CHAPTER I

INTRODUCTION

Progress in the improvement of methods and equipments for water purification is necessitated by an increasing demand of water of better quality. Various kinds of treatments are required to treat ground and surface water to meet industrial and domestic water quality standards. There are many kinds of dissolved minerals in ground water such as iron, manganese etc. which can cause many problems to the water user

Iron is one of the most common and widly distributed elements in the earth's crust, by the chemical behavior of the iron element it favors to retain in minerals of low solubility. In natural water, especially underground water, dissolved iron is present in minor amounts except in some special chemical condition.

Iron removal have become a matter of economical inportance. Since 1868, when the first reported iron removal plant was built, a vast amount of knowledge about and experience with the process has been recorded. During the past few years, many economical methods have been developed to remove the dissolved iron from the water. An electric field column has been invented to use electrical energy to oxidize the dissolved Fe^{+2} to Fe^{+3} and precipitating in the form of $Fe(OH)_3$.

Iron removal processed may be classified as follows:

1. Aeration alone
2. Aeration-settling-filtration
   a. At atmospheric pressure
   b. Under main pressures.
3. Coagulation-settling
   a. Without filtering
   b. Followed by filtration
4. Use of contact filters
   a. With aeration
   b. Without aeration
5. Use of special minerals and ores
6. Nonatmospheric oxidation
7. Removal incident to softening
   a. Cation exchange
   b. Lime
8. Stabilization

Purpose of Research

The purpose of this research is to study the feasibility in removing iron from underground water by electrical means. This process might be used in a small community water supply and it can also be used as a pretreatment of water for industrial uses.

Experimental Investigation

The samples of underground water which has various iron contents were used in this study. The water was passed through an electric field column to remove the dissolved iron.

In the experiments the following items was determined

1. The percentage of iron removal at various flow rates and power supply with a detention time of 120 mins.
2. pH
3. Temperature
4. Dissolved oxygen.
5. Hardness and alkalinity removal.

The synthetic water sample prepared by dissolving $FeSO_4 \cdot 7H_2O$ in the tap water, was used to identify the type of iron content in the water that was removed after passing through the electric field column by observing the precipitate of iron.