

Understanding Financial Management: A Practical Guide

Problems and Answers

Chapter 7

Capital Investments and Cash Flow Analysis

7.4. Guidelines for Estimating Project Cash Flows

1. Montvale Manufacturing Company is expanding its operations. As a result, analysts expect that during the first year of expansion, the firm's accounts receivable will increase by \$15 million, inventory levels by \$28 million, accounts payable by \$20 million, and wages payable by \$4 million.
 - A. How did the expansion affect Montvale's net operating working capital (NOWC) during the first year of its expansion?
 - B. Did the change in NOWC result in a cash inflow or a cash outflow?
2. A retail store chain is considering expanding into a new neighborhood. For the new store, the firm would pay rent of \$120,000 per year. Inventory would increase by \$250,000, while accounts payable would grow by \$150,000 and accruals by \$50,000. What is the impact of this project on the firm's net operating working capital?
3. Solar Products Inc. plans to increase its manufacturing facilities at a cost of \$75 million. Net operating working capital would increase by \$5 million. The firm will have to pay flotation costs of \$4 million in order to raise \$75 million in new debt to fund the project.
 - A. What type of project is this?
 - B. What costs are relevant?
4. Rockville Enterprises plans to sell an old warehouse and build a larger, more efficient warehouse at a cost of \$40 million. A year ago, the company paid architects \$500,000 to design the new warehouse. Analysts estimate that the new warehouse can reduce operating costs by \$1 million per year.
 - A. What type of project is this?
 - B. What costs are relevant?
5. Sector 9 Inc. is considering investing \$50 million to develop a line of digital cameras. Because these cameras easily connect to the firm's existing line of printers, management believes that printer revenues will increase by \$6 million per year. Should the increase in printer revenue be included in the cash flow estimation?
6. Trevor Corporation pays a transportation company \$400,000 per year for air delivery of its microcomputers. Concurrently, Trevor Corp. rents out its fleet of trucks to Seldom Inc. for \$220,000 per year. Trevor Corp. is considering ending the contract with Seldom Inc. in order to use the truck fleet to distribute its line of micro-computers on its own. Trevor Corp. would have to spend \$15,000 per year to pay for additional general, selling and administrative expenses. Furthermore, Trevor Corp's accounts receivable and accounts payable would increase by \$33,000 and \$20,000, respectively. If the firm undertakes this

project, which of these cash flows are outflows and inflows if the firm undertakes this project?

7.5 Cash Flow Components

7. Silica Corporation, an established firm in the semiconductor industry, spent \$15 million on developing a new chip. Production of the chip requires new equipment at the cost of \$20 million. In addition, shipping, installation and modification costs of the equipment are \$50,000, \$30,000, and \$80,000, respectively. What is the depreciable basis of the new equipment?
8. The following information applies to a computer system purchased by Astra Company on January 1, 2007, and disposed of on January 2, 2012.

• Cost of microcomputer	\$79,000
• Delivery and installation	\$ 1,000
• Estimated salvage value	\$ 8,000
• Estimated useful life	6 years
• MACRS property class	5 years

 - A. What is the depreciable basis for this 5-year property class?
 - B. What is the MACRS depreciation schedule for this 5-year property class?
9. Portman Corporation purchased new cutting equipment on the first day of the year for \$100,000. The expected life of the equipment is 8 years and its expected salvage value is \$11,000. Portman's marginal tax rate is 40%. What is the annual depreciation tax shield of the new equipment assuming Portman uses straight-line depreciation?
10. Arte Inc., an animation studio, bought a new computer system for \$90,000 and paid an additional \$7,000 for shipping and installation. The system has an estimated useful life of 7 years with estimated salvage value of \$8,000. The firm uses 5-year MACRS to depreciate this asset.
 - A. What is the depreciable basis of the new computer system?
 - B. What is the depreciation expense for each year?
11. GTL Corporation is considering expansion into a new market segment. During the first year of operation, the company expects the new product line to increase its revenues by \$20 million and operating expenses by \$14 million. The cost of the equipment, which is classified as a 7-year asset under MACRS, required for this project is \$12 million. The company will use a note payable with 8% annual interest rate to finance the acquisition. GTL's marginal tax rate is 40%. What are the operating cash flows during the first year of this project?
12. Harvest Farms wants to expand its operations. The equipment needed for this purpose sells for \$120,000 including shipping costs. The equipment has an expected life of 10 years with zero salvage value, and the firm uses the straight-line depreciation method. Harvest Farms plans to place the production into a building it owns but is currently unused. Nonetheless, the firm recently received an offer from a local firm to rent this building for \$40,000 per year. Harvest Farms expects annual revenue of \$420,000 and operating

expense excluding depreciation of \$310,000. The firm falls into the 40% tax bracket. What are the annual operating cash flows associated with this project?

13. Wheaton Industries plans to replace an old machine with a new more efficient machine with a greater production capacity. The depreciable basis of the new machine is \$100,000. The old machine was put into service 4 years ago, at which time its depreciable basis was \$80,000. Both the old and new machines are in the 7-year asset class under MACRS. An analyst estimates that acquiring the new machine will result in the following revenues, operating costs, and depreciation. For simplicity, assume that the changes in revenues and expenses are the same each year and that the firm's marginal tax rate is 40%.

	With New Machine	With Old Machine	Incremental Change
Sales revenue	\$160,000	\$125,000	\$35,000
Operating costs	75,000	65,000	-10,000
Depreciation			
Year 1	14,290	7,144	7,146
Year 2	24,490	7,144	17,346
Year 3	17,490	7,144	10,346
Year 4	12,490	3,560	8,930
Year 5	8,930	0	8,930
Year 6	8,930	0	8,930
Year 7	8,930	0	8,930
Year 8	4,450	0	4,450

What are the changes in operating cash flows (OCF) for years 1 through 8?

14. P&H Corporation is assessing the terminal value of a new production line. The company expects to sell the line in 10 years for its book value of \$25,000. In addition, P&H expects to recover the net operating working capital (NOWC) of \$20,000. P&H's marginal tax rate is 40%. What is the terminal cash flow of the project?
15. Analogy Inc. is going to sell a machine that has a book value of \$22,000 and a market value of \$25,000. It will cost \$500 to remove the machine and the marginal tax rate is 40%. The company expects to recover the entire \$1,500 in net operating working capital (NOWC) that it incurred when firm bought the machine.
- A. What is the after-tax net salvage value of the machine?
- B. What are the terminal cash flows?

Tax Effects of Selling Depreciable Assets

16. KMC Corporation just sold equipment it had purchased 8 years ago for \$40,000. On KMC's books, the asset had a value of \$35,000. The firm's marginal tax rate is 40%. How should KMC treat this sale?
17. Sunco Inc. terminated production of an unsuccessful product. The firm sold the equipment used in the production for \$22,000 while its book value was \$30,000. The firm did not have any other Section 1231 transactions. If the firm's marginal tax rate is 40%, what is the impact of the disposal on Sunco's tax liability?

18. Brilla Corporation closed its diamond cutting division. Since demand for quality diamond cutting machines currently exceeds supply, Brilla sold its cutting machine for \$525,000 although it had purchased it for \$500,000 two years ago. The firm used 5-year MACRS depreciation and has a tax rate of 40% on both ordinary and capital gains. What is the tax effect of the transaction?
19. Riddick Services bought a machine with a 7-year recovery period on April 1, 2007, for \$25,000 and sold it three years later. The firm's marginal tax rate is 40%. The firm has no other Section 1231 gains or losses during the current year or Section 1231 losses during the preceding three years.
- What is the machine's current book value using MACRS?
 - What are Riddick Service's net proceeds if the firm sells the machine for (1) book value, (2) \$10,000, and (3) \$15,000?

7.7 Applying Cash Flow Analysis

20. Slade Inc. is adding a new production line. The price of the equipment is \$215,000. The new production line requires a one-time increase in the firm's net operating working capital (NOWC) by \$20,000. Slade Inc. expects the line to generate \$180,000 in annual revenues with \$120,000 in operating expenses excluding depreciation. The company plans to abandon the product line after five years, when it expects to sell the equipment for its book value. The expected life of the equipment is 10 years with a zero salvage value. Slade Inc. uses straight-line depreciation and its marginal tax rate is 36%. What are the cash flows of the project?
21. Knight Company is considering expanding its current operations by adding new super-computers to increase its ability to process sale orders. The company plans to depreciate the computers over a 5-year economic life using MACRS and to sell the computers after four years. The firm's marginal tax rate is 40%. The following are estimates of the project's incremental cash flows:
- Purchase price of \$290,000
 - Delivery and installation costs of \$10,000
 - Initial net operating working capital required of \$15,000
 - Revenues of \$100,000 in year 1, \$200,000 in year 2, \$250,000 in year 3, and \$275,000 in year 4
 - Operating expenses, excluding depreciation, 35% of revenues
 - Salvage value of \$40,000 in year 4
 - NOWC \$15,000 is recuperated in year 4
- What is the project's initial investment?
 - What is the project's operating cash flows?
 - What is the project's terminal cash flow?
22. Arlington Enterprises manufactures various household products. The company plans to introduce an all-purpose cleaner. Analysts with the company have developed the following information about the proposed product.
- The project has an anticipated economic life of 8 years.
 - The cost of the equipment today (in year 0) is \$495,000. The company will incur an additional \$1,000 in transportation/installation costs, and \$4,000 in modification costs

- (both in year 0).
- Arlington will use the MACRS accelerated method to depreciate the equipment as 7-year property.
 - If the project is undertaken, the company will need to increase its inventories by \$50,000, and its accounts payable will rise by \$10,000 (both in year 0). Analysts expect to recover this net operating working capital at the end of the project life (in year 8).
 - If Arlington undertakes the project, analysts expect the company will realize an additional \$400,000 in sales over each of the next four years (years 1 through 4) and \$500,000 in sales over the remaining four years (years 5 through 8). The company's incremental operating cost (excluding depreciation) will be 60% of each year's incremental sales.
 - The company's interest expense each year will be \$15,000.
 - The firm spent \$50,000 last year (year -1) for research and development of the new all-purpose cleaner.
 - The new product will not change indirect costs, but Arlington's accountants plan to allocate \$20,000 of the firm's current overhead to the new project for internal reporting purposes.
 - Analysts expect the new all-purpose clear to reduce the after-tax cash flows of the company's existing products by \$25,000 a year over the life of the project.
 - The company's tax rate is 40%.
 - In year 8, the project's economic life is complete, but analysts estimate salvage value of \$50,000 for the equipment.

- A. What is the net investment outlay of the new equipment required in Year 0?
- B. What are the net operating cash flows in Years 1 through 8?
- C. What is the terminal cash flow in Year 8? (**Do not** include the net operating cash flow in the calculation of the terminal cash flow).

23. Eagle Company is considering the replacement of old production equipment.

- *Old equipment:* The old equipment is being depreciated by the straight-line method over a 10-year recovery period from a depreciable cost basis of \$120,000. The old machine has 5 years of remaining usable life, at which time its salvage value is expected to be zero, and it can be sold now (year 0) for \$50,000.
- *New equipment:* The installed price of the new equipment is \$250,000. Due to changes in technology, Eagle expects to replace the equipment in 5 years and receive an expected salvage value of \$30,000. Annual savings of electricity, labor, and materials from using the new equipment are estimated at \$40,000. The company is in a 40% federal-plus-state tax bracket. Eagle will use the MACRS depreciation method for this equipment, which is classified in the 5-year life category.

- A. What is the initial cash outlay for this replacement decision?
- B. What are the incremental cash flows in years 1 – 5 (excluding salvage value)?
- C. What is the net after-tax cash flow from salvage value in year 5?

7.8 Capital Budgeting for the Multinational Corporation

24. U.S.-based International Ventures has a subsidiary in Switzerland that earned \$5,000,000 before taxes last year on which it paid an equivalent of \$1,250,000 in Swiss taxes. If the U.S. tax rate is 40%, what amount would the company owe in taxes to the U.S. government?

Answers

- 1A. Montek's NOWC changed by an amount equal to the difference between increases in current operating assets (a use of funds) and in current operating liabilities (a source of funds):

$$\Delta \text{NOWC} = (\$15 + \$28) - (\$20 + \$4) = \$19 \text{ million}$$

- 1B. An increase (decrease) in NOWC is a use (source) of funds. Therefore, Montvale will incur a cash outflow during the first year of its operations to cover the increase in NOWC.
2. The calculation of net operating working capital (NOWC) includes only changes in non-interest earning current assets and liabilities, but does not reflect operating expenses, such as rent. Therefore, the firm's NOWC would increase by $\$50,000 = \$250,000 - \$150,000 - \$50,000$.
- 3A. This is an expansion project because the firm is expanding its existing infrastructure.
- 3B. The \$75 million cost and the \$5 million increase in working capital are relevant because these cash outflows can be directly attributed to the expansion project. The \$4 million flotation cost is not relevant because it is a financing cost that should be reflected in the required rate of return used to evaluate the project.
- 4A. This is a replacement project because the firm will replace its old warehouse with a newer, more efficient one.
- 4B. The \$40 million cost and the \$1 million savings in operating costs are relevant because they can be directly attributed to the replacement project. The \$500,000 fee paid to design the building is a sunk cost and is not an incremental cash flow.
5. Yes, the increase in printer revenue is a complementary side effect (cash inflow) that should be included in the cash flow estimation.
6. Trevor Corp. would incur an opportunity cost (cash outflow) in rental revenues of \$220,000 per year before taxes and an allocated overhead cost (cash outflow) of \$15,000 per year. The increase in net operating working capital of \$13,000 ($\$33,000 - \$20,000$) is part of the initial cash outflow. The firm would avoid the \$400,000 in cash outflows per year to the transportation company when using its own truck fleet.
7. Silca Corporation should exclude the research and development (R&D) costs from calculation of the initial investment because the \$15 million is a sunk cost. The depreciable basis of the new equipment is $\$20,160,000 = \$20,000,000 + \$50,000 + \$30,000 + \$80,000$.
- 8A. The depreciable basis is $\$79,000 + \$1,000 = \$80,000$.
- 8B. The MACRS depreciation schedule for this 5-year property class is:

Year	Depreciable basis [1]	Depreciation rate [2]	Depreciation amount [1] x [2]
2007	\$80,000	0.2000	\$16,000
2008	80,000	0.3200	25,600
2009	80,000	0.1920	15,360
2010	80,000	0.1152	9,216
2011	80,000	0.1152	9,216
2012	80,000	0.0576	4,608
Total depreciation =			\$80,000

9. The annual depreciation expense using straight-line depreciation involves subtracting the estimated salvage value from the initial cost of the asset and then dividing by the estimated life of the asset. The depreciation tax shield is the depreciation expense multiplied by the tax rate: $[(\$100,000 - \$11,000)/8] (0.40) = \$4,450$ per year.
- 10A. The depreciable basis includes the purchase price as well as shipping and installation costs. Because MACRS assumes zero salvage value, the depreciable basis is $\$97,000 = \$90,000 + \$7,000$.
- 10B. The depreciation expense is computed by multiplying the depreciable basis by the depreciation rate appropriate for each year. Total depreciation expense over the life of the asset will equal the depreciable basis.

Year	Depreciable basis [1]	Depreciation rate [2]	Depreciation amount [1] x [2]
1	\$97,000	0.2000	\$19,400
2	97,000	0.3200	31,040
3	97,000	0.1920	18,624
4	97,000	0.1152	11,174
5	97,000	0.1152	11,174
6	97,000	0.0576	5,587
Total depreciation expense			\$97,000

11. A general formula for the change in operating cash flows (OCF) is:

$$\begin{aligned} \Delta OCF &= (\Delta R - \Delta OC - \Delta D)(1 - T) + \Delta D \\ &= (\$20,000,000 - \$14,000,000 - \$1,714,800)(1 - 0.40) + \$1,714,800 \\ &= \$2,571,120 + \$1,714,800 = \$4,285,920 \end{aligned}$$

Under a MACRS, the depreciation during the first year for 7-year asset is \$1,714,800 ($\$12,000,000 \times 0.1429$).

GTL should evaluate the project independently of the source of funds.

12. Harvest Farms should include incremental cash flows as well as the after-tax opportunity cost when calculating the operating cash flows of the project. Depreciation is a non-cash expense, but Harvest should include the tax shield it provides in operating cash flows:

Incremental revenues	\$420,000
Incremental operating expenses	310,000
Depreciation	<u>12,000</u>
Taxable income	\$ 98,000
Income taxes (40%)	<u>39,200</u>
Net income	\$ 58,800
After-tax opportunity cost (\$40,000)(1 - 0.40)	24,000
Depreciation	<u>12,000</u>
Operating cash flow	<u>\$ 46,800</u>

13. The changes in operating cash flows for years 1 – 8 are:

$$\begin{aligned} OCF_1 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$7,146) \\ &= \$27,000 + \$2,858.40 = \$29,858.40 \\ OCF_2 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$17,346) \\ &= \$27,000 + \$6,938.40 = \$33,938.40 \\ OCF_3 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$10,346) \\ &= \$27,000 + \$4,138.40 = \$31,138.40 \\ OCF_4 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$8,930) \\ &= \$27,000 + \$3,572.00 = \$30,572.00 \\ OCF_5 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$8,930) \\ &= \$27,000 + \$3,572.00 = \$30,572.00 \\ OCF_6 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$8,930) \\ &= \$27,000 + \$3,572.00 = \$30,572.00 \\ OCF_7 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$8,930) \\ &= \$27,000 + \$3,572.00 = \$30,572.00 \\ OCF_8 &= [(\$35,000) - (-\$10,000)] (1 - 0.40) + (0.40)(\$4,450) \\ &= \$27,000 + \$1,780.00 = \$28,780.00 \end{aligned}$$

14. Terminal value of the project is the salvage value plus the return of the NOWC, which is \$25,000 + \$20,000 = \$45,000.

15A. The after-tax net salvage value of the machine is:

Salvage value	\$25,000
- Cost of removing the asset	<u>500</u>
Salvage value before taxes	\$24,500
- Tax effects on disposal of asset*	<u>1,000</u>
Net salvage value	<u>\$23,500</u>

$$*[(\$25,000 - \$22,000) - \$500](0.40) = (\$2,500)(0.40) = \$1,000$$

15B. The terminal cash flows are:

Net salvage value	\$23,500
Recovery of NOWC	<u>1,500</u>
Terminal cash flows	<u>\$25,000</u>

Because the firm recuperates its entire net operating working capital upon disposing of the machine, there are no tax implications.

16. The asset sold for above its book value but less than its initial depreciable basis. Thus, the company had a Section 1231 gain of $\$5,000 = \$40,000 - \$35,000$, which would be treated as recaptured depreciation and taxed at the firm's marginal tax rate of 40%. Thus, KMC would face an added tax liability of $\$2,000 = (\$5,000)(0.40)$ assuming it did not have any Section 1231 losses.
17. Sunco had a loss of $\$8,000 = \$30,000 - \$200,000$. The loss is fully deductible, so it reduces the firm's tax liability by $(\$8,000)(0.40) = \$3,200$.
18. Brilla recaptured depreciation and recognized a gain on the sale. The firm had already taken $\$260,000 = (\$500,000)(0.2000) + (\$500,000)(0.3200)$ in depreciation during the past two years. Since the firm sold its machines for more than the $\$500,000$ depreciable basis, the $\$260,000$ represents recaptured depreciation. The tax implication of recaptured depreciation is $\$104,000 = \$260,000(0.40)$. The $\$25,000$ difference between the selling price ($\$525,000$) and the depreciable basis ($\$500,000$) is treated as a long-term capital gain. The tax implication of capital gain is $\$10,000 = (\$25,000)(0.4)$. Thus, Brilla's total increase in tax liability is $\$114,000 = \$104,000 + \$10,000$.
- 19A. Total Depreciation = $0.1429(\$25,000) + 0.2449(\$25,000) + 0.1749(\$25,000)$
 = $\$3,572.50 + \$6,122.50 + \$4,372.50 = \$14,067.50$
 Current book value = $(\$25,000 - \$14,067.50) = \$10,932.50$

19B. The net proceeds are:

If Riddick Services sells the machine for its book value of $\$10,932.50$, there is no tax effect. Thus, the net proceeds from the sale are the current book value of $\$10,932.50$.

If Riddick Services sells the machine for $\$10,000$, which is below the book value of $\$10,932.50$, the firm receives a tax benefit on the loss of $[(\$10,000.00 - \$10,932.50)(0.40)] = \$373$, which reduces the firm's tax liability. Thus, the net proceeds are $\$10,000 + \$373 = \$10,373.00$.

If Riddick Services sells the machine for $\$15,000$, which is above book the book value of $\$10,932.50$, the firm increases its tax liability by $[(\$15,000.00 - \$10,932.50)(0.40)] = \$1,627.00$. Thus, the net proceeds are $\$15,000 - \$1,627 = \$13,373$.

20. Initial investment: $\$215,000 + \$20,000 = \$235,000$
 Depreciation expense: $(\$215,000)/10 = \$21,500$
 Operating cash flows: $(\$180,000 - \$120,000)(1 - 0.36) + (\$21,500)(0.36)$
 = $\$38,400 + \$7,740 = \$46,140$
 Terminal cash flow: $\$107,500^* + \$20,000 = \$127,500$
 *Book value = Cost – accumulated depreciation = $(\$215,000 - \$107,500) = \$107,500$

Year	0	1	2	3	4	5
Initial CF	-\$235,000					
Operating CF		\$46,140	\$46,140	\$46,140	\$46,140	\$46,140
Terminal CF						127,500
Total CF	-\$235,000	\$46,140	\$46,140	\$46,140	\$46,140	\$173,640

21A. The project's initial investment is:

Incremental cash flows	Year 0
Purchase price of new computers	\$290,000
+ Delivery and installation costs	10,000
Depreciable basis	\$300,000
+ Change in NOWC	15,000
= Initial investment	<u>\$315,000</u>

21B. The project's operating cash flows are:

Incremental cash flows	Year 1	Year 2	Year 3	Year 4
Operating revenues	\$100,000	\$200,000	\$250,000	\$275,000
- Operating costs (35%)	35,000	70,000	87,500	96,250
- Depreciation	60,000	96,000	57,600	34,560
Taxable income	\$5,000	\$34,000	\$104,900	\$144,190
- Taxes (40%)	2,000	13,600	41,960	57,676
Net income	\$3,000	\$20,400	\$62,940	\$86,514
+ Depreciation	60,000	96,000	57,600	34,560
= Operating cash flows	<u>\$63,000</u>	<u>\$116,400</u>	<u>\$120,540</u>	<u>\$121,074</u>

Year	Depreciable basis	Depreciation rate	Depreciation amount
	[1]	[2]	[1] x [2]
1	\$ 300,000	0.2000	\$ 60,000
2	300,000	0.3200	96,000
3	300,000	0.1920	57,600
4	300,000	0.1152	34,560

21C. The project's terminal cash flow is:

Incremental cash flows	Year 6
Salvage value	\$40,000
-- Tax effect on asset disposal*	4,736
Net salvage value	\$ 44,736
+ Recovery of NOWC	15,000
= Terminal cash flows	<u>\$ 59,736</u>

*Tax effect = (Sales price – Book value)(Marginal tax rate)
= (\$40,000 – \$51,840)(0.40) = - \$4,736 Ordinary loss reduces the tax liability resulting in a positive cash inflow

Book value = Depreciable basis – accumulated depreciation
= \$300,000 – \$248,160 = \$51,840

22A. Research and development in the amount of \$50,000 is a sunk cost and is irrelevant to computing cash flows. The total net investment outlay in year 0 is:

Initial cost	(\$495,000)	
Transportation and installation	(1,000)	
Modifications	<u>(4,000)</u>	
Depreciable basis		(\$500,000)
Inventory	(50,000)	
Accounts payable	<u>10,000</u>	
Change in NOWC		(40,000)
Total net investment outlay		<u>(\$540,000)</u>

22B. Interest expense of \$15,000 a year is not an operating cash flow, but it is part of the company's cost of capital. The allocated costs of \$20,000 a year is not an incremental cash flow. The net operating cash flows in Years 1 through 8 are:

Year	1	2	3	4	5-7	8
Sales	\$400,000	\$400,000	\$400,000	\$400,000	\$500,000	\$500,000
- Operating costs (60% of sales)	240,000	240,000	240,000	240,000	300,000	300,000
- Depreciation	71,450	122,450	87,450	62,450	44,650	22,250
Operating income before taxes	88,550	37,550	72,550	97,550	155,350	177,750
- Taxes (40%)	35,420	15,020	29,020	39,020	62,140	71,100
Operating income after taxes	53,130	22,530	43,530	58,530	93,210	106,650
+ Depreciation	71,450	122,450	87,450	62,450	122,450	22,250
- After-tax change in other products	25,000	25,000	25,000	25,000	25,000	25,000
Net cash flow	\$ 99,580	\$119,980	\$105,980	\$95,980	\$190,660	\$103,900

Year	Depreciable basis [1]	Depreciation rate [2]	Depreciation amount [1] x [2]
1	\$500,000	14.29	\$ 71,450
2	500,000	24.49	122,450
3	500,000	17.49	87,450
4	500,000	12.49	62,450
5	500,000	8.93	44,650
6	500,000	8.93	44,650
7	500,000	8.93	44,650
8	500,000	4.45	22,250

22C. The terminal cash outlay in year 8 is:

Salvage value	\$50,000
Tax in salvage value (40%)	<u>(20,000)</u>
After-tax salvage value	\$30,000
Recovery of NOWC	<u>40,000</u>
Terminal cash flow	<u>\$70,000</u>

23A. The initial cash outlay is:

Cost of new equipment	(\$250,000)
Sale price of old equipment	50,000

Tax savings due to loss on sale*	<u>4,000</u>
Net cash outlay at year 0	(\$196,000)

*(Book value – salvage value) = (\$60,000 - \$50,000)0.4 = \$4,000 tax savings

23B. The incremental cash flows in years 1 – 5 (excluding salvage value) are:

A general formula for computing the change in operating cash flows (OCF) for this replacement decision is:

$$\begin{aligned} \Delta OCF_t &= [(R_{\text{new}} - R_{\text{old}}) - (OC_{\text{new}} - OC_{\text{old}})](1 - T) + T(D_{\text{new}} - D_{\text{old}}) \\ &= [0 - (\$40,000)](1 - 0.40) + 0.40(D_{\text{new}} - D_{\text{old}}) \\ &= \$40,000(0.60) + 0.40\Delta D = \$24,000 + 0.40(\Delta D) \end{aligned}$$

Find (ΔD) over years 1 – 5 as follow;

Year	MACRS %	Depreciable basis	D _{new}				ΔD
				Straight-line %	Basis	D _{old}	
1	0.2000	\$250,000	\$50,000	0.10	\$120,000	\$12,000	\$38,000
2	0.3200	250,000	80,000	0.10	120,000	12,000	68,000
3	0.1920	250,000	48,000	0.10	120,000	12,000	36,000
4	0.1152	250,000	28,800	0.10	120,000	12,000	16,800
5	0.1152	250,000	28,800	0.10	120,000	12,000	16,800

Year	1	2	3	4	5
After-tax cost savings \$40,000(0.60)	\$24,000	\$24,000	\$24,000	\$24,000	\$24,000
Depreciation tax savings 0.40(ΔD)	15,200	27,200	14,400	6,720	6,720
Operating cash flows	\$39,200	\$51,200	\$38,400	\$30,720	\$30,720

23C. At the end of year 5, the accumulated depreciation on the new equipment is \$235,600. Thus, the book value of the new equipment is (\$250,000 - \$235,600) = \$14,400. Salvage value of the new machine at the end of year 5 is \$30,000. Since the book value of the machine is \$14,400, so the firm must pay a tax on this gain of (\$30,000 - \$14,400)0.40 = \$6,240. So the net after-tax salvage value is (\$30,000 - \$6,240) = \$23,760.

24 The tax burden would be \$2,000,000 (\$5,000,000 x 0.40) less the \$1,250,000 paid to the Swiss government. Thus, the U.S. firm would owe \$750,000 (\$2,000,000 - \$1,250,000) in U.S. taxes.