

823190

COMPANY: TECK CORPORATIONINTER-OFFICE LETTER      DATE: March 30, 1982

TO:      W. Meyer

FROM:    W.D. Madeley

COPIES TO:

R. Drozd  
 J.L. May  
 → R.O. Page

WHEN FEASIBLE, CONFINE LETTER  
 TO ONE SUBJECT

RE:

Grenoble Metallurgical Testing

Lakefield has done 10 flotation tests to date, 5 on each of the samples provided by Dick Page. (each sample is a composite of 5 holes, memo ROP to WM, Nov. 24, 1981). No optimization has been done so recoveries could possibly be improved slightly. Recoveries from unconfirmed results of the best tests, estimated for the samples provided, and assuming a conservative 50% recovery of recirculated middling values are:

1. Dacite ore - sample A

	Recovery	
	25% Cu Conct.	20% Cu Conct.
copper	95	97
gold	89	93

2. Serpentinite ore - sample B

copper	91	94
gold	81	85

The flowsheet for the best tests consists of a primary grind to about 60% - 200 mesh, bulk flotation, regrind to about 98% - 200 mesh and flotation of a copper concentrate with pyrite depression. One or two stages of cleaning prior to regrind will probably be required for the serpentinite ore.

*Metallurgy*

2. Copper flotation with cyanidation of tails.
3. Copper flotation followed by pyrite flotation of tails and cyanidation.
4. Cyanidation of ore followed by copper flotation.

Option 1 appears to be the most favourable at present since mineralogical examination of flotation products shows chalcopyrite inclusions in pyrite as fine as 7 microns, which could be occluded in pyrite unless a very fine primary grind is used. Tests 9 and 10 show the relative success of this treatment and the Cu recovery vs Au recovery plot illustrates this as well as the close relationship between the recoveries of the two metals.

X ?

Further tests should include:

- ?! 1. selection of a more representative sample;
2. primary and regrind testing;
3. confirmation of best results;
4. locked cycle tests;
5. cyanidation of feed, flotation tails and intermediate products.

Attached are a summary of tests completed to date, summary metallurgical data for the best tests 6, 9 and 10, copper grade - recovery curves and a copper recovery vs gold recovery curve, plus copies of Lakefield's mineralogical reports.

Please indicate if you wish to pursue further test work for this property.

Grenoble Flotation Test Summary

Cu	Grade		Recovery		Stage	Calc. Au Head	Remarks (PAX & CaO reagent except as noted)
	Au		Cu	Au			
7.9	92.1		77.5	49.0	3	5.6	Cu float @ 62% - 200, no regrind
5.8	49.6		82.4	57.4	3	3.23	Cu float @ 82% - 200, no regrind
9.9	47.7		88.2	77.7	4	5.49	Cu float @ 62% - 200, no regrind Na <sub>2</sub> CO <sub>3</sub> pH regulator
0.3	22.3		87.1	64.9	4	3.50	Cu float @ 62% - 200, no regrind Na <sub>2</sub> CO <sub>3</sub> pH regulator
4.4	61.7		88.3	53.2	3	4.38	Cu float @ 62% - 200, regrind ro. con.
9.9	51.5		91.3	75.9	3 Cu cl	3.74	bulk sulphide float, regrind, Cu float
7.2	45.3		93.9	79.3	2 Cu cl		
3.1	34.9		95.4	81.7	1 Cu cl		
1.2	36.2		93.9	81.1	4 Cu cl	3.91	same as 6
1.3	40.8		78.6	34.6	4 Cu cl	3.41	same as 5
0.7	121.4		84.1	66.5	3 Cu cl	5.2	same as 6 with slightly less PAX
5.2	112.5		92.0	78.9	2 Cu cl		
9.1	92.9		95.1	92.3	1 Cu cl		
0.0	49.2		70.5	37.8	5 Cu cl	3.55	same as 6 with slightly less PAX
5.6	62.3		82.3	65.4	4 Cu cl		
2.1	58.8		86.3	75.0	3 Cu cl		
9.7	53.2		88.8	78.6	2 Cu cl		
4.3	39.1		93.1	83.2	1 Cu cl		

GRENOBLE FLOTATION TEST

Primary grind to approx. 60% - 200 mesh, bulk sulphide float  
regrind to approx. 98% - 200 mesh, copper float

Reagents: Potassium amyl xanthate, lime, MIBC

6

Product	Weight %	Assays, % g/tonne		% Distribution	
		Cu	Au	Cu	Au
aner Conct.	5.52	19.9	51.5	91.3	75.9
aner Tail	1.04	2.97	12.1	2.6	3.4
aner Tail	2.22	0.82	4.12	1.5	0.4
aner Tail	20.36	0.14	2.39	2.4	13.0
leaner Tail	23.53	0.030	0.21	0.6	1.3
leaner Tail	14.68	0.064	0.32	0.8	1.3
er Tail	32.66	0.030	0.31	0.8	2.7
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.)	100.00	1.20	3.74	100.0	100.0

Grades and Recoveries

aner Conct.	6.56	17.2	45.3	93.9	79.3
aner Conct.	8.77	13.1	34.9	95.4	81.7
leaner Conct.	29.13	4.04	12.2	97.8	94.7
leaner Conct.	52.66	2.25	6.83	98.4	96.0
er Conct.	67.34	1.77	5.41	99.2	97.3

GRENOBLE FLOTATION TEST

Primary grind to approx. 60% - 200 mesh, bulk sulphide float  
regrind to approx. 98% - 200 mesh, copper float

Reagents: Potassium amyl xanthate, lime, MIBC

9

Product	Weight %	Assays, % g/tonne		% Distribution	
		Cu	Au	Cu	Au
Concentrate	2.85	30.07	121.4	84.1	66.5
Concentrate Tail	0.80	10.3	80.8	7.9	12.4
Concentrate Tail	1.52	2.11	46.0	3.1	13.4
Concentrate Tail	13.69	0.17	1.85	2.2	4.9
Concentrate Tail	4.77	0.18	0.58	0.8	0.5
Concentrate Tail	76.37	0.026	0.15	1.9	2.2
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Total		1.04	5.20	100.0	100.0

Grades and Recoveries

Concentrate	3.65	26.2	112.5	92.0	78.9
Concentrate	5.17	19.1	92.9	95.1	92.3
Concentrate	18.86	5.37	26.8	97.3	97.2
Concentrate	23.63	4.32	21.5	98.1	97.7

GRENOBLE FLOTATION TEST

Primary grind to approx. 60% - 200 mesh, bulk sulphide float  
regrind to approx. 98% - 200 mesh, copper float

Reagents: Potassium amyl xanthate, lime, MIBC

10

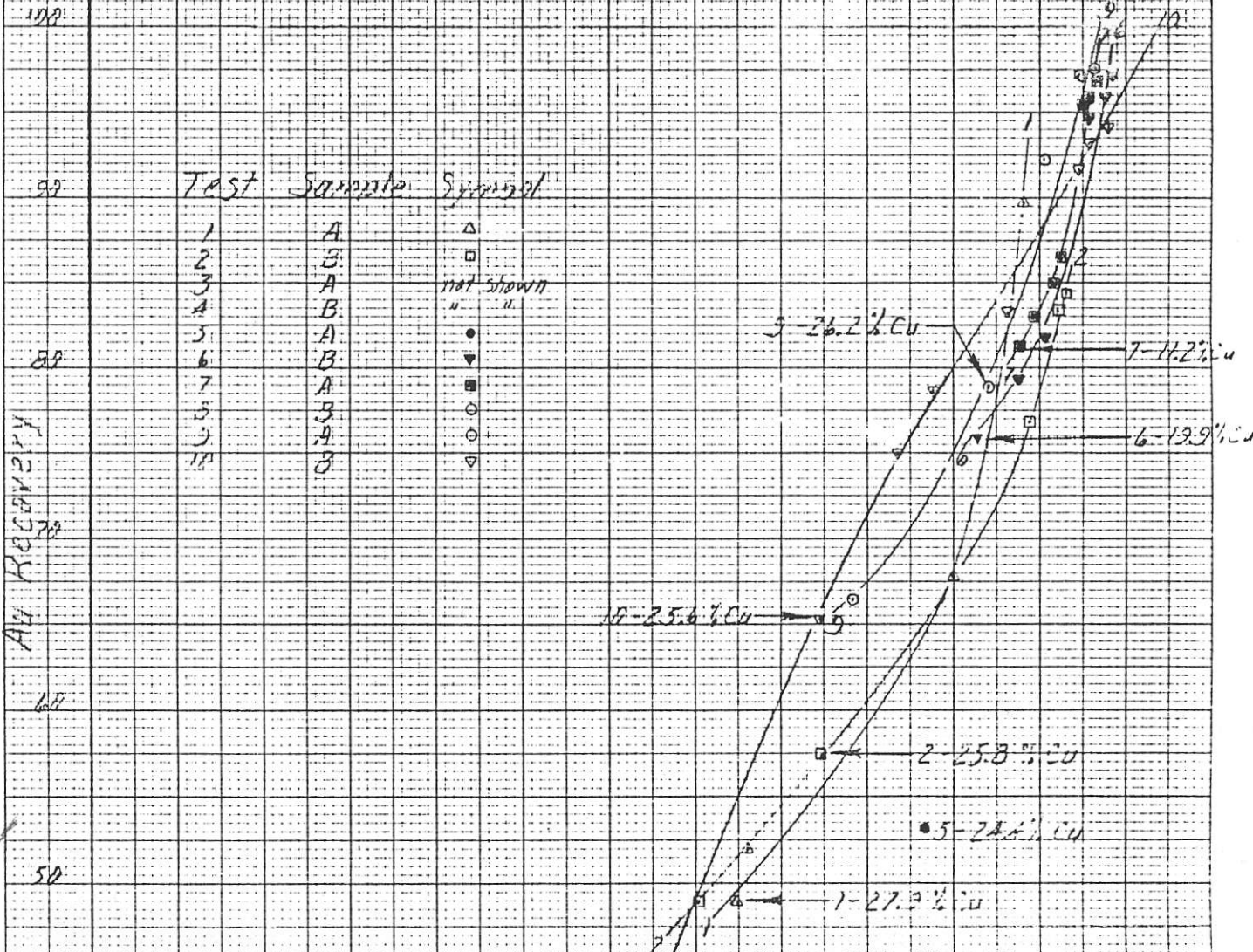
Product	Weight %	Assays, % g/tonne		% Distribution	
		Cu	Au	Cu	Au
aner Conct.	2.73	30.0	49.2	70.5	37.8
aner Tail	1.00	13.7	97.9	11.8	27.6
aner Tail	0.80	5.86	42.5	4.0	9.6
aner Tail	0.72	4.05	17.9	2.5	3.6
aner Tail	2.31	2.16	7.07	4.3	4.6
aner Tail	19.10	0.26	1.75	4.3	9.4
leaner Tail	10.53	0.058	0.20	0.5	0.6
leaner Tail	16.55	0.039	0.22	0.6	1.0
er Tail	46.27	0.037	0.44	3.5	5.7
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.)	100.00	1.16	3.55	100.0	

Grades and Recoveries

aner Conct.	3.73	25.6	62.3	82.3	65.4
aner Conct.	4.53	22.1	58.8	86.3	75.0
aner Conct.	5.25	19.7	53.2	88.3	78.6
aner Conct.	7.55	14.3	39.1	93.1	83.2
leaner Conct.	26.65	4.25	12.3	97.4	92.6
leaner Conct.	37.18	3.06	8.9	97.9	93.2
er Conct.	53.73	2.13	6.2	98.5	94.2

Grenoble

Cu Recovery vs. Au Recovery



Au Recovery

Cu Recovery

100

99

88

78

68

58

36.2% Cu

11.2% Cu

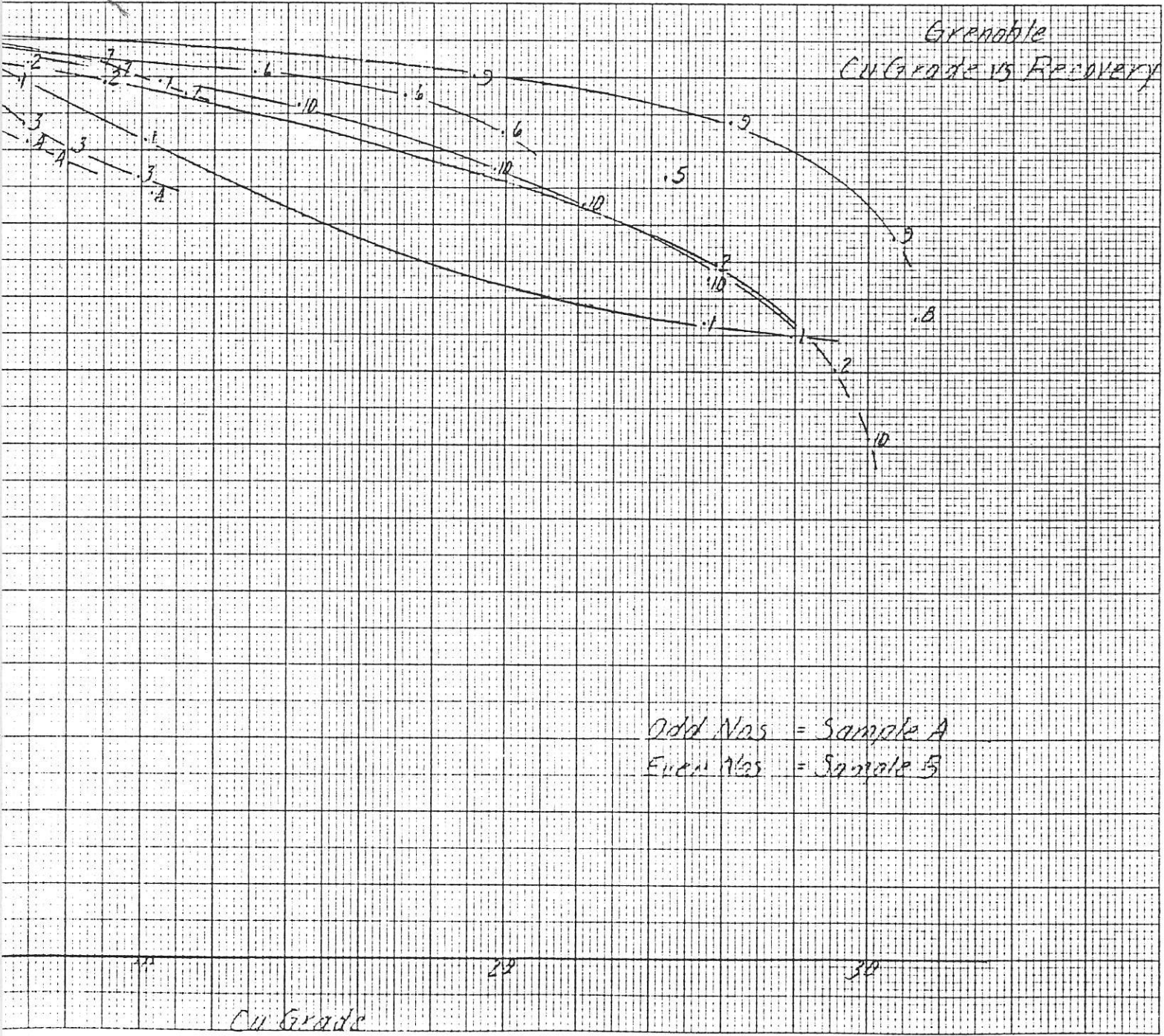
19.9% Cu

25.6% Cu

25.8% Cu

24.4% Cu

27.3% Cu





COMPANY: \_\_\_\_\_

INTER-OFFICE LETTER

DATE: February 18, 1982

COPIES TO:

TO: *R.O. Page*

FROM: *W.D. Madeley*

WHEN FEASIBLE, CONFINE LETTER  
TO ONE SUBJECT

RE: *Grenoble Order of Magnitude Costs*

*As you requested, I have derived preliminary, order of magnitude capital and operating costs for a 300 stpd concentrator for the Grenoble property. (Note that we do not have a flowsheet at this stage.)*

*The assumptions used were:*

- 1. The flowsheet is simple flotation only.*
- 2. No unusual crushing or grinding problems.*
- 3. Average conditions throughout regarding foundations  
plantsite water availability, etc.*
- 4. Service and administration buildings, access roads and  
power line costs are not included.*

*The costs are:*

*Capital cost - \$6.0 million  
Operating cost - \$13/s.t.*

*When we have more data on the characteristics of this ore, and further flotation testwork has been done, we will be able to design a flowsheet, and give a more precise cost.*