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Industry Perspective on BAT and BREF

Georges De Caluwé, ExxonMobil
Chairman of CONCAWE Task Force on the Revision of the Refining BREF

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Scope of presentation

1. CONCAWE comments on draft version Chapter 1 to 4
2. The total refinery bubble concept as proposed by CONCAWE
3. Further planned activities in 2011

Draft version Chapter 1 to 4

- **Draft Chapters 1 to 4 of Refining BREF Revision commented by CONCAWE.**
  - **~1400 comments received by EIPPCB**
    - **~700 comments from CONCAWE and Member Companies**
- **Key CONCAWE comments reflect :**
  - **Content which does not fit the purpose of Chapter 3 –'Current Emissions and Consumption levels' or Chapter 4 – 'Techniques to consider in the determination of BAT'**
    - **Bubble ranges based on BREF questionnaire statistics don't reflect performance of individual abatement techniques**
    - **Suggestion to use a combination of all techniques (sniffing, camera, DIAL, SOF) for VOC Monitoring not appropriate for Chapter 3.**
    - **Ranges for Waste Water Treatment based on 50 percentile BREF questionnaire data not appropriate for Chapter 4**
  - **Scope of Chapters 3 and 4**
    - **Inclusion of PM and CO in bubble concept**
    - **Include wording that not all RFG is amine treated.**
  - **Chapter 4 performance ranges**
    - **Increase upper SO_2 range for amine treated RFG to 50 mg/Nm3 to account for effect of fuel gas composition on emission concentration in the flue gas.**
    - **Low NOx Burner performance to be expressed as concentration ranges instead of % NOx removal**
    - **Align performance ranges for existing Vapor Recovery Unit to Stage 1 Directive.**
  - **Technical description and editing**

CONCAWE Proposal on Bubble Concept

- **Proposal submitted to EIPPCB and discussed in TWG subgroup meeting May 2010**
- **CONCAWE proposes a two-step approach:**
  1. **Establish an AEL range for the combustion bubble based on the variability of fuel firing and fuel composition in European Refineries**
  2. **Combine the combustion bubble range derived in step 1 with AELs for the contributing processes (e.g. FCCU, SRU) to derive a *site-specific* total refinery bubble.**
- **The proposal recognises:**
  - **There are large variations in refinery configuration across Europe.**
  - **The continued use of liquid fuels is a technical/economical necessity for a significant part of the European refining sector.**

Bubble Calculation basis

- **Total Refinery Bubble Concentration Range =**

$$FL_{comb} * [Comb] + FL_{FCC} * [FCC] + FL_{SRU} * [SRU]$$

- **Whereby:**
  - [Comb] = the refinery combustion bubble AEL range.
  - [FCC] = the FCC stack concentration AEL range
  - [SRU] = the SRU stack concentration AEL range
  - FL_{comb} = the fraction of combustion flue gas to total flue gas volume
  - FL_{FCC} = the fraction of FCC flue gas to total flue gas volume
  - FL_{SRU} = the fraction of SRU flue gas to total flue gas volume
- **Notes:**
  - Bubble concentration in mg/Nm3 @ 3% O_2 on a dry flue gas basis
  - Additional process units would extend the equation

Flue Gas Volumes

- The flue gas rates for the process units and the flue gas rates from combustion need to be known and expressed on a common basis.
- Use an equal energy basis of IEA standard fuel oil equivalent (foe) of 41.868 MJ/kg for fuels using lower heating value (LHV)
  - Convert fuel quantity to foe = (fuel quantity) * LHV/41.868
  - Industry values:

Flue gas volume combustion and FCC Coke	Nm3/kg foe
RFO	12.2
Natural Gas	11.7
RFG	11.4
FCC Coke	12.0

- Specific Rules for special fuels
  - 5.3 Nm^3/kg for dry sour water stripper gas
  - Explicit calculation for low Joule Gas,
    - Define (w/w basis) : a = CO, b = H_2 , c = C_1, d = C_2 , e = C_3 , f = C_4 , g = C_5 , h = inerts.
    - Flue gas Volume (Nm3/kg foe) = (a*2.47+b*24.57+c*13.92+d*13.23+e*12.95+f*12.81+g*12.7+h*0.93) *41.868/LHV
- Sulphur Recovery Unit
  - 1.5 Nm^3/ kg of dry acid gas.

Further Planned Activities in 2011

- **Data collection:**
  - **Cost of amine treatment of fuel gas**
  - **NOx emission from existing turbines**
- **2011 Update of Sulphur Survey:**
  - **Include FCC NOx emission data.**