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Working Document

Reconsideration of the *'Strategy to review the chemical BREFs'*

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SUMMARY

The purpose of this paper is to reconsider the 2007 *'Strategy to review the chemical BREFs'* (the '*Strategy*') in light of the Industrial Emissions Directive (IED) and to stimulate debate on a way forward. To this end, the paper first summarises the history of the development of the chemical BREF series. Subsequently, the paper assesses the consequences of the entry into force of the IED, the general principles agreed for the BREF work programme and the lessons learnt from the first chemical BREF reviews (CWW, CAK and LVOC). From this assessment, three main issues with the current work programme are identified:

- major gaps in BAT-AELs for emissions to air;
- high workload and long duration of the review processes for the chemical BREFs;
- need for consistency between chemical BREFs.

In order to overcome these issues, the Commission proposes the following five principles as inherent to any reconsideration of the *Strategy*:

i. Focus TWG efforts on BAT (and BAT-AELs) for the key environmental issues.
ii. Derive and define BAT and BAT-AELs at the most generic level possible.
iii. Limit/reduce the total number of illustrative processes and select them according to defined criteria.
iv. Ensure a transparent exchange of information.
v. Ensure that the efforts made so far are not lost and avoid further delays to the ongoing BREF reviews.

The last section of this paper poses questions on which the views of the IED Article 13 forum are sought.

1 PURPOSE OF THIS PAPER

At the IED Article 13 forum meeting in September 2012, the Commission announced its intention to reconsider the *'Strategy to review the chemical BREFs'*[1] (the *'Strategy'*), as adopted in 2007, in view of:

- the IED provisions, notably the enhanced status of BAT conclusions;
- the lessons learnt from the review of the BREFs on Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW), Large Volume Organic Chemicals (LVOC) and Chlor-Alkali (CAK);
- the principles discussed under the work programme for the exchange of information under Article 13(3)(b) of the IED, notably increased focus on deriving BAT conclusions for the main environmental issues of each sector;
- the desire to be more effective and efficient in determining BAT for chemical activities.

This task was subsequently included in the aforementioned work programme for 2014, which was presented to the IED Article 13 forum in June 2013.

This paper responds to the task and is structured as follows:

- Section 2 gives an overview of the development of the chemical BREFs.
- Section 3 reconsiders the *Strategy* with respect to the aforementioned aspects (i.e. IED provisions, lessons learnt from the review of the three chemical BREFs and discussions on the work programme, enhanced efficiency in determining BAT).
- Section 4 describes the issues which are likely to occur if continuing with the current work programme.
- Section 5 poses questions on which the views of the IED Article 13 forum are sought.

2 DEVELOPMENT OF THE CHEMICAL BREFS

2.1 Drawing up the original chemical BREFs (1997 – 2007)

In May 1997, a workshop on *'Best Available Techniques for the chemical industry in Europe'* was held in Paris, organised by CITEPA[2] on behalf the European Commission, which had two objectives:

- to analyse the chemical industry sector with a view to determine feasible approaches to describing BAT;
- to propose an optimal distribution of the industry for the drawing up of BREFs in the framework of the information exchange on BAT under the IPPC Directive.

The workshop viewed the complexity of the chemical industry as warranting a dedicated approach and concluded on the following:

- three BREFs covering the organic chemical industry;
- four BREFs covering the inorganic chemical industry;

[1] http://eippcb.jrc.ec.europa.eu/reference/BREF/strategy_review_chem_BREFs.pdf
[2] Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique

- one BREF on common issues (waste water and waste gas management/treatment systems).

Based on further discussion of the workshop conclusions, at the IPPC's Information Exchange Forum (IEF), it was decided to draw up eight BREFs for the chemical sector.

The eight original chemical BREFs were drawn up under the IPPC Directive in the period 1997 to 2007 (see Table 2.1). For each BREF, the time elapsed between the kick-off meeting and the final Technical Working Group (TWG) meeting was generally less than three years; in some cases even less than two years (e.g. LVOC, POL).

Table 2.1: Timetable for the drawing up of the original chemical BREFs

BREF title	Abbre-viation	Kick-off meeting	Final TWG meeting	Adoption by the COM
Chlor-Alkali Manufacturing Industry	CAK	12/1997	03/2000	12/2001
Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	CWW	04/1999	06/2001	02/2003
Large Volume Organic Chemical Industry	LVOC	04/1999	05/2001	02/2003
Manufacture of Organic Fine Chemicals	OFC	05/2003	06/2005	08/2006
Manufacture of Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers Industries	LVIC–AAF	10/2001	09/2004 ([1])	08/2007
Manufacture of Large Volume Inorganic Chemicals – Solids and Others Industry	LVIC–S	07/2003	02/2006	08/2007
Production of Speciality Inorganic Chemicals	SIC	10/2003	11/2005	08/2007
Production of Polymers	POL	12/2003	10/2005	08/2007
([1]) Four additional meetings until 06/2006 were held after the final TWG meeting to finalise the work.				

As summarised in Table 2.2, the size, structure and content of these eight BREFs varies markedly, reflecting such factors as the nature of the sub-sector, the availability of information and decisions made by the respective TWGs.

Table 2.2: Overview of structure and content of the original chemical BREFs

BREF	Approximate number of			Key observations on structure / content
	Pages	BAT statements ([1])	BAT values ([2])	
CAK	180	23	19	BAT defined (qualitatively and quantitatively) at generic level and for the three main process cell options (mercury / membrane / diaphragm).
CWW	470	29	95	BAT defined (qualitatively and quantitatively) for emissions to air and water.
LVOC	480	158	146	BAT defined (qualitatively and quantitatively) at generic level for all LVOC processes and specifically for seven illustrative processes.
OFC	460	68	49	In view of the sector's diversity of products, the BREF is based more on unit operations but BAT is still defined (qualitatively and quantitatively) for emissions to air and water.
LVIC–AAF	450	61	52	BAT defined qualitatively at generic level for the whole LVIC-AAF sector and also quantitatively for nine main product streams.

LVIC–S	710	213	243	BAT defined (qualitatively and quantitatively) for five 'cornerstone products' and, in less detail, for 17 'illustrative products'. No generic BAT, although Chapter 8 gives an overview of abatement measures used in the sector.
SIC	350	92	31	BAT defined (qualitatively and quantitatively) at generic level for all SIC processes and specifically for five families of products.
POL	320	62	138	BAT defined (qualitatively) at generic level for all POL processes and specifically for nine families of products.
Sum	**3420**	**706**	**773**	–

([1]) Where BAT statements are not uniquely numbered, an estimated count is made based on the topics addressed.
([2]) These quantified performance levels relate to emissions, consumptions, and process parameters, so are not always equivalent to BAT-AELs.

2.2 Strategy to review the chemical BREFs (2007)

In 2006, the IEF discussed how to best review the chemical BREFs, resulting in a *'Strategy to review the chemical BREFs*' (the '*Strategy*') in March 2007. The main elements of the *Strategy* are:

- The coverage of the chemical industry by the eight chemical BREFs developed from 1997 to 2007 (see Section 2.1) was confirmed. No changes in the number of chemical BREFs were deemed necessary.
- Approximately 40 new substances/processes or groups of substances/processes were identified by the IEF to be considered for the review of the chemical BREFs (see Appendix II of the *Strategy*).
- The need for inclusion of these substances/processes was prioritised according to criteria in Appendix I of the *Strategy* with the highest priority for substances / processes that:
  1) were mentioned in the 'Concluding remarks and recommendations for future work' Chapter of any of the chemical BREFs, and/or;
  2) had partial information submitted (e.g. but not enough to conclude on BAT) during the first round of BREFs, and/or;
  3) were considered to be of high importance taking into account the available information on production volume; number of producers and installations in Europe; environmental impact; and unit processes/operations not covered by the existing series of chemical BREFs.
- During the call for wishes for each chemical BREF review, to address those issues which were deemed to be only partially, or inconsistently, addressed within the chemical BREF series, including: decommissioning of installations; energy efficiency; monitoring; water saving measures; efficient use of raw materials; collection, use and treatment of rainwater; waste prevention; accident prevention.
- To explore ways of improving the chemical BREFs using the outcomes of the risk management under Regulation 793/93/EC and the, then forthcoming, REACH Regulation.
- The CWW BREF would be the first chemical BREF to be reviewed because it covers the whole chemical industry, describes common abatement techniques, and was used widely for the drawing up of the other chemical BREFs. The review of the CWW BREF would be based on a comparative analysis of the chemical BREF series, the recommendations for future work in the original CWW BREF, and possible generic

aspects of the other chemical BREFs which could be better addressed in the CWW BREF.

- With regard to the interface between the various chemical BREFs, the *Strategy* concluded that generic information would be included in the CWW BREF and not repeated in the other seven chemical BREFs, thereby leading to smaller documents. The CWW BREF would act as the 'default' BREF if no other chemical BREF was considered appropriate.
- Give special attention to clarity and consistency within the chemical BREF series.
- Add missing information on reference conditions for consumption and emission levels (e.g. averaging periods, standard conditions for concentrations in waste gases).
- The objective of a BREF review would not be to rewrite the whole document but to review new information which can have an impact on BAT conclusions. The review would also enable the correction of any errors and incoherencies.
- The reviews were prioritised with the following tentative schedule for start dates:

2007:	CWW;
2008:	CAK and LVOC;
2009 – 2011:	LVIC-AAF, LVIC-S, and SIC;
2011 – 2013:	OFC and POL.

2.3 Comparative analysis of the first series of chemical BREFs (2007)

In preparation for the review of the CWW BREF, the European IPPC Bureau (EIPPCB) carried out *'A comparative analysis of the first series of chemical BREFs*' in December 2007'[3]. This analysis started from the assumption that the CWW BREF would apply as the 'default' BREF if a relevant environmental issue was not specifically dealt with/addressed in any other chemical BREF. The main objective of the analysis was to set guidelines and recommendations for the first review of the CWW BREF. The analysis provided a systematic compilation of the candidate BAT, the BAT and the BAT-AELs by pollutant/achieved environmental benefit within the chemical BREF series. Moreover, four case studies were described in order to assess if gaps in the original CWW BREF could be filled during the review (i.e. split views due to the absence of BAT-AELs for emissions of metals and AOX to water; limited information on NO_X and dust abatement). The main recommendations for the review of the CWW BREF included:

- The BREF chapters on emission and consumption levels and on techniques to consider in the determination of BAT should be completed with installation-specific data with particular emphasis on issues such as: fugitive and diffuse emissions, particulate matter, odour, solvents removal/recovery, and waste water treatment.
- BAT conclusions should be derived from those installation-specific data.
- Specific gaps should be filled, including information on: environmental management systems, techniques to reduce waste gas volumes and loads, techniques to reduce emissions to air (of fine and ultrafine particles, fugitive/diffuse VOC, odour, toxic substances), water saving measures, and rainwater collection/treatment.
- Information from the other seven chemical BREFs should be used for completing and improving the CWW BREF.
- Consistency in the terminology should be improved.

Other findings in the comparative analysis which are relevant for this reconsideration of the *Strategy* included:

[3] http://eippcb.jrc.ec.europa.eu/ief/doc/Final_Dec08_Comparative%20analysis%20CWW[1].pdf

- End-of-pipe techniques represented 36–72 % of the techniques to consider in the determination of BAT in the chemical BREFs (with the exception of the CWW BREF), most of them for the treatment of waste gas.
- The chemical BREFs include BAT-AELs for several pollutants. Many of these are addressed in most of the chemical BREFs, either in the generic sections/chapters of the BREF and/or in the illustrative process sections/chapters (e.g. dust, NH_3, NO_X, HCl, SO_X), while others are specifically addressed in the inorganic chemical BREFs (e.g. HF) or the organic chemical BREFs (VOC, TOC/COD).
- For those pollutants addressed in the case studies of the comparative analysis (i.e. metals and AOX in waste water, dust and NO_X in waste gas), both process-integrated and end-of-pipe techniques were considered important.

2.4 Review of the chemical BREFs (2007 – 2014)

Table 2.3 summarises the timetable for the review of the chemical BREFs (as of September 2014). The time elapsed between the kick-off meeting and the final TWG meeting was approximately three years for the CAK BREF and five and a half years for the CWW BREF. For the LVOC BREF, it is foreseeable that this period will be longer than four years. This reflects in particular that the review of a BREF under the IED is much more demanding than under IPPC (see also Section 3.1).

Table 2.3: Timetable for the review of the chemical BREFs as of September 2014

BREF title	Abbre-viation	Kick-off meeting	Final TWG meeting	Review status
Production of Chlor-alkali	CAK	10/2009	12/2012	- BAT conclusions published in 12/2013 - BREF publication in 07/2014
Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector	CWW	06/2008	12/2013	- Final draft submitted to IED Article 13 forum in 07/2014
Large Volume Organic Chemical Industry	LVOC	12/2010	NH	- Draft 1 published in 04/2014 - Targeted additional data collection started
Manufacture of Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers Industries	LVIC–AAF	NH	NH	- Review to start in 2015 ([1])
Manufacture of Large Volume Inorganic Chemicals – Solids and Others Industry	LVIC–S	NH	NH	- Review to start in 2015 ([1])
Production of Speciality Inorganic Chemicals	SIC	NH	NH	- Review to start in 2016 ([1])
Manufacture of Organic Fine Chemicals	OFC	NH	NH	- Review to start in 2017 ([1])
Production of Polymers	POL	NH	NH	- Review to start in 2017 ([1])

NH = not yet held.

([1]) Planning according to the proposed work programme for the exchange of information under Article 13(3)(b) of the IED for 2014 as presented during the IED Article 13 Forum meeting of 6 June 2013, subject to reconsideration of the *Strategy*.

Table 2.4 gives an overview of the structure and content of the three BREFs / BAT conclusions that have been, or are being, reviewed to date.

Table 2.4: Overview of structure and content of the revised chemical BREFs

BREF	Number of				Key observations on structure / content
	Total pages	BAT Conclusions	BAT-AELs	Other BAT-AEPLs ([1])	
CAK ([2])	350	17	2	2	Relatively small BREF due to nature of the activity. Several negative BAT statements (e.g. Hg cells and asbestos diaphragms). AELs for chlorine to water and air. AEPLs for decommissioning (Hg to water) and on spent sulphuric acid.
CWW ([3])	670	25	15	0	All BAT-AELs relate to emissions to water (with footnote caveats for processes that cannot meet the ranges). No BAT-AELs for emissions to air.
LVOC ([4])	780	150	56	9	At a general level, BAT is defined by 28 conclusions and 7 BAT-AELs (all for emissions to air.) For the 12 'illustrative processes', BAT is defined by a total of 122 conclusions, 49 BAT-AELs and 9 AEPLs; the large majority for emissions to air. BAT is defined to varying degrees between 'illustrative processes', with two having no proposed BAT-AELs or BAT-AEPLs (aromatics and ethylbenzene). However, a number of 'placeholders' are included where it is still intended to derive BAT-AELs.

([1]) BAT-AEPL = BAT-associated environmental performance levels.
([2]) Production of Chlor-alkali, published, July 2014.
([3]) Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector, Final Draft, July 2014.
([4]) Large Volume Organic Chemical Industry, Draft 1, April 2014.

3 WHY RECONSIDER THE *STRATEGY*?

3.1 7EAP and IED

The EU's 7th Environment Action Programme[4] (7EAP) envisages that, by 2020, the overall environmental impact of all major sectors of the EU economy is significantly reduced. According to the 7EAP, a generalisation of the application of 'Best Available Techniques' in the context of the IED is required.

The change of the legal framework from IPPC to the IED has brought a number of changes which affect the drawing up and review of BREFs, including the chemical BREFs:

- BAT conclusions are now adopted as Commission Implementing Decisions following a committee procedure (Article 75).
- BAT conclusions shall be the reference for setting permit conditions (Article 14(3)).

[4] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013D1386

- Emission limit values in permits shall be set so that, under normal operating conditions, emissions do not exceed the BAT-AELs in BAT conclusions (Article 15(3)). Derogations from the latter are possible under certain, limited, circumstances (Article 15(4)).

Moreover, recital 13 of the IED states that the Commission should aim to update BREFs not later than eight years after the publication of the previous version.

As a consequence of the enhanced status of BAT conclusions, the drawing up and review of BREFs faces increased demands on clarity and consistency. More and better installation-specific data are needed and should be gathered via questionnaires in order to draw sound BAT conclusions, paying particular attention to potential influencing factors (e.g. reference conditions). These increased demands are also accompanied by and partially reflected in increased quality requirements on content and procedure (i.e. Commission Implementing Decision 2012/119/EU). These demands are generally reflected in considerably increased numbers of comments on draft BREFs and, in some cases, more split views raised during final TWG meetings.

The BREF guidance envisages a time frame of between 24 and 39 months for drawing up and reviewing a BREF. To meet this time frame it is clear that choices will need to be made and resources need to be focused on priority issues. Developing and revising BREFs under the IED therefore requires additional efforts from all TWG members, including the EIPPCB. This is set against a background of generally decreasing resources, in particular for EU Member States.

3.2 Principles discussed under the work programme

3.2.1 Work programme

The challenges on the BREF review process posed by the IED (e.g. higher quality outputs and increased speed of delivery) have been repeatedly discussed at the level of the IED Article 13 forum. The June 2013 forum meeting generally approved a number of measures that were proposed by the Commission to address these challenges. These measures are described in the latest version of the proposed work programme for the exchange of information (June 2013) and include the following:

- To clearly agree the BREF scope at the kick-off meeting.
- To adopt a more focused approach for the drawing up and review of BREFs. TWGs should foremost concentrate on a) the BAT conclusions and the associated chapter on candidate techniques, b) the most polluting sectors/subsectors, and c) the key environmental issues for the sector.
- To frontload the information exchange by addressing the aforementioned issues as early in the process as possible (i.e. during the preparation of the BREF review, the call for initial positions/wishes, and the kick-off meeting). The early transformation of the BAT sections/chapters of the original BREFs into BAT conclusions under IED could be used to focus the attention of the TWG on these most important issues.
- To resolve difficult issues with working documents or TWG subgroups.

These measures are already being implemented in ongoing BREF reviews and will contribute to making future reviews of chemical BREFs more efficient.

3.2.2 Interface between the chemical BREFs

Since the start of the drawing up the chemical BREFs, there has been discussion on their interface. The 'Scope' of the original CWW BREF (adopted in 2003) contains a figure to clarify the interface between CWW and the other chemical BREFs for the waste water part. The general view was that CWW would apply if a relevant environmental issue was not specifically addressed in another chemical BREF (see Section 2.3). In case of conflict between the CWW BREF and another chemical BREF, the more specific BREF would prevail.

With the coming into play of IED, enhanced clarity on the role of the different BREFs was sought in order to ensure a coherent and unambiguous implementation of BAT conclusions. The need to ensure complementarity between BREFs and to avoid conflicting BAT conclusions applies in particular to the whole chemical BREF series.

The interface between the chemical BREFs was discussed at the September 2012 IED Article 13 forum when the Commission presented the following main principles:

- Environmental issues that cut across the chemical sector as a whole would be covered in the CWW BREF. This includes environmental management systems, waste water management, diffuse VOC emissions, odour emissions, and noise emissions.
- For emissions to water, pretreatment and final treatment would be described in the CWW BREF, while process-integrated techniques and recovery of pollutants at source would be described in the other chemical BREFs. Moreover, the CWW BREF would include BAT-AELs for direct discharges to water.
- For emissions to air, the CWW BREF would contain BAT conclusions, but no BAT-AELs. The latter would be part of the other chemical BREFs, if appropriate.

3.2.3 Transparency of the information exchange

Provisions on the transparency of the information exchange are described in detail in Commission Implementing Decision 2012/119/EU. However, as the review of the LVOC BREF started before the entry into force of this Decision, the sharing of data submitted via questionnaires did not fully follow the approach set out therein.

Triggered in part by the limited sharing of questionnaires for the review of the LVOC BREF, the IED Article 13 forum discussed the transparency of the information exchange during its meeting in June 2013. The Commission underlined that transparency is at the heart of the information exchange, which implies that, generally, all information collected during the BREF review should be shared with the whole TWG via BATIS, with the possible exception of confidential business information or sensitive data under competition law. Such exceptions are generally not an issue where the information exchange concerns emission data that are in the public domain. These views were broadly shared by the IED Article 13 forum.

3.3 Lessons from the first reviews of chemical BREFs

3.3.1 CWW BREF

Following the recommendation in the *Strategy* (see Section 2.2), the CWW BREF was the first chemical BREF to be reviewed. The kick-off meeting was held in 2008 and the final TWG meeting five and a half years later in December 2013. The adoption of the CWW BAT conclusions is still ongoing. The CWW BREF increased from approximately 470 pages in the 2003 version, to approximately 670 pages in the final draft of the revised BREF. Two rounds of data collection via surveys were carried out covering approximately 100 directly discharging waste water treatment plants (WWTPs). Three TWG subgroup meetings were held to analyse the collected data.

The detailed data collection and analysis contributed to the long duration of the review process. The review of the CWW BREF was one of the first to use specifically elaborated questionnaires to gather installation-specific data. The results of the first survey were compiled in a report that fed into the drawing up of Draft 2, but also of the reference report on monitoring (ROM). Some of the time needed for the review of the CWW BREF can therefore be attributed to carrying out tasks for the first time, to the wider benefit of the information exchange process.

Another important factor in prolonging the duration of the CWW BREF review process was the modification of the scope. At the onset of the review, the BREF and the data collection focused on central WWTPs on large, integrated chemical sites. After the end of the commenting period on Draft 2 and a third TWG subgroup meeting in April 2012, the scope was enlarged to also cover the so-called 'stand-alone' chemical plants. A second round of the data collection at the end of 2012 then aimed at gathering respective information. In parallel, the interface between the CWW BREF and the other chemical BREFs was intensively discussed during 2012. In September 2012, the Commission presented its view on the issue at the IED Article 13 forum (see Section 3.2.2). To some extent, the discussions on the scope and the interface also held up the reviews of the CAK and LVOC BREFs.

At the final TWG meeting in December 2013, a number of generic BAT conclusions were agreed, which are relevant for the chemical industry as a whole, including issues such as: environmental management systems, monitoring, waste water and waste gas management and treatment, diffuse VOC emissions, odour emissions, noise emissions. Moreover, generic BAT-AELs for emissions of the most common pollutants/parameters to water, expressed in concentrations, were derived for the whole chemical industry. They apply when a certain pollutant load per year is exceeded. Specific exceptions for several BAT-AELs are described in footnotes to the BAT-AEL tables. Many of these exceptions arise from differences between the revised CWW BREF and the BAT chapters of the other chemical BREFs[5]. Other exceptions are based on the data specifically collected for the CWW BREF review.

Despite the heterogeneity of the chemical sector, it was possible to derive common BAT-AELs for emissions to water. For some parameters (e.g. TSS, total phosphorous) this was rather straightforward as the effluent concentration essentially depends on the performance of the final treatment. For other parameters (i.e. TOC/COD and total nitrogen (TN)/total inorganic nitrogen (N_{inorg}), the BAT-AELs are formulated in combination with abatement

[5] For example, the exception from the BAT-AELs for TSS and metals in soda ash and titanium dioxide production originate from the LVIC-S BREF; the exception from the BAT-AEL for AOX in the production of propylene oxide or epichlorohydrin via the chlorohydrin process originates from the LVOC BREF.

efficiencies in order to take into account the different production activities and/or compositions of the raw waste water.

The BAT conclusions as agreed by the TWG contain a number of gaps, some of which are mentioned in the final draft of the 'Concluding remarks and recommendations for future work', namely:

- A lack of BAT-AELs for emissions to air. This gap raised a split view supported by four TWG members.
- Specific exceptions for a number of BAT-AELs for emissions to water (see above).
- A lack of BAT-associated environmental performance levels (BAT-AEPLs) for indirect emissions to water (e.g. for metals and volatile compounds after pretreatment).
- A lack of short-term averages for the BAT-AELs for emissions to water (expressed only as yearly averages).

The lack of BAT-AELs for emissions to air in the revised CWW BREF is considered the main gap caused by the absence of adequate data, due to the following:

- Based on the conclusions of the June 2008 kick-off meeting no questionnaire to gather installation-specific data for emissions to air was initially designed.
- In its comments to Draft 1, one Member State proposed to collect such installation-specific data. The EIPPCB therefore invited the TWG to provide relevant data and to pay particular attention to the IEF document on '*Improving the collection and submission of data for deriving useful BAT conclusions'* (IEF 20–4 June 2008). Three Member States subsequently submitted data, but the EIPPCB considered that this data did not fulfil the criteria of the aforementioned BREF guidance.
- As a consequence, the EIPPCB asked the TWG in November 2010 if an additional data collection via questionnaires should be carried out. By January 2011, the EIPPCB had received feedback from eleven Member States and three industrial organisations. About half of the TWG members supported an additional data collection while the other half did not support it.
- Given the limited TWG support and the potential delays to the CWW BREF review process, the EIPPCB advised the TWG in February 2011 that it would not embark on an additional data collection on emissions to air, and would therefore follow the original decision taken at the kick-off meeting.

The fact that inadequate data was collected during the review of the CWW BREF does not mean that it is not possible to derive common BAT-AELs for emissions to air. An approach similar to the one applied for emissions to water could indeed be taken as for some parameters, the concentration in the emitted waste gas would essentially depend on the performance of the final treatment (e.g. dust). For other parameters, specific characteristics of the raw waste gas would need to be taken into account (e.g. waste gas composition and flow). Moreover, the specificity of certain processes could be taken into account, e.g. using information contained in the other chemical BREFs.

3.3.2 CAK BREF

The CAK BREF was the first chemical BREF for which BAT conclusions were adopted under the IED (in December 2013). Despite the limited and clear scope, the review process took more than three years (see Section 2.4), and the total number of pages increased from approximately 180 in the 2001 version to approximately 350 in the revised BREF published in July 2014. Two rounds of data collection via surveys were carried out, which included the

large majority of the approximately 70 chlor-alkali plants in the EU. The revised BREF contains new sections or sections with a significantly higher level of detail on a number of issues including: the membrane cell technique, the decommissioning of mercury cell plants, monitoring, consumption of raw materials, emissions to water, and site remediation.

The review process resulted in a clear identification of BAT and BAT-AEPLs. A few BAT conclusions include statements that certain techniques are 'not BAT' (e.g. the mercury cell technique), highlighting the importance of process-integrated techniques for this particular sector. No major gaps exist in terms of BAT-AELs.

The two major environmental concerns for the chlor-alkali industry (i.e. the use of mercury and asbestos) are likely to disappear due to process switches during the forthcoming years (by conversion to the membrane cell technique and to asbestos-free diaphragms).

3.3.3 LVOC BREF

The kick-off meeting for the review of the LVOC BREF was held in December 2010 and Draft 1 was published in April 2014. The total number of pages increased from approximately 480 in the original BREF to approximately 780 pages in Draft 1 of the revised BREF.

Appendix II of the *Strategy* proposes 16 candidate illustrative processes for potential inclusion in the LVOC BREF, on which BAT conclusions and BAT-AELs might be derived. As part of the LVOC BREF review process, the TWG considered the inclusion of these 16 processes and reported the outcome to the IED Article 13 forum in April 2013. The original LVOC BREF (adopted in 2003) contained seven illustrative processes[6] to which five illustrative processes[7] have been added by the review. The TWG decided not to include illustrative processes for 11 of the candidate substances/substance groups[8]. For some illustrative processes, only a very small number of installations operate in Europe (e.g. five installations for the production of ethanolamines).

The detailed preparation of background documents for the development of questionnaires (BDQ) and the questionnaires themselves for each of the 12 illustrative processes contributed to the long duration between the kick-off meeting and the release of Draft 1. A data collection was carried out for each illustrative process (however, one subgroup decided not to cooperate). In drawing up the background documents, particular attention was given to process-integrated techniques and some other-than-normal operating conditions with a significant pollution potential, drawing on the descriptions of the technical processes from the scientific literature.

There was no data collection outside of the 12 illustrative processes. As a result, no generic data on emissions to air were gathered. Moreover, emission data for waste gases from illustrative processes were not provided, if the waste gases were ducted to a shared treatment system.

[6] The original LVOC BREF covers the production of: lower olefins, aromatics, ethylene oxide and ethylene glycols, formaldehyde, acrylonitrile, ethylene dichloride/vinyl chloride monomer, and toluene diisocyanate.

[7] Draft 1 of the revised LVOC BREF also covers the production of: ethanolamines, styrene, phenol, ethylbenzene, and hydrogen peroxide.

[8] Production of adipic acid, chlorodifluoromethane, hydrogen cyanide, methanol and its derivatives, acrylic acid and its esters, bisphenol A, melamine, methyl ester biodiesel, carbon tetrachloride, glyoxylic acid, and surfactants.

For a number of illustrative processes, there is still a lack of emission data caused by concerns regarding confidentiality. Only some of the questionnaires have been shared with the whole TWG via the BAT Information System (BATIS). This has raised concerns of some TWG members regarding the transparency of the review process.

Draft 1 of the revised LVOC BREF contains a proposal for 150 individual BAT conclusions, 28 of which apply to the whole LVOC sector while the other 122 apply to individual illustrative processes. Virtually all the proposed BAT-AELs refer to emissions to air. Some of the proposed generic BAT and BAT-AELs are deduced from certain illustrative processes. Generic BAT-AELs for emissions to air are proposed for:

- ammonia from the use of selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR);
- VOCs, CO, NO_X and SO_2 associated with the use of thermal or catalytic oxidisers;
- benzene and NMVOCs from vapour recovery units during loading and unloading operations.

Although the LVOC BREF review process is not yet complete, it is obvious that the generic BAT-AELs in Draft 1 only address a limited part of the emissions to air from the LVOC sector. In particular, the BREF does not contain generic air-related BAT-AELs:

- for waste gas treatment techniques other than SCR/SNCR and thermal/catalytic oxidation;
- for units/processes other than vapour recovery units during loading and unloading (e.g. flue-gases from process heaters);
- for a number of other pollutants that are relevant for the LVOC sector, e.g. HCl, chlorine, phosgene.

Some of the proposed BAT-AELs for illustrative processes mainly reflect the use of similar end-of-pipe techniques and do not depend on the use of process-integrated techniques. This indicates that there is a potential for deriving more generic BAT-AELs to reflect the generic use of these techniques across several processes in the chemical sector.

The focus on illustrative processes has resulted in a large increase in the workload and therefore in the duration of the BREF review, as the questionnaire development and data collection process have effectively been repeated for each illustrative process. At the same time, data on common treatment techniques have not been collected. The relatively small number of plants for some of the illustrative processes may have magnified industry concerns over data confidentiality. Therefore, it is perhaps unsurprising that a number of gaps are likely to remain once the LVOC BREF review is completed.

The review of the LVOC BREF demonstrates the limitations of including more and more illustrative processes in the chemical BREFs. This confirms the need to strive for a more targeted approach focusing on the key environmental issues within and across sectors.

4 PROBLEMS WITH THE CURRENT WORK PROGRAMME FOR REVIEWING THE CHEMICALS BREFS

4.1 Major gaps in BAT-AELs for emissions to air

There are obviously still a number of significant sources of emissions to air from the chemical industry that are not appropriately covered by the BAT conclusions for the chemical sector, due to the following reasons:

- No BAT-AELs for emissions to air were derived during the first review of the CWW BREF.
- The example of the LVOC BREF shows that it is likely to be difficult to derive generic BAT-AELs for emissions to air from a limited number of illustrative processes.
- The approach to cover emissions to air for a whole range of illustrative processes separately is limited by the scarce TWG resources and the need to carry out the review process in a reasonable time.
- Confidentiality concerns represent another hurdle (due e.g. to a limited number of plants).
- The combined treatment of waste gases arising from different chemical processes and, more generally, the complexity of integrated chemical sites may not be covered if the focus is only on individual illustrative processes.

The following consequences may result from gaps in BAT-AELs for emissions to air:

- The emission reduction potential of the European chemical industry is not fully realised, although it constitutes an important source of emissions to air from industrial installations (see Chapter 1 of the Final Draft of the CWW BREF).
- No level playing field is achieved within the chemical sector, as BAT-AELs for emissions to air would apply to illustrative processes, but not to other processes with potentially similar or even higher environmental impacts.
- Some sectors of the chemical industry could benefit from a competitive advantage over other industrial sectors, which are covered by generic BAT-AELs.

4.2 Efficiency of the BREF review process

The current *Strategy* is likely to result in a high workload for the TWGs and a long duration of the BREF review processes due to:

- the large number of chemical BREFs (currently eight in total), which implies:
  - eight separate review processes with TWG meetings, information collection and analysis, production of formal drafts, and commenting;
  - duplication of information between BREFs (e.g. on techniques to reduce emissions to air);
  - the need to ensure consistency across all eight reviews (see Section 4.3);
- the potentially very large number of illustrative processes, which implies:
  - the setup of many TWG subgroups and/or shadow groups;
  - separate data collection, each with questionnaire development, surveys and data analysis;
  - duplication of information within a BREF;
  - the tendency to gather data from as many plants as possible, instead of focussing on BAT.

The present coverage of the chemical industry sector by eight BREFs is due to the large number of chemical substances produced and the heterogeneity of production processes. However, this might not be justified with regards to the number of chemical installations in the EU-27 (approximately 5000 IPPC installations in 2011) and their environmental impact. In many other sectors, having a similar or larger environmental impact than the chemical sector[9], a single BREF covers a large number of installations, e.g. 17 000 Intensive Rearing of Poultry and Pigs (IRPP) installations, 3 900 Waste Treatment (WT) installations, 2 900 Surface Treatment of Metals and Plastics (STM) installations, 2 800 Food, Drink and Milk (FDM) installations, and 2 800 Large Combustion Plants (LCP)[10].

A simple merging of BREFs as discussed in the IED Article 13 forum could result in some efficiency gains due to the reduced number of TWGs, the avoidance of duplication of information, and a reduced need for consistency. However, such simple merging would lead to very long BREFs that are difficult to handle, and it is unlikely that this will result in a major reduction of the workload if the number of illustrative processes is not reduced at the same time. Therefore, any such merger would need to focus on the expected outcomes and benefits of the information exchange, i.e. identifying the key environmental issues and establishing whether it is possible to deal with them in a generic manner.

4.3 Need for consistency between the chemical BREFs

As long as the chemical industry is covered by more than one BREF, there will be a need to ensure consistency between BREFs. This affects in particular the scope, the BAT conclusions, and the BAT-AELs, but also the definitions of technical terms. There is always a risk of scope overlaps, scope gaps, or contradictory BAT conclusions. Ensuring this consistency becomes increasingly difficult and time consuming with increasing numbers of chemical BREFs.

BREF numbers and consistency are also an issue for end-users since decisions must be made on which BAT conclusions to use for deriving permit conditions and triggering permit review. This can be particularly challenging for the chemical sector where eight BREFs cover a wide-range of complicated process configurations.

5 THE WAY FORWARD

5.1 General principles

In response to the problems described in the previous section, it is proposed to revise and update the current *Strategy*, in line with the following principles:

i. **Targeted effort:** Ensure that the outputs from information exchanges are commensurate with the resource inputs by focussing TWG efforts, especially the collection of high-quality data, on BAT (and BAT-AELs) for the key environmental issues.
ii. **Generic BAT if possible:** Derive and define BAT and BAT-AELs at the most generic level possible (i.e. for the whole chemical sector or, where not possible, for an entire sub-sector, e.g. organic chemicals) before considering how to deal with specific illustrative processes or products.

[9] Based on Chapter 1 of the Final Draft of the CWW BREF and E-PRTR data.
[10] These approximate installation numbers for each sector are from 2011 and relate to IPPC activities.

iii. **Fewer illustrative processes:** Limit the number of illustrative processes or products for which specific BAT conclusions are defined and select them according to defined criteria based on e.g. their environmental relevance, the potential for emission reduction and the number/distribution of installations in the EU.

iv. **Transparency:** Enhance transparency to ensure that it is at the heart of the information exchange.

v. **Efficiency:** Ensure that the efforts made so far are not lost and avoid further delays to the ongoing BREF reviews.

Questions on the general principles above and the long-term objectives:

A. In light of the IED and experiences from chemical BREF reviews to date, does the IED Article 13 forum agree that there is a need to update the *Strategy*?

B. Does the IED Article 13 forum agree with the general principles listed above?

C. What is considered to be a long-term, sustainable picture for the number and scope of BREFs covering the chemical sector and, if changes are needed compared to the current situation, by when do we want to achieve that goal?

5.2 Ongoing BREF reviews

CWW BREF: As explained in Section 3.3.1, there are a number of gaps within the revised CWW BREF, most notably its lack of BAT-AELs for emission to air. With the work of the TWG now completed, the Commission intends to finalise the review process by seeking the IED Article 13 forum's opinion and adopting the CWW BAT conclusions through the IED Article 75 Committee. However, this leaves the following unresolved questions:

Questions on CWW BREF review:

D. How should the recognised gaps in the revised CWW BREF be best addressed and when should this happen?

E. Is there a need to complement the CWW BREF with a new, targeted information exchange on emissions to air?

LVOC BREF: The review of the LVOC BREF is well-advanced with a First Draft published in April 2014. As described in Section 3.3.3 and Table 2.4, the information exchange has focussed on 12 illustrative processes and there are relatively few generic BAT conclusions and BAT-AELs for emissions to air. A final TWG meeting is envisaged to be held in mid-2015 with a view to seeking the IED Article 13 forum's opinion in late 2015.

Questions on LVOC BREF review:

F. **Should more efforts be made to define generic BAT conclusions for emissions to air and, if so, on which emissions should this focus and why?**
G. **If a CWW information exchange on emissions to air was re-opened (see Question E), how should this affect the on-going LVOC BREF review?**
H. **Are there any illustrative processes that could be dropped from the revised LVOC BREF (BAT conclusions) and why?**
I. **Is there a benefit in enlarging the scope of the current information exchange with a view to a consolidated BREF covering:**
   i. all large-scale organic chemical production (i.e. LVOC + POL)? or
   ii. all organic chemical production (i.e. LVOC + POL + OFC)?

5.3 Remaining reviews

Subject to reconsidering the *Strategy*, the current work programme envisages commencing the following BREF reviews:

- **2015**: two inorganic chemical BREFs i.e. LVIC-S (Large Volume Inorganic Chemicals – Solids) and LVIC-AAF (Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers)
- **2016**: SIC (Speciality Inorganic Chemicals) and POL (Polymers)
- **2017**: OFC (Organic Fine Chemicals)

Since only preparatory work has occurred for these BREF reviews there is more flexibility on the way forward, which prompts the following questions:

Questions on remaining chemical BREF reviews:

J. **Should more effort be made in the remaining BREF reviews to define generic BAT conclusions for emissions to air and, if so, for which pollutants and why?**
K. **For which chemical sub-sectors or illustrative processes or products should there be an information exchange and, if so, which key issues this should focus on and why?**
L. **Is there benefit in enlarging the scope of the currently proposed information exchanges with a view to a consolidated BREF covering:**
   i. all large-scale inorganic chemical production (i.e. LVIC-S + LVIC-AAF + CAK)? or
   ii. all inorganic chemical production (i.e. LVIC-S + LVIC-AAF + SIC + CAK)? or
   iii. all batch/speciality chemical production (i.e. OFC + SIC)?