CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The experiments were employed by immersion and potentiodynamic polarization test simultaneously and, consequently, the results were compared. Based on the limitation of each technique, therefore, the results were not exactly the same in both qualitative and quantitative views.

The results obtained from this work are in agreement with previous work for the study of temperature, chloride concentration, carbon dioxide partial pressure, and pH of the solution. It is found that temperature can enhance corrosion rate kinetically as same as general chemical reaction due to the excited kinetic energy. Moreover, the passive film of 13Cr is easily destructed due to the temperature in the range of 30°C to 60 °C. An increase in the partial pressure of carbon dioxide and acidity leading to an increase in cathodic reaction by inducing the amount of oxidizing agents such as hydrogen ions and bicarbonate ions. Chloride ions presenting in the produced water in the reservoir cause the higher possibility of pitting corrosion of the material especially on 13Cr by locally destroying the passive film. The presence of mercury(II) with in the range of 0-12 ppm does not cause any harmful effect to both materials. In addition, the formation of passive film of 13Cr was found to be more protective according to the decrease in passive current. However, if the concentration of mercury(II) is higher than 100 ppm, the solution become a lot more corrosive due to the large quantity of more powerful oxidizing agent, mercury(II). The presence of such ions leads to the increase in reduction process and inhibition of the passive film formation of 13Cr tubing material.

5.2 Recommendations

For further study, the morphology after the immersion test by using the smaller size of the immersed coupons should be investigated. Ferrous ions should be immediately measured to prevent the combination of the ions with oxygen in air resulting in the errors of the attained data. In addition, it will be very useful to focus on the continuous operation in order to account the effect of velocity of flowing fluids.