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**EXPLANATORY & GUIDANCE
document (E&G-d)
on IED-based – (draft)
Waste Incineration BREF
and BAT conclusions**

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ANNEX 5

Comments on some BAT conclusions

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ANNEX 5 – Comments on some BAT conclusions

Abbreviations

See [Annex 1](#) to this E&G-d.

Foreword

This Annex 5 to the E&G-d should be read in parallel with [Annexes 6.a and 6.b](#) that provide practical proposals to quickly acknowledge that each WI BREF BAT conclusion (BAT-c) is implemented in the considered non-hazardous waste incineration installation. Annex 5 elaborates on some of these proposals.

BAT-c n° 1 – environmental management system

BAT-c n°1 requires that *“in order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates”* 20 general features and 8 additional features, specific to incineration plants and/or, where relevant, to bottom ash treatment plants. 5 of these 8 features are addressed by BAT conclusions (BAT-c 9, 10, 18, 23, 37).

The 20 first requirements of BAT-c1 are included in the requirements of ISO 14001 standard.

The 6 specific features of BAT-c 1 for incineration plants (n° 21, 23, 24, 25, 27, 28) are to be covered by BAT-c n° 9, 18, 21, 37 as well as a residue management plan and an accident management plan that are specific to the installation.

BAT-c n° 2 – calculation of energy efficiency

“BAT is to determine either the gross electrical efficiency, the gross energy efficiency, or the boiler efficiency of the incineration plant as a whole or of all the relevant parts of the incineration plant.”

Please see [Annex 4](#) to this Explanatory and Guidance document (E&G-d).

BAT-c n° 4 – monitoring channelled emissions to air

“BAT is to monitor channelled emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.”

For each substance to be monitored, the table associated to BAT-c 4 provides the process to which the request applies, the relevant standard, the minimum monitoring frequency and the related BAT-c where BATAELs are given.

All requirements are related to combustion flue gas except one related to emissions of dust to air from enclosed bottom ash treatment with extraction of air. See BAT-c 26.

- Continuously monitored substances in flue gas
 - Emissions to be checked in NOC

In combustion flue gases, 9 substances (NO_x, NH₃, CO, SO₂, HCl, HF, Dust, Hg and TVOC) should be measured continuously. However, since according to IED Article 15.3, emissions should not exceed BATAEL values in NOC (Normal Operating Conditions), it is necessary to discard the emissions occurring

during OTNOC (Other Than NOC) situations and therefore to identify these periods in order to check compliance with the BATAEL-based ELVs in NOC. See [Annexes 2.a and 2.b](#) to this E&G-d about the NOC/OTNOC issue and in [Annex 2.c](#), proposals to help to automatically identify OTNOC situations.

- [Conditional continuous monitoring \(NH₃, HF, Hg\)](#)

Among the 9 substances, 3 are conditional.

- NH₃ is to be continuously monitored only “when SNCR and/or SCR [de-NO_x] is used”.
- “HF may be replaced by periodic measurements with a minimum frequency of once every six months if the HCl emission levels are proven to be sufficiently stable”.
- “For plants incinerating wastes with a proven low and stable mercury content (...), the continuous monitoring of emissions may be replaced by long-term sampling or periodic measurements with a minimum frequency of once every six months.”

- [Proven sufficiently stable emission of HCl \(for replacement of HF continuous monitoring by periodic measurements\)](#)

There is no precise definition of a “proven sufficiently stable” emission of HCl.

It is **proposed** to consider that HCl emissions are stable if the standard deviation of daily values from continuous measurement in NOC over a period of 6 months do not exceed 1.5 mg/Nm³.

For existing lines, the checking can be done on passed operating data or on data collected during the WI BAT conclusions implementation period. For new lines, it can be done after commissioning, when the line is in stabilised industrial operation.

It is worth noting that, according to the INERIS report (see [Annex 3.b](#) to this E&G-d), it is nearly impossible to properly calibrate HF monitoring instruments.

- [Proven low and stable mercury content](#)

In respect of “a proven low and stable mercury content”, note 5 to the table associated with BAT 4 suggests an example: “(e.g. mono-streams of waste of a controlled composition)”. It is **proposed** that periodic measurements are made every six months in plants exclusively combusting waste without mercury, which is the minimum required.

For municipal waste, which may have a ‘background’ content of mercury, it is **proposed** to consider that the content of mercury in waste is proven low and stable if:

- Either 6 successive short term sampling results do not exceed 5 µg/Nm³, which is the lower end of the BATAEL range for continuous monitoring, and in average over the short term sampling period.
NB: Note 2 associated to BAT-c 32 says that this lower end of the BATAEL range (5 µg/Nm³) may be achieved “when incinerating wastes with a proven low and stable mercury content, (e.g. monostreams of waste of a controlled composition)”.
- Or, over 6 months:
 - the continuous measurement half hourly average values in NOC do not exceed 35 µg/Nm³, which is the upper end of the indicative value given in BAT-c 31 for new plants (40 µg/Nm³ for existing plants);
 - or the long term sampling results do not exceed 10 µg/Nm³, which is the upper end of the BATAEL range for long term sampling.

For existing lines, the checking can be done on passed operating data or on data collected during the WI BAT conclusions implementation period. For new lines, it can be done after commissioning, when the line is in stabilised industrial operation.

Compliance with the criterion will be checked as compliances with ELV are, in particular after subtraction of the uncertainty.

When the criterion is met, the continuous measurement can be replaced by long term sampling every month.

NB: Using continuous measurement to provide evidence that it is not necessary may actually be a good idea. Indeed:

- In case of more than one line in the plant, the same continuous Hg analyser can provide evidence for all lines.
- Maintaining the Hg analyser is not so simple and keeping them continuously operational is a challenge.
- [Availability of NH₃ and Hg online measuring systems](#)

The availability of continuous measurement systems for the 7 substances (Dust, T(V)OC, HCl, HF, SO₂, NO_x, CO) that, according to IED Annex VI, have to be monitored within the relevant EOT (R-EOT, see [Annex 2.a](#) to this E&G-d) is given in Part 8 of this annex:

“To obtain a valid daily average value, no more than five half-hourly average values in any day shall be discarded due to malfunction or maintenance of the continuous measurement system. No more than ten daily average values per year shall be discarded due to malfunction or maintenance of the continuous measurement system.”

Since NOC situations are included within the R-EOT (see [Annex 2.a](#) to this E&G-d), for the measurement of these same 7 substances in NOC, it is not necessary to set additional requirements to the ones above that are already challenging.

However, it is **proposed** to set requirements inspired by the above for the two additional substances to be continuously measured according to the WI BAT conclusions, NH₃ and Hg.

NH₃ being in general measured by the same multi-gas instrument as T(V)OC, HCl, HF, SO₂, NO_x, CO, it is **proposed** to include it in the same counter as the one for those substances.

For mercury, it is **proposed** to have a separate counter taking into account the complexity of these instruments:

To obtain a valid Hg daily average value, no more than five half-hourly average values in any day, in NOC or OTNOC, shall be discarded due to malfunction or maintenance of the continuous measurement system. No more than thirty daily average values per year shall be discarded due to malfunction or maintenance of the continuous Hg measurement system.

NB: Although compliance with ELVs is only required in NOC for NH₃ and Hg (since there are no IED Annex VI ELVs for them), it is useful to measure these substances as well in OTNOC in order to comply with BAT-c 18.

- Periodically monitored substances in flue gas

- Emissions to be checked in NOC

In combustion flue gases, 6 groups of substances (N₂O, 11 metals and metalloids, PBDD/F, PCDD/F, PCB-DI and Benzo[a]pyrene) should be measured periodically, once every year for N₂O and Benzo[a]pyrene, once every 6 months for the other ones. Mercury may be added to them if it is not monitored continuously (see below the section on long-term sampling). As for periodic measurements requested by IED annex VI, these measurements should be done in NOC. In this way, the same measurements can be used to ensure compliance with IED Annex VI ELVs (for metals and metalloids, PCDD/F) and with these BATAEL-based ELVs. (In fact, since both ELVs will apply in NOC, in practice compliance will be checked only against the lower of the two).

As said in the BAT conclusions General considerations, in principle for periodic measurements, the average value over the sampling period is the *“average value of three consecutive measurements of at least 30 minutes each. For any parameter where, due to sampling or analytical limitations, 30-minute sampling/measurement and/or an average of three consecutive measurements is inappropriate, a more suitable procedure may be employed. For PCDD/F and dioxin-like PCBs, one sampling period of 6 to 8 hours is used in the case of short-term sampling.”*

- Conditional periodic monitoring (N₂O, PBDD/F)

Among the 6 groups of substances, 2 are conditional:

- N₂O should be measured only in case of combustion of waste in a fluidised bed furnace or when a SNCR de-NO_x is used with urea.
- The monitoring of PBDD/F (Polybrominated dibenzo-p-dioxins and –furans) only applies to the incineration of waste containing brominated flame retardants or to plants using the technique with continuous injection of bromine described in BAT-c 31 d for Hg abatement.

- Waste containing brominated flame retardants

Flame retardants are present in municipal waste, however in small quantities. It is **proposed** to measure PBDD/F three times in one year along with short-term or long term periodic PCDD/F and to stop if PBDD/F are less than 0.01 ng_{I-TEQ}/Nm³.

See **proposed** Toxic Equivalent Factors (TEF) for PBDD/F in **Section 3 of Annex 1** (Abbreviations and TEF) to this E&G-d.

NB: The **proposed** threshold of 0.01 ng/Nm³ is the same value as given in footnote 8 to BAT-c 4 table for ceasing to monitor DL-PCB.

- Long term sampling of substances in flue gas

In combustion flue gases, 3 groups of substances (PCDD/F, DL-PCB and Hg) should or may be measured once every month by long-term sampling, i.e. according to the BAT conclusions' General considerations *“over a sampling period of 2 to 4 weeks.”*

- Conditional long-term monitoring (PCDD/F, DL-PCB and Hg)

All 3 groups are conditional. However, for PCDD/F and DL-PCB, it is a first option, whilst for Hg, it is a 2nd option. About Hg, please look at the **Section above** on 'Continuously monitored substances in flue gas'

- Proven sufficiently stable emission of PCDD/F and PCB-DL

According to footnote 7 of BAT-c 4 associated table, the long-term sampling monitoring “does not apply if the emission levels are proven to be sufficiently stable” for PCDD/F on one hand and for DL-PCB on the other hand. In such cases, short term sampling is requested every 6 months for PCDD/F as well as for DL-PCB. However, even the short term sampling does not apply to PCB-DL if the emissions “are proven to be less than 0.01 ng_{WHO-TEQ}/Nm³”

It is **proposed** to consider that PCDD/F emissions are stable if over a period of 6 months the continuous sampling result values do not vary more than in a range of 0.03 ng_{I-TEQ}/Nm³ and that DL-PCB emissions are stable if over a period of 6 months the continuous sampling result values do not vary more than in a range of 0.02 ng_{WHO-TEQ}/Nm³. See TEF in **Section 3 of Annex 1** to this E&G-d.

- Compliance with measurement standards

The generic standards on continuous monitoring referred to in the table associated to BAT-c 4 (EN 15267-1, EN 15267-2, EN 15267-3 and EN 14181) describe the procedures to check compliance with the uncertainty allowed by legislation. However, BAT conclusions provide BATAELs without information on associated uncertainties.

According to the INERIS study (see **Annex 3.b** to this E&G-d), most of the uncertainties required by SRM standards are already most often widely exceeded when ELVs are set at the levels of Annex VI ELVs. (See **Table 3.b-3 in Annex 3.b** to this E&G-d).

Since, according to the standards listed in BAT conclusions, the online instruments (AMSs) need to be calibrated through parallel measurements with standard reference methods (SRMs) to check their uncertainty, it is necessary to define uncertainty targets for continuously monitored substances.

As recommended in **Section 5 of Annex 3.a** to this E&G-d, it is **proposed that**:

- The uncertainties to be subtracted from the measured emission values before comparison with BATAEL-based ELVs are the ones defined, *de facto* in absolute values, in IED Annex VI, since, although already too low, these values are currently in use and can be coped with when there is a sufficient margin between the emissions and the ELVs. (See **Table 3.a-1 in Annex 3.a** to this E&G-d).
- For substances for which the IED Annex VI does not provide confidence intervals, the uncertainties to be subtracted to the BATAEL-based ELVs are the ones provided by laws of two Member States as summarised in **Table 3.a.2 of Annex 3.a** of this E&G-d.

BAT-c 5 - monitoring channelled emissions to air during OTNOC

“BAT is to appropriately monitor channelled emissions to air from the incineration plant during OTNOC.”

The description of the BAT-c reads: “Emissions during start-up and shutdown while no waste is being incinerated [i.e. burner alone in operation], including emissions of PCDD/F are estimated e.g. every three years based on measurement campaigns, carried out during planned start-up/shutdown operations.” And “The monitoring can be carried out by direct emission measurements (e.g. for the pollutants that are monitored continuously) or by monitoring of surrogate parameters if this proves to be of equivalent or better scientific quality than direct emission measurements.”

Substances continuously monitored can be measured during start-up and shutdown periods while no waste is being incinerated. However, the feasibility on one hand and the representativeness and

the reliability of the readings on the other hand should be checked because the flue gas flow is very low during a significant part of start-up phase 1 (before waste is introduced into the furnace) and shutdown phase 2 (when no more waste is combusting). (About start-up and shutdown phases, see **Annex 2.b** to this E&G-d).

Moreover, the large variations of peripheral parameters, in particular of O₂, which are used to correct the raw readings to standard conditions, may significantly affect the apparently corrected emission values.

PCDD/F and metals can be measured every three years during start-up and shutdown while no waste is being incinerated, again if flow rates are sufficiently high. However, as a practical check it should be considered that these emissions should not be very different from the ones in the second phase of start-up (see **Annex 2.b** to this E&G-d) and operation just after, which are usually taken into account by PCDD/F long-term sampling.

Most other OTNOC situations being unplanned, it would be quite difficult to make periodic measurements, since such an operation needs to be planned with the laboratories.

BAT-c n° 9 – waste stream management

“In order to improve the overall environmental performance of the incineration plant by waste stream management (see BAT 1), BAT is to use all of the techniques (a) to (c) given below, and, where relevant, also techniques (d), (e) and (f).”

“a) Determination of the types of waste that can be incinerated”

In general the waste that can be incinerated in the installation are listed in the Permit to operate.

“b) Set-up and implementation of waste characterisation and pre-acceptance procedures” and

“c) Set-up and implementation of waste acceptance procedures.”

Not applicable to Municipal waste in Municipal waste incinerators. Procedures may be needed in these incinerators for other types of waste, e.g. Commercial & Industrial waste (C&I).

“d) Set-up and implementation of a waste tracking system and inventory”

Municipal waste and clinical waste as well as , in general, sewage sludge when co-incinerated with them are identified and track recorded by truck badging at weighbridge (producer, type of waste, tonnage, date, time of arrival).

For clinical waste, trolleys tracking up to furnace loading.

NB: Sewage sludge are sometimes directly fed to the furnace by a duct arriving from the water treatment plant. In such case, they do not need additional identification and tracking.

“e) Waste segregation “

Clinical waste trolleys are normally stored apart. Sewage sludge as well when co-incinerated and delivered by truck is stored apart from municipal solid waste.

“f) Verification of waste compatibility prior to the mixing or blending of hazardous wastes”

Not applicable when no hazardous waste is treated.

BAT-c n° 14 – combustion management

For existing plants, the assessment of the content of unburnt substances (TOC or LOI) can be made by using the values reported during the previous 3 years, or the available ones for recent plants. Indeed, the BATAEPL upper ends are equal to the limit values set in IED Article 50.

For new plants, the assessment can be made from the design values (e.g. the contractual performance data) and checked afterwards in operation at the same time when IED Article 50 limit values are checked.

BAT-c n° 18 – OTNOC management

“In order to reduce the frequency of the occurrence of OTNOC and to reduce emissions to air and, where relevant, to water from the incineration plant during OTNOC, BAT is to set up and implement a risk-based OTNOC management plan as part of the environmental management system (see BAT 1) that includes all of the following elements: “

A plant-specific OTNOC management plan should be made and updated in order to include causes and consequences of identified OTNOCs. **Annex 2.c** (Excel file) to this E&G-d can be used as an example.

An action plan should be made on this basis including an assessment of the appropriate design of critical equipment and a preventive maintenance plan for those pieces of equipment.

An assessment of the emissions in OTNOC should be made as well, taking into account (see **comments to BAT-c 5 above**):

- data collected by online instruments (AMSS) in OTNOCs that occur within the relevant EOT (i.e. as soon as and as long as the line is burning waste – see **Annexes 2.a and 2.b** of this E&G-d) and during emergency shutdowns.
- data collected during start-up phase 1 and shutdown phase 2, when no waste is burning. See **comments on BAT-c n° 5 above**.

BAT-c n° 20 – energy efficiency

“In order to increase the energy efficiency of the incineration plant, BAT is to use an appropriate combination of the techniques given below.”

The energy efficiencies in BAT-c-20 address the ability of the plant to recover energy efficiently. This assessment is different from the R1 criterion that aims at assessing the energy actually recovered and used every year. Indeed, the implementation of BATs is necessary to get the permit to operate and the validity of the permit must not be depending upon facts outside operator’s control, such as industrial customer consumption of steam, weather affecting heat consumption or even a turbine breakdown.

Please see **Annex 4** to this E&G-d for the calculation of the Energy efficiencies according to the requirements of BAT-c 20 (which are different from e.g. the ones of the R1 formula) in the different cases considered by BAT-c 20.

If the level of energy efficiency calculated for the installation reaches the relevant BATAEEL range, the combination of techniques (BATs) implemented in the installation (see techniques (a) to (i) of BAT-c 20) should be considered as appropriate and BAT-c 20 acknowledged as implemented.

However, while the IED requires (see Article 15.3) permit conditions to ensure that emissions do not exceed BATAEL-values, it does not mention BATAEELs and does not require that energy efficiencies

reach BATAEEL values. Article 11, which provides the “*General principles governing the basic obligations of the operator*”, only requests that “*energy is used efficiently*”.

Therefore, if the level of energy efficiency calculated for the installation is lower than the relevant BATAEEL lower end, the operator must investigate how to improve the efficiency and do what he can to achieve this goal. However, he cannot have an obligation to achieve results if this is outside his control.

GENERAL COMMENTS applicable to air emissions addressed in BAT-c 25 to BAT-c 31

- Basis for implementation

The objectives of these BAT-c are achieved if the emissions of the targeted substances, in NOC, do not exceed BATAELs.

This can be done by implementing one or a combination of the techniques (BATs) listed in the BAT-c or, since BATs are neither prescriptive nor exhaustive (see the 1st paragraph of WI BREF BAT-c, “*General considerations*”) any other technique or combination of techniques allowing to reach the objective. In the latter case, it would be suitable to explain the principle of the alternative technique.

- Two ways to ensure that emissions do not exceed BATAELs in NOC

According to IED Article 15.3, there are two ways to “*ensure that, under normal operating conditions [NOC], emissions do not exceed the emission levels associated with the best available techniques [BATAELs]*”, either by:

- “(a) setting emission limit values that do not exceed the [BATAELs]”
- “(b) setting different emission limit values than those referred to under point (a) in terms of values, periods of time and reference conditions. Where point (b) is applied, the competent authority shall, at least annually, assess the results of emission monitoring in order to ensure that emissions under normal operating conditions have-not exceeded the emission levels associated with the best available techniques.”

This is illustrated in **Figure 4 of E&G Main** document.

- Reference conditions

In both cases, the reference conditions must be the same as the ones in which the BATAELs are expressed. This is stated directly for case (a) in Article 15.3 (a) and indirectly for case (b) in IED Article 14.1(c)(i), which says: “(ii) where Article 15(3)(b) is applied, that results of emission monitoring are available for the same periods of time and reference conditions as for the emission levels associated with the best available techniques;”

The conditions are the following ones (see WI BREF BAT conclusions “*General considerations*”): (273.15 K, 101.3 kPa, 11% O₂, dry and expressed in mg/Nm³ for dust, metals and metalloids HCl, HF, SO₂, CO, TVOC, NO_x, NH₃, µg/Nm³, ng_{I-TEQ}/Nm³ or ng_{WHO-TEQ}/Nm³ for other substances. These conditions are the same as the ones given in IED Annex VI for the ELVs related to IED Chapter 4 and Annex VI (except ng_{WHO-TEQ}/Nm³, which should be used for DL-PCB, substances not regulated by IED Chapter 4 and Annex VI)

- Periods of time

IED Article 15.a allows to set BATAEL-based ELVs on shorter periods of time than the ones of BATAELs: *“Those emission limit values shall be expressed for the same or shorter periods of time and under the same reference conditions as those [BATAELs]”*. This flexibility given to Member States should not be applied to incineration and co-incineration installation. Indeed:

- For periodically measured substances, taking samples on shorter periods would lead to increase the uncertainties, which are already much higher than expected and requested by the relevant standards.
 - For continuously monitored substances, since all WI BREF BATAELs are expressed in daily average, it would probably mean that ELVs would be set from daily BATAELs on half hourly averages. Considering the very low level of BATAELs, the high heterogeneity of waste contents and the high uncertainties at BATAEL levels (see **Annex 3** to this E&G-d) it would not be possible to set ½-hr ELVs at daily BATAEL levels. As it can be seen in IED Annex VI, which contains both daily and ½-hr ELVs, the second ones should be much higher than the first ones. Moreover, it is on purpose that the EIPPCB did not set ½-hr ELVs: *“Half-hourly emission levels, where substantially different from the daily average emission levels, are usually driven by specific operating conditions. For half-hourly averages, the IED already includes half-hourly ELVs to provide a safety net against emission peaks”*. (See **Main document** of this E&G-d, **Section 4.4**).
- Proposed method to ensure that emissions do not exceed BATAELs

- Five cases

There are 5 main cases for checking that emissions do not exceed BATAELs:

- 1) Existing plants already in operation for a while or a longer time, applying in the period before the WI BAT conclusions enter into force for a reconsidered permit and already complying with the particular new requirement of a WI BAT conclusion.
- 2) Existing plants already in operation applying for a reconsidered permit and not yet complying with the particular new requirement of a WI BAT conclusion.
- 3) New plants applying for a permit.
- 4) New plants when started.
- 5) Existing plants, after modification to comply with the new requirement of a WI BAT conclusion.

- Cases 2 to 5

Cases 4 and 5 are similar. In both cases, it is assumed that the control system allows to identify the periods in OTNOC and to calculate the daily average values in NOC. On the other hand, it can be checked that periodic measurements are performed under NOC.

Cases 2 and 3 are similar. The plant being not started or the new necessary equipment being not yet installed, it is not possible to provide evidence that emission do not exceed BATAEL. In such case, the assessment should be based on the design performances of the plant and then checked when the plant or the equipment is started (see **cases 4 and 5 above**).

- Case 1

For case 1, it is **proposed** to use IED Article 15.3(b), i.e. to look at the passed emission in R-EOT, instead of NOC, and with ELVs higher than BATAELs. As requested by IED Article 14.1(c)(ii), the results should be made available on the same periods of time as BATAELs are, i.e. in NOC instead of R-EOT.

The problem is then that IED Chapter 4 and Annex VI require compliance with ELV within the relevant EOT, i.e. as soon as and as long as waste is burning and, therefore, that there is no signal available in plants to identify OTNOC situations and calculate daily average values in NOC. The operators that filled in the Questionnaire used to draw up the WI BREF sorted manually NOC and OTNOC situations from the data of one year (2014) and it was a tremendous work (17,520 rows of an Excel file per incineration line) that cannot be made for all existing lines in EU and over several years.

In case 1, for continuously monitored substances, the **proposal** is therefore to check the performance over 3 years if available, either:

- By checking if the daily average values, calculated in R-EOT, exceed the BATAEL values and when yes, to check if this was due to emissions in OTNOC or not. Therefore, the *a posteriori* verification of the NOC or OTNOC situation is limited to those days where the R-EOT daily average exceeds the BATAELs.
- Or to assume that days with significant OTNOC periods are less than x%, e.g. 2% of the relevant EOT and to check if during these 3 years, 100 - x%, in the example 98%, of the daily average values (calculated in the relevant EOT) are in the BATAEL range.

In such cases, the line is assumed to meet the requirement of the BAT-c with the equipment in place.

For periodically monitored substances, the **proposal** is to check that all values over 3 years are in the BATAEL range. (In principle, periodic measurements should already up to now be only made in NOC).

For long term monitored substances, the **proposal** is to check that all values over 3 years are in the BATAEL range. However, in this case the measurements having usually been made up to now in R-EOT, an adjustment may be needed.

If data over 3 years are not available, e.g. because the plant is recent, then the assessment can be made with the available data. Anyway, the risk of subsequent non-compliance (after the 4 years implementation period of the BAT conclusions) is for the operator.

- Uncertainty

There is not reference to uncertainties associated with BATAELs in WI BAT Conclusions. Therefore defining compliance rules against the new BATAEL-based ELVs cannot be done looking only at WI BAT Conclusions.

As said above (see **comments to BAT-c 4**), it is **proposed that**:

- The uncertainties to be subtracted from the measured emission values before comparison with the BATAEL-based ELVs are the ones defined, *de facto* in absolute values, in IED Annex VI. (see **Table 3.a-1 in Annex 3.a** to this E&G-d).
- For substances for which the IED Annex VI does not provide confidence intervals, the uncertainties to be subtracted to the BATAEL-based ELVs are the ones provided by laws of 2 Member States as summarised in **Table 3.a.2 of Annex 3.a** of this E&G-d.

BAT-c n° 25 – reduction of channelled emissions to air of dust, metals and metalloids

“In order to reduce channelled emissions to air of dust, metals and metalloids from the incineration of waste, BAT is to use one or a combination of the techniques given below.”

See **above** the “General comments applicable to air emissions addressed in BAT-c 25 to BAT-c 31”.

For dust, see the conclusions of the INERIS study on uncertainties. (See summary in **section 2.5.4 of Annex 3.b** to this E&G-d).

For metals and metalloids, see the uncertainties obtained during the validation of the CEN standards in **section 3 of Annex 3.b** to this E&G-d.

BAT-c n° 27 – reduction of channelled emissions of HCl, HF and SO₂ to air

“In order to reduce channelled emissions of HCl, HF and SO₂ to air from the incineration of waste, BAT is to use one or a combination of the techniques given below. “

See **above** the “General comments applicable to air emissions addressed in BAT-c 25 to BAT-c 31”.

For HCl, HF and SO₂, see the conclusions of the INERIS study on uncertainties. (See summary in **sections 2.5.6, 2.5.7 and 2.5.5 of Annex 3.b** to this E&G-d).

BAT-c n° 29 – reduction of channelled emissions to air of NO_x, N₂O, CO and NH₃

“In order to reduce channelled NO_x emissions to air while limiting the emissions of CO and N₂O from the incineration of waste and the emissions of NH₃ from the use of SNCR and/or SCR, BAT is to use an appropriate combination of the techniques given below.”

See **above** the “General comments applicable to air emissions addressed in BAT-c 25 to BAT-c 31”.

There is no BATAEL for N₂O and no information on uncertainty.

For NO_x, CO and NH₃, see the conclusions of the INERIS study on uncertainties. (See summary in **sections 2.5.1, 2.5.2 and 2.5.8 of Annex 3.b** to this E&G-d).

BAT-c n° 30 – reduction of channelled emissions to air of organic compounds including PCDD/F and PCBs (and T(V)OC)

“In order to reduce channelled emissions to air of organic compounds including PCDD/F and PCBs from the incineration of waste, BAT is to use techniques (a), (b), (c), (d), and one or a combination of techniques (e) to (i) given below.”

See **above** the “General comments applicable to air emissions addressed in BAT-c 25 to BAT-c 31”.

For T(V)OC, see the conclusions of the INERIS study on uncertainties. (See summary in **section 2.5.3 of Annex 3.b** to this E&G-d).

For PCDD/F, see the uncertainties obtained during the validation of the CEN standards in **section 3 of Annex 3.b** to this E&G-d.

For PCB-DL and PBDD/F, no information on uncertainty is available.

Toxicity equivalency factors are the I-TEQ ones for PCDD/F and the WHO-TEQ ones for PCB-DL. See **Section 3 of Annex 1** to this E&G-d.

- Comment on PCDD/F long-term sampling

BATAELs are derived in NOC and IED Article 15.3 requires that emissions do not exceed ELVs in NOC. (See **Annex 2** to this E&G-d).

However, in countries like Belgium and France and in other plants where it has been implemented, long-term sampling is performed within the relevant EOT, i.e. as soon as and as long as waste is burning. Since the incinerators will have to precisely identify the OTNOC periods (to check compliance with BATAEL-based ELVs and to comply with the requirements of BAT-c 18 on OTNOC management plan), it will be technically possible, as said the EIPPCB at the Final meeting in April 2018, to switch off the long-term sampling during OTNOC periods.

On the other hand, it is of interest to measure the overall emissions of the incinerator, including in OTNOC.

Since duplicating the sample bottle would induce useless extra costs (bottle setting up and laboratory analysis), it is **proposed**, if it is chosen to perform the long term sampling during the relevant EOT, to refer to the value of 0.1 ng_{I-TEQ}/Nm³.

BAT-c n° 31 – reduction of channelled mercury emissions to air

“In order to reduce channelled mercury emissions to air (including mercury emission peaks) from the incineration of waste, BAT is to use one or a combination of the techniques given below.”

See **above** the “General comments applicable to air emissions addressed in BAT-c 25 to BAT-c 31”.

For Hg, see the conclusions of the INERIS study on uncertainties. (See summary in **section 2.5.9 of Annex 3.b** to this E&G-d).

- Hg half hourly indicative values

BAT-c 31 gives indicative half-hourly values for Hg. These are not BATAELs and therefore it is not requested to ensure that emissions do not exceed these values.

Moreover, these values have been obtained¹:

- Firstly by filtering the data with the series of ‘fine’ data filtering used for daily BATAELs (in order to exclude all values recorded in OTNOC situations).
- And then, in addition, by excluding the 60 highest half-hourly emission levels reported in the year.

No explanation is given for the exclusion of the 60 highest ½-hr values reported by all plants in the **final draft** of the WI BREF. WI BREF Draft 1 of 24/5/2017 said the same (see p. **189, 270, 295**). The explanation was given in the 7th paper accompanying D1²: The 60 highest 1/2-hr average values were considered as “statistical outliers” without justification. This is surprising, in particular, when applied to Hg since as continuous monitoring of Hg shows, Hg is released by peaks when some Hg is fed to the furnace.

Therefore if indicative Hg ½-hr average values were to be used, it would be necessary before comparison with emissions in NOC to discard from them the 60 highest Hg ½-hr average values of the year as the EIPPCB did with data reported in the questionnaires after having discarded 1/2-hr values obtained in OTNOC situations.

¹ See WI BREF **final draft** of 14/12/2018, Section **3.2.2 (p. 150), Main document** of this E&G-d, **Sections 2.4 and 2.5**.

²² 7th paper accompanying D1: “Compilation and presentation of plant-specific WI data in D1 of the revised WI BREF “(see pp. 29-30/33):

BAT-c n° 34 – reduce emissions to water from wet FGC process

“In order to reduce emissions to water from FGC and/or from the storage and treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.”

- Proposed method to ensure that emissions do not exceed BATAELs

The principle is the same as presented for air emissions (See **above** “General comments applicable to air emissions addressed in BAT-c 25 to BAT-c 31”):

The same reasoning applies to cases 2, 3, 4, 5. For case 1, it is proposed to proceed as for air emissions.

In the period before the WI BATC enters into force, the **proposal** is to check that over 3 years all daily averages for TSS and, for other substances, all monthly daily average values but one³ are in the BATAELs ranges. If not, it should be checked if some OTNOC situations relevant for water emissions (see **Section 6.3 of Annex 2.a** to this E&G-d) occurred on the corresponding period.

If data over 3 years are not available, e.g. because the plant is recent, then the assessment can be made with the available data.

For new plant or new equipment not yet installed, it is not possible to provide evidence that emission do not exceed BATAEL. In such case, as for air emissions, the assessment should be based on the design performances of the plant and then checked when the plant or the equipment is started

NB: BATAEL values being very low, it may be useful to check the concentration in input water.

³ Compliance rule similar to the one in IED Annex VI Part 8, Point 2 :

“The emission limit values for water shall be regarded as being complied with if:

(a) for total suspended solids 95 % and 100 % of the measured values do not exceed the respective emission limit values as set out in Part 5;(b) for heavy metals (Hg, Cd, Tl, As, Pb, Cr, Cu, Ni and Zn) no more than one measurement per year exceeds the emission limit values set out in Part 5; or, if the Member State provides for more than 20 samples per year, no more than 5 % of these samples exceed the emission limit values set out in Part 5;(c) for dioxins and furans, the measurement results do not exceed the emission limit value set out in Part 5.”