

Implementation of hybrid pollution control techniques to regulate the metal finishing industries in the eThekweni Municipality

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Abstract

The preparation of the Durban Metro Sewage Disposal Bylaws forced a closer investigation with respect to metals in the different sewer catchments in the then Durban Metro area. The status in 1999 found few Metal Finishing Industries complying with all environmental regulations and principles, high heavy metal concentrations in some of the sewage work sludges and illegal discharges of untreated heavy metal industrial effluents to the receiving environments.

This paper describes the implementation and uses of hybrid pollution control techniques to regulate the metal finishing industries to reduce their environmental impact. The techniques used are a combination of environmental auditing tools, cleaner production, formation of and co-operation between industry associations and the local authority, waste minimisation groups, cost based incentives and structured enforcement of the bylaws and agreements.

These techniques have been developed and used over the last four years, and have shown success in reducing the environmental impacts and improving relationships between industry and the municipality. This allowed for a better participative approach to setting new standards to be achieved and a more sustainable environment in which both the metal finishing industries and municipality can operate.

Introduction

In November 1996 the Durban Metropolitan Pollution Division was formed from several local authorities. Various bylaws from Durban, Pinetown, Amanzimtoti, New Germany, Tongaat, Verulam and DSB had to be enforced. Each of these bylaws had their own standards for heavy metal discharge limits to the corresponding wastewater treatment works. Varying pre-treatment, enforcement, sampling and analytical methods were also practiced in these areas. On the 13th of May 1999 the Durban Metropolitan Sewage Disposal Bylaws were promulgated creating a single legal standard to be used in the enforcement of the industries in the Durban Metropolitan Area. These bylaws set two uniform heavy metal discharge limits for all the sewage works in the Metropolitan Area based on the size of the sewage works.

Owing to the varying standards enforced by the different Local Authorities on Metal Finishing Industries, these industries did not initially fully comply with the new discharge standards set in the Sewage Disposal Bylaws. Also, high levels of heavy metals being discharged to the various treatment works caused some of the treatment works sludge to be non compliant with the new standards set by the Department of Water Affairs and Forestry. There were also numerous illegal discharges of untreated heavy metal industrial effluents to the sewer and storm water catchments.

A series of different techniques was used to regulate these industries to help them achieve environmental compliance.

Pollution control techniques

Metal finishing guideline document

The Metal Finishing Guideline Document (1) was developed to produce a Best Available Technology (BAT) in effluent treatment for the Metal Finishing Industries to meet. This document was developed by the eThekweni Municipality and agreed on by representatives of the metal finishing industries, the Durban Chamber of Commerce and Industry.

The guideline document represents a guide to practical treatment processes, process control methodology and engineering design. It also sets out how the Department will exercise controls to ensure compliance with effluent quality limits. Adoption of the recommendations given in this guideline document provides for both industry compliance with effluent standards and the Department's statutory control function, without the latter entailing excessive costs.

The document consists of five sections and are as follows:

- A. Correct treatment process chemistry
- B. Correct process control
- C. Correct engineering design
- D. Metro requirements for effluent compliance and monitoring
- E. Methods of sludge handling, storage and disposal

Sections A through C set out the minimum criteria that are required to pre-treat the effluent and the design of the effluent treatment plant. The requirement for effluent compliance and monitoring in section D was where the biggest challenge lay for both industry and Municipality. This represented a shift of responsibility for control and monitoring of the industry's effluent from the Municipality to the Industries. The Municipality's role was now only to do spot monitoring to determine compliance.

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