168813
07 04 2003

# ANALYSIS OF WATER QUALITY IN WELL WATER IN THE VICINITY OF AN INDUSTRIAL ZONE AND ANALYSIS OF SOURCES AND EFFECTS

By

**U. M.S. RIYANKA**
**B.Sc (University of Colombo)**

**Thesis**

**Submitted in partial fulfillment of the requirements of the**

**Masters of Science**
**Forestry and Environment Management**

**Faculty of Graduate studies**
**University of Sri- Jayewardenapra**
**Gangodawila**
**Nugegoda**
**Sri Lanka**
**2002**

168813

**03rd November 2002**

ABSTRACT

The Ratmalana- Moratuwa area located in the south of Colombo has developed as an industrial residential suburb of Colombo in the 1950's. It has been revealed that the environmental problems in the area are very acute due to the activities of large number of industries. About 150 industries are densely packed, within this area. Most of these industries are non- agro based industries they can be categorized in to several groups such as paint industries, galvanising industries, asbestos industries, dyeing and finishing, pharmaceutical industries and battery manufacturing industries. According to an investigation of discharges produced in the area it was found that major part of the effluent was released via surface drainage to Lunawa and Bolgoda Lake. The main issue associated with this industrial pollution is water contamination. Even though many studies have been carried out on surface water contamination, studies on ground water contamination have not been done in detail. The intention of this study was to analyze ground water samples at various sites of the industrial zone and to relate the results to the present industrial activities of the area. From these studies it was found that the chemical oxygen demand (COD) levels far exceed the acceptable portable water quality standards, indicating high chemical pollution. In addition it was found that Chemical pollutants are present in the ground water. Biological oxygen demand (BOD) has exceeded the tolerant limits for portable water level at several locations. The trace metals that exceed the levels are Zn , Fe, Cd, Pb and Ni which had not been noted in a previous study done by De Silva *et al.* (1986)

Low pH values in some of the samples indicate water contamination with acids. Some samples have been contaminated with acids and it was revealed by low pH of some samples. Most industries in the area dispose their effluents directly in to the drainage system without any prior treatments. Ground water contamination is thought to be a direct consequence of these inefficient effluent systems. This study discusses the analytical results of water samples taken from various locations of the industrial area and describes the industrial activities in the area that might have caused this ground water contamination, and discusses possible health effects due to use of polluted water as a source of potable water in this well water.

# CONTENTS


| CONTENTS | PAGE |
|---|---|
| List of content | iv |
| List of Tables | v |
| List of Figures | vi |
| Dedication | vii |
| Abbreviation | viii |
| Abstract | ix |
| **Chapter 1** | |
| **1. Introduction** | |
| 1.1 General Introduction | 1 |
| 1.1.1 Extent and Source of water pollution | 2-3 |
| 1.1.2Industrial waste | 3-4 |
| 1.1.3 Ground water | 4-6 |
| 1.2 Aim of study | 7 |
| 1.2.1 Study objectives | 7 |
| 1.3 Study Location | |
| 1.3.1 Criteria for site selection | 7-9 |
| 1.3.2 Telawala north and south gramasewaka devisions | 9-15 |
| 1.3.3 Work plan | 16-17 |
| Chapter 2 | |
| 2. .Litrature review | 17-18 |
| 2.1Industrial waste water flows and loading | 18-19 |
| Chapter 3 | |
| 3. Methodology | 20 |
| 3.1Selection of water quality variable | 20-23 |

3.1.1. Physical Parameters

3.1.2. Chemical Parameters
3.2 Identification of pollution sources and the details 23-25

Chapter 4

4.Results 26-30

4.1Results of well water quality analysis 26
4.1.1pH 27
4.1.2 Conductivity 27
4.1.3 Chemical Oxygen Demand 27-28
4.1.4 Biological Oxygen Demand 28
4.1.5 Hardness 28
4.1.6 Calcium 28
4.1.7 Magnesium 28
4.1.8 Sulphate 28
4.1.9 Nitrate 29
4.1.10 Dissolved solids total solids and suspended solids. 29
4.1.11 Phosphate 29
4.1.12 total iron 29
4.1.13 Heavy metals 20-31

Chapter 5

Discussion 32-33
5.1Possible effects due to the presence of pollutants 33-35

Chapter 6

6.1 Conclusion 36
6.2 Recommendations 36-37

References 38-40

Appendix 1

Appendix 11
Appendix 111