

6-16 *Life Cycle Costing*

St. Agatha Company manufactures laser printers. Government agencies have advised the company that for all new products it will have to provide for recycling of used toner cartridges.

A study has determined that St. Agatha Company has three options. It can design a printer with cartridges that the customer refills with toner, eliminating the need to recycle the cartridges. It can design cartridges that it will recover and refill with toner. Or it can design cartridges that it will recover, crush, and sell the resulting plastic as scrap.

Planners at St. Agatha are considering the design of a cartridge for a new printer. The company expects that customers will use about 600,000 cartridges a year during the five-year manufacturing life of the new printer. After that, the company expects that cartridge use will fall at the rate of 200,000 per year. The cost of making a cartridge is \$60. Assume that the company's before tax cost of capital is 12%.

Marketing staff estimates that printer sales will suffer if it offers a cartridge that customers have to refill. Therefore they plan to cut the printer prices to maintain volume. The net effect on profits is expected to be about \$6,000,000 per year during the five-year manufacturing life of the printer. Under this alternative, the company would price the replacement toner to break even and would make 250,000 cartridges in each of the five-year manufacturing life of the new printer with the balance of use in the first five years and the last two years accounted for by refills.

The marketing staff has estimated that for every 100 cartridges used, only 80 will be returned. Returns are made in the year that the cartridge is used. The company is expected to pay a \$15.00 landfill fee at the end of the product's lifetime for every cartridge disposed of.

The cost to clean and refill a cartridge is \$20. Under this alternative, the company would make 500,000 cartridges in each of the first two years and rely on recovered cartridges after that.

If the company chooses the crushing alternative, it must purchase a plastic recovery machine at the start of the project. The cost of the machine is \$5,000,000 and it would be useless when the product is abandoned. The recycled plastics and other materials can be sold to yield \$38.00.

Ignore the effects of taxes in answering this question.

If the company's objective is to minimize the take-back cost, which alternative should it pursue: (1) make a cartridge that customers can refill, (2) make a cartridge that is recycled, or (3) make a cartridge that is recovered, crushed, and remanufactured?