

Røstvangen

J. Killi



Energy, Mines and  
Resources Canada

Canada Centre for  
Mineral and Energy  
Technology

CANMET

555 Booth Street  
Ottawa, Canada  
K1A 0G1

Énergie, Mines et  
Ressources Canada

Centre canadien de la  
technologie des minéraux  
et de l'énergie

555 rue Booth  
Ottawa, Canada  
K1A 0G1

Kjersti Larsen  
Folldal Verk A/S  
2661 Hjerkin  
Norway

January 7, 1991

Dear Ms. Larsen,

I have conducted some cursory tests on your oxidized Cu ore samples. I apologize for the delay caused by some renovation work taking place in our laboratory.

Since you were not able to provide sufficient mineralogical information, it was found to be very difficult to make a proper reagent choice. Nevertheless, we have achieved very encouraging results. Our simple and unique approach to treating oxidized sulphide ores has enabled us to achieve the following results.

**SAMPLE I (labelled very oxidized)**

From the few tests conducted it can be concluded that a Cu recovery of about 87-89% may be obtained. The concentrate can be upgraded to higher than 24% Cu. The recovery of Zn can be improved to 75 to 80% in the bulk concentrate. The treatment of this sample required a de-sliming step before grinding to remove the micaceous gangue that seriously interfered with the flotation. This component constitutes about 11% of the ore. A better knowledge of the mineralogy, liberation analysis and optimum flotation conditions may allow higher than 90% Cu and 85% Zn recovery. (The ore contains 0.95% Cu and 0.18% Zn and the tests were conducted under non optimized conditions).

**SAMPLE II (Labelled "oxidized")**

This sample did not require any pretreatment steps. A few indicative tests conducted show that 94 to 96% Cu and 75 to 85% Zn can be concentrated in about 20% of feed material (note that such an upgrading is usually difficult for oxidized sulphide minerals). Only one concentrate cleaning test was conducted (without reagent additions) and it has been observed that the concentrate cleans

Canada

very well. (The feed sample contains about 0.8% Cu and 0.6% Zn). We believe that a far better result could be achieved if the flotation parameters are carefully screened and optimized. If the deposit is of any interest to you we suggest the following steps:

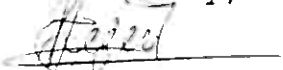
1. carry out quantitative and qualitative mineralogical analysis on both samples; determine the liberation size,
2. perform flotation reagent selection and optimization of conditions,
3. conduct locked cycle tests and process evaluation.
4. develop a flowsheet.

Unless we are requested to do so, we are not intending to make more investigation on the samples at least in the immediate future. We assure you that despite its high degree of oxidation the ore can be made amenable to treatment by flotation providing a high metal recovery.

CANMET's well established mineralogical and ore dressing laboratories can provide you with quality information which you may require for further planning. In case you decide for supplementary test work for a flowsheet development, we can send you a proposal in which the terms and conditions for undertaking such a study are stipulated.

We look forward to hearing from you.

Yours truly,

  
T. Negeri, Ph.D  
Ore Dressing Scientist.

cc: W. Cameron  
L. Kuehn

TEST No: FV1-2

PRODUCT	WEIGHT (%)	A S S A Y		CUMMULATIVE GRADE		CUMMULATIVE RECOVERY	
		%Cu	%Zn	% Cu	%Zn	%	%
1. Cu CON	1.03	10.94	0.76	10.94	0.76	14.70	4.68
2. Cu CON	0.92	7.44	0.66	9.29	0.71	23.61	8.30
3. Cu CON	0.80	5.26	0.65	8.11	0.69	29.14	11.43
Cu SCAV	1.60	8.66	1.29	8.31	0.91	47.22	23.77
Zn CON	3.16	2.83	0.81	2.83	0.81	11.70	15.34
TAIL	92.49	0.34	0.11	0.34	0.11	41.08	60.89
HEAD-CALCU	100.00			0.77	0.17	100.00	100.00

TEST No: FV1-3

PRODUCT	WEIGHT (%)	A S S A Y		CUMMULATIVE GRADE		CUMMULATIVE RECOVERY	
		%Cu	%Zn	% Cu	%Zn	Cu (%)	Zn (%)
1. Cu CON	4.87	18.01	1.32	18.01	1.32	86.01	41.57
2. Cu CON	1.16	4.98	1.62	15.50	1.38	91.69	53.76
3. Cu CON	2.10	1.41	0.78	11.86	1.22	94.59	64.35
Cu SCAV	0.00	0.00	0.00	11.86	1.22	94.59	64.35
Zn CON	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAIL	91.87	0.06	0.06	0.06	0.06	5.41	35.65
HEAD-CAL	100.00			1.02	0.15	100.00	100.00

TEST No: FV1-4

PRODUCT	WEIGHT (%)	A S S A Y		CUMMULATIVE GRADE		CUMMULATIVE RECOVERY	
		%Cu	%Zn	% Cu	%Zn	Cu (%)	Zn (%)
1. Cu CON	2.25	24.25	1.22	24.25	1.22	57.32	15.21
2. Cu CON	1.38	11.76	1.84	19.51	1.46	74.34	29.26
3. Cu CON	1.54	6.44	1.85	15.62	1.57	84.75	45.04
SLIME	12.88	0.27	0.04	0.27	0.04	3.65	2.86
Zn CON	3.74	0.65	0.84	0.65	0.84	2.56	17.42
TAIL	78.21	0.11	0.08	0.11	0.08	9.04	34.68
HEAD-CAL	100.00			0.95	0.18	100.00	100.00

TEST No: FV2-1							
PRODUCT	WEIGHT (%)	A S S A Y		CUMMULATIVE GRADE		CUMMULATIVE RECOVERY	
		%Cu	%Zn	% Cu	%Zn	% (Cu)	% (Zn)
1. Cu CON	9.64	8.16	1.32	8.16	1.32	93.49	22.36
2. Cu CON	0.80	2.44	2.53	7.72	1.41	95.80	25.92
3. Cu CON	3.23	0.44	2.15	6.00	1.59	97.49	38.13
	0.00	0.00		6.00	1.59	97.49	38.13
1. Zn CON	5.66	0.07	2.35	0.07	2.35	0.47	23.35
2. Zn CON	2.51	0.06	0.64	0.07	1.82	0.65	26.17
	0.00	0.00	0.00	0.07	1.82	0.65	26.17
	0.00	0.00	0.00	0.07	1.82	0.65	26.17
TAIL	78.16	0.02	0.26	0.02	0.26	1.86	35.70
HEAD-CALC	100.00			0.84	0.57	100.00	100.00

Timed flotation

TEST No: FV2-2

PRODUCT	WEIGHT (%)	A S S A Y		CUMMULATIVE GRADE		CUMMULATIVE RECOVERY	
		%Cu	%Zn	% Cu	%Zn	% (Cu)	% (Zn)
CLEANING							
1. Cu CON	2.50	15.69	0.69	15.69	0.69	53.48	2.99
2. Cu CON	0.93	10.17	0.64	14.19	0.68	66.37	4.03
3. Cu CON	2.45	5.86	1.20	10.73	0.89	85.90	9.12
4. Cu CON	2.57	1.99	1.64	8.07	1.12	92.87	16.43
Cu CLNR T	8.49	0.33	1.31	4.19	1.22	96.68	35.70
Cu RGHR C	16.94	4.19	1.22	4.19	1.22	96.68	35.70
• Zn CON	15.59	0.07	2.25	0.07	2.25	1.49	60.79
TAIL	67.47	0.02	0.03	0.02	0.03	1.84	3.51
HEAD-CAL	100.00			0.73	0.58	100.00	100.00

Cu rougher cleaning was timed.

Double the amount of copper sulphate used to activate Zn in test no. FV2-1 was used.