

CHAPTER V

CONCLUSIONS

Life cycle assessment (LCA) was used to investigate, quantify, and compare environmental performance of two types of polyamide chip (T-100 and T-200) used for polyamide fiber production in Thailand. Simapro 5.1 software was used to analyze the environmental impact of the two products and identify the hot spot per one ton of each chip (functional unit) as the goal and scope of the study. The result from the impact assessment of Eco-indicator 95 and 99 methods showed that the hot spot of T-100 and T-200 life cycle was raw material phase. From the final weight score of Eco-indicator 99 methods, the largest environmental effect in the production of two chips, shared 84 percent of all effects, was due to resources usage. The main source was the crude oil use from the caprolactam production that used as raw material. Although there was no resource usage calculation in Eco-indicator 95 method, the raw material phase still remained the hot spot of the life cycle of chips. The reason was due to the largest contributions to the greenhouse effect and, acidification and eutrophication potential. The important phase that generated the second largest environmental burden was production phase especially extraction process, this was due to the emission from the NaOH production that used for producing water in Thailand. The recovery phase generated the lowest environmental burden because low volume ratio of recovery water was used in production phase. T-200 generated approximately 7.3 percent less environmental burden than the T-100. This was due to lower electrical energy being used per functional unit in the higher production capacity of the T-200. The extra additives in T-200 chip had very little effect on the environment performance of the two chips.