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To ..... Directors .....

Date December 5, 1985

Copies To .....

Ref. ....

From ..... D. J. Emery .....

Subject ..... ARSENIC PROJECT - PROGRESS REPORT .....

At the Directors' meeting of April 16, 1985, approval was given to spend up to \$50,000 in research at Lakefield to investigate the possibilities of producing copper arsenate (CA) for the wood preservative industry using a process developed by Applied Research of Charlotte, North Carolina.

Initial work, totalling \$15,000, has shown that the process has merit, although there may be some problems in separating and disposing of residues.

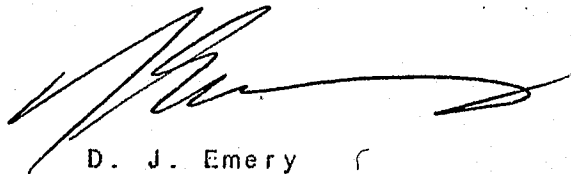
Since the Directors' meeting, William Blythe and Co. Ltd. of England (a member of the Hickson Group, with annual sales of 134 million Pounds) has acquired control of Applied Research. Blythe officials have met with us on two occasions to explore the possibility of joint venturing a pilot plant in England to prove up the technology at a proposed cost of US \$500,000.

They have suggested joint venture terms in which Giant would contribute 40% of the project money for the pilot plant and also for construction of a full scale plant if successful, for 40% of the net proceeds. Giant would provide  $As_2O_3$  at no cost to the joint venture. We are attempting to negotiate more favourable terms.

In the event that suitable terms can be achieved, Directors approval will be required for an expenditure of approximately US \$250,000 for the pilot plant work.

The attachments from P. J. Raleigh, Chief Engineer of Falconbridge Limited, and S. O. Fekete, Giant's Consulting Metallurgist, indicate the need to do this work before committing to a full scale plant. The assessment indicates that we may be able to improve on the revenues from the sale of arsenic over what we are presently obtaining by selling the crude product to Koppers. An increase in annual revenues in the order of \$1.5 million could be anticipated.

A meeting with Blythe is being scheduled for late January at which time a decision will have to be made on whether to enter into the joint venture pilot plant work. A vote of Directors will be taken by phone at that time (or at our next meeting February 12, 1986) to obtain approval for the necessary expenditure of approximately US \$250,000.



D. J. Emery

/kas

Attachments



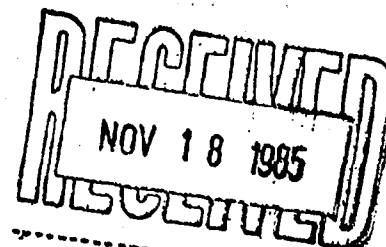
FALCONBRIDGE

RG-1473

## Memorandum

Date: November 15, 1985  
To: D.J. Emery Yellowknife, N.W.T. (Rapi fax: (403) 873-2980)  
Copies to: P.J. Raleigh  
From:  
Subject: Arsenic Project

RAPIFAX



Giant has pursued several avenues for the disposal of both their current Arsenic Trioxide production, and the large volumes of the material stored underground, during the last few years. In 1985 interest in processing the raw material has been increasing, with sales to Koppers Corp. at or near current production levels. Tests at the Con Mine of Cominco Ltd., and at Wm. Blythe, a subsidiary of Hickson Int. in Britain, were undertaken to determine the treatment characteristics of the raw material.

Since Giant is the major North American source of Arsenic Trioxide it has an advantage on the continent, in that it can ship the raw material in bulk, a considerable saving to the end user and a financial plus for Giant.

As part of the ongoing efforts to market all the stored material in the mine, a joint venture scheme has been proposed by the American Subsidiary of Wm. Blythe, whereby Giant would be the supplier of raw arsenic trioxide to a facility to be built in the South Eastern U.S. The facility proposed will produce a non toxic product known as Copper Arsenate, using a partly developed process owned by "Wm. Blythe U.S.". The Non-Toxic Copper Arsenate (C.A.) would be used in conventional formulations of Copper Chrome Arsenate which is a wood preservative used in most countries. Copper Chrome Arsenate (C.C.A.) is considered toxic until it is chemically combined into treated wood.

The new process allows for impure arsenic to be substituted for purified material and offers the processor advantages in the use of lower priced metallic copper in the formulation of the non-toxic product.

The facility is proposed to process 5,000 T/year of  $As_2O_3$  from Giant and may be expected to be on line in 1987. Test work to define the flow sheet and equipment parameters is being determined and approval is sought for the actual work.

Giant may be expected to ship volumes of  $As_2O_3$  to its customers as follows:

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Value of the C.A. is as follows:

Normal route to C.A. Equivalent Operating Costs

Purified As <sub>2</sub> O <sub>3</sub> - @ 45¢/		
Oxidation to As <sub>2</sub> O <sub>4</sub> @ 5¢/# of Product	50¢/# x .6 =	.30
Copper Oxide Pure @ \$1.10/#	1.10/# x .4 =	.44
Value of C.A. as 60% As <sub>2</sub> O <sub>4</sub> , 40% CuO	=	<u>.74¢</u>

Value of C.C.A. wood preservative by conventional route:

50% C.A. (37¢) + 50% CrO <sub>3</sub> (40¢)	=	\$0.77/#
Sales value normally		\$0.88/#

The Blythe route to C.A. (Operating Costs Only)

	Operating Cost of C.A.
As <sub>2</sub> O <sub>3</sub> ex Giant @ 5¢/#	
Transport 18¢/#	
Processing Cost @ 7¢/#	
As <sub>2</sub> O <sub>3</sub> 30¢/# x .6	18.0
Copper as Metal @ 65¢/# x .4	26.0
Processing Cost @ 6¢/# C.A.	6.0
Total	<u>60.0</u>

Value of CCA wood preservative by the non-toxic C.A. route is 50% C.A. (30¢) + 50% CO<sub>3</sub> (40¢) = 70¢

Increased value of arsenic going the Blythe route is (77-70) - .3 = 23.3¢/# contained in the C.C.A. mixture.

If Giant gets 49% of difference then they get an additional 11.5¢/# of As<sub>2</sub>O<sub>3</sub> contained after Joint Venture charges.

Value of gold in material recovered from underground and shipped to the Joint Venture may be as follows, assuming 85% As<sub>2</sub>O<sub>3</sub> in the dust and .369 oz. of Au per ton (2000#) of dust for 1,000 T of pure As<sub>2</sub>O<sub>3</sub> the gold values are as follows:

Residue 176.0 T

Gold 1,176 x .369 = .433.8 x .9 = 390 oz.

Value @ 325.00/oz. U.S. = 126,750 - 10,560 = U.S.\$116,190

Treatment cost of \$60.00/T of residue.

Calculated values to Giant from the Blythe Giant Joint Venture are as follows:

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Year	To Koppers from Current Production @ 90% As <sub>2</sub> O <sub>3</sub> (Tons)	To Wm. Blythe U.S. from U.G. @ 85% As <sub>2</sub> O <sub>3</sub> (Tons)	Total Shipments (Tons)
1986	3,000	2,350	3,000
1987	3,000	2,350	5,350
1988	3,000	3,500	6,500
1989	2,000	4,700	6,700
1990	2,000	5,900	7,900

Therafter, current production plus underground material as the market dictates.

Koppers currently is not returning any real revenue to Giant but is saving the cost of disposal. In 1986 it is anticipated Koppers will return the gold bearing residue to Giant, also some revenue from the arsenic dust is expected, probably 5¢/# of As<sub>2</sub>O<sub>3</sub> contained.

The following is my estimate of revenues from Koppers over a 5 year period, in U.S.\$, assuming gold at \$325.00 and treatment costs at \$60.00/T. Dust to Koppers is 90% pure and 0.08 oz. Au/T.

Year	Tons Shipped	Revenue from As <sub>2</sub> O <sub>3</sub>	Revenue from Au	Total
1986	3,000	\$270,000	\$52,200	\$322,200
1987	3,000	270,000	52,200	322,200
1988	2,000	180,000	34,800	214,800
1989	2,000	180,000	34,800	214,800
1990	2,000	180,000	34,800	214,800

Residue = 3000 x .9 = 300 T

300T of residue @ .8 Au

240 oz

240 oz. @ .9 recovery

216 oz

Gross Revenue 216 x 325.00

\$ 70,200

Less Treatment Cost 300 x 60

(18,000)

\$ 52,200

For 1986 & 1987

The joint venture with Blythe U.S. should be more interesting as Giant will benefit from the value added feature of the process being developed and gold values are indicated to be higher in product from underground.

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<u>Year</u>	<u>Tons of As<sub>2</sub>O<sub>3</sub></u>	<u>Tons of Dust @ 85%</u>	<u>Value at Giant 0.01@/#</u>	<u>Gold Value</u>	<u>J.V. Participa- tion</u>	<u>Total</u>
1986	-	-	-	-	(2.7x10 <sup>6</sup> )	(2,700,000)
1987	2,000	2,350	40,000	232,380	460,000	732,380
1988	3,000	3,500	60,000	348,570	690,000	1,098,570
1989	4,000	4,700	80,000	464,760	920,000	1,464,760
1990	5,000	5,900	100,000	580,950	1,150,000	1,830,950

Note: Value at Giant allows for a payment of 5¢/# less operating costs of 4¢/#. J.V. costs assume Giant contributes its 49% of the capital as cash (probably not the case).

Result of expected shipments is as follows:

<u>Year</u>	<u>Koppers Revenue</u>	<u>J.V. Revenue</u>	<u>Gold Revenue</u>	<u>Cash Flow Cumulative</u>
1986	270,000	(2,700,000)	52,200	(2,377,800)
1987	270,000	460,000	284,580	(1,363,220)
1988	180,000	690,000	383,370	(109,850)
1989	180,000	920,000	499,560	1,489,710
1990	180,000	1,115,000	615,750	3,400,460

Annual revenues may be expected to be in the range of U.S.\$1,900,000 after 1990 if the situation develops as projected.

At this point in time, two items will require further work by Giant

1. The recovery of material from underground. This will require further test work and if successful the design and purchase of equipment, and technology to ensure the volumes of material are available.
2. a) The pursuit of a suitable joint venture agreement with Wm. Blythe U.S. for the development and commercialization of the new copper arsenate process.
- b) The approval of Giants' participation in the research work proposed by Wm. Blythe for the development of the new copper arsenate process.

P.J. Raleigh



FALCONBRIDGE

RG-1492

## Memorandum

Date: December 5, 1985

To: D.J. Emery - via Rapifax

Copies to: P.J. Raleigh, F.G.T. Pickard

From: S.O. Fekete

Subject: ARSENIC PROJECT

As you requested, herewith the writer's thoughts on the subject:

1. Lakefield were requested in May to conduct some exploratory tests on the dissolution of  $As_2O_3$  from crude dust and characterize the residues produced. Tentative conclusion based on this work was that it will be difficult to dissolve and remove all the soluble  $As_2O_3$  and produce a residue which might be classified as non-hazardous. The best they could achieve was about 5% water soluble  $As_2O_3$  in the residue.

The work was terminated in August pending review of progress made by AR and clarification as to who will do what. In the meantime, the Hickson group got into the picture and appear to be in a position to carry out the necessary work.

The cost of the work carried out at Lakefield was about \$15,000.

2. Judging from our discussions with Tom Robson the Hickson group does seem to have the financial and technical acumen to develop and commercialize the concepts advocated by AR. It is recommended that Giant support this work and contribute up to \$250,000 to develop bench and pilot plant scale data to be used for a feasibility study and design of a commercial facility.
3. Giant's contribution to the development expenses should be made contingent on sharing in the program planning and gaining reasonable access to the information obtained. It should also be recognized that the expenses at this stage are to be considered venture capital with no guarantee that a viable process will result.

*S.O. Fekete*

S.O. Fekete

SOF:sc