

# RECLAMATION COST ESTIMATE CALCULATIONS

The preparation of reclamation cost estimates is a step-by-step process for calculating the amount of financial assurances necessary to perform site reclamation. The calculation will differ between locations based on the tasks necessary to implement the approved reclamation plan.

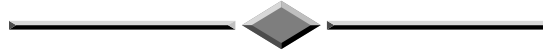
In response to inquiries from lead agencies and mine operators for guidance, the following Example of a Financial Assurance Cost Estimate calculation work sheet is offered. This information is provided as a guideline only. The work sheets are not to be interpreted by lead agencies or mine operators as a mandatory format for estimating reclamation costs.

Although an individual mining operation may encounter conditions not listed on the work sheets, through the application of basic estimating principles, most tasks can be broken down into component parts, and simplified. The following methodology (or one similar) may be considered in the development of reclamation cost estimates. The idea is to simplify the tasks and provide justification for the listed costs; merely listing the costs is not adequate.

- ✓ Describe the task to be performed. Examples would include: spoil grading, highwall reduction, revegetation, etc. Following the identification of broad reclamation categories, the component parts of these tasks should be identified. For example, revegetation may include seed bed preparation, seeding and fertilizing, irrigation and weed control. Each of these subtasks should be estimated individually to simplify the overall process. Where grading of a pit area is part of the reclamation plan, it is recommended that cross-sections and maps of pit areas be used to justify grading quantities.
- ✓ Identify the equipment necessary to complete the proposed task.
- ✓ Identify the labor requirements.
- ✓ Identify the materials to be used.
- ✓ Define each of the unit costs.
- ✓ Calculate Production Rates.
- ✓ Multiply the Unit Cost (e.g. \$/hr) by Production Rate (e.g. cubic yards/hr) to determine the total cost for each cost item (e.g. Scrapers). Add the costs for all cost items to find the total cost per category (e.g. Equipment).
- ✓ Add Total Cost of all categories (i.e. Equipment, Labor, Materials, etc.) to determine the Total Direct Cost of reclamation.
- ✓ Add charges for Supervision, Profit, Overhead, Contingencies and Mobilization.

A number of cost estimating manuals are available to assist you with the preparation of your financial assurance cost estimates. These manuals are available in government and technical

book stores. It is often helpful to rely on a variety of sources, as not all categories are clearly defined and in some cases they are not listed at all. Personal experience can be a good indicator of the actual cost of performing certain tasks; however, the estimator should endeavor to provide justification for all listed costs.



Following is a list of references that may be helpful in calculating reclamation bond estimates:

1. ***The Cost Estimating Guide for Road Construction***, 1988, USDA Forest Service, Intermountain Region, 324 25th Street, Ogden, UT 84401. This publication contains information on road obliteration, earth moving, equipment rental, and wage rates. It is important to remember that equipment rental and wage rates vary, both geographically and with time. In determining labor rates and heavy equipment costs, local rates or rates prevailing in the area of the nearest source should be used.
2. ***The Cost Reference Guide for Construction Equipment***, 1988, The Equipment Guide Book Company (commonly referred to as "The Blue Book"). This lists guidelines for calculating equipment performance and costs per unit of material removed.
3. ***The Mine Cost Service***, 1989, Western Mine Engineering, P. O. Box 9008, Spokane, WA 99209. This publication lists prices and costs for labor, equipment, supplies, transportation, etc. Most Regional Office Mineral Staffs and Mineral Examiners have updated copies and are available to assist in providing helpful information and data for mineral operation costs.
4. ***The Mineral Industry Costs***, 1977 & 1981, Northwest Mining Association, 633 Peyton Building, Spokane, WA 99201. These publications provide data on Time, Risk Factors, Costs, Assessing Costs, and Estimating Various Project Costs. The costs are in 1980 dollars and an adjustment of 1980 dollars to current dollars must be made. Most Mining Engineers and Geologists can supply the factor needed to make the conversion.
5. ***Means Heavy Construction Cost Data, 6th Annual Edition***, 1992, R. S. Means Company, Inc., Construction Consultants and Publisher, 100 Construction Plaza, P. O. Box 800, Kingston, MA 02364-0800. Telephone (617) 585-7880. The manual provides current equipment and labor rates for a variety of heavy construction activities. This manual is difficult for the beginning estimator to use; however, through practice and familiarity, most tasks can be estimated with a reasonable expectation of accuracy. If questions arise concerning the location or application of certain construction activities, the estimating department will assist with questions by telephone.
6. ***Handbook for Calculation of Reclamation Bond Amounts***, 1987, United States Department of the Interior, Office of Surface Mining Reclamation and Enforcement, 1951 Constitution Avenue NW, Washington, D. C., 20240. This handbook provides an array of examples for estimating common mining reclamation activities. The publication is not recommended for use by the beginning estimator. Proper application of the concepts illustrated requires advanced estimating and technical skills.
7. ***Caterpillar Performance Handbook***, 1991, Caterpillar Inc., Peoria, IL. This handbook lists the equipment specifications and production capabilities of all Caterpillar equipment. It is particularly useful for identifying equipment capabilities, various modifications and production rates.

# FINANCIAL ASSURANCE COST ESTIMATE

FOR

COUNTY OF KERN

CA MINE ID# 91- \_\_\_\_\_

Prepared by:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_

**Note:** This worksheet was developed by the Office of Mine Reclamation to assist lead agencies and operators prepare a reclamation cost estimate and determine an appropriate amount for the financial assurance in conformance with Section 2773.1 of SMARA. It should be used in conjunction with the Financial Assurance Guidelines adopted by the State Mining and Geology Board. Like the guidelines, it is advisory only.

## Instructions

The worksheet is divided into seven sections to simplify the cost analysis process. Below is a list of instructions for each section. Please read them carefully before filling out the form. If a section is not applicable, please indicate so with a brief statement. An equipment list is provided after Section 7 for summarizing equipment used for reclamation. In addition, a page is provided at the end of the form for notes and calculations. Copies of supporting documentation such as contractor estimates should also be attached.

## **Section I - Primary Reclamation Activities**

This section should be used to calculate direct costs associated with primary reclamation activities. These activities include, but are not limited to: establishing final slopes on all cuts and fills, removal of haul/access roads, constructing drainage/erosion controls, decompacting staging/stockpile areas, demolition and disposal of building foundations and other debris as well as underground structures (i.e. storage tanks and septic systems), cleanup of boneyard areas, well closure, topsoil replacement/redistribution, finish grading, remediation of any soil contamination, and establishing access restrictions.

Refer to the approved reclamation plan to determine the various tasks required to reclaim the site. If the reclamation plan is not specific enough to provide this information, the lead agency should be consulted to help determine your reclamation requirements. Using the form provided, estimate the costs for each task by: 1) briefly describing the reclamation task to be performed and the methods to be implemented; 2) completing the calculation tables; and 3) adding the results at the bottom of the page. It may make it easier to break large mine sites into smaller areas and address each area separately. If this is done, make copies of the worksheet page and fill them out for each reclamation task and area. Page numbers were intentionally left off for this purpose so be sure to number the pages as they are completed.

## **Section II - Revegetation**

This section should be used to calculate direct costs associated with revegetating disturbed areas. Revegetation activities include, but are not limited to: soil preparation/amendment, mulching, installation of irrigation systems, custom seed/plant collection, nursery services, hydroseeding, seed/plant installation, plant protection, and remediation.

Refer to the approved reclamation plan or revegetation program to determine the various tasks and materials required to revegetate the site. Follow the procedures discussed in Section I to estimate the costs for each task. Be sure to provide the unit of measure (i.e. pallet, pound, ton) in the materials table for the type of material to be used.

## **Section III - Plant Structures and Equipment Removal**

This section should be used to calculate the costs associated with dismantling and removal of plant structures and equipment. The Financial Assurance Guidelines adopted by the State Mining and Geology Board provide that the cost to reclaim the plant site may be net of the surplus/salvage value of the facilities to be reclaimed. Please note however, that the value of mined material stockpiles located within the plant site area cannot be used to offset the cost of their removal. This reclamation cost should be provided in the primary reclamation activities section.

Refer to the approved reclamation plan to determine the tasks required to reclaim and remove the plant structures and equipment. Estimate these costs using the tables provided. To establish the salvage value of the plant site an estimate, bid or cost calculation from an impartial company or contractor which provides industrial dismantling or equipment salvage services, or is in the business of buying and selling scrap metals or similar products, must be provided. The estimate, bid or cost calculation should contain the following information:

- |  |  |
|--|--|
| a. Name & location of company or contractor    | e. Cost of such work                       |
| b. Statement of qualifications and experience  | f. Net salvage value of equipment/material |
| c. Location of mine site & California Mine ID# | g. Effective period of estimate or bid     |
| d. Description of work to be done              | h. Signature of responsible party          |

Follow the directions provided in subsection E to determine if the cost to remove the plant equipment may be offset by its salvage value.

#### **Section IV - Miscellaneous Costs**

This section should be used to list any miscellaneous costs for materials, labor or services required to complete final reclamation and closure of the site (i.e. plant decommissioning, lead agency final inspections, reclamation mitigation measures, etc.). Using the table provided, list the item or service needed, the quantity, its unit cost (if appropriate) and total cost. Indicate the sum of these costs at the bottom of the page.

#### **Section V - Monitoring**

This section should be used to list the costs associated with any required monitoring of the site once initial reclamation has been completed. This could include monitoring for successful revegetation and habitat establishment, slope stability, erosion control, access controls, or site remediation (i.e. process reagents/hydrocarbons). Monitoring required by other agencies (i.e. California Regional Water Quality Control Board) and covered under a separate financial assurance need not be listed. Using the table provided, list the monitoring task, the cost per site visit, the number of site visits per year, the number of monitoring years and total cost. Indicate the sum of these costs in the space provided below the table. If a consultant will be conducting the monitoring, provide a copy of his/her estimate or contract.

#### **Section VI - Supervision / Profit & Overhead / Contingencies / Mobilization**

This section includes the costs associated with supervision of reclamation activities, profit and overhead, contingencies (unforeseen costs) and mobilization (the cost of moving equipment to and from the site). These costs are based on a percentage of the total direct costs and normally decline as the value of the operation increases. Refer to Graph 1 and Graph 2 to determine the percentage rates to be used.

#### **Section VII - Summary of Costs**

This section should be used to determine the total cost of reclamation and the amount of the financial assurance. Add all the cost sheets from each section together and place their totals in the spaces provided. The lead agency should determine how much, if any, administrative cost is to be added.

**I. PRIMARY RECLAMATION ACTIVITIES**

Description of Task:

Methods to be Used:

Miscellaneous Information:

Overburden (cubic yards): \_\_\_\_\_ Topsoil (cubic yards): \_\_\_\_\_ Acres: \_\_\_\_\_  
 Production Rate (cubic yards/hour): 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_  
 Haul Distance (feet): 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

A. Equipment - List all equipment required to complete identified task. For large reclamation jobs separate mine areas for ease of accounting.

Equipment	Quantity	\$/Hour	# of Hours	Cost (\$)
1.				
2.				
3.				
4.				

Total Equipment Cost for this Task \$ \_\_\_\_\_

B. Labor - List all labor categories to complete identified task.

Labor Category	Quantity	\$/Hour	# of Hours	Cost (\$)

Total Labor Cost for this Task \$ \_\_\_\_\_

C. Materials - List all materials required to complete identified task (include disposal costs).

Item	Quantity	\$/Unit	Cost (\$)

Total Materials Cost for this Task \$ \_\_\_\_\_

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = \$ \_\_\_\_\_

## II. REVEGETATION

Description of Task:

Methods to be Used:

A. Equipment - List all equipment required to complete identified task.

Equipment	Quantity	\$/Hour	# of Hours	Cost (\$)

Total Equipment Cost for this Task \$ \_\_\_\_\_

B. Labor - List all labor categories to complete identified task.

Labor Category	Quantity	\$/Hour	# of Hours	Cost (\$)

Total Labor Cost for this Task \$ \_\_\_\_\_

C. Materials - List all materials required to complete identified task.

Item / Plant Species	Unit of Measure	# of Units	\$/Unit	Cost (\$)

Total Materials Cost for this Task \$ \_\_\_\_\_

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost \$ \_\_\_\_\_

### III. PLANT STRUCTURES AND EQUIPMENT REMOVAL

Description of Task:

Methods to be Used:

A. Equipment - List all equipment required to complete identified task.

Equipment	Quantity	\$/Hour	# of Hours	Cost (\$)

Total Equipment Cost for this Task \$ \_\_\_\_\_

B. Labor - List all labor categories to complete identified task.

Labor Category	Quantity	\$/Hour	# of Hours	Cost (\$)

Total Labor Cost for this Task \$ \_\_\_\_\_

C. Demolition - List all structures and equipment to be dismantled or demolished.

Structure / Equipment	Type of Material	Volume (cubic feet)	Unit Cost Basis	Disposal Cost	Cost (\$)

Total Materials Cost for this Task \$ \_\_\_\_\_

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Demolition Cost = \$ \_\_\_\_\_

## E. Surplus / Salvage Value

1. Total cost to reclaim plant structures and equipment pursuant to the approved reclamation plan. \$ \_\_\_\_\_
2. Net salvage value of the plant structures and equipment.\* \$ \_\_\_\_\_
3. Subtract Line 2 from Line 1 \$ \_\_\_\_\_

4. If Line 3 is greater than \$0, enter this amount on the total plant structures and equipment removal cost line under Section VIII (Summary of Costs). If Line 3 is less than \$0, enter \$0 on the appropriate line in Section VIII.

**\*NOTE** This is the value of plant structures, buildings and equipment on a salvage basis -- e.g. after the structures and equipment have been removed for sale or use off-site. In order to include net salvage value in the financial assurance calculation, the operator must provide a letter of agreement, signed contract, bid or quote from an independent company which provides industrial dismantling or equipment salvage services, or is in the business of buying and selling scrap metals or similar products.

**IV. MISCELLANEOUS COSTS**

Examples of this type of cost could include temporary storage of equipment and materials off site, special one-time permits (i.e. transportation permits for extra wide or overweight loads, etc.), decommissioning a process mill (i.e. decontamination of equipment), or disposal of warehouse inventories.

Item / Task	Quantity	\$/Unit	Cost (\$)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Total Miscellaneous Costs \$ \_\_\_\_\_

**V. MONITORING**

Monitoring Task	\$/Visit	# Visits/Year	# of Monitoring Years	Cost (\$)
1.				
2.				
3.				
4.				
5.				

Total Monitoring Costs \$ \_\_\_\_\_

## VI. SUPERVISION/PROFIT & OVERHEAD/CONTINGENCIES/MOBILIZATION

A. Supervision - Supervision or reclamation management includes project inspection and supervision. These activities are usually performed by a consultant or staff member with experience in reclamation of disturbed lands. Reclamation management may include recommending change orders, verifying completed work, verifying compliance with project specifications, and other reclamation management oversight activities. Please refer to Graph No. 1 to determine the supervision cost factor.

B. Profit and Overhead - Where it becomes necessary for the Lead Agency or the Department of Conservation to complete reclamation of the mining site, a third party will be retained to do the actual reclamation work. Because profit and overhead costs are not included in the reclamation cost sheets, these costs must be added to the total reclamation estimate. Please refer to Graph No. 2 to determine the profit and overhead cost factor.

C. Contingencies - A contingency cost should be included in the financial assurance estimate to provide for project uncertainties and unexpected natural events. The U.S. Department of the Interior, Office of Surface Mining publishes the Handbook for Calculation of Reclamation Bond Amounts which recommends contingency percentages be based upon the level of direct costs, as shown below:

<u>Total Direct Cost (\$)</u>	<u>Contingency (%)</u>
0 - \$500,000	10
\$500,00 - 5 million	7
5 million - 50 million	4
Greater than 50 million	2

D. Mobilization - Mobilization costs are attributed to moving equipment to the project site for reclamation purposes. These costs normally range between one and five percent of the total direct cost of the reclamation operations. These costs will vary depending upon the site location and the total value of the reclamation operations to be performed. Please insert the percentage used to estimate mobilization costs under Section VIII - Summary of Costs.

**VII. SUMMARY OF COST**

Total of all Primary Reclamation Activities Costs \$ \_\_\_\_\_

Total of all Revegetation Costs \$ \_\_\_\_\_

Total of all Plant Structures &  
Equipment Removal Costs \$ \_\_\_\_\_

Total of all Miscellaneous Costs \$ \_\_\_\_\_

Total of all Monitoring Costs \$ \_\_\_\_\_

Total of Direct Costs \$ \_\_\_\_\_

Supervision ( \_\_\_\_\_ %) \$ \_\_\_\_\_

Profit/Overhead ( \_\_\_\_\_ %) \$ \_\_\_\_\_

Contingencies ( \_\_\_\_\_ %) \$ \_\_\_\_\_

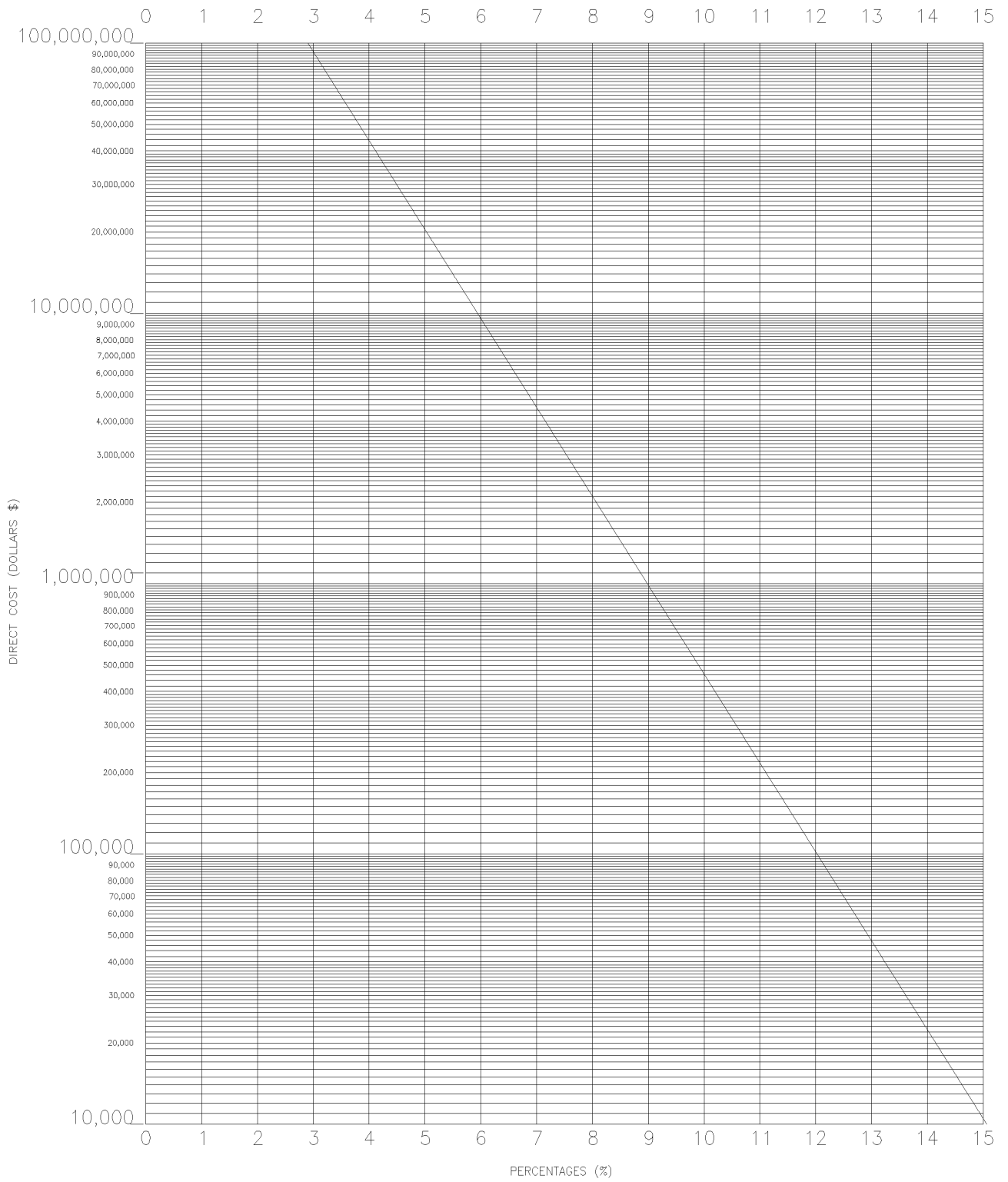
Mobilization ( \_\_\_\_\_ %) \$ \_\_\_\_\_

Total of Indirect Costs \$ \_\_\_\_\_

Total of Direct and Indirect Costs \$ \_\_\_\_\_

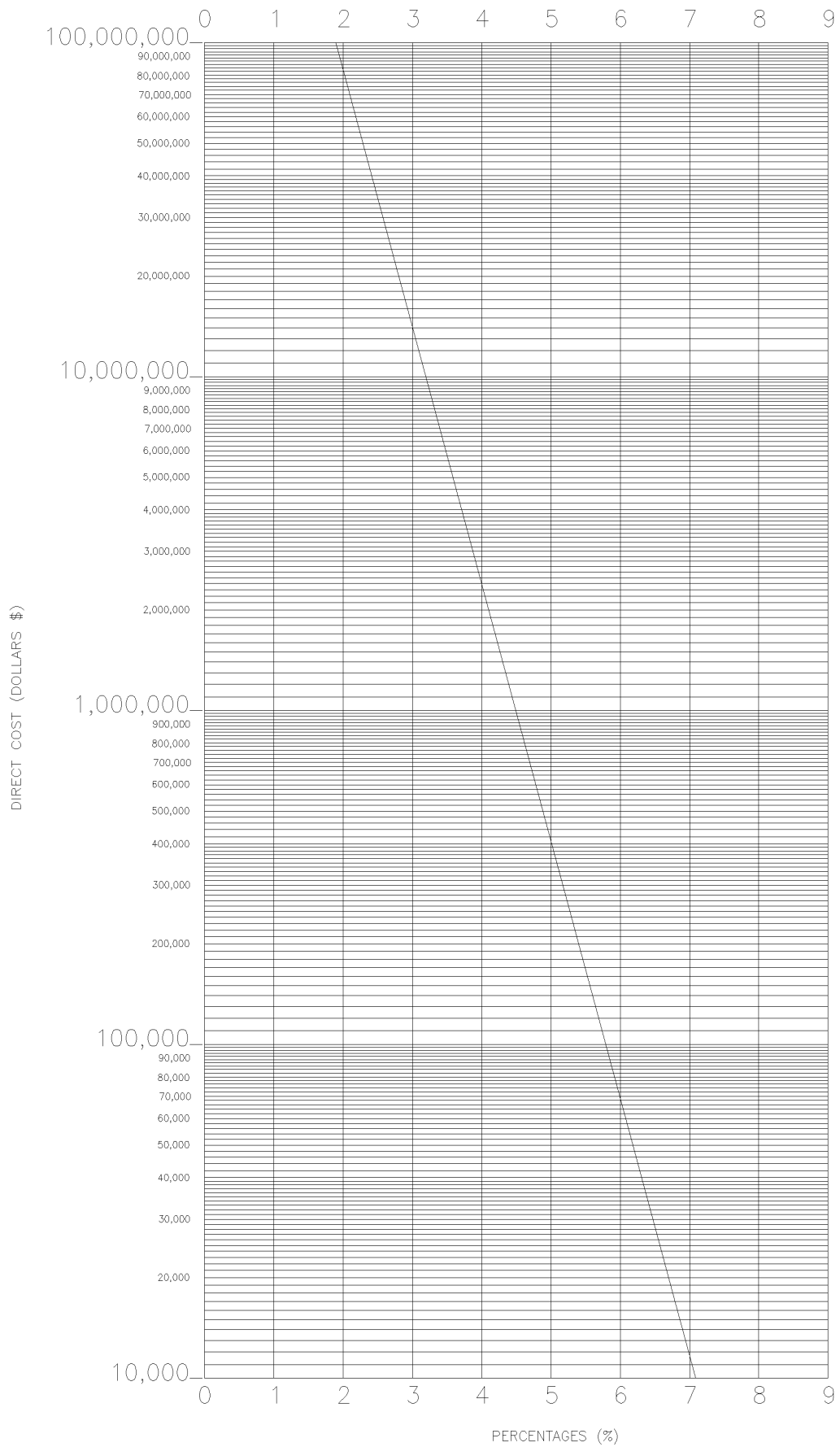
Lead Agency Administrative Cost\* \$     N/A      
(Determined by the Lead Agency)**Total Estimated Cost of Reclamation** \$                     

**\*Note** The Financial Assurance Guidelines recommend that when reviewing and approving a financial assurance cost estimate, lead agencies should include their administrative cost to draw on the financial assurance and implement the reclamation plan, should it become necessary.



GRAPH 2.--Profit and Overhead

(source: R. S. Means Co., Inc., 44th ed.)



GRAPH 1.--Reclamation Management