

CHAPTER 8

CONCLUSION

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The findings in the waste audit and characterizations studies are summarized below:

- i. Spent bleaching earth generated was 2.23 tonnes in a day with a moisture content of 0.88% and a TOC value of 63.8%. Heavy metals content are at trace limits only.
- ii. Waste filter cake generated was 0.78 tonnes in a day with a moisture content of 4.8% and a TOC value of 48.4%. Estimated loss due to glycerine loss in the filter cake was RM 16,330 per year. Heavy metals content are at trace limits only.
- iii. Residue fatty acids generated from the distillation and fractionation processes, on average have an acid value below 45 with a yield factor of 4.88% and 3.86% respectively.
- iv. Approximately 167kg of spent nickel catalyst were produced with an average nickel content of 17.8%.
- v. Biological sludge produced from the wastewater treatment plants has a moisture content of 4.84% and a TOC value of 14.6%. Around 621kg of sludge is produced in a day. Heavy metals content is at trace limits only.
- vi. Glycerine pitch has an average COD value of 9,784ppm. The amount of glycerine pitch produced in average is 494kg, which cost an annual lost of RM 487,575.

- vii. Raw process wastewater daily flowrate to the treatment plant was around 9.28 m³/h with a COD of 7,827ppm, BOD of 3,106ppm, TSS of 172ppm, O&G of 771ppm and pH of 4.8. The treated wastewater discharged from Palm –Oleo had the following characteristics: COD (42ppm), BOD (14ppm), TSS (28ppm), O&G (4.3ppm) and pH (7.5).
- viii. 2.5 tonnes of spent activated carbon is generated in a month.

The benefits of practicing Cleaner Technology (waste minimization) are as below:

- i. Reduction in the amount of hazardous spent nickel catalyst waste which need to be handled and a savings around RM924,000 per year by recycling the spent catalyst
- ii. Spent earth disposed at landfill contains less amount of oil and a savings of RM60,960 per year can be achieved by extracting the retained oil in the spent bleaching earth.