BUSITEMA UNIVERSITY
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FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

FINAL YEAR PROJECT REPORT

DESIGN OF AN EFFICIENT DEWATERING SYSTEM AT TIBET HIMA MINING COMPANY

BY

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ABSTRACT

Dewatering is one of the mine systems that aim to guarantee safe operating conditions underground through pumping volumes of water out of the mine.

The objectives of the study were to estimate water inflows, to determine water quality and to select a pump and design a dewatering system.

During this study, the mine water inflow into the mine was estimated as 0.586h7yb m^3/hr.

Water quality tests were carried out at Uganda Industrial Research Institute. These tests considered parameters such as p.H, electrical conductivity, turbidity, total dissolved solids, copper and iron metal concentrations.

The copper concentrations for the levels 4200, 4300 and 4500 were 854.7mg/l, 4.52 mg/l and 2.16mg/l respectively. The iron concentrations for the levels 4200, 4300 and 4500 were 851.3 mg/l, 34.1mg/l and 78.12mg/l respectively. These metal concentrations were recommended for treatment before discharge.

The p.H ranged from 4.97 to 7.44. The Turbidity for levels 4200, 4300 and 4500 were 680 NTUs, 21.6 NTUs, and 83.2 NTUs respectively. The electrical conductivity for levels 4200, 4300 and 4500 were 2200µS/cm, 706µS/cm and 579µS/cm respectively. The TDS values for levels 4200, 4300 and 4500 were 1119mg/l, 345mg/l and 283mg/l respectively

Pump selection was carried out and a 3DS submersible pump and mono pump were selected for pumping water out of the mine.

DECLARATION

I MUKUNDANE EMMANUEL hereby declare to the best of my knowledge that this is my true and original piece of work and has never been submitted to any university or institution of higher learning by anybody for any academic award.

Signature.....

Date 30/05/2017

APPROVAL

This piece of work has been approved by;

Main Supervisor

Mr. NASASIRA HILLARY

Signature.....

Date.....

Co Supervisor

Mr. WANGI MARIO GODFREY

Signature.....

Date.....

DEDICATION

I dedicate this report to my beloved parents; for their generous support towards me. Am very humbled and equally grateful for their support and May the Almighty God reward them abundantly.

ACKNOWLEDGEMENT

I am very grateful to the Almighty God for the protection, guidance and good health He has provided to me.

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I appreciate my parents, Aunt Annette and all my friends who have all supported me in order to attain quality education. May the Almighty God bless the works of their hands!

Finally, I give credit to my fellow finalists who have always encouraged me, told me inspiring words of counsel and wisdom. May the Good Lord bless and reward them with success.

LIST OF ACRONYMS/ ABBREVIATIONS

EC	Electrical Conductivity
NTUs	Nephelometric Turbidity Units
TDS	Total Dissolved Salts
UIRI	Uganda Industrial Research Institute
PH	Power of hydrogen ions
AAS	Atomic Absorption Spectrophotometer
UNBS	Uganda National Bureau of Standards
UNEP	United Nations Environment Programme
W.H.O	World Health Organization

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CHAPTER ONE: INTRODUCTION

1.0 INTRODUCTION

This chapter includes the following; background of the study, problem statement, purpose of the Study, justification, objectives of the study, scope of the study and the significance of the Study

1.1 BACK GROUND

Everywhere where mining is contemplated or in progress, there must be a well-structured plan to control water in the mining area. Management of groundwater flow in mines is improving with new advanced investigation methods and better understanding of mine hydrogeology (Sahoo, Bandyopadhyay, & Banerjee, 2014).

Mine dewatering can represent up to 5% of the total energy demand of a mine, and is one of the mine systems that aim to guarantee safe operating conditions. As mines go deeper, dewatering pumping heads become bigger, potentially involving several lift stages. Greater depth does not only mean greater dewatering cost, but more complex systems that require more sophisticated control systems, especially if mine operators wish to gain benefits from demand response incentives that are becoming a routine part of electricity tariffs.(Romero *et al.,* 2014)

Since Neolithic times, dewatering of mines was a major task for the miners, and where no dewatering was available, the mine had to be closed down. Beyond manual water haulage and the use of buckets and leather buckets mounted on water wheels, no real innovation was made in underground mining for centuries (Wolkersdorfer, 2008).

The first reliable wooden pumps were invented at the German Rammelsberg in the 16th century and it was not until 1749 when the first reliable metal pump was introduced in Schemnitz by Joseph Hell. The first water-independent dewatering machine was installed in 1712 and the first one with a metal pump was installed in 1788(Wolkersdorfer, 2008). Until then, the depth of underground mines was mainly controlled by the depth of the water table or the dewatering techniques available. Nowadays, the dewatering techniques for open pit mines and underground mines are well established and even mines that are several thousands of meters deep can be dewatered.(Kumar, Sarkar, & Paul, 2013)

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