CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

It can be concluded from the characterization of the spent caustic obtained from the National Petrochemical Public Co., Ltd. that the aldol condensation is possibly one of the main causes of the fouling in a caustic tower.

The yellow color of the product from the aldol condensation of acetaldehyde, which is believed to be the cause of the fouling, can be used as an indicator for the fouling formation in the caustic tower. From the effect of temperature study, it can be concluded that the aldol condensation rate increases with temperature. And from the effect of acetaldehyde concentration study, the aldol condensation rate is proportional to the concentration of acetaldehyde.

Both hydroxylamine hydrochloride and hydroxylamine sulfate shown to be good alternatives for the fouling reduction in the caustic tower. The efficiency of the reduction by adding the antipolymerants decreases with the increase of temperature. Moreover, the efficiency of the reduction is proportional to the amount of the antipolymerants. Comparison of the two antipolymerants indicated that to achieve the same efficiency of the reduction, the amount of hydroxylamine sulfate required is less than that of hydroxylamine hydrochloride.

Finally, sodium sulfate, which is formed in the oxidation reactor, can promote the fouling formation.

5.2 Recommendations

Although these results show that the hydroxylamine salts are successful for the fouling reduction in the caustic tower, effects of the antipolymerants to the accessories of the caustic tower with direct contact to the chemicals must be studied. Despite the success results, a new chemical or a new method, which is more economical and provides safety to the environment, the reduction of fouling in the caustic tower is still needed. The last recommendation is to test the antipolymerants in a pilot scale.