

## 2016 Worksheet for Calculating Closure and Post-closure Cost Estimates

All site data necessary to calculate estimates of closure and post-closure costs can be gathered by completing table H.1. Data from Table H.1 should be inserted into Tables H.2 and I.1 to complete calculations.

**Table H.1 Site Data**

**Facility Name:**

**Permit Number:**

| Description                                    | Quantity | Units       |
|--|----------|-------------|
| Total Permitted Area                           |          | acres       |
| Active Portion                                 |          |             |
| Composite Lined                                |          | acres       |
| Soil Lined                                     |          | acres       |
| Area of Largest Cell/Phase Requiring Final Cap |          |             |
| Composite Lined                                |          | acres       |
| Soil Lined                                     |          | acres       |
| Perimeter Fencing                              |          | linear feet |
| Groundwater Monitoring Wells                   |          | VLF         |
| Methane Gas Probes                             |          | VLF         |
| Terraces                                       |          | linear feet |
| Letdown channels                               |          | linear feet |
| Perimeter drainage ditches                     |          | linear feet |
| Average Daily Flow                             |          | tons/day    |
| Landfill Disposal Cost                         |          | \$/ton      |

VLF = Vertical linear feet. The sum of the depths of all monitoring wells.

**Table H.2 Closure Cost Estimate**

**Facility Name:**

**Permit Number:**

| Task/Service              | Quantity     | Units    | Multiplier <sup>a</sup> | Unit Cost <sup>b</sup> | Subtotal   |
|---------------------------|--------------|----------|-------------------------|------------------------|------------|
| 1 Preliminary Site Work   |              |          |                         |                        |            |
| a Conduct Site Evaluation | 1            | Lump sum | 1                       | \$3,516.19             | \$3,516.19 |
| b Dispose Final Wastes    |              |          |                         |                        |            |
| Average Daily Flow        | <sup>c</sup> | tons/day |                         |                        |            |
| Disposal Cost             | <sup>d</sup> | tons/day | 5                       | <sup>e</sup>           |            |

|   |  |   |             |      |             |            |
|---|--|---|-------------|------|-------------|------------|
| c | Remove Temporary Building(s)                                   | 1 | lump sum    | 1    | \$3,224.36  | \$3,224.36 |
| d | Remove Equipment   | 1 | lump sum    | 1    | \$2,632.02  | \$2,632.02 |
| e | Repair/Replace Perimeter Fencing                               |   | linear feet | 0.25 | \$3.45      |            |
| f | Clean Leachate Line(s)   | 1 | lump sum    | 1    | \$1,592.58  | \$1,592.58 |
| 2 | <b>Monitoring Equipment</b>                                    |   |             |      |             |            |
| a | Rework/Replace Monitoring Well(s)                              |   | VLF         | 0.25 | \$73.94     |            |
| b | Plug Abandoned Monitoring Well(s)                              |   | VLF         | 0.25 | \$29.60     |            |
| c | Rework/Replace Methane Probe(s)                                |   | VLF         | 0.25 | \$63.86     |            |
| d | Plug Abandoned Methane Probe(s)                                |   | VLF         | 0.25 | \$23.33     |            |
| e | Rework/Replace Remediation and/or Gas Control Equipment        | 1 | lump sum    | 0.05 |             |            |
| 3 | <b>Construction</b>  |   |             |      |             |            |
| a | Complete Site Grading to include on- and off-site borrow areas |   | acres       | 1    | \$1,394.08  |            |
| b | Construct Final Cap  |   |             |      |             |            |
|   | Compacted On-site Clay Cap or                                  |   | cubic yards | 1    | \$5.01      |            |
|   | Compacted Off-site Clay Cap or                                 |   | cubic yards | 1    | \$8.14      |            |
|   | Install Geosynthetic Clay Liner Cap                            |   | square feet | 1    | \$0.52      |            |
| c | Construct Landfill Gas Venting Layer                           |   |             |      |             |            |
|   | Place Sand or  |   | acres       | 1    | \$37,276.19 |            |
|   | Install Net and Geotextile                                     |   | square feet | 1    | \$0.37      |            |
| d | Install Passive Landfill Gas Vents                             |   | acres       | 1    | \$892.99    |            |
| e | Install Flexible Membrane Liner                                |   | square feet | 1    | \$0.40      |            |
| f | Drainage Layer   |   |             |      |             |            |
|   | Place Sand or  |   | acres       | 1    | \$37,276.19 |            |
|   | Install Net and Geonet   |   | square feet | 1    | \$0.37      |            |

|    |   |   |             |      |          |   |
|----|---|---|-------------|------|----------|---|
| g  | Place On-site Topsoil   |   | cubic yards | 1    | \$2.15   |   |
|    | Place Off-site Topsoil  |   | cubic yards | 1    | \$17.22  |   |
| h  | Establish vegetative cover, including on- and off-site borrow areas |   | acres       | 1    | \$529.05 |   |
| 4  | <b>Drainage/erosion control</b>                                     |   |             |      |          |   |
| a  | Construct Terraces  |   | linear feet | 1    | \$9.02   |   |
| b  | Construct Letdown Channels  |   | linear feet | 1    | \$8.46   |   |
| c  | Clean Perimeter Drainage Ditches                                    |   | linear feet | 0.50 | \$6.87   |   |
| 5  | <b>Tasks Not Identified</b>   |   |             |      |          |   |
| 6  | <b>Subtotal</b>   |   |             |      |          |   |
| 7  | <b>Administrative Services</b>                                      | 1 | lump sum    | 0.10 | g        |   |
| 8  | <b>Technical and Professional Services</b>                          | 1 | lump sum    | 0.12 | g        |   |
| 9  | <b>Closure Contingency</b>  | 1 | lump sum    | 0.10 | g        |   |
| 10 | <b>Total Final Closure</b>  |   |             |      |          | h |

a Multipliers are determined from the *Solid Waste Financial Assurance Program Report*, December 22, 2000.

b Unit costs include a 0.99% inflationary adjustment for 2016.

c New facilities: Insert the value for "W" in OAC 252:515-27-8(a)(2). Existing facilities: Insert reported annual tonnage for the previous year, divided by 312 operating days per year (52 weeks per year x 6 operating days per week).

d Insert number of tons/day from above.

e Insert landfill disposal cost per ton of waste (\$/ton).

f Input capital cost for gas control/remediation equipment, if installed at the site.

g Input subtotal from line 6.

h Add rows 6 through 9.

**Table I.1 Post-closure Cost Estimate**

**Facility Name:**

**Permit Number:**

|   | <b>Task/Service</b>                      | <b>Quantity</b> | <b>Units</b> | <b>Multiplier<sup>a</sup></b> | <b>Unit Cost<sup>b</sup></b> | <b>Subtotal</b> |
|---|--|-----------------|--------------|-------------------------------|------------------------------|-----------------|
| 1 | <b>Site maintenance</b>                  |                 |              |                               |                              |                 |
| a | Site Inspections                         | 4               | per year     | 30                            | \$639.63                     | \$76,755.60     |
|   |  |                 |              | 8                             |                              | \$20,468.16     |
| b | General Maintenance                      | 1               | per year     | 30                            | \$1,917.66                   | \$57,529.80     |
|   |  |                 |              | 8                             |                              | \$15,341.28     |
| c | Remediation and/or Gas Control Equipment | 1               | lump sum     | 0.3 <sup>c</sup>              | <sup>d</sup>                 |                 |
| 2 | <b>Monitoring equipment</b>              |                 |              |                               |                              |                 |
| a | Rework/Replace Monitoring Well(s)        |                 | VLF          | 0.25                          | \$74.43                      |                 |
| b | Plug Abandoned Monitoring Well(s)        |                 | VLF          | 0.25                          | \$29.60                      |                 |
| c | Final Plugging of Monitoring Wells       |                 | VLF          | 1                             | \$29.60                      |                 |
| d | Rework/Replace Methane Probe(s)          |                 | VLF          | 0.25                          | \$63.86                      |                 |
| e | Plug Abandoned Methane Probe(s)          |                 | VLF          | 0.25                          | \$23.33                      |                 |
| f | Final Plugging of Methane Probes         |                 | VLF          | 1                             | \$23.33                      |                 |
| g | Final Plugging of Piezometer(s)          |                 | VLF          | 1                             | \$23.33                      |                 |
| 3 | <b>Sampling and analysis</b>             |                 |              |                               |                              |                 |
| a | Groundwater Monitoring Wells             |                 | wells        | 60                            | \$689.71 <sup>e</sup>        |                 |
|   |  |                 |              | 16                            | \$170.24                     |                 |
| b | Methane Gas Probes                       |                 | probes       | 60                            | \$44.75                      |                 |
| c | Surface Water Monitoring Points          |                 | points       | 60                            | \$83.12                      |                 |
| d | Leachate                                 |                 | sample       | 60                            | \$133.94                     |                 |
| 4 | <b>Final cover maintenance</b>           |                 |              |                               |                              |                 |
| a | Mow and Fertilize Vegetative Cover       |                 | acres        | 30                            | \$211.60                     |                 |

|    |   |   |          |             |            |             |
|----|---|---|----------|-------------|------------|-------------|
|    |   |   |          | 8           |            |             |
| b  | Repair Erosion, Settlement, and Subsidence for On-site Soils  |   | acres    | 30          | \$3.07     |             |
|    | Repair Erosion, Settlement, and Subsidence for Off-site Soils |   | acres    | 30          | \$18.35    |             |
| c  | Reseed Vegetative Cover                                       |   | acres    | 0.20        | \$529.04   |             |
| 5  | <b>Leachate management</b>                                    |   |          |             |            |             |
| a  | Clean Leachate Line(s)  | 1 | per year | 30 (30 yrs) | \$1,640.20 | \$49,206.00 |
| b  | Maintain Leachate Collection System and Equipment             | 1 | per year | 30 (30 yrs) | \$2,548.11 | \$76,443.30 |
| c  | Collect, Treat, Transport, and Dispose of Leachate            |   | gal/yr   | 30          | \$0.33     |             |
| 6  | <b>Tasks not identified</b>                                   |   |          |             |            |             |
| 7  | <b>Subtotal</b>   |   |          |             |            |             |
| 7  | <b>Administrative Services</b>                                | 1 | lump sum | 0.06        | f          |             |
| 8  | <b>Technical and Professional Services</b>                    | 1 | lump sum | 0.07        | f          |             |
| 9  | <b>Post-closure Contingency</b>                               | 1 | lump sum | 0.10        | f          |             |
| 10 | <b>Total Post-closure</b>                                     |   |          |             |            | g           |

<sup>a</sup> Multipliers are determined from the *Solid Waste Financial Assurance Program Report*, December 22, 2000.

<sup>b</sup> Unit costs include a 0.99% inflationary adjustment for 2016.

<sup>c</sup> 5% of equipment capital cost, maintenance performed once per 5 yrs for 30 years.

<sup>d</sup> Input capital cost for gas control/remediation equipment, if installed at the site.

<sup>e</sup> If the approved groundwater monitoring plan requires monitoring for alternative constituents, unit costs shall be calculated in accordance with OAC 252:515-27-52(b) or (c).

<sup>f</sup> Input subtotal from line 7.

<sup>g</sup> Add lines 7 through 10.