Document on the General Principles of Monitoring. Regarding economic data and in case there are significant cross-media effects, the Reference Document on Economics and Cross-Media Effects should be taken into account. Against this background, it appears obvious that the target is to receive the descriptions of techniques and their associated performance (especially consumption and emission levels) and costs as fully as possible.

However, none of this shall imply that incomplete descriptions shall not be submitted or would be excluded from the information exchange. In cases where the information is incomplete, it may be complemented by other sources during the process.

¹ Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (codified version), OJ L 24, 29.1.2008. Formerly, this was article 16(2) of Directive 96/61/EC.

Purpose of this guidance document

The purpose of this Guidance Document is to set out the principles guiding the TWG members when providing information under article 17(2) of the IPPC Directive² in order to improve the process of deriving useful BAT conclusions.

In the framework of the exchange of information on BAT, associated monitoring and developments in them stipulated in Article 17(2) of the IPPC Directive, this guidance document is based on **the conclusions of the IEF working group that was put together in order to improve the collection and submission of data for the review of the BREFs.**

The IEF working group met on 20 June 2007 to discuss and answer the issues detailed in the 'Mandate for the IEF working group' which was sent to the members of the IEF on 26 March 2007.

This guidance document presents the outcome of the work of this group, taking into account the initial contributions sent by members, the draft guidance document prepared by the European IPPC Bureau prior to the meeting of 20 June 2007, the discussions during the aforementioned meeting and the comments sent by the IEF members based on the written consultation carried out in September and October 2007 and in April 2008. The guidance document was revised based on the comments received. This guidance document has been presented and discussed during the IEF meeting of 30 April 2008.

Structure of this guidance document

This guidance document has been structured in four main parts (sections) in order to cover the group's tasks and objectives as set out in the 'Mandate for the IEF working group':

1. What are the main gaps in the data provided so far to the European IPPC Bureau?
2. What are useful BAT conclusions?
3. What should the main principles for the type, format and quality of data regarding the environmental performance of installations and applied techniques be?
4. What specific issues will be under the remit of each TWG?

Background

At the 19th IEF meeting, Germany proposed that the IEF should set-up a working group in order to define some principles to improve the collection and submission of environmental performance data (in particular consumption and emission data) in the BREF review framework. In addition, these general principles could be supplemented by sector-specific criteria for certain BREFs by the relevant TWGs.

The rationale for the German proposal was based on a lack of sufficiently qualified emission and consumption data on plant level for the first series of BREFs. The German paper presenting the proposal mentions the following main shortcomings in current BREF documents:

1. *Frequently, the technical background material only vaguely describes the environmental performance of applied techniques or whole real plant installations*
2. *The presented data are often highly aggregated with regard to time (e.g. yearly averages) or number of installations (e.g. no data from individual installations). Especially, plant*

² previously: article 16(2) of Directive 96/61/EC

specific information and qualified figures for best performances are sometimes difficult or even impossible to get

3. *Data reported do not always include information on the techniques being used to reach certain levels of performance. This information, however, is essential for determining BAT and BAT AELs*
4. *Sometimes insufficient information is given for the non-ambiguous interpretation of provided data. In some cases related to issues like sampling and analysis methods, in others related to reference time intervals (e.g. half hourly, daily or yearly average values), computation methods and reference conditions.*

The proposal made by Germany was generally well received and, based on the major importance of the issue of data collection and submission for the review of BREFs, it was decided:

- to establish a working group under the IEF
- to call for contributions to be discussed at a meeting
- that the concrete outcome of the work of this subgroup be submitted for comments to the whole IEF before the finalisation of the work.

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1 MAIN GAPS IN THE DATA PROVIDED SO FAR TO THE EUROPEAN IPPC BUREAU

The following table presents an overview of the main type of gaps in the data provided to the European IPPC Bureau in the framework of the BREF elaboration/review process. These gaps were identified during the development of the first series of BREFs and also during the kick-off meetings for the first BREF reviews.

1. Quantity and representativeness of data

2. Data at installation level needed to determine BAT

3. Important data for determining BAT

- data from processes using particular techniques
- data from best performing installations
- data on cross-media effects
- economic data

4. Data on particular topics

- energy
- residues and waste
- fugitive/diffuse emissions
- emission monitoring
- emissions of "non-standard" pollutants
- processes

5. Comparability of data

- 'background' information
- 'context' information

Details concerning each of the topics mentioned are given in Appendix 1.

In order to improve the Sevilla process operation and its output, these gaps should be filled during the reviews of BREFs.

The following sections of this document set out the proposed way forward to ensure this process.

2 USEFUL BAT CONCLUSIONS

The type of data to be collected and reported to the European IPPC Bureau regarding the environmental performance of installations when applying certain techniques shall allow drawing useful BAT conclusions.

Useful BAT conclusions are meant to assist Member States' national authorities in the determination of 'BAT-based' emission limit values and other permit conditions or in the establishment of general binding rules under Article 9(8) of the Directive. They are also meant to be useful for operators in making clear what the BAT are and what environmental performance they can achieve.

A useful BAT conclusion will contain in particular an indication of the **performance associated with BAT** (usually a numerical range, e.g. 10 – 50 mgC/Nm³) but noting that in some instances a numerical range cannot be easily indicated – e.g. for BAT related to minimising risk or to Environmental Management System (EMS). The performance range associated with BAT is often referred to in BREFs or TWG meetings as an Associated Emission Level (AEL) but it can obviously also refer to a consumption level (e.g. consumption of energy, water, raw material). **If a performance figure is provided, the units, the reference conditions (e.g. flue gas oxygen level) – if applicable – and the averaging period (e.g. daily/weekly/monthly/yearly average) should be provided too.**

Useful BAT conclusions should also indicate, in particular, **technique(s) to satisfy the environmental objective(s)/benefit(s) referred to in the BAT chapter and to meet the associated performance**. BAT conclusions should be as clear as possible in stating that either certain or sequences or combinations of techniques are necessary to achieve the BAT AEL or that example techniques are given which support the BAT AEL.

Useful BAT conclusions are also those which indicate when certain techniques are not BAT due to factors such as economics, cross-media conflicts, and operational reliability.

An example of a 'useful' BAT conclusion is provided in Appendix 2.

When defining a performance range associated with BAT, the rationale for the lower-end and the upper-end of the range should be found in the BREF document (generally in Chapter 4 'Techniques to consider in the determination of BAT'). A range reflects the fact that there are differences within the sector (e.g. use of different fuels or raw materials) that result in variations in the environmental performances achieved when applying BAT.

When defining the range, it is necessary (see BREF Outline and Guide) to use the best environmental performance³ provided in the information exchange, unless this best environmental performance is not accepted/agreed as part of the BAT AEL range by the TWG and there is an explanation in the BREF of why it has been rejected.

With regard to pollutant emissions ranges (to air, water, or land) and waste production, they may be expressed in more than one way, e.g.

- mass of pollutant/waste released per volume (concentration value, e.g. in mg/Nm³ or mg/l)
- mass of pollutant/waste released per unit of time⁴ (e.g. in kg/yr)
- mass of pollutant/waste released per mass of product manufactured (specific value, e.g. in kg/t)
- mass of pollutant/waste released per mass of raw material (e.g. in kg/t).

³ The installation achieving the best performance for a given environmental impact indicator may not be able to be the best performing for other indicators

⁴ Ranges expressed in this way are not sufficient to enable meaningful comparisons between installations with different production levels

With regard to consumption ranges (e.g. of raw material, energy, water), they may be expressed in more than one way, e.g.

- consumption per mass of product manufactured (specific value, e.g. in kg/t, MJ/t)
- consumption per unit of time⁵ (e.g. m³/yr).

It is preferable to use a true range rather than an expression of the type <X, because this gives less information.

The performance associated with BAT should take into account possible constraints for the data collection, particularly technical issues (e.g. monitoring methods, accuracy of measurements).

⁵ Ranges expressed in this way are not sufficient to enable meaningful comparisons between installations with different production levels

3 GENERAL PRINCIPLES FOR THE TYPE, FORMAT AND QUALITY OF DATA TO BE COLLECTED AND REPORTED IN ORDER TO DERIVE USEFUL BAT CONCLUSIONS

The general principles that Technical Working Group (TWG) members will follow for collecting and reporting data for the BREF review process in order to derive useful BAT conclusions are outlined below.

Data sets at the level of single installations describing the environmental **performance** achieved as well as the **techniques** used are needed for **enhancing the comparability** of the information exchanged **and for determining BAT**. It is therefore important that TWG members supply data sets following the guidance provided in Sections 3.1 and 3.2.

Data aggregated from several installations are generally not sufficient to derive useful BAT conclusions. In many cases, it is also necessary to gather data at a more discrete level (e.g. reactor, furnace, production line, unit, operation or process level). In exceptional cases, issues of confidentiality may necessitate the aggregation of information by the European IPPC Bureau (see also the paragraph on Confidentiality issues below).

Both the in-process and end-of-pipe **techniques** utilised in the installation to minimise its impact on the environment should be mentioned. Where relevant, a full description of the technique(s) will be given following the table in Section 3.1 and this will need to be linked to individual emission sources within the installation (e.g. stack level)

Type of data:

- the main **data/information** should be collected at least at the **installation** level and preferably even at a more discrete level (e.g. plant, unit, process, furnace), making clear reference to the applied **technique(s)**

Note: information providing a global overview of the sector – which might include industry capacity, production levels, market information, prices and other possibly sensitive information – can be provided in an aggregated form, but this will be mainly useful for developing or updating Chapter 1 'General information' and Chapter 3 'Current emission and consumption levels' of a BREF

- the information reported on techniques should address, as far as possible, all aspects mentioned in Section 3.1, in order to allow the drafting of Chapter 4 'Techniques to consider in the determination of BAT'. Performance of techniques should be put into context and supported in particular by the relevant operational and economic data (see Sections 3.1 and 3.2)
- information from best performing installations should be provided

Note: this does **not** mean that **only** information on best performing plants should be collected and submitted. Updating Chapter 3 'Current consumption and emission levels' necessitates that information be reported on the range of currently observed consumption and emission levels for the overall process and its sub-processes

Format of data:

- information at the installation level should preferably be submitted to the European IPPC Bureau using a common template agreed by the TWG. For minimising the work of completing this common template, the TWG is encouraged to take into account periodic reporting requirements and the availability of data. Templates are particularly useful for gathering a great deal of information, to enable comparison of data as well as to identify

gaps and anomalies. This does not exclude using other formats or supplementary data (e.g. case-studies, technical or cost data concerning specific techniques) if considered instrumental for deriving useful BAT conclusions

- the main type of data/information that a template for gathering complete data sets at installation level should contain is indicated in Sections 3.1 and 3.2 (detailing the operational data needed)

Quality of data:

- the information reported should be at a sufficient level of detail so as to enhance comparability and finally be used to draw useful BAT conclusions (see Section 2). Although the focus of the data collection exercise for BREFs is on available measured data, it is recommended to take into account the data quality rating system shown in Appendix 3 to assure the quality of estimated data
- all **figures** reported should be given **in S.I. units** or in units commonly used within the sector and agreed on by the TWG at the kick-off meeting.

Confidentiality issues:

- if any information submitted to the European IPPC Bureau is considered confidential and should therefore not be reported in the BREF, this should be clearly stated when sending the information and the reason/justification for the confidentiality should be given. The European IPPC Bureau will eventually aggregate the information before presenting it in the BREF (if necessary with the help of the industry association)
- using plant names under the heading 'Reference plants' in the format in Section 3.1 is considered to be very useful and should generally not pose difficulties.

3.1 Type of Information needed to fill the chapter(s) on 'techniques to consider for the determination of BAT' and to derive useful BAT conclusions

In order to determine BAT, all techniques to be considered in the BAT decision making will be presented in the BREF according to a standard structure (agreed and used in the current BREFs), shown in the first two columns of the following table. The third column gives more details on the specific data which are needed from the TWG members in order to draft the Chapter 4 'Techniques to considered in the determination of BAT' and to derive useful BAT conclusions from it:

Name of the type of information	Type of information to be included in the BREF	Important information to collect and to report ⁶
Description	Technical description of the technique (including drawings, schematics if necessary)	The description can include both prevention and control measures (in-process and end-of-pipe)
Achieved environmental benefits	The main environmental impacts (including energy, water, raw material savings, as well as production yield increases...), addressed by the technique	
Cross-media effects	Any side effects and disadvantages to other media caused by implementation. Environmental effects of the technique in comparison with others	The Reference Document on Economics and Cross-media Effects (ECM) is a document that should be taken into account with regard to cross-media aspects as far as there are significant cross-media effects.
Operational data	Data on consumption and emission levels from operational plants using the technique (including reference conditions and monitoring methods used). Any other information on how to operate, maintain and control the technique	<p><u>Emission data (see also Section 3.2.6):</u></p> <ul style="list-style-type: none"> • both the concentration and (specific) load of pollutant(s) (if available) or the data needed to derive this information. For specific load data, the product referred to should be clearly defined • the quantity of pollutant before and after the abatement system in order to determine the abatement efficiency • the Reference Document on General Principles of Monitoring (MON) is a document that should be taken into account with respect to the expression of monitoring results and how to deal with uncertainties, emission factors, direct measurements and monitoring requirements <p><u>Consumption data:</u></p> <ul style="list-style-type: none"> • the type and amount of fuel, energy (heat, electricity), water and raw materials/chemicals consumed/used by the technique <p><u>Waste:</u></p> <ul style="list-style-type: none"> • the type and quantities of waste generated and treatment/disposal methods and/or techniques to prevent waste

⁶ based on the main gaps identified during the elaboration of the first series of BREFs

		<u>Others:</u> <ul style="list-style-type: none"> • sensitivity and durability of the technique • operation/control/maintenance issues
Applicability	Indication of the type of plants in which the technique may be applied, considering, e.g. plant age (new or existing), plant size (large or small), techniques already installed and type of product	Examples: <ul style="list-style-type: none"> - information on retrofitting of parts of the installation.
Economics	Information on costs (both investment and operational) and possible savings, including details on how these costs have been calculated	<ul style="list-style-type: none"> • capital/investment, operating and maintenance costs including details on how these costs/savings have been calculated/estimated • possible savings (including payback time), including details on how these costs/savings have been calculated/estimated. • cost data will preferably be given in euros (EUR) (If a conversion is made from another currency, the data in the original currency and the year when the data were collected will be indicated. This is important as conversion rates vary over time) • price/cost of equipment or service will be accompanied with the year it was purchased • information on the market for the sector to put costs of techniques into context <p>The Reference Document on Economics and Cross-media Effects (ECM) and the Reference Document on the General Principles of Monitoring (MON) should be taken into account with regard to economic aspects and monitoring costs, respectively.</p>
Driving force for implementation	Local conditions or requirements which lead to or may stimulate implementation. Information on reasons other than environmental ones for implementation (e.g. increase in productivity, safety)	Examples: <ul style="list-style-type: none"> • information on type/quality of receiving waters (e.g. temperature, salinity) • information on environmental quality standards • information on the increase of production or productivity
Example plants	Reference to plants in which the technique is applied and from which information has been collected	
Reference literature	Literature that was used in writing the section and that contains more details	

3.2 Installation specific operational data needed to draw useful BAT conclusions

Currently, there is no agreed common **format or template(s)** for gathering complete data sets at installation level (or at a more discrete level, e.g. unit, process, furnace). Due to the diversity of the sectors covered by the IPPC Directive, it is unlikely that such a common format can be elaborated.

However, the **main type of operational data** that a **template for gathering installation level data** (or data at a more discrete level, e.g. unit, process, furnace) should contain is further outlined in the sections below.

3.2.1 Water use and emissions to water

The information reported should distinguish between cooling water and process water, and indicate whether water is re-used and how much. Data/information submitted should include, if relevant for the sector concerned:

- the amount and flow rate of discharged process waste waters as well as an indication of whether exceptional discharges are included
- an indication of the sources (e.g. unit processes) of discharged process water
- the amount and flow rate of discharged cooling water
- whether rainwater is collected and treated in the installation and how much
- the emission levels of discharged pollutants for each waste water stream considered and whether the waste water is discharged directly or indirectly to the receiving water
- an indication of whether the water effluents are treated in a waste water treatment plant (WWTP) located onsite or offsite (e.g. municipal or central for a whole industrial site) of the installation
- information about the origin of the water used and about the receiving water (e.g. name, type – surface water, i.e. lake, river, stream, sea, or ground water; when relevant also temperature, flow, quality).

3.2.2 Air emissions

Data/information submitted should include, if relevant for the sector concerned:

- the emission levels of pollutants emitted, making a distinction between stack emissions and diffuse/fugitive emissions as well as an indication of whether exceptional emissions are included
- an indication of the sources (e.g. unit processes) of both diffuse/fugitive and stack emissions
- flue-gas flow rate
- reference conditions (e.g. concentration data will refer to dry waste gases – if not, this will be indicated – and reference oxygen content will be mentioned, if applicable).

3.2.3 Residues/waste

Information submitted should include, if relevant for the sector concerned:

- the type(s) of residues/waste (e.g. sludge) generated/created by the activity
- the (physical/chemical) characteristics of the residues/waste generated/created by the activity (e.g. metals content, average dry solid content)
- the specific weight of organic and inorganic residues/waste disposed of and the specific weight which is recycled/re-used internally or externally.

3.2.4 Energy

The information reported should include, if relevant for the sector concerned:

Inputs:

- the type of fuel/energy used (e.g. fuel oil, LPG, natural gas, steam, electricity, waste or biomass used as fuel), including cooling and technical gases (e.g. N₂, O₂). If steam is used, the temperature and pressure of the steam will be indicated
- fuel/energy consumption (per type), making a distinction between thermal and electrical energy

Outputs:

- whether energy is produced (e.g. electricity production) and how much. If steam is produced, the temperature and pressure of the steam will be indicated
- whether revenues are generated from the production of energy

Others:

- whether there is recovered energy (in what part of the installation, under which form and how much)
- whether there are exothermic reactions (in what part of the installation and how much)
- heat losses (in what part of the installation and how much)
- whether energy management systems or tools (such as energy benchmarking) are being used.

System boundaries (included parts of plant) and reference conditions should be provided when presenting energy consumption/efficiency values.

Energy data should be expressed in kWh or MJ per tonne of product, indicating whether net or gross calorific values were used to determine this.

The BAT reference document on Energy Efficiency (ENE) should be taken into account for collecting and reporting energy data.

3.2.5 Other information

The operational data provided should be accompanied with all the relevant general information such as, where applicable:

- the year the installation was built and an indication of the nature and dates of major retrofits
- the type of production process, catalysts, process equipment (e.g. mill, heat exchanger and furnace) used
- the main operating conditions of the process (e.g. continuous or batch process, recurring events such as furnace decoking, catalyst regeneration⁷, production load, process temperature, etc)
- the feedstock/raw material used and its composition
- the different type of products manufactured and how their quality may affect the consumptions/emissions.

3.2.6 Reference information

For emissions monitoring data, the information submitted should include, where applicable:

- the emission source (e.g. reactor, furnace)
- an indication of the type of emission pattern (e.g. minimum/maximum values, percentiles or a graphic presentation)
- the value and unit for the parameter monitored
- the frequency of the measurement/sampling/monitoring
- the averaging period used to report the data (see detailed information below)
- the monitoring method used, e.g. measurement, mass/heat balances
- an indication of the measurement/sampling/monitoring uncertainties
- details of the data source, e.g. who collected, analysed and submitted the data
- whether the data was taken during normal operation or under any other situation (e.g. start ups/shutdowns, regular maintenance, exceptional conditions).

The Reference Document on General Principles of Monitoring (MON) should be taken into account with respect to the expression of monitoring results and how to deal with uncertainties, direct measurements and monitoring requirements.

⁷ consumption/emission data may need to be collected separately from normal operating conditions

Averages

When providing emission monitoring information, the period over which the values are averaged should be unambiguously indicated as well as the monitoring regime (continuous measurements or a specified number of spot measurements).

1. In case of **continuous emission measurements**, both yearly average values as well as shorter term averages (e.g. daily, hourly, ..) will be available and should be provided.

- Yearly averages generally give a good image of the environmental performance related to a process/technique, independently of local disturbances or short-time variations as they include emissions under various conditions throughout the year, both under normal and exceptional situations.
- Shorter term averages give a better picture of the fluctuations of the emissions and of possible occurring peak emissions. Additionally, it is useful to submit data indicating the range of shorter term emission values found during “normal operation” as well as data about frequency, type and magnitude of “non-regular-operation”.

2. In case of **only spot emission measurements**, at least the average of the measured values over one year, their range (minimum and maximum values) and the number or frequency of measurements should be provided.

4 SPECIFIC ISSUES UNDER THE REMIT OF EACH TECHNICAL WORKING GROUP

- the Technical Working Groups (TWGs) set up for the elaboration or review of a BREF should adhere to the general principles indicated in Section 3 of this paper. For the purpose of the information exchange, as defined in article 17(2), **TWG members should therefore provide information (especially consumption and emission data) at least down to the installation level.** The TWG will determine whether or not to go to a more disaggregated level (e.g. reactor, furnace, unit operation, process). However, data aggregated from several installations can be used to elaborate the chapter on 'Current consumption and emissions levels'.
- in the case of a BREF review, TWG members should suggest in their list of wishes the type and format of sector-specific data that should be collected for the review of the BREF in question. The background paper prepared by the European IPPC Bureau for the kick-off meeting should present the TWG suggestions and make concrete proposals for the outline of a **sector specific** data collection template and for discussions regarding the type and format of data to be collected and reported.
- the TWG should decide at its kick-off meeting whether the general principles provided in this guidance document on data collection will have to be supplemented by sector-specific aspects for the BREF in question.
- the TWG should discuss and develop **sector specific template(s)** for collecting and reporting information to the European IPPC Bureau following the general principles given in Section 3. The TWG should in particular determine the type of data, averages, units, reference conditions to be used/reported, taking into account the data available and the units and reference conditions used by the producers. Agreeing on these issues will therefore be one of the objectives of the kick-off meeting and there should be enough time foreseen for this.
- the TWG should define at their kick-off meeting the time schedule for gathering and submitting data to the European IPPC Bureau (in accordance with the Generic Schedule for the review of BREFs agreed at IEF). Last minute data should be avoided.
- for emissions data, the TWG should decide, on the basis of the concentration and (specific) load data gathered (if both data are available, they should both be reported), if one or both types of data would contribute to deriving useful BAT conclusions.

Note:

Both concentration and (specific) loads can be useful for the BREFs.

Specific loads allow the comparison of the environmental performance of installations irrespective of their different production volumes and are not influenced by mixing or dilution.

Loads give an idea of the total environmental impact of an installation.

Concentrations (accompanied with reference conditions and averaging period) generally give more information on short term performance of individual processes or unit operations and thus can reveal peak emissions. They also establish environmental performance at any given moment. Combining them with flow data, allows establishing the pollution load at any given moment. When continuous measurements are used, concentrations can be used to provide information on performance over a longer time period (e.g. a year).

APPENDICES

APPENDIX 1: MAIN GAPS IN THE DATA PROVIDED SO FAR TO THE EUROPEAN IPPC BUREAU

Quantity and representativeness of data

Sometimes, too few data sets were provided during the exchange of information.

In some instances, the number of plants involved in the collection of data was not indicated and this made it difficult to distinguish between data from one single plant and data representative of a number of European plants (e.g. representative of the sector as a whole and/or of the installations operating a given technique/unit process).

Data at installation level needed to determine BAT

To determine BAT, disaggregated data are needed at installation level and sometimes even at a lower level (e.g. at the unit process level for waste water). Such disaggregated data have been difficult to obtain in some instances often due to competition issues within the sector, but these could be overcome by assuring the anonymity of the installations (provided the number of producers and installations allow this to be possible).

The **lack of complete data sets at installation level** (e.g. full monitoring reports of an installation) which include not only emission data/information (e.g. waste gas, waste water and solid waste), but also information on the techniques applied, consumption data/information (e.g. on energy, water, chemicals and other raw materials) and economic costs has been a major gap.

It has been identified during the development of several BREFs that aggregated data (e.g. Member States/sector level data or performance ranges covering a large number of installations) as such are not sufficient for determining BAT. However, such data are generally acceptable for getting an overview of the environmental impact of the sector as a whole.

Important data for determining BAT

The following data have been recognised as essential when determining BAT, yet have sometimes been difficult to obtain during the exchange of information:

- data from processes which use particular techniques with information showing the effectiveness of the techniques
- data from best performing installations
- economic data

When deciding on BAT, having economic data is key as it allows the linking of techniques with their associated costs and possible savings. However, during the exchange of information the following data were often missing:

- retrofitting and operating costs associated with the installation and operation of the technique in-situ
- savings such as payback time of techniques

- unit costs (e.g. related to a tonne of product manufactured, a tonne of pollutant abated, or a volume of waste water treated)
- background information on what exactly is included in the cost figures reported or how these figures have been calculated/estimated.

It is important to take into account that costs can vary considerably between plants when operating the same technique, e.g. due to different technical characteristics and different timings for plant investments.

- data on cross-media effects when applying certain techniques.

Data on particular topics

- data on energy

The provision of quantitative data on energy savings associated with the application of techniques/processes has been low and little information on practical experiences has been reported. When energy data (e.g. balances) have been reported, the assumptions and conditions have often not been sufficiently qualified. Furthermore, data on energy consumption that distinguish thermal and electrical energy consumption have not been provided by all TWGs and it is not clearly stated in some BREFs if the data on the energy requirements for a specific process were determined using net or gross calorific values.

- data on residues and waste

During the exchange of information, there has sometimes been a lack of information/data on solid waste quantities and characteristics, as well as on measures and techniques to prevent or reduce waste.

- data on fugitive/diffuse emissions

Different practices in collecting, sampling, measuring and/or calculating fugitive emissions have sometimes led to low levels of quantitative data being provided. It was pointed out that there is a lack of standardized monitoring or calculation methods to quantify fugitive emissions, e.g. of dust and VOCs.

- data on emission monitoring

Data on monitoring methods and frequency is often not provided, thus making it difficult to derive sector-specific BAT conclusions on emission monitoring.

- emission data for "non-standard" pollutants

Information on some particular types of pollutants, for example heavy metals and organic compounds (especially in emissions to water) was often lacking probably due to a lack of available monitoring data and knowledge on their environmental impacts.

- information on processes

There was information missing on some process routes for producing certain substances, especially in the chemicals BREFs.

Comparability of data

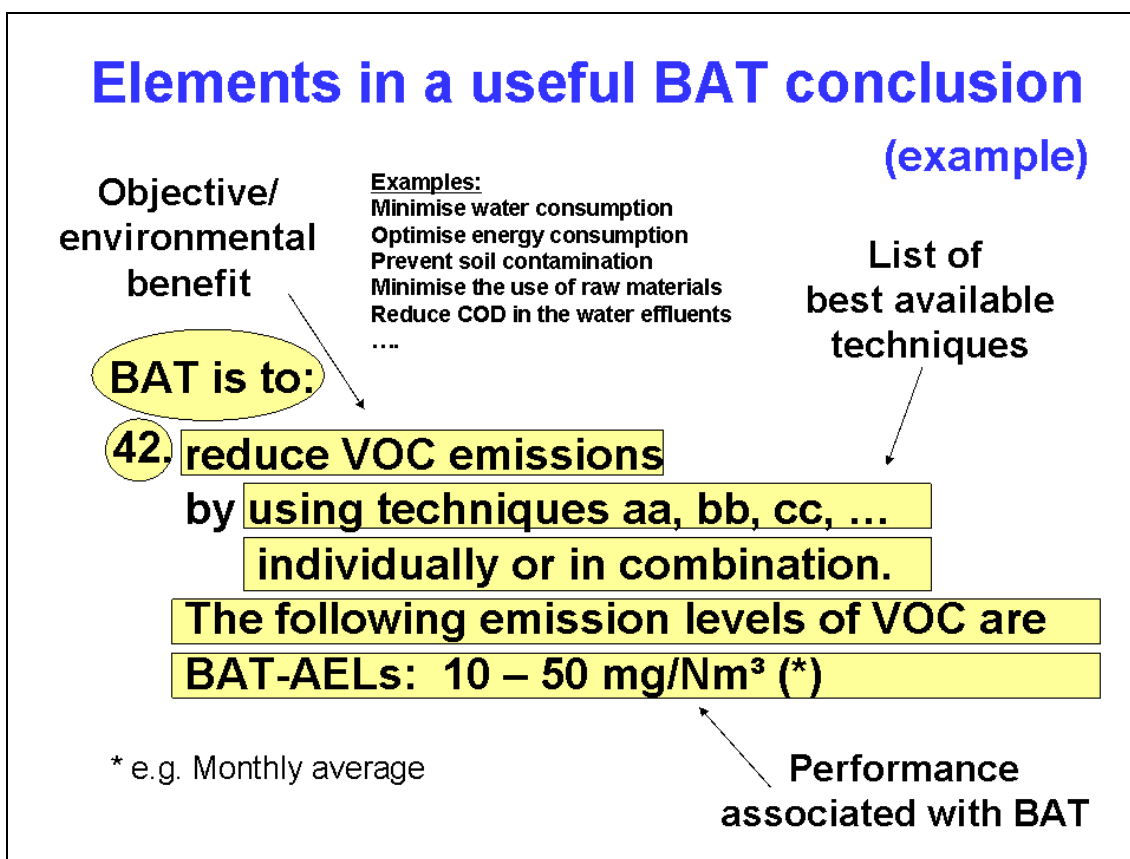
Quantitative data/information supported by 'background information' is essential in order to properly interpret and compare data.

Important gaps to fill are:

- reference time intervals (e.g. hourly, daily or yearly average values)
- type and number of measurements (continuous, spot measurements)
- measurement, sampling, analytical and computation methods (this is essential, given the lack of harmonisation in monitoring conditions/methods)
- reference conditions (e.g. reference oxygen content and standard conditions)
- process/operating conditions, e.g. continuous process vs. batch, stable process vs. start-ups and shut-downs, inclusion of exceptional or recurring events (e.g. furnace decoking, catalyst regeneration)
- stream(s) of emissions (not) covered by the data, e.g. fugitive/diffuse emissions.

Next to this, also '**context information**', such as the age of the installation, when it was last rebuilt, the mix and characteristics of the raw materials used, the local context or technical conditions (e.g. type of production process, furnace/reactor used and the type of fuel used) have not always been reported in data sets whereas such information is generally necessary to guarantee an unequivocal interpretation and comparison of quantitative data.

APPENDIX 2: ELEMENTS IN A 'USEFUL' BAT CONCLUSION



APPENDIX 3: DATA QUALITY RATING SYSTEM

The information below has been drawn from the Economics and Cross-media Effects (ECM) BREF (Section 2.4.1 of the ECM BREF).

Data quality rating systems have been used for emission estimates to give a qualitative indication of the reliability of data estimates. This approach has been extended to a generic data quality rating system. The following data quality rating system is recommended for all collected data:

- A. an estimate based on a large amount of information fully representative of the situation and for which all background assumptions are known
- B. an estimate based on a significant amount of information representative of most situations and for which most of the background assumptions are known
- C. an estimate based on a limited amount of information representative of some situations and for which background assumptions are limited
- D. an estimate based on an engineering calculation derived from a very limited amount of information representative of only one or two situations and for which few of the background assumptions are known
- E. an estimate based on an engineering judgement derived only from assumptions.

Data of A or B quality are the most appropriate for determining BAT.