

**BONDING WORKSHEETS
FOR
MUNICIPAL / RESIDUAL WASTE PROCESSING
AND
DISPOSAL FACILITIES**

Revised August 30, 2001



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

BONDING WORKSHEETS FOR MUNICIPAL/RESIDUAL WASTE PROCESSING AND DISPOSAL FACILITIES

Instructions

Prior to commencement of operations, the operator of a municipal or residual waste processing or disposal facility shall file with the Department a bond. As part of each application for a municipal or residual waste processing or disposal facility, it is required that you provide bond calculations to account for the costs that would be incurred if the Department had to close and maintain the facility until final closure status is reached. You would not have to submit an actual bond until the Department requests your bond. That gives the Department opportunity to review and comment on your cost estimates.

As a governmental agency, the Department would be required to use prevailing wage rates when taking steps to complete closure, post-closure, and final closure activities. Therefore, prevailing wage rates are to be used for the bond calculations.

The attached worksheets have been developed to account for all costs that may be associated with the closure, post-closure and monitoring of your facility. Any unique features not covered by the worksheets that would require closure or monitoring should also be included. You may add as many sheets as necessary to accurately estimate costs. Your cost estimates should reflect any increased costs (as necessary) to utilize contractors to perform functions that you may be able to do cheaper with your own personnel and equipment.

Select a likely "worst case" scenario where you would have a maximum amount of the facility open and in need of closure. Provide a description of the scenario with references to site development stages. It is also a requirement that these calculations be updated annually as part of the Annual Operations Report.

The bond calculation worksheets are generic in nature, but we expect you to include any unique features of your facility that would have to be closed if you were no longer able to close the facility. Only one bond may be carried for each permitted facility and the minimum bond is \$10,000.00. Refer to 25 Pa Code § 271, Subchapter D. It should be noted that the surety company issuing the bond must, at a minimum, be among those listed as acceptable sureties in Circular 570 of the U. S. Department of Treasury.

Bonding worksheets are provided for the following types of facilities/activities:

1. Landfills
2. Impoundments for disposal
3. Resource recovery facilities
4. Transfer facilities
5. Agricultural utilization of municipal waste other than sewage sludge or residual waste
6. Composting
7. Other processing facilities

Applicable worksheets must be completed for each component of the facility. Documentation of your assumptions and or work product may either be provided below each item on the worksheet or attached as an addendum. Multiple sheets should be used as necessary.

Most of the costs may be obtained from contractors, liner manufacturers, cleanup contractors, labs and consulting engineers. Reference guides are to be used for earthwork costs as well as any other construction costs that can be referenced in published construction cost literature. Permit applicants must document all costs (reference source of cost estimations). Copies of reference pages should be included with the submission.

Monitoring

When calculating monitoring costs, the following minimum time periods should be used in the estimates:

1. Landfills (includes leachate management, storage or pretreatment, impoundments, gas monitoring, groundwater monitoring, etc.) – **30 years**
2. Disposal impoundments. – **30 years**
3. Processing facilities (includes composting, incineration, transfer, and other processing facilities) – **10 years**

Inflation

The bond for your facility will be a financial instrument that the Department can access if you are no longer able to properly close and monitor the facility as some future time. Because of the time value of money, your final estimate will need to be adjusted for inflation. As we do not know when or if forfeiture of the bond will occur, the Department has adopted a three year adjustment for inflation.

First, determine the inflation rate for prior years. One way that this can be done is by averaging the annual Implicit Price Deflator for Gross National Product published by the U.S. Commerce Department for at least the three prior years. This estimated inflation for the next three years should be added to the total bond amount (the bond amount includes closure and post closure costs). A different source of inflation rates may be used with the Department's prior written approval.

The following is an example of an inflation adjustment calculation:

CALCULATIONS FOR INFLATION

Example:

Source: Survey of Current Business; U.S. Department of
Commerce/Bureau of Economics
EPA Hotline: 800-424-9346
Fixed - Weighted Price Indexes for Gross
National Products, 1996 Weights

	<u>Annual</u>
Base 1996	100
1997	106.47
1998	112.39
1999	118.63
2000	126.36

$$\text{Example : } \frac{126.36 - 118.63}{118.63} + \frac{118.63 - 112.39}{112.39} + \frac{112.39 - 106.47}{106.47} = 0.18$$

Estimate inflation for past 3 years (1997 to 2000):

Rounding off to the nearest whole number, the bond should be calculated for 18%.

Price Indexes can also be obtained by calling the EPA Hotline.

Contingency

Contingencies need to be addressed in the cost estimate to adjust for unforeseen circumstances such as storms, floods, price changes, strikes, and unproductive labor. As such, a contingency fee (see Table 1) must be added to the total bond amount. Table 1 lists contingency fee percentages that you need to use to adjust your bond estimates. The Department reserves the right to require additional contingency fees based on the complexity of the facility.

TABLE 1: CONTINGENCY FEE RATE

Bond	Contingency Fee
Cost < \$5 million	12.5%
\$5 million < Cost < \$10 million	10.0%
\$10 million < Cost < \$20 million	7.5%
Cost > \$20 million	5.0%

Administrative Costs

Also, an additional cost of either 5% or 10 % must be added to the total bond amount for administrative costs and cost overruns.

Project Management Costs

A cost of 5% must be added to the total bond amount to account for the use of a project manager to complete any facility closure.

Conversion Factors and Densities

This section contains conversion factors (Table 2) and densities (Table 3). You may use these to change the units of an item given in a facility's application to the units required on the unit cost worksheets, or to change units between worksheets. The densities listed will help you to determine the appropriate density of a substance and should be consulted if you do not have site specific information for a specific substance. The following is an example using both a conversion factor and density.

Example: To convert 1 ton of soil to ft³ of soil,

$$1 \text{ ton of soil} \times 2000 \frac{\text{lbs}}{\text{ton}} \div \text{density of soil in lb/ft}^3$$

TABLE 2. CONVERSION FACTORS

Quantity	Equivalent Values		
Volume	1 m ³	=	1000 liters = 35.315 ft ³ = 264.17 gallons
	1 ft ³	=	7.481 gallons = 0.02832 m ³ = 28.317 liters
	1 gallon	=	3.785 m ³ = 0.1337 ft ³ = 3.785 liters
	1 CY	=	27 ft ³
Length	1 m	=	100 cm = 39.37 in = 3.28 ft = 1.094 yards
		=	6.219 x 10 ⁻⁴ miles
	1 ft	=	12 in = 0.333 yards = 0.3048 m = 30.48 cm
Area	1 ft ²	=	0.111 yd ² = 2.296 x 10 ⁻⁵ acres = 0.0929 m ²
	1 yd ²	=	9 ft ² = 2.066 x 10 ⁻⁴ acres = 0.836 m ²
	1 acre	=	4840 yd ² = 43,560 ft ² = 4046.8 m ²
	1 m ²	=	10.764 ft ² = 1.196 yd ² = 2.471 x 10 ⁻⁴ acre
Mass	1 kg	=	1000g = 0.001 metric ton = 2.20 lb = 35.2 oz
		=	1.10 x 10 ⁻³ tons
	1 lb	=	16 oz = 5 x 10 ⁻⁴ ton = 453.59 g = 0.45359 kg
	1 ton	=	2000 lb = 907.18 kg
	1 metric ton	=	1000 kg = 1.10 tons

TABLE 3. ESTIMATED DENSITIES OF VARIOUS MATERIALS

Material	Density
Ashes	35 - 45 lb/ft ³ or 4.7 - 6.0 lb/gal
Demolition Rubble	90 - 120 lb/ft ³
Liquids	46 – 110 lb/ft ³ or 6.2 – 15 lb/gal
Residue	60 – 80 lb/ft ³ or 8.0 – 11 lb/gal
Sludge	70 - 90 lb/ft ³ or 11 - 12 lb/gal
Soil	75 - 120 lb/ft ³
Solids	60 - 160 lb/ft ³
Water	62.4 lb/ft ³ or 8.35 lb/gal
Municipal Waste	2,000 lb./3 cu. yards

Acronyms

AOR	Annual Operation Report
BWM	Bureau of Waste Management, DEP
C/D Waste	Construction/Demolition Waste
CY	Cubic Yard
DEP	Department of Environmental Protection, Pa
DMR	Discharge Monitoring Report
E&S	Erosion and Sedimentation
FML	Flexible Membrane Liner
GMP	Gas Monitoring Probe
HDPE	High Density Polyethylene
L & I	Department of Labor and Industry, Pa
LFG	Landfill Gas
MW	Groundwater Monitoring Well
MSW	Municipal Solid Waste
NSPS	New Source Performance Standards
O/M	Operation & Maintenance
QA/QC	Quality Assistance/Quality Control
RW	Residual Waste
SF	Square Foot
SWMA	Solid Waste Management Act

References

EPA, Handbook for Remedial Action at Waste Disposal Sites, Technology Transfer,
EPA 625/6 - 82 - 006, June 1982.

EPA, Handbook for Evaluating Remedial Action Technology Plans,
EPA - 600/2 - 83 - 076, August 1983.

EPA, Average and Maximum Engineering Cost Estimates for Closure, Pope - Reid
Associates, Inc., St. Paul, Minn., October 1983.

EPA, Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal
Facilities Under RCRA, Subtitle C, Section 3004, Draft Guidance, Financial Requirements: Interim Status
Standards (40 CFR 265, Subpart H), SW - 913 1981, addendum.

Bonding information is also available on the Department's web site at:

<http://www.dep.state.pa.us/dep/deputate/airwaste/wm/MRW/Forms/Lrwm0089.pdf>