CHAPTER 7
CONCLUSION & RECOMMENDATION

7.1 Conclusion

The result of the marketing, engineering, management, and financial analysis are; the marketing analysis indicates that ABC Company should develop the marketing strategy by penetration in current market by investment in Controlled Air Incinerator service business. Since the demands of infectious wasted in Sumutprakan and eastern of Thailand are increasing from 4.5 ton/year to 5.66 ton/year in 2002 and the supplies of these wastes are 2.1ton/day in 1999 continue increasing to 2.4 ton/day in 2002. Therefore the gap of infectious wastes volume are about 4 ton/year. Consequently, the ABC Company can do this project by starting sale forecast with 1.78 ton/ day in 2003 and increase to 2.55 ton/day in the 10^{th} year as shown in Table 3.16. Accordingly, the market segment, which ABC Company has selected, is Sumutprakan and the east of Thailand. The company will focus on both industrial and local hospitals, and provide special service with free training.

The result of engineering analysis found that the appropriate process of the incineration service should start by collecting infectious wastes from each customer and weigh it in order to record the amount. Then transfer the infectious waste by using a refrigerated truck at a temperature 0-degree Celsius for the prevention of growth of any bacteria, and virus. Next, transfer the infectious waste to the storage and convey to the incinerating plant. The automatic feeder will tip the infectious waste into the primary chamber, which uses excess air at 850 degree Celsius to ensure the completion of the combustion. At this step, the ash is released from the primary chamber by the ash removing and the flue gas from primary chamber is combusted in the secondary chamber at 1,100-degree Celsius in order to completely incinerating. In addition, the secondary chamber can combust Toxins and Carcinogens entirely. In this step, the gas will be sent to an air pollution control unit for removal of Carbon particulate and absorb Hydrochloric acid and hot air. The wastewater from Air Pollution Controlled unit will be sent to treatment and recheck by ABC's laboratory before discharging to the river.

Accordingly, the engineering analysis indicates that the production program will start with 71.2% in first year and increase to 100% in the 10^{th} year. The necessary machines and equipment, which ABC Company has to use are as; the incinerator, Automatic Feeder, Scrubber Air Pollution Control, Ash Removal, pH meter, and Refrigeration truck and so on. Besides, the result of location evaluation which use the Location Rating System and Financial evaluation, indicates that the most appropriate site is Wong Chan at Rayong Province which has 2,500 square metres. Also the transportation routing in first year are as, Sumutprakan-Chachoengsao Route and Chonburi- Chanthaburi Route. And the next 5 year, it will increase the Chonburi-Trat Route because of sale increasing. In addition, the plant layout should use the process layout as shown in Figure 4.44. In addition, the necessary raw material is diesel, which consume about 60 lit per day.

The management analysis result indicates that the ABC's organization structure should consist of Procurement & Administration, Production, Quality Assurance, Logistic, Engineering, Financial, Marketing and Human Resource section, which are shown in Figure 5.1. The total employees should have 40 positions and the total salaries are as 922,000 baht. Accordingly, the recruitment and selection of ABC Company should do job analysis by observation, interview, and structured questionnaires. The recruitment systems of ABC Company should be employee referral, school, colleges and university recruiting, newspaper, business magazine and so on. In addition, the implementation plan shows that ABC Company will has about 1 year to preparing each procedure for implementation as shown in Table 5.1.

The financial analysis indicates that ABC Company will expend about 20.7 million baht for infectious waste incineration plant. Source of fund will categorized into 2 part, of which shareholder's equity will be 10.7 million baht and 10 million baht will come from loan from Thai Commercial Bank or Finance. In addition, NPV of this project is 38,164,269 baht. Pay back period is 4 years. IRR is 39% and B/C ratio is 1.388. The sensitivity analysis found that the minimum inflow that make the project feasible are 28% and the maximum outflow which make project feasible is 39% so the project is a safe investment because it is not sensitive to change.

7.2 Discussion

The project feasibility of investment is necessary for ABC Company because it can help to avoid failure from investment and shows each step and detail for investment. ABC Company can be easily to set the marketing strategy for its service and it can estimate gap between demand and supply of infectious waste, which indicated the feasible of the investment. If the Company does not know the gap of volumes of this waste, it can not know the current actual demand, so it can not know whether this project will have profit or not

Accordingly, the engineering analysis can help the company to know how is the suitable process and how feasible of this technology. Since, some technology can not do successful in present time; however, in this project, the process can feasible. Besides, ABC Company can estimate the price of each machinery and equipment that it needs and the project feasibility enables the company select the potential equipment which have high quality at a reasonable price. In addition, the engineering analysis can help ABC Company to select the appropriate location and site before plant set up. The result of the study can show the community effects and other related necessary factor, which ABC Company need to understand. Because the approximate site can reduce cost of transportation, raw material, and related expenditures. If ABC Company do not do the project feasibility study, it can not have the significant information. When the company set up the plant, cost of transportation will grow. If that location which the company set plant without doing feasibility study has communication problem, sometime the company need to close the plant immediately. Therefore, the project feasibility is very important for the site selection. In addition, it will make the company to know how environmental effects and its protection.

In view of management analysis, the project feasibility enables ABC Company to know how many employees, ABC Company needs to hire, and how the job functions and their qualification of each position. In addition, the result of study can present the method for recruitment and selection that ABC Company should concern and propose the appropriate method. For these reasons, ABC Company can estimate direct and indirect labor and other management cost.

One of necessary topic which ABC Company want to know from the project feasibility study is cash flow and the analysis of investment make ABC Company know that this project can invest and the pay back period is 4 years. And this project is not sensitive to change. Unless of the feasibility study, ABC Company can not predict the result of investment. In addition, the project feasibility study is not only necessary to ABC Company, but it also important to investment in every project.

7.3 Recommendation

- **Market Research**

  The project feasibility study in marketing analysis part should do market research in order to know the customer behavior and the demand of the infectious waste in order to compare with the current demand of the Trend Intertrade Company for know the actual demand of the infectious wastes. However, in this thesis, the market research by interviewing and questionnaire survey was not successful because the 200 copies were sent to local hospitals and industries but the returned questionnaire are only 12% so the information can not represent the actual demand and the customer behavior.

- **Infectious wastes incineration service's price**

  The price of infectious waste is dependent on competitor because there is not controlled price from government now but in the future, price of service will control by government. At that time, the sale forecast and the margin will be changed.

- **Location Evaluation**

  Although, the location rating system shows that the appropriate location is Wong Chan site at Rayong Province, it is recommended that Chonburi (Bangbung site) is also potential site because it is the most approximate to customer, ease to set transportation routing, and save raw material cost. But the reason that does not

select Chonburi (Bangbung site) is because there are some community problems in last 2 years. The local people are not pleased for Chonburi municipal waste disposal because it make odor so they also believe that others waste disposal's organization will make the same thing. In this case I suggest that if ABC Company can explain and give the right information to the community about how safety and controlled air pollution and odor system of the company are by set training courses for waste management and advertising, the community will understand. Then the company can set the infectious wastes incineration plant. However, it still takes time consumption, increases cost for communication and training cost. Therefore, ABC Company should compare these costs with transportation cost and raw material cost reducing if the Company set the plant in Chonburi.

- **Machinery and equipment**

This thesis presents the necessary machinery and equipment such as; the controlled-air incinerator, Automatic Feeder, Scrubber Air Pollution Control, Ash Removal, pH meter, and Refrigeration truck. However, it is recommended that when setting up plant, ABC Company should consider of technology changing and bargaining price. If technology, time, supplier changes, cost of these machinery and equipment will be changed. In addition, the other cost that depended on time and technology will be changed.

- **Wastewater Treatment**

It is recommended that the wastewater treatment plant of ABC Company should outsource or has joint venture with the potential company, which has the experts and the international standard in order to provide the environmental protection. Accordingly, the laboratory, which test the wastewater, air pollution, ABC Company should also outsource with the potential company such as SGS Thailand Company to check the environmental testing. This strategy will make ABC Company reduce cost and has higher environmental standard.

- **Employees**

The employee of ABC Company for this project is around 40 positions and total salary about 0.9 million baht per month. It is quite high when compare with the inflow. It is recommended that if ABC Company outsource some task such as laboratory testing and wastewater treatment, it will reduce company cost and reduce number of employees.

- **Motivation**

Although, ABC Company will use many source for recruitment and selection, the candidates who pleases to work with the infectious waste disposal is very few so the Company should set appropriate employee salary and bonus and other' s beneficial in order to motivate the employees.

- **Forecasting System**

It is recommended that linear regression is not the most appropriate method to forecast the demand of the infectious because there are much factor effect it such as seasonal, birth rate, population demographic, number of hospital beds, and so on. However, the linear regression can forecast the demand of infectious wastes in short time period.

- **Financial Analysis**

In this thesis, it uses estimate cost for financial analysis but in the real life, cost of production, overhead cost, and other cost can be changed by many factors such as bargaining price, technology development and so on. Therefore, the financial evaluation can not predict the feasible of project by 100% but it can indicates the estimate financial evaluation for decision making. However, in this project, IRR is 29%, B/C ratio is 1.38 and the project is not sensitive, so it will be invest in this project for ABC Company and other SME.