CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

In the investigation on the suitability of equation of state for evaluating the properties of fluid, it was found that the using compressibility factor, Zc in calculation gave the different effects to the predicting the properties of fluid. From the calculations, the best result was given Soave-Redlich-Kwong Equation of State by using Zc = 0.274 (Compressibility factor of carbon dioxide).

Obtaining computer program for design and simulation RESS process by using Explicit Finite Difference Technique solving the sets of equations which gives the consistent results with Reverchon and Pallado's work.

For investigating the effect of inlet temperature on temperature profile of fluid, it could be seen that the all inlet temperatures give the same trends of temperature of fluid that passed through the nozzle. The temperature of fluid decreased extremely at the distance of 1D from the nozzle, but for the distance of 2D from the nozzle, the temperature of fluid increased slightly into environmental temperature.

For investigating the effect of inlet velocity on RESS process, it could be clearly seen that the inlet velocities rarely give effect to the temperature of flowing fluid passed through the nozzle. Also, inlet velocities rarely give effect to the temperature of fluid in nozzle.

Finally, it was clearly seen that inlet pressure affects on the predicted the temperature profile of flowing fluid along the calculating domain with increasing pressure. Also, the inlet pressure provides strong effect on the temperature of fluid in nozzle. The increasing in the pressure makes the

temperature of fluid of the vicinity of the nozzle decreases. It is consistent with the throttling process.

7.2 Recommendation

From the simulated results, it was found that the Explicit Approach gave the better results than Implicit Approach. However, as mention previously, the implicit simulation could be not exhibit the clear effect of the inlet temperature as could be seen from explicit simulation because of deficiency of the program code developed in this work.

Basically, the implicit method should provide the same on better results compared with that of the explicit method. Many effects have been pound into solving the deficiency problem but it has not succeeded yet. Therefore, it could be inevitably summarized here that the explicit method is a usable the best model for investigating the phenomena of rapid expansion of supercritical carbon dioxide.

For better simulation results, the both developed programs by using Explicit and Implicit methods should be modified, and solved the mentioned deficiency problem.

It should also take into account the interaction of particles which will be coming targets of RESS. DEM technique will be suitable approach for this motion. Such consideration will provide an insight of particles by RESS which is the ultimate goal of our team effort.