

Abstract

Approximately 8 years of daily operational data were gathered from the two treatment streams of the Rustamiyah Sewage Treatment Plant (SE₁ and SE₂). The data spanned between (May, 1988 and December, 1996) with data for the missing year 1991, the year immediately after the war.

Statistical analysis was carried out in order to investigate the nature of the variability of the effluent quality from both streams. It was found that the data were best described by the log-normal distribution rather than the normal distribution. The compliance of the effluent quality with the present Iraqi standards of 40 mg/l BOD₅ and 60 mg/l T.S.S was investigated. It was found that a new standard was called for which incorporate the present Iraqi standards on effluent discharges plus a probability statement on compliance with this standard. This was possible through the introduction of Porter (1975) and Wheatland (1972) technique, which depended upon a relationship between percentiles of compliance and mean of effluent quality. In our study effluent quality was measured by BOD₅ and T.S.S concentrations. Other relevant findings are reported herein.

Introduction

According to Berthouex, et.al. (1989), the purpose of wastewater treatment plant is to transform raw sewage into an effluent that meets standards prescribed in environmental legislation.

The investment in wastewater treatment facilities often forms a large and important segment of a nation's total public expenditure. Hence, it is desirable to plan such investment on a regional basis, so potential cost savings through the economics of scale may be realized in the construction and operation of treatment works. This desire has led to considerable work in applying mathematical programming techniques to identify the optimal design (or at least a good candidate) for a regional wastewater system (Ong and Adms, 1990).

Water quality standards have both qualitative and quantitative aspects. The qualitative aspects include the concepts of what is a standard and what type of standards should be set. For example, the question of what level of water quality should be maintained, or in the case of many rivers and lakes returned to, is basically a conceptual problem.

People directly affected thus were the predominant decision makers with respect to water quality. Unfortunately, the involvement of taxes, industrial jobs, and desired community growth in the standard formulation process usually resulted in a decision to fish upstream.

Standards are defined here as values of water quality parameters