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KICK-OFF MEETING
FOR THE REVIEW OF THE
REFERENCE DOCUMENT ON BEST AVAILABLE TECHNIQUES IN THE
LARGE VOLUME ORGANIC CHEMICAL INDUSTRY

SEVILLE, 13 – 16 December 2010

MEETING REPORT

INTRODUCTION

The Technical Working Group (TWG) for the review of the Reference Document on Best Available Techniques (BAT) in the Large Volume Organic Chemical Industry (the LVOC BREF), held its first plenary meeting at the Institute for Prospective Technological Studies (IPTS) of the European Commission in Seville, Spain on 13 – 16 December 2010. This record represents a summary of the results of this first plenary meeting.

Technical Working Groups (TWGs) are set up to facilitate the exchange of information on best available techniques, associated monitoring and developments in them under Article 13(1) of Directive 2010/75/EU on Industrial Emissions (Integrated Pollution Prevention and Control), having originally been conceived under Article 17(2) of Directive 96/61/EC (which was subsequently recast as Directive 2008/1/EC).

The existing LVOC BREF (available on the European IPPC Bureau website at <http://eippcb.jrc.es>) was started in 1999, finalised in 2001 and formally adopted by the European Commission in 2003 under Directive 96/61/EC (which was subsequently recast as Directive 2008/1/EC). The LVOC BREF currently serves as information and guidance for regulators within the procedure of issuing permits to LVOC installations.

This first plenary meeting, also called the kick-off meeting, officially started the work on the review of the LVOC BREF document based on an exchange of information between the members of the Technical Working Group set up for the purpose. By virtue of Article 14(3) of Directive 2010/75/EU, the BAT conclusions that will be contained within the reviewed LVOC BREF will be the reference for setting permit conditions for activities within the LVOC sector.

Mr Serge Roudier, Head of the European IPPC Bureau, chaired the meeting and Mr Iain Clenahan led the technical discussions.

The meeting was attended by 46 participants:

- 22 representing 12 Member States: Austria (AT), Belgium (BE), the Czech Republic (CZ), France (FR), Germany (DE), Ireland (IE), Italy (IT), the Netherlands (NL), Portugal (PT), Spain (ES), Sweden (SE), and the United Kingdom (UK)
- 17 representing the chemical industry under the umbrella of CEFIC
- 2 representing other interested industrial sectors (CONCAWE, European Biodiesel Board)
- 1 representing the European Environmental Bureau
- 4 staff from the European Commission services (DG Environment and the Joint Research Centre)

The agenda of the meeting involved presentations and discussions on the exchange of information on best available techniques (as stipulated in Directive 2010/75/EU), the definition of the scope of the work to review the LVOC BREF and the outline of the LVOC BREF. These discussions were covered during the first two and a half days of the meeting. The final half day covered the information exchange tools (i.e. BATIS) as well as the conclusions of the meeting.

In order to facilitate the meeting, a background paper highlighting the items proposed for discussion at the meeting was prepared by the European IPPC Bureau and sent to the TWG members in advance of the meeting (background paper sent on 26 October 2010). The items had been derived from about 170 wishes sent by the TWG. A "wish" in this context stands for suggestions/comments provided by the members of the TWG to modify the existing LVOC BREF.

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1 BREF CONTENT AND STRUCTURE

1.1 Scope of the LVOC BREF

Because of the complexity of the European chemical industry, eight BREFs have been elaborated to cover the entire sector, and the LVOC BREF is one of this series of chemical BREFs. The other seven chemical BREFs (six other 'vertical' BREFs that cover specific parts of the chemical sector, and one 'horizontal' BREF that covers the whole chemical sector) are:

- Chlor-Alkali Manufacturing Industry (CAK) BREF
- Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers Industries (LVIC-AAF) BREF
- Large Volume Inorganic Chemicals – Solids and Others Industry (LVIC-S) BREF
- Production of Speciality Inorganic Chemicals (SIC) BREF
- Manufacture of Organic Fine Chemicals (OFC) BREF
- Production of Polymers (POL) BREF
- Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF.

The LVOC BREF is one of three that address the organic chemical production activities listed in Section 4.1 of Annex 1 to Directive 2010/75/EU. It covers the production of organic chemicals that have a Europe-wide manufacturing capacity of greater than 100 000 tonnes per year. However, the production of polymers is deliberately excluded from its scope, as this is addressed by the specific polymers (POL) BREF.

Conclusions reached by the TWG for the revised LVOC BREF:

Although the scope of the LVOC was not identified during the collection of wishes as a specific issue, it became clear during the kick-off meeting that the current scope required clarification, as the reliance on a production threshold was seen as inappropriate. Furthermore, there was the possibility of including an illustrative chapter for an inorganic substance mainly manufactured using predominately organic chemicals. Given the interactions between the LVOC and various other BREFs, it was also clear that the exercise of reconsidering the scope could not be performed in isolation.

The TWG identified possible characteristics of an LVOC process, including:

- continuous rather than batch
- produces commodity chemicals rather than consumer products
- located on an integrated chemicals production site

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- TWG members would consider the opportunities for restructuring the scope and share their views via BATIS, ideally by 31 January 2011.
- The EIPPCB will analyse submissions received from TWG and propose a clarification of the current scope of the LVOC BREF taking into consideration:
 - the OFC BREF, the POL BREF and the REF BREF (along with the CWW BREF)
 - the points raised during the kick-off meeting
 - relevant guidance documents
- The EIPPCB's proposal will be provided to the TWG in due course for consideration.

1.2 Background Information (Existing Chapter 1 of the LVOC BREF)

Chapter 1 contains information (including some market data) that relates largely to the chemical sector as a whole.

Conclusions reached by the TWG for the revised LVOC BREF:

- Reduce the information presented on pages 4 and 5 of the existing BREF, as it has a limited direct bearing on BAT conclusions.
- Update market data if information is available, otherwise delete.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

Any information will be supplied by 30 June 2011.

1.3 Generic Chapters (Existing Chapters 2, 4, 5 and 6 of the LVOC BREF)

The LVOC BREF currently contains a number of chapters that deal with generic issues:

- **Chapter 2** (20 pages) currently describes the various chemical transformations and unit operations employed in the LVOC sector.
- **Chapter 4** (9 pages) provides a largely qualitative analysis of typical emissions and waste arisings within the sector, as the BREF recognises that these are very much process specific.
- **Chapter 5** (51 pages) provides descriptions of various candidate techniques, but does not employ the 9 headings structure (see Annex I), and contains very little quantitative data.
- **Chapter 6** (11 pages) provides an essentially exclusively qualitative assessment of generic BAT, and those data that are present appear unsuitable to be adopted as BAT AELs.

Conclusions reached by the TWG for the revised LVOC BREF:

- Merge chapters 2, 4, 5 and 6 into a single chapter covering "generic issues" so as to mimic the structure of the illustrative chapters.
- Correct errors or omissions in existing process descriptions, and particularly in sections 2.1.4, 2.1.7 and 2.1.15.
- Develop elements that address potential environmental impacts, and discuss process details primarily in the context of how they can affect environmental impact.
- Reduce the size of the combined chapter (ideally to around 50 pages in total) by:
 - removing information that has no bearing on BAT conclusions
 - maximising the use of cross references to the other BREFs, and the CWW BREF in particular
- The reasons for any information being removed from the BREF should be clearly indicated in future drafts (these notes will be removed when the BREF is finalised).
- Include new elements to address unit operations such as fermentation.
- Any information gathered in respect of processes included in illustrative chapters that is generic in nature should be included in the merged generic chapter.
- Adopt the 9 headings structure for documenting generic techniques to be considered (see Annex I).
- If possible, derive generic BAT conclusions, and possibly BAT-AELs, from data collected for illustrative chapters.
- The BAT conclusions presented in the existing Chapter 6 require complete revision.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

Information would be supplied by 30 June 2011. See Section 4 for details of specific issues.

1.4 Thumbnail Descriptions (Existing Chapter 3 of the LVOC BREF)

Chapter 3 of the LVOC BREF currently contains descriptions of varying detail regarding processes employed for the manufacture of a wide range of organic chemicals. These are largely focused on describing the manufacturing steps, and many say little or anything about the environmental footprints of the processes.

Conclusions reached by the TWG for the revised LVOC BREF:

The TWG agreed that:

- The thumbnail descriptions were a useful resource for permit writers and should be enhanced to provide the descriptions with a greater focus on the environmental footprints of processes.
- Explore the possibility of presenting the thumbnail descriptions in a tabular form.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- The EIPPCB will provide a template for assisting in the development of revised thumbnail descriptions.
- TWG members to provide information for updating the existing thumbnail descriptions.
- Include new thumbnail descriptions, e.g. in respect of bioethanol.

1.5 Illustrative Chapters (Existing Chapters 7 to 14 of the LVOC BREF)

Each illustrative chapter currently provides a more detailed analysis of the manufacture of a substance, or a group of related substances.

Conclusions reached by the TWG for the revised LVOC BREF:

- Include additional illustrative chapters - see Section 2 below.
- Illustrative chapters should address only issues and pollutants that are deemed to be of significance, and in respect of which permit conditions might be required or desirable.
- A data collection exercise that is focused on delivering BAT conclusions should be conducted in order to gather appropriate emission and consumption data and techniques according to the latest IEF guidance – see Section 3 below.
- Present information regarding techniques to consider according to the 9 headings structure (see Annex I).
- The following information should be removed from illustrative chapters:
 - information that is irrelevant to BAT conclusions
 - information that is already covered in other BREFs
 - information that could be migrated to the generic chapter
- If possible, target a reduction in the average size of an illustrative chapter to less than 25 pages.

2 SELECTION OF ILLUSTRATIVE CHAPTERS

2.1 Introduction

The LVOC BREF includes a number of illustrative process chapters that deal with the manufacture of a single substance, or a group of related substances. The IEF's strategy for the review of the chemical BREFs identified a number of additional substances for which illustrative chapters should be included in the LVOC BREF at its first review ("Priority 1" substances), and those whose inclusion should be considered by the TWG when planning the first review ("Priority 2" substances).

The IEF's view was reflected in a number of wishes that were received in advance of the kick-off meeting. In addition, a number of wishes were received for the inclusion of substances that were not addressed in the IEF strategy. Consequently, one of the major matters to be decided by the TWG at the kick-off meeting was to determine which substances should be covered in detail in an illustrative chapter in the LVOC BREF, and whether any changes were justified to existing illustrative chapters.

In recognition of the fact that the TWG had to reach conclusions in respect of a significant number of candidate substances during the kick-off meeting, the EIPPCB requested that information was supplied by the TWG in advance of the meeting to supplement the wishes that had been received. The plan was for this information to facilitate the preparation of material for, and inform the discussions and decision-making at, the kick-off meeting.

2.2 Illustrative Chapter Concept

Before considering the substances for which illustrative chapters should be provided, the TWG considered a number of questions related to the illustrative chapter concept, including the nature and role of an illustrative chapter, and the drivers for including an illustrative chapter in respect of any substance or group of substances. The factors that might influence the inclusion of a substance in an illustrative chapter that were considered included:

- the IEF's strategy to review the chemical BREFs
- the use of proprietary process technology
- potential environmental footprint
- production capacity
- number and location of installations
- availability of relevant information
- competition issues
- relationship with other BREFs
- TWG resources

Conclusions reached by the TWG for the revised LVOC BREF:

The TWG agreed that:

- Illustrative chapters should not become "a catalogue of exotic substances", but should focus on processes that individually and/or collectively have the potential to cause material environmental impact, and in respect of which information would be beneficial to permit writers.
- The analysis (including BAT-AELs) presented in an illustrative chapter is likely to have a narrow relevance to the process(es) concerned, although some generic elements (e.g. in respect of abatement techniques) could potentially have a wider relevance.
- Illustrative chapters should have a conscious focus on the provision of information that is needed during the permitting process, and information that does not fill this brief should be excluded.
- The analysis presented in the illustrative chapters needs to reflect the fact that many of the processes are conducted on highly integrated sites, and consequently the emission and consumption profile of an individual process will be influenced by its specific (and potentially unique) interactions with other processes.

2.3 Candidate "Priority 1" Substances

"Priority 1" Substances are those that the IEF's strategy for the review of the chemical BREFs identified should be included in the LVOC BREF at its first review.

Conclusions reached by the TWG for the revised LVOC BREF:

The TWG concluded that the following candidate "Priority 1" substances should be included within an illustrative chapter:

- **Styrene** – In addition to being a "Priority 1" substance, styrene was also identified in the existing BREF's concluding remarks as a candidate for inclusion in an illustrative chapter. As it was recognised that the production of styrene and propylene oxide could be inextricably linked, the TWG concluded that a single illustrative chapter should cover both substances.
- **Propylene oxide** –
 - As mentioned above, the TWG agreed that there should be a single illustrative chapter covering the production of both styrene and propylene oxide, given that a significant quantity of propylene oxide is co-produced with styrene via the indirect oxidation route.
 - The link between MTBE manufacture and propylene oxide production using isobutane was commented upon, but whereas the REF BREF covers some processes for the manufacture of MTBE, it specifically excludes its manufacture linked with propylene oxide production, indicating that this was a matter for the LVOC BREF.
 - The use of ethylbenzene as a raw material in the co-manufacture of propylene oxide and styrene raised questions about the possibility of including ethylbenzene in the styrene/propylene oxide chapter.
 - The fact that propylene oxide is also produced via the chlorohydrin route raised some concerns about the breadth of the proposed chapter.
 - It was concluded that the routes using cumene and hydrogen peroxide should currently be viewed as emerging processes.

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- **Phenol** – The chapter would focus on the cumene oxidation process, as this is by far the predominant process employed within Europe.
 - **Ethylbenzene** – The close link with styrene manufacture was noted.
 - **Ethanolamines** – The chapter would include both the aqueous and anhydrous routes.

There was no strong support from the TWG for the inclusion of the following candidate "Priority 1" substances:

- **Hydrogen cyanide** – Although hydrogen cyanide was listed as a "Priority 1" substance, the IEF's strategy for the review of the chemical BREFs indicated that hydrogen cyanide should be included in the LVIC-AAF BREF; the strategy recognised that some hydrogen cyanide is produced as a co-product in the manufacture of acrylonitrile, and that appropriate cross-referencing from the LVOC BREF to the LVIC-AAF BREF should therefore be adopted. In order to clarify the precise situation in respect of hydrogen cyanide, and the various options for manufacture (along with their environmental footprints), the TWG agreed that an illustrative chapter outline would be produced for hydrogen cyanide, and that an informed decision would be taken by the TWG after this had been completed.
- **Methanol and its derivatives** – As formaldehyde is already included in its own illustrative chapter, only methanol and other derivatives were under consideration. The TWG discussed the nature and number of production facilities within Europe for methanol, and concluded that the number of facilities was likely to be low (it was felt that production was largely concentrated close to gas feedstocks elsewhere in the world). The possibility of strong processing link between elements of its process of manufacture and those included in the LVIC-AAF BREF raised concerns amongst some TWG members about possible duplication. In the circumstances, the TWG agreed to complete an illustrative chapter outline for methanol and its derivatives in order to clarify the situation, and provide a clear basis for an informed decision about whether to exclude methanol and derivatives other than formaldehyde from detailed consideration in an illustrative chapter.

The TWG concluded that the following candidate "Priority 1" substances should not be included within an illustrative chapter:

- **Adipic acid** – the TWG felt that the driver for the requirement for adipic acid to be included in an illustrative chapter was its N₂O emissions. However, this aspect is now covered by the Emissions Trading Scheme, which was not in place at the time the strategy to review the chemical BREFs was adopted. Furthermore, the TWG could not identify any other environmental issues that would merit its inclusion in an illustrative chapter at this time (the potential scope of the chapter was taken to exclude the manufacture of cyclohexanone and cyclohexanol raw materials). The TWG noted that a thumbnail description of adipic acid would remain, and that this would be enhanced as part of the process of developing the thumbnail descriptions to better reflect the environmental footprint of processes, and deliver information to permit writers (see Section 1.4).
- **Chlorodifluoromethane** – the TWG felt that R23 emissions to air were the driver for the requirement for chlorodifluoromethane to be included in an illustrative chapter. However, the fact that its production is generally the subject of phase out, and as all plants within the EU now employ incineration for R23 destruction, the TWG felt that including it in an illustrative chapter would be excessive and unjustified. It was decided that the currently very brief thumbnail description should be enhanced (along with the other thumbnail descriptions – see Section 1.4).

The EIPPCB will report to the IEF as soon as possible the basis for these decisions, taking into account the information presented at the meeting, and any information that is subsequently provided.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- Information relating to the manufacture of **styrene**, **propylene oxide** and **ethylbenzene** was stated to be readily available. CEFIC had already started to collect data in respect of styrene manufacture, and this could be made available after being quality checked. IT had produced a "mini BREF" in respect of styrene which had been prepared in respect of the BREF review. NL was hopeful that it could obtain information.
- FR indicated that it could provide information regarding **phenol** manufacture.
- In order to make a final decision in respect of **hydrogen cyanide** and **methanol** and its derivatives, members of the TWG were tasked with collating information about these sectors.

2.4 Candidate "Priority 2" Substances

The IEF expressed an opinion that a number of substances "should be considered by the relevant TWG for inclusion in the first review of the chemical BREFs".

Conclusions reached by the TWG for the revised LVOC BREF:

The TWG concluded that the following candidate "Priority 2" substance should be included within an illustrative chapter:

- **Hydrogen peroxide** – The inclusion of an illustrative chapter for hydrogen peroxide will necessitate a revision of the BREF's scope to include inorganic substances that are mainly produced using predominately organic substances.

The TWG could not conclude definitively at the meeting either whether, or to what extent, the following candidate "Priority 2" substances should be included within an illustrative chapter:

- **Glyoxylic acid** – The uncertainty in respect of this substance was partially due to a lack of knowledge about the extent to which it is manufactured within the EU. Also, the TWG was of the opinion that the primary driver for the need to consider its inclusion in an illustrative chapter was its N₂O emissions, which are now subject to control under the Emissions Trading Scheme, which wasn't in place at the time the strategy to review the chemical BREFs was adopted. However, there was acknowledged to be uncertainty about production volumes within the EU, and an incomplete understanding of the potential environmental footprint of the process. The TWG therefore agreed to complete an illustrative chapter outline to collate this information and provide a basis for making a decision whether there was merit in including it within an illustrative chapter.
- **Surfactants** – This covers a number of families of substances. It was recognised that it would not be feasible for the BREF to address all of these families, and that it would therefore be appropriate to include only a select number of widely produced families with a material potential environmental impact that met the criteria for inclusion in the LVOC BREF. The TWG agreed that the analysis to allow a decision about which families it would be appropriate to include in an illustrative chapter would be based on illustrative chapter outlines, which would be completed following the kick-off meeting.

The TWG concluded that the following candidate "Priority 2" substances should not be included within an illustrative chapter:

- **Acrylic acid and its esters** – The inclusion of these substances was felt inappropriate because the TWG agreed that the extensive use of protected propriety technology would result in a very limited availability of data. Also, it was felt that the main driver for consideration was waste water emissions. However, as acrylic acid and its esters are normally produced on highly integrated sites with shared waste water treatment plants, it was felt that the CWW BREF would provide more than adequate coverage.
- **Bisphenol A** – As the primary driver for this substance being considered was the potential presence of BPA in waste waters, the fact that this was actually primarily an issue for polymer manufacture led the TWG to conclude that this matter would be addressed in the POL BREF. Furthermore, the fact that BPA is manufactured on highly integrated sites with shared waste water treatment plants was seen by the TWG as indicating that the CWW BREF would provide adequate coverage.
- **Melamine** – The proprietary nature of the production processes was considered by the TWG to be a major hurdle to producing BAT conclusions in respect of melamine manufacture. It was noted that the current thumbnail description would be enhanced.
- **Methyl ester biodiesel** – The TWG recognised that the growth in biodiesel production within Europe had increased significantly over recent years, and was expected to grow further. However, there was a view that this in itself did not warrant its manufacture being included within an illustrative chapter. The primary reason for its "Priority 2" status was a concern about the disposal of by-product glycerol, but this is not always going to be a problem following changes to the Animal By-products regulation. Odours were recognised by the TWG as a potential problem, but it was felt that this issue would be adequately addressed by the CWW BREF, which includes various sections on odour and its control. However, it was recognised that there was currently no thumbnail description for methyl ester biodiesel, and that one should therefore be developed.
- **Carbon tetrachloride** – The ozone-depleting nature of the substance was the primary driver for its "Priority 2" status. However, due to controls on its usage, and the controls introduced under the Montreal Protocol, production has decreased significantly over recent years, and its manufacture is predominately as a by-product during the production of other chemicals.

The EIPPCB will advise the IEF the basis for these decisions, taking into account the information presented at the meeting, and any information that is subsequently provided.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- In order to make a final decision in respect of **hydrogen cyanide** and **methanol and its derivatives**, members of the TWG were tasked with collating and providing information about these sectors.
- NL and AT would provide information to help enhance the thumbnail description for **melamine**.
- The EBB, FR and IE will provide information regarding **methyl ester biodiesel** to assist with the development of a thumbnail description.

2.5 Other Candidate Substances

Wishes were received for the inclusion of substances other than those identified by IEF as either "Priority 1" or "Priority 2".

Conclusions reached by the TWG for the revised LVOC BREF:

The TWG concluded that none of the other candidate substances should be included within an illustrative chapter. The proposals for the inclusion of the following substances were therefore not supported by the TWG:

- **2-ethylhexanol** (wishes received from SE and FR) – Although neither a "Priority 1" nor a "Priority 2" substance in the IEF's strategy to review the chemical BREFs, 2-ethylhexanol was identified as a candidate for inclusion in an illustrative chapter in the current BREF's concluding remarks. However, the TWG felt that the fact that it was currently being phased out, combined with a belief that waste water arising from its manufacture would be adequately handled by the CWW BREF, meant that it would not be appropriate to include it within an illustrative chapter. However, the existing thumbnail description should be enhanced as part of the overall development of thumbnail descriptions.
- **Maleic anhydride** (wish received from AT) – The available information suggested that there was limited maleic anhydride production within the EU. The fact that few if any of the producers were CEFIC members raised concerns about the ability to obtain good quality data; AT might be able to supply data in respect of its sites, but there were concerns that drawing conclusions on just such data could prove problematic. AT agreed that rather than include in an illustrative chapter the existing thumbnail description should be developed.
- **MDI** (wish received from PT) – It was recognised that many of the environmental footprint issues associated with MDI manufacture were already covered by the TDI chapter. The TWG therefore agreed that the TDI chapter should be updated to reflect MDI specifics, but avoid repeating what is already covered in the OFC BREF.
- **Chloromethane** (wish received from UK) – As the manufacture of chloromethane is already covered in Section 6.3 of the Speciality Inorganic Chemicals (SIC) BREF, the TWG decided that it would be inappropriate to include it in an illustrative chapter in the LVOC BREF. Instead, it would be included as a thumbnail description, with appropriate cross-referencing to the SIC BREF. UK was content with this approach.
- **Bioethanol** (wish received from UK) – It was agreed that the fact that the LVOC BREF did not currently list fermentation within the collection of unit operations was an omission and should be corrected. The possibility that this activity was already covered in the FDM BREF was raised, but it was acknowledged that the scope and scale might not fully match the non FDM bioethanol production activities. However, it was felt that there was not an adequate justification for the inclusion of bioethanol in an illustrative chapter, and it was therefore agreed that the processes would be reflected in the expanded thumbnail descriptions, with appropriate cross-references to the FDM BREF.
- **Biobutanol** (wish received from UK) – Biobutanol production was considered to be still too immature for inclusion in an illustrative chapter at this time, although it could warrant inclusion by the time of the next review of the BREF. UK withdrew its wish prior to the meeting.
- **Methacrylic acid and its esters** (wish received from UK) – Expand the existing thumbnail description.

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- **Substances of very high concern (SVHC) under REACH** (wish received from Oekopol) – In advance of the meeting the EIPPCB discussed the current SVCHs under REACH with the European Chemicals Agency (ECHA) in order to determine which, if any, could be candidates for inclusion in the revised LVOC BREF. This indicated 9 candidate SVHCs:
 - **Anthracene** manufacture did not appear to meet the current criterion for inclusion in the LVOC BREF.
 - **Trichloroethylene** is currently being phased out.
 - **Dinitrotoulene** is already addressed in the current illustrative chapter for TDI, and **4-4' diamonodiphenylmethane** is an intermediate in the manufacture of MDI.
 - **Hexabromocyclododecane, triethyl arsenate, dibutyl and diisobutyl phthalates, and tris(2-chloroethyl)phosphate** have no or only limited production within the EU.

The EIPPC would maintain and develop its relationship with ECHA in order to ensure the timely notification of the classification as an SVHC of any substance that might fall within the scope of the LVOC BREF.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

The following information would be forthcoming:

- UK, IT and DE will provide information regarding the manufacture of **methacrylic acid and its esters** in order to allow the development of the thumbnail description.
- NL and PT would provide information regarding MDI manufacture.

3 DATA COLLECTION

3.1 Scoping the Data Collection Exercise

The quantitative information presented in the existing illustrative chapters needs to be significantly enhanced, and this will therefore be one of the main objectives of the review. However, as a significant number of additional illustrative process chapters needed to be included, another important objective of the review will be the acquisition of robust quantitative information relating to the manufacture of a range of new substances.

The EIPPCB proposed that revisiting the existing illustrative process chapters, and developing new illustrative process chapters, should be approached in a systematic and transparent manner that focused on the data that will be needed to support BAT conclusions (see Section 1.5). This would require an analysis of each process in order to determine the matters in respect of which BAT conclusions might be anticipated, and also the techniques that might have a bearing on these matters.

The EIPPCB consequently proposed the use of **Illustrative Chapter Outlines** (ICOs - see Annex II) to assist with this analysis. Although Illustrative Chapter Outlines would be brief documents that were primarily designed to facilitate the transparent development of data and information acquisition questionnaires that are fit for purpose, they were recognized as likely to have a wider use during the review process.

Conclusions reached by the TWG for the revised LVOC BREF:

- Perform a focused data collection exercise in respect of those data that will be required to derive useful BAT conclusions.
- Develop a systematic, efficient and transparent approach to identifying:
 - those aspects of an illustrative process's environmental footprint for which permit conditions might be anticipated
 - the techniques that could have a bearing on such aspects
- Identify:
 - the types of information that would be required regarding the matters in respect of which permit conditions might be required, and the techniques that could have a bearing on those matters
 - the format and likely availability of such information
- Adopt the use of illustrative chapter outlines (ICOs) to deliver the above.
- Establish sub-groups of the TWG for the development and finalisation of each ICO – as a minimum, each sub-group would comprise at least:
 - 1 member of EIPPCB (Iain Clenahan)
 - 1 TWG member representing Member States
 - 1 TWG member representing industry.

- The memberships of the sub-groups were agreed as follows:

Illustrative Chapter	Member State(s)	Industry⁽¹⁾
Lower olefins	Spain	Philip de Smedt, Paul Broekaart
Aromatics	Italy	François de Borman
Ethylene oxide and glycols	Germany	Johan de Veirman
Formaldehyde	Germany, Portugal	CEFIC to discuss with the sector
Acrylonitrile	United Kingdom	Ian McVey
EDC/VCM	Spain, United Kingdom	Arjen Sevenster
TDI	Germany, Portugal	Peter Breidenbach
Styrene/propylene oxide ⁽²⁾ ⁽³⁾	The Netherlands	Olivier Delinares (styrene), Gerhard Zimmer (PO)
Phenol	France, Italy	Ruediger Hoffman
Ethylbenzene ⁽³⁾	The Netherlands	Olivier Delinares
Ethanolamines	Belgium, France, Sweden	Tom Fremau
Hydrogen peroxide	Belgium	Stefan Dommes
Hydrogen cyanide ⁽⁴⁾	France	Stefan Dommes
Methanol and its derivatives ⁽⁴⁾	Belgium, Germany	Keith Harsham
Glyoxylic acid ⁽⁴⁾	Austria	To be confirmed
Surfactants ⁽⁴⁾	Belgium, Portugal	Stefan Dommes
⁽¹⁾ François de Borman would be a member of each sub-group because of his CEFIC co-ordinating role. ⁽²⁾ Spain subsequently withdrew from the Styrene/propylene oxide sub-group due to an over-commitment. ⁽³⁾ The ICOs for styrene/propylene oxide and ethylbenzene to be developed in concert. ⁽⁴⁾ It is not certain that an illustrative chapter will be included for these substances.		

- Environmental NGOs can participate at their convenience in the sub-groups.
- The ICOs produced by the various sub-groups would be subject to a two week period of consultation within the entire TWG before being confirmed.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- The individual sub-groups would develop the Illustrative Chapter Outlines in order to scope the types of information that would be required for each illustrative chapter.

3.2 Questionnaire Development

Conclusions reached by the TWG for the revised LVOC BREF:

- The EIPPCB will propose to the TWG the format to be employed for the questionnaires.
- The questionnaires would respect the requirements of IEF guidance paper 20-4.
- The questionnaires will set out clearly the purpose of the questions being asked, and the process to be adopted for the handling of the data that are submitted.
- The questionnaires will include a clear indication of the interactions between the LVOC BREF and other BREFs
- The questionnaires for the process-elements of the illustrative chapters would be developed by the sub-groups mentioned in Section 3.1 on the basis of the confirmed ICOs.
- The questionnaires would be subject to a four week period of consultation with the entire TWG before being confirmed.

3.3 Questionnaire Dissemination and Data Submission

Conclusions reached by the TWG for the revised LVOC BREF:

- Arrangements would need to be devised that would avoid multiple questionnaires being sent to operators of integrated sites at different times.
- Any TWG member submitting a questionnaire would review the quality and completeness of information contained in questionnaires from operators and correct any deficiencies before submitting the questionnaires to the EIPPCB.
- The EIPPCB will engage with CEFIC regarding the approach to be adopted in respect of any information that might be commercially sensitive.

3.4 Timing of the Data Collection Exercise

Conclusions reached by the TWG for the revised LVOC BREF:

- The ICOs should ideally be finalised by 31 April 2011.
- The questionnaires should ideally be finalised and disseminated by mid July 2011.
- The data should ideally be submitted (including all quality checks) by mid October 2011.

4 TECHNIQUES

The wishes identified a number of techniques in respect of which attention might have to be paid during the development of ICOs, and these were discussed by the TWG.

4.1 Flaring

Conclusions reached by the TWG for the revised LVOC BREF:

- Flaring recognised as a horizontal issue, so duplication of information in other BREFs (and the CWW BREF in particular) should be minimised.
- The relevant chapters of the CWW BREF would be made available to the TWG via BATIS.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- CEFIC to provide information on the practicalities and costs involved in (retro)fitting flare gas recovery systems for crackers.
- SE to provide information on the effect of operating rate on flare performance.
- NL to provide general information on flare performance.
- BE will investigate the information that it might have available.

4.2 Cracker design and operation

Conclusions reached by the TWG for the revised LVOC BREF:

- Information is not readily available regarding the particle size range of the dust produced during de-coking.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- CEFIC had already provided information regarding measures that could be adopted during de-coking to minimise emissions, and NL will provide information on this subject.

4.3 Furnace design and operation

Conclusions reached by the TWG for the revised LVOC BREF:

- Contributions made by CONCAWE for the review of the REF BREF should be checked for relevance.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- FR should be able to provide information (case study) on the cost effectiveness of, and operability issues associated with the use of SCR, and CEFIC can contribute information in respect of the lower olefins sector. NL might be able to provide data.

4.4 VOC Control

Conclusions reached by the TWG for the revised LVOC BREF:

- As the CWW BREF extensively addresses the prevention and control of VOC emissions, minimise duplication.
- VOC control should be addressed when completing the ICOs.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- NL can provide information regarding techniques for minimising emissions of VOCs during the treatment of effluents from aromatics production.
- NL and SE can provide information regarding fugitive emissions.

4.5 Other than normal operating conditions

Conclusions reached by the TWG for the revised LVOC BREF:

- The concept of "other than normal operating conditions" is one that would benefit from clarification.
- The ICOs should explore "other than normal operating conditions" – if measures exist for the reduction of the environmental impact associated with these situations, they should be documented.
- Any issues associated with abatement plant up-time should be addressed when completing the ICOs.
- Information on measures for protecting groundwater following a loss of containment offered by UK is more appropriate for the review of the Emissions from storage BREF.

4.6 Waste water and waste gas treatment

Conclusions reached by the TWG for the revised LVOC BREF:

Maximise cross-referencing to the CWW BREF.

4.7 Combustion of process liquids

Conclusions reached by the TWG for the revised LVOC BREF:

The combustion of process liquids is a potentially important matter for the LVOC sector.

Information identified or promised to be delivered by the TWG for the revised LVOC BREF:

- NL will provide generic information regarding the combustion of residual process liquids as fuels.
- IE can possibly supply information related to biodiesel production.

4.8 Process selection/design

Conclusions reached by the TWG for the revised LVOC BREF:

- The possibility of cross-referencing information regarding options for improving catalyst performance presented in the LVIC-AAF BREF should be assessed.
- The ICOs should document process selection/optimisation issues (including availability) where appropriate.
- Emerging techniques should be included when completing the ICOs.
- Start-up and shut-down regimes should be addressed.

5 INFORMATION EXCHANGE

An effective information exchange is dependent on the active involvement of all TWG members. The TWG is expected to collaborate fully and to use objective scientific communication to support the views expressed. Information submissions may take the form of quantitative data or qualitative descriptions, but must be made by **30 June 2011 in respect of information other than the data collection exercise outlined in Section 3.** Earlier submissions are encouraged in order to speed up the work. **There is no guarantee that late information will be taken into account.**

E-mail and the European IPPC Bureau information exchange forum (within the BAT Information System, BATIS) both play an important role in the information exchange. The exchange of information necessarily involves public disclosure (since members of the TWG share all information), but there is a provision for accepting confidential submissions. In this case, this request should be clearly communicated to the European IPPC Bureau.

The TWG will also have access to a workspace (BATIS forum for LVOC) for exchanging information. The LVOC forum in BATIS is only accessible to members of the LVOC TWG and to European IPPC Bureau staff. An invitation to join BATIS has been sent by e-mail to all TWG Members. Should you request any assistance in the use of BATIS, please do not hesitate to contact the European IPPC Bureau secretariat (email: jrc-ipts-eippcb@ec.europa.eu; tel.: +34 954 488 284; fax: +34 954 488 426).

Site visits to installations constitute a good method for gathering and validating information. Some TWG members have already offered their help to organise site visits for the BREF Author. Visits will be prepared in advance so that the topics to be discussed can be selected and studied.

6 ANNEX I: STANDARD STRUCTURE FOR DESCRIBING THE 'TECHNIQUES TO CONSIDER IN THE DETERMINATION OF BAT'

When providing information on "Techniques to consider in the determination of BAT", the use of a standard structure is required in order to enable comparisons of techniques and so that an objective assessment against the definition of BAT given in the IED (2010/75/EU) can be made. This standard structure is stipulated in the BREF Outline and Guide and is as shown in Section 6.1. It is necessary to use this standard structure for the provision of information for specific techniques.

6.1 Type of information needed to fill the sections dealing with 'Techniques to consider in 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 process will be presented in the BREF according to a standard structure, 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 'Techniques to consider in the determination of BAT' and to derive useful BAT conclusions from them:

Name of the type of information	Type of information to be included in the BREF	Important information to collect and to report ¹
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 environmental media (e.g. air, water, land) 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. This document is available from the European IPPC Bureau website at http://eippcb.jrc.es/pages/FActivities.htm
Operational data	Data on consumption and emission levels from operational plants using the technique (including reference conditions – e.g. O ₂ level – and monitoring methods used). Any other information on how to operate, maintain and control the technique	<p><u>Emissions data:</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 <p><u>Others:</u></p> <ul style="list-style-type: none"> • sensitivity and durability of the technique

¹ based on the main gaps identified during the elaboration of the first series of BREFs

Name of the type of information	Type of information to be included in the BREF	Important information to collect and to report ¹
		<ul style="list-style-type: none"> 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	<p>Examples:</p> <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	<p>Mainly:</p> <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. Both documents are available from the European IPPC Bureau website at http://eippcb.jrc.es/pages/FActivities.htm</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)	<p>Examples:</p> <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	

7 ANNEX II: TEMPLATE FOR THE ILLUSTRATIVE CHAPTER OUTLINE

Substance(s)	
Name(s)	Rationale for Inclusion
<i>Where possible, please use the name that is used in the Background Paper for the kick-off meeting.</i>	<i>Indicate the rationale for the inclusion of an illustrative chapter in the BREF for this substance. In doing so, cognisance should be taken of the criteria set out in Section 14.2.1 of the current BREF.</i>

Applied processes and techniques		
Description	Comments	Information Available
<i>In this column, provide a brief description of the processes of manufacture that are employed. There is no need for a lot of detail, but do mention things that differentiate one process from another.</i>	<i>Indicate the relative importance of the processes in this column, and any obvious circumstances that might result in one process being used in preference to another.</i>	<i>Reference documents for the processes should be listed here.</i>

Matters in respect of which BAT conclusions are anticipated		
Description	Justification	Data Required/Available
<i>List in this column the matters that the BREF should address. A very brief description is all that is required.</i>	<i>Summarise in this column the reasons why the matters listed in the first column need to be addressed in the BREF.</i>	<i>This column should describe the data that are currently available, and any data that might become available in the near future - the likely timescale for the availability of data should be explicitly mentioned. The format and nature of the data (including the extent to which it meets the expectations set out in IEF 20-4) should be described, along with any issues that might be attached to them (e.g. confidentiality concerns).</i>

Techniques relevant to the matters in respect of which BAT conclusions are anticipated		
Description	Justification	Information Required/Available
<i>List in this column the techniques that could have a material impact on the matters that are listed in the first column of the previous table. If possible, amplify each technique with examples and/or options.</i>	<i>Summarise in this column the reasons why (and to what extent) the techniques affect one or more of the matters listed in the first column of the previous table.</i>	<i>This column should describe the information that is available, and any information that might become available in the near future - the likely timescale for the availability of information should be explicitly mentioned. The format and nature of the information (including the extent to which it meets the expectations set out in IEF 20-4) should be described, along with any issues that might be attached to it (e.g. confidentiality concerns).</i>