

FALCONBRIDGE NICKEL MINES LIMITED

INTER-OFFICE MEMORANDUM

DATE: April 3, 1979

TO: D. J. Emery

COPIES TO:

FROM: P. J. Raleigh

SUBJECT: TREATMENT AND SALE OF ARSENIC TRIOXIDE

The production of gold bearing arsenic dust from the roasting of the gold ores has been a problem in the Yellowknife area for many years. Traditionally the dust recovered by the baghouse units has been considered a waste product of very undesirable characteristics. The dust has been successfully disposed of in underground excavations.

The need to prepare data to justify additional expenditures of about \$717,000 for underground arsenic dust storage is scheduled for later in 1979. An alternate to the storage of the dust has been developed over the last year as a result of outside interest in the purchasing of arsenic for use in the wood preserving chemicals field. The alternative method involves the purification of the baghouse dust in hot water. The process will produce a saleable product and allow for the recovery of gold values now carried with the arsenic dust to storage.

Considerable study of the subject by several disciplines in the Falconbridge Organization, including, marketing, metallurgy, general engineering and the operations group at Yellowknife lead to the following recommendation.

1. That funds be appropriated for the design and installation of a Hot Water Arsenic Purification system with a design capacity of 6,000 tons of As_2O_3 per year. To produce a bulk Arsenic product for sale on the North American market. And to allow for gold recovery from the residue using present plant facilities.

The new plant has been estimated to have a Capital Cost of \$825,000 and other items are estimated at \$100,000 for a total of \$925,000.

Actual net cost of entering this new field would be \$175,000 over the cost of new underground storage stopes.

2. That the plant should be placed in operation at the earliest possible date to:
 - (a) To take advantage of the significant financial returns that the proposed endeavour will provide Giant.
 - (b) Eliminate the need for new storage stopes underground at Giant.

- (c) To take advantage of the current tight market situation in Arsenic supply, and to establish ourselves as reliable suppliers of the product to users in the U.S. and Canada.
- (d) To recover additional volumes of gold from current operations and from stored materials.
- (e) To be able to treat stockpiled arsenic residues considered environmental hazards in the Yellowknife area thus benefiting the community.

Your consideration of the proposal and the accompanying data we hope will allow you and your advisers to react favourably to the request for an early go ahead on the project.



P. J. Raleigh

PJR/vl

As₂O₃ TREATMENT COSTS

CAPITAL COST

Plant Capital \$ 825,000 (see attached Est.)

Liability on Transport Contract 100,000 (Est. from Trimac info)

TOTAL CAPITAL COSTS \$ 925,000

OPERATING COST FOR 6,000 T/YEAR PLANT

Pre revenue operating costs not included!

Labour

(8) Operators @ 22,000/year \$ 176,000 X

Supervisor @ 20% 35,200 X

MAINTENANCE

@ 5% of Capital Cost \$ 41,250 X

SUPPLIES

Fuel @ 1.5¢/# As₂O₃ \$ 180,000

Power @ 250 Kw @ 300.00/Kw 75,000 X

Steam @ .5¢/# As₂O₃ 60,000

Water 5,000

PLANT OVERHEADS

Payroll, Warehouse, Mgt. etc. \$ 50,000 X

OPERATING COST PER YEAR

\$ 622,450

* Fixed - 377 450
Variable - 245 000
622 450

\$
(0.05187/#As₂O₃)

SELLING PRICE (March 1979)

From selling price at Atlanta - Gas 25.2¢ (Mar. 79 Price from FIL)
Shipping to -13.0 (Est. from Trimac)

Insurance, etc. 12.2¢
- 1.2 (Est. PJR)

NET SELLING PRICE

\$0.11

NET VALUE TO GIANT OF As_2O_3	\$0.11¢/#
Sales Value at Giant Yellowknife	\$1,320,000
Arsenic Values (Net) (1320,000 - 622,450)	<u>\$ 697,550</u>

GOLD VALUES FROM 6,000 TONS/YEAR - (Assume Dust is 80%
 As_2O_3 & has .25 oz/ton
 Au Recoverable)

Tons Dust treated $\frac{6,000}{.80} = 7,500$ T/Year

Gold recovered $\frac{7,500}{75.00} \times .25 = 1875$ oz.

Cost of Gold Recovery @ 35.00/oz. = \$65,625 (Recovery) x (Avg. Au Content)

Value of Gold recovered 1875 x 276.00 C\$ - 517,500 ✓

GOLD VALUES NET 451,875

≤ 87.1 % *too high!*
 (should be 70 %)

As_2O_3 + Gold Values net \$1,149,425

A 6,000 T/year facility has the potential to return the Investment in less than one year.

April 3, 1979

CASE II (worst case)

Treat only current production from Giant Baghouses with no supplemental feed to fill the plants proposed capacity.

Current Product is

+ 3500 Tons/Year of 90% As_2O_3 containing 0.1 oz. of Gold recoverable.

Capital Cost

Pilot Plant capital is Op Costs
As previous

?
\$925,000.00

Per revenue operating costs say 4 mos:

$\frac{173,000.00}{1098,000.00}$

Operating Cost

Proportioned to production

$3150/6000 \times 622,450$

this isn't right!

326,786.00

Fixed: 377,450

Variable: 128,620

Gold Costs 350×35.00

12,250.00

506,070

518,320

Revenue

As_2O_3 @ .11/#

693,000.00

Gold

96,000.00 ← *high*

TOTAL SALES

789,600.00

Net on Sales

\$450,614.00

271,280

Calculated rate of return is in excess of 40% based on a 6 Year project life. Based on total investment of \$925,000.00.

April 3, 1979

CAPITAL COST ESTIMATEFALCONBRIDGE NICKEL MINES LIMITEDENGINEERING DEPARTMENT, TORONTOPROJECT: _____ DESCRIPTION: ARSENIC RECOVERY PROJECT NUMBER: _____LOCATION: GIANT YELLOWKNIFE MINES LTD. HOT WATER LEACH AREA NUMBER: _____PREPARED BY: L. HURST DATE: MARCH 13, 1979 REVISION & DATE: _____ SHEET 2 OF 3

ACCOUNT NUMBER	DESCRIPTION	QUANT.	H.P. W.H.P.	TOTAL WEIGHT	M.H. UNIT COST @ 18.00		ESTIMATED COST				TOTAL
					LABOUR	MATERIAL	LABOUR	MATERIAL	SUB. CONTR.	EQUIP.	
	SETTLED STORAGE TANK (EXIST)										
	WITHDRAWAL PUMP		15	500	10	20	180	20		2,200	2,400
	PACKAGED 2 STAGE BURNER SYSTEM		40	6,000	300	1,000	4,800	1,000		93,000	98,800
	TRANSFER PUMP		15	500	10	20	180	20		2,200	2,400
	2 PRESSURE LEAF FILTERS			10,000	200	1,000	3,600	1,000		142,000	146,600
	PRECOAT TANK AND PUMP SYSTEM		2	2,000	50	200	900	200		20,000	21,100
	COLLECTING CHUTES (2)			1,200	50		900	900		-	1,800
	WITHDRAWAL SCREWS (2)		5	800	50	200	900	200		10,000	11,100
	DISCHARGE CHUTES (2)			800	20		360	600		-	960
	4 x 6 RUBBER LINED MIX TANKS (2)			1,600	10	50	180	50		2,000	2,230
	2 AGITATORS (10 HP EACH)		20	600	30	500	540	500		10,800	11,900
	TRANSFER PUMPS (2)		15	1,000	20	40	360	40		5,600	6,000
	AIR SPARGE TANK 10' ϕ x 10' x 5'										
	CONE			5,800	100	200	1,800	200		25,000	27,000
	ROOTES BLOWER 1700 CMF @ 10 PSI		100	5,700	30	100	540	100		19,000	19,640
	CONDENSER			700	20	200	360	200		2,000	2,560
	CRYSTALLIZING TANK 10' ϕ x 10'H x										
	5' CONE			5,800	100	200	1,800	200		26,000	28,000
	AGITATOR & BRIDGE		2	4,000	30	700	540	700		10,000	11,240
	COOLING BUNDLES			1,500	50	500	900	500		34,000	35,400
	DISCHARGE PUMP		15	500	10	20	180	20		2,200	2,400

CAPITAL COST ESTIMATE

FALCONBRIDGE NICKEL MINES LIMITED

ENGINEERING DEPARTMENT, TORONTO

PROJECT: _____ DESCRIPTION: **ARSENIC RECOVERY** PROJECT NUMBER: _____

LOCATION: GIANT YELLOWKNIFE MINES LTD. HOT WATER LEACH AREA NUMBER:

PREPARED BY: L. HURST DATE: _____ REVISION & DATE: _____ SHEET 3 OF 3

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