# OIL SUPPLY COMPANY

|      | OIL SUPPLY COMPANY |                    |               |                   |       |     |                              |        | Solution from VAM: |                     |            |  |  |
|------|--------------------|--------------------|---------------|-------------------|-------|-----|------------------------------|--------|--------------------|---------------------|------------|--|--|
| VAM: |                    | K1=                | K2=           | K3=               | K4=   | K5= | 1                            |        | S1> D2             | 140 @\$8            | 1120       |  |  |
|      | Source             | D1                 | D2            | Destination<br>D3 | D4    | D5  | SUPPLY                       | O/L    | S1> D3<br>S2> D1   | 20 @\$6<br>100 @\$9 | 120<br>900 |  |  |
| R1=  | S1                 | 13                 | 8             | 6                 | 9     |     |                              | 8-6=2  | S3> D1             | 80 @\$15            | 1200       |  |  |
|      |                    |                    | 140           | 20                |       |     | <del>160</del> <del>20</del> |        | S3> D3             | 60 @\$7             | 420        |  |  |
| R2=  | S2                 | 9                  | 10            | 12                | 17    |     | <u> </u>                     | 10-9=1 | S3> D4             | 100 @\$8            | 800        |  |  |
|      |                    | 100                |               |                   |       |     | 100                          | 0      | _                  | _                   | 4560       |  |  |
| R3=  | S3                 | 15                 | 11            | 7                 | 8     |     |                              | 8-7=1  |                    |                     |            |  |  |
|      |                    | 80                 |               | 60                | 100   |     | 240                          |        | _                  |                     |            |  |  |
| R4=  | S4                 |                    |               |                   |       |     |                              |        |                    |                     |            |  |  |
|      | DEMAND             |                    |               |                   |       |     |                              |        |                    |                     |            |  |  |
|      |                    | <del>_180</del> 80 | _140          | <del>80</del> 60  | 100   |     |                              |        |                    |                     |            |  |  |
| O/L  |                    | <u>13-9=4</u>      | 10-8=2        | 7-6=1             | 9-8=1 |     |                              |        |                    |                     |            |  |  |
|      |                    | 15-13=2            | <u>11-8=3</u> |                   |       |     |                              |        |                    |                     |            |  |  |

| <b>MODI:</b> 1st I | teration |
|--------------------|----------|
|--------------------|----------|

|     | _      | K1= | 14 | K2= | 8   | K3=                                   | 6           | K4= | 7  | K5= |    |        |
|-----|--------|-----|----|-----|-----|---------------------------------------|-------------|-----|----|-----|----|--------|
|     | Source | _   | )1 | ٦   | )2  |                                       | nation<br>3 | D   | 14 | Г   | )5 | SUPPLY |
| R1= | S1     | 13  | +  | 8   | , _ | 6                                     |             | 9   | 7  |     | ,5 | OOLILI |
| C   |        | +20 | -1 | 140 |     | · · · · · · · · · · · · · · · · · · · | 0           | Ŭ   | 2  |     |    | 160    |
| R2= | S2     | 9   |    | 10  |     | 12                                    |             | 17  |    |     |    |        |
| -5  |        | 100 |    |     | 7   |                                       | 11          |     | 15 |     |    | 100    |
| R3= | S3     | 15  | -  | 11  |     | 7                                     | +           | 8   |    |     |    |        |
| 1   |        | .80 | 60 |     | 2   | 60                                    | +20         | 100 |    |     |    | 240    |
| R4= | S4     |     |    |     |     |                                       |             |     |    |     |    |        |
|     |        |     |    |     |     |                                       |             |     |    |     |    |        |
|     | DEMAND |     |    |     |     |                                       |             |     |    |     |    |        |
|     |        | 180 |    | 140 |     | 80                                    |             | 100 |    |     |    |        |

# MODI: 2nd Iteration

|     |        | K1= | 13 | K2= | 8  | K3=   | 5      | K4= | 6  | K5= |   |        |        |
|-----|--------|-----|----|-----|----|-------|--------|-----|----|-----|---|--------|--------|
|     |        |     |    |     |    | Desti | nation |     |    |     |   |        | STOP - |
|     | Source |     | )1 |     | )2 |       | )3     |     | )4 |     | 5 | SUPPLY |        |
| R1= | S1     | 13  |    | 8   |    | 6     |        | 9   |    |     |   |        |        |
| 0   |        | 20  |    | 140 |    | Ĭ     | 1      |     | 3  |     |   | 160    |        |
| R2= | S2     | 9   |    | 10  |    | 12    |        | 17  |    |     |   |        |        |
| -4  |        | 100 |    |     | 6  | Ĭ     | 11     |     | 15 |     |   | 100    |        |
| R3= | S3     | 15  |    | 11  |    | 7     |        | 8   |    |     |   |        |        |
| 2   |        | 60  |    |     | 1  | 80    |        | 100 |    |     |   | 240    |        |
| R4= | S4     |     |    |     |    |       |        |     |    |     |   |        |        |
|     |        |     |    |     |    |       |        | l   |    |     |   |        |        |
|     | DEMAND |     |    |     |    |       |        |     |    |     |   |        | 1      |
|     |        | 180 |    | 140 |    | 80    |        | 100 |    |     |   |        |        |

180

## - no more negative values --> optimal solution

| Solution from MODI: |          |      |  |  |  |  |  |  |  |
|---------------------|----------|------|--|--|--|--|--|--|--|
| S1> D1              | 20 @\$13 | 260  |  |  |  |  |  |  |  |
| S1> D2              | 140 @\$8 | 1120 |  |  |  |  |  |  |  |
| S2> D1              | 100 @\$9 | 900  |  |  |  |  |  |  |  |
| S3> D1              | 60 @\$15 | 900  |  |  |  |  |  |  |  |
| S3> D3              | 80 @\$7  | 560  |  |  |  |  |  |  |  |
| S3> D4              | 100 @\$8 | 800  |  |  |  |  |  |  |  |
|                     | •        | 4540 |  |  |  |  |  |  |  |
|                     |          |      |  |  |  |  |  |  |  |

# 13 140

# 100 (c) Network Model

### (d) Formulation:

**MIN**:  $13D_1X_1 + 8D_1X_2 + 6D_1X_3 + 9D_1X_4 + 9D_2X_1 + 10D_2X_2 + 12D_2X_3 + 17D_2X_4$  $+ 15D_3X_1 + 11D_3X_2 + 7D_3X_3 + 8D_3X_4$ 

**s.t.:** 
$$D_1X_1 + D_1X_2 + D_1X_3 + D_1X_4 = 160$$
  
 $D_2X_1 + D_2X_2 + D_2X_3 + D_2X_4 = 100$   
 $D_3X_1 + D_3X_2 + D_3X_3 + D_3X_4 = 240$   
 $D_1X_1 + D_2X_1 + D_3X_1 = 180$   
 $D_1X_2 + D_2X_2 + D_3X_2 = 140$   
 $D_1X_3 + D_2X_3 + D_3X_3 = 80$   
 $D_1X_4 + D_2X_4 + D_3X_4 = 100$   
 $D_1X_3 \Rightarrow 0$