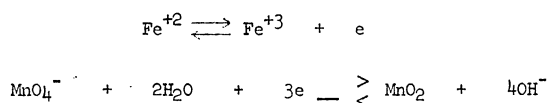


C. Potassium Permanganate Systems:--The chemical reactions involved in the treatment of Fe^{+2} with potassium permanganate are:



The use of KMnO_4 has been evaluated experimentally by Barnes & Tucker Coal Co., 1966 (48) for treatment 1.44×10^6 gpd of alkaline water being discharged from the Lancashire No. 15 mine. The iron content of the water averages 20 ppm with a fluctuation of 1.6-64 ppm. The permanganate is being evaluated as a chemical oxidant for Fe^{+2} . Reported cost of the KMnO_4 is 25-40 cents/lb. At 20 ppm iron, the reagent cost/thousand gallons is reported at \$0.026. The maximum possible reagent cost at 64 ppm Fe is \$0.083/M gal. This is equivalent to \$122.00 per day. Capital cost of the complete system has not been reported, however, the total cost includes cost of:

1. KMnO_4 storage tank.
2. 20 x 20 ft, 14,000 gal capacity mixing tank.
3. 6 x 40 x 150 ft, 270,000 gal capacity settling pond.
4. 40 x 40 ft, 1,150 sq ft filtering area, sand filter.
5. Auxiliary pumps, meters, piping.

Construction of the experimental unit has been completed. In addition to the above-reported equipment, two large holding ponds have also been added. Results of the initial experiences with permanganate have not been published.

D. Sodium Hydroxide Neutralization System:--The reactions of NaOH with mine water constituents are basically identical with the $\text{Ca}(\text{OH})_2$ reactions. NaOH is a much stronger base than $\text{Ca}(\text{OH})_2$ and has the advantage of being added as a liquid rather