CHAPTER 1

INTRODUCTION

The characteristics of wastewaters produce from sewage and industrial processes are as complex varied as the processes themselves. Its complexity and variability has created many problems for sanitary engineers. Generally, wastes which have high BOD and high suspended solids contents may contain materials which are toxic not only to plant and animal life but to man as well, and may have unpleasant odors and other objectable physical, chemical, and biological characteristics.

Physical, chemical and biological treatment processes has been used to solve these problems. The operations and the methods of treatment are selected by a variety of reasons depending on the waste itself, the location of the industrial plant, the regulations governing the discharge of effluents, and the availability and economics of process water.

Its purification results in the production of large volumes of semi-liquid sludges, and these have to be disposed of without causing nuisance, pollution of watercourses, danger to public health or damage to public amenities.

Biological digestion of sludge involving an aerobic decomposition of organic matter is the usual process for sludge treatment. In recent years, the principle of auto - oxidation of sludges, has been ultilized in the design of

"extended - aeration" plants. These units, utilizing long detention periods for mixed liquor have been able to minimize the accumulated of excess activated sludge. It is possible to ultilize auto - oxidation in the design of aerobic digester as a seperate treatment unit.

"Aerobic digestion" will thus relate to a process wherein sludges separated from their associated liquors, undergo stabilization during prolonged aeration.

Purpose and Scope of Research

One of the purposes of this research was to study the physical, chemical and biological characteristics of activated sludge. Studies were made on the efficiency of aerobic digesters in treating this sludge.

The sludges used in this research were obtained from one of the three soft drink activated sludge plants in Bangkok. The liquid wastes produced in the factory result from bottle - washing water about 90 percent, the others from sugar-boiler cleaning and floor-cleaning water. More than 90 percent of the wastewater is sugar.

Fig. 1 shows a schemetic diagram of the wastewater treatment plant. The BOD loading of this plant is 360 kg/day. BOD : COD ratio is about 9 : 10

In the aerobic digester studies, six separate batch runs were made at the temperatures of 30°c and 35°c. The solid loadings were 1, 2 and 3 percent. Each loading condition was

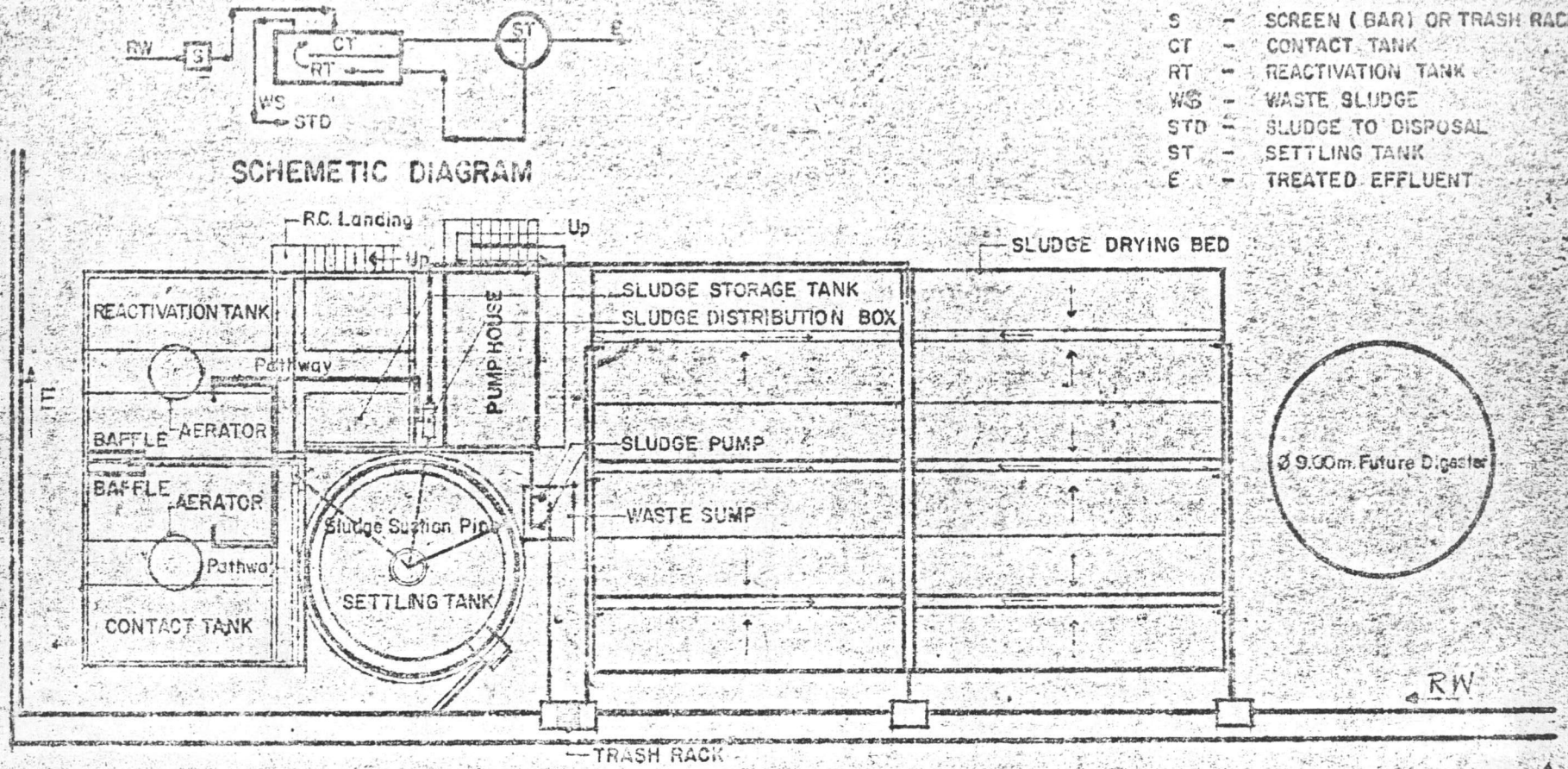

FIG. 1 LAYOUT PLAN OF WASTE TREATMENT PLANT

studied for a 15-day period. The raw and digested sludges were mixed without adding nutrients and aerated in excess of oxygen requirements, but provided for the satisfactory mixing of the mass. Biochemical oxygen demand (BOD), chemical oxygen demand (COD), pH, total solids, volatile solids and settleability were determined three days once during all six runs. Studies on microorganisms in the digesters were also carried out through out the series of the six loading conditions.

All forms of Nitrogen which were important data in indicating the condition of sludge were not investigated in this study because of lacking of instruments.