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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 2.b

**NOC-OTNOC identification
for WI air emissions**

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ANNEX 2.b–NOC-OTNOC identification for WI air emissions

Abbreviations

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

Foreword

The IED does not define NOCs, nor does the Guidance document on BREF drawing-up (Commission implementing decision 2012/119/EU). However, the IED and Guidance 2012/119 provide examples of OTNOC (Other Than Normal Operating Conditions) situations. [Table 2.a-4 and Figure 2-a.1 in Annex 2.a](#) of this E&G-d show a non-exhaustive list of OTNOCs elaborated from these examples.

This [Annex 2.b](#) aims at providing some principles and at proposing some practical ways to identify OTNOC situations that can then, further to agreement with the competent authority, most often be automatically signalled by the plant control system (see [Annex 2.c](#) to this E&G-d).

1 Principles

- BATAEL-based ELVs must be complied with in NOC.
- IED Annex VI ELVs must be complied with:
 - for continuously monitored substances, within the EOT excluding the start-up and shut-down periods if no waste is being incinerated (i.e. the Relevant EOT, R-EOT);
 - for periodically monitored substances, in NOC.
- All operating situations are NOC or OTNOC. What is NOC is not OTNOC. What is not NOC is OTNOC.
- R-EOT includes all NOC periods. EOT includes some OTNOC periods but not all of them (excluded are the OTNOC periods when the line is not running and when it runs without burning waste, i.e. when only the burner(s), or equivalent, is/are in operation).
- When the line is in OTNOC and within the R-EOT (i.e. except if no waste is combusted), the emissions are still limited (in daily & ½ hr averages): Indeed, IED Annex VI ELVs act as a safety net. There is no risk of pollution. Even if these ½-hr ELVs are higher than the daily BATAEL-based ELVs applicable in NOC, the operator cannot ignore an increase of emission because the line still has to comply with the ½-hourly and the daily IED Annex VI ELVs.
- Therefore being in OTNOC situations does not mean that emissions are not controlled.
- Being in OTNOC situation is a physical fact: the incineration line is not in normal conditions.
- Considerations on the reason why an OTNOC situation occurred is a different question. It is normal that the competent authority ensures that the operator maintains the line properly but this must be addressed separately in the context of BAT-c 18 (and/or BAT-c 1).
For example, if there is a hole in a baghouse filter, it is an OTNOC. Discussions may occur afterwards about the time needed to identify and isolate the chamber containing the leaking bag for repair and the frequency for preventively changing the bags or on how to monitor drifts in emissions in order to avoid such an incident again.

2 Proposals for the definitions of Start-up and Shutdown periods

2.1 Facts

Neither the IED nor the Guidance (Decision 2012/119), nor other EU legislative text provides a definition of start-up and shutdown periods for waste incinerators.

A minimum temperature of combustion gas for 2 seconds is required by IED Article 50¹ (850°C for non-hazardous waste, 1,100°C for hazardous waste if more than 1 % of halogenated organic substances). An auxiliary burner, or an equivalent system, must be used to maintain these temperatures in different operating conditions.

Waste can be introduced into the furnace when the required temperature is reached. However at start-up, it takes time before the combustion of waste is able to maintain stable combustion and steam conditions by itself (i.e. without the burner).

2.2 Comments

In the absence of a definition, and although it does not apply to waste incineration, it is of interest to look at Decision (2012/249/EU) on determination of Start-up & Shut-down for LCP (Large Combustion Plants). This document is complex but takes as main criterion that the start-up period is finished when the line has reached the conditions of stable operation. Similarly, the shutdown period begins when the line leaves the conditions of stable operation.

The start-up period lasts a certain time after introduction of waste into the furnace and the shutdown period begins a certain time before waste finishes to burn. These periods need to be defined.

2.3 Proposals

The criterion to define the end of the start-up period should be simple. Since different criteria are used in the MSs and since changing them would be costly without significant benefits, our **proposal** is to keep a variety of criteria, including but not limited to the ones indicated below.

According to Annex VI Part 8 of the IED, a distinction has to be made according to the presence/absence of waste burning in the combustion chamber. Indeed, continuously measured data used to calculate the average values to assess the compliance with ELVs are only required for the periods when waste is incinerated.

Therefore two phases should be considered within both start-up and shutdown periods.

2.3.1 Start-up phases 1 and 2

Start-up phase 1 (which is an OTNOC but that is excluded from the relevant EOT, R-EOT)

- begins when the burner is started;
- finishes when waste begins to be fed into the furnace:
 - normally at 850°C for non-hazardous waste incinerators and co-incinerators;
 - at 1,100°C for hazardous waste if more than 1 % of halogenated organic substances;

¹ However, IED Article 51 allows competent authorities to authorise other temperatures under certain conditions

- possibly at lower temperature in case of derogation on the temperature criterion (in accordance with IED Article 51).

As an option the criterion could be that the O₂ level is as low as 13% as in the Netherlands, 15% as in France or 16% as in Germany.

Start-up phase 2 (which is included in the relevant EOT, R-EOT, but still in OTNOC)

- begins at the end of phase 1; (at that time, the burner is still running);
 - finishes when the grate, or other combustion system, is fully covered with waste and stable combustion and steam conditions are reached. The criterion, for instance, can be:
 - EITHER defined by a specific period of time (pragmatic approach), e.g. 1.5 hour after the introduction of waste into the furnace;
 - OR, O₂ concentration is the operational one and steam/hot water generation is at least 80% or the operation rating if the line should be operated at lower rating.
- NB: Strictly speaking, the line is not yet in steady state before it reaches 100% rating.

2.3.2 Shutdown phases 1 and 2 (planned shutdown)

Shutdown phase 1 (which is included within the relevant EOT, R-EOT, and in OTNOC)

- begins when the incineration line ceases to be fed with waste
- finishes when there is no more waste combusted in the furnace, which in practice can be either when:
 - Waste feed is stopped for more than a certain time, e.g. 1.5 hour;
 - OR energy of produced steam = energy to the burner(s) +/- 10%;
 - OR high level of O₂ in raw flue gas at boiler outlet: e.g. 13% as in the Netherlands, 15% as in France or 16% as in Germany.

Shutdown phase 2 (which is excluded from the relevant EOT, R-EOT)

- begins at the end of phase 1; this is the time when the auxiliary burner maintaining the 850°C-2s condition can be stopped;
- finishes when O₂ in raw flue gas at boiler outlet reaches 20% and the furnace is at a given temperature.

After the shutdown phase, some pieces of equipment may still be kept running (e.g. fans during maintenance periods) but this is excluded from the relevant EOT.

2.3.3 Unplanned shutdown

In case of emergency shut down or of a trip, the line is instantaneously in OTNOC (if it was not already in OTNOC due to the cause of the emergency shut down) and therefore compliance with BATAEL-based ELVs is not required.

3 Other OTNOC situations within the R-EOT

There is a wide range of OTNOC situations. Some may have an impact on emissions, some don't. Only OTNOC situations likely to influence emissions should be relevant.

3.1 Leaks

All leaks are generating an OTNOC situation.

However, not all are relevant in respect of emissions. Only leaks possibly affecting the emission levels should be considered as inducing a relevant OTNOC situation when they occur. However, if the operator decides to continue operation because the consequence of the leak is minor, then, as long as the leak impact does not increase, the period should not be considered OTNOC as long as the ELV is not exceeded.

3.2 Malfunctions

3.2.1 Malfunctions of process equipment including abatement system

As leaks, malfunctions of process equipment possibly affecting the emission levels should be considered as inducing a relevant OTNOC situation when they occur. However, if the operator decides to continue operation because the consequence of the malfunction is minor, then, as long as the malfunction impact does not increase, the period should not be considered a relevant OTNOC.

3.2.2 Malfunctions of measuring equipment

Malfunctions of a measuring equipment indispensable for emission compliance checking (AMS, Flue gas P, T, moisture, O₂ content...) is to be considered relevant OTNOC. However, if for instance the instrument measuring dust concentration does not work, it is an OTNOC for dust emissions but it is not necessarily a relevant OTNOC for the emissions of other substances.

It should be noted that IED Annex VI provides a safety net in this respect. For the continuously monitored substances, it requires that no more than five half-hourly average values per day and 10 daily average values a year are discarded because of malfunction or maintenance of the continuous measurement system. (See IED Annex VI Part 8, point 1.2): *“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. 1.3.”*

3.3 Breakdown

All breakdowns are generating an OTNOC situation.

However, as said for leaks and malfunctions, only breakdown possibly affecting the emission levels should be considered as inducing a relevant OTNOC. Such situation cannot last long because according to IED Article 46.6, the operator cannot run the plant more than 4 hours if IED Annex VI ½-hr ELVs are exceeded. In fact, if the breakdown generates an emission increase, there is little chance that the increase induces a breach on BATAEL-based ELVs only (i.e. and not as well on the IED Annex VI ELVs).

Indeed, IED Article 46.6 says: *“Without prejudice to Article 50(4)(c), the waste incineration plant or waste co-incineration plant or individual furnaces being part of a waste incineration plant or waste co-incineration plant shall under no circumstances continue to incinerate waste for a period of more than 4 hours uninterrupted where emission limit values are exceeded.*

The cumulative duration of operation in such conditions over 1 year shall not exceed 60 hours.”

3.4 Bypassing of abatement systems

Bypassing of abatement systems is an exceptional procedure. It may occur in case of breakdown, in order to protect the equipment and as said above this cannot last more than 4 hours at a time.

4 OTNOC situations either within or outside the R-EOT

4.1 Regular maintenance

Regular maintenance is currently achieved outside the R-EOT as well as within the R-EOT.

Regular maintenance within the R-EOT is identified as a cause of OTNOC situation, e.g. calibration of AMSs, online replacement of filter bags (closed off compartment). Regular maintenance of measuring equipment for IED Annex VI continuously monitored substances is, as said above (see **Section 3.2.2** to this E&G-d) already limited, in total with malfunctions, to five half-hourly average values per day and 10 daily average values a year.

4.2 Exceptional conditions

Some exceptional conditions can be listed in advance, such as the following.

- Weather conditions: snow, freezing, flooding, lightning, earthquake...
- Malicious or criminal intent
- Excessive contents of pollutants in waste (i.e. significantly higher than “normal” waste input) such as large amounts of Hg or radioactivity containing substances may be considered exceptional conditions.

Being exceptional, these conditions most often cannot be detected automatically by the control system and are to be manually reported by the operator.