VI CONCLUSIONS

It could be concluded from the investigation of both alum coagulation and electrical coagulation of turbid water as follows :

1. The maximum effluent overflow which the electrical coagulator could handle sucessfully was 3.8 l./min. The decrease in the effluent overflow resulted in higher turbidity reduction.

2. The minimum power supply used in coagulation was 26 watts. The increase in power supply resulted in higher turbidity reduction. In comparision with alum coagulation, a dosage of 30 to 40 mg/l. would be required to produce maximum percentage of light transmission in finally clarified water.

3. Electrical coagulation was possible for various pH ranges, while alum coagulation proceeded at the optimum pH range of 5.7 to 7.2 for surface water taken from Klong Prapa. The electrical treatment method provided a slight change in pH but alum coagulation reduced pH rapidly when the alum dosage was increased.

4. The estimated treatment costs by the electrical treatment method was more expensive than by the conventional method. Treatment costs by electrical coagulation varied from 0.19 to 3.51฿/m^3 depending upon flowrate, wattage and initial turbidity, while treatment cost by alum coagulation

ranged from 0.041 to 0.055 ฿/m^3. To obtain final residual turbidity of 94 percent of light transmission, the treatment cost by electrical coagulation was 0.72 ฿/m^3 (0.048 ฿/m^3 for alum coagulation).

5. Electrical coagulation always gave higher efficiency of treatment than alum coagulation especially when removals of iron and turbidity are concerned. Electrical treatment could remove 85 to nearly 100 percent of total iron, 5 to 12 percent of total hardness, 4 to 10 percent of total solids, 3 to 40 percent of chloride. However, the experiments showed that fluorides were not affected.

6. Settling curves obtained from treated water appeared to have the same shape regardless of the source or chemical composition of the water.

The relationship between percent transmission, T, and total settling time, t, could be expressed empirically as

$$T = t / (a + bt) + c$$

7. Slope, $\frac{1}{a}$ at t = 0 and the saturation value, $(\frac{1}{b} + c)$ varied with flowrate, wattage and initial turbidity of raw waters.

8. The initial percentage of light transmission of the treated water, T_o, was equal to, lower or higher than its initial percentage of light transmission when it was in the raw state, depending upon the concentration of flocs.

9. The mechanism of electrical coagulation and floc formation seemed to be dued to the combined effects of charge neutralization, electrohydraulics, mechanical shock wave, the Brownian movement, sonic vibration, and partial electrolysis.

10. There were tiny gas bubbles entrapped inside the flocs in electrical coagulation, which resulted in the circulation of the flocs in the settling column.