



## AOX requirements for Ecolabelled paper products - EEB and BEUC comments



Revised version, prepared by Rune Leithe and Lukas Hammer, 19.04.2010

### **Introduction**

Discussions in the current Ecolabel criteria have been very controversial on the requirements for the bleaching technology. While EEB and BEUC have been arguing that only TCF (Total Chlorine Free) paper should be awarded with the Ecolabel, industry advocated that also ECF (Elemental Chlorine Free) paper should be allowed. Furthermore, discussions on the limits for emissions of halogens (AOX levels) were highly controversial. **EEB and BEUC called for the lowest possible AOX levels (below 0,05 kg/ADT). As a very last compromise 0,15 kg/ADT would have been accepted by both organisations.**

### **Arguments against requiring TCF and lower AOX limits**

The following arguments have been brought up against stricter requirements on AOX emission and for allowing ECF paper in the Ecolabel<sup>1</sup>:

- I. TCF is not superior to ECF in terms of environmental performance. Even more, TCF bleached pulp would have worse performance for energy efficiency and result in increased wood use compared to ECF.
- II. Below 0,5kg/ADT the level of AOX emissions would not be of any environmental importance.
- III. Lowering the AOX levels too much would exclude “a significant portion of the current pulp available on the market”. Many producers called for AOX level well above 0,15kg/ADT (0,2 – 0,3 kg/ADT).

**In this paper we show that NONE of these claims are justified based on data or peer reviewed research.**

Findings in the documentation provided by UPM suggesting that there was no difference between toxicity levels of effluence between ECF and TCF based their evidence on research done at a German mill with AOX emissions that are 5 times lower than currently proposed (0,04 vs. 0,2 kg/ADT). Furthermore, claims that TCF technology requires the use of more raw materials and more energy were based on research at mills that were not optimized for TCF operations but former ECF mills that had been converted to TCF. It seems that industry funded research comparing the best ECF with the worst TCF to get to the desired outcome.

---

<sup>1</sup> See p. 33-34 of the final background document

Additionally, research<sup>2</sup> showing that TCF scores significantly better on the toxicity of effluents was not considered in the background document and obviously overlooked in the studies presented by the paper industry.

### **Questionable documentation in favour of ECF**

It has been argued that there was no difference between ECF and TCF technology from an environmental point of view. **The main evidence for this claim stems from a paper that has not been peer reviewed** and that was financed by the Federation of German Paper Industry<sup>3</sup>. The paper concludes that there are no “*differences between the impact of wastewater from modern ECF and TCF sulphate pulp mills*”. While we question these conclusion per se, they point to a very important fact that has been ignored in recent discussions: the case study of the paper refers to a very modern ECF plant (the Rosenthal paper mill in Blankenstein, Germany) that achieves an AOX level of 0,04 kg/ADT and that also produces TCF pulp. This has the following implications:

- I. The example of the Rosenthal mill is not representative for ECF as the market average of AOX emissions of ECF plants is 5 times higher (0,04 vs. 0,15 kg/ADT).
- II. The Rosenthal plant, however, clearly shows how well developed ECF technology already performs and that very low AOX emission levels can already be achieved. Very low AOX emission level lead to minimized toxicity of the effluents.
- III. Apart from differences in toxicity levels, it has also been argued that TCF uses more wood and energy than ECF. Mills (like the one in Blankenstein) that have not been optimized for TCF might have these problems. However, for modern TCF mills there is no such evidence – at least no scientific prove that would support this claim has been presented in the criteria development process. Mills like the Swedish “SCA Graphic Sundsvall” that produce 100% TCF claim that their energy and raw material efficiency is equal to ECF plants.

---

<sup>2</sup> Tarkpea, M. / Eklund, B. / Linde, M. / Bengtsson, B. (1999) TOXICITY OF CONVENTIONAL, ELEMENTAL CHLORINE-FREE, AND TOTALLY CHLORINE-FREE KRAFT-PULP BLEACHING EFFLUENTS ASSESSED BY SHORT- TERM LETHAL AND SUBLETHAL BIOASSAYS, Institute of Applied Environmental Research, Stockholm University, S-106 91, Stockholm, Sweden.

<sup>3</sup> Göttsching, L. / Ham, M. (2003) ECF AND TCF SULPHATE PULPS – A COMPARISON OF THEIR ENVIRONMENTAL IMPACT, Department of Paper Technology and Mechanical Engineering, Darmstadt University of Technology, Darmstadt, Germany.

## **ECF vs. TCF – Peer reviewed research show that TCF effluents are less toxic**

Tarkpea et al. published research into the toxicity of nine effluents from Swedish kraft pulp mills using conventional, elemental chlorine-free and totally chlorine-free bleaching processes<sup>4</sup>. **They found significant difference between conventional, ECF and TCF technology whereas conventional sites produced the most and TCF the least toxic effluents. Unfortunately, this peer reviewed publication was ignored in the papers (not peer reviewed) presented by UPM.**

Comparing ECF plants to TCF plants, Tarkpea et al. found that in a lethality test involving the *Nitocra Spinipes* crustacean, a toxic emissions factor (TEF) of 690 was obtained for ECF (chlorine dioxide bleaching) effluent before secondary treatment, compared to 85 for a TCF plant employing ozone bleaching without secondary treatment. **Even after secondary treatment, the toxicity factor for the ECF plant was more than three times higher than the TCF plant without secondary treatment,** at a TEF of 290 compared to 85.

One of the authors of the study said later in an article: “We have tested waste water from different types of mills where the pulp has been bleached with pure chlorine gas, with a mixture of chlorine and chlorine dioxide, with chlorine dioxide only, as well as from three different waste water streams where the pulp has been bleached with hydrogen peroxide or a mixture of ozone and hydrogen peroxide, that’s to say a totally chlorine free (TCF) bleaching process...**Our results show for all test organisms that waste water from the Totally Chlorine Free (TCF) processes are the least dangerous.**”<sup>5</sup>

In another (peer reviewed) paper, Vidal and Diez are coming to the following conclusion:

”The toxicity of the bleached effluent is determined by the kind of feedstock and for the bleaching technologies. **So, ECF bleached effluent using *Pinus radiata* as feedstock is the most toxic for the methanogenic bacteria** (effluent III, 50% IC = 0.55 gCOD/L). In this case, compounds such as wood resin from *Pinus radiata* contribute to the high methanogenic toxicity in bleached effluents. **TCF bleached effluent was less toxic** (effluent VI, 50% IC = 2.3 gCOD/L); the main contribution to the toxicity is the EDTA content” (emphasis added).<sup>6</sup>

---

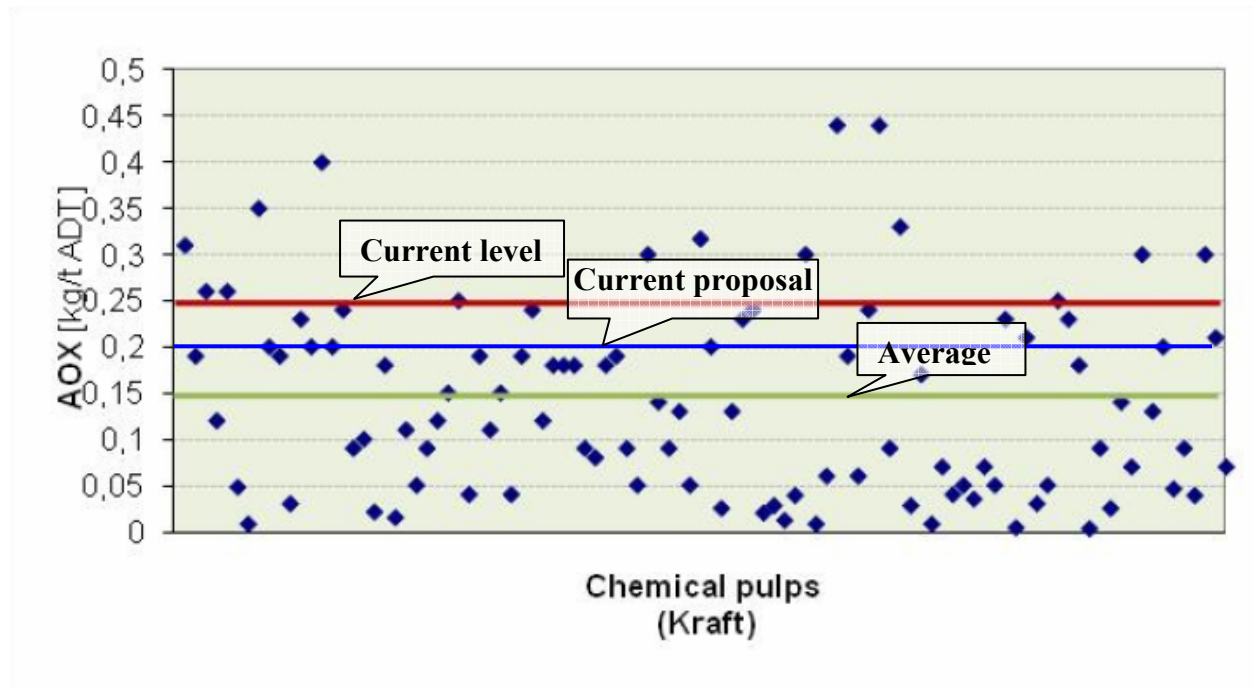
<sup>4</sup> Tarkpea, M. / Eklund, B. / Linde, M. / Bengtsson, B. (1999) TOXICITY OF CONVENTIONAL, ELEMENTAL CHLORINE-FREE, AND TOTALLY CHLORINE-FREE KRAFT-PULP BLEACHING EFFLUENTS ASSESSED BY SHORT- TERM LETHAL AND SUBLETHAL BIOASSAYS, Institute of Applied Environmental Research, Stockholm University, S-106 91, Stockholm, Sweden.

<sup>5</sup> Eklund, B. (2000), Hur giftigt är avloppsvattnet? translation of article in Havsutsikt, 1/2000

<sup>6</sup> Vidal, G. / Diez, M.C. (2003) Influence of feedstock and bleaching technologies on methanogenic toxicity of kraft mill wastewater, Water Science and Technology Vol 48 No 6 pp 149–155 © IWA Publishing 2003, p. 154.

## **Availability of pulps with low AOX levels – EU Ecolabel should not be worse than average!**

The first background report presented data that related to 138 Kraft pulps.



The **average AOX value for Kraft pulps** of the data in the background report is **0,148 kg/ADT**. However, this data does not include CTMP and Recycled pulps which are as followed:

CTMP pulp: **0,012 kg/ADT**

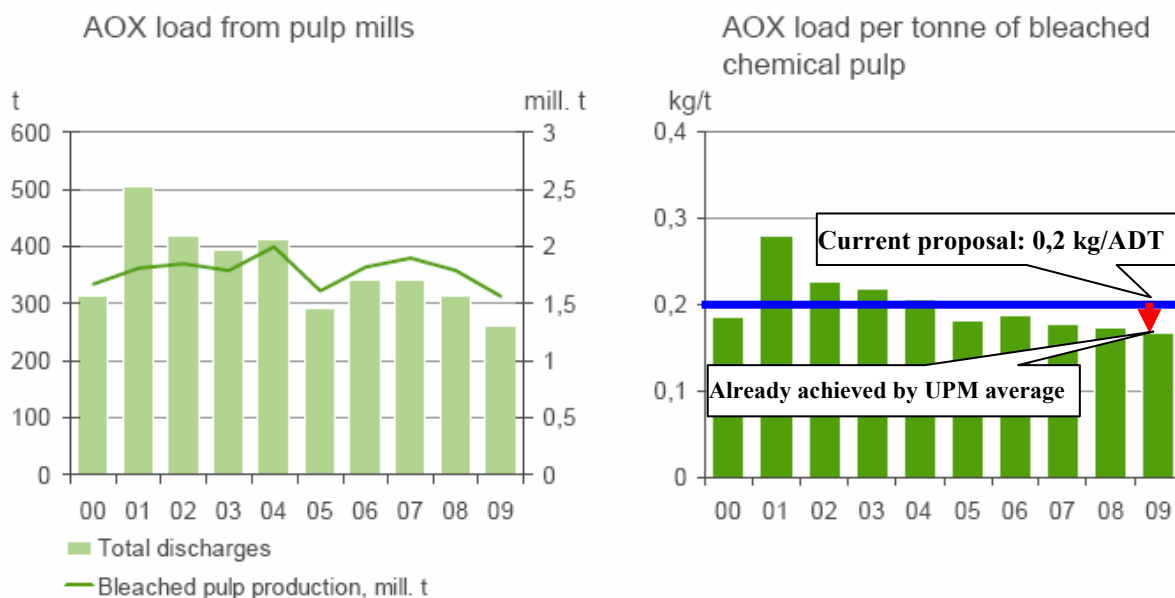
Recycled pulp (deink): **0,008 kg /ADT**

Nevertheless, **the current draft proposal suggests setting the requirements to 0,2kg/ADT** (for each pulp used). According to this data, **this level could be passed by about 80% of the pulps** (If recycled and CTMP pulp would be included in this statistic this level would be even higher).

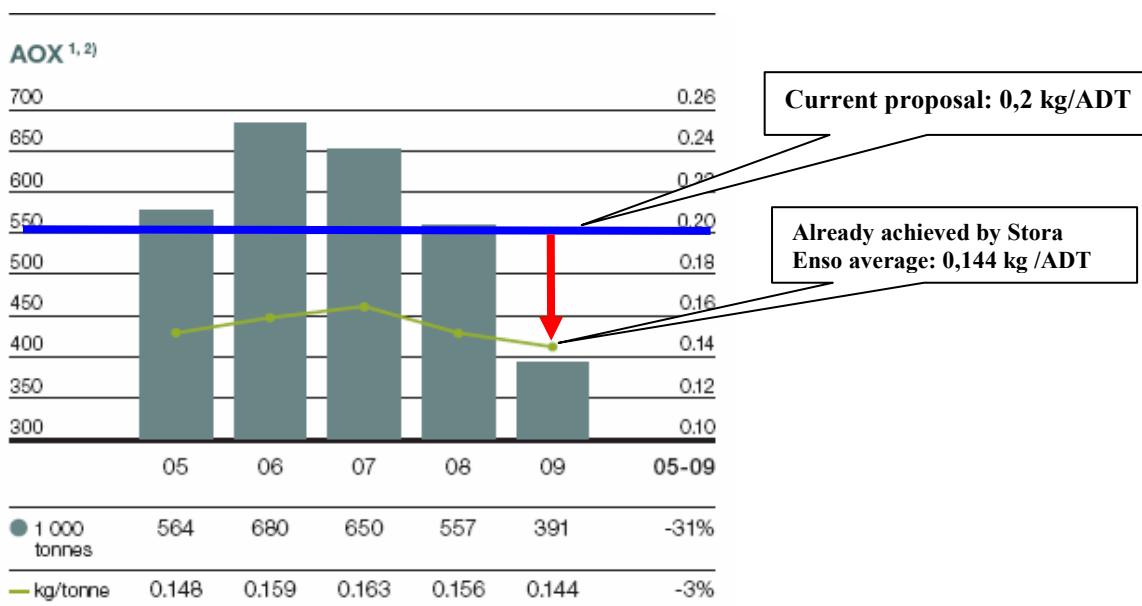
Especially paper producers UPM and Stora Enso advocated against AOX levels of 0,15 kg/ADT – even though they could already be achieved by more than half of the producers without any further investment.

UPM suggested setting the limit to 0,22/0,2 kg ADT. According to the data provided for the Environmental and Social Performance Report 2009 this level is worse than UPM's average.

## AOX load

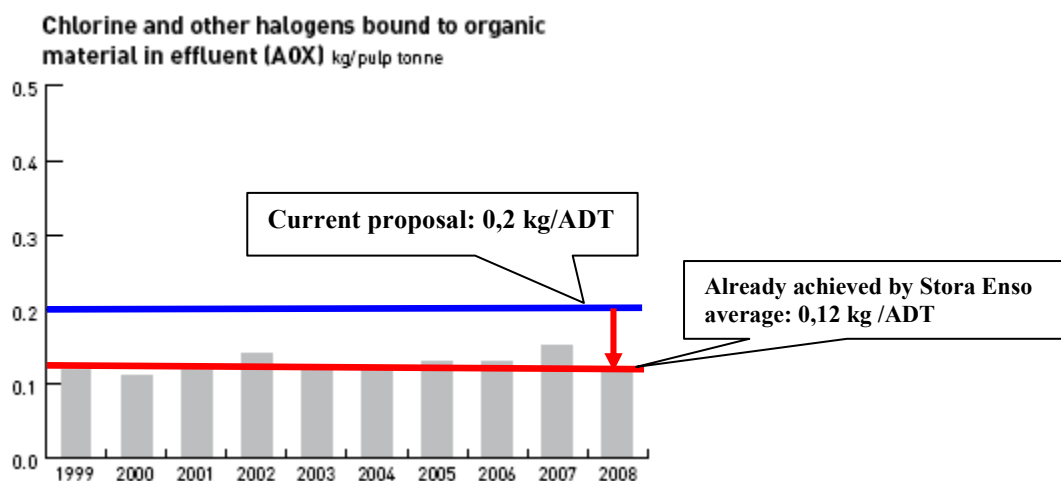


Stora Enso said that “the AOX limit value can be no less than 0,3 [kg/ADT]”<sup>7</sup>. According to the companies own figures (Sustainability Performance 2009) the company’s average AOX value is 0,144 kg/ADT.



Another pulp producer; Metsälitto, argued in their comments that an AOX limit of 0,20 kg/ADT would be acceptable. Metsälitto owns 83% of the pulp producer Botnia, UPM the remaining part. Botnias four pulp mills have an average AOX level of app. 0,12 kg/ADt.

<sup>7</sup> See final background report, p. 35



Finally, pulp and paper producer Portucel called for average emission limits of 0,15kg/ADT and for 0,25 for each pulp. In its Sustainability Report 2006/2007, the company says that it emits 0,058 kg/ADT coming down from 0,062kg/ADT in the two previous years.

**It is not understandable that producers call for less strict requirements that they are already achieving with more than half of their production.**

## **Conclusions**

The long-term effects of the chlorinated effluents are still not well known. What is known is that chlorinated organic compounds often are toxic, bioaccumulating and have poor biodegradability. **Research also indicates that TCF effluents are generally less toxic than ECF effluents.**

The aim of the Ecolabel should therefore be to award only the most advanced technologies that emit no AOX at all (TCF) or that have successfully minimized their emissions. Claims that it is “not relevant at all lowering AOX values” or that TCF technology implies other negative environmental impacts are not justified by peer reviewed research presented in the current EU Ecolabel discussion. **Therefore, the current proposal on AOX requirements should be strengthened to at least 0,15kg/ADT for each pulp and further lowered after 2 years to 0,10 kg/ADT for each pulp.** Arguments referring to the limited availability are disproved by data that published by the same producers that oppose stricter AOX levels.

Finally, we suggest that (preliminary) findings of the revised BREF document for paper products that is currently in the making are taken into account by the Ecolabel Board and the Commission.

## **Contact:**

Lukas HAMMER  
 EU Ecolabel Coordinator for EEB and BEUC  
 E-Mail: [lukas.hammer@eeb.org](mailto:lukas.hammer@eeb.org), Tel: +32 2 740 2803 (BEUC) / +32 2 2 89 1303 (EEB)

Rune LEITHE  
 EEB and BEUC expert, Ecology & Pioneering  
 E-Mail: [rune@ecologyandpioneering.com](mailto:rune@ecologyandpioneering.com), Tel: +46 31 711 33 50