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Postboks 3021, 7002 Trondheim

Rapportarkivet

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Tittel

A brief description of Saltdal copper mines. Ingeborg, Baldoaivve, Stülhaugen.

Forfatter	Dato	Bedrift
BAY K.	1928	Sulitjelma Gruber A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad

Fagområde	Dokument type	Forekomster
Råstofftype	Emneord	

Sammendrag

Kort skildring av forekomstene Ingeborg, Baldoaivve og Stülhaugen i Saltdal. ùkonomiske overslag for produksjon med forskjellige alternativer.

Engl. 5

A Brief Description

of

Saltdalen Copper Mines.

Saltdalen Copper Mines.

These Copper Mines have 3 main lodes:

Ingeborg,

Baldoivi and

Staalhaugen.

Karl Bay

The distance from good harbour in the Saxenvikbukten at the bottom of the Saltenfjorden is in air passage:

To Ingeborg 3,5 km.

To Baldoivi 13 km.

To Staalhaugen 9,5 km.

From Baldoivi to Jakobsbakken mines Sulitjelma, about 14 km. in air passage.

To the fields belong 61 claims. The mines contain mainly Cupriferous magnetic iron pyrites.

I n g e b o r g.

The main lode is about 1700 meters long = 1870 yards.

The course of the lode is north-east to south-west with 70°-75° dip to south-east. The width is varying from 0,50 meters to 3 meters.

The Government Mines Inspector in Nordland, has calculated the lode matrix from adit 1 to shaft 1, to about 576.000 tons and director Bay has calculated the whole mineralbearing lode matrix to 700.000 tons which can be broken out.

Further it is most probable that the lode continues

About 500 meters aside from the footwall of the main lode there is a parallel lode, the Stördal lode, which in a section opened looks very promising.

As here is only mined in one spot, a nearer description is omitted.

B a l d o i v i.

Here is two parallel lodes. The main lode is about 5000 meters long. Of which about 2000 meters are opened up with short adits, shallow sharts and quarried sections and crosscuts of the lode.

The width of the lode is analogical with the Jakobsbakken lode, Sulitjelma. The largest and the smallest width have been stated by diamonddrilling, as the drillkern shows a width up to 2,70 meters.

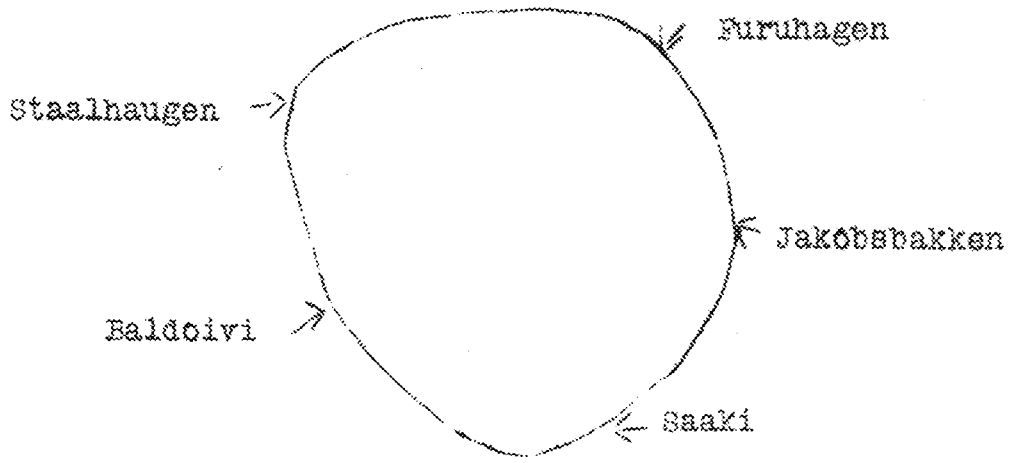
The lodes carries pyrites, cupriferous magnetic iron pyrites and cupriferous iron pyrites.

The lode no.2 which occurs in the footwall and about 90,- m. from the main lode has nearly the same dip as the main lode. The so far made trial works on this lode can only be characterised as preliminary works on the surface and the width is varying from 0,50 to 1,25 meters and has so far as this lode is concerned proved only to contain iron pyrites and cupriferous iron pyrites. No magnetic iron pyrites is observed.

The greatest depth obtained at present is at the drill hole no.3 which has been drilled through the main lode, the drill kern showing mainly iron pyrites ores. Drill hole no.3 has cut through lode no.2 on a depth of 43,38 from the surface, the drill kern is rich in copper. Drill hole no.1, drilled through the same lode on the depth 32 meters, width of lode 1,25 meters very rich cupriferous pyrites.

lode matrix a more illustrating average analysis is missing.

By the geological investigations has been proved that this mine is situated in the same zone as the Sulitjelma Mines.



As the properties has not been sufficiently investigated or set out, neither as regards the extent nor the depth, a calculation of the probable ore quantity will be too floating as a basis to rely on, but it has been certainly proved that the lodes have a great continuously extent, carry a goodcupriferous pyrites as a remunerative proposition.

S t a a l h a u g e n.

The mine is situated south of Baldoivi and in the same direction. The lode has been opened up by 2 adits along the strike of the lode with a respective length of 12 and 15 meters. This lode has also a considerable extent, and has about the same type as the ore from Ingeborg.

Nearer description is omitted, as on account of its being situated somewhat far from the other mines, this lode has been regarded as reserve lode only.

Concentrating plant.

The concentrating plant at Saltdalen constructed to treat 160 tons per day x 300 = 48.000 tons per year. The Copper on the lode averages 3 per cent of Cu, hence with a recovery of

Mining & flotation cost etc.

The cost of mining transport and flotation of the ore from the "Ingeborg" lode can be fixed at kr. 12.50 per ton of ore, it being assumed that the crude ore being delivered to the concentrating plant as an average will contain 3 per cent Cu. The specified cost should be estimated as follows:

Mining (breaking of ore) pr. ton	kr.	5.00
Transport total delivered, concentr. plant . .	"	2.00
Timbering	"	0.50
Sorting crude	"	1.50
Flotation	"	3.50
Total:	kr.	12,50

Hence the production cost will be as follows:

9.26 tons crude ore x kr. 12.50 gives total	"	115.75
Transport and freight per ton concentrate U. K. or Continent	"	15.00
	kr.	130.75

Basing £ 1 equal kr. 18.20.

Self cost delivered C.i.f. U.K. or Continent per ton concentrate . . . . . £ 7.3.0.

Bases for sale of copper produced:

Terms B.S. price less 1.3 unit and £ 15

1 ton of concentrate	250 kg.	copper
Less 1.3 unit	13 "	"
Nett	237 kg.	copper

Present London price £ 68 per ton of 1016 kg. B. S.

Smelters charges/					
on concentrate deduct	15	"	"	"	"

Nett: £ 53 per ton of 1016 kg. B. S.,

which at present rate of exchange (£ 1 equal kr. 18.20 norwegian

Brutt & nett profit if sold as concentrate.

Income.

5180 tons concentrate
5180 x Kr. 225.15 delivered O.i.f. Kr.1.166.377

Less expences.

5180 tons concentrate
5180 x 130.75 O.i.f. . . . . " 677.285

Giving brutt profit: Kr. 488.992

Deduct Wages to staff, general expences and
taxes Kr. 3.- per ton crude ore 48.000 x 3.- " 144.000

Nett to capital . . . . . Kr. 344.992

which in English currency makes:

£ 1.0.0 = Kr. 18.20

profit: £ 19.000

and in U.S.A. currency makes one dollar = Kr. 3.72

profit: £ 92.700

If the above concentrate were smelted on the spot by the Westly copper smelting process (not electrolytic), the profit would be considerably increased. * By using the new Westly method or electrothermic smelting now in Vogue in Sweden and hence also applicable to this country where waterpower can be obtained still cheaper, the copper sold will be in the form of Bessemer copper and sold without any deduction based on B.S. London quotation on date of sale. Present London price for such copper is about £ 68 pr. 1016 kg., or in norwegian currency kr. 1.20 pr. kg. metal. The electric energy to smelt 5180 tons of concentrate pr. year based on 300 days i.e. about 17.1/4 tons of concentrate per day would be about 400 Kw. and the smelting expenses per ton concentrate should by the Westly electrothermic process not exceed Kr. 57.- per ton of concentrate or about kr. 230.- per ton equal

less 6 % loss nett 1218 tons.

5180 ton concentrate	per ton (kr. 115.75) £ 6.7.0...	£ 32.893
5180 " "	smelting per ton concentrate (kr. 57.-) £ 3.3.....	" 16.317
		£ 49.210
Above represent 1218 tons copper nett	freight per ton U.K. £ 1.10.0..	" 1.827
Wages Norway staff, taxes general expences etc. calculated at kr. 3.- per ton crude	(48.000 x 3.- = kr. 144.000)....	" 8.000
	Total expences	£ 59.037
Sale price C.i.f. London		
1218 tons copper á £ 68.0.0		£ 83.824
Less expences		" 59.037
	Nett	£ 24.784

In the capital required of above 1½ million Kroner were not included smeltingplant, but as the price index since the index prices of above were estimated, has dropped to points 193 compared to 1914, so will the capital be ample to also include the smelting plant and increase of power to meet demand. The capital required should be £ 80.000.- The profit would on above be about 32 % on the capital. I must point out that the Ingeborg lode, which is a very strong one, below the lake, should at least carry the same quantity as based above lake level, making a total of at least 1,5 million tons of copper ore.

I will also point out that the Baldoivi lode which for the present will be kept in reserve, leaving it to the company when the Ingeborg lode (which is the nearer one to the cost,) has been in operation for some time, to expend operation also to this large field. This Baldoivi lode which corresponds to the best known lode in Sulitjelma (Jakobsbakken) should, although my opinion not can be fixed with, exact figures as to quantity, become when opened up a large producer. The ore shipped from there will con-

5000 meters, the proved length by shallow shafts and adits 2000 meters, the largest depth attained by diamond drilling 43 meters. As Baldoivi not can be tackled for the time being, I have not so closely gone into what this mine can be worth, but assuming one not calculate with the known length of 5000 meters, but strictly adhere to the proven length of 2000 meters and further base the width on 1,5 meters and the sp. gr. of the ore to 3.

One will then here have 2000 x 1,5 = 3000 m3 x 3 = 9.000 tons per meter sunk. A lode of this description and length imbedded in a micaceous schist will as a rule continue on depth for a goodly distance and one can certainly reckon with that this lode will yield several millions tons of ore, of that I am positively certain.

By the new electric ore finding devices, I consider it possible to find other ore bodies between Ingeborg and Baldoivi. Taken as a whole I consider that the Saltdalen group possesses just as good possibilities to become a large producer as now is the case with the Sulitjelma ranges of mines. It is capital which is required to open up the lodes, when this can be furnished the success will be given. -

O s l o, June 15th 1928.

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Report on flotation trials with
copper ore from "Ingeborg", Saltdalen.

To my disposition for above trials were first received samples of a very oxidized character containing 4,63 per cent of Cu. This sample was mixed with an equal quantity country rock from the same mine. With this sample a few trials were made of which 2 were analysed:

Sample nr. 247.

Weighed in 1000 gr. á 2,36 per cent Cu.
Received: 71 gr. Cu concentrate á 17,63 per cent Cu.
929 " Tailings " 1.21 " " "
This give an extraction of 53 per cent.

Sample nr. 253.

Weighed in 1000 gr. á 236 per cent Cu.
Received 144 gr. Cu Concentrate á 11.30 per cent Cu.
856 " Tailings " 0.89 " " "
This gives an extraction of 69 per cent.

Both above mmed tests may be regarded as very poor, and as the reason may be due to the artificial mixing of the ore with country rock, new tests were to be made solely based on sample of "fresh ore" from the mines. The result of the tests made shows that the above named anticipation with regard to the previous bad results was correct.

The new sample was rather rich in copper namely 6.27 per cent Cu. This is somewhat ackward for the tests itself. One has namely to work with a nearer weighed in quantity, for instance 1000 gr. and when one then with a rich ore as above fin-

cult to recover. This will, however, when working on a commercial scale not occur, as one here then are working with a continuous flow of ore which adjust itself.

It will therefore from the below teste be seen that even if the extraction is rather good (about 82 - 86 per cent), so is the copper left in the tailing still too high.

In order not to be deceived of the too nigh in the copper left tailing, so were the in nr. 276 received tailing again floated under a correct mixing of the pulp from which it were made clear that one very easy could get out the rest of the copper left and that the final tailing were reduced to 0.43 per cent of copper, which in this instance may be terned as very good, as the recovery were brought up to 96 per cent of the total copper in the ore.

The two below mentioned tests is the result of a series of trials made, when amongst other things also was fixed the right fineness to which the ore has to be crushed and as only this is analysed, it shall be referred in full:

Test nr. 276: The sample were crushed to 84 per cent + 200 mesh.

Weighed in 800 gr. crude ore á 6.27 per cent Cu
Received 150 " Copper centrate "28.50 " " "
" 650 " tailing " 1.12 " " "

which gives an extraction of 86 per cent.

From above received "tailing" 1.12 per cent Cu were again weighed in 250 gr. and floated from which were obtained:

16 gr. Concentrate 11 a á 11.3 per cent Cu.
234 " Tailing á 0.43 " " "

If both above named results is added together one get:

Crude ore:	6.27	per cent	Cu.
Copper concentrate	25	" "	"
Tailing	0.43	" "	"
Extraction	96.00	" "	of total copper.

which gives an extraction of 82.5 per cent.
As flotationmean were used "Barret" nr.4 (creosoteoil).

As will be seen one does not obtain with this oil the fine high concentrate which one also could expect, as, as far as I know no other mixture than the "X-Cake-Xylidine" has been capable to produce a so wonderfull high concentrate as 28.5 per cent of copper. (In Porsa are obtained with "X-Cake-Xylidine" the same class of high concentrates).

Conclusion: The ore from the "Ingeborg" Saltdalen flotates well. One can obtain very fine and high in per centage of copper concentrates of about 25 per cent of Cu, despite the large contents of magnetic pyrites and iron pyrites which is in the ore. The extraction will as a minimum be 80 per cent.

Before an eventual start operation on a large scale, it shall be recommended that one take out a as much as possible correct average sample of the ore which one will use when actual working and then preferably another type then the one now made tests with. This sample which I presume should be in the neighbourhood of 2.5 per cent of Cu. ought to be trialflotated in order to make a check on already made tests. Should also these tests confirm the result of the now obtained copper concentrate and extraction, so can one with safety build a concentrating plant. It has always been proved that the results obtained in the laboratory is correct, as a rule one obtain even better results when working on a commercial scale. -

(signed) Fred. Egeberg.

A p p e n d i x.

The neighbouring mine to Saltdalen ore Sulitjelma.

Until the end of 1924, the Sulitjelma mines on the other side of the mountain had been in operation for 35 years and had in all produced:

Sulitjelma mines.	Tons.	% S.	% Cu.
Crude ore broken.	5.455.200		
Of this quantity has been delivered:			
Pyrites to pulp factories and acid manufactories.	2.468.885	43.9	3.11
Copper ores sent to smeltere	18.688		7.43
Copper ore smelted on the spot	368.257		
T o t a l:	2.855.830		

The ores smelted in Sulitjelma from above has given the following products:

Smelted ore.	Tons.	% Cu.
Exported matt	2.836.5	33.87
Bessemer Copper	17.392.5	
Copper ores from other sources	552.4	

The average of the crude ore in Sulitjelma in 1924 were as follows:

	% S.	% Cu.
Crude ore average	24.70	2.15
By handpicking, mechanical treatmant and flotation, the following quantities were obtained:		
1. Lump ore by handpicking	44.0	3.02
2. Fines from handpicking	41.0	3.15
3. Smelting ore	28.0	9.07
4. Concentrated ore from Washing plants	43.6	2.82
5. Concentrates from flotation plant	34.5	6.96

The total tonnage of pure sulphur and copper (Bessemer etc.) derived from the Sulitjelma ores shipped until end of 1924 has been:

Tons sulphur 1.083.950
" pure copper 96.928

The actual production capacity of the Sulitjelma mines are calculated to be 7000 tons per meter sunk and this is anticipated to be maintained. In this tonnage is not included the reserves available from other occurrances, which so far not has been opened up. With above as an average they should at the Sulitjelma mines have for disposal:

Actual ore	-	2,200,000 tons
Possible	-	4,500,000 "
Probable	-	Important quantity.