Report from HAZBREF – Stakeholder Conference 21st–22nd May 2019 in Tallinn, Estonia

1. Introduction

The two-day conference aimed at presenting the progress of the HAZBREF project, which is now in the middle of the project timeline (for the final agenda see HAZBREF webpage).

The conference was attended by 80 participants from 13 EU Member States, representing EU Commission (EIPPCB, ECHA), Ministries for Environment, Environmental Protection Agencies and local authorities, industry organisations, operators or environmental mangers as well as environmental NGOs. This provided an excellent basis for discussions, exchanging views and gathering input from the various stakeholders. These contributions are useful to develop the activities in line with HAZBREF project objectives.

The programme started with a welcome speech from the Estonian Ministry of the Environment. The overview of the progress in HAZBREF was presented by the Project Manager and the WP leaders.

The main focus of Day 1 was preliminary findings of the textile industry that is one of the three sectors chosen as example within HAZBREF. The activity leader for the textile sector and the sector expert presented the first results from two case installations in Germany. A panel discussion followed with participants from Member State authorities, textile industry and environmental NGOs.

The second day focused on getting stakeholder input for the main HAZBREF activities. Four Break-out groups discussed the following four topics:

- 1: What are "substances of concern" in industrial emissions?
- 2: IED and other substance-related EU-legislation: Use of available data to enhance implementation.
- 3: BATs for management of hazardous chemicals.
- 4: IED and circular economy

Main views exchanged in these 4 groups are summarised in section 3 further below. The outcome of the groups presented after the discussions in the plenary session of the conference can be found in the HAZBREF webpage.

2. Main issues discussed during Day 1

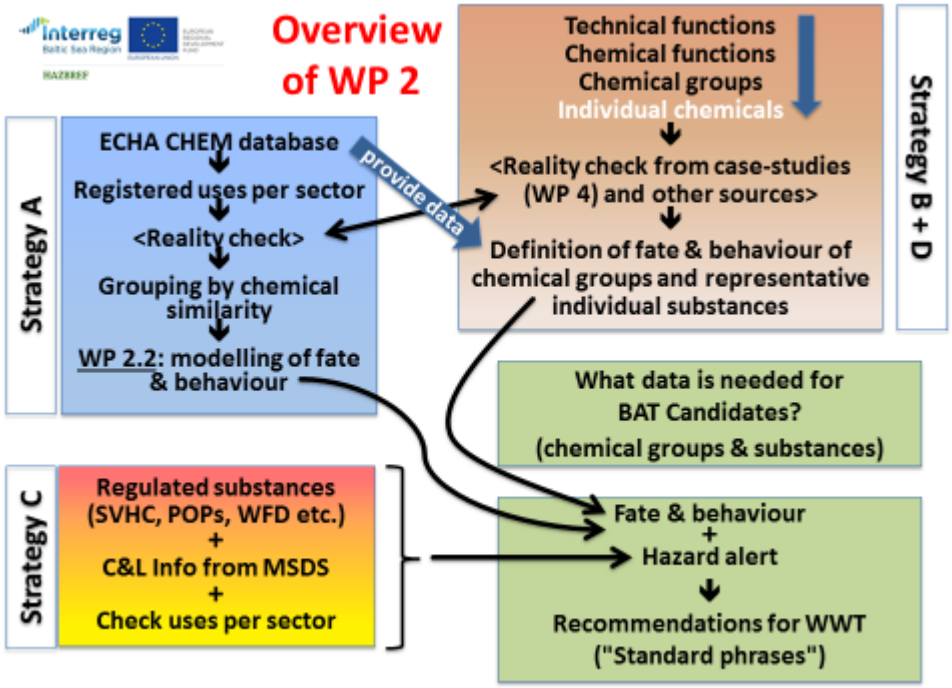
Deputy Secretary General Kaupo Heinma from the Estonian Ministry of the Environment welcomed the participants to Tallinn. He emphasized the need for interaction and coherence between the different EU legislations regulating chemicals and wished HAZBREF could come up with findings that could be beneficial for authorities, industries and other stakeholders in this issues

The Project Manager Kaj Forsius from the Finnish Environment institute (SYKE) presented the project and its main objectives. HAZBREF aims to increase the knowledge base of the industrial sources and the reduction measures of hazardous chemicals. Moreover, the project aims at enhanced institutional capacity by better and systematic exchange and utilization of existing information between different regulatory frameworks in the preparation of EU BREFs.

The progress of the work in the HAZBREF Work Packages was presented by the WP leaders. Nannett Aust from the German Environmental Agency (UBA) presented WP2 Selection of relevant target substances in BREF industrial sectors:

The WP2 has designated three strategies to derive lists of relevant target substances for the 3 case sectors: A) “substance-based approach”, B) “use-based approach” and C) “hazard-based approach”.

Most work so far is done for the textile sector as the TXT BREF is currently being reviewed by the EIPPCB. HAZBREF has identified about 200 chemical substances or groups that are relevant in the context of the textile sub-processes. This list will further be narrowed down by applying certain criteria. Defining this criteria will be the next step in the project.

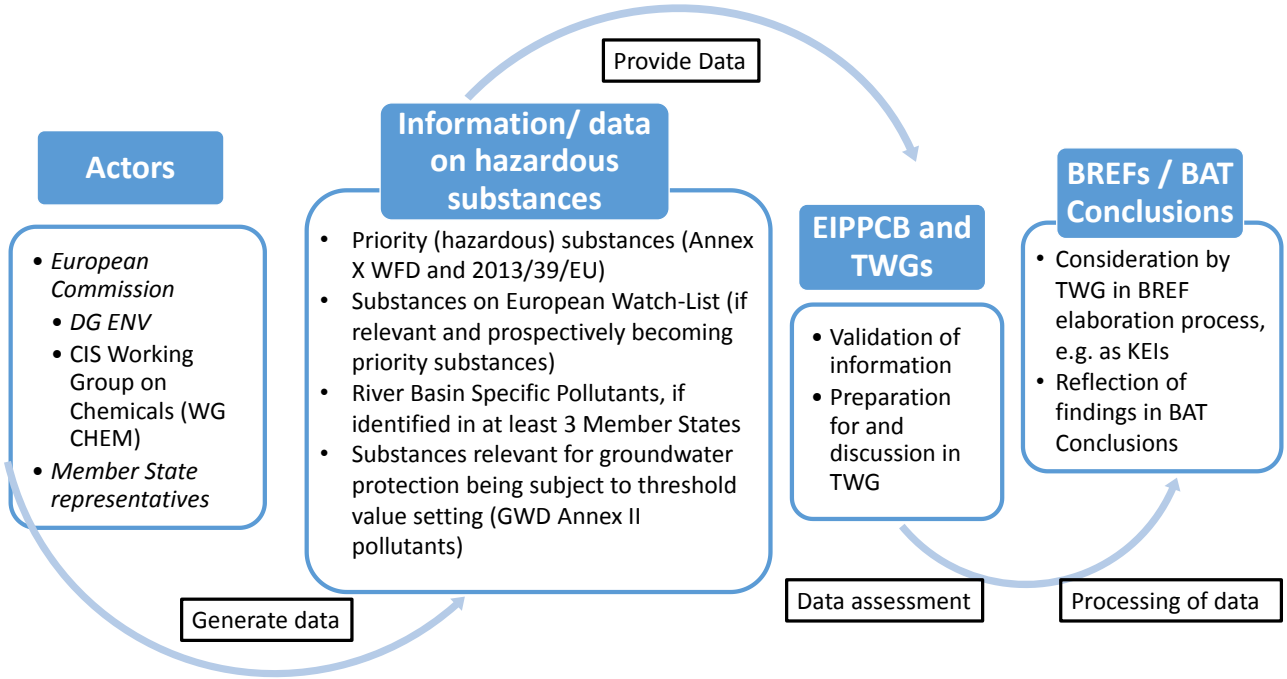


The work in WP 2 extends the view from truly hazardous substances (Strategy C) to substances whose fate and behaviour in wastewater treatment and discharge into the environment has raised concern. Strategy A reverts to use information in the ECHA Registration database and is supported by modelling with SimpleTreat 4.0. Strategy B does a systematic survey on technical and chemical functions and chemical groups actually used in the industry. The latter is supported by the outcome of the case studies. The final outcome is supposed to be recommendations (a decision tree) for operators of industrial wastewater treatment plants with regard to BAT candidate substances and chemical groups.

Michael Suhr from UBA presented the design and first results of WP 3 “Policy improvement”. The WP 3 consists of 2 activities. Activity 3.1 seeks to understand the links and gaps between different European legislation that provide data on chemical substances and discusses the usefulness of that data for BREF reviews and BAT conclusions. The objective of activity 3.2 is to elaborate a practicable method for including the information on hazardous substances in the BREFs/BAT conclusions systematically and at the right time. The draft report of

activity 3.1 will be circulated to interested stakeholders in June for comments. If requested, a smaller workshop can be organized to exchange views on the proposals of the report. Activity 3.2 will start after the summer break and continue until March 2019.

The following figure (from the draft report of activity 3.1) show WFD/MSFD-related information that could provide important input to the BREF elaboration process in particular during the discussions on Key Environmental Issues (KEIs) and substance specific requirements:



The report on activity 3.1 elaborates similar proposals as for the WFD for the interaction of REACH and the IED and for the POP Regulation and the IED.

Janusz Krupanek from the Institute for Ecology of Industrial Areas (IETU) presented WP4 “Best practices in chemicals management in industry”:

The WP 4 provides a reality check to WP2 results by identifying and characterizing the hazardous substances used in the case installations and to WP3 activities by interviewing operators about implementation of legislation and administrative practices. The case studies are carried out in textile (4), surface treatment of metals and plastics (6) and chemical sectors (5). Review of chemical management practices, identification of best practices and opportunities for improvement at these installations complemented with sector wide reviews is a basis for deriving information on potential BAT candidates on chemicals management as well as opportunities for incorporating Circular Economy issues in BREFs revision process.

The outcome of WP4 will be a set of sectoral guidances that support the revision of BREFs as well as the industrial policies on strategic level and stimulate the improvement of permitting process and the management of chemicals at local level.

The second session of Day 1 focused on the first results of HAZBREF work in the textile industry sector. This session was introduced by the activity leader Brigitte Zietlow from UBA followed by a presentation of the

preliminary results from the German textile industry case study installations by scientific expert Harald Schönberger.

The analysis of the case installations showed, that the only available data on chemicals is often limited and insufficient. The quality of Material Safety Data Sheets (MSDS) needs to be improved to enable the operators to better implement measures for safe use and emission prevention. Based on the chemical inventory carried out in the case installations, HAZBREF proposes BAT for storage and handling of chemicals and for handling of certain waste streams.

The presentation on the progress in the textile sector was followed by a panel discussion moderated by Nils Simon from Adelphi. The panel members were:

- Benoit Zerger, European IPPC Bureau (EIPPCB)
- Céline Fanguet, Ministry for the Ecological and Solidary Transition, France
- Siv Hansson, County Administrative Board, Västra Götaland, Sweden
- Harald Schönberger, Scientific expert
- Christian Schaible, European Environmental Bureau (EEB)
- Thomas Schäfer, bluesign technologies Germany
- Zheng Luo, Lenzing AG

During the panel discussion the following points were touched upon. (A detailed summary of the panel is provided in Annex 1 of this report):

- Many BATs are already being implemented by the industry, including specific processes and chemical management. The driving forces behind the implementation are however still unclear.
- BATs should cover as many aspects as possible while at the same time avoid redundancies with the chemical regulations that already exist.
- REACH and IED are both intended to serve the same objective which is for the industry to become more sustainable and to avoid or at least minimize negative effects for humans and the environment. However, these measures do have a different focus. While REACH focuses on substances and their safe use and handling, the IED tries to achieve a high level of protection by following a more integrated approach and focusing on the measures that are within the operators reach.
- BREFs might help to specify the already existing substitution approaches, improve the automation of processes and inform about best practices regarding storage and handling of chemicals.
- Textile BREFs should also be seen as a guideline to improve the situation on a global level.
- Textile manufacturers need help to understand the different chemical regulations in order to find opportunities for chemical substitution. This is even more important as there are often no chemists left in many textile factories.
- A positive list for chemicals contains at the moment roughly 10,000 products. This amount of chemicals is sufficient for regular textile production but might not be enough for specialised processes. It is also important to think about how to address global issues as many textile products come from outside the EU and are often non-compliant with the REACH regulations.
- The diversity of the sector has always to be taken into account as the use of chemicals differs in production of textiles for fashion industry and for instance technical textiles.
- For the textile industry, chemical recycling is of high importance, both from an environmental as well as from an economic perspective. For some players in the industry chemical recycling is even essential for surviving in the market as it has multiple economic benefits, reduces the load to the waste water treatment plants and is furthermore necessary to meet the regulatory demand. Chemical recycling might

also to broaden the focus of chemicals management, since it is necessary to separate the waste and bring it back to production in order to have efficient chemical recycling processes.

- Europe has also lost many of its skilled textile chemists and the remaining plants work without these professionals. The resulting knowledge gap hinders the implementation of BATs and therefore the HAZBREF project should provide guidance on how to manage the complexity of chemicals use as well as guidance on how to use information given in MSDS.

3. Main discussions during Day 2

The second day focused on getting stakeholder input for the main HAZBREF activities. The programme, titled "Exchange of views to improve the Seville process", was opened by a presentation by Michael Suhr from UBA on the key points from the discussions on Day 1.

The rest of the day was dedicated to discussions in four break-out groups focusing on 4 different topics. The topics were introduced by the topic moderators in the plenary before going into group discussion. Michael's presentation as well as the slides from the plenary session on the outcome from the discussion group can be found on the HAZBREF webpage.

In connection to the presentation of the topics a video of the main findings in the study "IED contribution to the circular economy" was presented. The video was a greeting to the HAZBREF Conference from the Project manager Natalia Anderson from Ricardo who is carrying out the study for the DG Environment. The video can be seen here

Topic 1: What are "substances of concern" in industrial emissions?

Moderated by Nannett Aust & Johann F. Moltmann, UBA

The following questions were discussed:

- Clarification of the terms "hazardous", "substances of concern", "substances relevant for BREFs", "substances relevant for the environment"
- What should HAZBREF understand under the term "relevant target substances"? Is a focus on lists of individual substances helpful, or should the BREF process focus on functional substance groups?
- How do operators currently identify hazardous substances? Do competent authorities exhibit any control of the selection and release of substances with low biodegradability?
- Which are the expectations from the BREF TWG and/or operators towards possible support a project (such as HAZBREF) may provide with regard to substance properties data? Is there an overlap in the understanding of the terms "hazardous" and "concern" between regulators and data users?
- What is for your understanding of the original meaning of "BAT"? Does it also include measures for preventing and reducing emissions caused by chemicals that are not retained by abatement techniques? What should be the impact of applying BAT with regard to hazardous substances?
- What do the reviewers of BREFs (TWG) want to achieve with BATs on relevant chemicals? What do TWG members expect from HAZBREF?

Main points raised in the discussions:

Among participants and project partners there is a lot of confusion regarding the term "hazardous substances". On one hand, this is often associated with "poisonous substances" – which are then classified and labelled as such – and on the other hand, with substances which show other "concerns". For example, substances with a ready biodegradability are considered of low concern, even if they show some ecotoxicity in the usual tests. After all, those substances which are "not eliminated" in wastewater treatment are "relevant" for BAT. A little bit tricky to handle under IED are those substances, which are enclosed in or on the matrix of products (e.g. textiles) leaving the factory through the gate and not via the industrial the waste stream. During professional and consumer use those substances may very well end up in water and waste, but then it is more an issue of circular economy than of industrial emissions.

Topic 2: IED and other substance-related EU-legislation: Use of available data to enhance implementation

Moderated by Michael Suhr, UBA

The following questions were discussed:

- What is the role of the IED and BAT conclusions with regard to chemicals management in companies that use substances that may have adverse effects to the environment? How do you see the role of REACH, WFD and POP regulation in this context?
- Do you have ideas for a practical method how to include more systematically information on hazardous substances in BREFs from these frameworks?
- Should BAT conclusions include routinely an assessment of the occurrence and release of priority substances identified in the context of the Water Framework Directive (and of the POP-regulation)?
- Where starts and ends the responsibility of competent authorities that are in charge of controlling industrial emissions?
- A key tool for carrying out industry's own responsibility for chemicals used in their processes are safety data sheets (SDS) that should contain relevant information from the Chemical Safety Assessments and exposure scenarios. Do you have evidence whether this information is incomplete regarding biodegradability, acute/chronic toxicity including CMR or endocrine effects?
- If there are gaps in SDS, do you think this should be improved by greater dissemination and transfer of information within the supply chain only (e.g. improving transparency of and accessibility to such information), or should this be supported by permit requirements?

There was a common view among the participants that the IED and REACH have similar objectives even if the scope is different. When it comes to interaction of these two frameworks, some, especially from the industry side, were of the opinion that the implementation of the two regulations should clearly be kept separate. However, especially from the authority side it was pointed out that better interaction is needed because IED permitting authorities lack tools to get information on provisions from REACH side especially concerning the conditions for safe use of chemicals. Many companies may lack knowledge on the safe use and fate of chemicals since many Safety Data Sheets often seem to be incomplete also as far as key environmental data is concerned (biodegradability, toxicity). Transparent and complete information would help everybody.

It is evident that the Safety Data Sheets under REACH include some information on risk reduction measures and therefore it would be beneficial to consider information in the SDS in the BREF processes in order to ensure harmonisation and to avoid possible gaps or contradictions.

As BAT conclusions are the main references in setting permit requirements it would help authorities if relevant information from REACH would be included to BREFs/BATCs.

REACH is the main instrument to consider restrictions for substances, if justified and needed, but there are gaps in the implementation of measures. More effective implementation of the REACH is needed.
It was pointed out that there is a possibility to address REACH restricted substances in BREFs, but not necessarily by defining BAT-AELs. Addressing restricted substances in the BREF/BATC could, however, help a more effective implementation.

Also substitution of hazardous substances can be addressed in BREFs/BATC, as complementary to REACH risk reduction measures, but of course without overlaps or contradictions with REACH requirements. BREFs could go in more detail and indicate what measures should be applied.

In discussions on SDS many participants pointed out that these are often incomplete in many ways and should be improved under REACH. One identified problem was also that permit writers do not always have enough knowledge of REACH or lack tools to get information from companies on the risk reduction measures applied and they must thereby ask chemical safety experts if draft permits are sufficient. Sometimes SDS contains already too much information in some areas, which makes implementation of the most crucial measures difficult. Participants saw a role for HAZBREF in giving guidance in what issues are the most relevant to be specified in the SDS to serve better implementation from IED and BAT point of view.

Companies using chemicals don't have obligation to require more comprehensive SDS from the suppliers. In order to help improve the information in SDS, examples from authorities that supported companies to get the necessary information on the chemicals used were mentioned.

Industry also pointed out that for instance in textile industry there are big differences in the use of chemicals between production of e.g. technical clothes and fashion textiles. In fashion textiles other than legal requirements (ZDHC, Eco-labelling, Ökotex 100, etc.) put much stricter provisions on the use of chemicals than REACH.
Some BAT conclusions already have a chemical management plan, which was considered to be a good tool. However, the current BATs regarding this technique are quite general and the implementation varies a lot in Europe. The key features of such chemical management plan need to be specified in more detail in BAT conclusions in order to be effective.

When discussing the importance of considering priority (hazardous) substances identified under the WFD, it was quite a common view that the relevance of WFD substances should be assessed in the frontloading of each BREF preparation. The authorities see a benefit in flagging relevant WFD substances in the BREFs together also with information what would be BAT if the flagged substances are used. Also for downstream WWTPs it is important to know which substances can potentially be released from different sectors, as the substances may disturb the purification processes.

Available studies on WFD substances, such as a comprehensive French study[1], are already used by EIPPCB, when determining KEI. It was seen as important that national and other studies on the WFD substances are provided to BREF processes in frontloading.

[1] INERIS: Hazardous substances for the aquatic environment in industrial wastewater releases. National Action for Research and the Reduction of releases of Hazardous Substances into Water Bodies (RSDE) by Classified Facilities – Second Phase, June 2016

It was discussed that also substances addressed and information for measures provided in the POPs Convention/Regulation could be relevant to be more systematically and completely considered in the BREF process. If data would justify, BAT-AELs for the identified relevant substances may complement the available protocols on BEP/BAT. By such process the implementation of the requirements of the POP Regulation would be harmonised in Europe.

It was pointed out that the BREFs cannot cover an exhaustive list of substances, so also the permit writer has a responsibility to be aware of substances e.g. that have a significance on the local level, which should be covered in permitting.

Topic 3: BATs for management of hazardous chemicals.

Moderated by Janusz Krupanek, IETU

In the topic 3 sessions, the four groups were discussing the possibility to improve the management of hazardous chemicals by applying different types of BAT in IED operations. Participants had the possibility to get familiar with the background information and the steering questions in advance. Discussions in the groups were focusing on general chemical management, chemical inventory and the content and improvement of safety data sheets, whilst (due to the time limitations) questions related to integrated environmental permits were somewhat less treated.

The following questions were discussed:

- Which BATs would be the most recommendable for managing the hazardous substances: general management techniques, integrated process techniques, minimizing the use of hazardous chemicals, substitution, abatement techniques?
- Is there a need for a general BAT for chemical management and what should be the key elements? Could a requirement for e.g. a chemical inventory at the installation be included in the BAT conclusions?
- Should environmental permits specifically address the issue of hazardous substances and if yes, by which manner or means?
- Is there a need for additional procedures for assessing the environmental risks of hazardous chemicals at installations by the operators apart from current IED obligations?
- Is there a need for improving the information delivered by suppliers of chemicals in extended safety data sheets (SDS) or chemical safety reports used as basis for management decisions on hazardous substances?
- Could the information in REACH and other databases be used in the permitting process? How could it be done in practice?
- How should information on legal restrictions related to the use of specific hazardous substances or their mixtures be included in integrated permits?

It was quite much agreed that the general management of chemicals is already minimizing the use of hazardous chemicals and releases of hazardous substances and that continuous development of the managementis one of the key issues in assessing the most suitable chemicals and BAT applications. Moreover, substitution of hazardous substances and process integrated techniques and measures were prioritized over abatement techniques but it was also noted that in some circumstances, like when there is the need for effective water circulation, also abatement techniques will be needed. However, the basic principle should be to apply other measures prior to abatement to avoid mixing hazardous substances with waste water. It was also pointed out that the BAT compliant operation always uses a combination of BAT techniques and measures instead of only one technique.

One concern was that in some areas the development of processes and techniques is relatively fast making the BAT associated information given in BREF documents (and in BATC) little bit outdated before the documents will be revised. This challenges the inclusion of BATs for hazardous substances into BREFs also and argues for good criteria for BAT selection. Also, as we do not have much monitoring data on hazardous substances, setting a BAT associated limit value could be difficult if not impossible. Therefore, deriving of risk based BATs could be the better way to go.

Substitution, although highly recommended as BAT for hazardous substances, can be difficult to formulate to a BAT conclusion as such. It obviously needs the comprehensive background information to be introduced together with the requirement. Lifetime of BAT conclusions is relatively long and we cannot challenge it by naming substitutes for hazardous substances which are used in the sector. That is actually one of the key questions the HAZBREF project is trying to answer.

The role and intended use of chemical inventory as a tool for better chemical management and one possible BAT as well as the role of SDS as a source of information were highlighted. It was very clearly stated that chemical inventory as already obligatory measure is a key player here but the criteria for chemical inventory BAT should be further defended and developed as we do not have much experience yet. Question is, how we extend chemical inventory to usable data base which can better be used for different aspects, also those related to hazardous substances. There was quite common understanding on the need for improving the information content of the safety data sheets so that they could be better used as information sources but the way to do that still remained open.

To conclude, the discussing groups very much agreed that there is a clear need to apply new BATs to better manage hazardous chemicals in industrial processes and to minimize the releases of hazardous substances. General chemical management, substitution and process integrated measures were seen as effective ways to proceed. Improvement of chemical inventories and safety data sheets was thought to be a good starting point to fulfill the information needs and the inventory BATs were not objected once the criteria for the level of BAT is clearly defined. However, also obstacles and limitations can be seen in introducing new BATs in the BREF process and the HAZBREF project is expected to find at least partial solution for that.

Topic 4: IED and Circular Economy

Moderated by Helena Dahlbo, SYKE

These questions were discussed:

- Does the current scope of IED and BREF guidance enable the inclusion of CE aspects into BREFs? Do you have concrete examples where it enables/does not enable this?
- How should the scope of IED be extended for the purpose of better inclusion of CE aspects? What benefits/problems could this generate?
- How can connecting installations from different sectors (e.g., IED/non-IED) be promoted? How to improve/ensure the transfer of data and information in the value chain between the installations (to enable the use of secondary raw materials/industrial symbiosis)?
- Do you have experience of CE issues in IED permitting process in your country? Have you any good examples of CE applied to IED installations (by-products, use of secondary raw material etc.)?

Main points raised in the discussions

This session discussed the needs of additional elements and possibilities to include circular economy aspects into the BREF process and BAT conclusions for further promoting circularity of non-toxic materials.

Currently, a project launched by the Commission ("IED contribution to CE") is about to be finalized by Ricardo Energy & Environment consultants. The project aims at providing an understanding of the contribution of the IED to meeting EU objectives on CE. The 17 new BAT conclusions were analysed and the conclusion from the project is that IED might not be the best instrument to promote CE. However there is potential for greater contribution in terms of waste generation, recycling rates and contribution of recycled materials in raw material demand and chances for new innovations. This report is being finalized and will be published later this year in CIRCABC (European Commission > Environment > IED > Studies).

The recently published Make it Work and IMPEL guidance "Making the Circular Economy work" has also identified already existing elements in the IED and in the BREF process that can be used to promote CE. In the discussions it became clear that these tools are not utilized in systematic manner or not at all. Defining waste, by-product and end-of-waste products requires more clarity nationally and in the EU. Many installations are not allowed to accept any waste and this limits their possibility to use secondary raw materials. On the other hand there was one example of promoting the use of secondary raw materials in setting less strict BAT AELs for installation producing glass from recycled materials.

The waste hierarchy is generally binding and also mentioned in many BREFs. However there is the possibility to deviate from this if this is not economically and technically feasible. But, how this feasibility is defined is a very subjective matter. One idea was that could BREFs give good examples on how to utilize by-products and secondary raw materials. Another suggestion from the group was that maybe the Waste Treatment BREF could give some quality criteria for the secondary raw materials produced.

One mean to support non-toxic material flows through BREFs would be the BAT for chemical inventory. The information of the chemical content of the products should be transferred throughout the whole supply-chain all the way from the production of raw materials until the waste treatment phase of the post-consumer product.

Conclusions from the groups were that BREFs and integrated permits should not hinder CE development. But there are also barriers in circular material flows that are not dependent on BREFs. For example, one fundamental question is: is there enough demand in the market for the secondary raw materials? Sometimes the product legislation limits the use of waste derived raw materials. Obstacles for recycling materials are not always caused by hazardous substances but sometimes the material itself is not suitable for recycling, for example textiles consisting of many different fibres.

There are already good examples on industrial installations contributing to the non-toxic circular material flows. They are, however, few and there is the pressure to make big changes in the whole economic system. Therefore now it might be too early to include any additional circular economy aspects to the BREFs. Circular economy is an overarching issue that requires IED, REACH, Waste directive and product legislation are better aligned and implemented in the whole EU and in the end, in the whole World.

4. Next steps in the HAZBREF Project

The Project manager Kaj Forsius wrapped up the seminar by presenting the foreseen next step in the project.

The first outputs form the work on the textile sector concerning BAT candidates will be made available for commenting to the HAZBREF stakeholders by the end of June 2019. By the same time these documents will be fed into the TXT BREF process and uploaded to BATIS for the consideration of TXT TWG and the EIPPCB.

The draft comprehensive HAZBREF sector guidance will be ready for commenting by the end of September, including also consideration of relevant hazardous substance (groups) in this sector and recommendations for good environmental permits. The aim is to have this sector guidance finalised by the end of November.

Also work on the two other HAZBREF case sectors (chemicals industry and surface treatment of metals and plastics) is ongoing. The plan is to have draft sector guidance reports ready for commenting in the autumn. Workshops for these sectors are under planning.

The HAZBREF project will end in September 2020 and the final results will be presented at the final HAZBREF Stakeholder conference. The place and timing of the conference is not yet decided, but it will probably take place in early summer 2020 somewhere in Germany.

More information will be made available at the HAZBREF webpage: www.syke.fi/projects/hazbref

Annex 1. Panel Discussion

Date: **21.05.2019, Tallinn, Estonia**
Project: **Hazardous Industrial Chemicals in the IED BREFS (HAZBREF)**
Background: **Tallinn Conference**
Moderator: **Nils Simon, Adelphi**
Rapporteur: **Brigitte Zietlow, UBA Germany; Julian Ahlers, Adelphi**

Panellists

Benoit Zerger, European IPPC Bureau (EIPPCB)
Benoit Zerger holds a Master of Science in Engineering. He works at the European IPPC Bureau which is in charge of drafting the BREFs. European IPPC Bureau is part of the Joint Research Centre of the European Commission.. Benoit has been part of the IPPC team since 2015 and has contributed to the elaboration of various BREFs, including the BREF on Waste Treatment. He is also one of the two authors of the BREF document for the Textiles Industry which is currently under review. Benoit is a member of the clearing house of the Task Force on Techno-Economic Issues (TFTEI), in the framework of the Convention on Long Range Transboundary Air Pollution.

Céline Fanguet, Ministry for the Ecological and Solidary Transition, France
Céline Fanguet graduated in chemical engineering after which she specialized in environmental management. She started her career in 2005 as an inspector of classified installations for environmental protection in the north of France, after which she switched to the French Ministry of the Environment where she worked as a policy officer on REACH and POPs regulations for four years. After a few years working for the French nuclear safety authority, Céline returned to the French Ministry of the Environment in 2016 to work as coordinator for the BREFs in the unit in charge of the IED implementation. In her work she is involved in the review processes of all BREFs and also in the national implementation actions of BAT conclusions, which are conducted in cooperation with the sectorial ministry units. She is furthermore personally responsible for the Textile BREF in the ministry.

Siv Hansson, County Administrative Board, Västra Götaland, Sweden
Siv Hansson works for the Västra Götaland County Administrative Board (CAB) which is the regional permitting authority in Sweden responsible for licensing of permits and inspection of environmentally hazardous activities amongst others. In her position she has been working with the textile industry as an inspector for over 30 years. Siv is also supervising the textile company that takes part in the case study for Sweden. She is also the Swedish expert in the Technical Working Group for the Textile BREF.

Harald Schönberger, Scientific expert
Harald Schönberger is a senior researcher working on chemicals and sustainability in the textile sector with a doctorate in chemistry. For more than 15 years, he was responsible for the permission and implementation procedures for industrial emissions installations in Freiburg in Germany. Harald worked on building up the EIPPC Bureau in Seville, and has drafted the first Textile BREF in the early 2000s. During his work Harald gathered a lot of experience regarding the Sevilla process and chemicals management in the textile sector.

Christian Schaible, European Environmental Bureau (EEB)
Christian Schaible is a Policy Manager for Industrial Production at the European Environmental Bureau. He is in charge of activities on industrial production, in particular the review of the environmental performance industry benchmarks. Christian holds a master's degree in international law with a focus on environmental law.

Thomas Schäfer, bluesign technologies germany

Since 2008 Thomas Schäfer is the managing director of bluesign technologies germany gmbh, and part of bluesign technologies' leadership. As the head of the academy – the think tank of bluesign – his responsibilities comprise generating and disseminating knowledge on the current trends and changes in textile production with focus on consumer safety relevant topics and environmental implications of chemicals management in textile production. Based on this research, his academic background of textile chemistry as well as market know-how, Thomas Schäfer regularly revises the various criteria of the bluesign system and consults brands, textile manufacturers, chemical suppliers and institutions.

Zheng Luo, Lenzing AG
Zheng Luo holds a Master of Science in Environmental Management and is Global Environment Manager at the Lenzing Group. Before her work at Lenzing she worked, among others, as Recycling Manager for European Aluminium. Lenzing is a globally connected Austrian chemical company that produces wood-based fibres and other fibre products. Lenzing has around 6,500 employees and an annual turnover of almost 2.3 billion Euros.

Summary of the discussion
With regard to her opinion and experience on the state of implementation of BATs in the textile industry and new practices that could possibly be seen as best available techniques, Céline Fanguet noted that many BATs are already being implemented, including specific processes and chemical management. In her view, it would be interesting to know what the driving forces for the implementation of BATs are and what role the progress of chemical regulation plays in this context. She pointed out that this moment it is still not clear which role the BATs play with regard to improved chemical management in the textile sector. During the discussion it was furthermore highlighted by Ms Fanguet that the BATs should cover as many aspects as possible while at the same time avoid redundancies with the chemical regulations that already exist. Furthermore, it was mentioned that there might be limits to the BAT conclusions as some companies that work on behalf of third parties do not have full control of the raw material they use for their processes.

When asked about his opinion on the importance of BATs with regard to the implementation of REACH and overlaps, synergies or possibilities for mutual support Mr Schaible, EEB stated that there are without doubt noticeable overlaps between REACH and IED as both are intended to serve the same objective which is for the industry to become more sustainable and to avoid or at least minimize negative effects for humans and the environment. However, he also pointed out that both measures do have a different focus. While REACH focuses on substances and their safe use and handling, the IED follows a more integrated approach, trying to achieve a high level of protection while focusing on the measures that are within the operators limit. It was further noted by Mr Schaible that BREFs might help to specify the already existing substitution approaches, improve the automation of processes and inform about best practices regarding storage and handling of chemicals. As stakeholders from all around the globe have free access to the EU BREFs and can therefore receive information about the state of the art practices available to the sector, there is also a synergetic potential between the European BREFs and the textile industry on a global level, especially since many of the brands already use the BREFs as a source of information/reference today. This point was again underlined later in the discussion, when it was mentioned that many production sites e.g. in Asia operate under less stringent environmental requirement and BREFs should therefore be used as a guideline to improve the situation on a global level.

Regarding his opinion on the textile industries potential to substitute hazardous chemicals with benign substances Mr Schäfer, bluesign stated that it is important to look at the different players in the textile supply chain. While the brands have for a long time not been concerned which chemical management at all and only started to think about it in the recent years, the chemical suppliers are mostly concerned with how to procure the raw materials

for their products (e.g. dyestuff). Textile manufacturers therefore need help to understand the different chemical regulations in order to find opportunities for chemical substitution. This is even more important as there are often no chemists left in many textile factories. When asked by Mr Schönberger how big their share of products on the positive list is, Mr Schäfer replied that at the moment there are around 12000 textile auxiliaries and dyes on the bluesign® FINDER, a positive list of preferred chemicals, which is sufficient for the regular textile production but might not be enough for specialised processes. He added that simple MRSL thinking in the form of banning substances is often not enough as most substance occur as impurities and not as active substances. Therefore the performance of the mextures (bioelimination, aquatic toxicity, AOX, VOC content) has to be considered and that preferred chemicals are produced from chemical suppliers which have the Responsible Care thinking and a Clean Factory approach. In general it was stressed that the diversity of the sector has always to be taken into account as the use of chemicals differs in production of textiles for fashion industry and for instance technical textiles. Furthermore, it was underlined by Mr Schäfer that there are still many "low hanging fruits" in the context of chemical management in the textile industry. In his opinion the industry therefore should focus on "eating" these first instead of creating new guidelines and checklists.

Mr Schaible agreed that having a positive list is a good starting point; he however added that it is also important to think about how to address the global issues as many textile products come from outside the EU and are often non-compliant with the REACH regulations.

Responding to the question of how relevant chemical recycling and regional supply of chemicals are for the chemical industry Ms Luo, Lenzing, explained that for Lenzing chemical recycling is of high importance, both from an environmental as well as an economic perspective. As a result Lenzing tries reusing chemicals wherever possible. She noted that for some players in the industry chemical recycling is even essential for surviving in the market as it has multiple economic benefits, reduces the load to the Waste Water Treatment Plants and is furthermore necessary to meet the regulatory demand. Mr Schaible added that chemical recycling might also broaden the focus of chemicals management, since it is necessary to separate the waste and bring it back to production in order to have efficient chemical recycling processes. It therefore forces companies to look at their entire supply chain instead of only focusing on their own processes.

With regard to the progress which has been achieved in the textile sector since the publication of the last textile BREFs Mr Schönberger stated that the situation of the textile industry has changed a lot as Europe has lost even more of its textile production capacities and nowadays about 90% of the textile we consume is imported from Asia or Turkey. He added that together with the loss of the industry Europe has also lost many of its skilled textile chemists and the remaining factories work without these professionals. The resulting knowledge gap hinders the implementation of BATs and therefore HAZBREF should provide guidance on how to manage the complexity of chemicals use, including guidance on how to use information given in MSDS. Another big challenge for the textile industry in Europe relates to the low availability of "clean chemistry". However, as the majority of the chemicals used by the textile industry are very cheap, there are almost no incentives to improve them as they cannot be sold for a higher price afterwards. In his opinion the only major improvement in the recent years was the ZDHC Foundation (Zero Discharge of Hazardous Chemicals) which was triggered by the Greenpeace DETOX initiative, showing the importance of brands, retailers and NGOs as innovation drivers in textile industry.

When being asked about her opinion on the usefulness of textile BATs in general and with regards to chemicals management Ms Hansen, Swedish Competent Authority, replied that from her point of view the 2003 BREFs did not result in major improvements in the Swedish industry. She stated that this is mainly based on the fact that Sweden had already started to substitute hazardous chemicals in the 1970s. She also added that toxicity levels in Sweden are not measured as fish toxicity as the wastewater from the textile factories are usually treated in the

municipal wastewater treatment plants and therefore it is more relevant to measure micro-toxicity, inhibition of activated sludge or inhibition of nitrification. During the later discussion it was suggested that besides substitution of a number of chemicals BREFs should also focus on biodegradability/elimination together with (fish) toxicity.

With regard to the progress of chemical related BATs since 2004 Mr Zerger, EIPPCB, highlighted the significant changes in the regulation of industrial emissions and chemicals as well as the development of new technologies. In his opinion a revision of the textile BREFs is therefore required. He expressed his hopes that there will be a stronger focus on Emission Limit Values ELVs and consumption levels in the new BREF versions. Mr Zerger also noted that BREFs are possibly limited in the sense that they can not necessarily address products.

Regarding the role of the BREFs for the promotion of a circular economy it was mentioned that the current scope of the BREFs is on a gate to gate lifecycle basis whereas Circular Economy requires supply chain thinking. Nevertheless, the BREFs should include techniques which enable the recyclability in different stages of the supply chain. Furthermore, information on chemicals used should be made available through the entire supply chain as knowledge and data are key for moving towards a circular economy.

It was further pointed that HAZBREF was not to be implemented as an additional regulatory approach but intended to enrich the Sevilla process with regard to the use of hazardous substances and feed into BREF reviews of some selected sectors. HAZBREF also provides proposals for the coordination of existing regulations as well as suggestions for a more efficient implementation of regulations.