

ABSTRACT

The centre for Best Available Techniques (BAT) is founded by the Flemish Government and is hosted by Vito. The BAT centre collects, evaluates and distributes information on environment friendly techniques. Moreover, it advises the Flemish authorities on how to translate this information into its environmental policy. Central in this translation is the concept 'BAT' (Best Available techniques). BAT corresponds to the techniques with the best environmental performance that can be introduced at a reasonable cost.

This report focuses on the treatment of dredged material. Flanders counts about 13 treatment facilities for dredgings. These facilities often also treat soil. Important environmental issues are noise, odour, dust and local water pollution.

Techniques that lead to an environment-friendly treatment of dredged materials are evaluated in this BAT report. The evaluation of the treatment of the dredgings as such is not discussed. The environmental techniques considered in this report are mostly related to the dewatering of dredgings, as being the only technique for the treatment of dredgings currently employed in Flanders, with the main topic being the waste water treatment. Common water pollutants are particulate matter, chemical oxygen demand (COD) and nitrogen (N). Other water pollutants are e.g. absorbable halogenated compounds (AOX), poly aromatic carbons (PAC), heavy metals, polychlorinated biphenyl (PCB) and tributyltin (TBT). Regarding the current permit condition for nitrogen, in particular 15 mg total N/l, there seem to be some problems to comply with this level.

BAT selection was brought about on the basis of a literature survey and technical assistance from industry experts. Additional, there were several discussions with representatives of the sector and specialists from public services. The formal consultation was organised by means of an advisory committee of which the composition is given in Annex 1.

Several preventive measures are BAT, e.g. measures to reduce fugitive emissions of dust, to prevent the leach out of pollutants to the ground and prevention of noise nuisance.

Regarding the discharge to surface water, it is BAT to implement several primary measures to reduce the concentration of unsolvable compounds and the flow rate. Pollutants such as heavy metals, PAC, PCB and phosphate, with the exception of nitrogen, are for 80 to more than 95% bound to unsolvable compounds. Because of this characteristic the reduction of unsolvable compounds leads to a reduction of the load of pollutants in the surface water.

Measures to reduce the concentration of unsolvable compounds and the flow rate can be implemented during the construction of the lagunation and dump basins. If these measures do not achieve the required level, additional measures need to be taken to increase the sedimentation or reduce the concentration of particulate matter by using end-of-pipe techniques.

Because of the discontinuity of the flow rate of the supply water, the typical 'unilateral' composition of the water and the technical feasibility and cost of the wastewater treatment techniques only a few wastewater treatment techniques are BAT, e.g. the use of sedimentation basin and/or sand filtration to remove particulate matter.

The BAT mentioned above can be inadequate due to the following reasons :

- the quality of the surface water (e.g. vulnerability/sensitivity of the surface water; the Flemish reduction programme for hazardous compounds);

- the relative impact of the installation on the surface water.

Therefore, an additional treatment of the wastewater can be necessary to remove organic micropollutants or nitrogen.

The BAT to remove organic micropollutants is the use of activated carbon.

For the removal of nitrogen biological treatment and chemical oxidation are the BAT. If nitrogen removal is necessary, preference is given to the use of the biological treatment. Chemical oxidation is to be avoided because of its cross-media effects and only to be applied in case biological treatment is not technically feasible.

The implementation of N-removal at facilities for the treatment of dredgings is hindered by:

- for biological treatment;
 - the characteristics of the wastewater; discontinuity of the flow and ‘unilateral’ composition of the waste water;
 - the temperature dependency of the biological technique, therefore the N removal efficiency will be low in winter times when the discharged waste water flow is the highest. (This temperature dependency is especially for the treatment of dredgings of importance because these installations do not have the opportunity to use waste heat for the warming of the biological reactor during winter times.);
 - the relatively high costs compared to the relatively low N burden.
- for chemical oxidation:
 - the cross-media effects of this technique (possible generation of chlorinated hydrocarbons, e.g. trihalomethane);
 - the relatively high costs of the N-removal compared to the relatively low N.

Other factors relevant for the BAT evaluation of the N-removal are:

- the continuity or discontinuity of the waste water flows;
- other activities at the facilities for the treatment of dredgings that may have an impact on the quality of the waste water.

Based on the BAT a proposal for water discharge values for facilities for the treatment of dredgings is drafted.

Overview of the proposal for water discharge values for facilities for the treatment of dredgings

Pollutant	Proposal for water discharge values
Particulate matter	60 mg/l
BOD	25 mg/l
COD	125 mg/l
P total	2 mg/l
Chloride	1.200 mg/l
Sulphate	1.500 mg/l
Total N	15 – 60 mg/l

- The BAT evaluation for N removal needs to be done in a case by case approach, using the evaluation factors as mentioned above;
- If N removal is considered to be BAT, a preference is made for the biological treatment. With biological treatment a value of 15 mg N/l is achievable, with deviation to 60 mg N/l in case the temperature is below 12°C (as the temperature in the reactor);

- If N removal is not BAT, the achievable discharge value is 60 mg N/l;
- For other pollutants, such as heavy metals, PAC, PCB, AOX and TBT, a proposal for achievable discharge values could not be made due to lack of useful information.

However, it needs to be remarked that the discharge of hazardous pollutants as listed in annex 2C of Vlarem I needs to be permitted in case these are discharged in concentrations above the environmental quality standards or detection limit (in case no environmental quality standards exist). Because of the toxicity, persistency and bio-accumulative characteristics of these hazardous substances, the aim is to set strict water discharge values for the most hazardous compounds. The basic principle is to stop the discharge of these hazardous substances starting with a gradual reduction and achieving the environmental quality standard.

When issuing a permit for a specific soil remediation site one has to consider not only BAT but also the environmental quality standards and the impact of the dredging treatment activity.