European Environmental Bureau

Split views
TWG meeting in Seville 1st - 5th and 8th - 9th June 2015

BAT conclusion/BAT-AEL to which the split view refers to: Scope (EIPPCB TWG Slide 2)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to exclude the co-incineration of hazardous waste from the scope of the LCP BREF

Rationale:

This split view is supported by the following rationale …

- There is a lack of clarity regarding the threshold of 40% of heat release for hazardous waste that supposedly determines whether the WI or LCP BREFs apply:
  – is this a maximum/minimum threshold?
  – is there an averaging period over which it should apply, and if so, what is that period?

As a consequence, there is a lack of clarity over which BREF should apply, and this can only be safely resolved by ensuring that hazardous waste is not burned in LCPs

References

This split view is based on the following 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:

- *Scope of the LCP and WI BREFs*: Sweden Memo 2014-04-20; Case number NV-00153-13; pages 2-3

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 4 (EIPPCB TWG Slide 24)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to keep the upper NH_3 BATAEL at 10 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- The increase in the upper BATAEL from 10 to 15 mg/Nm^3 resulted from a number being presented without any clear technical justification and/or basis in the reference plants. This is not a proper basis for the determination of BATAELs and the EEB therefore cannot accept this BAT conclusion.
- By contrast, the EEB submitted data supplied by system supplier Yara that supports an upper limit of 10 mg/Nm^3:
  - SCR can achieve emission reductions of up to 99% with NH_3 slip <2-5 mg/
  - SNCR can achieve 50-60% reductions with NH_3 slip of about 10 mg/Nm^3
- This accords with data provided by the Institute of Clean Air Companies, also presented by the EEB
- It also accords with data from the reference plants. The largest NH_3 emission recorded for any coal plant >300 MWth is 3.4 mg/Nm^3 ((Plant 267), whilst most have emissions <0.5 mg/Nm^3 e.g. Plants 219, 123 and 77 fitted with SCR and 376 fitted with SNCR

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: page 40
- EEB document posted on BATIS folder 04_ sub-folder Environmental NGOs_sub-folder SCR on Lignite_ *Nox_SCR_ICAC:* Institute of Clean Air Companies; May 2009; pages 15-16
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Coal and/or lignite combustion:NOX, CO and NH3 emissions to air:* EIPPCB; Table 3

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 11 (EIPPCB TWG Slide 34)

Split view submitted by: European Environmental Bureau

Proposal:

- TOC short term average should be <20 mg/l
- COD upper short term average should be 60 mg/l
- TSS upper short term average should be 20 mg/l
- Fluoride upper short term average should be 12 mg/l
- Sulphite upper short term average should be 5 mg/l
- Arsenic upper short term average should be 20 mg/l
- Cd upper short term average should be 2 ug/l
- Cr upper short term average should be 12 ug/l
- Cu upper short term average should be 20 ug/l
- Hg upper short term average should be 1 ug/l
- Hg lower short term average should be <0.05 ug/l
- Ni upper short term average should be 15 ug/l
- Pb upper short term average should be 16 ug/l
- Zn upper short term average should be 64 ug/l

Rationale:

This split view is supported by the following rationale …

- TOC short term average

  – The proposed upper BATAEL is set by a significant rounding up of the maximum data for Plant 121 (from 42.8 to 50 mg/l)
  – This one plant has been used to increase the upper BATAEL by a factor of at least 2.5 compared with the maximum emissions recorded by the other plants in the sample.
  – The upper limit of the yearly TOC BATael should be based on plant 123 with emissions of 16 mg/l
  – This includes all sampled types of WWT processes and single and multiple flue gas treatment streams
  – It also covers both coal and lignite plants, the full age range and sampled sizes and load factors

- COD upper short term average

  – The proposed BATAEL appears to have been set by a significant rounding up of the data for plant 223
  – However, as that plant includes other streams, it cannot set the BATAEL
  – There are only 4 plants within the proposed range that have emissions deriving from flue gas treatment only, and the one with the highest emissions is Plant 122a at 75 mg/l
  – However, this adds nothing in terms of fuel, age, capacity, load factor, SOx flue gas treatment and WWTP technique to a BATAEL set by the 2 better performing plants – 662 and 123 (maximum emissions of 51.3 and 57 mg/l respectively)
  – The upper daily BATAEL should therefore be 60 mg/l (Plant 123)

- TSS short term average

  – Whether the proposed upper limit is set by plant 441-2 or 384-1, these plants include other streams within the plant and therefore cannot set the BATAEL

– The upper BATAEL therefore cannot be more than 25 mg/l (Plant 367)
– However, this adds nothing to an upper BATAEL set at Plant 456, which includes all fuels, capacities, load factors, SOx flue gas treatments and WWTP techniques
– The upper BATAEL should therefore be 20 mg/l (Plant 456)

- Fluoride upper short term average

– The proposed upper BATAEL is set by Plant 121
– However, this adds nothing to a BATAEL set at Plant 123 which covers the sampled fuel and the full range of age, capacity, load factor, SOx flue gas treatment and WWTP technique
– The upper BATAEL should therefore be 12mg/l (Plant 123)

- Sulphite upper short term average

– There are no reference plants even nearly supporting an upper BATAEL of 20 mg/l – the nearest is Plant 121, with a maximum emission of 13 mg/l (the highest recorded)
--However, there is nothing distinctive about Plant 121 in terms of age, fuel, operating hours, SOx abatement, WWTP technology or single/multiple flue gas treatment streams
– The upper BATAEL should therefore be set by Plant 141
– The upper BATAEL should therefore be 5 mg/l (Plant 141)

- Arsenic upper short term average

– There are no reference plants for an upper BATAEL of 50ug/l – it lies between Plants 141 (30 ug/l) and 121 (70 ug/l)
– However, there is nothing distinctive about plant 141 that cannot better be represented by Plant 662 in terms of fuel, age, capacity, operating hours, SOx abatement and WWTP technique.
– Plant 662 should therefore represent the upper BATAEL at 20 ug/l

- Cd upper short term average

– The propose upper BATAEL is set by plant 197, which includes other streams and cannot therefore be BAT
– It also duplicates plant and abatement characteristics that are represented in better performing plants elsewhere in the sample.
– Setting the BATAEL at plant 121 includes all fuels and fuel combinations and the full range of age, capacity, operating hours, SOx abatement and WWTP technique.
– The upper daily BATAEL should therefore be 2 ug/l (Plant 121)

- Cr upper short term average

– There is no reference plant corresponding to the proposed upper limit.
– The closest plant within that limit is 233, which has maximum emissions of 40 ug/l but includes other waste streams and cannot therefore provide a proper basis for the BATAEL
– Further, plant 233 adds nothing to an upper BATAEL set by plant 456, 28 MWth, commissioned in 1984 and operating 2800 hours.
– This BATAEL covers all sampled fuels, the full age range, and all sizes, operating hours and SO2 flue gas treatments.
– The upper daily BATAEL should therefore be 12 ug/l (Plant 456)

- Cu upper short term average

– There is no reference plant corresponding to the proposed upper limit
– Plants 386-1 and 223 have maximum emissions of 32 and 37 ug/l respectively, but both include other streams and cannot therefore provide a proper basis for a the BATAEL
– The closest plant within that limit that does not include other streams is 141, which has maximum emissions of 20 ug/l
– The upper BATAEL should therefore be 20 ug/l (Plant 141)

- Hg upper short term average

– The proposed upper limit is nominally set by Plant 141
– However, plant 141 adds nothing to an upper BATAEL set by plant 476 (1 ug/l) which covers all sampled fuels, the full range of age, size, operating hours, SO2 flue gas treatments and WWTP techniques.
– The upper BATAEL should therefore be 1 ug/l (Plant 476)

- Hg lower short term average

– Of the 16 plants sampled 4 have maximum emissions lower than the proposed lower BATAEL limit, with no grounds for excluding them from the BATAEL
– Plant 662 measuring only the flue gas treatment stream has emissions of 0 ug/l, presumably below the level of detection
– Plant 479 has no maximum data, whilst Plant 496 has maximum emissions of 0.05 ug/l
– Therefore the lower limit should be <0.05 ug/l (Plant 496)

- Ni upper short term average

– The proposed upper limit is nominally set by Plant 197,but this includes streams other than just the flue gas treatment stream.
– The next best performing plant is 121 with maximum emissions of 42 ug/l
– However, plant 121 adds nothing to an upper BATAEL set by plants 662 and 138 (15 ug/l) which covers all sampled fuels, the full range of age, size, operating hours, SO2 flue gas treatments and WWTP techniques.
– The upper BATAEL should therefore be 15 ug/l (Plants 662 and 138)

- Pb upper short term average

– The upper limit is set by plant 141
– However, plant 141 adds nothing to an upper BATAEL set by plant 456 (16ug/l) which covers all sampled fuels, the full range of age, size, operating hours, SO2 flue gas treatments and WWTP techniques.
– The upper BATAEL should therefore be 16 ug/l (Plant 456)

- Zn upper short term average

– There is no reference plants corresponding to the proposed upper BATAEL
– The closest is Plant 223, (150 ug/l) but that cannot form the BATAEL because it includes streams other than just the flue gas treatment stream.
– In practice, the upper limit is set by plant 138, with maximum emissions of 142 ug/l
– However, plant 138 adds nothing to an upper BATAEL set by plant 456 (64 ug/l) which covers all sampled fuels, the full range of age, size, operating hours, SO2 flue gas treatments and WWTP techniques.
– The upper BATAEL should therefore be 64 ug/l (Plant 456)

References

This split view is based on the following 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:

- *Graphs and tables on waste water emissions from the plants which submitted a questionnaire for the LCP BREF review:* EIPPCB; Version 2
- *G1 EEB response to the Background Paper*: pages 16-32

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 48 (EIPPCB TWG Slide 59)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to set CO BATAELs for gas turbines firing natural gas

Rationale:

This split view is supported by the following rationale …

- CO emissions are an indicator of how well a plant is run – it is an indicator of corrosion risk and unburned fuel, and therefore an indicator of efficiency
- Comprehensive data has been collected in the TWG plant survey

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Natural gas combustion in gas turbines: NOX, CO and NH3 emissions*: List of tables / graphs, tables 1-6: EIPPCB
- LCP BREF 2006; Section 1.3.2.5; p.18

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 48 (EIPPCB TWG Slide 59)

Split view submitted by: European Environmental Bureau

Proposal:

- The lower yearly BATAEL for OCGTs burning natural gas should be 6 mg/Nm^3
- The lower daily BATAEL for OCGTs burning natural gas should be 7 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- The yearly and daily BATAELs proposed by the final TWG meeting were achieved by an arbitrary averaging of the performance of plants 330, 331 332, 333 and 102. This does not properly reflect what can be achieved, as demonstrated by the performance of plant 332.

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Natural gas combustion in gas turbines: NOX, CO and NH3 emissions*: List of tables / graphs, table 2: EIPPCB

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 48 (EIPPCB TWG Slide 59)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that …

- The yearly upper BATAEL for existing plants >/= 600 MWth with <75% fuel utilisation should be 25 mg/Nm^3
- The daily upper BATAEL for existing plants >/= 600 MWth with <75% fuel utilisation should be 35 mg/Nm^3
- The yearly upper BATAEL for existing plants >/= 600 MWth with >75% fuel utilisation should be 30 mg/Nm^3
- The daily upper BATAEL for existing plants >/= 600 MWth with >75% fuel utilisation should be 45 mg/Nm^3
- Footnote 16 is simply aligning the BATAEL to IED Annex V – it is not justified by the reference plant data

Rationale:
This split view is supported by the following rationale …

- Yearly upper BATAEL for existing plants >/= 600 MWth with <75% fuel utilisation

  – An upper BATAEL of 40 mg/Nm^3 is set by plants 193 and 433
  – However, this adds nothing to setting the upper BATAEL at 25 mg/Nm^3 (Plant 10) – all sampled abatement techniques would still be covered
  – Anything more than 25 mg/Nm^3 is simply duplication of plant types with less well performing ones, and this cannot be BAT
  – Therefore the upper BATAEL should therefore be 25 mg/Nm^3 (Plant 10)

- Daily upper BATAEL for existing plants >/= 600 MWth with <75% fuel utilisation

  – Nearly all the plants with yearly emissions 25–40 mg/Nm^3 have a difference between the yearly and 95th %ile data of <10 mg/Nm3
  – For plants with yearly emissions 21-25 mg/Nm^3, all such differences are <8 mg/Nm^3
  – Therefore for a yearly average of 25 mg/Nm^3 the upper daily BATAEL should be 35 mg/Nm^3

- Yearly upper BATAEL for existing plants >/= 600 MWth with >75% fuel utilisation

  – There is no reference plant justifying an upper BATAEL of 55 mg/Nm^3 -- all the plants in the dataset > 75% fuel utilisation have emissions <50 mg/Nm^3
  – However, 4 of the 5 plants in this category would be included in an upper BATAEL of 30 mg/Nm
  – The other plant (49) is a poorer performing example of the commonly used DLN
  – The upper BATAEL for plants >600 MWth with fuel utilisation >75% should therefore be 30 mg/Nm^3

- Daily upper BATAEL for existing plants >/= 600 MWth with >75% fuel utilisation

  – A well managed plant should not have 95th % ile data excessively above its average

– The proposed upper BATAEL has been set by Plant 49, which has higher than normal difference between the yearly and daily data, and is excluded from the EEB's proposal
– Better performing plants with yearly emissions of 30 mg/Nm^3 would achieve daily limits within ~45mg/Nm^3
– Therefore the upper daily BATAEL should be 45 mg/Nm^3

- Footnote 16

  Given that the above data from the reference plants was collected in the period covered by the footnote, it shows that existing plants >/= 600 MWth with >75% fuel utilisation can easily comply with the BATAELs

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: page 159-160
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Natural gas combustion in gas turbines: NOX, CO and NH3 emissions*: List of tables / graphs, table 4: EIPPCB

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 48 (EIPPCB TWG Slide 60)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that …

- The yearly upper BATAEL for existing plants 50-600 MWth with <75% fuel utilisation should be 30 mg/Nm^3
- The daily upper BATAEL for existing plants 50-600 MWth with <75% fuel utilisation should be 40 mg/Nm^3
- Footnotes 17 and 18 are simply aligning the BATAEL to IED Annex V – they are not justified by the reference plant data

Rationale:

This split view is supported by the following rationale …

- Yearly upper BATAEL for existing plants 50-600 MWth with <75% fuel utilisation

  – The proposed upper BATAEL is set at Plant 104 (commissioned 2005) and includes 14 plants fitted with DLN alone
  – Within these DLN plants, Plant 135 dates back to 1994 but still achieves yearly emissions of 28 mg/Nm^3
  – Plant 104 cannot be BAT if a plant 11 years older is performing significantly better
  – Therefore the upper yearly BATAEL should be 30 mg/Nm^3 (Plant 135)

- Daily upper BATAEL for existing plants 50-600 MWth with <75% fuel utilisation

  – A yearly BATAEL of 30 mg/Nm^3 is proposed by the EEB, which includes Plant 171a
  – Plant 171a has 95th % ile data of 40 mg/Nm^3 which is the highest in the proposed yearly BATAEL range
  – Therefore for a yearly upper BATAEL of 30 mg/Nm^3 the upper daily BATAEL should be 40 mg/Nm^3

- Footnotes 17 and 18

  The BATAELs agreed for existing plants 50-600 MWth with >75% fuel utilisation are derived from reference plant data collected in the period covered by the footnotes. This shows that these plants can easily comply with the BATAELs

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: page 161-163
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Natural gas combustion in gas turbines: NOX, CO and NH3 emissions*: List of tables / graphs, tables 5 and 6: EIPPCB

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 49 (EIPPCB TWG Slide 79)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to set CO BATAELs for boilers and engines firing natural gas

Rationale:

This split view is supported by the following rationale …

- CO emissions are an indicator of how well a plant is run – it is an indicator of corrosion risk and unburned fuel, and therefore an indicator of efficiency
- Comprehensive data has been collected in the TWG plant survey

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Natural gas combustion in gas boilers and gas engine: NOX and CO emissions*: List of tables / graphs: EIPPCB; Tables 1 and 2
- LCP BREF 2006; Section 1.3.2.5; p.18

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 49 (EIPPCB TWG Slide 79)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that ….

- The upper limit for new gas engines burning natural gas should be 30 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- The yearly average in the revised BREF was the daily average in the 2006 BREF, with no correlation to the reference plant data
- This was not satisfactorily explained in the final TWG meeting – reference was simply made to the difference in legal status of the two BREFs without this being related to the data
- The reference plant data shows that 30 mg/Nm^3 can be achieved with lean burn concept and SCR (Plants 354 and 353). As plant 354 dates back to 1984, it is reasonable to expect this of new plants.

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Natural gas combustion in gas boilers and gas engine: NOX and CO emissions*: List of tables / graphs: EIPPCB; Table 2

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 60 (EIPPCB TWG Slide 91)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to remove footnote 2

Rationale:

This split view is supported by the following rationale …

- No evidence was provided in support of the threshold of >70% of base load power being the basis of the BATAELs, either in the meeting or in the Background Paper

References

This split view is based on the following 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:

- *FINAL MEETING OF THE TECHNICAL WORKING GROUP (TWG) FOR THE REVIEW OF THE BAT REFERENCE DOCUMENT FOR LARGE COMBUSTION PLANTS (LCP BREF)*:EIPPCB; pages 215-16

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 19 (EIPPCB TWG Slide 102)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that the following BATAELs should apply for NOx emissions from FBC plants coal/lignite and lignite fired PC boilers:

- The yearly upper BATAEL for existing plants should be 100 mg/Nm^3
- The daily upper BATAEL for existing plants should be 160 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- <u>Yearly upper BATAEL for existing plants</u>

  – The BATAEL of 175 mg/Nm3 is set by plant 170
  – However, there are better performing plants than this which are representative of the range of plants included in the BATAEL in terms of boiler type age, size and load factor (including mid merit) and achieve emissions of </= 150 mg/Nm3 without any secondary abatement
  – Secondary abatement has not been required of lignite to date because it could meet existing standards without it
  – However, that is not a proper basis for determining BAT and given the relatively low costs of SNCR, it is reasonable that BAT should require it for all plants
  – SNCR achieves reductions of 30-50%, resulting in emissions of ~100 mg/Nm3
  – The yearly existing upper NOx BATAEL for lignite PC and FBC plants should therefore be 100 mg/Nm3

- <u>Daily upper BATAEL for existing plants</u>

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The daily emissions of plants 167 and 170 are excessive compared with similar plants using primary measures – 83 and 137 mg/Nm3 above the yearly average.
  – By comparison, Plants 99, 377 and 123 have 95th %ile data of 60, 35 and 26 mg/Nm3 respectively above the yearly average
  – For a PC yearly upper BATAEL of 100mg/Nm3 the daily existing upper BATAEL is 160 mg/Nm3

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 48-50
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Coal and/or lignite combustion:NOX, CO and NH3 emissions to air:* EIPPCB; Table 4

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 19 (EIPPCB TWG Slide 102)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that the following BATAELs should apply for NOx emissions from coal-fired PC boilers:

- The yearly upper BATAEL for existing plants should be 85 mg/Nm^3
- The daily upper BATAEL for existing plants should be 140 mg/Nm^3
- The yearly upper BATAEL for new plants should be 70 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- <u>Yearly upper BATAEL for existing plants</u>

  This has been calculated on the basis of the worst possible case for both the emissions after primary measures have been applied and for the subsequent application of SCR.

  The EEB presented the following case for significant reduction, which has been checked with supply company engineers who work on fitting SCR:

  – The proposed upper limit has been achieved by combining the LCPD legal requirement of <500 mg/Nm3 for primary abatement with 70% removal efficiency for SCR -- the bottom end of the range identified by the Bureau in the BP (69 – 89%)
  – However, plants regularly achieve below 500 mg/Nm3 with just primary measures e.g. Plant 496 (343 mg/Nm3); Plant 379 (299 mg/Nm3); Plant 386-2 (196 mg/Nm3); Plant 406 (358 mg/Nm3)
  – Further, the fact of 70% NOx reduction with SCR does not mean that this is what it can achieve – an operator is not going to run the plant higher than they have to
  – Assuming a modest SCR emission reduction of 75% with primary measures achieving 350 mg/Nm3 gives NOx emissions of 88 mg/Nm3. Similarly, 75% SCR reduction on 300 mg/Nm3 achieves emissions of 75mg/Nm3.
  – Existing plant 141 achieves this, and plants 367, 34 and 253 exceed it
  – Therefore the upper BAT-AEL limit should be 85 mg/Nm3 if it is to reflect what plants can achieve (Plant 141).

- <u>Daily upper BATAEL for existing plants</u>

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – There is no 95th %ile data for plant 141. The closest comparable plant is for Plants 26, 17, 267 and 268, where the 95th %ile data exceeds the yearly average by 48, 28, 67 and 56 mg/Nm3 respectively
  – For a PC yearly upper BATAEL of 85mg/Nm3 the daily existing upper BATAEL is 140 mg/Nm3

- <u>Yearly upper BATAEL for new plants</u>

  – The Bureau notes that new plants can be expected to achieve emission levels <85%
  – However, that of itself does not justify setting the upper BATael at 85 mg/Nm3 i.e. at

plant 141
– There are 3 plants performing better with primary measures and SCR – Plants 367, 34 and 253, with NOx emissions of 66, 66 and 69 mg/Nm3 respectively
– These pre-date the normal age range for new plants, but if an older and smaller plant that is otherwise comparable can achieve a particular standard, it is reasonable to expect all new plants to do so.
– Plants 367, 34 and 253 should therefore provide the basis of the BAT-AEL i.e. 70mg/Nm3.

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 51-52
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Coal and/or lignite combustion:NOX, CO and NH3 emissions to air:* EIPPCB; Table 3

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 21 (EIPPCB TWG Slide 115)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that ...

- The general case for existing coal and lignite plants should be differentiated according to fuel
- The general case for existing lignite plants should be further differentiated according to fuel S-content: 1% S and 1-3.25% S dry wt
  - 130 mg/Nm3 for plants burning fuels up to 1-3.25% S
  - 40 mg/Nm3 for plants burning fuels <1% S
- The yearly upper SO2 BATael for existing coal plants should be 40 mg/Nm^3
- The yearly upper SO2 BATael for new coal plants should be 20 mg/Nm^3
- The upper yearly SOx BATael for new lignite PC plants should be:
  - 75 mg/Nm3 for plants burning fuels up to 1-3.25% S
  - 20 mg/Nm3 for plants burning fuels <1% S
- The daily upper SO2 BATael for existing coal plants should be 75 mg/Nm^3
- The upper daily SOx BATael for existing lignite PC plants should be:
  - 205 mg/Nm3 for plants burning fuels up to 1-3.25% S
  - 75 mg/Nm3 for plants burning fuels <1% S
- The daily upper SO2 BATael for new coal plants should be 60 mg/Nm^3
- The upper daily SOx BATael for new lignite PC plants should be:
  - 110 mg/Nm3 for plants burning fuels up to 1-3.25% S
  - 60 mg/Nm3 for plants burning fuels <1% S

Rationale:

This split view is supported by the following rationale …

- <u>Differentiating between coal and lignite in the general case for existing plants</u>

  – The use of raw flue gas content as the basis for setting different standards arises from the inclusion of both coal and lignite (with different LHVs) within the indigenous and non-indigenous categories
  – This was no part of the Domestic Fuels Initiative and no justification has been provided for the classification of individual plants between these 2 categories – indeed, industry representatives are questioning the classification of some of them.
  – Further, plants burning either indigenous or non-indigenous coals can use coal blending
  – The differentiation should therefore be on the basis of coal and lignite.

- <u>Differentiating existing lignite plants according to fuel S-content: 1% S and 1-3.25% S dry wt</u>

  – Plant 170 burns lignite with a dry S-content of 3.22% and achieves emissions of 122 mg/Nm3
  – However, it would be excessive to allow this level of emissions to plants with a lower fuel S content

– A pro-rata reduction in emissions for plants with a fuel S content of 0.9% would result in a maximum emission of ~38 mg/Nm3

– This is easily achievable in practice -- Plant 137 dates from 1972, burns lignite with a fuel S content of 0.9% and achieves yearly emissions of 21 mg/Nm3 based on half hour averages.

– Therefore the general case upper BATAEL for existing lignite should be 130 mg/Nm3 for plants burning fuels up to 1-3.25% S and 40 mg/Nm3 for plants burning fuels <1% S

- The yearly upper SO2 BATAEL for existing coal plants should be 40 mg/Nm^3

– The proposed BATAEL is set by Plant 219, dating back to 1974.

– However, there are several existing coal-fired reference plants that currently achieve emissions considerably below this whilst being older – Plants 211 (1965) and 212 (1970) achieve emissions of 56 and 58 mg/Nm^3 respectively

– Plant 124b (1968) has yearly emissions of 40 mg/Nm3 based on half hourly averages

– Therefore the yearly upper SO2 BATAEL for existing plants should be 40 mg/Nm^3 (Plant 124b)

- The yearly upper SO2 BATael for new coal plants should be 20 mg/Nm^3

– Plant 34 has average SO2 emissions of 9 mg/Nm3, although no fuel S-content is reported

– However, it is known that plant 137 (1972) achieves emissions of 21 mg/Nm3 (half hourly average) with a fuel S-content of 0.9%

– The new plant upper BATAEL should therefore be 20 mg/Nm^3

- The upper yearly SOx BATAEL for new lignite PC plants should be:
  - 75 mg/Nm3 for plants burning fuels up to 1-3.25% S
  - 20 mg/Nm3 for plants burning fuels <1% S

– The general case BATAEL proposed in the BATAEL for new plants is based on 75 mg/Nm3 emissions

– However, this would be excessive for plants burning fuels with lower S contents

– Plants 137, 130 and 116 date from 1972, 1975 and 2003 respectively and all burn lignite with a S-content of 0.9 %.

– They achieve emissions of 21, 68 and 77 mg/Nm3 based on half hourly averages.

– If a plant as old as 1972 can achieve can achieve 21 mg/Nm3 on half hourly averages, then it can be expected of the newest plants

– The upper yearly SOx BATAEL for new lignite PC plants >300 MWth should therefore be:
  - 75 mg/Nm3 for plants burning fuels up to 1-3.25% S
  - 20 mg/Nm3 for plants burning fuels <1% S

- Daily upper SO_2 BATael for existing coal plants

– A well run plant should not have a large variation between the yearly average and 95th % ile data

– The yearly BATAEL was set by plant 124b, which has a difference of 34 mg/Nm3 between the yearly and 95th %ile data

– This is not excessive (Plants 26,123 and 134 have differences of 31, 41 and 31 mg/Nm3 respectively)

– For a yearly upper BATael of 40 mg/Nm3 the daily upper BATael should therefore be 75 mg/Nm^3

- Daily upper SOx BATael for existing lignite PC plants

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The yearly BATael for plants with fuel S content 1-3.25% was set by plant 139
  – 205 mg/Nm3 (Plant 388) is the best 95th % ile data for plants in this emissions range
  – For the yearly BATAEL for plants with a fuel S-content <1% was set by plant 124b, which has a difference of 34 mg/Nm3
  – Plants 124b, 26, 123 and 134 have differences between the yearly and 95th %ile data of 34, 31, 41 and 31 mg/Nm3 respectively
  – Therefore the general case daily upper BATAEL for lignite should be:
    - 205 mg/Nm3 for plants burning fuels up to 1-3.25% S
    - 75 mg/Nm3 for plants burning fuels <1% S

- Daily upper SO2 BATael for new coal plants

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The top performing yearly average new plant does not provide 95th % ile
  – Plants 26, 124b and 123 have difference between the daily and yearly data of 32, 34 and 41 mg/Nm^3 respectively
  – For a yearly upper BATael of 20 mg/Nm^3 the daily upper BATael should therefore be 60 mg/Nm^3

- Daily SOx BATael for new lignite PC plants

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The yearly BATael was set by plant 137, with a difference between the daily and yearly data of 47 mg/Nm3
  – Plants 116 has a difference between the daily and yearly data of 36 mg/Nm^3
  -– The daily upper BATael should therefore be:
    - 110 mg/Nm^3 for plants 1-3.25% S content
    - 60 mg/Nm^3 for plants <1% S-content

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 63-69
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Coal and/or lignite combustion: SO2 emissions:* EIPPCB; Tables 3 and 4
- *EURELECTRIC reactions on background paper and other meeting documents:* 08 May 2015; page1

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 22 (EIPPCB TWG Slide 131)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that …

- The yearly upper limit for new plants 300-1000MWth should be 3.5 mg/Nm^3
- The yearly upper limit for existing plants 300-1000MWth should be 6 mg/Nm^3
- The daily upper limit for new plants 300-1000MWth should be 6.5 mg/Nm^3
- The yearly upper limit for new plants >1000MWth should be <2 mg/Nm^3
- The yearly upper limit for existing plants >1000MWth should be 3.5 mg/Nm^3
- The daily upper limit for new plants >1000MWth should be 4 mg/Nm^3
- The daily upper limit for existing plants >1000MWth should be 6 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

Yearly upper limit for new plants 300-1000MWth

– The reference plant for the proposed upper limit is 662, dating back to 1986 and using a fuel with a raw ash content of 13.37% dry wt.
– Plant 443-1 burns a fuel with a higher raw ash content of 15.77% wt (age unknown) and is representative of the dataset and a range of abatement techniques.
--Therefore the upper limit of the yearly dust BATael for new plants 300-1000 MWth should be 3.5 mg/Nm^3 (plant 443-1)

Yearly upper limit for new plants 300-1000MWth

--The D1 proposal is set approximately by plant 26 (10.5 mg/Nm^3)
– However, setting the BATael at plant 386-3 equally includes all relevant types of FGD and dust abatement (ESP alone cannot be BAT for plants of this size, which require FGD*)*
– It does not explicitly include lignite plants, but its fuel ash content (23.4 wt % raw) is the same as plant 386-2, and greater than all the lignite plants (Plant 389 = 9.6 wt % raw; plant 137 = 5.1 wt % raw; plant 170 = 18.83 wt % raw)
– The upper BATael should therefore be 6 mg/Nm^3 (Plant 386-3)

Daily upper limit for new plants 300-1000MWth

– A well run plant should not have a large variation between the yearly average and 95th % ile data
– The EEB's proposed yearly BATael was set by Plant 443-1, which has 95th %ile data 4.6 mg/Nm^3 above the yearly average
– Very similar plants 415-1 and 134 have 95th % ile data that is up to 3 mg/Nm^3 higher than the yearly average
– For a the EEB's yearly upper BATael of 3.5 mg/Nm3 the daily upper BATael should therefore be 6.5 mg/Nm3.

Yearly upper limit for new plants >1000MWth

– The proposal is set at plant 77, commissioned in 1983 – not new plant age
– However, Plant 253 (2008) burns fuel with a higher ash content (12.4 compared to 12.2 % wt raw) and achieves emissions of 1.6 mg/Nm^3
– It is also representative in terms of size and operating hours.
--The BATael should therefore be set by plant 253 at 2 mg/Nm^3, resulting in an overall new plant yearly BATAEL of <2 mg/Nm^3

Yearly upper limit for existing plants >1000MWth

– The proposed limit is set by plant 384-2
– Plant 496 dates back to the late 1960s, burns fuel with a raw ash content of 12.2% wt, and operates at mid merit loads. Setting the BATael at this plant includes both bag filters and ESPs with FGD, and both coal and lignite.
– The upper BATael should therefore be 3.5 mg/Nm^3 (Plant 496)

Daily upper limit for new plants >1000MWth

– A well run plant should not have a large variation between the yearly average and 95th % ile data
– The EEB's proposed yearly BATael is set by Plant 253, which does not report 95th % ile data
– Neighbouring plant 122a reports 95th % ile data of 1.8 mg/Nm^3 above its average
– For a yearly upper BATael of 2 mg/Nm3 the daily upper BATael should therefore be 4 mg/Nm^3

Daily upper limit for existing plants >1000MWth

– The proposed upper daily limit is set by plant 101
– The plants with the highest emissions within that range are plants 128-1 and 129-2 at 8.6 mg/Nm^3, both commissioned in the 1980s
– Plant 496 dates back to the late 1960s, burns fuel with a raw ash content of 12.2% wt, and operates at mid merit loads. Setting the BATael at this plant includes both bag filters and ESPs with FGD, and both coal and lignite.
The upper daily BATael for the EEB's yearly proposal should therefore be 3.5 mg/Nm^3 (Plant 496)

The above rationales are further underlined by the fact that dust emissions are particularly harmful to human health, resulting in a damage cost per tonne significantly higher than that for NOx and SOx. This is especially the case for fine particulates, which are laden with heavy metals and can penetrate deep into the lungs.

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 81-86

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Coal and/or lignite combustion:Dust emissions* EIPPCB; Tables 3 and 4

- *Health and Economic Implications of Alternative Emission Limits for coal-fired power plants in the EU: Appendix 1: Damage per tonne estimates for NH_3, NOx, $PM_{2.5}$, SO_2 and VOCs*; Greenpeace and European Environmental Bureau; May 2015; pages 14-16

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 23 (EIPPCB TWG Slide 143)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that ….

- The yearly upper BATAEL for new coal plants <300 MWth should be 0.6 ug/Nm^3
- The yearly upper BATAEL for existing coal plants <300 MWth should be 3.5 ug/Nm^3
- The yearly upper BATAEL for new coal plants >300 MWth should be =/< 0.5 ug/Nm^3
- The yearly upper BATAEL for existing coal plants >300 MWth should be 1.5 ug/Nm^3

Rationale:

This split view is supported by the following rationale …

- <u>Yearly upper BATAEL for new coal plants <300 MWth</u>

  – The proposed upper BATAEL is approximately set by Plants 683 which burns sub-bituminous coal
  – Plants burning sub-bituminous coals are of particular interest as they have higher amounts of elemental mercury that is not removed by co-benefit abatement
  – However, Plants 286 (retrofitted 2002) and 689 (2004) also burn sub-bituminous coal and have Hg emissions of 0.57 and 0.6 ug/Nm^3 respectively
  – The upper BATAEL should therefore be 0.6 ug/Nm^3

- <u>Yearly upper BATAEL for existing coal plants <300 MWth</u>

  – The upper BATAEL is set by Plant 690 (2006) burning sub-bituminous coal but the inclusion of additional plants in the database justifies the revision of this upper BATAEL.
  – Plants burning sub-bituminous coals are of particular interest, as they have higher amounts of elemental mercury that is not removed by co-benefit abatement.
  – There are older plants burning 100% sub-bituminous fuels that achieve lower emissions e.g. Plant 683 with Hg emissions of 3.1 ug/Nm^3 plus several others with even lower emissions
  – Further, these emissions have been achieved without the use of the Hg-specific abatement techniques that have been accepted as BAT
  – Therefore the upper BATAEL should be 3.5 ug/Nm^3 (Plant 683)

- <u>Yearly upper BATAEL for new coal plants >300 MWth</u>

  – The top performing plants all pre-date the usual 2008 cut-off date for new plants, but if they can achieve higher levels of abatement, then it is reasonable to use them to set the BATAEL
  – The BAT-AEL should be set at plant 662-268-267 which covers the full range of plant sizes and the range of abatement technique constellations; has 2 operating at mid-merit; and despite dating back to 1986 or 2004 retrofits, have lower emissions than Plant 253 which dates from 2008
  – They achieve emissions of 0.5 micrograms/Nm^3 by co-benefit abatement alone, and mercury-specific abatement techniques have been accepted as BAT and are available if

required.
– Plant 662-268-267 should therefore provide the basis of the BAT-AEL i.e. =/< 0.5 µg/Nm^3

- Yearly upper BATAEL for existing coal plants >300 MWth

  – The proposed upper limit of 4 ug/Nm^3 reflects the EEB's position at the D1 consultation
  – However, since then 2 things have changed
    - Confirmation of the commercial operation of related techniques -- such as concrete-friendly ACI and separation of Hg in WWTP sludge -- necessitates less of a margin being left between EU and US standards
    - Additional data such as age, operating hours, size etc can inform decisions on BAT within groups of plants
  – The proposed upper BATAEL is set by Plant 134 – SCR-WFGD-ESP – burning bituminous coal and based on half hourly averages which will overestimate the actual emissions
  – However, this adds nothing compared to a BATAEL set at Plant 212, which includes all sampled combinations of SOx/NOx/dust abatement and is representative of the whole sample in terms of plant age, size and operating hours.
  – These emissions have been achieved by co-benefit abatement alone, and mercury-specific abatement techniques have been accepted as BAT if required.
  – The BAT-AEL should therefore be 1.5ug/Nm^3 (Plant 212b)

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 90-92

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Coal and/or lignite combustion: Hg emissions:* EIPPCB; Table 1

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 23 (EIPPCB TWG Slide 143)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that ….....

- The yearly upper BATAEL for new lignite plants <300 MWth should be </=1 ug/Nm^3
- The yearly upper BATAEL for existing lignite plants <300 MWth should be 3.5 ug/Nm^3
- The yearly upper BATAEL for new lignite plants >300 MWth should be </=1 ug/Nm^3
- The yearly upper BATAEL for existing lignite plants >300 MWth should be 3 ug/Nm^3

Rationale:

This split view is supported by the following rationale …

- <u>Yearly upper BATAEL for new lignite plants <300 MWth</u>

  – Plant 25-1 burns 100% lignite, is the oldest of the plants in this size category (1996, 1997) and is still one of the best performers.
  – If this plant can achieve emissions of 1 ug/Nm^3, then this should be the new plant standard
  – This is especially the case when this has been achieved without using Hg-specific abatement, which is available as a BAT technique
  – The upper BATAEL for new lignite plants <300 MWth should therefore be </=1 ug/Nm^3 (Plant 25-1)

- <u>Yearly upper BATAEL for existing lignite plants <300 MWth</u>

  – There is no reference plant within this size category for an upper BATAEL of 10 ug/Nm3 – the nearest is plant 22-1 with Hg emissions of 6.7 ug/Nm3 but burning only 60% lignite, with 40% wood.
  – Lignite is the fuel of particular interest because it has a high level of elemental mercury which more difficult to abate by co-benefit.
  – Plant 19 is newer than Plant 22-1 but burns 100% lignite, and therefore provides a proper basis for the upper BATAEL
  – The upper BATAEL for existing lignite plants < 300 MWth should therefore be 3.5 ug/Nm^3

- <u>Yearly upper BATAEL for new lignite plants >300 MWth</u>

  – Plant 18-2 emits <1 ug/Nm3, by co-benefit abatement
  – Plant 25-1 achieves emissions of 1 ug/Nm3 despite being only 144 MWth
  – Mercury-specific abatement techniques have been accepted as BAT and are available if required to supplement co-benefit abatement
  – Data submitted by the EEB on the lignite fired US Oak Grove Units 1 and 2 show that Hg emissions are kept below 1µg/Nm³ with the use of ACI
  – BAT can be based on plants anywhere in the world, so the BAT-AEL for lignite should be set at </= 1µg/Nm³

- <u>Yearly upper BATAEL for existing lignite plants >300 MWth</u>

– The proposed BATAEL is set by plants 127-1 and -2
– However, the much older plants 130 and 137 have the same configuration of pollution abatement techniques and achieve emissions of 3 micrograms/Nm^3 by co-benefit abatement alone
– Mercury-specific abatement techniques have been accepted as BAT and are available if required.
– The upper yearly Hg BAT-AEL for existing lignite plants >300 MWth should therefore be 3µg/Nm^3 (Plants 130 and 137)

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 93-94
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Coal and/or lignite combustion: Hg emissions:* EIPPCB; Table 2

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 26 (EIPPCB TWG Slide 150)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that …..

- The yearly upper BATAEL for existing plants 100-300 MWth should be 140 mg/Nm^3
- The daily upper BATAEL for existing plants 100-300 MWth should be 190 mg/Nm^3
- BATAELs should be set for CO

Rationale:

This split view is supported by the following rationale …

- <u>Yearly upper BATAEL for existing plants 100-300 MWth</u>

  – The only case made for an upper limit of 180 mg/Nm^3 is the possibility that some existing FBC plants may have difficulty getting the right temperature window in all loads (BP).
  – However, CFBC plants even smaller than this size category operate SCNR e.g. Plants 466 (98 MWth) and 470 (50 MWth), both achieving emissions of ~70 mg/Nm^3
  – In this size range, CFBC plants 190 (2004) and 46 (2008) are fitted with SNCR
  – It is these plants that should form the basis of the BATAEL, especially plant 190, which is slightly older and also fitted with primary NOx abatement measures.
  – Faced with this evidence, the upper BATAEL cannot be set higher on a possibility that might arise at some FBC plants for some loads.
  – The upper BATAEL for existing plants should therefore remain at 140 mg/Nm^3 (Plant 190)

- <u>Daily upper BATAEL for existing plants 100-300 MWth</u>

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – Plant 190 – the proposed reference plant with SNCR – does not have an excessive difference between the average and 95th % ile data i.e. a difference of 50 mg/Nm^3.
  – Plant 667 shows the same difference.
  – For a yearly upper BATael of 140 mg/Nm3 the daily upper BATael for existing plants should therefore be 190 mg/Nm^3.

- <u>BATAELs for CO</u>

  – CO emissions are an indicator of how well a plant is run – it is an indicator of corrosion risk and unburned fuel, and therefore an indicator of efficiency
  – Comprehensive data has been collected in the TWG plant survey

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 104-105

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Biomass and/or peat combustion: NOX, CO and NH3 emissions to air:*EIPPCB; all tables
- *FINAL MEETING OF THE TECHNICAL WORKING GROUP (TWG) FOR THE REVIEW OF THE BAT REFERENCE DOCUMENT FOR LARGE COMBUSTION PLANTS (LCP BREF)*:EIPPCB;
- LCP BREF 2006; Section 1.3.2.5; p.18

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 28 (EIPPCB TWG Slide 161)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that:

- The yearly upper BATAEL for new plants <100 MWth should be 50 mg/Nm^3
- The yearly upper BATAEL for existing plants <100 MWth should be 65 mg/Nm^3
- The daily upper BATAEL for new plants <100 MWth should be 85 mg/Nm^3
- The daily upper BATAEL for existing plants <100 MWth should be 180 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- Yearly upper BATAEL for new plants <100 MWth

  – The proposed upper BATAEL for new plants is 70 mg/Nm^3, on the grounds that DSI achieves emissions <70 mg/Nm^3
  – However, this adds nothing to an upper BATAEL based on the better performance of DSI at Plant 655
  – The upper BATAEL for new plants should therefore be 50 mg/Nm^3 (Plant 655)

- Yearly upper BATAEL for existing plants <100 MWth

  – The proposed upper BATAEL is set by Plant 190 from the 100-300 MWth category
  – However, this 100% peat plant has already been made a separate case, so it is not reasonable to use it as the reference for a BATAEL for wider than that special case
  – The BP proposes using sorbent injection as the BAT technique, and plants 489-1 and 489-2 achieve emissions of 62 and 46 mg/Nm^3 with this technique within this size category.
  – Setting the upper BATAEL at 65 mg/Nm^3 would easily cover >69% peat combustion (Plant 1012; 120MWth; 2 mg/Nm^3)
  – The upper BATAEL for existing plants should therefore be 65 mg/Nm^3

- Daily upper BATAEL for new plants <100 MWth

  – A well run plant should not have an excessive difference between the average and 95th %ile emissions
  – The upper yearly BATAEL for new plants is set by Plant 655, which has a difference of 33 mg/Nm^3 between its yearly and 95th %ile data
  – This is not excessive, compared with the differences of Plants 108-1 and 108-2 which also operate with DSI (differences between the yearly and 95th %ile data of 61 and 63 mg/Nm^3)
  – The upper daily BATAEL for new plants with a yearly average of 50 mg/Nm3 should therefore be 85 mg/Nm^3 (Plant 655)

- Daily upper BATAEL for existing plants <100 MWth

  – A well run plant should not have an excessive difference between the average and 95th %ile emissions
  – None of the plants using sorbent injection in this size category provide 95th % ile data

– However, Plant 46 (206MWth) uses sorbent injection and has 95th %ile data that is 112 mg/Nm^3 above the yearly average
– The upper daily BATAEL for existing plants with a yearly average of 65 mg/Nm^3 should therefore be 180 mg/Nm^3

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 111-112
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Biomass and/or peat combustion: SO2 emissions to air*: EIPPCB; Table 1

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 29 (EIPPCB TWG Slide 180)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that …..

- The yearly upper BATAEL for new plants <100 MWth should be 3.5 mg/Nm^3
- The yearly upper BATAEL for existing plants <100 MWth should be 6 mg/Nm^3
- The daily upper BATAEL for new plants <100 MWth should be 6 mg/Nm^3
- The daily upper BATAEL for existing plants <100 MWth should be 12 mg/Nm^3
- The yearly upper BATAEL for new plants 100-300 MWth should be 3.5 mg/Nm^3
- The yearly upper BATAEL for existing plants 100-300 MWth should be 5 mg/Nm^3
- The daily upper BATAEL for new plants 100-300 MWth should be 16 mg/Nm^3
- The daily upper BATAEL for existing plants 100-300 MWth should be 12 mg/Nm^3
- The yearly upper BATAEL for new plants >300 MWth should be 3 mg/Nm^3
- The yearly upper BATAEL for existing plants >300 MWth should be 5 mg/Nm^3
- The daily upper BATAEL for new plants >300 MWth should be 8 mg/Nm^3
- The daily upper BATAEL for existing plants >300 MWth should be 10 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- <u>Yearly upper BATAEL for new plants <100 MWth</u>

  – There is no reference plant according with the proposed BATAEL -- it lies between Plants 424 and 125
  – However, a BATAEL set at Plants 424-2 and 489-3, provides no loss in the range of fuels combustion technologies or dust abatement techniques
  – The upper yearly BATAEL for new plants should therefore be 3.5 mg/Nm^3 (Plants 424-2 and 489-3)

- <u>Yearly upper BATAEL for existing plants <100 MWth</u>

  – The proposed BATAEL is set by Plant 676
  – However, setting the BATAEL at this plant allows just 5 plants to increase the upper BATAEL by a factor of 2.5 from the BATAEL set by the other 17 plants
  – This is allowing a few plants a disproportionate impact on the BATAEL that is not justified by the data – it adds nothing to a BATAEL set by Plant 457 in terms of plant size, age, load factor and boiler and dust abatement technologies
  – Plant 457 (28 MWth) was commissioned in 1984 and operates for just 3200 hours.
  – The upper yearly BATAEL for existing plants should therefore be 6 mg/Nm^3 (Plant 457)

- <u>Daily upper BATAEL for new plants <100 MWth</u>

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The reference plants proposed by the EEB for this BATAEL do not provide 95th % ile data but neighbouring plants do – Plants 108-1, 72 and 125 have 95th % ile data that is higher than the average data by 2.68, 2.4 and 2.66 mg/Nm^3 respectively
  – The upper daily BATAEL for new plants with average data of 3.5 mg/Nm^3 (EEB

proposal) should therefore be 6 mg/Nm^3

- Daily upper BATAEL for existing plants <100 MWth

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The reference plant proposed by the EEB for this BATAEL does not provide 95th % ile data and neither does any other plant abated by ESP + FGD condenser
  – However, neighbouring plants do – Plants 655, 464 and 125 have 95th % ile data that is higher than the average data by 4.95, 6.19 and 2.4 mg/Nm3 respectively
  – The upper daily BATAEL for existing plants with average data of 6 mg/Nm^3 should therefore be 12 mg/Nm^3

- Yearly upper BATAEL for new plants 100-300 MWth

  – The proposed BATAEL is set at Plant 686 and includes a number of existing plants
  – However, this adds nothing to a BATAEL set by Plant 190, which includes plants burning 100% peat and straw, and covers the range of boiler and abatement technologies
  – The upper BATAEL for new plants 100-300 MWth should therefore be 3.5 mg/Nm^3 (Plant 190)

- Yearly upper BATAEL for existing plants 100-300 MWth

  – The proposed BATAEL is set at Plant 13
  – However, this adds nothing to an upper BATAEL set at Plant 686, which includes several plants burning varying proportions of the higher dust herbaceous and peat fuels.
  – It also includes the range of boiler and dust abatement technologies featured in the sample
  – The upper BATAEL for existing plants 100-300 MWth should therefore be 5 mg/Nm^3 (Plant 686)

- Daily upper BATAEL for new plants 100-300 MWth

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The EEB's yearly BATAEL is set by Plant 190 which has 95th %ile data ~16 mg/Nm^3
  – Therefore the upper daily BATAEL should be 16 mg/Nm^3

- Daily upper BATAEL for existing plants 100-300 MWth

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – The EEB's yearly BATAEL is set by Plant 686, which does not provide 95th %ile data
  – However, neighbouring plant 674 with the same ESP abatement technology does – here the 95th %ile data is 7 mg/Nm^3 higher than the average
  – Therefore a yearly upper BATAEL of 5 mg/Nm^3, the upper daily BATAEL should be 12 mg/Nm^3

- Yearly upper BATAEL for new plants >300 MWth

  – The proposed upper BATAEL is set by plant 14
  – Setting the BATAEL at the better performing Plant 539 (2010) would include the boiler, fuel and dust abatement options
  – Therefore the yearly upper BATAEL for new plants >/= 300 MWth should be 3

mg/Nm^3 (Plant 539)

- Yearly upper BATAEL for existing plants >300 MWth

  – An upper BATAEL of 10 mg/Nm^3 is set by plant 31, which is the only plant in the sample burning straw (25%)
  – Straw has an ash content about 5 x that of other biomass,but so does peat, which is represented in similar or larger amounts in better performing plants
  – Setting the upper BATAEL at Plant 14 covers the age range (including retrofits), the range of fuels relevant to dust, and the boilers and dust control techniques in the sample
  – Therefore the yearly dust upper BATAEL for existing plants should be 5 mg/Nm^3 (Plant 14)

- Daily upper BATAEL for new plants >300 MWth

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – Plant 14 set the EEB's yearly BATAEL, with 95th %ile emissions 5.6 mg/Nm^3 above the yearly average, this is not excessive -- plant 42 has an equivalent figure of 95th 4 mg/Nm^3
  – Therefore the daily upper BATael for new plants with a yearly average of 3 mg/Nm should be 8 mg/Nm^3

- Daily upper BATAEL for existing plants >300 MWth

  – A well run plant should not have a large variation between the yearly average and 95th % ile data
  – Plant 539 set the EEB's yearly BATAEL and its 95th % ile data is 7.6 mg/Nm^3 higher than its average – 5.6 mg/Nm^3 higher.
  – However, this is high compared with the differences between average and 95th %ile data of Plants 42 and 14 of 4 and 5.66 mg/Nm^3 respectively
  – Therefore the daily upper BATael for existing plants with a yearly average of 5 mg/Nm^3 should be 10 mg/Nm^3

The above rationales are further underlined by the fact that dust emissions are particularly harmful to human health, resulting in a damage cost per tonne significantly higher than that for NOx and SOx. This is especially the case for fine particulates, which are laden with heavy metals and can penetrate deep into the lungs.

References

This split view is based on the following 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:

- *G1 EEB response to the Background Paper*: pages 129-133
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Biomass and/or peat combustion: dust emissions to air*: EIPPCB; all tables
- *Health and Economic Implications of Alternative Emission Limits for coal-fired power plants in the EU: Appendix 1: Damage per tonne estimates for NH_3, NOx, $PM_{2.5}$, SO_2 and VOCs*; Greenpeace and European Environmental Bureau; May 2015; pages 14-16

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 78 (EIPPCB TWG Slide 192)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that ….

- The upper BATAEL for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants <300 MWth should be 0.25 mg/Nm^3
- The upper BATAEL for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants >/=300 MWth should be 0.04 mg/Nm^3
- The upper BATAEL for Cd + Tl for plants <300 MWth should be 6 ug/Nm^3
- The upper BATAEL for Cd + Tl for plants >300 MWth should be 3 ug/Nm^3

Rationale:

This split view is supported by the following rationale …

- The upper BATAEL for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants <300 MWth

  – There is no reference plant that accords with the proposed upper BATAEL of 0.5 mg/Nm^3 – plant 684 has emissions of 0.54 mg/Nm^3, whilst plant 689 has emissions of 0.2462 mg/Nm^3
  – Setting the upper BATAEL at plant 689 would include 4 out of the 5 samples and cover all fuels and plant sizes.
  – The upper BATAEL should therefore be 0.25 mg/Nm^3

- The upper BATAEL for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants >/=300 MWth

  – No plant in the sample emits the proposed upper limit 0.2 mg/Nm^3 – the largest average emission is 0.156 mg/Nm^3 by Plant 117-2 burning 97% lignite and 3% waste
  – However, plants 128-1, -2, -3 and -4 also burn 97% lignite and 3% waste, but still achieve average emissions of at most 0.04 mg/Nm^3
  – Therefore the upper BATAEL should be 0.04 mg/Nm^3

- The upper BATAEL for Cd + Tl for plants <300 MWth

  – The proposed upper limit appears to be based on the only maximum emission recorded (Plant 81, the plant with the highest average emission) and not on the averages
  – Based on averages, the BATAEL should be no greater than 6 ug/Nm^3 i.e. plant 81

- The upper BATAEL for Cd + Tl for plants >300 MWth

  – It is not possible to justify an upper BATAEL of 8 ug/Nm^3 because no reference plant achieved emissions this high
  – The largest emission sampled is 6 ug/Nm^3 (Plant 146)
  – However, just 3 plants – 146, 198 and 197 – increase the upper BATAEL by 50% compared to that set by the other 14 plants in the sample
  – It should therefore be set at 3 ug/Nm^3 by plant 124f (0.0028 ug/Nm^3), which covers a wide range of fuels and the full capacity range.

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: waste co-incineration: metals, dioxins/furans and TOC emissions* : EIPPCB; tables 1, 2, 4 and 6

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 79 (EIPPCB TWG Slide 197)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that ….

- The upper BATAEL for Cd + Tl should be 2 ug/Nm^3

Rationale:

This split view is supported by the following rationale …

- <u>Upper BATAEL for Cd + Tl</u>

  – Plant 72 is rightly excluded from the BATAEL because rather than co-incinerate waste, it predominantly burns it (93.4% of total fuel)
  – 2 ug/Nm^3 is the highest average emission of plants that would qualify as '*biomass-and/or peat-fired boilers including waste co-incineration plants"*
  – Therefore the upper BATAEL should be no higher than 2 ug/Nm^3

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: waste co-incineration: metals, dioxins/furans and TOC emissions* : EIPPCB; table 5

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 81 (EIPPCB TWG Slide 202)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes that ….....

- The BATAELs for coal/lignite and biomass/peat should be separated
- Footnote (8) should be removed

Rationale:

This split view is supported by the following rationale …

- BATAELs for coal/lignite and biomass/peat

  – The reference plant data shows that combining coal/lignite and biomass/peat in one BATAEL means that they are too high for coal/lignite by a factor of about 10

- Footnote (8)

  – Waste is inherently variable and therefore fuel/waste quality assessment should not be used as an alternative to the specified minimum monitoring frequencies

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: waste co-incineration: metals, dioxins/furans and TOC emissions* : EIPPCB; tables 8 and 9

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 33 (EIPPCB TWG Slide 221)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to reduce the upper yearly limit for new and existing plants <300 MWth to 75 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- The Proposed limit of 175 mg/Nm^3 is based on an assumption of 0.1% S in the fuel. However, this overlooks the option of combining fuel choice with an abatement technique to reduce emissions

- It also fails to accord with any reference plant:

  – An upper BATAEL of 175 mg/Nm^3 lies between plants 33 (72 mg/Nm^3) and 290 (330 mg/Nm^3) i.e. significantly detached from both.
  – Setting the upper BATAEL at plant 83 would include the full ranges of sampled fuels and equivalent full load operating factor values.
  – It also represents what can be achieved by the smallest plants within this category, and therefore what it is reasonable to expect from plants >100 MWth.
  – The upper BATAEL for both new and existing plants should therefore be 75 mg/Nm^3

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: HFO- and/or gas oil combustion in boilers: SO2 emissions to air*: EIPPCB; Table 1

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 37 (EIPPCB TWG Slide 235)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to remove footnotes (4) and (5) in favour of the use of IED Article 15.4 derogations instead

Rationale:

This split view is supported by the following rationale …

– No such equivalent provision is available for other fuels – where there is an issue over whether the BATAEL can be met due to available space, this is the subject of an Art 15.4 derogation
– The trigger for the application of the footnote is the inability to fit secondary abatement. However, this is an artificial qualification in that it overlooks the reality of partial ability to fit secondary abatement in the face of space requirements.
– The justification required for an Article 15.4 derogation allows the potential for secondary abatement to be fully explored.

References

This split view is based on the following 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:

- *SIS_Yara plant_Lamedusa:* EEB folder on BATIS containing emissions data for Lampedusa Power Station and details of the constraints on the fitting of SCR due to space
- *DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast)*: Article 15.4

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BAT conclusion/BAT-AEL to which the split view refers to: BAT 39 (EIPPCB TWG Slide 251)

Split view submitted by: European Environmental Bureau

Proposal:

This split view proposes to retain the upper BATAELs set out in the Background Paper:

- The yearly upper limit for new plants should be 7 mg/Nm^3
- The daily upper limit for new plants should be 15 mg/Nm^3
- The yearly upper limit for existing plants should be 20 mg/Nm^3
- The daily upper limit for existing plants should be 40 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

- All upper limits

  Dust emissions are particularly harmful to human health, resulting in a damage cost per tonne significantly higher than that for NOx and SOx. This is especially the case for fine particulates, which are laden with heavy metals and can penetrate deep into the lungs.

- Yearly upper limit for new plants

  – Plants 362, 363, 364 and 365 achieve average dust emissions of 5-7 mg/Nm^3 with bag filters.
  – Bag filters are more effective than ESPs at removing the fine particles that are most damaging to human health
  – The upper BATAEL for new plants should therefore be 7 mg/Nm^3

- Daily upper limit for new plants

  – Plants 362, 363, 364 and 365 achieve 95th %ile dust emissions of 12-15 mg/Nm^3
  – As these plants form the basis of the EEB's proposed yearly average, the upper daily average should be 15 mg/Nm^3

- Yearly upper limit for existing plants

  – The TWG proposed upper limit is set by plant 428-5, which uses fuel choice without any secondary abatement
  – However, plant 428-10 also uses fuel choice without secondary abatement, but performs much better
  – The upper BATAEL should therefore be 20 mg/Nm^3 (plant 428-10)

- Daily upper limit for existing plants

  – A well-run plant should not have an excessive difference between its average and 95th %ile emissions
  – There is no 95th %ile or maximum data reported for the reference plant 428-10, used by the EEB to propose a split view for the yearly upper limit for existing plants
  – However, plants 429-2, 429-4 and 430 have differences of 1-5 mg/Nm^3 between its average and maximum data
  – Therefore, for a yearly average of 20 mg/Nm^3, the daily average should be 25

mg/Nm^3

References

This split view is based on the following 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:

- *Health and Economic Implications of Alternative Emission Limits for coal-fired power plants in the EU: Appendix 1: Damage per tonne estimates for NH_3, NOx, $PM_{2.5}$, SO_2 and VOCs;* Greenpeace and European Environmental Bureau; May 2015; pages 14-16
- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: HFO- and/or gas oil combustion in engines: Dust emissions to air*: EIPPCB; Table 1
- *FINAL MEETING OF THE TECHNICAL WORKING GROUP (TWG) FOR THE REVIEW OF THE BAT REFERENCE DOCUMENT FOR LARGE COMBUSTION PLANTS (LCP BREF)*:EIPPCB; pages 152-3

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 67 (EIPPCB TWG Slide 326)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes that the upper BATAEL limit for existing plants should be 10 mg/Nm^3

Rationale:

This split view is supported by the following rationale …

– A proposed upper limit of 10 mg/Nm^3 was rejected by the TWG on the grounds that 15 mg/Nm^3 was necessary to cover the use of 100% process gases.
– However, an upper limit of 10 mg/Nm^3 would still cover this through other plants i.e. 61, 527 and 374
– It would also include a wide range of fuels as well as fully representing the sample of plants in terms of capacity, operating hours and equivalent full load operating factor values
– The upper BATAEL for existing plants should therefore be 10 mg/Nm^3 (Plants 298 and 75-2)

- This is further underlined by the fact that dust emissions are particularly harmful to human health, resulting in a damage cost per tonne significantly higher than that for NOx and SOx. This is especially the case for fine particulates, which are laden with heavy metals and can penetrate deep into the lungs.

References

This split view is based on the following 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:

- *LCP BREF review – Data collection carried out in 2011-2012 at European plant levels: Process fuel from the chemical industry: Dust emissions to air*: EIPPCB; Table 1

- *Health and Economic Implications of Alternative Emission Limits for coal-fired power plants in the EU: Appendix 1: Damage per tonne estimates for NH_3, NOx, $PM_{2.5}$, SO_2 and VOCs;* Greenpeace and European Environmental Bureau; May 2015; pages 14-16

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<u>BAT conclusion/BAT-AEL to which the split view refers to</u>: BAT 68 (EIPPCB TWG Slide 331)

Split view submitted by: European Environmental Bureau

Proposal:

- This split view proposes to remove footnote 8

Rationale:

This split view is supported by the following rationale …

- The industry itself emphasises that the fuels from chemical processing are of a variable composition, to the extent that emissions of pollutants may vary by a factor of 2 for short periods of time. It is therefore unrealistic to use fuel quality as a basis for determining monitoring frequency

References

This split view is based on the following 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:

- *Revision of the BREF LCP Document: Study about NOx reduction in large combustion plants:* CEFIC; page 8 [BATIS folder 04_industry sub-folder_CEFIC sub-folder}

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