

Multi-metal deposits - Grade Equivalents

When several marketable commodities are present in the mineralisation, the cut-off grade is a function of the total value (f.o.b.)* of all these contained products.

In this case, it is common to convert the values of the by-products into *equivalent* values of the primary product. Thus, the mineralisation is classified as ore if its equivalent grade is above the cut-off grade determined for the primary product.

For instance, assume mineralisation that contains:

- 2.5 % Cu for which the mill recovery is 95 %, the market price is \$1.75/lb and the NSR (f.o.b.) is 75 %
- 4 % Zn for which the mill recovery is 75 %, the market price is \$0.65/lb and the NSR (f.o.b.) is 55 %
- 12 g/t Ag for which the mill recovery is 85 %, the market price is \$7.50/oz and the NSR (f.o.b.) is 80 %

The in-situ grade of this mineralisation in copper equivalents is determined as follows.

Revenue per tonne (f.o.b.) * of mineralisation containing 1 % Cu:

$$0.01 (0.95) 1.75 (2204.623) 0.75 = 27.4889$$

Value for 1 % Zn: $0.01 (0.75) 0.65 (2204.623) 0.55 = 5.9111$

Therefore, 1 % Zn = $[5.9111 / 27.4889]$ % Cu or 0.215 % Cu

Value for 10 g/t Ag: $10 (0.85) [7.50 / 31.1035] 0.80 = 1.6397$

Therefore, 10 g/t Ag = $[1.6397 / 27.4889]$ % Cu or 0.0596 % Cu

Thus, the copper equivalent grade of the mineralisation is:

$$2.5 + 4 (0.215) + [12 / 10] (0.0596) = \mathbf{3.43 \% Cu}$$

- As the cut-off grade is expressed as an in-situ value, all calculations are based on undiluted grades.
- 1 ton = 2204.623 lb