



# Bleaching in Pulp Mills

*The performance of the pulp industry is attracting increased attention through high profile controversies involving pulpmill projects in Latin America. In addition, changes to the German DIN Norm classification regarding the definition of "chlorine free" bleaching, has led to the use of an inaccurate statement thus creating a misleading precedent. For paper buyers "clean production" is a factor in their paper purchasing decisions. Bleaching is a key variable in "clean production".*

*In response to this situation, WWF has produced this Position Statement on the bleaching technology used in chemical pulp production. Except where noted, it does not attempt to assess other factors (such as energy consumption) or try to compare the wider footprint of different pulp production techniques. Nor does it consider bleaching in recycled paper production.*

There is increasing global awareness about the impacts of hazardous chemicals on people and the environment. Of particular concern are persistent, bio-accumulative and toxic chemicals which are named in the Stockholm Convention on Persistent Organic Pollutants. The Stockholm Convention became legally binding in May 2004 and requires governments to protect the environment and human health by eliminating their production or use. WWF is working to increase the scope and implementation of the Convention as part of WWF's 2020 Vision of a 'Toxic Free' future.

There are a range of pollutants from pulp mills. The most significant are dioxins and related persistent, bio-accumulative and toxic compounds which are produced during bleaching with chlorine and chlorine based compounds. Pulp mills are highlighted as a potential source of dioxins in the Stockholm Convention.

In the last 15 years the pulp industry has been successful in decreasing the use of chlorine compounds in bleaching. The majority of the industry has converted to Elemental Chlorine Free (ECF) bleaching processes. A small number of companies have totally eliminated chlorine compounds, by converting to Total Chlorine Free bleaching (TCF). TCF produces no dioxins as part of the bleaching process. While concerns have been raised about the quality and energy efficiency of TCF pulp, the evidence is inconclusive, with variation occurring by species, geographic region, and processing variables.

The following issues demand a renewed emphasis on efforts to reduce the production and impact of dioxins from pulp and paper plants/production, and for paper buyers/users to help drive improved performance by the industry:

1. about 20% of the world's total production of bleached kraft pulp continues to be bleached with Elemental Chlorine, mostly outside of Europe and the US. These mills continue to have the potential to produce high quantities of dioxins.
2. even though the levels of pollution emitted by mills has generally decreased in the last decade, when measured per tonne of pulp produced (the typical measure), the increasing size of pulp mills (two to three times the size compared to the early 1990's), means that the absolute load of toxic pollutants emitted by individual mills is still significant<sup>1</sup>. Efforts therefore still need to be made to reduce AOX in relative and absolute terms at individual mill sites.
3. confusingly, there are several ECF processes which use and produce different levels and types of chlorine compounds. Only a few companies using ECF processes achieve what is considered as best environmental practice regarding AOX levels<sup>2</sup> present in the effluents. Therefore, buyers of ECF pulp need to request additional information regarding the production process to verify if the pulp has been produced to best environmental practice.

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<sup>1</sup> Based on published data from 2006 typical ranges for world scale ECF pulpmills are 70-130T AOX.

<sup>2</sup> AOX is an indirect measure of chlorinated organic pollutants such as dioxin and furans. Emissions from ECF mills vary by a factor of 100, from 0.02 to 2.0 kg AOX /ADMT. Source: Corporate Environment Reports of Pulp & Paper companies

4. the effluent from kraft mills is affected by the fibre raw material as well as by contributions from the unbleached side of the process and the bleaching process. The emphasis of the debate about ECF or TCF as a choice for bleaching, should therefore rather be on how to improve the pulping operation itself. However, as a starting point it should be recognised that in terms of precautionary and prevention principles, and the need to meet the legislative requirements of the Stockholm Convention, ECF bleaching is not currently Best Environmental Practice.

5. the parameter for measuring the overall water pollution (including non-chlorine pollutants) caused by pulp mills is Chemical Oxygen Demand (COD)<sup>3</sup>. Its significance is that it provides a measure of the overall performance of a mill's effluent treatment and effluent recovery programmes. In order to avoid any potential perverse effects of focussing exclusively on AOX, any effort to reduce AOX emissions should also focus on simultaneously reducing overall pollution levels as measured by COD levels.

6. Best Available Technology (BAT) levels established for pulpmills in Europe by the European Commission in 2001<sup>4</sup> are based on technology prevalent in the mid 1990's, and from limited numbers of sample data. The levels are now (2007) seriously out of date and largely irrelevant for modern pulpmills. Reference to BAT levels as targets for kraft pulpmills are therefore an unreliable measure of best environmental practice. Meanwhile in several regions of the world environmentally adequate clean production standards are not in place, whilst the lack of regulatory enforcement of standards exacerbates the problem of securing toxic-free mill effluents.

**WWF believes that:**



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- The elimination of the production of dioxins and other persistent, bio-accumulative or toxic chemicals is the only sustainable direction for industry. The pulp and paper industry should commit to implement the vision and objectives of the Stockholm Convention.
- The use of chlorine dioxide / chlorine compounds creates unnecessary hazards and risks for workers using these chemicals and the communities close to mill sites, and has damaging effects on the environment.
- Paper producers and consumers should use paper with low brightness levels, thereby reducing the need for high levels of bleaching of the constituent pulps. Pulp and paper producers need to educate consumers of the benefits and functionality of lower brightness paper products.
- Pulp mills using elemental chlorine bleaching should phase out the process by 2012.
- New greenfield kraft pulpmills and major upgrades of pulpmills located within particularly sensitive ecosystems should use TCF bleaching.
- Best environmental practice for ECF technology is for AOX emissions of less than 0.05 kg/ADMT<sup>5</sup>. Companies using ECF technology should put in place a time bound action plan to reduce their emissions to below this level.
- Companies should also focus on reducing water pollution as measured by COD. Best environmental practice for COD is less than 5 kg of COD/T of pulp. Companies should put in place a time bound action plan to reduce their emissions below this level.
- Effective monitoring and transparent, frequent and rapid reporting at mill and industry levels are essential to build public trust in the industry.

<sup>3</sup> COD measures chemically the amount of degradable organic matter in the mill effluent. Emissions vary by a factor of 8, from 5 to 40 kg COD /ADMT Source: Corporate Environment Reports of Pulp & Paper companies

<sup>4</sup> Integrated Pollution Prevention and Control: European Commission, December 2001

<sup>5</sup> Log storage in seawater may lead to elevated natural levels of dioxins. This needs to be recognised in policy setting