

## 7.1. MINERAL PROCESSING--OPERATING COSTS

7.1.9. GENERAL EXPENSES  
ADMINISTRATIVE COSTS

These costs include expenses incurred in the everyday operation of the plant and do not include general company overhead.

The total daily operating costs are from three separate cost curves (labor, supplies, and equipment operation) based on the capacity rate (X), in metric tons of processing plant feed per day. The curves are valid for operations between 100 and 100,000 mtpd, operating three shifts per day.

## 7.1.9.1. ADMINISTRATIVE SALARIES AND WAGES

The general expense curve for mineral processing administrative salaries and wages is intended to cover the supervision and various other administrative functions required for plants of varying sizes. The number of administrative (salaried) employees varies from 5 persons working three shifts in the smaller plant to over 100 in the larger plants. Note that the costs from the curves are per operating day of the plant.

## BASE CURVE

(L) Administrative Salaries and Wages  $(Y_L) = 43.589(X)^{0.488}$

The operating labor costs consist of the following typical range of personnel:

Direct labor.....	99%
Maintenance Labor.....	1%

The average base salary including burden for labor is as follows:

	Small (100 to 20,000 mtpd)	Large (20,000 to 100,000 mtpd)	Av salary per hour (base rate)
Supervision (managers foremen).....	36%	36%	\$23.39
Clerical (office management)....	21%	22%	13.62
Engineering (Metallurgical chemical, mechanic).....	18%	20%	19.85
Assaying and metallurgical.....	12%	11%	15.13
Purchasing and warehousing.....	9%	7%	14.14
Safety, first aid, security....	4%	4%	18.85

The average wage for labor is \$17.93 per worker-hour (including burden and average shift differential).

Selected median annual salaries are as follows (without burden):

Mill superintendent.....	\$50,400
General maintenance foreman.	33,600
Chief electrician.....	40,900
Engineer.....	35,900
Safety director.....	35,900
Director of purchasing.....	42,000

#### ADJUSTMENT FACTOR

Burden Factor If the burden is other than 32%, multiply the labor cost obtained from the curve by the following factor:

$$\text{Labor factor } (F_L) = (1+B)/(1.32)$$

where B = new burden, expressed as a decimal.

#### 7.1.9.2. ADMINISTRATIVE PURCHASES

##### BASE CURVE

(S) Administrative Purchases  $(Y_S) = 3.427(X)^{0.557}$

The administrative purchases cost consist of 27% miscellaneous fees, dues and donations, and laboratory supplies; 22% professional and computer services when applicable; 21% supplies for office, engineering, safety and first aid; 15% expenses for telephone, telegraph and postage; 9% travel and entertainment; and 6% small tools.

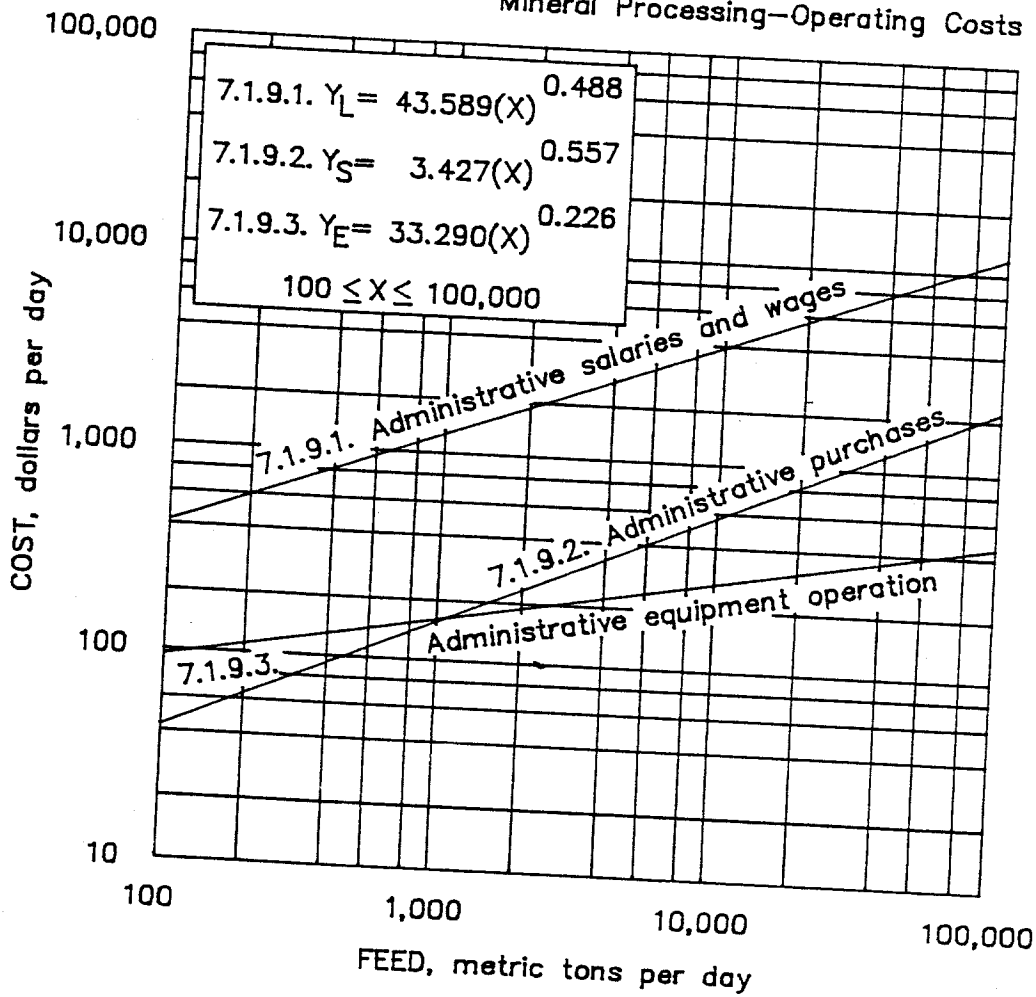
#### 7.1.9.3. ADMINISTRATIVE EQUIPMENT OPERATION

##### BASE CURVE

(E) Administrative Equipment Operation  $(Y_E) = 33.290(X)^{0.226}$

The administrative equipment operating cost consists of 70% for fuel, 14% for repair parts, 12% for lubricants, and 4% for tires. The equipment usage averages 20% of its available time. This curve includes administrative equipment operation expense for vehicles such as sedans, pickups, forklifts, and flatbed trucks.

Mineral Processing—Operating Costs



7.1.9.1.-3. General expenses  
 ADMINISTRATIVE SALARIES AND WAGES  
 ADMINISTRATIVE PURCHASES  
 ADMINISTRATIVE EQUIPMENT OPERATION

7.1. MINERAL PROCESSING--OPERATING COSTS

7.1.10. INFRASTRUCTURE

7.1.10.2. TOWNSITE-CAMPSITE

CAMPSITE

Where conditions such as remote location or seasonal operation require a single-status campsite (i.e., room, board, and recreation facility), the daily operating cost should be derived from the following base cost curve. Today a caterer is usually employed to provide board, housekeeping, and recreation supervision. Heat, lights, garbage disposal, and plant maintenance are usually provided by the owner.

BASE CURVE

The total daily cost is derived from the supply curve based on the total number of persons who occupy the campsite (X). The curve is valid for campsites occupied by 20 to 1,000 persons. All persons receive both room and board.

(S) Supply Operating Cost  $(Y_S) = 37.143(X)^{0.897}$

	Small (20 to 450 persons)	Large (450 to 1,000 persons)
Board.....	61.5%	59.0%
Housekeeping and recreation.	23.9%	23.0%
Heat.....	6.4%	9.0%
Light.....	2.4%	3.4%
Maintenance.....	5.8%	5.6%

If the number of persons requiring board varies from the number of persons requiring room, use the following equation:

(S) Supply Operating Cost  $(Y_S) = [37.143(X)^{0.897}][0.60(B/R)+0.40(R)]$   
 where B = number of persons requiring board only,  
 and R = number of persons requiring room only.

These curves are based on a caterer who provides all necessary personnel for food service, housekeeping, distribution and collection of mail, monitoring recreation, etc., and all necessary supplies, such as pots, pans, dishes, silverware, sheets, pillowcases, blankets, waste cans, recreation supplies, janitorial supplies, food, etc. The evaluator must add the cost for local, State, or Federal taxes where required.

ADJUSTMENT FACTORS

Owner-Operator Factor When the facility is owner-operated rather than catered, multiply the cost obtained from the curve by the following factor:

Owner-operator factor  $(F_0) = 0.93$

Diesel Power Factor When the electric power is provided by a diesel-electric system rather than a power line grid, multiply the cost obtained from the curve by the following factor:

$$\text{Diesel power factor } (F_D) = 1.04$$

#### TRAILER COURT

Where conditions such as remote location or lack of available housing require installation of a family trailer court complete with utilities, laundromat, recreation facilities, blacktop driveway, and possibly swimming pool, the daily operating cost should be derived from the following two curves. The total daily cost is derived from the supply curve, based on the total number of trailer spaces (X) required. The curve is valid for trailer courts with 20 to 1,000 units.

#### BASE CURVE

The curves are based on trailer and facility maintenance, insurance, casualty insurance, supervisory and worker wages, plus overhead, heat, and lights.

(S) Supply Operating Cost  $(Y_S \text{ FREE}) = 49.514(X) - 0.590$   
Company-owned mobile homes, spaces, and facilities where the trailers and spaces are free to supervisors and workers. The company pays all operating costs on the facility.

(S) Supply Operating Cost  $(Y_S \text{ RENTED}) = 1,676.049(X) - 0.716$   
Company-owned mobile homes, spaces, and facilities where the trailers and spaces are rented to supervisors and workers. The company pays for any loss on the facility.

#### ADJUSTMENT FACTORS

Swimming Pool Factor When the trailer court does not provide a swimming pool, multiply the curve  $(Y_S \text{ FREE})$  by the following factor:

$$\text{Swimming pool factor } (F_P \text{ FREE}) = 0.82$$

When the spaces and trailers are rented and the trailer court has 52 or more units, it will show a profit. If there are less than 52 units multiply the curve  $(Y_S \text{ RENTED})$  by the following factor:

$$\text{Swimming pool factor } (F_P \text{ RENTED}) = 0.05$$

Trailer Space Rental Factor When the occupants rent trailer space for their own trailers, multiply the curve  $(Y_S \text{ FREE})$  by the following factor:

$$\text{Trailer space rental factor } (F_R \text{ FREE}) = 0.36$$

#### PERMANENT HOUSING

Company totally owned and operated townsites are decreasing in number because of their high cost and persistent social problems. The trend seem to be toward small family housing facilities combined with an existing nearby city.

#### Large townsite permanent housing

Today, the military appears to be the greatest user of this type of facility. The Air Force provides housing to its officers and enlisted personnel. The Government pays for housing and facility maintenance, all utilities, supervisor, and worker labor, etc. The average operating costs for 1983 were:

McCord Air Base--993 units: \$6.66 per day per unit

Fairchild Air Base--1,580 units: \$6.93 per day per unit

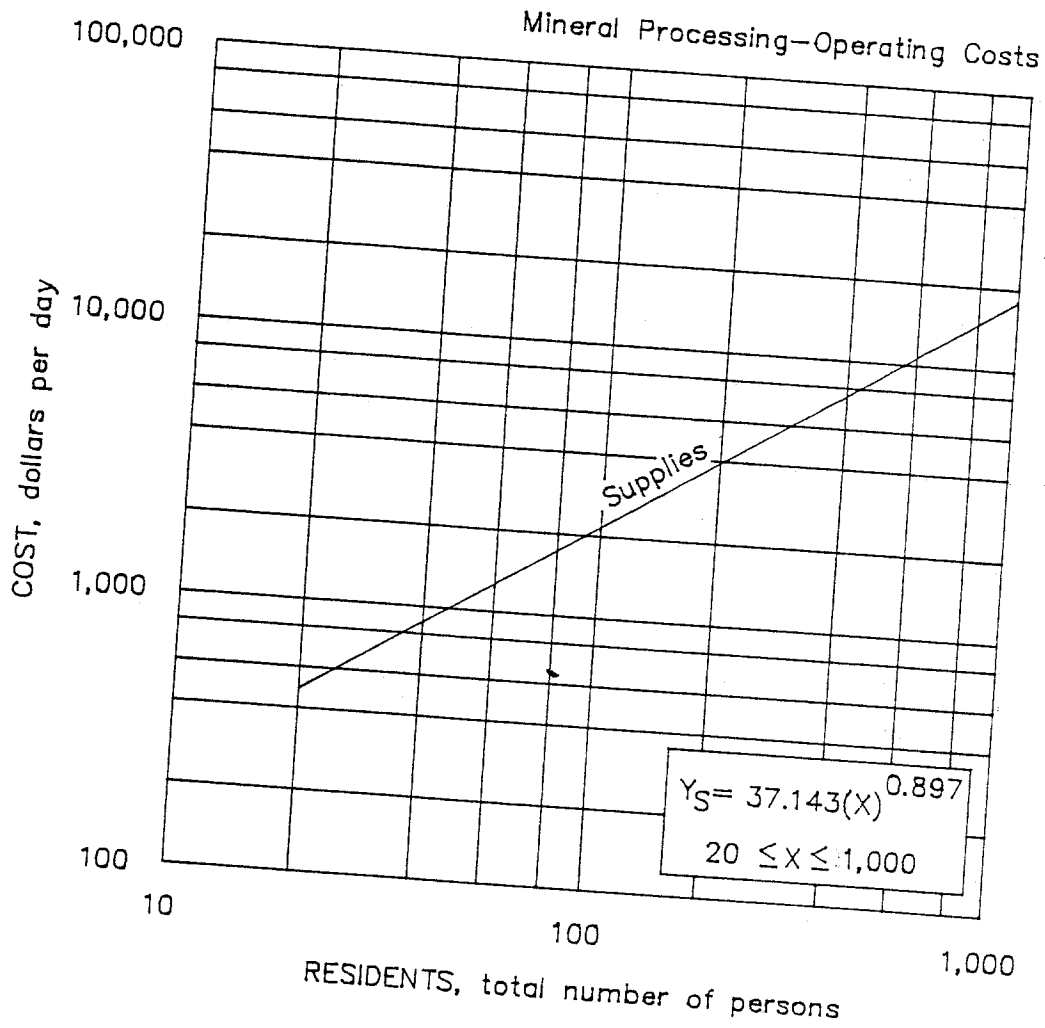
#### Small townsite permanent housing

These facilities are generally rented to their occupants at a modest fee, with the company paying for the general maintenance, insurance, and taxes. Rent is applied to the capital investment. A new housing facility (175 family units) in the western United States, cost the company \$0.98 per day per unit to maintain.

#### BASE CURVE

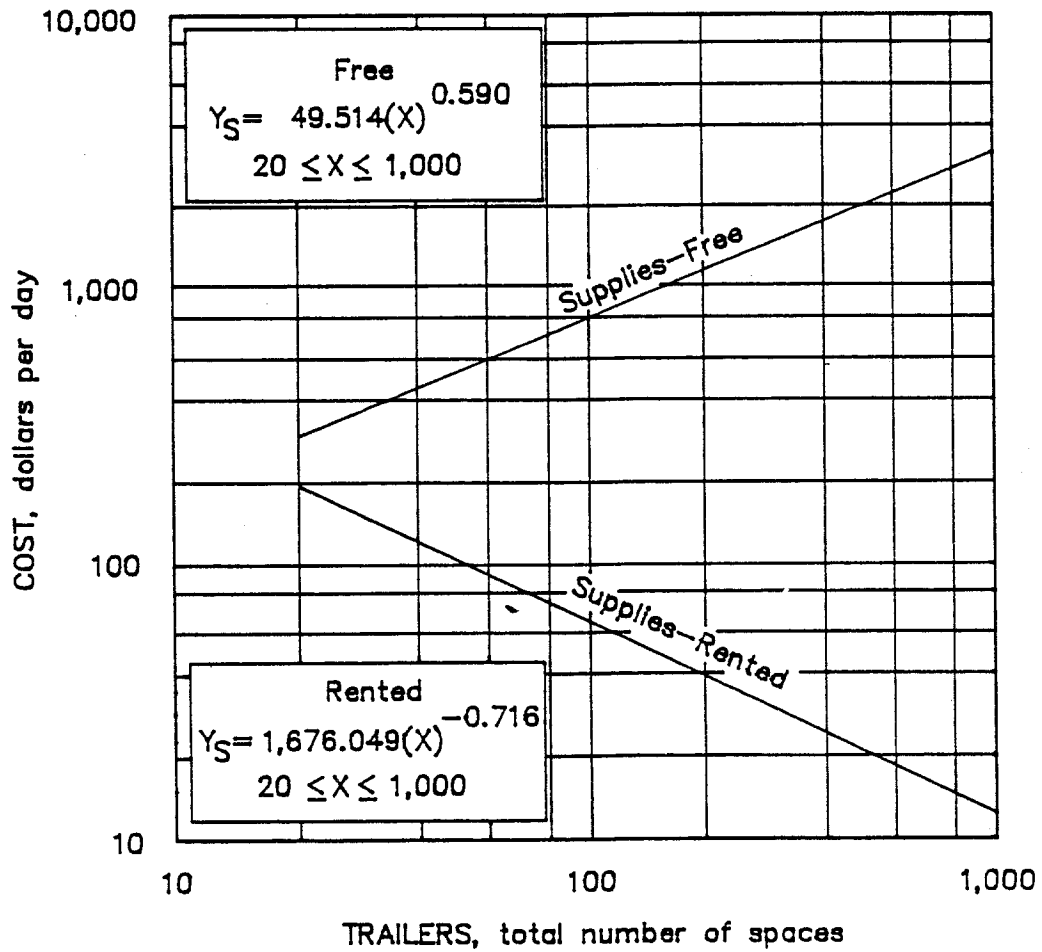
The total daily cost is derived from the supply curve based on the total number of housing units, (X), required. The curve is valid for 140 to 1,900 housing units.

(S) Supply Operating Cost  $(Y_S) = 0.008(X)^{0.948}$

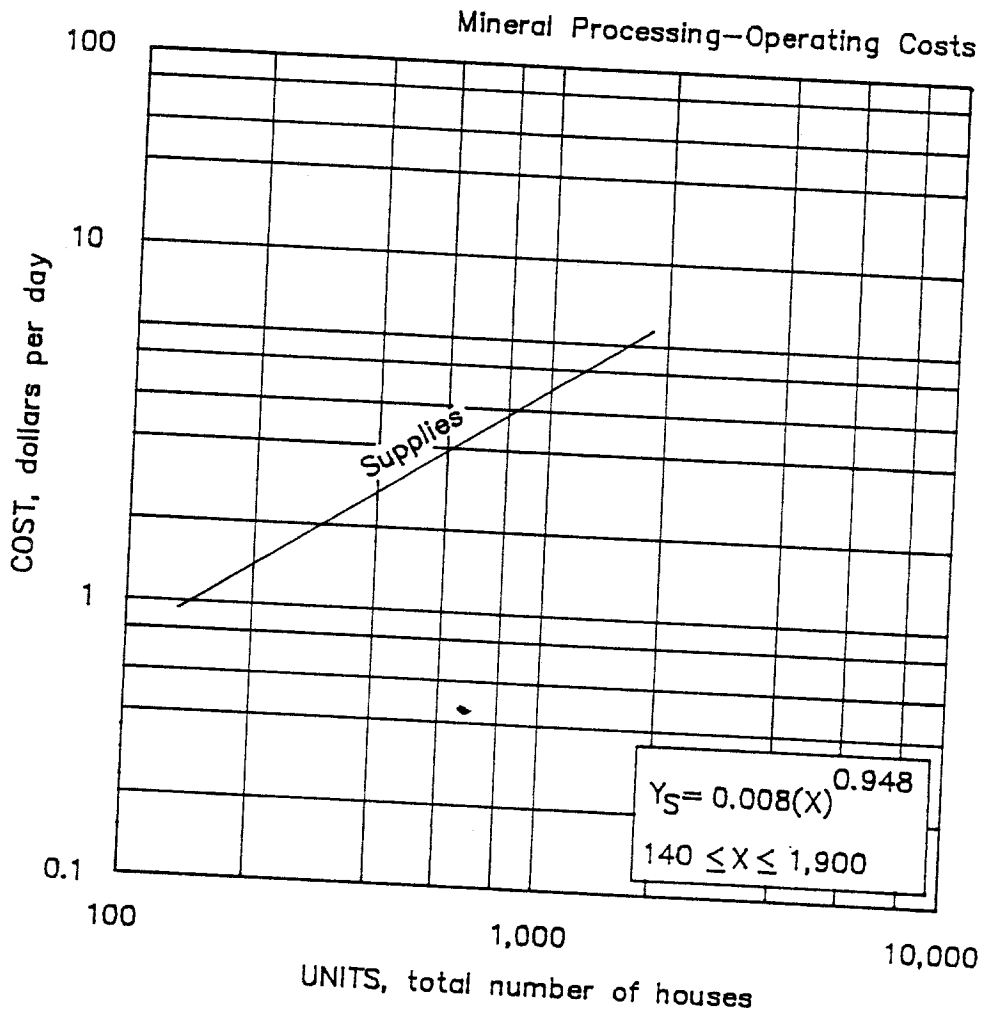


7.1.10.2.a Townsite-Campsite  
CAMPSITE

### Mineral Processing—Operating Costs



7.1.10.2.b Townsite-Campsite  
TRAILER COURT



7.1.10.2.c Townsite-Campsite  
PERMANENT HOUSING