**Underground Mining of Metalliferous Deposits**
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**Lecture: 08**
**Determination of Cut Off Grade – 2**

## CUT OFF GRADE (Continued)

**[6] Cost Analysis for *One ton of ROM ore containing 0.55%* .**

| | Cost/ROM |
|---|---|
| Mining | $1.00 |
| Milling | $2.80 |
| General and administration(15% of mining and milling) | $0.57 |
| Direct Production Cost | = $4.37 |
| Depreciaion | = $0.87 |
| Mill to smelter | =$0.03 |
| Smelting cost | = $1.10 |

[1]

The copper price assumed $1.00/lb

Furthermore, there is a by-product credit for gold, molybdenum,

etc. of $1.77 per st of ROM of 0.55% cu.

Thus the gross value is -

GV = 8.56 × $1 + $1.77 = $10.33

[2]

Assume, Mining cost is .$1.00 per st. ROM

Assume, Milling cost is .$2.80 per st. ROM

Other cost (mining and milling) @ 15% = $ 0.15*3.80 = $ 0.57

So Direct Production Cost = $4.37

[3]

Depreciation is 20% of production cost = 0.2*$4.37 = $0.87

[4]

Transport cost from mill to smelter = $1.40 per ton of concentrate

= $1.40/45.45 ton of ROM = $ 0.03

[5]

Smelting cost = $50 per ton of concentrate

= $50/45.45 ton of ROM = $ 1.10

[6]

Transport cost from smelter to refinery = $50 per ton of cu in Blister

= $50/233.1 ton of ROM = $ 0.21

[7]

Refining cost = $130 per ton of cu in Blister

= $130/233.1 ton of ROM = $ 0.56

[8]

Final shipment cost = $0.01 per lbs of pure cu

= $0.01 *8.56 ton of ROM = $ 0.09

[9]

Other cost in smelter, refinery etc = $0.07 per lbs of pure cu

= $0.07 *8.56 ton of ROM = $ 0.60

**NET VALUE = GV-TE**

**$10.33 - $7.83 = $2.50**

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| General and administration(15% of mining and milling) | $0.57 |
| Direct Production Cost | = $4.37 |
| Depreciation | = $0.87 |
| Mill to smelter | =$0.03 |

| | |
|---|---|
| Smelting cost | = $1.10 |
| smelter to refinery | =$0.21 |
| Refining cost | = $ 0.56 |
| Final shipment | = $ 0.09 |
| General cost at plant | = $0.60 |

*Now the steps of the net value computation are outlined below for an ore containing 0.35% Copper. All of the costs and revenues will be calculated with respect to one ton of ore (2000 lbs).*

*Step 1. Compute the amount of saleable copper (lbs/st of ore).*

[1] Contained copper (CC) in the ROM is

$$CC = 2{,}000\ lbs/st \times \frac{0.35}{100} = 7.0\ lb$$

[2] Copper recovered by the mill (RM) is

$$RM = 7.0\ \times \frac{80}{100} = 5.6\ lb\ RM = 7.0\ \times \frac{80}{100} = 5.6\ lb$$