

CHAPTER 1

INTRODUCTION

1.1 Water and Wastewaters

Water is one of the factors indispensable to life. In general sense, water should mean clean water and the degree of cleanliness may vary considerably depending on the purpose of uses. Despite its unique usefulness, water may serve as a mode of transmission of diseases if it is contaminated by toxic materials or pathogenic microorganisms.

The main source of contamination usually originates from dwellings, mercantile establishments and manufacturing processes. Here, the border line is drawn between the domestic wastewater and the industrial wastewater.

All wastewaters must eventually find their way into water courses, or other bodies of water that constitute the natural drainage channels of a region. If sewage matters and industrial wastewaters are to be kept out of rivers and other receiving waters, they must be unloaded from the transporting water at the terminus of the sewerage system.

1.2 Classification of Wastes

If wastes are classified, so that manufacturing process

waters are separated from cooling waters, the volume of water requiring intensive treatment may be reduced considerably. Sometimes it is possible to classify and separate the process waters themselves, so that only the most polluted ones are treated and the relatively uncontaminated are discharged without treatment. The three main classes of waste are :

(a) Wastes from manufacturing processes. These include waters used in forming paper on traveling wire machines, expended from plating solutions in metal fabrication, discharged from washing of milk cans in dairy plants, and so forth.

(b) Waters used as cooling agents in industrial processes. The volume of these wastes varies from one industry to another, depending on the total Btu's to be removed from the process waters. One large refinery discharges a total of 150 million gallons per day (mgd), of which only 5 mgd is process waste; the remainder is only slightly contaminated cooling - water waste. Although cooling water can become contaminated by small leaks, corrosion products, or the effect of heat, these wastes contain little, if any, organic matter and are classed as nonpollutional from that standpoint.

(c) Wastes from sanitary uses. These will normally range from 25 to 50 gallons per employee per day. The volume depends on many factors, including size of the plant, amount of waste - product materials washed from floors and the degree

of cleanliness required of workers in the process operation.
(Nemerow 1971)

1.3 Purpose of the Research

The increasing domestic demand of pulp and paper, as well as the economic situation in Thailand, seem to be a strong motivation to the growth of the pulp and paper industry in the country. Considering this future trend, one can expect a greater environmental problem to be encountered as a result. The wastewater from pulp mills and paper mills are absolutely different in the waste characteristics, therefore, they require different methods of treatment. The pulp mill wastewater consists mainly of the reaction products from cooking chemicals and wood substances. Treatment of this wastestream to render the effluent with acceptable characteristics according to the ministerial regulations has been found to be uneconomical. Recovery of cooking chemicals from pulp mill waste stream has proved to be the most practical and economical of all. However the pulp mill to be equiped with the chemical recovery system must have a compatible production capacity, because of its high cost of installation and operations. In the case of paper mills, the reuse of waste paper is practiced to a greater extent than ever due to the increasing price of the imported pulp. The reuse of waste paper would certainly mean more contamination of waste stream, consequently the wastewater may require more complicated treatments.

Accordingly, the intensive study should be devoted to this problem so as to serve as a mean to be successful in our environmental protection. This research work will deal with the treatment of wastewater from paper mills by chemical method. The mill under study is a paper board mill using waste paper as a principal raw material. The work is expected to present as much useful information as possible.
