

**Problem 13-19** (45 minutes)

1. Product RG-6 has a contribution margin of \$8 per unit ( $\$22 - \$14 = \$8$ ). If the plant closes, this contribution margin will be lost on the 16,000 units (8,000 units per month  $\times$  2 months) that could have been sold during the two-month period. However, the company will be able to avoid some fixed costs as a result of closing down. The analysis is:

|  |              |                    |
|--|--------------|--------------------|
| Contribution margin lost by closing the plant for two months (\$8 per unit $\times$ 16,000 units)..... |              | \$(128,000)        |
| Costs avoided by closing the plant for two months:   |              |                    |
| Fixed manufacturing overhead cost (\$45,000 per month $\times$ 2 months = \$90,000).....               | \$90,000     |                    |
| Fixed selling costs (\$30,000 per month $\times$ 10% $\times$ 2 months).....                           | <u>6,000</u> | <u>96,000</u>      |
| Net disadvantage of closing, before start-up costs.....  |              | (32,000)           |
| Add start-up costs.....  |              | <u>8,000</u>       |
| Disadvantage of closing the plant .....  |              | <u>\$ (40,000)</u> |

No, the company should not close the plant; it should continue to operate at the reduced level of 8,000 units produced and sold each month. Closing will result in a \$40,000 greater loss over the two-month period than if the company continues to operate. An additional factor is the potential loss of goodwill among the customers who need the 8,000 units of RG-6 each month. By closing down, the needs of these customers will not be met (no inventories are on hand), and their business may be permanently lost to another supplier.

**Problem 13-19** (continued)

Alternative Solution:

|   | <i>Plant<br/>Kept<br/>Open</i> | <i>Plant<br/>Closed</i> | <i>Difference:<br/>Net<br/>Operating<br/>Income<br/>Increase or<br/>(Decrease)</i> |
|---|--------------------------------|-------------------------|--|
| Sales (8,000 units × \$22 per unit × 2) .....             | \$ 352,000                     | \$ 0                    | \$(352,000)  |
| Variable expenses (8,000 units × \$14 per unit × 2) ..... | <u>224,000</u>                 | <u>0</u>                | <u>224,000</u>   |
| Contribution margin .....                                 | <u>128,000</u>                 | <u>0</u>                | <u>(128,000)</u>   |
| Less fixed costs:   |                                |                         |  |
| Fixed manufacturing overhead costs (\$150,000 × 2) .....  | 300,000                        | 210,000                 | 90,000   |
| Fixed selling costs (\$30,000 × 2) .....                  | <u>60,000</u>                  | <u>54,000</u> *         | <u>6,000</u>   |
| Total fixed costs .....                                   | <u>360,000</u>                 | <u>264,000</u>          | <u>96,000</u>  |
| Net operating loss before start-up costs .....            | (232,000)                      | (264,000)               | (32,000)   |
| Start-up costs .....                                      | <u>0</u>                       | <u>(8,000)</u>          | <u>(8,000)</u>   |
| Net operating loss .....                                  | <u>\$(232,000)</u>             | <u>\$(272,000)</u>      | <u>\$ (40,000)</u>   |

\*  $\$30,000 \times 90\% = \$27,000 \times 2 = \$54,000$

**Problem 13-19** (continued)

2. Birch Company will not be affected at a level of 11,000 total units sold over the two-month period. The computations are:

|   |                 |
|---|-----------------|
| Cost avoided by closing the plant for two months<br>(see above) ..... | \$96,000        |
| Less start-up costs .....   | <u>8,000</u>    |
| Net avoidable costs .....   | <u>\$88,000</u> |

$$\frac{\text{Net avoidable costs}}{\text{Per unit contribution margin}} = \frac{\$88,000}{\$8 \text{ per unit}} = 11,000 \text{ units}$$

Verification:

|  | <i>Operate at<br/>11,000<br/>Units for<br/>Two<br/>Months</i> |    | <i>Close for<br/>Two<br/>Months</i> |
|--|---|----|-------------------------------------|
| Sales (11,000 units × \$22 per unit) .....                     | \$ 242,000  | \$ | 0                                   |
| Variable expenses (11,000 units × \$14<br>per unit) .....      | <u>154,000</u>  |    | <u>0</u>                            |
| Contribution margin .....                                      | <u>88,000</u>   |    | <u>0</u>                            |
| Fixed expenses:  |   |    |                                     |
| Manufacturing overhead (\$150,000 and<br>\$105,000, × 2) ..... | 300,000   |    | 210,000                             |
| Selling (\$30,000 and \$27,000, × 2) .....                     | <u>60,000</u>   |    | <u>54,000</u>                       |
| Total fixed expenses .....                                     | <u>360,000</u>  |    | <u>264,000</u>                      |
| Start-up costs .....   | <u>0</u>  |    | <u>8,000</u>                        |
| Total costs .....  | <u>360,000</u>  |    | <u>272,000</u>                      |
| Net operating loss .....                                       | <u>\$(272,000)</u>  |    | <u>\$(272,000)</u>                  |