Waterways Continuing Problem

WCP15 Waterways Corporation is a private corporation formed for the purpose of providing the products and the services needed to irrigate farms, parks, commercial projects, and private homes. It has a centrally located factory in a U.S. city that manufactures the products it markets to retail outlets across the nation. It also maintains a division that provides installation and warranty servicing in six metropolitan areas.

The mission of Waterways is to manufacture quality parts that can be used for effective irrigation projects that also conserve water. By that effort, the company hopes to satisfy its customers, provide rapid and responsible service, and serve the community and the employees who represent them in each community.

The company has been growing rapidly, so management is considering new ideas to help the company continue its growth and maintain the high quality of its products.

Waterways was founded by Will Winkman who is the company president and chief executive officer (CEO). Working with him from the company’s inception was Will’s brother, Ben, whose sprinkler designs and ideas about the installation of proper systems have been a major basis of the company’s success. Ben is the vice president who oversees all aspects of design and production in the company.

The factory itself is managed by Todd Senter who hires his line managers to supervise the factory employees. The factory makes all of the parts for the irrigation systems. The purchasing department is managed by Hector Hines.

The installation and training division is overseen by vice president Henry Writer, who supervises the managers of the six local installation operations. Each of these local managers hires his or her own local service people. These service employees are trained by the home office under Henry Writer’s direction because of the uniqueness of the company’s products.

There is a small Human Resources department under the direction of Sally Fenton, a vice president who handles the employee paperwork, though hiring is actually performed by the separate departments. Sam Totter is the vice president who heads the sales and marketing area; he oversees 10 well-trained salespeople.

The accounting and finance division of the company is headed by Abe Headman, who is the chief financial officer (CFO) and a company vice president; he is a member of the Institute of Management Accountants and holds a certificate in management accounting. He has a small staff of Certified Public Accountants, including a controller and a treasurer, and a staff of accounting input operators who maintain the financial records.

A partial list of Waterways’ accounts and their balances for the month of November 2012 follows.

<table>
<thead>
<tr>
<th>Account</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts Receivable</td>
<td>$275,000</td>
</tr>
<tr>
<td>Advertising Expenses</td>
<td>54,000</td>
</tr>
<tr>
<td>Cash</td>
<td>260,000</td>
</tr>
<tr>
<td>Depreciation—Factory Equipment</td>
<td>16,800</td>
</tr>
<tr>
<td>Depreciation—Office Equipment</td>
<td>2,400</td>
</tr>
<tr>
<td>Direct Labor</td>
<td>42,000</td>
</tr>
<tr>
<td>Factory Supplies Used</td>
<td>16,800</td>
</tr>
<tr>
<td>Factory Utilities</td>
<td>10,200</td>
</tr>
<tr>
<td>Finished Goods Inventory, November 30</td>
<td>68,800</td>
</tr>
<tr>
<td>Finished Goods Inventory, October 31</td>
<td>72,550</td>
</tr>
<tr>
<td>Indirect Labor</td>
<td>48,000</td>
</tr>
<tr>
<td>Office Supplies Expense</td>
<td>1,600</td>
</tr>
<tr>
<td>Other Administrative Expenses</td>
<td>72,000</td>
</tr>
<tr>
<td>Prepaid Expenses</td>
<td>41,250</td>
</tr>
<tr>
<td>Raw Materials Inventory, November 30</td>
<td>52,700</td>
</tr>
<tr>
<td>Raw Materials Inventory, October 31</td>
<td>38,000</td>
</tr>
<tr>
<td>Raw Materials Purchases</td>
<td>184,500</td>
</tr>
<tr>
<td>Rent—Factory Equipment</td>
<td>47,000</td>
</tr>
<tr>
<td>Repairs—Factory Equipment</td>
<td>4,500</td>
</tr>
<tr>
<td>Salaries</td>
<td>325,000</td>
</tr>
<tr>
<td>Sales</td>
<td>1,350,000</td>
</tr>
<tr>
<td>Sales Commissions</td>
<td>40,500</td>
</tr>
<tr>
<td>Work In Process Inventory October 31</td>
<td>52,700</td>
</tr>
<tr>
<td>Work In Process Inventory, November 30</td>
<td>42,000</td>
</tr>
</tbody>
</table>
2 Waterways Continuing Problem

Instructions
(a) Based on the information given, construct an organizational chart of Waterways Corporation.
(b) A list of accounts and their values are given above. From this information, prepare a cost of goods manufactured schedule, an income statement, and the current assets section of the balance sheet for Waterways Corporation for the month of November 2012.
Waterways Continuing Problem

**WCP16** Waterways has two major public-park projects to provide with comprehensive irrigation in one of its service locations this month. Job J57 and Job K52 involve 15 acres of landscaped terrain which will require special-order sprinkler heads to meet the specifications of the project. Using a job cost system to produce these parts, the following events occurred during December 2012.

Raw materials were requisitioned from the company’s inventory on December 2 for $5,061; on December 8 for $1,059; and on December 14 for $3,459. In each instance, two thirds (2/3) of these materials were for J57 and the rest for K52.

Six time tickets were turned in for these two projects for a total amount of 18 hours of work. All the workers were paid $16.50 per hour. The time tickets were dated December 3, December 9, and December 15. On each of those days, 6 labor hours were spent on these jobs, two-thirds (2/3) for J57 and the rest for K52.

The predetermined overhead rate is based on machine hours. The expected machine hour use for the year is 2,112 hours, and the anticipated overhead costs are $840,576 for the year. The machine were used by workers on projects K52 and J57 on December 3, 9, and 15. Six machine hours were used for project K52 (2 each day), and 8.5 machine hours were used for project J57 (2.5 the first day and 3 each of the other days). Both of these special orders were completed on December 15, producing 237 sprinkler heads for J57 and 142 sprinkler heads for K52.

Additional job order activities during this period of time included:

- **Dec. 1** Purchased raw materials from Durbin Supply Company on account for $53,200.
- **Dec. 2** Issued $40,000 of direct materials from the company’s inventory to jobs other than K52 and J57 and $3,000 of indirect materials.
- **Dec.12** Paid Waterways’ factory salaries and wages in the amount of $65,000.
- **Dec.13** Paid the factory’s water bill of $9,000.
- **Dec.18** Transferred $50,000 of costs from other completed jobs to finished goods.
- **Dec.21** Paid the factory’s electric bill of $12,000 for Waterways’ factory.
- **Dec.31** Made adjusting entries for the factory that included accrued property taxes of $12,000, prepaid insurance of $8,800, and accumulated depreciation of $16,000.

**Instructions**

(a) Set up the job cost sheets for Job No. J57 and Job No. K52. Determine the total cost for each manufacturing special order for these jobs. (Round unit cost to nearest cent.)

(b) Journalize the activities from these job cost sheets in the general journal. Also journalize the other costs that occurred during this period of time.

(c) Assuming that Manufacturing Overhead has a debit balance of $3,600, determine whether overhead has been under/over applied and make the adjusting entry.

(d) Why would Waterways choose machine hours as the cost driver for the overhead rather than direct labor cost? What would Waterways be likely to choose as the cost driver for the overhead for the job of installing the irrigation system and why?
Waterways Continuing Problem

Because most of the parts for its irrigation systems are standard, Waterways handles the majority of its manufacturing as a process cost system. There are multiple process departments. Three of these departments are the Molding, Cutting, and Welding departments. All items eventually end up in the Package department which prepares items for sale in kits or individually.

The following information is available for the Molding department for January.

Work in process beginning:
- Units in process: 22,000
- Stage of completion for materials: 80%
- Stage of completion for labor and overhead: 30%

Costs in work in process inventory:
- Materials: $168,360
- Labor: $67,564
- Overhead: $17,270
- Total costs in beginning work in process: $253,194

Units started into production in January: 60,000
Units completed and transferred in January: 58,000

Costs added to production:
- Materials: $264,940
- Labor: $289,468
- Overhead: $60,578
- Total costs added into production in January: $614,986

Work in process ending:
- Units in process: 24,000
- Stage of completion for materials: 50%
- Stage of completion for labor and overhead: 10%

Instructions
(a) Prepare a production cost report for Waterways using the weighted-average method.
*(b) Show the equivalent units for materials and conversion costs if Waterways used FIFO instead of weighted-average.
**Waterways Continuing Problem**

**WCP18** Direct labor or machine hours may not be the appropriate cost driver for overhead in all areas of manufacturing due to the complexities of many manufacturing processes. Many companies use activity-based costing (ABC) which uses multiple drivers (items that consume resources) rather than just one driver to apply overhead to their activities. With ABC, a company can use a cost driver that has a direct cause/effect relationship in its applied overhead costs.

Waterways looked into ABC as a method of costing because of the variety of items it produces and the many different activities in which it is involved. The activities listed below are a sample of possible cost pools for Waterways.

- Assembling
- Payroll
- Billing
- Plant supervision
- Digging trenches
- Product design
- Janitorial
- Purchasing materials
- Machine maintenance
- Selling
- Machine setups
- Testing
- Molding
- Welding
- Packaging

**Instructions**

(a) For each of these cost pools, what would be the likely activity cost driver?

(b) Using the following information, determine the overhead rates and the actual cost assigned for each of the activity cost pools in a possible ABC system for Waterways.

**WATERWAYS CORPORATION**

<table>
<thead>
<tr>
<th>Activity Cost Pools</th>
<th>Cost Drivers</th>
<th>Estimated Use of Cost Drivers per Activity</th>
<th>Actual Use of Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation installation</td>
<td>Labor cost</td>
<td>$1,998,432</td>
<td>12,960</td>
</tr>
<tr>
<td>Machining (all machine use)</td>
<td>Machine hours</td>
<td>1,670,400</td>
<td>33,408,000</td>
</tr>
<tr>
<td>Customer orders</td>
<td>Number of orders</td>
<td>30,636</td>
<td>2,553</td>
</tr>
<tr>
<td>Shipping</td>
<td>None (direct)</td>
<td>N/A</td>
<td>traced directly</td>
</tr>
<tr>
<td>Design</td>
<td>Cost per design</td>
<td>820</td>
<td>8</td>
</tr>
<tr>
<td>Selling</td>
<td>Number of sales calls</td>
<td>350,400</td>
<td>21,900</td>
</tr>
</tbody>
</table>

(c) How would you classify each of the following activities by level—unit level, batch level, product level, or facility level?

- Testing of products
- Machine maintenance
- Designing new products
- Advertising
- Packaging
- Equipment setups
- Molding
- Electricity required to run equipment
- Assembling
- Requisitioning materials
- Depreciation

(d) (1) The results of ABC can provide a more accurate picture of costs. Discuss the value of Waterways using this system to determine overhead costs.

(2) How might using ABC affect decision making at Waterways?
Waterways Continuing Problem

WCP19 Vice President for Sales and Marketing Sam Totter is trying to plan for the coming year in terms of production needs to meet the sales demand. He is also trying to determine ways in which the company’s profits might be increased in the coming year.

Instructions
(a) Waterways markets a simple water control and timer that it mass-produces. During 2013, the company sold 696,000 units at an average selling price of $4.20 per unit. The variable expenses were $1,900,080, and the fixed expenses were $683,256.
(1) What is the product’s contribution margin ratio? (Round to nearest whole percentage)
(2) What is the company’s break-even point in units and in dollars for this product?
(3) What is the margin of safety, both in dollars and as a ratio? (Round to nearest whole percentage)
(4) If management wanted to increase its income from this product by 10%, how many additional units would have to be sold to reach this income level?
(5) If sales increase by 51,000 units and the cost behaviors do not change, how much will income increase on this product?
(b) Waterways is thinking of mass-producing one of its special-order sprinklers. To do so would increase variable costs for all sprinklers by an average of $0.70 per unit. The company also estimates that this change could increase the overall number of sprinklers sold by 10%, and the average sales price would increase $0.20 per unit. Waterways currently sells 491,740 sprinkler units at an average selling price of $26.50. The manufacturing costs are $6,863,512 variable and $2,050,140 fixed. Selling and administrative costs are $2,651,657 variable and $794,950 fixed.
(1) If Waterways begins mass-producing its special-order sprinklers, how would this affect the company?
(2) If the average sales price per sprinkler unit did not increase when the company began mass-producing the special-order sprinkler, what would be the effect on the company?
Waterways Continuing Problem

WCP20

Part 1
Waterways has a sales mix of sprinklers, valves, and controllers as follows.

Annual expected sales:
- Sale of sprinklers 460,000 units at $26.50
- Sale of valves 1,480,000 units at $11.20
- Sale of controllers 60,000 units at $42.50

Variable manufacturing cost per unit:
- Sprinklers $13.96
- Valves $7.95
- Controllers $29.75

Fixed manufacturing overhead cost (total) $760,000

Variable selling and administrative expenses per unit:
- Sprinklers $1.30
- Valves $0.50
- Controllers $3.41

Fixed selling and administrative expenses (total) $1,600,000

Instructions
(a) Determine the sales mix based on unit sales for each product.
(b) Using the annual expected sales for these products, determine the weighted-average unit contribution margin for these three products. (Round to two decimal places.)
(c) Assuming the sales mix remains the same, what is the break-even point in units for these products?

Part 2
Waterways packages some of its products into sets for home installations. One set (small) sells for $77 with variable costs of production for the set at $50. Another set (large) sells for $152 with variable costs of $100. The parts for the $77 set take 9 machine hours to produce. The parts for the $150 set take 20 machine hours to produce.

Instructions
Given the information above, and assuming all of the package sets produced can be sold each month, illustrate the best use of machine hours.

Part 3
The section of Waterways that produces controllers for the company provided the following information.

Sales for month of February: 4,000
Variable manufacturing cost per unit: $9.75
Sales price per unit: $42.50
Fixed manufacturing overhead cost (per month for controllers): $81,000
Variable selling and administrative expenses per unit: $3.00
Fixed selling and administrative expenses (per month for controllers): $13,122

Instructions
(a) Using this information for the controllers, determine the contribution margin ratio, the degree of operating leverage, the break-even point in dollars, and the margin of safety ratio for Waterways Corporation on this product.
(b) What does this information suggest if Waterways’ cost structure is the same for the company as a whole?
Waterways Continuing Problem

WCP21

Part 1
Waterways mass-produces a special connector unit that it normally sells for $3.90. It sells approximately 35,000 of these units each year. The variable costs for each unit are $2.30. A company in Canada that has been unable to produce enough of a similar connector to meet customer demand would like to buy 15,000 of these units at $2.60 per unit. The production of these units is near full capacity at Waterways, so to accept the offer from the Canadian company would require temporarily adding another shift to its production line. To do this would increase variable manufacturing costs by $0.30 per unit. However, variable selling costs would be reduced by $0.20 a unit.

An irrigation company has asked for a special order of 2,000 of the connectors. To meet this special order, Waterways would not need an additional shift, and the irrigation company is willing to pay $3.10 per unit.

Instructions
Given the information above:
(a) What are the consequences of Waterways agreeing to provide the 15,000 units to the Canadian company? Would this be a wise “special order” to accept?
(b) Should Waterways accept the special order from the irrigation company?
(c) What would be the consequences of accepting both special orders?

Part 2
Waterways has discovered that a small fitting it now manufactures at a cost of $1.00 per unit could be bought elsewhere for $0.82 per unit. Waterways has fixed costs of $0.20 per unit that cannot be eliminated by buying this unit. Waterways needs 460,000 of these units each year.

If Waterways decides to buy rather than produce the small fitting, it can devote the machinery and labor to making a timing unit it now buys from another company. Waterways uses approximately 500 of these units each year. The cost of the unit is $12.66. To aid in the production of this unit, Waterways would need to purchase a new machine at a cost of $2,345, and the cost of producing the units would be $9.90 a unit.

Instructions
Given the information above:
(a) Without considering the possibility of making the timing unit, evaluate whether Waterways should buy or continue to make the small fitting.
(b) (1) What is Waterways’ opportunity cost if it chooses to buy the small fitting and start manufacturing the timing unit?
(2) Would it be wise for Waterways to buy the fitting and manufacture the timing unit? Explain.

Part 3
Waterways is considering the replacement of an antiquated machine that has been slowing down production because of breakdowns and added maintenance. The operations manager estimates that this machine still has 2 more years of possible use. The machine produces an average of 50 units per day at a cost of $6.50 per unit, whereas other similar machines are producing twice that much. The units sell for $8.50. Sales are equal to production on these units, and production runs for 260 days each year. The replacement machine would cost $55,000 and have a 2-year life.

Instructions
Given the information above, what are the consequences of Waterways replacing the machine that is slowing down production because of breakdowns?
Waterways Continuing Problem

**WCP22** Waterways uses time and material pricing when it bids on irrigation projects. Budgeted data for 2013 are as follows.

<table>
<thead>
<tr>
<th></th>
<th>Time Charges</th>
<th>Material Loading Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor wages</td>
<td>$240,000</td>
<td></td>
</tr>
<tr>
<td>Supervisor’s</td>
<td>$60,000</td>
<td></td>
</tr>
<tr>
<td>Clerical and</td>
<td>60,000</td>
<td>4,000</td>
</tr>
<tr>
<td>accountant wages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation</td>
<td>40,000</td>
<td></td>
</tr>
<tr>
<td>supplies manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead</td>
<td>53,950</td>
<td>21,000</td>
</tr>
<tr>
<td>Total</td>
<td>$353,950</td>
<td>$125,000</td>
</tr>
</tbody>
</table>

Waterways has budgeted for 5,750 labor hours. It desires a $14 profit margin per hour of labor and 16% profit on materials. It estimates the total invoice cost of materials in 2012 will be $640,000.

**Instructions**

(a) Compute the rate per hour of labor. (Round to two decimal places.)

(b) Compute the material loading charge. (Round to two decimal places.)

(c) Waterways has received a request for a bid to do a parkway for the city. The irrigation manager estimates that it will take about a month to complete the project and require 480 hours of labor and $80,000 of materials. Compute the total estimated bid for the parkway project.
Waterways Continuing Problem

WCP23 Waterways Corporation is preparing its budget for the coming year, 2014. The first step is to plan for the first quarter of that coming year. Waterways gathered the following information from the managers.

Sales

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit sales for November 2013</td>
<td>112,500</td>
</tr>
<tr>
<td>Unit sales for December 2013</td>
<td>102,100</td>
</tr>
<tr>
<td>Expected unit sales for January 2014</td>
<td>113,000</td>
</tr>
<tr>
<td>Expected unit sales for February 2014</td>
<td>112,500</td>
</tr>
<tr>
<td>Expected unit sales for March 2014</td>
<td>116,000</td>
</tr>
<tr>
<td>Expected unit sales for April 2014</td>
<td>125,000</td>
</tr>
<tr>
<td>Expected unit sales for May 2014</td>
<td>137,500</td>
</tr>
<tr>
<td>Unit selling price</td>
<td>$12</td>
</tr>
</tbody>
</table>

Waterways likes to keep 10% of the next month’s unit sales in ending inventory. All sales are on account. 85% of the Accounts Receivable are collected in the month of sale, and 15% of the Accounts Receivable are collected in the month after sale. Accounts receivable on December 31, 2013, totaled $183,780.

Direct Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount Used per Unit</th>
<th>Inventory, Dec. 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>1 lb @ 58¢ per lb.</td>
<td>5,177.5 lbs</td>
</tr>
<tr>
<td>Plastic</td>
<td>12 oz @ 6¢ per oz</td>
<td>3,883.125 lbs</td>
</tr>
<tr>
<td>Rubber</td>
<td>4 oz @ 5¢ per oz</td>
<td>1,294.375 lbs</td>
</tr>
</tbody>
</table>

2 lbs per unit 10,355.0 lbs

Metal, plastic, and rubber together are 75¢ per pound per unit.

Waterways likes to keep 5% of the materials needed for the next month in its ending inventory. Payment for materials is made within 15 days. 50% is paid in the month of purchase, and 50% is paid in the month after purchase. Accounts Payable on December 31, 2013, totaled $120,595. Raw Materials on December 31, 2013, totaled 11,295 pounds.

Direct Labor

Labor requires 12 minutes per unit for completion and is paid at a rate of $8 per hour.

Manufacturing Overhead

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per Labor Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect materials</td>
<td>30¢</td>
</tr>
<tr>
<td>Indirect labor</td>
<td>50¢</td>
</tr>
<tr>
<td>Utilities</td>
<td>45¢</td>
</tr>
<tr>
<td>Maintenance</td>
<td>25¢</td>
</tr>
<tr>
<td>Salaries</td>
<td>$42,000 per month</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$16,800 per month</td>
</tr>
<tr>
<td>Property taxes</td>
<td>$ 2,675 per month</td>
</tr>
<tr>
<td>Insurance</td>
<td>$ 1,200 per month</td>
</tr>
<tr>
<td>Janitorial</td>
<td>$ 1,300 per month</td>
</tr>
</tbody>
</table>

Selling and Administrative

Variable selling and administrative cost per unit is $1.60.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>$15,000</td>
</tr>
<tr>
<td>Insurance</td>
<td>$ 1,400</td>
</tr>
<tr>
<td>Salaries</td>
<td>$ 72,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$ 2,500</td>
</tr>
<tr>
<td>Other fixed costs</td>
<td>$ 3,000</td>
</tr>
</tbody>
</table>
Other Information
The Cash balance on December 31, 2013, totaled $100,500, but management has decided it would like to maintain a cash balance of at least $800,000 beginning on January 31, 2014. Dividends are paid each month at the rate of $2.50 per share for 5,000 shares outstanding. The company has an open line of credit with Romney’s Bank. The terms of the agreement requires borrowing to be in $1,000 increments at 8% interest. Waterways borrows on the first day of the month and repays on the last day of the month. A $500,000 equipment purchase is planned for February.

Instructions
For the first quarter of 2014, do the following.
(a) Prepare a sales budget.
(b) Prepare a production budget.
(c) Prepare a direct materials budget. (Round to nearest dollar)
(d) Prepare a direct labor budget. (For calculations, round to the nearest hour.)
(e) Prepare a manufacturing overhead budget. (Round amounts to the nearest dollar.)
(f) Prepare a selling and administrative budget.
(g) Prepare a schedule for expected cash collections from customers.
(h) Prepare a schedule for expected payments for materials purchases. (Round totals to nearest dollar)
(i) Prepare a cash budget.
Waterways Continuing Problem

Waterways Corporation is continuing its budget preparations. Waterways had the following static budget and overhead costs for March 2014.

<table>
<thead>
<tr>
<th>WATERWAYS CORPORATION</th>
<th>WATERWAYS CORPORATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Overhead Budget</td>
<td>Manufacturing Overhead Costs (Actual)</td>
</tr>
<tr>
<td>(Static) For the Month of March 2014</td>
<td>For the Month of March 2014</td>
</tr>
<tr>
<td>Budgeted production in units</td>
<td>117,500</td>
</tr>
<tr>
<td>Budgeted costs</td>
<td>Costs</td>
</tr>
<tr>
<td>Indirect materials</td>
<td>$ 5,875</td>
</tr>
<tr>
<td>Indirect labor</td>
<td>14,100</td>
</tr>
<tr>
<td>Utilities</td>
<td>11,750</td>
</tr>
<tr>
<td>Maintenance</td>
<td>8,225</td>
</tr>
<tr>
<td>Salaries</td>
<td>42,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>16,800</td>
</tr>
<tr>
<td>Property taxes</td>
<td>3,000</td>
</tr>
<tr>
<td>Insurance</td>
<td>1,200</td>
</tr>
<tr>
<td>Janitorial</td>
<td>1,500</td>
</tr>
<tr>
<td>Total budgeted costs</td>
<td>$104,450</td>
</tr>
</tbody>
</table>

Waterways produced 118,500 units in March rather than the budgeted number of units.

Instructions
(a) Prepare a flexible overhead budget based on the following amounts produced.
   (1) 115,500 units
   (2) 116,500 units
   (3) 117,500 units
   (4) 118,500 units
   (5) 119,500 units
(b) Prepare a flexible budget report showing the differences (favorable and unfavorable) in manufacturing overhead costs for the month of March.
(c) Prepare a responsibility report for the manufacturing overhead for March, assuming only variable costs are controllable.
Waterways Continuing Problem

WCP25 Waterways Corporation uses very stringent standard costs in evaluating its manufacturing efficiency. These standards are not “ideal” at this point, but the management is working toward that as a goal. At present, the company uses the following standards.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Item</th>
<th>Per unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>1 lb.</td>
<td></td>
<td>63¢ per lb.</td>
</tr>
<tr>
<td>Plastic</td>
<td>12 oz.</td>
<td></td>
<td>$1.00 per lb.</td>
</tr>
<tr>
<td>Rubber</td>
<td>4 oz.</td>
<td></td>
<td>88¢ per lb.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Direct Labor</th>
<th>Item</th>
<th>Per unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>15 min.</td>
<td></td>
<td>$8.00 per hr.</td>
</tr>
</tbody>
</table>

Predetermined overhead rate based on direct labor hours = $4.28

The January figures for purchasing, production, and labor are:

The company purchased 229,000 pounds of raw materials in January at a cost of 78¢ a pound.
Production used 229,000 pounds of raw materials to make 115,500 units in January.
Direct labor spent 18 minutes on each product at a cost of $7.80 per hour.
Overhead costs for January totaled $54,673 variable and $73,800 fixed.

Instructions
Answer the following questions about standard costs.

(a) What is the materials price variance?
(b) What is the materials quantity variance?
(c) What is the total materials variance?
(d) What is the labor price variance?
(e) What is the labor quantity variance?
(f) What is the total labor variance?
(g) What is the total overhead variance?
(h) Evaluate the variances for this company for January. What do these variances suggest to management?
Waterways Continuing Problem

WCP26 Waterways puts much emphasis on cash flow when it plans for capital investments. The company chose its discount rate of 8% based on the rate of return it must pay its owners and creditors. Using that rate, Waterways then uses different methods to determine the best decisions for making capital outlays.

In 2014 Waterways is considering buying five new backhoes to replace the backhoes it now has. The new backhoes are faster, cost less to run, provide for more accurate trench digging, have comfort features for the operators, and have 1-year maintenance agreements to go with them. The old backhoes are working just fine, but they do require considerable maintenance. The backhoe operators are very familiar with the old backhoes and would need to learn some new skills to use the new backhoes.

The following information is available to use in deciding whether to purchase the new backhoes.

<table>
<thead>
<tr>
<th></th>
<th>Old Backhoes</th>
<th>New Backhoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase cost when new</td>
<td>$90,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Salvage value now</td>
<td>$42,000</td>
<td></td>
</tr>
<tr>
<td>Investment in major overhaul needed in next year</td>
<td>$55,000</td>
<td>$90,000</td>
</tr>
<tr>
<td>Salvage value in 8 years</td>
<td>$15,000</td>
<td>$90,000</td>
</tr>
<tr>
<td>Remaining life</td>
<td>8 years</td>
<td>8 years</td>
</tr>
<tr>
<td>Net cash flow generated each year</td>
<td>$30,425</td>
<td>$43,900</td>
</tr>
</tbody>
</table>

Instructions

(a) Evaluate in the following ways whether to purchase the new equipment or overhaul the old equipment.
(Hint: For the old machine, the initial investment is the cost of the overhaul. For the new machine, subtract the salvage value of the old machine to determine the initial cost of the investment.)

(1) Using the net present value method for buying new or keeping the old.
(2) Using the payback method for each choice. (Hint: For the old machine, evaluate the payback of an overhaul.)
(3) Comparing the profitability index for each choice.
(4) Comparing the internal rate of return for each choice to the required 8% discount rate.

(b) Are there any intangible benefits or negatives that would influence this decision?

(c) What decision would you make and why?