Revised
Best Available Techniques (BAT) Reference Document for the
Refining of Mineral Oil and Gas (REF BREF)

Final draft for the opinion of the IED Article 13 forum

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Outline of the presentation

- Scope of the REF BREF / Activities not addressed
- Overview of the review process, data, site visits
- Main changes in the revised REF BREF
- Main challenges in the review of the REF BREF
- Data collection and transparency
- Proposal for BAT in D2, complementary data
- Structure of the revised REF BREF / BAT conclusions
- Comments received from IED forum members
- Items for clarification
- Key points proposed for discussion
Scope of the REF BREF

- Industrial activities concerned with (specified in Annex I to Directive 2010/75/EU):
  - Energy industries 1.2. Refining of mineral oil and gas

- The REF BREF covers the typical refining activities and processes e.g. alkylation, catalytic cracking, combustion, sulphur recovery unit

- It also includes the combustion of refinery fuels, the integrated refinery management, and the waste gas and waste water treatments
Activities not addressed by the REF BREF

The REF BREF does NOT cover:

- The exploration and production of crude oil and natural gas
- The transportation of crude oil and natural gas
- The marketing and distribution of products

In addition, the combustion of commercial fuels alone is NOT covered by the REF BREF but rather by the LCP BREF
# Overview of the review process 1/2

<table>
<thead>
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<th>Main steps</th>
<th>Date</th>
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<tr>
<td>TWG reactivation</td>
<td>January 2008</td>
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<td>Call for wishes</td>
<td>March 2008</td>
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<td>Kick-off meeting</td>
<td>September 2008</td>
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<td>TWG subgroup questionnaire design</td>
<td>End of 2008</td>
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<td>Collection of information</td>
<td>April 2009- January 2010</td>
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<td>1st TWG subgroup meeting on the 'bubble approach'</td>
<td>May 2010</td>
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<td>Draft 1</td>
<td>July 2010</td>
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*Change of author*
### Overview of the review process 2/2

<table>
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<th>Main steps</th>
<th>Date</th>
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<tbody>
<tr>
<td>Commenting period (1486 comments received)</td>
<td>November 2010</td>
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<td>2nd TWG subgroup meeting on the 'bubble approach'</td>
<td>April 2011</td>
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<td>Draft 2</td>
<td>March 2012</td>
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<td>Commenting period (1249 comments received)</td>
<td>May 2012</td>
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<td>Final TWG meeting</td>
<td>11-15 March 2013</td>
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<td>Revised draft after final TWG meeting</td>
<td>May 2013</td>
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<tr>
<td>Final draft for the opinion of the IED Article13 forum</td>
<td>July 2013</td>
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Data collection

Data received: 62 filled-in site questionnaires
(2008 yearly average values) from 16 countries of the EU+

Number of refineries and filled-in questionnaires received per country

- Number of refineries (2010)
- Number of questionnaires (2008)
19 refinery site visits carried out in 9 countries (BE, DE, ES, FR, NO, PT, RO, SE, UK) from March 2009 to September 2011

- Mainly oil refineries, and some gas refineries
- Various sizes, configurations and complexity levels
Main changes in the revised REF BREF

- General update of the document, more details on the processes and fuller descriptions of the techniques

- Data on emissions from refinery sites questionnaires and presented in numerous tables and graphs in the REF BREF

- BAT conclusions (Chapter 5) according to IED

- Detailed monitoring (technique, frequency) for emissions to air and water in the BAT conclusions

- Description of the BAT in a dedicated glossary
Main challenges in the review of the REF BREF

- 2003 REF BREF contains a number of split views (27)
- BREF review started under the IPPC Directive (2008)
- IED adopted after the release of D1
- IED taken into account in D2 (BAT conclusions)
- Additional detailed emissions data were gathered and shared during D2 commenting period
Experience from the BREF reviews (4/9)

**REF**
- Data collection started **before** the entry into force of the Guidance
- TWG subgroup created at the KOM to agree on questionnaire template
- Questionnaire template agreed by the TWG at the end of 2008 with the following caveat:
  "The information submitted will only be used for the purpose of the review of the REF BREF. The submitted data will only be dealt with by European IPPC Bureau personnel, and will not be reproduced in the BREF in a way allowing the site identification unless the EIPPCB has been duly authorised to do so.';
  As a consequence, the filled-in questionnaires received by the EIPPCB were not uploaded on BATIS
- Data collection exercise carried out in 2009
- Data on emissions and consumptions linked to techniques provided in the BREF in tables and figures showing the relevant contextual information and anonymous site labels
Data collection and transparency 2/3

> TWG KOM and subgroup (2008) : questionnaire based on YEARLY data (emissions, energy, productions,...)

> Questionnaires treated as confidential: energy consumption were considered sensitive by operators

Annual loads (t/yr) are reported for some units: FCC, coker, boilers and furnaces

Extract from questionnaire # 1
Data collection and transparency 3/3

Data extracted from site questionnaires and reported in the BREF under numerous tables and graphs.

Example of graph
PM emissions from FCC
Yearly average concentration (mg/Nm³)

Figure 3.27: PM yearly average concentration from a sample of 20 European FCC units
Proposal for BAT conclusions in D2

- YEARLY data from EU refinery questionnaires
- General information (performances from equipment providers, examples from EU and non EU sites) + complementary information (e.g. TWG general contributions)

Proposal for BAT-AELs on emissions to air for daily averaging period

+ Asked TWG to complement the 2008 data collection(*) and support the proposal

(*) Consultation on the second draft of the revised REF BREF, 9 March 2012.
Deadline for comments 23 May 2012
Complementary data after D2

- Additional data-sets during D2 commenting or after
- Day-to-day variations for sites using various techniques
Use of the combined data-sets

- Data from questionnaires (ref. year: 2008, yearly values)
- Additional data-sets received after D2 (ref. years: 2011-2012, daily values)

The two types of data-sets from refineries using the candidate techniques were considered together to draft the Background Paper and prepare the final TWG discussions.
Structure of the revised REF BREF

- Preface
- Scope
- Chapter 1 – General information
- Chapter 2 – Applied processes and techniques
- Chapter 3 – Current emission and consumption levels
- Chapter 4 – Techniques to consider in the determination of BAT
- Chapter 5 – BAT conclusions
- Chapter 6 – Emerging techniques
- Chapter 7 – Concluding remarks and recommendations for future work
- References
- Glossary
- Annexes
56 BAT conclusions

13 BAT conclusions with at least one BAT-AEL, e.g.:
- BAT on emissions to water
- BAT on emissions to air from FCC, coking, combustion processes, etc.
- BAT on vapour recovery units

One BAT conclusion with an associated environmental performance level (BAT-AEPL)

Detailed BAT for the monitoring of emissions to air and to water
Degree of consensus and split views

Chapter 7 of the REF BREF

- A high degree of consensus was reached on the BAT conclusions

- Nevertheless, after careful assessment, 7 split views were accepted and registered in Table 7.2 of Chapter 7
A total number of 163 comments:

- **112** comments from **17** Member States: (AT, BE, CZ, DE, DK, EL, ES, FI, FR, HR, IT, NL, PL, PT, SE, SK, UK)

- **17** comments received from industry (EUROPIA/CONCAWE)

- **34** comments from environmental NGOs (EEB)

and in addition, 6 comments from NO (observer)
Comments received on the final draft 2/2

- **10** comments considered consensual (typo, factual correction,...)
- **12** comments considered consensual with amendments (e.g. clarifications on monitoring)
- **141** comments considered non-consensual, and representing the views of certain members (e.g. issues agreed at the final meeting, split views repetitions or reopening debates)
- Among these, **19** comments are linked to the 'bubble approach' and subject to a specific item discussion
Items for clarification

- BAT 29 on coking: Replace 'final venting' by 'venting prior to the drum being opened to atmosphere' for clarification
- BAT 35: the 2 footnotes were unintentionally removed
- BAT 36 on RFG gas firing: Modify to 'an H/C molar ratio above 5'
Key points proposed for discussion – Topic #1 1/2

**BAT4 on the monitoring of emissions to air**

- Footnote (4): 'Only SO$_2$ is continuously measured, SO$_3$ is only periodically measured…'

- *Apply this monitoring rule to SO$_x$ only (EEB)*

- Footnote 6: 'refers to the capacity connected to the stack where emissions occurs applies for plants 50-100 MW only

- *Apply this monitoring rule to all combustion units (PL,SE,UK)*
Key points proposed for discussion – Topic #1 2/2

BAT4 on the monitoring of emissions to air

➤ Footnote 8: 'With the exception of combustion units firing only refinery fuel gas'

➤ Clarification: Reference to RFG firing was intended to cover also mixture of RFG and natural gas.

➤ Propose to modify text to: 'With the exception of combustion units firing only gaseous fuels'
Key points proposed for discussion – Topic #2

General consideration of the economic viability

CONCAWE, ES, HR, PL consider that applicability restrictions should include economic considerations especially for existing units.

CONCAWE acknowledges that economic viability should not be part of the formulation of applicability constraints for BAT, but considers the decision to remove all the elements used to assess the applicability of the corresponding BAT was not justified.