

## **Chapter 5**

### **Conclusions and Recommendation**

#### **5.1 Conclusions**

##### **5.1.1 Batch Adsorption**

1. Chlorinated water at very low chlorine content in level of 2 ppm decomposed about 40 percent after 3 hour storage in an open system. There was no significant difference of decomposition between agitation and no agitation of chlorine in chlorinated water.
2. Activated carbon was able to adsorb free residual chlorine until chlorine content was reduced to the desired level.
3. Adsorption isotherm for very low chlorine content in the level of less than 5 ppm exhibited linear isotherm.

##### **5.1.2 Continuous Adsorption Column**

1. The minimum bed depth of an adsorption column had to be longer than the mass transfer zone in order to achieve the desired chlorine content in the effluent.
2. For adsorption in the fixed bed depth column, increasing of service flow rates results in increasing of chlorine content in the effluent because when the residence time was decreased , mass transfer zone length would be extended.

3. For adsorption in the fixed service flow rate condition, increasing of bed depth resulted in decreasing of chlorine content in the effluent because the long bed depth provided the long residence time.
4. The suitable residence time could be adjusted by arranging of bed depth and service flow rate simultaneously. The very short bed depth with very low service flow rate providing long residence time condition was not applicable because of the difficulty of distribution of the fluid across the bed.
5. After the optimum service flow rate and bed depth were found, the service flow rate and bed depth were used to determine the optimum residence time for adsorption. This residence time could be used for adsorption bed sizing at various flow rates. Residence time for dechlorination by activated carbon used in the experiments were found about 2-2.5 minute for the chlorine content in the influent about 4 ppm.

## **5.2 Recommendation**

In this studying, bed sizing using optimum residence time for dechlorination achieved in the key assumption that the activated carbon can be consistently rejuvenated back to design adsorption capacity by the regeneration. The furthermore studying should includes the regeneration of these activated carbons. In addition, the adsorption at high range of chlorine content such as many hundreds ppm should be studied.