MODEL EVALUATION OF THE CONTACT STABILIZATION PROCESS BY LABORATORY STUDIES

by

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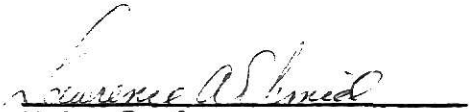

Major Professor

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INTRODUCTION

The activated sludge method of wastewater treatment has been practiced in the United States since 1917 (1). The conventional process, as originally developed, has undergone significant changes due primarily to experience accumulated from years of successful operation. Early design improvements and process modifications had a predominantly empirical basis derived from operational data of existing treatment plants. In the late 1950's it was recognized that further significant advancements would come only from a better understanding of the kinetics and mechanisms of the biological sludge. This has resulted in the development of several mathematical descriptions of the kinetics and operational characteristics of the activated sludge process (2-6). These models, however, have been applied almost exclusively to the design of single reactor systems with varying degrees of mixing of the reactor contents (7). A two reactor system, such as contact stabilization is affected by interactions between the reactors and has a larger number of independent variables. A more comprehensive description of the microbial kinetics and reactor characteristics is therefore required for its rational design.

Jatko (8), based on a combination of the single reactor models of McKinney (2), Eckenfelder (3) and Lawrence (5), developed a mathematical model of the contact stabilization process. Application of the model, however, required knowledge of several kinetic coefficients that were not evaluated by established laboratory techniques.

The objective of this study was to evaluate the model by typical laboratory activated sludge procedures. A complete mixed activated sludge reactor was operated and the necessary kinetic coefficients of the model

were determined from the operational data analysis. A design example using the experimentally determined kinetic coefficients is also presented.