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REVIEW OF THE BEST AVAILABLE TECHNIQUES (BAT) REFERENCE DOCUMENT FOR WASTE INCINERATION (WI BREF)

Updated assessment of split view rationales

Edificio Expo, C/ Inca Garcilaso, s/n, E-41092 Sevilla, - Spain
Telephone: +34 954 488 284. Fax: +34 954 488 426.
E.mail : jrc-ipts-eippcb@ec.europa.eu, Internet : http://eippcb.jrc.ec.europa.eu

Edificio Expo, C/ Inca Garcilaso, s/n, E-41092 Sevilla, - Spain
Telephone: +34 954 488 284. Fax: +34 954 488 426.
E.mail : jrc-ipts-eippcb@ec.europa.eu, Internet : http://eippcb.jrc.ec.europa.eu

1 INTRODUCTION

1.1 General aspects

According to Commission Implementing Decision 2012/119/EU (Section 4.6.2.3, page 27), the following provisions apply to dissenting views expressed at final TWG meetings:

4.6.2.3 Final TWG meeting

4.6.2.3.1 General

The final TWG meeting aims at resolving outstanding issues with a view to conclude the technical discussions within the TWG.

In the final TWG meeting, the objective is to reach conclusions by consensus of the TWG members present. When there are well founded dissenting views, these will be recorded as indicated in Section 4.6.2.3.2 below.

4.6.2.3.2 Split views

BAT as well as environmental performance levels (see Section 3.3) associated with BAT will be drafted by the EIPPCB on the basis of information available at the time of distributing the draft to the TWG for its final meeting (see Section 4.6.2.3). Such information may include any specific proposals for BAT or associated environmental performance levels received from the TWG.

TWG members are expected to provide sound technical, cross-media and economic arguments as relevant to their case when they do not agree with the draft BAT conclusions. Such arguments should be submitted initially as comments to the formal draft BREF within the consultation period set (see Section 1.2.4).

If the TWG in the end reaches no consensus on an issue, the dissenting views and their rationale will be reported in the "Concluding remarks and recommendations for future work" section of the BREF only if both the following conditions are fulfilled:

1. the dissenting view is based on information already made available to the EIPPCB at the time of drafting the conclusions on BAT for the BREF or has been provided within the commenting period corresponding to such a draft;

2. a valid rationale supporting the split view is provided by the TWG member(s) concerned. The EIPPCB will consider a rationale to be valid if it is supported by appropriate technical, cross-media or economic data or information relevant to the definition of BAT.

The Member States, environmental NGOs or industry associations that bring or support the split view will be explicitly named in the document (see Section 2.3.10).

This document lists the split views submitted in the context of the final TWG meeting for the review of the WI BREF, which took place in the week from 23 to 27 April 2018, and assesses for each split view whether both of the conditions 1 and 2 listed above are met. The chapter on "Concluding remarks and recommendations for future work" of the revised WI BREF

shall reflect the dissenting views which are shown by the present assessment to meet such conditions.

However, a positive assessment of those conditions and the reporting of a dissenting view in the BREF are not to be interpreted as an agreement of the EIPPCB with the arguments supporting that split view, or as an indication that the related BAT conclusion as agreed at the final TWG meeting may be subject to changes.

For the purposes of this document, the following acronyms are used.

Acronym	Definition
BP	Background paper for the final meeting of the Technical Working Group (TWG) for the review of the WI BREF, released on 23 February 2018
D1	First draft of the revised WI BREF, published on 24 May 2017
FGC	Flue-gas cleaning
FM	Final WI TWG meeting
HW	Hazardous waste
HWI	Hazardous waste incinerator/incineration
IED	Industrial Emissions Directive (2010/75/EU)
KEI	Key environmental issue of the WI BREF review
KoM	Kick-off meeting
LoQ	Limit of quantification
MSW	Municipal solid waste
ONHW	Other non-hazardous waste
ROM	JRC Reference Report on monitoring of emissions to air and water from IED installations
SCR	Selective catalytic reduction
SNCR	Selective non-catalytic reduction
TWG	Technical Working Group for the review of the WI BREF
WI	Waste incineration
WtE	Waste to energy
WWTP	Waste water treatment plant

1.2 Overview of split views expressed at the final TWG meeting for the review of the WI BREF and confirmed afterwards

During the final TWG meeting for the review of the WI BREF held from 23 to 27 April 2018 in Seville, a high degree of consensus was achieved within the TWG. Nevertheless, 20 dissenting views were recorded in the meeting and confirmed afterwards, which are listed in the following table.

Number of the split view submitted	Consolidated WI final meeting conclusions' slide number(s)	Topic	BAT conclusion / Section / Table number	TWG member(s) raising the split view(s) and those supporting it	Section number in this document
1	35	Gross electrical efficiency formula	General considerations	AT, EEB	2.1
2	54	Monitoring frequency for metals and metalloids except Hg	BAT 5	DE	3.1
3	55	Monitoring of Hg by continuous measurement	BAT 5	EEB	3.2
4	56, 57	Monitoring of PCDD/F by long-term sampling	BAT 5	DE	0
5	56, 57	Monitoring of PCDD/F by long-term sampling	BAT 5	BE	0
6	84	Monitoring of POPs in incoming non-hazardous waste	BAT 12	SE, EEB	4.1
7	111	BAT-AEELs for the incineration of hazardous waste other than hazardous wood waste	Table 5.1	Cefic, Eurits, FEAD, HWE	5.1 –
8	127, 133, 140, 149, 150,	Measurement uncertainty for channelled emissions to air	Table 5.2, Table 5.4, Table 5.5, Table 5.6, Table 5.7	CEWEP, ESWET, FEAD, Euroheat & Power	6.1
9	127	Restrict the applicability of the higher dust BAT-AEL where a bag filter is not applicable	Table 5.2	AT	6.2
10	137	Applicability of selective non-catalytic reduction (SNCR) and of selective catalytic reduction (SCR)	BAT 29	DK, FI, Eurits, FEAD, HWE	6.3
11	140	Decrease the higher end of the BAT-AEL range for channelled NO_X emissions to air	Table 5.5	BE, NL, SE, EEB	6.4.1

12	140	Restrict the applicability of the higher NO_X BAT-AEL where SCR is not applicable	Table 5.5	AT	6.4.2
13	140	Extend the applicability of the higher NO_X BAT-AEL where SCR is not applicable	Table 5.5	FI, Cefic, Eurits, FEAD, HWE	6.4.3
14	140	Do not set BAT-AELs for channelled NO_X emissions to air for older small plants	Table 5.5	DK	6.4.4
15	140	Decrease the lower and upper end of the BAT-AEL range for NH_3 emissions to air	Table 5.5	AT, EEB	6.4.5
16	149	Decrease the lower end of the BAT-AEL range for TVOC emissions to air	Table 5.6	EEB	6.5.1
17	150	Decrease the BAT-AELs for PCDD/F and PCDD/F + dioxin-like PCBs emissions to air	Table 5.6	AT, BE, NL, EEB	6.5.2
18	160, 161	Half-hourly and yearly BAT-AELs for Hg emissions to air	Table 5.7	EEB	6.6
19	175, 176,	Increase the BAT-AEL for As, Cd Cr, Cu, Ni, Pb, Sb, Tl, Zn emissions to water	Table 5.8	CEWEP, ESWET, FEAD, Eurits, HWE, Euroheat & Power	7.1
20	175	Decrease the BAT-AEL for Cd, Hg, Ni and Sb emissions to water	Table 5.8	EEB, AT	7.2
21	182	Separate treatment of fly ashes and bottom ashes	BAT 35	EEB	8.1

For each of the split views, the detailed rationales provided by the TWG member(s) concerned are summarised in the following pages together with the EIPPCB's assessment and an indication of whether/how the split views could be formulated in the BREF. The contents of individual split views on the same topic may differ from one to another. In this document, some split views are grouped together when the proposals and the rationales are similar.

1.3 Split views expressed after the final TWG meeting for the review of the WI BREF

Additional split views (see table below) were submitted by TWG members after the final TWG meeting without having been raised during the meeting. These positions are not presented or assessed in this document given that the last paragraph of Section 4.6.2.3.1 of Commission Implementing Decision 2012/119/EU (under "*4.6.2.3 Final TWG meeting*") stipulates that:

*"**In the final TWG meeting**, the objective is to reach conclusions by consensus of the TWG members present. When there are well founded dissenting views, these will be recorded as indicated in Section 4.6.2.3.2 below."*

Additional split view number	Consolidated WI final meeting conclusions' slide number(s)	Topic	BAT conclusion / Section / Table number	TWG member(s) raising the split view(s)
1	NA	BAT-AELs in Normal Operating Conditions	General considerations	CEWEP, ESWET, FEAD, Euroheat & Power
2	NA	Moving the sentence on measurement uncertainty from Chapter 7 to Chapter 5 of the BREF	General considerations, BAT 5	CEWEP, ESWET, FEAD, Euroheat & Power
3	NA	Meaning of "generally applicable"	General considerations	CEWEP, ESWET, FEAD, Euroheat & Power
4	140	Increase the higher end of the BAT-AEL range for NO_X in footnote ([2])	BAT 29, Table 5.5	Cefic, Eurits, HWE
5	150	Operating conditions of the PCDD/F and of the PCDD/F + dioxin-like PCBs	BAT 30, Table 5.6	CEWEP, ESWET, FEAD, Euroheat & Power
6	174 and 178	Lower end of the BAT-AEL ranges for emission to water not applicable in the case of high chloride concentration	BAT 34, Table 5.8, Table 5.9	CEWEP, ESWET, FEAD, Euroheat & Power

1.4 Split views expressed during the final TWG meeting for the review of the WI BREF but not confirmed after the meeting

Five dissenting views were expressed during the final TWG meeting that were not confirmed by sending documentation to the EIPPCB after the meeting. These split views are considered as not having been submitted and are not presented or assessed in this document.

Un-confirmed split view number	Consolidated WI final meeting conclusions' slide number(s)	Topic	BAT conclusion/ Table number	TWG member(s) raising the split view(s) and those supporting it
1	23	Absence of definition for gross electrical efficiency	Definitions	AT, SE, EEB
2	30	Definition of the daily average for continuous measurements	General considerations	BE, DK
3	163	BAT statement	BAT 33	DE
4	174	BAT-AELs for TSS emissions to water	Table 5.8	NL
5	177	BAT-AELs for PCDD/F emissions to water	Table 5.8	AT

2 GENERAL CONSIDERATIONS

2.1 Gross electrical efficiency formula (AT, EEB)

Conclusion of the meeting
Slide 35

$$\eta_e = \frac{W_e}{Q_{th}} \quad x\ (Q_b/(Q_b-Q_i))$$

Split view summary

- AT and EEB propose to delete (Qb/(Qb-Qi)) from the formula.

The split view is accompanied by the following rationale

- The term "gross electrical efficiency" is defined in the literature and it is the ratio between the gross electrical output of an installation and its thermal input.
- The additional factor "Qb/(Qb-Qi)" leads to higher efficiency values if the internal consumption Qi rises. Thus, installations with high internal energy consumption are "rewarded" with a higher electrical efficiency than installations with low own consumption.
- The word "gross" (in "gross electrical efficiency") is generally linked to a total value, not to a net value where certain parts of the total are excluded.
- The correction factor was not mentioned in the Background Paper nor proposed in the draft BAT Conclusions of the European Commission.

Information on which the split view is based

- Directive 2012/27/EU on energy efficiency.
- European Commission - Draft BAT Conclusions for WI, 23.2.2018.
- European Commission - Background paper for BREF WI FM, 23.2.2018.
- European Commission - Presentations for BREF WI FM 2nd Day, 24.3.18.
- Background Paper BREF WI Energy Efficiency, Germany's contribution, 7.9.2017 => Definition of "Gross Electric Efficiency" (page 8), based on Guideline VDI 4661 Energetic characteristics - Fundamentals - Methodology (Richtlinie VDI 4661: Energiekenngrößen - Definitionen - Begriffe - Methodik). Verein Deutscher Ingenieure VDI (Editor), Beuth-Verlag, Berlin, 2003.

EIPPCB assessment
The documents and information referred to in the split view were available, with the exception of VDI 4661.

Validity of the supporting rationale:

- The draft BAT conclusions were amended during the final meeting in accordance with the conclusions agreed by the TWG.
- Directive 2012/27/EU does not define the gross electrical efficiency. It contains a definition of energy efficiency that could be consistent with both definitions, the one agreed at the FM and the one proposed by AT and EEB, to express the gross electrical efficiency.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of the aforementioned TWG members fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
General considerations	Delete the factor (Qb/(Qb-Qi)) from the formula to represent the gross electrical efficiency	*AT, EEB*	*NA*

3 MONITORING

3.1 Monitoring frequency for metals and metalloids except Hg (DE)

Conclusion of the meeting

Slide 54 on monitoring of channelled emissions to air (BAT 5):

Substance/Parameter	Process	Standard(s)	Minimum monitoring frequency	Monitoring associated with
Metals and metalloids except mercury (As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Tl, V)	Incineration of waste	EN 14385	Once every six months	BAT 26

Split view summary

DE proposes to change the minimum monitoring frequency to at least two measurements per year.

The split view is accompanied by the following rationale

- The minimum monitoring frequency for waste incineration plants is laid down at the point 2.1 of the Part 6 of the Annex VI of IED.
- An established monitoring system is questioned on the basis of which the plant data was determined.

Information on which the split view is based

- IED.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- Part 6 "Monitoring of emissions" of Annex VI to the IED refers to the ELVs set by the same Directive. The TWG can set minimum monitoring frequencies that are different, as long as they are not be in breach of the IED provisions.
- The data collection shows that, for the emissions to air of metals except mercury, Germany is the only Member State to adopt the practice to carry out all (three) of the spot measurements in a year on consecutive days; in all other Member States these measurements are performed at intervals of several months[1]. The conclusion to set a minimum monitoring frequency of once every six months is thus correctly expressed as a frequency (the inverse of a time interval), and in line with current practice.

[1] The following are examples of Cd+Tl samples taken by plants in different Member States: In Austria, AT04.1 took three Cd+Tl samples on 12 March 2014 and then other three samples on 8 and 9 September 2014; In France, FR003 took Cd+Tl samples on 04 April 2014 and then other samples on 9 October 2014; In Italy, IT01.1 took Cd+Tl samples on 18 March 2014, 9 July and 19 November of the same year; In The Netherlands, NL05 took Cd+Tl samples on 19 March and on 17 September 2014; In Sweden, SE06 took Cd+Tl samples on 10 April and on 23 October 2014.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of DE does not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

3.2 Always require the continuous monitoring of Hg when incinerating household and commercial waste (EEB)

Conclusion of the meeting

Slide 55 on monitoring of channelled emissions to air (BAT 5):

Substance/Parameter	Process	Standard(s)	Minimum monitoring frequency	Monitoring associated with
Hg	Incineration of waste	Generic EN standards and EN 14884	Continuous ([3])	BAT 31
([3]) For plants incinerating wastes with proven low and stable mercury content (e.g. mono-streams of waste of a controlled composition), the continuous monitoring of emissions may be replaced by long-term sampling (no EN standard is available for long-term sampling of Hg) or periodic measurements with a minimum frequency of once every six months. In the latter case the relevant standard is EN 13211.				

Split view summary

EEB proposes to add in footnote ([3]) that "household and commercial waste cannot be regarded as a waste with a proven low and stable mercury content".

The split view is accompanied by the following rationale

- Hg is classified as Priority Hazardous Substance (PHS) under the EU Water Framework Directive, which dictates that any emission should be phased out ("cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances" (2000/60/EC Article 1 c)). Hg is regulated by the Minamata Convention which was ratified by the EU.
- A precondition to detect mercury peaks in the raw gas is continuous monitoring either in the raw gas or e.g. in case where no wet scrubbers or fixed/moving-bed filter are used in the clean gas. Information provided by EEB (mostly from German municipal waste incineration plants equipped with continuous mercury measurement) shows that mercury peaks occurred in recent years very often at municipal waste incineration plants. An example: a specific red colour in former years was often made by cinnabar which is mercury-sulfide. This substance was purchasable in every colour store in packages up to 500 g (431g Hg) until prohibition approximately 10 years ago. If a tube of this colour (content 25 g) gets into the garbage and is burned in a waste incineration plant, a mercury peak, exceeding the ELV of IED occurs. Mercury can be part of different other devices, which may be disposed into household and commercial waste, e.g. fever thermometers (up to 70 g), relays, switchers (up to 500g Hg), thermostats, high intensity discharge lamps (HID), mercuric oxide, alkaline and zinc air button cell batteries, etc, dental amalgam waste, old compact lamps (up to 50 mg Hg/piece), linear fluorescent lamps, cosmetics, old blood pressure measurement devices (up to 80 g), old barometers (up to 700 g) and excess mercury and waste from laboratories and educational institutions.
- Household and commercial waste cannot be considered as a waste with a proven low and stable mercury content, as shown in the data collection by the frequency of peaks from municipal waste incinerators where mercury is monitored continuously. This is why household and commercial waste should be mentioned in the proposed way in footnote ([3]) of the table in BAT 5.

Information on which the split view is based

- Input of EEB during the revision process which shows mercury peaks at municipal waste incineration plants.
- Data collection.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- Most of the equipment containing mercury listed by EEB has been off the market for years. Mercury should therefore not be present in significant amounts in MSW or in ONHW, but the data shows that waste containing mercury is sometimes incinerated and may give rise to mercury peaks.
- Mixed municipal waste is of a heterogeneous nature, difficult to trace with regard to its origin, and generally only subject to sporadic composition checks. It can therefore be considered that ascertaining the absence of mercury in mixed municipal waste is especially challenging.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of the EEB fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 5	*Add in footnote ([3]) that mixed municipal waste cannot be regarded as a waste with a proven low and stable mercury content*	*EEB*	*NA*

3.3 Monitoring of PCDD/F by long-term sampling

Conclusion of the meeting

Slides 56 and 57 on monitoring of channelled emissions to air (BAT 5):

Substance/Parameter	Process	Standard(s)	Minimum monitoring frequency	Monitoring associated with
PCDD/F	Incineration of waste	EN 1948-1, EN 1948-2, EN 1948-3	Once every six months for short-term sampling	BAT 30
		No EN standard available for long-term sampling, EN 1948-2, EN 1948-3	Once every month for long-term sampling ([4])	BAT 30
Dioxin-like PCBs	Incineration of waste	EN 1948-1, EN 1948-2, EN 1948-4	Once every six months for short-term sampling ([6])	BAT 30
		No EN standard available for long-term sampling, EN 1948-2, EN 1948-4	Once every month for long-term sampling ([4])([6])	BAT 30
([4]) The monitoring does not apply if the emission levels are proven to be sufficiently stable. ([6]) The monitoring does not apply where the emissions of dioxin-like PCBs are proven to be less than 0.01 ng WHO-TEQ/Nm^3.				

3.3.1 Do not give preference to long-term sampling over short-term sampling (DE)

Split view summary

- DE proposes that the long-term sampling of "PCDD/F" and "PCDD/F + dioxin-like PCBs" should not take priority over short-term sampling. This also refers to BAT 30 – Table 5.6.

The split view is accompanied by the following rationale

- A measurement method for which no European standard exists should not have priority over a standardised method.
- The method was not part of the data collection performed through the questionnaire and only introduced in December 2017 as an alternative sampling and measurement method to the short-term sampling.

Information on which the split view is based

- WI BREF Review.
- IED.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- The BAT conclusion agreed on at the final meeting is for PCDD/F to be always monitored with short-term sampling, while the long-term sampling may be omitted if the PCDD/F emissions are sufficiently stable.
- The monitoring of PCDD/F emissions with long-term sampling is used in several Member States. The CEN technical specification (1948/5) is already available.
- The December 2017 informal TWG meeting in Seville clarified that almost no PCDD/F emission data based on long-term sampling was reported in the 2016 data collection, and that the initial count of a substantial number of measurements based on long-term sampling was the result of misreported averaging period units. In order to overcome that situation, several members of the TWG (CEWEP-FNADE, HWE, BE, SE) provided additional data, which substantially improved the data basis.
- To ensure a level playing field in comparing the emissions of different plants to the BAT-AELs, the use of standardised emission measurement methods is the preferred option.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of DE fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 5	*Set the long-term sampling of PCDD/F and of PCDD/F + dioxin-like PCBs only as an optional alternative to short-term sampling in periodic measurements*	*DE*	*NA*

3.3.2 Obviation of long-term sampling in the case of “sufficiently stable emission levels” only for non-hazardous waste (BE)

Split view summary

- BE proposes to delete footnote ([4]) or to set monitoring by continuous sampling as BAT for the incineration of hazardous waste, with the possibility for other wastes to decrease the monitoring frequency if it can be demonstrated that the emission levels are continuously very low compared to the BAT-AEL.

Based on the same argument, BE has also proposed to delete footnote ([2]) of Table 5.6 "BAT-associated emission levels (BAT-AELs) for channelled emissions to air of TVOC PCDD/F, and dioxin-like PCBs from the incineration of waste". This BE proposal is reported in Section 6.5.2.

The split view is accompanied by the following rationale

- It is necessary to make the long-term sampling obligatory next to the periodic measurement in order for the BAT conclusions to have a real impact.
- Periodic measurements only will not give enough insight in the environmental performance of a plant for PCDD/F. On the other hand, long-term sampling only gives an indication of the total dioxin emissions to the environment and not whether the plant is operated well on a shorter timescale.
- “Sufficiently stable” is too generic a formulation, which results in too much room for interpretation during implementation and will not lead to a level playing field, which is one of the aims of a BREF.

Information on which the split view is based

- Initial BE positions.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- The monitoring of PCDD/F by long-term sampling provides a significant added value in terms of monitoring the total load of emitted PCDD/F over a broader range of operating conditions, compared to the exclusive periodic monitoring by short-term sampling.
- The draft BAT conclusion for omitting a certain type of monitoring if the specific emissions are sufficiently stable has been used, in several other BAT conclusions, as a formulation that appropriately reflects the prerogatives of the competent authorities to address local issues in light of the plant's emission load, FGC system configuration, as well as possible specific composition of the waste that is incinerated. It is therefore more consistent, in the reporting of this split view, to use the option to delete the footnote.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of BE, expressed in terms of deletion of footnote ([4]), fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 5	*Delete footnote ([4])*	*BE*	*NA*

4 GENERAL ENVIRONMENTAL AND COMBUSTION PERFORMANCE

4.1 Inclusion of POPs in the list of substances monitored in the deliveries of non-hazardous waste (SE, EEB)

Conclusion of the meeting

Slide 84 on waste deliveries (BAT 12):

Waste type	Waste deliveries monitoring
Municipal solid waste and other non-hazardous waste	• Radioactivity detection • Weighing of the waste deliveries • Visual inspection • Periodic sampling of waste deliveries and analysis of key properties/substances (e.g. calorific value, content of halogens and metals/metalloids). For municipal solid waste, this involves separate unloading.

Split view summary

- SE and EEB propose to keep (as proposed in D1) POPs among the examples of substances periodically monitored at the delivery of municipal solid waste and other non-hazardous waste.

The split view is accompanied by the following rationale

- Municipal solid waste and other non-hazardous waste streams contain quite a few of the "new POPs". The POP content is an important factor to consider when assessing the appropriateness of the incineration for a certain waste delivery.
- Not all wastes containing POPs are classified as hazardous waste. This especially applies to “new POPs”. Hence, it is not enough to explicitly regulate this for hazardous waste.
- It should also be noted that mixed municipal waste with EWC 20 03 01 is classified as non-hazardous waste. It is actually always to be assumed that mixed municipal waste with EWC 20 03 01 consists of some hazardous waste (at least until, in a specific case, the opposite is proven). Hence, it is illogical to retain the phrase “POPs” for “hazardous waste” but remove it for "municipal solid waste and other non-hazardous waste".
- Periodic POP monitoring of municipal solid waste and other non-hazardous waste provides information on the hazardous substances potentially contained, possibly not suitable for incineration in the non-hazardous waste incinerator.
- The periodic POP monitoring of municipal solid waste and other non-hazardous waste is a clear signal to waste providers to ensure proper control and keep hazardous waste separate from non-hazardous waste.
- Monitoring is ensuring sound implementation of the waste-related provisions of EC Regulation No 850/2004 (Article 7 and Annexes IV, V).

Additional arguments provided by Eurits and HWE as comments to the EIPPCB´s split view assessment shared in BATIS on 28 September 2018

- POPs are not a single substance and the list of POPs is expanding. It is therefore not possible to measure POPs generally without specifying the substances.

Information on which the split view is based

- Sweden Comment SE-111 on D1.
- The potential POP content of waste is underlined by the "General Considerations" proposal on a POP destruction efficiency in D1 (see Chapter 5, page 682).
- EC Regulation No 850/2004 (Article 7 and Annexes IV, V).
- Stockholm Convention.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- POPs can be found in municipal solid waste and knowledge of their presence could improve the control of the incoming waste and help ensure its correct incineration.
- Noting also that the draft BAT conclusions do not contain any environmental performance levels associated with the monitoring of POPs, the list of substances monitored and the way how the monitoring is performed are considered implementation issues. This is already the case in the draft BAT conclusions agreed at the final TWG meeting, where the analysis of POPs (without further specification of the substances to be monitored) is foreseen for HW deliveries.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of the aforementioned TWG members fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 12	*Add POPs to the examples of substances periodically monitored at the delivery of municipal solid waste and other non-hazardous waste*	*SE, EEB*	*NA*

5 ENERGY EFFICIENCY

5.1 Decrease the lower end of the BAT-AEEL range for the incineration of hazardous waste other than hazardous wood waste (Eurits, HWE, Cefic, FEAD)

Conclusion of the meeting
Slide 111 on BAT-associated energy efficiency levels (BAT-AEELs) for the incineration of waste (Table 5.1).

Plant	Hazardous waste other than hazardous wood waste ([6])
	Boiler efficiency (%)
New plant	60–80
Existing plant	
([6]) The BAT-AEEL only applies where a heat recovery boiler is applicable.	

Split view summary
Eurits, HWE, Cefic and FEAD propose to decrease the lower end of the BAT-AEEL range for the incineration of hazardous waste other than hazardous wood waste, for existing plants, to 40 %.

The split view is accompanied by the following rationale

- It was agreed at the KoM that energy efficiency was not a KEI for the incineration of hazardous waste as the primary goal of such plants is the destruction of organic wastes and the immobilisation of inorganic pollutants. As such the data collection was limited in scope and the energy efficiency sub-group did not consider HW incinerators. The data provided is a mixture of design values and estimated values with some uncertainty about the reliability of the data e.g. plants with greater than 100% efficiency.
- The BAT-AEEL is related to the calorific values of the waste inputs. The calorific values provided in the data collection is a very rough estimation as it is very difficult or even impossible to provide accurate data (as industry explained during the different discussions on this issue) on the calorific values of hazardous waste in the kiln due to the wide variety of wastes, the variability of calorific value for mixed waste (especially for solid/pasty waste in the bunkers) and the fact that there are a lot of different points of injection of different types of waste into the kiln and at the secondary combustion chamber. In addition, it has never been specified that the calorific value provided should have corresponded to operation at full load of the kiln. Consequently, the results of the ratios based on the data collection are not definitively in compliance with the methodology defined in BAT 3 concerning the determination of the boiler efficiency.
- The BAT-AEEL is already split into new and existing plants for Municipal Solid Waste incinerators. It is logical to make the same distinction for existing HW incineration plants as the possibilities to change or improve the boiler for an existing HW incinerator are very limited as there will be knock on impacts further down the FGC system. For example, some HW incinerators are equipped with a boiler lowering the temperature to 250 – 350 °C before an electrostatic precipitator – in this case lowering the temperature exiting the boiler (and increasing the efficiency) would create increased corrosion and emissions.
- For existing plants the only possibility to increase the boiler efficiency would be a complete retrofit of the boiler and any associated downstream FGC systems therefore providing a clear signal that there are differences between existing plants and new plants would be proportionate. There is no possibility for improving an existing plant's boiler efficiency without incurring disproportionate economic costs.

Additional arguments provided by Eurits and HWE as comments to the EIPPCB´s split view assessment shared in BATIS on 28 September 2018

- There was no involvement of the dedicated hazardous waste incineration sector because the understanding of Eurits and HWE was that the energy efficiency subgroup was focussing on municipal waste incinerators. This was evidenced by the outcomes of the energy efficiency subgroup with a questionnaire designed for completion by MWIs. All information on energy efficiency relevant for dedicated hazardous waste incineration was provided by Eurits and HWE to the full TWG and not to the subgroup.
- A very limited number of non-dedicated plants co-incinerating HW completed the questionnaire along with an even more limited number of dedicated plants. Some plants delivered incorrect data which cannot be taken as a base for further evaluation. The majority of the dedicated HW incineration plants did not complete the energy efficiency questionnaire as it was not designed for the rotary kiln/PCC process. The limited amount of data given by 5 or 6 hazardous waste incinerators is not a basis for a scientifically sound approach to evaluate boiler efficiency for dedicated hazardous waste incineration plants.
- The EIPPCB argues that because HW incinerators control the average calorific value (CV) of the input to the kiln, the variability of the input CV is not relevant. But this is only correct if the waste delivered year on year has some sort of overall average consistency, which is not the case. Especially smaller plants or plants specialised on specific waste streams have to take waste streams as they come, with no possibility to influence the CV. The assumption is therefore incorrect as the variability of the waste is not just that different wastes have different CVs but that there is no consistency over a period of the type of waste delivered, e.g. one year may see the delivery of substantial quantities of high-CV liquid wastes, then due to changes in the market the following year may see very little high-CV liquid waste and a shift to lower-CV solid wastes, with the net effect of lowering the average CV of the input. This is a clear difference to MWI incinerators, where the single input stream is more or less homogenised in the bunker. This fundamental difference was the main reason for HWI operators not to deliver data on energy efficiency.
- Eurits and HWE accept that the limited reported data for boiler efficiencies of existing plants are above 40%, though as acknowledged the dataset is not complete or 100% reliable. Hence Eurits and HWE suggested that the range should at least reflect the efficiency values calculated given that BAT is related to a technique and in this case all the plants are using the same technique (i.e. the use of a boiler), and that the variation of the efficiency is largely due to the availability of opportunities to generate heat/steam vs electricity.

Information on which the split view is based

- Data collected as part of the WI BREF review.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- At the KoM it was concluded:
    - to include energy recovery as a key environmental issue for the review of the WI BREF;
    - to set BAT-AEPLs for the design of new plants to be verified during the performance testing and to consider setting BAT-AEPLs based on actual performance for existing plants;
    - to take into account the specific issues of hazardous waste incineration due to its primary function in relation to the destruction of hazardous waste.

- Representatives of all the relevant industrial associations were part of the WI TWG subgroup on energy efficiency. The energy subgroup did not specify that the energy questionnaire was developed only for MSWI plants. Indeed, for the determination of the gross electrical efficiency, the Annex II questionnaire drafted by the energy subgroup requires to specify the amount of steam produced by the boiler, the amount of steam entering the turbine, and the electricity generated during the performance test. For the determination of the gross energy efficiency, the same questionnaire requires the amount of electricity generated by the back-pressure turbine, and/or the nominal thermal power of direct export and/or the nominal thermal power of the heat exchangers. All this information should be available also for an HWI plant. The Annex II questionnaire has indeed been completed also by plants incinerating hazardous waste.
- Regarding the influence of variability of the calorific value on the achieved energy efficiency, we point out the following:
    - It is quite common in the hazardous waste incineration sector to control the calorific value of the incoming waste in order to adjust the waste feed so that the calorific value of the waste mix is within the optimum (design) parameters.
    - BAT-AEELs are expressed in the draft WI BAT conclusions not as (e.g.) yearly average levels but are determined, in accordance with BAT 3, preferentially by carrying out a performance test, which can be done with waste of known characteristics so as to avoid problems associated with the variability of the calorific value. And neither in the case of existing plants that did not carry out a performance test does the variability of the calorific value affect the energy efficiency determination, since in this case the efficiency can be determined using design values.
    - It is not clear why the availability of opportunities to generate heat/steam vs electricity should be considered a major factor influencing the boiler efficiency. The possible lower overall availability of energy export opportunities for HWIs has been taken into account as one of the main factors to support the expression of BAT-AEELs, for HWI, as boiler efficiency instead of gross electrical efficiency or gross energy efficiency. However, even a high boiler efficiency can be reached irrespective of whether a plant is designed to export steam or electricity (a boiler can be efficient even with modest steam parameters)
- The Sevilla process, to support the setting of environmental performance levels associated with BAT, relies primarily on the plant-specific data gathered through questionnaires.
- The vast majority of the hazardous waste incineration lines that participated in the 2016 data collection and that provided enough information to derive the boiler efficiency were put into operation before the year 2000. Such a scarcity of information regarding more recent plants of this category did not allow the derivation of different BAT-AEELs for new and for existing hazardous waste incineration plants.
- All the plants incinerating hazardous waste other than hazardous wood waste that participated in the 2016 data collection show a boiler efficiency higher than 40 %.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of the aforementioned TWG members does not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

6 EMISSIONS TO AIR

6.1 Accounting for the measurement uncertainty in the BAT-AELs for emissions to air of dust, metals, metalloids, HCl, HF, SO_2, NH_3, CO, TVOC, PCDD/F, dioxin-like PCBs and Hg (CEWEP, ESWET)

Split view summary

CEWEP and ESWET propose either:

- to state in the BAT conclusions that when ELVs are set at BAT-AEL levels, the feasibility to comply with the requirements of relevant monitoring standards (see BAT 5) and of IED, in particular in respect of uncertainty of monitoring equipment and of linked standard reference methods used for calibration, are checked by the permitting authorities, and that little information is available on the confidence intervals at emission levels other than those of the IED Annex VI ELVs; or
- to change the full BAT-AEL ranges, reflecting the recommendations made in the INERIS study to guarantee the respect of uncertainty requirements, as follows:
    - dust: < 10 mg/Nm^3
    - Cd+Tl: 0.05 mg/Nm^3
    - Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V: 0.5 mg/Nm^3
    - HCl: 50 mg/Nm^3
    - HF: delete daily BAT-AEL
    - SO_2: 30 mg/Nm^3
    - NH_3: 30 mg/Nm^3
    - CO: 50 mg/Nm^3
    - TVOC: 10 mg/Nm^3
    - PCDD/F: 0.035 ng I-TEQ/Nm^3
    - Hg: 0.05 mg/Nm^3

This split view is supported by FEAD and Euroheat&Power.

The split view is accompanied by the following rationale

- By definition, BAT and BAT-AELs reflect the performances of available techniques. The techniques to be considered include the monitoring techniques, in particular the performances of the standard reference methods to be used for calibration and for measuring the emissions continuously or periodically.
- The uncertainty levels requested by the relevant EU standards for the monitoring of dust, HCl, HF, SO_2, NH_3, CO, TVOC and Hg are in general not achievable with available monitoring techniques and therefore the requirements on uncertainty of the standards are usually not reachable, as it is demonstrated by a scientific study made by INERIS.

Dust

- The argument given to set the dust BAT-AEL about the fact that a substantial number of plants have reported dust emission levels well below 1 mg/Nm^3 is not sufficient to use the values as BAT-AELs since, according to IED Article 15.3, BAT-AELs are reference values for setting Emission Limit Values (ELVs) and it is not because a value has been observed that it can be used as ELV. When setting ELVs, other contextual requirements must be complied with and these contextual requirements (e.g. on uncertainty) sometimes are not fulfilled at these levels.

- Indeed, the INERIS report starts from the requirements on uncertainty given in the IED and relative standards and derives which are the minimum concentration values that can be used as BAT-AELs and ELVs while at the same time guaranteeing respect of uncertainty requirements. On Dust, it states: "Analysing QAL2 test reports confirms the impossibility of establishing a calibration function for concentrations under 5 mg/Nm³", and "A Daily ELV of 50 mg/Nm³ would provide a minimal risk when declaring whether an AMS is compliant or noncompliant. It is hence strongly recommended not to lower the Daily ELV under the current value of 10 mg/Nm³."
- The statement made in Background Paper p. 74 that "A level of 2 mg/Nm^3 for the lower end of the BAT-AEL range (...) is also consistent with the performance level that has been considered appropriate by other TWGs." is not true. Even if many LCP BREF TWG members did not say anything about such value because they had no experience at this level, a split view was made by ESWET which already had encountered problems at these levels before the LCP BREF final meeting. This split view was rejected by EIPPCB for procedural reason (delay) but not for substantive reasons.

Cd+Tl

- The presentation of the INERIS report includes data (see p.18 of the presentation, uploaded on BATIS, of the INERIS study presented during the workshop of 21/10/2016 in Brussels) on the very high uncertainties reported by CEN on Cd and Tl at the BAT-AEL level in the relevant Standards (EN 14385): For concentrations between 2 and 10 µg/Nm^3 of Cd and 5 to 60 µg/Nm^3 of Tl the uncertainties are respectively of 147 % and 385%.
- For the Standards validation test above, the estimated relative uncertainty for the sum Cd + Tl at the mean value of 20 µg/Nm^3, which is the higher end of the proposed BAT-AEL value, was 245 % rel. Also, the representativeness of this value is very limited since it reflects the results of only one single test.
- Lowering the capping value for future ELVs below the current ELV (50 µg/Nm^3) when the uncertainty is nearly 3 times as high as the ELV would hamper the possibility to use BAT-AELs in permit setting.

Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V

- The presentation of the INERIS report includes data (see p.18 of the presentation, available BATIS, presented at the workshop of 21/10/2016 in Brussels, on the very high uncertainties reported by CEN on Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V at BAT-AEL level in the relevant Standards (EN 14385): For concentrations in the range of the current ELV of 500 µg/Nm^3 for the sum of 9 metals, the uncertainties are between 97 % (Pb) and 447 % (Cr).
- For the Standards validation test above, the estimated relative uncertainty for the sum of Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V between 100 and 1300 µg/Nm^3, which is higher than the higher end of the proposed BAT-AEL value, was 81 % rel. with Pb and 86 % without Pb. The report also highlighted the fact that the representativeness of this value is very limited since it reflects the results of only one single test.
- Lowering the capping value for future ELVs below the current ELV (50 µg/ Nm^3) when the uncertainty is nearly 3 times as high as the ELV would hamper the possibility to use BAT-AELs in permit setting.

HCl

- The INERIS report concludes that the Umax SRM << Umax AMS condition necessary for a reliable QAL2 calibration at the level of the current Daily ELV of 10 mg/Nm³ for Waste Incineration is hence not fulfilled, this weakens the reliability of this calibration and therefore the accuracy of the results given by the AMS.

- In the current SRM implementation configuration, a Daily ELV of 50 mg/Nm³ is necessary to declare whether an AMS is compliant or non-compliant. It would be desirable not to decrease ELV below 50 mg/Nm³.

SO_2

- The INERIS report concludes that the Umax SRM << Umax AMS condition necessary for a robust QAL2 calibration at the level of the current Daily ELV of 50 mg/Nm³ for Waste Incineration is hence not fulfilled, this weakens the reliability of this calibration and therefore the accuracy of the results given by the AMS."
- In the current SRM implementation configuration, it is hence not desirable to lower the Daily ELV under 50 mg/Nm³ to maintain a minimal risk when declaring whether an AMS is compliant or non-compliant."
- The possible improvement routes are the following: (…) Use some certified GFCIR analysers as an alternative method to the SRM, which would enable fulfilling uncertainty levels under 8% at 50 mg/Nm³ and would approach about 13% at 30 mg/Nm³." Therefore the higher ends of the two BAT-AEL ranges for SO2 can be accepted.

HF

- The INERIS report concludes that the QAL2 calibration is inoperable at the current Daily ELV level for waste incineration for HF. A Daily ELV much higher than the current one will certainly be necessary to declare whether an AMS is compliant or non-compliant."

NH_3

- The INERIS report concludes that the Umax SRM << Umax AMS condition necessary for a reliable QAL2 calibration at the level of 10 mg/Nm³ is hence not fulfilled, this weakens the reliability of this calibration and therefore the accuracy of the results given by the AMS.
- A Daily ELV higher than the current one in France (30 mg/ Nm^3) will certainly be necessary to declare with a minimal risk whether an AMS is compliant or non-compliant.

CO

- The INERIS report concludes that even for a Daily ELV of 50 mg/Nm³, the measurement uncertainty is too high: 18 relative % for a target of 6%. A Daily ELV of 120 mg/Nm³ would provide a minimised risk when declaring whether an AMS is compliant or non-compliant.
- Lowering the ELV under the current value of 50 mg/Nm³ therefore risks leading to biased ELV compliance/incompliance declarations, because of measurements with an uncertainty higher than the IED's 10% confidence interval.

TVOC

- The INERIS report concludes that currently, the required uncertainty for the SRM is only reached for concentrations above 50 mgC/Nm³, and the measurement uncertainty exceeds 20% at the current Daily ELV level of 10 mgC/Nm³.
- A Daily ELV of 50 mg/Nm³ would enable a minimized risk when declaring whether an AMS is compliant or non-compliant. It is hence strongly recommended not to lower the Daily ELV under the current value of 10 mg/Nm³." (NB: there is a typing mistake in the report, which state that the current value is 50 mg/Nm³ instead of 10 mg/Nm³)

PCDD/F

- For PCDD/F, the only available information on uncertainty is the one provided by Standard EN 1948 that reports an uncertainty value of 140% at 0.035 ng/Nm^3.

Hg

- The INERIS report concludes that the Umax SRM << Umax AMS condition necessary for a reliable QAL2 calibration at the level of the current Daily ELV of 50 µg/Nm³ for Hg for Waste Incineration is hence not fulfilled, this weakens the reliability of this calibration and therefore the accuracy of the results given by the AMS.
- With the SRM, a Daily ELV above 50 µg/Nm³ would be necessary to declare with a minimal risk whether an AMS is compliant or non-compliant.
- Alternative methods to the SRM were tested in Germany, based on mercury adsorption on solid adsorbing traps enabling to differentiate oxidised and elementary mercury in the gas stack. The possibility of increasing the sampling time, by hours, days or weeks, enables much more reliable QAL2 calibrations than the current SRM.

Information on which the split view is based

- INERIS study on monitoring DRC-16-159382-06994A (uploaded on BATIS on 01/08/2016).
- EN 14385 Standards.
- Presentation made at the workshop for IED Article 13 Forum members and WI BREF TWG members on the INERIS study (Brussels, 21/10/2016).
- Answer by INERIS to Austrian comments on INERIS report, uploaded on BATIS on 23/12/2016.
- CEWEP-ESWET Feedback on BREF WI webinars_final. Paper uploaded to BATIS and/or sent to TWG on 22/12/2016: “Points that should have been discussed before data assessment and must be discussed before beginning to derive BATAELs” //“Monitoring and uncertainties”.
- INERIS study on monitoring taking into account remarks and answering questions asked during and after the workshop – DRC-17-168319-02463 B (uploaded on BATIS on 8/9/2017 as attachment to our comments on WI BREF Draft1 and on01/3/2018).
- CEWEP-ESWET Comments number 686- 687-688-693-704-705-709-725 in Excel template with comments on D1 on 8/9/2017.
- CEWEP-ESWET key points for WI BREF D1 workshop, paper uploaded to BATIS and/or sent to the TWG on 28/11/2017 “5) Taking into account the measurement uncertainty” + Attachment number 5 to this paper, dedicated to the uncertainty issue.
- Point 5 "Measurement uncertainty" of the document “CEWEP-ESWET-FEAD requests for the background paper for the BREF WI Final Meeting” uploaded to BATIS and sent to TWG on 11/1/2018.
- CEWEP email entitled “RE WI BREF review - Preparation of the Final TWG meeting”, to the WI TWG on 6/4/2018.
- CEWEP-ESWET comments number 22-23-47-49-51-55-58-67-69-71-72-73-74-75-80-89 in Excel template with comments on Pre-Final BAT conclusions on 6/4/2018.
- Industry position on topics to be discussed at the WI BREF Final Meeting, paper signed by CEFIC, CEWEP, ESWET, EULA, EURITS, EUROHEAT & POWER, FEAD, HAZARDOUS WASTE EUROPE and requesting that measurement uncertainty be discussed at the Final meeting among other issues to clarify the conditions corresponding to BAT-AELs in particular in respect of uncertainty, uploaded to BATIS and/or sent to TWG on 19/4/2018.

EIPPCB assessment

The documentation and the information referred to in the split view were available on time.

Validity of the supporting rationale:

- The assessment of compliance with ELVs set by the competent authorities is an implementing issue outside the remit of the BAT conclusions.
- As laid out in IED Article 3(13), a BAT-AEL means the ranges of emission levels obtained under normal operating conditions using a (combination of) BAT. BAT-AELs are therefore set on the basis of real plant emissions and not on the basis of meeting certain measurement uncertainty requirements.
- IED Annex VI includes provisions for the assessment of compliance with the ELVs set in the same Annex. The requirements for the measurement uncertainty in this Annex refer to the emission levels at the level of the ELVs set out in that Annex. The uncertainty requirements do not necessarily apply at emission levels within the BAT-AEL ranges.
- Each BREF takes into account the techniques used to prevent or reduce the emissions of the sector concerned. There is a separate, horizontal JRC Reference Report on Monitoring of Emissions to Air and Water from IED installations. To better compare data coming from different plants and to exclude as far as possible any implementation issues from the data collected, the WI TWG decided to collect raw emission data without correction for the measurement uncertainty.
- In accordance with the BREF Guidance (Commission Implementing Decision 2012/119/EU), it is acceptable to use an expression of the type '< X' to express a BAT-AEL where the lower end of the range cannot be accurately defined.
- The results of the INERIS study in terms of measurement uncertainties are not comparable with the uncertainty required by the EN standards used to monitor the emissions into air by the waste incineration sector, because this study, to calculate the measurement uncertainty, uses interlaboratory comparisons while EN standards rely on the so-called GUM approach.
- However, the INERIS study shows that, irrespective of the approach used to derive the measurement uncertainty, there may be an issue related to the calibration of automated measuring systems (AMS) with the standard reference methods (SRMs) at low emission levels, in particular for dust.
- Moreover, the absolute measurement uncertainty generally decreases with decreasing emission levels. The decision on which measurement uncertainty is 'acceptable' is not a purely technical decision and also depends on the way the measurement uncertainty is determined and handled in the applied rules for compliance.
- The waste incineration sector has been regulated at the European level for many years, so there is a great deal of experience in calibrating AMS at the level of the IED Annex VI ELVs.
- BAT-AELs cannot be defined in ranges that would constitute breaches of the ELVs established in Annex VI to the IED.
- No specific proposal is made for an alternative BAT-AEL for periodically measured emissions of metals and PCDD/F, which are indeed not covered by the original INERIS study. It is also noted that it is possible, in general, to reduce the measurement uncertainty by increasing the sampling time.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the part of the split view representing the opinion of the aforementioned TWG members in relation to the proposed changes for the BAT-AELs for dust, CO, TVOC, SO_2, NH_3, and Hg fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This part of the split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

The EIPPCB considers that the other parts of the split view do not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU, and will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

A possible formulation of this split view could be:

BAT conclusion	Dissenting view *Change the following BAT-AELs to take into account the measurement uncertainty:*	Expressed by	Alternative proposed level (if any)
BAT 26 Table 5.2	*dust*	*CEWEP, ESWEP, Euroheat&Power, FEAD*	*10 mg/Nm^3*
BAT 25,BAT 28, Table 5.4	*SO_2*		*New plants: 30 mg/Nm^3* *Existing plants: 30 - 40 mg/Nm^3*
BAT 29, Table 5.5	*NH_3* *CO*		*NH_3: 30 mg/Nm^3* *CO: 50 mg/Nm^3*
BAT 30, Table 5.6	*TVOC*		*10 mg/Nm^3*
BAT 31, Table 5.7	*Hg (expressed as a daily average or average over the sampling period)*		*50 µg/Nm^3*

6.2 Restrict the applicability of the footnote setting specific BAT-AELs for channelled dust emissions to air where a bag filter is not applicable (AT)

Conclusion of the meeting
Slide 127 on BAT-AELs for dust and metal emissions from the incineration of waste:

Table 5.2: BAT-associated emission levels (BAT-AELs) for channelled emissions to air of dust, metals and metalloids from the incineration of waste

Parameter	BAT-AEL (mg/Nm^3)	Averaging period
Dust	< 2–5 ([1])	Daily average
Cd+Tl	0.005–0.02	Average over the sampling period
Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V	0.01–0.3	Average over the sampling period
([1]) For existing plants dedicated to the incineration of hazardous waste and for which a bag filter is not applicable, the higher end of the BAT-AEL range is 7 mg/Nm^3.		

Split view summary
AT proposes to change footnote ([1]) to "For existing plants until the next filter upgrade/reconstruction, the higher end of the BAT-AEL range is 7 mg/Nm^3".

The split view is accompanied by the following rationale

- Only 86 installations (i.e. only 26.3% of all reference lines) are not able to keep a maximum daily average for dust of 5 mg/Nm^3 (OP, OC1, ELV, 43).
- A bag filter can always be applied, when the filter is renewed, in order to raise the plant's environmental performance.
- Footnote ([1]) is especially in favour of hazardous waste incinerators, as they have the biggest installations in the higher ranges of dust emissions / non-compliance with stricter values.
- Reducing dust emissions is an important measure to reduce the emissions of heavy metals, as these pollutants are contained in the dust particles. Due to their hazardous input, hazardous waste incinerators are prone to emit higher amounts of heavy metals. Granting an exemption of the higher BAT-AEL values to these incinerators of will have considerable environmental impact.

Information on which the split view is based

- BREF WI Review data collection.
- Comment AT-23 on D1.

EIPPCB assessment
The documentation and the information referred to in the split view were available on time.

Validity of the supporting rationale:

- The applicability restriction of the bag filter for existing plants is linked to the operating temperature profile of the FGC system.
- Even if the dust abatement equipment is renewed, if the rest of the FGC system remains unchanged (e.g. flue-gas characteristics at the bag filter entrance do not fit with the temperature and humidity required by the bag filter) the bag filter may still not be applicable.

- However, in the case of an upgrade of the dust abatement system, be it based on a bag filter or on a different technique such as ESP, technical solutions are available to improve the performance of such a system and to achieve dust emissions lower than 5 mg/Nm^3. Indeed, the 2006 data collection includes plants which are fitted with a variety of different dust abatement techniques, and which incinerate different types of waste including also HW and achieve dust emission levels well below 5 mg/Nm^3.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of AT fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 26, Table 5.2	*Change footnote ([1]) to: "For existing plants, the higher end of the BAT-AEL range is 7 mg/Nm^3 until the existing filter is upgraded/rebuilt"*	*AT*	*NA*

6.3 Restrict the applicability of SNCR and SCR (DK, HWE, Eurits, FEAD, FI)

Conclusion of the meeting
Slide 137 on techniques to reduce channelled NO_X emissions to air while limiting the emissions of CO and N_2O from the incineration of waste and the emissions of NH_3 from the use of SNCR and/or SCR (BAT 29):

Technique		Description	Applicability
d	Selective non-catalytic reduction (SNCR)	See Section 5.2.2	Generally applicable
e	Selective catalytic reduction (SCR)	See Section 5.2.2	In the case of existing plants, the applicability may be limited by a lack of space

Split view summary
DK proposes to add under applicability that techniques d and e are not applicable to existing waste (co-)incineration plants as defined in IED, Annex VI, Part 1 and with a nominal capacity below 6 t/h.
HWE, Eurits and FEAD propose to add under applicability that technique d is not applicable to hazardous waste incineration plants with a capacity below 6 t/hour where the temperature in the secondary combustion chamber is above 1 000°C and that are equipped with a direct quench from at least 1 000°C to 75/80°C.
HWE, Eurits and FEAD propose to add under applicability that technique e is not applicable to hazardous waste incinerators with a capacity below 6 t/h where the gases are at a temperature of 75-80°C and are saturated with water after a direct quench.
FI proposes to add under applicability that there may be economic restrictions to retrofitting technique e to existing plants with a capacity of < 250 000 t/y.

The split view is accompanied by the following rationale

- BAT conclusions should not overrule the provision in the IED that existing plants (as per the definition of IED Annex VI Part I) with a capacity of 6 tons/hour or less can be operated without SNCR/SCR.
- It is not without problems to retrofit small old plants with SNCR. The control of NH_3 injection can be difficult.
- The reduction of NO_X emissions is small compared with the costs of installing the equipment. According to Danish experience, the investments cost for SNCR is 0.5–0.7 million Euro per plant and the operating cost is 20 000 Euro per year per plant. A plant that incinerates municipal waste without DeNOx abatement achieves daily emissions between 225 mg/Nm^3 and 350 mg/Nm^3. If the emission limits value is reduced to 180 mg/Nm^3, the reduction of NO_X from these small plants will be 12-35 tonnes NO_X per year.
- SNCR cannot be applied to plants operated at temperatures above 1 000°C because at such high temperatures the process is not effective. When the flue-gas is quenched directly from more than 1 000°C to temperatures lower than 100°C, again at such low temperatures SNCR cannot be used for NO_X reduction.
- Hazardous waste incinerators with a direct and complete quench cannot apply SCR to abate NO_X. The cross-media effects and the costs are so high for small installations without any possibility of recover energy (because of the direct quench) that it would be detrimental for the overall impact of the installation to re-heat and dry the gases in order to reach the right operating conditions for SCR.

- Due to the high operating temperature, the generation of thermal NO_x is substantial and at the moment there are no effective, economically viable techniques allowing these installations to reach the BAT-AEL defined in the BAT conclusions.
- Only the lack of space is currently mentioned as the applicability restriction. There are also other technical reasons affecting the investment and operating costs to retrofitting SCR. SCR needs the appropriate temperature window, which might need costly technical measures both for high-dust and low-dust applications. The need to avoid SCR deactivation due to the properties of flue-gas might lead to selecting special catalysts, oversizing of the unit, or shortening of the catalyst lifetime. Additional costs might also be incurred when a special arrangement is needed for the reception and storage of the reagent. NH_3 slip control might also be needed in some cases. The reduction of emission of NO_X is relatively small compared with the costs of installing SCR.

Information on which the split view is based

- DK comments on D1 of the revised WI BREF.
- HWE comments on the BP for the final WI TWG meeting.
- Collected data.
- D1, BAT 29, applicability of technique e.
- Reference Document on the Best Available Techniques for Waste Incineration, August 2006, Table 4.59 in Chapter 4.4.4.1.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- The IED ELVs are considered a safety net, while BAT-AELs represent the performance achieved by plants applying best available techniques in accordance with the information gathered during the BREF review process.
- The cost-benefit estimate proposed for the installation of deNO_X in small plants does not demonstrate that the costs would be generally disproportionate compared with the benefits. The total annuitised cost for a capital cost between EUR 0.5 million and EUR 0.7 million and an operating cost of EUR 20 000 may be estimated, with a default capital charge of 10 %, at EUR 70 000 to EUR 90 000 per year. This is to be compared with the benefits accruing from the annual reduction of 12–35 tonnes NO_X per year. With the commonly used EEA values (see EEA 2014: "Costs of air pollution from European industrial facilities 2008–2012") for the benefit of reducing 1 tonne NO_X (EUR 4 419 to EUR 11 966 per tonne), the benefit can be roughly estimated to span the range EUR 53 000–418 000 per year, with a benefit to cost ratio between 0.6 and 6 while essentially considering only the human health impact due to the formation of secondary inorganic particles (without considering any direct NO_2 effects, long-term ozone effects, or ecosystem damage).
- The data collection also includes numerous examples of plants of the categories mentioned in the split view that have been successfully retrofitted with SNCR and SCR and that are achieving emission levels within the BAT-AEL range; however, the issue has been discussed extensively within the TWG for the review of the WI BREF, and it can be acknowledged that the retrofitting of these techniques may in certain cases (e.g. incineration at very high temperature followed by abrupt water quench) pose some technical challenges that need to be overcome.
- No specific information has been provided to support the notion that the reduction of emission of NO_X is disproportionately small compared with the cost of installing SCR in plants with an incineration capacity of < 250 000 tonnes/year.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the parts of the split view representing the opinion of HWE, Eurits and FEAD fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. These parts of the split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

Conversely, the EIPPCB considers that the parts of the split view representing the opinion of DK and FI do not fulfil the same conditions, and will therefore not be reported.

A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if
BAT 29	*Applicability of technique d (SNCR): not applicable to hazardous waste incineration plants with a capacity below 6 t/h where the temperature in the secondary combustion chamber is above 1 000 °C and equipped with a direct quench from at least 1 000 °C to 75/80 °C*	*HWE, Eurits, FEAD*	*NA*
	Applicability of technique e (SCR): not applicable to hazardous waste incinerators with a capacity below 6 t/h where the gases are at a temperature of 75/80 °C and are saturated with water after a direct quench	*HWE, Eurits, FEAD*	*N/A*

6.4 BAT-AELs for NO_X, CO and NH_3 emissions

Conclusion of the meeting
Slide 140 on BAT-AELs for NO_X, CO and NH_3 emissions (Table 5.5).

Table 5.5: BAT-associated emission levels (BAT-AELs) for channelled NO_X and CO emissions to air from the incineration of waste and for channelled NH_3 emissions from the use of SNCR and/or SCR

Parameter	BAT-AEL (mg/Nm3)		Averaging period
	New plant	Existing plant	
NO_X	50–120 ([1])	50–150 ([1]) ([2])	Daily average
CO	10–50	10–50	
NH_3	2–10 ([1])	2–10 ([1]) ([3])	
([1]) The lower end of the BAT-AEL range can be achieved when using SCR. The lower end of the BAT-AEL range may not be achievable when incinerating waste with a high nitrogen content (e.g. residues from the production of organic nitrogen compounds). ([2]) The higher end of the BAT-AEL range is 180 mg/Nm^3 where SCR is not applicable. ([3]) For existing plants fitted with SNCR without wet abatement techniques, the higher end of the BAT-AEL range is 15 mg/Nm^3.			

6.4.1 Decrease the higher end of the BAT-AEL range for channelled NO_X emissions to air (BE, NL, SE, EEB)

Split view summary

- BE proposes to decrease the higher end of the BAT-AEL range for NO_X to 100 mg/Nm^3 for new plants and to add in footnote ([2]) "and when incinerating mainly hazardous waste".
- NL proposes to decrease the higher end of the BAT-AEL range for NO_X to 100 mg/Nm^3 for new and existing plants, to add SNCR to footnote ([2]).
- SE proposes to decrease the higher end of the BAT-AEL range for NO_X to 110 mg/Nm³ for existing plants and 100 mg/Nm³ for new plants, and to delete footnote ([2]).
- EEB proposes to decrease the higher end of the BAT-AEL range for NO_X to 100 mg/Nm^3 for new and existing plants and to delete footnote ([2]).

The BE split view is accompanied by the following rationale

- 100 mg/Nm^3 as the higher limit is feasible for 1/3 of all existing reference lines, according to the data collection:
    - 103 of the reference lines (AMS 04-NO_X graph hh 97 pc – OP, OC2, O30) currently comply with 100 mg/Nm^3
    - levels below 100 mg/Nm³ with low ammonia slip can be achieved through various technical ways in existing plants, so for new plants it must be possible anyhow. SCR is not the only option to go as low as 100 mg/Nm^3, which is proven by the 11 existing reference lines applying SNCR (eventually in combination with other techniques) which have NOx-emissions lower than 100 mg/Nm^3.

The NL split view is accompanied by the following rationale

- The higher level of the NO_X BAT-AEL is not related to the application of the BATs SCR and SNCR, but illustrates the ELV in the permits in the EU. In the Netherlands, the ELV for waste incineration is 70 mg/Nm^3 since 1992. This emission level can according to the Nehetherlands experience be achieved using SCR or SCNR, both in new and in existing

plants. The Netherlands therefore proposes a higher level of the NO_X BAT-AEL of 100 mg/Nm^3 for both new and existing plants.

- The higher level of the NO_X BAT-AEL can also be achieved when using SNCR. As a result, there is no need for a less stringent higher level of the NO_X BAT-AEL. When using SNCR, a higher limit of 100 mg/Nm^3 can be achieved. This is proven by the Dutch waste incineration plants, which have to comply with an ELV of 70 mg/Nm^3 since 1992.

The SE split view is accompanied by the following rationale

- Daily averages below 110 mg/Nm^3 for existing plants can be achieved by using (Primary Techniques and) SNCR. To reach such a performance it is important to have the injection of reduction agent (NH_3, NH_4) at several levels and to control the dosage by means of the temperature. With SCR emissions below the lower end of the BAT-AEL range can be achieved.
- The plant IT01.2 is an examples of this, with (OP, OC1, ELV, 43) = 100 mg/Nm^3. On the graph sheet 2/4, further examples are the plants DK02.2, FR019 and DE47.2. All of the mentioned are built with grate firing. On graph sheet 1/4 there are 7 other plants using SNCR without SCR with even lower emissions. Those that achieve the lowest emission of these are built with fluidised bed.
- For new plants, there are more possibilities for optimisation, and hence daily averages below 100 mg/Nm^3 can be achieved by using primary techniques and SNCR.

The EEB split view is accompanied by the following rationale

- The higher level of the NO_X BAT-AEL is not related to the application of the BATs SCR and SNCR, but illustrates the emission levels achieved by compliance with ELV set in the permits in the EU. In the Netherlands, the ELV for waste incineration is 70 mg/Nm^3 (monthly averaged) since 1992. France already has an ELV set of 70 mg/Nm³ in areas with elevated levels of background pollution. Austria has an ELV (daily averaged) set at 100 mg/Nm³ (for the >6t/day category) as well as Sweden (monthly averaged). In Germany, as from 2019 the ELVs are at 150 mg/Nm³ (daily average). Keeping the higher level of 180 mg/Nm³ would not reflect the technical process in the sector substantiated by the data provided of reference plants and be even worse than national binding rules already in force.
- 100 mg/Nm³ can be achieved both by using SCR (not disputed) but also with SNCR, both in new and in existing plants. Levels below 100 mg/Nm³ are already achieved by reference plants that have optimized the SNCR systems in place. Examples include MVR Müllverwertung Rugenberger Damm (Germany) (76.27 mg/Nm^3) SET Mont Blanc (France) (93.42 mg/Nm^3) and I/S Vestforbrænding (Denmark) (99.83 mg/Nm^3), all are max daily average data and reference plants.
- About 1/3 of all the reference lines in the data collection do already achieve the proposed higher level of 100 mg/Nm³, the levels in the current proposal would allow polluters maximum flexibility and would not require the optimisation of NO_X abatement. Even future plants, that are yet to be built, would be allowed to pollute at levels significantly above what is technically possible and proven economically viable for the operators.
- Failure to ensure Europe-wide levels for harmful pollutants are set based on frontrunners performance, defining BAT-levels allowing the status quo is unfair to European citizens living in countries that have weaker limits. It would also represent an absurd setback for those countries that have acted for improved protection levels for human health and the environment (e.g. the Netherlands, Austria, France and Sweden), Germany considering the implementation timescales.
- The proposed level is representing the status quo of the 2006 WI BREF despite solid technico-economic evidence justifying the level of 100 mg/Nm³ as proper higher end of the range for non-SCR systems.
- The proposed higher end of the NO_X BAT-AEL range can also be achieved with SNCR systems. As a result, there is no need for the footnote ([2]).

Information on which the split view is based

- BREF WI Review data collection.
- Initial BE positions.
- BE comments on revised proposals for the BAT conclusions.
- BE comments on D1.
- SE comments on D1 SE 95 and SE 96.
- 2018 02 14 EEB input on NO_X reduction.pdf and additional information from EEB on NO_X reduction techniques.
- 01 WI_KoM TWG conclusions_final.pdf.
- EEB comments on D1 (#72).
- EEB input on high optimisation of SNCR in existing waste incineration plants, uploaded in BATIS on 14 February 2018.
- BREF Guidance and in particular aim of the BREF to *"serve as a driver towards improved environmental performance across the Union"*.

EIPPCB assessment

The documents referred to in the split view were available on time.

Validity of BE supporting rationale:

- In accordance with the BREF Guidance (Commission Implementing Decision 2012/119/EU), the higher end of the BAT-AEL range is derived by considering the range of performance associated with the application of the BAT under normal operating conditions.
- The assessment of the 2016 data collection made by BE to support their split view refers to the 97th percentile of half-hourly emission levels evaluated with the "fine" data filter. Although this is in principle at odds with a daily BAT-AEL, the number of reference lines showing daily emission levels (with the "fine" data filter OP, OC1, ELV, 43) within 100 mg/Nm^3 is very similar (around 100 reference lines). The argumentation proposed by BE can therefore be considered substantively in line with the BREF Guidance.
- No specific rationale has been provided for the proposed change to footnote ([2]).

Validity of NL supporting rationale:

- According to the data reported by the NL plants, the NO_X ELV of 70 mg/Nm^3 is specified as a monthly average.
- Usually the FGC systems are designed and operated to reach a set point, which in many cases is close to the ELV set. When SCR and SNCR are well designed, they can be operated to keep NO_X emissions close to the ELV by optimising the use of reagent and the ammonia slip.
- The data gathered shows that there are several plants able to keep their NO_X emissions below 100 mg/Nm^3 using different techniques or combinations of techniques irrespective of the size, age and type of waste treated or the type of furnace.

Validity of SE supporting rationale:

- See EIPPCB assessment on the validity of NL supporting rationale related to NO_X emissions.

Validity of EEB supporting rationale:

- See EIPPCB assessment on the validity of NL supporting rationale related to NO_X emissions.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the parts of the split view representing the opinion of BE in relation to the modification of footnote ([2]) and of NL in relation to the modification of footnote ([3]) do not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. These split views will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.
The EIPPCB considers that the other parts of the split view representing the opinion of BE, NL, SE and EEB fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. These split views will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. A possible formulation of these spit views could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 29, Table 5.5	*Decrease the higher end of the NO_X BAT-AEL range*	*BE, NL, SE, EEB*	*110 mg/Nm^3 for existing plants (SE)* *100 mg/Nm^3 for existing plants (NL, EEB)* *100 mg/Nm^3 for new plants (BE, NL, SE, EEB)*
	Delete footnote ([2])	*NL, SE, EEB*	*NA*

6.4.2 Restrict the applicability of the footnote setting a higher BAT-AEL for channelled NO_X emissions to air for existing plants where SCR is not applicable (AT)

Split view summary
AT proposes to change footnote ([2]) to "the higher end of the BAT-AEL range is 180 mg/Nm^3 for existing plants until the next De-NOx system upgrade/reconstruction".

The split view is accompanied by the following rationale

- Footnote ([2]) refers to existing plants "where SCR is not applicable". With a well-performing SNCR, 150 mg/Nm^3 NO_X are achievable. An SCR can also be applied in order to raise the plant's environmental performance.
- 63.6% of all reference lines comply with a higher BAT-AEL of 180 mg/Nm³ (OP, OC1, ELV, 43).
- 48 installations that are equipped with SNCR, but without SCR, have maximum daily averages of less than 150 mg/Nm^3 (OC, OP1, ELV, 43).

Information on which the split view is based

- BREF WI Review data collection.
- Comment AT.40.

EIPPCB assessment
The documents referred to in the split view were available on time.

Validity of the supporting rationale:

- For new plants there is no applicability restriction to the use of SCR. For existing plants, the final TWG meeting agreed that the applicability may be restricted by a lack of space.
- There is no need to specify existing plants in the text of the footnote, because the footnote only applies to the BAT-AEL for existing plants.
- While it can be agreed that a state of the art SNCR system can achieve NO_X levels below 150 mg/Nm^3, the purpose of removing the part of the footnote referring to the non-

applicability of SCR is unclear. In this respect, we note that it would mean raising to 180 mg/Nm^3 (until the reconstruction of the de-NO_X systems) the higher end of the BAT-AEL range for all existing plants, even for those that are already equipped with SCR; for those plants, relatively straightforward operational optimisation is expected to be sufficient to achieve a level of 150 mg/Nm^3 without significant risk to incur in detrimental side effects (such as increased ammonia slip).

- The 2016 data collection includes the following examples:
    - DE55.1, which was put into operation in 1996 and had SNCR installed in 2013. This reference line is able to keep NO_X emissions lower than 150 mg/Nm^3 as a daily average.
    - FR087.3, which was put into operation in 1994 and had SNCR installed in 2004. Also this reference line is able to keep NO_X emissions substantially lower than 150 mg/Nm^3 as a daily average.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of AT fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

A possible formulation of this spit views could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 29, Table 5.5	*Change footnote ([2]) to: "Where SCR is not applicable, the higher end of the BAT-AEL range is 180 mg/Nm^3 until the DeNO$_X$ system is upgraded/rebuilt"*	*AT*	*NA*

6.4.3 Extend the applicability of the footnote setting a higher BAT-AEL for channelled NO_X emissions to air where SCR is not applicable (FI, Cefic)

Split view summary
FI proposes to change footnote ([2]) to: "the higher end of the BAT-AEL range is 180 mg/Nm^3 where SCR is not used".
Cefic, supported by Eurits, FEAD and HWE, proposes to add the following to footnote ([2]): "or when incinerating waste with a high nitrogen content (e.g. residues from the production of organic nitrogen compounds)."

The FI split view is accompanied by the following rationale

- The collected data shows that usually SCR performs better than SNCR. The collected data show that many plants using SNCR have NO_X emissions higher than 180 mg/Nm^3. SNCR is chosen as a NO_X reduction technique also in the newest plants. The installation of SCR is not technically reasonable, it is not cost-effective nor justified from the environmental point of view.

The Cefic split view is accompanied by the following rationale

- Waste from the chemical industry regularly contains higher nitrogen compounds since molecules containing nitrogen are common in the chemical industry and as such are a usual component of chemical waste.

- Facilities which combust ordinary or even municipal wastes cannot be compared to those dealing with chemical residues. Substances with a higher content of nitrogen unavoidably lead to higher concentrations of NO_X in the off-gases.
- The LCP BREF in the "Concluding remarks and recommendations for future work" Chapter reported the suggestion to further evaluate the gathering during the next BREF review of information on the impact of high nitrogen and hydrogen contents on NO_X emissions.
- Higher temperatures are essential and required for the incineration of hazardous waste, which again lead to higher concentrations for NO_X.
- Higher oxygen content in the incinerator is also a relevant parameter for higher NO_X values (fuel-nitrogen). In HWI, the oxygen content is usually slightly higher due to the intrinsic waste input fluctuations in - comparatively - smaller incineration units, a technical fact.
- The data basis on HW incineration stemming specifically from installations of the chemical industry is rather limited. However, BAT-AEL can be set if information from all (chemical) plants is taken into account. Plants DE-04R, DE-33R, DE-22R, which have NO_X emissions of up to 200 mg/Nm^3, reflect the usual situation in the chemical industry. Their emission values are a given fact due to the technical and economic restrictions in the incinerations units and especially due to the input of nitrogen containing substances.
- A further reduction means either more NH_3/urea or new or additional catalyst capacity respectively. However, the latter would not be possible in many cases for constructional reasons or significant energy losses. Such energy losses are usually compensated by the use of fossil fuels which increase the amount of CO_2 emitted to the atmosphere. But, above and beyond, if such fuels are burned, additional NO_X is emitted which in parts compensate the NO_X "reduced" via the use of SCR.
- The fine tuning of the ammonia/urea injection point can also be a major challenge in existing incinerators that were not initially designed to include SNCR systems.
- To add more NH_3 or urea for NO_X reduction could lead to the formation of ammonium chloride which can lead to corrosion in the downstream equipment. In order to avoid this, the temperature has to be increased which in return reduces the energy efficiency. The formation of ammonium chloride (or other salts) can also lead to cross-media effects in the waste water from FGC systems, namely higher emissions for metals and TSS and interferences in the waste water analysis/monitoring.
- Further reductions of the NO_X levels for HWI have no added value for the environment. The anticipated emission reductions in the HWI are so small that they are even reversed by secondary emissions for the production of NH_3.

Additional arguments provided by Eurits and HWE as comments to the EIPPCB´s split view assessment shared in BATIS on 28 September 2018

- Besides the arguments put forward by Cefic, Eurits provided additional information based on the data collection (see the summary that was uploaded by Eurits on BATIS as a presentation) to support the split view, showing that there are more plant examples than just those mentioned by Cefic. The two most important problems are:
    - dedicated HW incinerators will typically have much higher (and more variable) nitrogen content in the input, and
    - they operate at higher temperatures.

  As a result, more NOx is generated. This is exacerbated by the requirement to incinerate drums, which may lead to higher NOx emissions.

Information on which the split view is based

- BREF WI Review data collection.
- D1 of the revised WI BREF.
- Cefic's proposal for revision of April 6th, 2018.

EIPPCB assessment
The documents referred to in the split view were available on time.

Validity of FI supporting rationale:

- The data gathered shows that SCR is used by several different types of plant irrespective of the size, age and type of waste treated or the type of furnace. The fact that a plant does not have SNCR installed does not per se prevent the possibility of installing SCR in a retrofit (including lower cost solutions such as slip catalyst in a plant already fitted with SNCR).
- The data gathered also shows that there are several plants using SNCR that are able to keep their NO_X emissions lower than 180 mg/Nm^3. For plants already fitted with SNCR, there are a number of cost-effective solutions available that would allow the improvement of the performance of their deNO_X system while containing the costs (e.g. slip catalyst, or advanced SNCR designs).

Validity of Cefic's supporting rationale:

- According to the split view, NO_X emissions up to 200 mg/Nm^3 are expected when waste with a high nitrogen content is incinerated irrespectively of the techniques applied to reduce them. The split view supports this statement based on the emission levels achieved by plants DE04, DE22, and DE33, proposed by Cefic as well-performing plants representing the higher end of the BAT-AEL range for NO_X emissions in such cases.
- However, DE22 does not use SNCR or SCR; it only reported the use of a low-NO_X burner (which at most is a technique effective for the reduction of thermal NO_X). DE04 and DE33 have SNCR but are grate incinerators burning hazardous wood waste. These plants do not seem therefore to be representative of plants burning waste with a high nitrogen content and their emissions do not appear to be an appropriate reference for such a case.

Validity of Eurits's supporting rationale:

- From the data assessment based on the plant-specific data that is presented by Eurits, it is not possible to derive a clear picture of which may be the drivers for higher emissions in the different examples, in particular the relative contributions of different potential factors such as the nitrogen content of the waste, the incineration temperature, the design and age of the plant, or operational factors.
- The TWG acknowledged that the incineration of certain wastes with a very high nitrogen content (examples of mono-streams of residues of the production of nitrogenous compounds with a nitrogen content of up to around 27 wt-%, which would generate extremely high NO_X concentrations in the raw flue-gas, were mentioned) may pose serious challenges to the feasibility of achieving very low NO_X levels such as those in the region of the lower end of the BAT-AEL range set in the draft BAT conclusions, even when using SCR. The validity of a similar argument regarding the higher end of the BAT-AEL range, which is not qualitatively distant from the limits that most of the plants currently in operation are required to meet, is undemonstrated. Furthermore, it is not entirely clear how this argument would fit with the condition of non-applicability of SCR, as it may be difficult to consider a plant without SCR suitable to incinerate streams of waste that generate extremely high NO_X concentrations.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the split views representing the opinion of the aforementioned TWG members do not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. These split views will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

6.4.4 Do not set BAT-AELs for channelled NO_X emissions to air for older WI plants with capacity lower than 6 t/h (DK)

Split view summary
DK proposes to add the following footnote to Table 5.5: "The BAT-AEL for NO_X does not apply to waste (co-)incineration plants covered by the definition of existing plants of IED Annex VI Part 1, and with a nominal capacity of 6 tonnes per hours or less".

The split view is accompanied by the following rationale

- BAT conclusions should not overrule the provision in the IED that existing plants (in the definition of IED) with a capacity of 6 tonnes/hour or less can be operated without SNCR/SCR.
- It is not without problems to retrofit small old plants with SNCR. The control of NH_3 injection can be difficult.
- The reduction of emission of NO_X is small compared with the costs of installing the equipment. According to Danish experience the investments cost is 0.5–0.7 million of euro per plant. Operation cost is 20 000 euro per year per plant.
- A plant that incinerates municipal waste without DeNOx abatement achieves daily emissions between 225 mg/Nm^3 and 350 mg/Nm^3. If the emission limits value is reduced to 180 mg/Nm^3, the reduction of NO_X from these small plants will be 12-35 tonnes NO_X per year.

Information on which the split view is based

- DK comments on D1.

EIPPCB assessment
The documents referred to in the split view were available on time.

Validity of the supporting rationale:

- The IED ELVs are considered a safety net, while BAT-AELs represent the performance achieved by plants applying best available techniques in accordance with the information gathered during the BREF review process.
- For the cost-benefits estimate of the retrofitting of deNO_X in smaller plants, see the assessment in Section 6.3.
- The data collection includes numerous examples of plants of the categories mentioned in the split view that have been successfully retrofitted with SNCR and SCR and that are achieving emission levels within the BAT-AEL range, even if it could be acknowledged that the retrofitting of these techniques may in certain cases pose some technical challenges that need to be overcome.
- The 2016 data collection includes the following plants with a capacity below 6 t/hour:
    - two lines that were put into operation before 2002 (PL06-1998 and DE21.1-1997), without SNCR or SCR, that are able to keep their emission lower than 180 mg/Nm^3;
    - two lines put into operation before 2002 and using SNCR (DK03-1991, IT16-2000) that are able to keep their emission lower than 180 mg/Nm^3;
    - three lines (DE20.1-1967, DE20.2-1983, NL04-1990) that were put into operation before 2002 and that are able to keep their NO_X emissions lower than 150 mg/Nm^3 with SCR.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of DK does not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

6.4.5 Decrease the higher and the lower end of the BAT-AEL range for channelled NH_3 emissions to air (AT, NL, EEB)

Split view summary

- AT proposes to decrease the lower end of the BAT-AEL range for NH_3 to 1 mg/Nm^3 for new and existing plants.
- AT and EEB propose to decrease the higher end of the BAT-AEL range for NH_3 to 5 mg/Nm^3 for new and existing plants.
- NL proposes to delete footnote ([3])
- EEB proposes to decrease to 8 mg/Nm^3 the higher end of the BAT-AEL range in footnote ([3]).
- EEB proposes to add the following footnote to the BAT-AEL range for existing plants: "the higher end of the BAT-AEL range can be achieved with high efficiency SNCR in combination with wet abatement techniques".

The AT, NL and EEB split view is accompanied by the following rationale

- 41 reference lines (18.7%) have a maximum daily average emission value lower than 1 mg/Nm³ (OP, OC1, ELV, 43).
- 56.2% of all reference lines already comply with an upper daily average BAT-AEL of 5 mg/Nm^3 (OP, OC1, ELV, 43).
- The data collection does not show a need for a less stringent higher end of the BAT-AEL range for NH_3 for plants with SNCR without a wet scrubber. According to the data, there are 75 reference lines with SNCR without wet scrubber. 62 of these reference lines meet the BAT-AEL of 10 mg/Nm^3. Only 3 out of the 75 reference lines emit between 10 and 15 mg/Nm^3. Therefore, there is no rationale for footnote ([3]). Furthermore, the environmental impact of ammonia should be taken into account, as it is nearly 3 times larger than NO_X. 1 mg of NH_3 will be oxidized in the environment into 2.7 mg NO_2. Therefore, an emission of 15 mg NH_3/Nm^3 equals 40 mg NO_X/Nm^3, which is substantial compared to the NO_X BAT-AEL.
- The level of 15 mg/Nm^3 in the current footnote ([3]) would allow polluters maximum flexibility and would not require the optimisation of DeNOx abatement for those using SNCR. The footnote would even reward those operators that use the less effective DeNOx systems compared to those operators that use SCR.

Information on which the split view is based

- BREF WI Review data collection.
- AT comments on D1 (#46, #47).
- EEB comments on D1.
- EEB input on high optimisation of SNCR in existing waste incineration plants, uploaded in BATIS on 14 February 2018 with data on ammonia slip.
- BREF Guidance and in particular aim of the BREF to *"serve as a driver towards improved environmental performance across the Union"*.

EIPPCB assessment

The documents referred to in the split view were available on time.

Validity of AT and EEB the supporting rationale for decreasing the lower and the higher end of the NH_3 BAT-AEL range:

- It is not clear to which data set AT and EEB refer when indicating that 41 lines show NH_3 emissions lower than 1 mg/Nm^3 when the filter OP, OC1, ELV, 43 is applied. Indeed according to the document "Tables and graphs for emissions to air – continuous monitoring" filtering the data on NH_3 emissions with the filter OP, OC1, ELV, 43, only 23 reference lines show emissions lower than 1 mg/Nm^3.

- In accordance with the BREF Guidance (Commission Implementing Decision 2012/119/EU), the higher end of the BAT-AEL range is derived by considering the range of performance associated with the application of the BAT under normal operating conditions.
- The assessment of the 2016 data collection made by AT and EEB to support their split view on decreasing the higher end of the NH_3 BAT-AEL range, refers to the data filter OP, OC1, ELV, 43, which according to the rationale of their split view represents the normal operating conditions for the incineration of waste.
- The number of reference lines showing daily emission levels (with the OP, OC1, ELV, 43 data filter) within 5 mg/Nm^3 is very similar (around 100 reference lines) to what AT and EEB have reported in their split view. The argumentation proposed by AT and EEB can therefore be considered substantively in line with the BREF Guidance.

Validity of the NL and EEB supporting rationale regarding footnote ([3]):

- It is not clear to which data filtering option the NL and EEB assessment of NH_3 emissions refers. The 2016 data collection includes reference lines with SNCR without a wet scrubber that achieve NO_X emission levels in the range of 90–150 mg/Nm^3 with NH_3 emissions close to 15 mg/Nm^3 (e.g. FR019, ES03.1, ES03.2). More generally, the data reported by NL and EEB (3 plants with SNCR and no wet scrubber reporting emission levels between 10 mg/Nm^3 and 15 mg/Nm^3) may have overlooked about 10 plants within the 10–15 mg/Nm^3 range, which report NH_3 emissions measured by continuous monitoring.
- No specific rationale is provided regarding the justification of a level of 8 mg/Nm^3 proposed by the EEB for plants fulfilling the conditions of footnote ([3]).

Validity of the EEB supporting rationale regarding the addition of footnote ([4]):

- No specific rationale has been provided for the proposed addition of footnote ([4]).

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the parts of the split view representing the opinion of AT and EEB in relation to decreasing the lower end of the BAT-AEL range for NH_3, of NL and EEB in relation to the modification of footnote ([3]), and of EEB in relation to the addition of footnote ([4]), do not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. These split views will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

The EIPPCB considers that the part of the split view representing the opinion of AT and EEB regarding the decrease of the higher end of the BAT-AEL range for NH_3 fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This part of the split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. A possible formulation of this spit view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 29, Table 5.5	*Decrease the higher end of the BAT-AEL range for NH_3 emissions to air*	*AT, EEB*	*5 mg/Nm^3*

6.5 BAT-AELs for TVOC, PCDD/F and PCBs emissions

Conclusion of the meeting
Slides 149 and 150 on BAT-AELs for TVOC, PCDD/F and PCBs emissions (Table 5.6).

Table 5.6: BAT-associated emission levels (BAT-AELs) for channelled emissions to air of TVOC, PCDD/F and dioxin-like PCBs from the incineration of waste

Parameter	Unit	BAT-AEL		Averaging period
		New plant	Existing plant	
TVOC	mg/Nm^3	< 3 – 10	< 3 – 10	Daily average
PCDD/F ([1])	ng I-TEQ/Nm^3	< 0.01 – 0.04	< 0.01 – 0.06	Average over the sampling period
		< 0.01 – 0.06	< 0.01 – 0.08	Long-term sampling period ([2])
PCDD/F + dioxin-like PCBs ([1])	ng WHO-TEQ/Nm^3	< 0.01 – 0.06	< 0.01 – 0.08	Average over the sampling period
		< 0.01 – 0.08	< 0.01 – 0.1	Long-term sampling period ([2])
([1]) Either the BAT-AEL for PCDD/F or the BAT-AEL for PCDD/F + dioxin-like PCBs applies. ([2]) The BAT-AEL does not apply if the emission levels are proven to be sufficiently stable.				

6.5.1 Decrease the lower end of the BAT-AEL range for TVOC (EEB)

Split view summary
EEB proposes to decrease the lower ends of the BAT-AEL ranges to < 2 mg/m^3.

The split view is accompanied by the following rationale

- According to the BREF Guidance, "for defining the lower end of the range, it is necessary to take the performance of plant(s) achieved under normal operating conditions by the BAT obtaining the best environmental performance".
- TVOC is an important parameter to indicate completeness of the combustion process which (in combination with low CO values) proves a high conversion of organic material into CO_2, at the same time indicating an energy efficient use of the fuel.
- TVOC is also an important indicator of the reduction of toxic organic pollutants (although not linear with their occurrence).
- If a low TVOC value is technically achievable and achieved by plants operating under "normal conditions", such low levels should be reflected in the BAT-AEL range.
- There are no cross-media effects linked with a low TVOC level reflecting complete combustion as low values can be achieved with optimised process control (optimised combustion temperature and retention time).
- TVOC data is available from continuous measurement of 302 installations whereof 156 installations report maximum daily TVOC emission levels below 2 mg/m^3 (applying the data assessment filter "OP, OC1, ELV, 43", hence not including AUX (Operation with only auxiliary fuel without waste being fed into the furnace), BREAK (Breakdown), FAILMON (Failure or malfunction of monitoring devices), MAINT (Regular maintenance), STOP (Line out of operation).
- This means that 51.7 % of the reported TVOC maximum daily emission values obtained under normal operation conditions are already below the proposed level of 2 mg/m^3.
- Already at present, uncertainty is not an issue at the TVOC level lower 2 mg/m^3 as continuous measurement devices are available certified for "lowest range ≤ 1.2 mg/m^3 (LoQ req.) measured with EN 12619:2013" (see ROM final draft page 125).

Information on which the split view is based

- Graphs and tables related to BAT-AELs proposed in the revised BAT conclusions for the final TWG meeting - EMISSIONS TO AIR, JRC European Commission: Review of the BREF for Waste Incineration (WI BREF), April 2018.
- Plant data from the questionnaires.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- The filter that only excludes the operating conditions marked as AUX, BREAK, FAILMON, MAINT, and STOP (combined with operating parameters) is the filter "OP, OC2". The filter "OP, OC1, ELV, 43" is more stringent and also excludes, for instance, the start-up and shutdown phases where waste is being combusted in the furnace. In these situations it is not uncommon for WI plants to experience TVOC emission peaks.
- However, a substantial share of the plants of the 2016 data collection report emission levels that result in daily emission levels below 2 mg/Nm^3 even when derived with less stringent data filters. There are indeed 56 plants, covering different plant sizes, processes and types of waste burnt, that reported emissions lower than 2 mg/Nm^3 even without applying any data filter (raw).

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of EEB fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

A possible formulation of this spit views could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 30, Table 5.6	*Decrease the lower end of the TVOC BAT-AEL range*	*EEB*	*< 2 mg/Nm^3*

6.5.2 Decrease the higher end of the BAT-AELs ranges for PCDD/F and PCDD/F + dioxin-like PCBs (AT, BE, EEB, NL)

Split view summary

AT, BE and EEB propose to decrease the higher end of the BAT-AEL range for emissions of PCDD/F measured by long-term sampling to 0.04 ng I-TEQ/Nm^3 for new plants and to 0.06 ng I-TEQ/Nm^3 for existing plants.

AT and BE propose to decrease the higher end of the BAT-AEL range for emissions of PCDD/F + dioxin-like PCBs as long-term sampling to 0.06 ng I-TEQ/Nm^3 for new plants and to 0.08 ng I-TEQ/Nm^3 for existing plants.

NL proposes to decrease the higher end of the BAT-AEL range for emissions of PCDD/F for existing plants to 0.06 ng I-TEQ/Nm^3 as long-term sampling and to 0.04 ng I-TEQ/Nm^3 as an average over the sampling period.

Additionally, BE proposes to delete footnote ([2]) from Table 5.6. This is closely related to the BE split view assessed in Section 0.

The AT and EEB split view is accompanied by the following rationale

- Long-term sampling results in lower emission concentrations, as possible spikes/peaks are levelled out due to the longer sampling period, if start-up periods are not included. Thus, the emission concentrations for long-term sampling periods should be lower than or equal to those for spot sampling.
- Data derived from the questionnaires show that 46 lines have no long-term average higher than 0.4 ng I-TEQ/Nm³ and only 12 lines (not exceeding the ELV) report maximum emissions above 0.4 ng I-TEQ/Nm³. All these data are from existing plants. Most plants with higher PCDD/F emissions have no adsorption bed and some have no activated carbon injection.
- New data from the BE plants comparing long-term and short-term averaging show that 7 plants report higher emissions as short term average(s) than as long-term averages, and only 3 plants behave the other way around, without any explanation for this.
- BAT-AELs should be derived from qualified data. From anonymous data without knowledge of abatement techniques used and operating conditions (NOC/OTNOC), no qualified BAT-AELs can be derived.
- The new data on long-term and short-term sampling provided in March 2018 shows that 90% of the long-term sampling values compared to 96% of the short-term sampling values are below 0.06 ng I TEQ/Nm^3. The graphs show very little difference between long- and short-term sampling data.
- Only 4% of the submitted long-term sampling values are above 0.08 ng I-TEQ/Nm^3. Therefore the environmental benefit of setting a BAT AEL of 0.08 ng I-TEQ/Nm^3 would be poor and just corresponds to the currently observed emission levels.
- The excel sheet for the data compilation provided by the EIPPCB shows that only 10% of the values of the short-term measurements and approximately 15% of the long-term values were above 0.06 ng I-TEQ/Nm^3. Compared with other parameters for which BAT-AELs were derived in this BREF, only 15% of the plants do not achieve the proposed higher value of 0.04 / 0.06 ng I-TEQ/Nm^3, indicating the levels set do not reflect BAT performance.

The BE split view is accompanied by the following rationale

- Looking at the emission levels, there is no reason to set long-term average PCDD/F BAT-AELs higher than the short-term averages. For the Belgian plants, the semi-continuous measurements are consistently lower than the periodic measurements, and 95% of the semi-continuous measurements are even below 0.02 ng I TEQ/Nm^3.
- Concerning the differences between French and Belgian PCDD/F periodic and semi-continuous data, BE received extra information from a Belgian company measuring emissions at several Belgian waste incinerators, and from the French TWG-representatives. This information is not enough to conclude that PCDD/F emission values are higher if measured with long-term sampling.
- Performing only periodic measurements for PCDD/Fs do not have a significant added value. It is namely quite easy for operators with a wet scrubber to add carbon sorbent in the period the measurement takes place to prevent having high levels of dioxins in this period. By this, the measured levels for PCDD/F will be easily result in low values. So only a periodic measurement will not give an insight in the environmental performance of a plant for PCDD/F. On the other hand, long-term sampling only gives an indication of the total dioxin emissions to the environment and not whether the plant is operated well on a shorter timescale.

The NL split view is accompanied by the following rationale

- The techniques applied to prevent or reduce PCDD/F emissions are the same for new and existing plants.
- The data collected by the EIPPCB do not show a significant difference in emission levels between new and existing plants.

Information on which the split view is based

- Data collection.
- IED Article 3(13).
- AT comments on the Draft BAT conclusions.
- Stockholm Convention on Persistent Organic Pollutants.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- The data gathered shows that for some (although not for all) plants, e.g. the Belgian plants, there is little difference between PCDD/F emissions measured with short-term or with long-term sampling.
- The data collection by definition covers existing plants: the distinction between new and existing plants is based on the lesser design constraints applying to greenfield projects, which result in new incineration plants being able to achieve a better performance more easily. This is of importance in particular for the effectiveness of primary, preventive techniques.
- The assessment on the BE proposal to delete footnote ([2]) is in Section 0 of this document.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the part of the split view representing the opinion of NL does not fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

The EIPPCB considers that the parts of the split view representing the opinion of AT, BE and EEB fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. These parts of the split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

A possible formulation of this split view could be:

BAT conclusion	*Dissenting view*	*Expressed by*	*Alternative proposed level (if any)*
BAT 30, Table 5.6	*Decrease the higher end of the BAT-AEL range for PCDD/F emissions to air measured with long-term sampling.*	*AT, BE, EEB*	0.04 ng I-TEQ/Nm^3 *for new plants* 0.06 ng I-TEQ/Nm^3 *for existing plants*
	Decrease the higher end of the BAT-AEL range for PCDD/F + dioxin-like PCBs emissions to air measured with long-term sampling.	*AT, BE*	0.06 ng I-TEQ/Nm^3 *for new plants* 0.08 ng I-TEQ/Nm^3 *for existing plants*
	Delete footnote ([2])	*BE*	*NA*

6.6 Add yearly and half-hourly BAT-AELs for Hg emissions to air (EEB)

Conclusion of the meeting
Slides 160 and 161 on BAT-AELs for Hg emissions (Table 5.7).

Table 5.7: BAT-associated emission levels (BAT-AELs) for channelled emissions to air of mercury to air from the incineration of waste

Parameter	BAT-AEL (µg/Nm^3) ([1])		Averaging period
	New plant	Existing plant	
Hg	< 5–20	< 5–20 ([2])	Daily average or average over the sampling period
	1–10	1–10	Long-term sampling period

([1]) Either the BAT-AEL for daily average or average over the sampling period, or the BATAEL for long-term sampling period, applies. The BAT-AEL for long-term sampling may apply in the case of plants incinerating waste with a proven low and stable mercury content (e.g. mono-streams of waste of a controlled composition).

([2]) The lower end of the BAT-AEL ranges may be achieved when:

- **incinerating wastes with proven low and stable mercury content (e.g. mono-streams of waste of a controlled composition), or**
- **using specific techniques to prevent or reduce the occurrence of mercury peak.**

The higher end of the BAT-AEL ranges may be associated with the use of dry sorbent injection.

As an indication, the half-hourly average mercury emission levels will generally be:

- < 15–40 µg/Nm^3 for existing plants;
- < 15–35 µg/Nm^3 for new plants.

Split view summary

EEB proposes:

- to add a BAT-AEL for mercury emissions to air of < 0.5–5 µg/m^3 as a yearly average for new and existing plants.
- to remove the indicative half-hourly emission levels and set instead BAT-AELs.

The split view is accompanied by the following rationale

Rationale on BAT-AELs as half-hourly averages:

- Hg is a toxic heavy metal which enriches in the food chain and can lead to health risks for humans. Hg is classified as Priority Hazardous Substance (PHS) under the EU Water Framework Directive, which dictates that any emission should be phased out, therefore the air route is covered as well. Mercury is regulated by the Minamata Convention which was ratified by the EU.
- In order to avoid mercury peaks, BAT-AELs for half hourly values should be set. This is also consistent with the IED, which sets for mercury a half-hourly ELV of 50 µg/Nm³ dating back from 2006 and constitutes negative progress compared to the previous 2006 WI BREF, where a half-hourly BAT-AEL range of 1-30µg/Nm³ was set.
- The proposed levels are supported by the data reported by many reference plants.
- The EEB objects "Indicative" BAT-AEL, as these are foreseen neither by the BREF Guidance nor by the IED, and may risk not getting implemented due to doubts on their binding nature. Measures to reduce peaks would be taken later (to prevent peak values of 0.05 mg/Nm^3 as required by the IED) than if lower levels were established as BAT-AELs.

Rationale on BAT-AEL as a yearly average:

- Hg is a toxic heavy metal which accumulates in the food chain and can lead to health risks for humans. Hg is classified as priority hazardous substance (PHS) under the EU water framework directive, which dictates that any emission should be phased out, therefore the air immission route is covered as well. Mercury is regulated by the Minamata Convention which was ratified by the EU.
- In order to reduce and push for the reduction of a higher number of mercury peaks during the year, BAT-AELs for yearly averages should be set in addition to the BAT-AELs for daily averages.
- The data shows that approximately 85% of the plants that are part the data collection using continuous measurements achieve values below 5 μg/Nm^3.
- For long-term sampling, a BAT-AEL of 1–10 μg/Nm^3 was set at the final meeting. Accordingly, for continuous measurement a BAT-AEL should be set for long-term averaging (here one year).
- The yearly average should be significantly lower than the daily average as daily average variations are levelled out.
- All types of waste incineration plants including hazardous waste incineration plants are able to achieve the proposed higher end of the range (5 μg/Nm^3).
- The guidance paper on waste incineration based on Art. 8 of the Minamata Convention recommends a yearly average for mercury.

Information on which the split view is based

- Data collection.
- Minamata Convention, Article 8 recommending to take measures to reduce emissions of Hg from sources like waste incineration, listed in Annex D of the Convention.
- Water Framework directive 2000/60/EC and EQS Directive 2013/39/EU.
- Comments of EEB on D1.
- Guidance on best available techniques and best environmental practices - Waste Incineration Facilities - UN Environment 2016.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

Rationale on BAT-AELs as half-hourly averages:

- The IED does not include any half-hourly ELV for Hg, but an ELV based on periodic monitoring.
- The data collected for the WI BREF review includes continuously monitored Hg emission data, reported on the half-hourly averaging period, for 90 reference lines monitoring Hg continuously and incinerating wastes of different types.
- Mercury emissions from waste incineration plants are highly dependent, in the short term, on the mercury input present in the waste. The commonality of observing mercury peaks in a large number of waste incineration plants is also reflected in the data of the 2016 data collection, and highlighted by the substantial differences that are often seen on the averaging period of half an hour when determining emission performance levels with different data filtering options.
- BAT 31 includes techniques that can be considered effective at preventing (e.g. fixed- or moving- bed adsorption with sufficiently high capacity) or controlling mercury peaks when they are detected (e.g. injection of bromine or of reagent-doped activated carbon connected with the continuous monitoring of mercury in the raw gas). Information on these techniques has been also gathered during the WI BREF review through site visits (Austrian WI plants for fixed bed adsorption, Limay plant for bromine injection).

Rationale on BAT-AEL as a yearly average:

- BAT-AELs expressed as a yearly average are in general a useful representation of the performance of the plant in the long term. The long-term performance in most cases reflects not only the appropriateness of the techniques applied, but also how the plant is maintained and operated.
- A level of 5 μg/Nm^3 as the higher end of the yearly BAT-AEL range was not discussed at the final meeting (the EEB proposal was 10 μg/Nm^3, which was not agreed by the TWG). A split view can only relate to a discussion held at the FM.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the part of the split view representing the opinion of the EEB regarding the setting of a half-hourly and a yearly BAT-AEL fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. These part of the split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. The EIPPCB further considers that the part of the split regarding the proposed level does not fulfil the same conditions and will therefore not be reported.

A possible formulation could be:

BAT conclusion	*Dissenting view*	*Expressed by*	*Alternative proposed level (if any)*
BAT 31, Table 5.7	*Set a BAT-AEL for Hg emissions to air expressed as a yearly average*	*EEB*	NA
	Remove the half-hourly indicative emission levels and set a BAT-AEL for Hg emissions to air expressed as a half-hourly average	*EEB*	NA

7 EMISSIONS TO WATER

Conclusion of the meeting
Slides 174-180 on BAT-AELs for direct and indirect emissions to a receiving water body BAT 34 Tables 5.8 and 5.9.

Table5.8: BAT-AELs for direct emissions to a receiving water body

Parameter		Process	Unit	BAT-AEL ([1])
Total suspended solids (TSS)		FGC Bottom ash treatment	mg/l	10–30
Total organic carbon (TOC)		FGC Bottom ash treatment		15–40
Metals and metalloids	As	FGC		0.01–0.05
	Cd	FGC		0.005–0.03
	Cr	FGC		0.01–0.1
	Cu	FGC		0.03–0.15
	Hg	FGC		0.001–0.01
	Ni	FGC		0.03–0.15
	Pb	FGC Bottom ash treatment		0.02–0.06
	Sb	FGC		0.02–0.9
	Tl	FGC		0.005–0.03
	Zn	FGC		0.01–0.5
Ammonium-nitrogen (NH_4-N)		Bottom ash treatment		10–30
Sulphate (SO_4^{2-})		Bottom ash treatment		400–1 000
PCDD/F		FGC	ng I-TEQ/l	0.01–0.05
([1]) The averaging periods are defined in the General considerations.				

Table 5.9: BAT-AELs for indirect emissions to a receiving water body

Parameter		Process	Unit	BAT-AEL ([1]) (daily average)
Metals and metalloids	As	FGC	mg/l	0.01–0.05
	Cd	FGC		0.005–0.03
	Cr	FGC		0.01–0.1
	Cu	FGC		0.03–0.15
	Hg	FGC		0.001–0.01
	Ni	FGC		0.03–0.15
	Pb	FGC Bottom ash treatment		0.02–0.06
	Sb	FGC		0.02–0.9
	Tl	FGC		0.005–0.03
	Zn	FGC		0.01–0.5
PCDD/F		FGC	ng I-TEQ/l	0.01–0.05
([1]) The BAT-AELs may not apply if the downstream waste water treatment plant is designed and equipped appropriately to abate the pollutants concerned, provided this does not lead to a higher level of pollution in the environment.				

7.1 Increase the BAT-AEL ranges for As, Cd, Cr, Cu, Ni, Pb, Sb, Tl, Zn emissions (CEWEP, ESWET, FEAD, Eurits, HWE, Euroheat & Power)

Split view summary
CEWEP, ESWET, FEAD, Eurits, HWE, Cefic and Euroheat & Power propose to increase the lower end of the BAT-AEL range for the following pollutants:

- As, to 0.02 mg/l;
- Zn, to 0.1 mg/l.

CEWEP, ESWET, FEAD, Eurits, HWE and Cefic propose to increase the lower end of the BAT-AEL range for the following pollutants:

- Cd, to 0.01 mg/l;
- Cu, to 0.05 mg/l;
- Ni, to 0.05 mg/l;
- Pb, to 0.05 mg/l.

CEWEP, ESWET, FEAD and Euroheat & Power propose to increase the lower end of the BAT-AEL range for Sb to 0.3 mg/l.

CEWEP, ESWET, FEAD, Eurits, HWE, Cefic and Euroheat & Power propose to increase the upper end of the BAT-AEL range for the following pollutants:

- As, to 0.1 mg/l;
- Zn, to 1.5 mg/l.

CEWEP, ESWET, FEAD, Eurits, HWE and Cefic propose to increase the upper end of the BAT-AEL range for the following pollutants:

- Cd, to 0.05 mg/l;
- Cr, to 0.3 mg/l;
- Cu, to 0.5 mg/l;
- Ni, to 0.5 mg/l;
- Pb, to 0.2 mg/l.

The split view on As is accompanied by the following rationale (submitted by CEWEP-ESWET)

- In the case of high Chloride content (> 25gCl/l), as encountered in the FGC effluents of incineration plants, available standards listed in BAT 7 applied by different certified laboratories show high uncertainty and different values at low concentration such as 0.01 mg/l.

The split views on As, Cd, Cr, Cu, Ni, Pb, Zn are accompanied by the following rationale (submitted by Eurits and HWE)

- The data collection mixes very different situations and dilutes the cases where the conditions of monitoring, the whole treatment process, the segregation systems of different water streams and the type of discharge are more stringent than others. All the data have been taken into account without differentiating the cases where:
    - the waste water treatment plant is shared or not,
    - the discharge is direct or indirect,
    - there is a real segregation of the collection system and the treatment system for process water from the wet FGC system and other water streams,
    - the minimum monitoring frequency.
- The monitoring frequency is also important in that, although the data appears to have several hundred data points, in reality many of those data points are from the same

plant(s), particularly those with increased monitoring frequency. For many of the water parameters the 2 or 3 plants that reported daily values are typically at the high end or above the proposed BAT-AEL range.

- There is a real impact on the level of emissions depending on all the above-mentioned parameters. In addition, the type of waste water input and the techniques used for its treatment are similar to the ones used for the treatment of waste water in water-based liquid waste treatment plants described in the Waste Treatment (WT) BREF (in some cases they will be the same plant shared for different purposes). Consequently, for the sake of consistency between BREFs, which was one of the conditions expressed the first day of the final meeting (Slide 27, 3rd presentation on April 23 "Final Meeting of the Technical Working Group (TWG) for the review of the BAT reference document on Waste Incineration (WI BREF)"), there is no reason why the BAT-AELs would be different in the WI BREF taking into account the safety net of the ELVs in Annex VI to the IED.

The split view on Sb is accompanied by the following rationale (submitted by CEWEP-ESWET)

- In case of high chloride content (>25gCl/l), as encountered in waste water from the wet FGC system in WtE plants, when using BAT 34.f to BAT34.n listed in together, except "j." (additional Reverse Osmosis is not applicable due to high salt content) in waste incineration water treatment (FGC already equipped with ESP), Sb can be in different oxidised forms as oxyanion or other and elimination is limited even with specific ion exchange. A total efficiency of 40% can be achieved from 0.4 mg/l (leading to 0.26 mg/l). If inlet value is lower than 0.4 mg/l, better results can be achieved but with a more limited efficiency.

The split view on Zn is accompanied by the following rationale (submitted by CEWEP-ESWET)

- In the case of high chloride content (> 25gCl/l), as encountered in WtE plants FGC effluents, when using techniques "f." to "n." listed in BAT34 together, except "j." (additional Reverse Osmosis is not applicable due to high salt content) in Waste Incineration Water Treatment (FGC already equipped with ESP), the Zn concentration is higher than 0.01 mg/l and up to over 0.03 mg/l, and its elimination is limited even with ion exchange.

Additional arguments provided by Eurits and HWE as comments to the EIPPCB´s split view assessment shared in BATIS on 28 September 2018

- In the split view assessment shared in BATIS on 28 September 2018, the EIPPCB has considered valid the rationale for increasing the higher end of the BAT-AEL range on nickel, yet rejected the rationales presented for all other metals. This seems inconsistent, particularly as the argument used is that one German plant has a reported maximum emission approaching 0.5mg/l, yet for other metals similar plants reporting higher emissions that could follow the same justification for particular parameters are discarded. The argument used is that those plants fail to meet the IED-ELVs for different pollutants, which is irrelevant given that the pollutants are considered individually and not as a group parameter. Eurits and HWE would welcome considering cross-media impacts in much greater detail, but this would mean a substantial piece of work. In the given circumstances, allowing such disqualification of certain data by considering them as "group" data is not acceptable and entirely inconsistent, as the split view assessment implies that if a plant reports data on e.g. Cd which meets the IED ELVs, then the EIPPCB has discarded that value if the same plant exceeds any of the IED-ELVs values for other pollutants.

Information on which the split view is based

- CEWEP-ESWET comments on the revised WI BAT conclusions.
- Eurits and HWE comments on the revised WI BAT conclusions.
- 2016 data collection.

EIPPCB assessment

The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- The data collection for emissions to water from waste incineration plants concerns waste water coming from the wet FGC system. This implies that chloride is always present. There are several plants that performed many As emission measurements, reporting concentrations lower than the lower end of the BAT-AEL range set.
- In principle, increasing salt concentrations make any chemical analysis more difficult. This is reflected in some standards that refer to chloride as a potential source of interference, e.g. EN ISO 17294-1 refers to the potential formation of polyatomic ions and EN ISO 15586 to the potential loss of analytes due to the volatilisation of metal chlorides from the furnace. Nevertheless, a number of possibilities should exist to work around those limitations: 1) The best method among the ones given in the BAT conclusions could be chosen, i.e. EN ISO 17294-1 (ICP-MS). 2) The samples could be diluted before analysis. If a sample shows a pollutant level around the proposed lower end of the BAT-AEL range (i.e. 10 µg/l for As), it could be diluted by one tenth and the resulting concentrations would still be a factor of 10 higher than the LoQ given in EN ISO 17294-1. 3) The standards also provide procedures to reduce the effect of the sample matrix, e.g. matrix-matching, addition of internal standards, or the method of standard addition.
- It is not clear why the split views consider that the data on waste water emissions are diluted and that the characteristics of the streams and of the waste water treatment plants have not been taken into account. It is noted for instance that, before the final meeting, for all pollutants the EIPPCB provided the TWG with separate graphs on emissions to water depending on the type of discharge, one for direct discharges only, the other also including indirect discharges.
- Before the final meeting, the EIPPCB provided the TWG with graphs where only one line per plant is represented, which also report whether the discharge is direct or indirect, and the number of samples taken over the year. This was done to provide the TWG with broader information also regarding the representativeness of the data.
- Where enough data is available, BAT-AELs for each sector are primarily determined taking into account the performance of the sector under investigation rather than transposing BAT-AELs set for other sectors. Accordingly, neither the BAT-AELs of the LCP BREF for the treatment of waste water from flue-gas cleaning nor the BAT-AELs of the WT BREF were transposed to the waste incineration sector. It is further noted that waste water streams in waste treatment installations can be very different from those typical of waste incineration plants. For example, water-based liquid waste could contain high concentrations of organic compounds, which is usually not the case in waste water streams from waste incineration plants.
- Regarding the argument that in cases where an installation includes both a HWI plant and a water-based liquid waste treatment plant it may happen that the same WWT plant treats the effluents of both sources, it should be noted that in the case of the WI BREF review the data provided was meant to be representative of WI plants, and analogously -in the case of the WT BREF review- of WT plants. Cases where the combined treatment of different effluents is carried out are to be considered implementation issues.
- The TWG asked the EIPPCB to take into account the performance of the plant looking not only at the performance level achieved for the single pollutant, but also for the other pollutants emitted. This is consistent with an integrated approach.

- As per the BREF Guidance, for defining the lower end of the range, it is necessary to take the performance of plant(s) achieved under normal operating conditions by the BAT obtaining the best environmental performance as provided in the information exchange.
- Regarding the representativeness of data, we note that data analysis that supported the setting of the BAT-AELs for emissions to water included the emissions reported by around 50 plants. This is considered a fully adequate data set for the setting of BAT-AELs. We remark in fact that this number is even higher than the total number of WI reference lines that submitted air emission data and that incinerate predominantly hazardous waste or sewage sludge.
- When examining in particular the plants of the 2016 data collection that reported more frequent monitoring (e.g. at least one water sample per week in 2014), the following is found:
    - For As, there is no plant that reported maximum water emissions of As of 0.1 mg/l. Regarding the lower end of the range, Plants DE17 and SE02 report maximum As levels substantially lower than 0.02 mg/l.
    - For Cd, the plant potentially supporting a higher end of the BAT-AEL range of 0.05 mg/l is Plant FR109, which however does not meet the ELVs of IED Annex VI for other water pollutants. Regarding the lower end of the range, Plants DE15, SE02 and NL05 report maximum Cd levels substantially lower than 0.01 mg/l.
    - For Cr, the plant potentially supporting a higher end of the BAT-AEL range of 0.3 mg/l is Plant DE23, which however does not meet the ELVs of IED Annex VI for other water pollutants.
    - For Cu, the plant potentially supporting a higher end of the BAT-AEL range of 0.5 mg/l is Plant FR108, which however does not meet the ELVs of IED Annex VI for other water pollutants. Regarding the lower end of the range, Plants DE21, SE02 and NL05 report maximum Cu levels substantially lower than 0.05 mg/l.
    - For Ni, DE18, reporting a maximum emission level of 0.41 mg/l, may support a higher end of the BAT-AEL range of 0.5 mg/l. Regarding the lower end of the range, Plants SE02 and NL05 report maximum Ni levels substantially lower than 0.05 mg/l.
    - For Pb, there is no plant that reported maximum water emissions of Pb of 0.2 mg/l. Regarding the lower end of the range, Plants DE15, SE02 and NL05 report maximum Pb levels substantially lower than 0.05 mg/l.
    - For Zn, the plant potentially supporting a higher end of the BAT-AEL range of 1.5 mg/l is Plant FR108, which however does not meet the ELVs of IED Annex VI for other water pollutants. Regarding the lower end of the range, Plants DE15 and NL05 report maximum Zn levels substantially lower than 0.1 mg/l.
- Sb treatment in waste water is complicated by the fact that it can be present in several oxidation states (Sb(-III), Sb(0), Sb(III) and Sb(V)). In environmental, biological and geochemical matrices, Sb usually occurs as Sb(III) and Sb(V). Sb in water can be precipitated using several iron-based reagents. For example, AT03 and AT11 have waste water treatment plants treating mainly waste water coming from their scrubbers, using ferric chloride as reagent and reporting Sb levels lower than 0.01 mg/l.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the part of the split view representing the opinion of the aforementioned TWG members regarding the increase of the upper end of the Ni BAT-AEL range fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This part of the split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF. Conversely, the EIPPCB considers that the other parts of the split view do not fulfil the same conditions.

A possible formulation could be:

BAT conclusion	*Dissenting view*	*Expressed by*	*Alternative proposed level (if any)*
BAT 34, *Tables 5.8 and 5.9*	*Increase the higher end of the BAT-AEL range for Ni*	*CEWEP, ESWET, FEAD, Eurits, HWE and Cefic*	0.5 mg/l

7.2 Decrease the BAT-AEL ranges for Cd, Hg, Ni and Sb emissions (AT, EEB)

Split view summary

EEB proposes to change the lower end of the BAT-AEL range for Cd to <0.005 mg/l.

EEB proposes to decrease the higher end of the BAT-AEL range for Cd to 0.01 mg/l.

EEB proposes to decrease the higher end of the BAT-AEL range for Hg to 0.003 mg/l.

EEB proposes to decrease the higher end of the BAT-AEL range for Ni to 0.1 mg/l.

AT proposes to decrease the higher end of the BAT-AEL range for Sb to 0.2 mg/l.

The split view on Cd is accompanied by the following rationale

- The higher end of the range is set on the basis of reference plants FR076 and R571 (30 best out of 50 values, reflecting the performance of 60% of the plants in the data collection). Plant FR076 is only equipped with a coagulation/flocculation unit. However, more than 50% of the plants meet emission levels lower than 0.01 mg/l. Most of these plants work with a combination of adsorption, sedimentation and coagulation/flocculation and chemical precipitation. The same technique combination is used with plants which show emission levels between 0.01 and 0.03 mg/l. This indicates that with this combination of techniques an emission level far below the concluded higher value of the BAT-AEL range can be achieved.
- The data collection shows that there are several plants which have to meet emission limit values below 0.03 mg/l (DK01, NL06, DK02.1, IT1.1, NO03.1). Most of these plants are also equipped with a combination of sedimentation and coagulation/flocculation and chemical precipitation.
- 40% of the plants achieve levels below 0.005 mg/l.
- All types of waste incineration plants including hazardous waste incineration plants are able to achieve the proposed higher end of the range (0.01 mg/l).

The split view on Hg is accompanied by the following rationale

- The higher end of the BAT-AEL range is set on the basis of reference plant SE02 (33 best out of 50). However, 50% of the plants meet emission levels lower than 0.003 mg/l. Most of these plants apply a combination of adsorption, sedimentation and coagulation/flocculation and chemical precipitation. The same technique combination is used by plants which show emission levels between 0.001 and 0.01 mg/l. This indicates that with this combination of techniques emission levels far below the concluded higher value of the BAT AEL range can be achieved.
- Additionally, the data collection shows that there are several plants which have to meet emissions limit values below 0.01 mg/l (DK01, DK02.1, DK06). Most of these plants are also equipped with a combination of sedimentation and coagulation/flocculation and chemical precipitation.

The split view on Ni is accompanied by the following rationale

- The higher end of the BAT-AEL range is set on the basis of reference plant ES11 (38 best out of 50, reflecting 76% of the data collected). However, 60% of the plants meet emission levels lower than 0.1 mg/l. Most of these plants work with a combination of adsorption, sedimentation and coagulation/flocculation and chemical precipitation which is a standard combination of techniques to reduce water emissions. The same technique combination is used with plats which show emission levels between 0.1 and 0.15 mg/l. This indicates that with this combination of technologies emission level far below the concluded higher value of the BAT-AEL range can be achieved.
- Only 3 plants out of 50 show emission levels between 0.1 and 0.15 mg/l.

- The data collection shows that there are several plants which have to meet emissions limit values below 0.01 mg/l (DK01, NO03, BE03). Most of these plants are also equipped with a combination of sedimentation and coagulation/flocculation and chemical precipitation.
- All types of waste incineration plants including hazardous waste incineration plants are able to achieve the proposed higher end of the BAT-AEL range (0.1 mg/l).

The split view on Sb is accompanied by the following rationale

- Comparing to other heavy metals taking into account their toxicity (e.g. Zn (lower toxicity, higher BAT-AEL 0.5 mg/l) and Cr (higher toxicity, higher BAT-AEL 0.1 mg/l)) the higher end of the BAT-AEL range for Sb of 0.9 mg/l is too high.
- The higher end Sb BAT-AEL range should not be higher than the value defined by the existing BREF WI dating from 2006, which is 0.85 mg/l.
- All Austrian waste incinerators have managed to comply with an ELV of 0.2 mg/l for direct and for indirect emissions for 15 years now.
- During the BREF WI Review data collection, Austrian operators reported for Sb:
    - maximum daily averages: 0.01 – 0.19 mg/l.

Information on which the EEB split view is based

- 2016 data collection.

Information on which the AT split view is based

- WI BREF review data collection.
- "AT Contribution on State-of-the-Art (BAT) in Waste Incineration (EN)", uploaded on BATIS on January 27 2017.
- Austrian Ordinance on Water Emissions from the Cleaning of Flue Gas from Incineration (AEV Verbrennungsgas, BGBl. II Nr. 271/2003, issued on May 27th, 2003).
- Comment on D1 AT-145.

EIPPCB assessment

The documents and information referred to in the split view were available on time. The Austrian ordinance was not referenced in this context prior to the final meeting.

Validity of the supporting rationale of the split view on Cd:

- The usual technique to reduce Cd emissions is chemical precipitation. Sedimentation and coagulation/flocculation are used to remove the solid particles formed during the precipitation, thereby improving the waste water treatment performance. These techniques are also used to abate other metals in the waste water.
- The performance of the waste water treatment plant should be evaluated taking into account not only the performance with regards to the removal of a single pollutant, but the emissions levels achieved for a range of metals, while taking into account the variability of incineration conditions, e.g. with respect to the type of waste input.
- Among the well-performing plants proposed by the EEB to represent the higher end of the BAT-AEL range for Cd, DK01 and DK02 are able to keep the emission levels for all the metals within the concluded BAT-AEL range and also within the levels proposed in the EEB split view.
- In accordance with the BREF Guidance, the use of an expression of the type "less than" is appropriate when the lower end of the BAT-AEL range cannot be accurately defined (e.g. when data are close to the limit of detection).
- The LoQ for the measurement of Cd is around 0.1/0.2 µg/l depending on the method used, i.e. substantially lower than the lower end of the range of 5 µg/l agreed at the FM.

Validity of the supporting rationale of the split view on Hg:

- The performance of the waste water treatment plant should be evaluated taking into account not only the performance with regards to the removal of a single pollutant, but the emission levels reached in terms of emissions of a range of metals.
- Among the plants that reported maximum Hg emissions in 2014 between 0.003 mg/l and 0.01 mg/l there are several plants that are generally performing well when compared with the BAT-AELs set, but with some improvements needed for removing metals at least for one parameter (e.g. As for NL05, Cu for UK01, Cr for AT11, Tl for AT05 and FR87, Zn for SE02).
- Among the well-performing plants proposed by EEB, DK01 and DK02 are able to keep all the metal emissions in the concluded BAT-AEL range, and also within the levels proposed in the EEB split view.

Validity of the supporting rationale of the split view on Ni:

- The usual technique to reduce Ni emissions is chemical precipitation. Sedimentation and coagulation/flocculation are used to remove the solid particles formed during the precipitation, thereby improving the waste water treatment performance. These techniques are also used to abate other metals in the waste water.
- The performance of the waste water treatment plant should be evaluated taking into account not only the performance on a single pollutant, but the emissions levels reached in terms of emissions of a range of metals.
- Among the well-performing plants proposed by EEB, DK01 is able to keep all the metal emissions in the concluded BAT-AELs range, and also within the levels proposed in the EEB split view. Plant DK02 seems to also fulfil the same conditions.

Validity of the supporting rationale of the split view on Sb:

- Annex VI to the IED does not set an ELV for Sb emissions to water; this explains why not all the plants reported Sb emissions.
- BAT-AELs are derived taking into account the techniques used by the plants and their performance levels as reported by questionnaires.
- The performance of the waste water treatment plant should be evaluated taking into account not only the performance on a single pollutant, but the emissions levels achieved in terms of a range of metals.
- Most of the well-performing plants proposed by AT to represent the higher end of the Sb BAT-AEL range are able to keep all the metal emissions within the BAT-AEL range. Only AT04 and AT05 would need to slightly improve their performance in relation to one or two parameters.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers the parts of the split view representing the opinion of the aforementioned TWG members in relation to the higher ends of the BAT-AEL ranges fulfil the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This part of the split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

The EIPPCB considers, conversely, that the part of the split view regarding the lower end of the BAT-AEL range does not fulfil the same conditions. This part of the split view will therefore not be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

A possible formulation of this split view could be:

BAT conclusion	*Dissenting view*	*Expressed by*	*Alternative proposed level (if any)*
BAT 34, Tables 5.8 and 5.9	*Decrease the higher end of the BAT-AEL ranges for Cd, Hg, Ni and Sb emissions to water*	*EEB*	Cd: 0.01 mg/l
			Hg: 0.003 mg/l
			Ni: 0.1 mg/l
		AT	Sb: 0.2 mg/l

8 MATERIAL EFFICIENCY

8.1 Require the separate treatment of bottom ash and fly ash (EEB)

Conclusion of the meeting
Slide 182 on BAT 35.

BAT 35. In order to increase resource efficiency, BAT is to handle and treat bottom ashes separately from FGC residues.

Split view summary
EEB proposes to modify the BAT statement specifying that BAT is to handle and treat bottom ashes separately from fly ashes.

The split view is accompanied by the following rationale

- If bottom ash is mixed with fly ash, hazardous volatile heavy metals (mainly Cd, Tl, Hg) as well as organic compounds formed after the combustion (PCDD/F) decrease the quality of the material to be recovered.
- The volatility of these heavy metals and the formation mechanism of PCDD/F is a physical fact which automatically leads to their higher content in fly ash compared with bottom ash.
- Higher values of volatile heavy metals have been reported in a UK study on ashes with and without boiler ash. The result of 4 255 samples from 29 municipal waste incinerators shows: for Cd, 50 % higher mean value and 100 % higher maximum value; for Tl, 50 % higher mean value and 15 % higher maximum value; for Hg,16 % higher mean value and 40 % higher maximum value.
- The material recovery of ashes is (in comparison with disposal) associated with the cross-media effect of potential distribution of hazardous substances via the recovered ash into road construction etc. This cross-media effect should be kept as low as possible by keeping the fly ash separate from the material recovery of ashes.

Information on which the split view is based

- UK municipal waste incinerator bottom ash analysis - with and without boiler ash.

EIPPCB assessment
The documents and information referred to in the split view were available on time.

Validity of the supporting rationale:

- Bottom ash and fly ash coming from the incineration of waste usually have very different compositions. Usually, fly ashes are hazardous and rarely treated to recover useful materials, whereas bottom ashes are usually not hazardous and are treated to recover metals and inert materials.
- The amount of bottom ash generated by incineration is one order of magnitude higher that the amount of fly ash generated. Fly ash usually contains metals and organic compounds which are volatilised during combustion. If the fly ash is mixed with bottom ash, these hazardous substances would be diluted in the bottom ash.
- The data provided by UK confirms that for most of the pollutants, their maximum values are higher in the case of bottom ashes mixed with boiler ashes than in the case of bottom ashes only.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view representing the opinion of the EEB fulfils the conditions set out in Section 4.6.2.3.2 of Commission Implementing Decision 2012/119/EU. This split view will therefore be reported in the "Concluding remarks and recommendations for future work" chapter of the BREF.

A possible formulation of this split view could be:

BAT conclusion	Dissenting view	Expressed by	Alternative proposed level (if any)
BAT 35	*Include in the BAT statement that: "BAT is to handle and treat bottom ashes separately from fly ashes and from other FGC residues"*	*EEB*	*N/A*