FALCONBRIDGE

Memorandum

Date: January 21, 1985

To: D.J. Emery

Copies to:

From: P. J. Raleigh

Subject: **Applied Research In Copper Arsonate Plant**

The process proposed by Bill Drinkard, President of Applied Research, is shown on the attached sheets. The process is considered to be propriatory.

1. The process shown is a modification of the process seen at Equity Silver in Houston, B.C. The Equity plant was run to purify their copper silver concentrate of unwanted AS_2O_3 and other impurities soluable in NaOH. The plant was run using the Applied Research process for a start time 2-3 months.

   Market conditions for the concentrate improved and it is now more economical to ship dirty concentrate to Japan for smelting.

   The Equity plant was a very expensive unit to operate with pressure leaching and a multiplicity of filtering units. No economical use can be made of the plant where it is, as extensive modifications would be needed. The operators are now looking for alternate products from the Noranda group to process in the plant.

2. The products resulting from the run at Equity were used by Applied Research to produce C.C.A. wood preservatives at their plant in North Carolina. The product was quite acceptable to their customers.

3. As a result of the loss of product from Equity, Applied Research approached Giant in an effort to get an assured supply of raw material. Negotiations on this are in progress.

4. The raw material AS_2O_3 from Giant needs to be purified before it can be used in any process. In addition, it needs to be oxidized to AS_2O_5, mixed with Copper Oxide (CuO.) and Chromic Oxide (Cr_2O_3) in proportions specified in A.S.T.M. standards, so it can be used as a wood preservative.

The Applied Research Process uses the impure product to produce an intermediate product called Copper Arsenate, which can be used for making various wood preservatives by adding Chromic Acid or Amonia to make a specification product.

By products from the current process would include only gold recovered from the crude AS_2O_3 sludge and the resulting sludge.

Air borne pollutants would only be amonia which will be recovered to the maximum extent possible.

The plant as currently imagined, can be built in Yellowknife but at the expense of transporting copper, amonia and packaging materials to Yellowknife and back to source. Plus, the cost of moving a higher value product from Yellowknife to the use location. Net effect is expected to favour a processing location near the end user, e.g.

AS_2O_3 to North Carolina	@ .15¢/#	
6000 x 2000 x .15	$= 1.8 \times 10^6$	- (1)
Product to market $22 \times 10^6 \times .02$¢	$= .440 \times 10^6$	
Total	2.24×10^6	

Copper, amonia and bags to YK 4000T @ .05¢/#	$= .4 \times 10^6$
Product to Users $22 \times 10^6 \times .15$¢	$= 3.3 \times 10^6$
	3.7×10^6
Net savings in N.C. =	1.46×10^6/year

The plant in the use location appears to be justified on the transport basis.

A plant required to produce products as envisaged by Applied Research would be similar to the one at Connly, Ga., owned by Koppers Corp. The Koppers plant is only capable of purifying the AS_2O_3 for use in their process.

Major cost items are not in the process area but in the receiving and storage of raw materials and the packaging and storage of product.

A plant as projected, capable of receiving 6000 tons of raw material to produce 22×10^6 pounds of product with a nominal moisture content of 7% is expected to be as follows:

Based on operations of 250 days/year, two shifts of 8 hours each and making the process as continuous as possible with a 4 hour residence in any process tank, the major equipment would be as follows:

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1. Truck Scale 40' long
2. Truck Unloading Station (Vacuum)
3. AS_2O_3 Storage S-lo and Vent System 500T
4. AS_2O_3 Feed System to Process 10T/h
5. NH_3 Storage Tank 10T
6. NH_3 Feed to Process (Distr.)
7. Arsenic Leak or Leach (?) Tank and Agitator 2 @ 12x12
8. Transfer Pump 100 gpy
9. Clarifyer Thickner 5' @ $65,000.
10. Centrifudge for Sludge 5T/d
11. Sludge re Pulp Tank 6'x6'
12. CaCN Contact Tank and Aggitator 6x6
13. Carbon Screen (Sweco)
14. Disposal Pond and Recycle Pump $50,000.
15. Contact Tank and I---pellar 12x12
16. Heat Exchanger (Cold Hot Plate Type)
17. Boil Out Tank and Heaters 6x6 Electric
18. Amonia Still? $100,000.
19. Copper Storage Tank $10,000.
20. Product Filter Dryer (Small Unit) $100,000.
21. Product Packaging (Tank and Scales) $100,000.
22. Steam Plant - 10,000#/hr. if not electric
23. Compressed Air 200 cfm
24. Instruments and Laboratory $100,000.
25. Water Supply and Power Supply
26. Staff of 4 people @ $150,000./year
27. Building - 4000 sq. ft. @$50.00. = $200,000.

The accompanying flow diagram is our initial attempt to describe the process. Discussions with Applied during the later part of January should clarify the areas where process changes have been made.

The cost of producing the Copper Arsenate product is expected to be ± 30¢/#, assuming copper costs at 60¢/# and Arsenic Trioxide is transported to a site in the use area in the U.S.

Profits from operations should be better than $3,000,000./year, assuming gold content is ± .2 oz. per ton.

Capital cost estimates of near $4,000,000. were generated using the scheme shown on the flow diagram.

I trust this will be useful as a basis for ongoing discussions.

P. J. Raleigh

PRJ/rh

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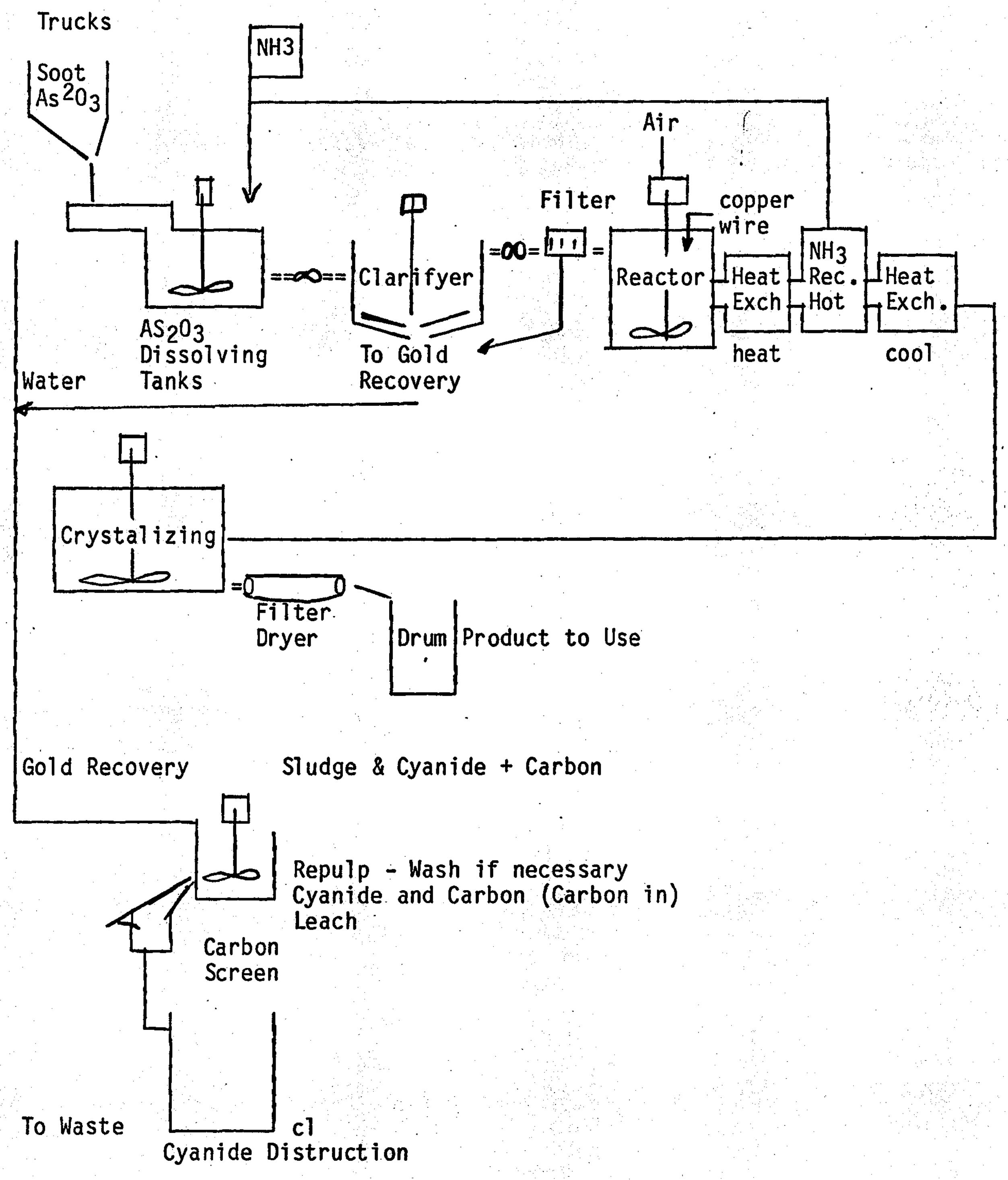
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Soot
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Filter
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Tanks
Clarifyer
To Gold
Recovery
Reactor
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heat
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Hot
Heat
Exch.
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Water
Crystalizing
Filter
Dryer
Drum
Product to Use
Gold Recovery
Sludge & Cyanide + Carbon
Repulp - Wash if necessary
Cyanide and Carbon (Carbon in)
Leach
Carbon
Screen
To Waste
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