Bergvesenet

Postboks 3021, N-7441 Trondheim

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Tittel

Joma Bergverk, Norway
Ore reserves

Forfatter	Dato År	Bedrift (Oppdragsgiver og/eller oppdragstaker)
Bunill, G.H.R.	02.12 1964	

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Røyrvik	Nord-Trøndelag		1924 1	Grong

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geologi Malmberegning		Jomaforekomsten

Råstoffgruppe	Råstofftype
Malm/metall	Cu, Zn, Py

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

Notat på engelsk.
En kort geologisk og malmgeologisk beskrivelse med vekt på at sink er anriket i liggen i den steile del av forekomsten.
Total malmberegning gir 13.119.000 tonn med 1,09% Cu og 1,43 % Zn.

Joma Bergverk, Norway
Ore Reserves.

Tennell: The orebody at Joma is located in a volanic assemblage of rocks belonging to the late-Cambrian or Ordovicium period. It consist of a central massive pyrite core lying along the axis of a complexe in---- fold whose axis strikes N 55° E and pitches at about 25° to the SW. This fold is itself folded along a N-S axis and it appears that Joma is located at the intersection of these -- fold structures where the volcanic rocks were favorable for replacement.

The pyrite core itself only contains about 0.4% copper and 1.8% zinc however later zinc and copper mineralisation have produced an enriched base metal envelope to this central pyrite mass. It would appear likely that this later mineralisation is related to the same source of mineralisation which gave rise to the original pyrite core.

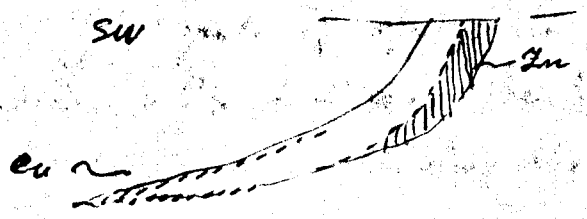
The zinc and copper mineralisation took place in quite distinct and separate periods. In general they occupy completely different locations in relation to the main pyrite mass. However, as would be expected, the zinc zone is mineralised by copper zone along the limits of the envelope and in a few special structurs.

The zinc mineralisation which was accompanied by some pyrrhotite, but no chalcopyrite was the second stage of mineralisation in the formation of the Joma ore-body. The copper content is roughly the same as the

main pyrite mass. The zinc mineralisation is predominantly located along the footwall of the pyrite mass and along the footwall of the envelope. It is richest near the surface and gradually dies out at depth.

The final stage of mineralisation took place with the introduction of chalcopyrite and pyrrhotite. Little or no zinc accompanied this stage of mineralisation This copper mineralisation is almost all located along the hanging wall of the main pyrite mass and along the hanger wall of the envelope. In addition near the ext of the pyrite mass, in areas where the zinc mineralisation has faded away, copper mineralisation is also found along the footwall of the main pyrite mass.

Generalized Section along NE axis.



Thus it has been found possible to divide the ore quite naturally into three well defined and distinct entities.

(a) Copper Ore - low zinc
(b) Zinc Ore - low copper
(c) Massive pyrite - low copper & zinc

A Copper Ore

The reserves of copper ore indicated by the very extensive surface drill programme and the limited underground programme are: -

5,274,000 tons grading 38,1 % S, 2.22 % Cu and 0,5 %

In addition there is a footwall zone on the west flank of the structure which could provide a further 250,000 tons grading 2.50 % copper and 1.5 % zinc. This footwall structure lies about 15 to 20 metres below the main area of mineralisation and separated by completely barren greenstone.

The only other location which provide a further addition to this tonnage is located at the south west extremity of the orebody near station 13. This locality could provide an additional 250,000 tons grading 1.8 % copper

The grade of copper mineralisation shows a steady decrease with depth. The best 'shoot' of copper ore located to date occurs between the 490m level and the surface to the west of the main pyrite mass. Here, over a length of 400 metres, there are about 200,000 tons indicate averaging 5.1 % copper. Values are very consistent.

It is pointed out that the above figures show the tonnage and grade that can be expected as will feed. A 15 % dilution factor has been used and it has been assumed, after discussions with Mr. Bassermann, that 80 % of the orebody will be recovered by mining.

The details of these ore reserves are as follows: -

(1) Horizontal Plans	Location	Tons	Grade % Cu
	Surface - 546 m	230,000	4.26
	545 m - 500 m	616,000	2.56
	500 m - 455 m	1.560.000	2.16
	455 m - 410 m	1.920.000	2.05
	410 m - 365 m	1.040.000	2.03
	Total	5,366,000	2.22 % Cu

(2) Vertical Sections	Section	Tons	Grade % Cu
	94.650 N	34.500	1.87
	94.700 N	29.400	1.49
	94.750 N	105,500	1.11
	94.800 N	171.500	1.87
	94,850 N	352.000	3,10
	94.900 N	214,000	2.13
	94.950 N	299.000	2.94
	95,000 N	518.000	2,19
	M	258.000	2.00
	N	460.000	1.93
	O	198.200	1.74
	P	149.000	2.84
	Q	223.000	2.43
	31.600 E	86.600	3.31
	31.550 E	164.500	2:15
	31.500 E	195.000	2,48
	31.450 E	538,000	1.71

31.400 E	480.000	2.18
31.350 E	123.000	1.63
Total	5.182.200 tons	2.23 % Cu

The average of these two ore estimates is 5.274.000 tons grading 2.22% copper.

B. Zinc Ore

The reserves of zinc ore indicated by the surface drill programme are: —

2,595.000 tons grading 2.77% Zn, 0.42% Cu and 41.2% S

There do not appear to be any areas which might provide an increase to this tonnage. The details of these ore reserves are as follows: —

(1) Horizontal Plans	Location	Tons	Grade
	Surface - 545m	955.000	2.98 % Zn
	545 m - 500 m	1.081.000	2.92 % Zn
	500 m - 455 m	403.000	2.27 % Zn
	455 m - 410 m	141.000	1.99 % Zn
	410 m - 305 m	Nil	
		2.580.000	2.79 % Zn

(2) Vertical Sections	Section	Tons	Grade % Zn
	94,650 N	148.000	1.82
	94,700 N	46,400	3.90
	94.750 N	91.300	2.50

94.800 N	161,000	2.60
94.850 N	63.100	2.24
94.900 N	82.800	2.60
94.950 N	125.000	2.91
95.000N	90,800	4.64
95.050N	132.000	4.38
K	293.000	2.86
L	320.000	2.47
M	465.000	2.51
N	282.000	3,14
O	177.000	2.01
31550 E	111.000	2.20
31500 E	25.000	3.21
Total	2.593.400	2.75% Zn

The average of these two calculations i.e. 2.586.700 tons grading 2.47 % Zinc.

C. Massive Pyrite

The reserves of pyrite indicated by the surface drill programme are:- 5.250.000 tons grading 43,1 % S, 0.39% Cu and 1.40 % Zn.

There is a possible addition of 500.000 tons in a footwall zone found at the surface. This footwall zone is believed to be the overturned limb of the main orebody. If this proves to be correct an additional million tons will probably be found here.

Deposits

The total ore reserves for the Joma property are:-

Copper Ore	5.274.000	38.1 % S	2.22 % Cu	0.51 % Zn
Zinc Ore	2.595.000	41.2 % S	0.42 % Cu	2.75 % Zn
Massiv Pyrite	5.250.000	43.1 % S	0.39 % Cu	1.70 % Zn
	13.119.000 tons	41.7 % S	1.09 % Cu	1.43 % Zn

Precious metal values are low. The silver content averages about 0.5 g/tonn. This ore has been outlined by a total of 212 holes and no further drilling is warranted over this main orebody.

G H R Bunill P. Eng.
Joma, Norway
2. Dec 1964