



WATER RECYCLE PROJECT

(WRP)

IDIMAZHAR BIN IDRIS @ HARUN

(98156678)

A thesis submitted in partial fulfillment of the requirements for the award of Diploma
Engineering (Mechanical)

Faculty of Mechanical Engineering
Universiti Teknologi MARA (UiTM)

APRIL 2003

TABLE OF CONTENTS

CONTENTS	Page
Table of contents	i
List of tables	v
List of figures	vi
List of abbreviations	vii
Acknowledgement	viii
Abstract	ix
Preface	x

CHAPTER 1

1.0	Introduction to CCM Bioscience Berhad	1
1.1	Core Activities	1
1.2	Market Standing	1
1.3	Environmental Concern	2
1.4	Organisation Structure	3

CHAPTER 2

2.0	Quaternisation Plant	4
2.1	Introduction	4
2.2	The Process	5

2.3	Chemical Reaction	6
CHAPTER 3		
3.0	Gramoxone Plant	7
3.1	Introduction	7
3.2	The Process	9
CHAPTER 4		
4.0	Project Selection	10
4.1	Introduction	10
4.2	Objectives	10
4.3	Analyzing and Identifying Most Likely Solution	10
4.4	Problems Encountered	12
4.5	Solution and Implementation	12
4.6	Activities of Water Recycling Project	14
CHAPTER 5		
5.0	Calculation of the Total Pump Head for the Recycling Pipeline Project	19
5.1	Introduction	19
5.2	Calculation for Total Pump Head	21
5.2.1	Stock Tank Sump Pit	23
5.2.2	Quat Plant Sump Pit	26
5.3	Photograph of Effluent Pit and Sump Pit	29

5.3.1	The Quat Plant Sump Pit	29
5.3.2	The Stock Tank Sump Pit	31
5.3.3	The Gramoxone Plant Effluent Pit	33
5.4	Discussion	36
5.5	Conclusion	36
CHAPTER 6		
6.0	Results and Evaluation	37
6.1	Determining the Suitability of Water Usage	37
6.2	Data Collection and Evaluation	38
6.2.1	Cost Evaluation	39
6.2.2	Net Savings per Year	41
6.2.3	Returns	42
6.3	Discussion	42
6.4	Conclusion	43
6.5	Future Plans	43
6.6	Measurement Appendices	43
REFERENCES		47
APPENDICES		
Appendix 1: Quotation of Piping from Sump to Effluent Plant		48
Appendix 2: Versatile Sandpiper Solutions		49
Appendix 3: Performance Curves		50
Appendix 4: A Slot of Newspaper		51

ABSTRACT

“Water Recycle Project” (WRP) requires careful measure to ensure the project yield good benefit. Many parameters need to be investigated and studies done before the project could be carried out. This WRP involves the works of piping, wiring and the installation of pumps, motors, air regulations valves in order to make the project perfectly in progress. This is followed by the activity of testing, analysis and data collection and then from here the result will be obtained to identify the effectiveness of the project. At the same time the cost evaluation of the project will be done to know whether the project worthwhile or not. Even though the project is estimated to expend a lot of cost but with a better planning and precise measure, it is will sure, the project will be succeed and will be given a lot of profit.