VII CONCLUSIONS

The use of potassium permanganate for removal of soluble iron in potable water by means of conventional jar tests and filtration technique were performed.. The results of the experimertal runs can be concluded as follows:

1. Potassium permanganate can be used satisfactorily and more effectively for iron removal. It is less expensive to cope with iron removal problem.

2. The reaction of $KMnO_4$ with any soluble form of iron is complete and very rapid over a wide pH range. Potassium permanganate will reduce the quantity of both iron forms in the treated water to acceptable USPHS standards.

3. The reduction product of $KMnO_4$, manganese dioxide (MnO_2) is of benefit as it is responsible for the fact that $KMnO_4$ dosage, less than the theoretical, are required for the oxidation of iron and manganese. The reason for this is that MnO_2 sorbs cations such as Mn^{+2}. Further, manganese dioxide often serves as coagulant aid because of its density and, in many cases, cuts primary coagulation requirements.

4. Potassium permanganate is easy to handle.

A. $KMnO_4$ is stable and can be stored for an indefinite period of time.

B. $KMnO_4$ is not dusty and can be handled by any conventional materials accessible system.

C. Minimum storage space is required due to the high bulk density and the low dosages of $KMnO_4$ required.

D. In solution, it is odorless and non-corrosive to iron and steel and does not produce harmful vespers.

E. No special equipment is required to feed $KNmO_4$.

5. $KMnO_4$ is easy to control.

A. The $KMnO_4$ dosage required to react with soluble iron in a raw water supply can easily be determined in the

laboratory by conducting conventional jar tests.

B. The $KMnO_4$ dosage can be controlled in the plant by simply observing the color change from pink to brown.

6. The $KMnO_4$ method can be used in large or small water plants having gravity system.

7. It appears that a single media filter of burnt rice husk or anthracite will be satisfactory. The single layer of burnt rice husk filter provides high efficiency to remove precipitated iron turbidity and also coliform because of a biological layer on the surface of the medium itself.

8. For burnt rice husk at any filtration rate, the efficiencies of precipitated iron, turbidity and coliform removals are higher than that of anthracite.

9. Duration of runs using burnt rice husk is always longer than that of anthracite.

10. The cost of burnt rice husk filter media is very low. Only transportation cost from the mill to series water treatment plant is considered because burnt rice husk is usually free of charge.

RECOMMENDATIONS FOR FUTURE WORK

Some suggestions for future work are as follows:

1) A low - cost iron removal units for rural areas by using local filter media and potassium permanganate should be studied.

2) Cost analysis of iron removal by potassium permanganate comparing to other treatment methods should be made.

3) Comparison of the efficiency and benefit, advantages and disadvantages of removing iron in water by the method of tray aeration and potassium permanganate should be made.

4) A study of taste and odor removal by using potassium permanganate should be conducted.

5) Comparison of feasibility of gravity filtration and pressure filtration for water treatment system should be performed.

6) Economical comparison of iron removal in water treatment plant by using potassium permanganate with and without sedimentation tank.