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 environmentally 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.

A wide range of activities take place in laboratories: from scientific research over quality control to industrial innovation. The sectors in which these laboratories are situated are very diverse. This is also reflected in their setup and configuration. While some are small and play a supportive roll others are large, independent, have a big budget and employ a lot of people.

The scope of this study is threefold. The legal framework for laboratories is reassessed and recommendations for improvements are proposed. The available technologies are listed, discussed and the BAT's are selected. Emission limits on wastewater are adjusted where necessary, based on new and available measurements.

This study shows that the distinction between different setups of laboratories is not taken into account in a logical way in the current VLAREM I legislation. A new classification is proposed with the focus on the nature of the activity and not on the amount of polluting substances in the wastewater.

The environmental impact of laboratories is mainly caused by energy consumption, water consumption, the use of chemicals and the handling of produced waste. Ventilation of fume hoods and lab space are the biggest energy consumers. The fine balance between safety, comfort and energy efficiency determines whether or not the implementation of a technology is feasible. Centralization and optimization of the HVAC installation and the correct use of the fume hoods are examples of technologies that qualify as BAT. In order to cut back on water consumption a few BAT's are defined that suggest the use of alternative techniques or that close the water loop. Examples are the use of a vacuum pump and closing the cooling circuits. Key concepts in dealing with chemicals and (environmentally) dangerous substances are prevention and selective collection. The use and disposal of these substances needs to be transparent and documented. Measures at the source have a big impact on the quality of the wastewater.

The current effluent quality of discharged wastewater from laboratories is described based on available analysis of wastewater samples. New emissions limits are proposed for a few hazardous substances. For others a general approach is developed. In this way this study sets forth a correct and transparent framework to handle discharge conditions from laboratories with the focus on prevention and selective collection.

The BAT selection in this study was based on company visits, a literature survey, a technical and socio-economic study, cost calculations, and discussions with industry experts and authorities, …. The formal consultation was organized by means of an advisory committee.