ABSTRACT

A STUDY OF WATER QUALITY AND POLLUTION LEVELS OF
THE BHARALU RIVER

Chapter 1: INTRODUCTION

This chapter includes a brief description of the Bharaluu, a tributary of the Brahmaputra and its role as the principal drainage channel for the city of Guwahati (India). The municipal and other inputs to the Bharaluu have been described and the general environmental situation pertaining to the river has been accounted for.

The second part of the chapter deals with the geographical features of Guwahati and gives a brief description of the land-use pattern, industrial situation, growth of vehicular traffic in the city, etc. The inadequacies of the city's water supply, sewerage and drainage systems have been described. The rainfall and climatological parameters for the city are given and finally the aims of the study are summarised.

[3 references, 2 tables, 4 figures]

Chapter 2: LITERATURE REVIEW

The chapter begins with a review of the broad aspects of water quality problems associated with hydrological
processes, introduction of foreign constituents through interaction with soil and vegetation, surface runoff additions, etc. The various factors, affecting river water quality, have been listed. Literature reports have been cited in support of influences of channel processes in determining water quality parameters. Various types of anthropogenic influences brought upon river water quality by human activities have been briefly described.

The second part deals with important published works on water quality of rivers of the world, in particular, the Amazon, the Rhine, the Po, etc. The chapter concludes with a summary of important works done on the water quality of prominent Indian rivers like the Ganges, the Yamuna, etc.

[147 references, 3 tables, 4 figures]

Chapter 3 : EXPERIMENTAL DETAILS

After giving a list of the water quality parameters, chosen for monitoring, this chapter gives a brief description of each of these parameters, their importance in water quality assessment and the methodology followed for experimental measurement.

The methods followed in collection and storage of samples have been briefly mentioned. The chapter ends with a description of sampling seasons and the sampling points.

[33 references, 1 table, 1 figure, 24 plates]
Chapter 4 : RESULTS AND DISCUSSION

The chapter gives the results of monitoring water quality parameters for 8 sets from pre-monsoon 1988 to winter 1990, MPN and SPC of coliform organisms for winter 1990 to post-monsoon 1991 and a few physico-chemical parameters and metals in bed-sediments of the Bharalu during early 1992.

The water quality parameters measured include temperature, pH, conductance, turbidity, TSS, TDS, total solid, hardness, alkalinity, chloride, sulphate, nitrate-N, phosphate, DO, BOD, COD, oil and grease, phenol, Na, K, Ca, Mg, Fe, Mn, Cu, Zn, Pb, Cd, Cr, As and Hg, MPN of coliform organisms and standard plate count (SPC). The results indicate very high turbidity, TSS, TDS and chloride. The NO$_3^-$-N and PO$_4^{3-}$ levels are sufficiently high to promote excessive growth of weeds and other vegetation. BOD and COD loads are very large along with low DO levels. The river has very high oil and grease content and phenol content is also considerable. While the iron and manganese concentrations are more than most of the natural streams, the heavy metals Pb, Cd, Cr, As and Hg have concentrations exceeding the tolerance limits. The river is thoroughly polluted with faecal coliforms from its origin to its confluence with the Brahmaputra. Calculation of average pollution load for most of the pollutants carried by the Bharalu to the Brahmaputra indicates that for a small tributary like Bharalu, the pollutant load can be described as
tremendous. Many of the water quality parameters are shown to exhibit near perfect linear correlation.

The analysis of the bed sediments reveal considerable accumulation of the metals in them showing that the water of the Bharalu has been in a degraded state for a very long time.

[54 references, 36 tables, 49 figures]