



To: D. J. Emery

Subject: Giant Yellowknife Hot Water Leach Refined As₂O₃.

Date: February 11, 1980

INTER-OFFICE MEMORANDUM

H.O. 331-4-79

From: D. N. Zeraldo

Copies to: PJR, TJD, L. Connel, R. Hatch, P. Berry, FGTP, L. Price.

At this point in time it is important to review the 2 years spent by various groups of individuals in Falconbridge in investigating and analysing whether the Giant mine can and should invest in a process to produce refined arsenic trioxide for sale to the North American market. It is the writer's understanding that the following conclusions have been made:

- (1) The "hot water leach" pilot plant program at the mine resulted in successful production of refined product. Mine personnel have confirmed that a full-scale hot water leach process will produce a high quality As₂O₃ product.
- (2) Samples of the pilot plant product were sent to major U.S. buyers, all of whom confirmed it to be an excellent product which they were interested in purchasing as soon as possible.
- (3) An alternative product which could be sold by Giant is its baghouse dust which historically runs at about 80-85% As₂O₃. Mine operating personnel have confirmed that the precipitators cannot be fine-tuned to continuously produce a baghouse product grading 92% As₂O₃ which would be the minimum grade required by buyers of this product. Hence this is not a feasible alternative.
- (4) Alternative processes such as "pressure-leach" or "fuming" which could yield a refined product have been eliminated from further consideration because of one or more of the following reasons:
 - (1) A capital cost higher than hot water leach;
 - (2) Extremely long time period required for further pilot plant testing;
 - (3) Inhouse metallurgical opinion that the (fuming) process will not produce a marketable product.
- (5) The capital cost of the hot water leach plant is \$U.S. 2,200,000.

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Given the problems (both cost and environmental) that Giant has in disposing of about 4,000 SDT/year of its baghouse dust it is clear from the above conclusions that the hot water leach process presents the only metallurgical solution to Giant.

In terms of economics, the hot water leach process should still be a very attractive proposition to Giant, even at a capital cost of \$U.S. 2,200,000. Provided in the appendix is a 'Giant return on investment calculation'. The calculation indicates that at current market prices, the project has a net present value of \$U.S. 1,600,000; an after tax internal rate of return of 31%; and a payback period of 2.4 years.

Conclusion and Recommendation

The market continues to be very tight and the opportunity exists for Giant to enter into 2-3 year contracts for its entire refined output. The writer cannot see any reason for Giant to delay further in proceeding with the installation of a hot water leach plant.

It is recommended that a meeting be scheduled for attendance by the following groups.

- (1) D. J. Emery
- (2) Toronto Engineering
- (3) Mine Management
- (4) Toronto Marketing
- (5) FNM Lab

The purpose of this meeting should be for all parties concerned to unanimously resolve whether or not to move ahead with the As_2O_3 refinery.

DNZ:dlr


D. N. Zeraldo

APPENDIX

TABLE 1 - PROJECTED GIANT MINE NETBACKS FROM BUYERS OF REFINED AS2O3

Annual Qty Sold (SDT)	Buyer	Buyer Location	Mexican f.o.b. Laredo Price	Bulk Rail Freight to Buyer (1979 Rates)	Giant Truck Cost to Buyer (1979 Rates + 20%)	Giant Mine Netback
			(US¢/lb)	+	(US¢/lb)	= (US¢/lb)
1,000 ST	Pennwalt	Texas (Bryan)	30.0		1.14	10.92
1,000 ST	V.P.G.	Texas (Bonham)	30.0		1.14	10.44
2,000 ST	Osmose	Tenn (Memphis)	30.0		2.29	10.68

WEIGHTED AVERAGE MINE NETBACK 21.07¢/lb
(\$US 422/ST)

TABLE 2 - GIANT RETURN ON INVESTMENT

		YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	PROJECT TOTAL
Quantity Produced/Sold	ST	-	4,000	4,000	4,000	4,000	4,000	4,000	4,000	28,000
Mine Netback	¢US/LB	-	21.07	21.07	21.07	21.07	21.07	21.07	21.07	21.07
	\$US/ST	-	422	422	422	422	422	422	422	422
Mine Revenue	\$US	-	1,688,000	1,688,000	1,688,000	1,688,000	1,688,000	1,688,000	1,688,000	11,816,000
Giant Investment		(2,200,000)	0	0	0	0	0	0	0	(2,200,000)
Operating Cost (\$US 130/ST)		-	(520,000)	(520,000)	(520,000)	(520,000)	(520,000)	(520,000)	(520,000)	(3,640,000)
Before Tax Cash Flow	\$US	(2,200,000)	1,168,000	1,168,000	1,168,000	1,168,000	1,168,000	1,168,000	1,168,000	5,976,000
Less Depreciation (30% D. Bal)	\$US	-	(660,000)	(462,000)	(323,400)	(226,400)	(158,500)	(110,900)	(77,600)	(2,018,800)
Less Taxes @ 40%	\$US	-	(203,200)	(282,400)	(337,800)	(376,600)	(403,800)	(422,800)	(436,100)	(2,462,700)
Plus Depreciation	\$US	-	660,000	462,000	323,400	226,400	158,500	110,900	77,600	(2,018,800)
Project After Tax Cash Flow	\$US	(2,200,000)	964,800	885,600	830,200	791,400	764,200	745,200	731,900	3,513,300
(A) Project After Tax Discounted Cash Flow (i = 12%)	\$US	(2,200,000)	861,400	706,000	590,900	502,900	433,600	377,500	331,100	1,603,400 N.P.V.
(B) Project After Tax Internal Rate of Return			31%							
(C) Payback Period			2.4 Years							