GIANT YELLOWKNIFE MINES LIMITED

WAROX PROJECT

1989

DRAFT FEASIBILITY STUDY

DATED SEPTEMBER 15, 1989

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GIANT YELLOWKNIFE MINES LIMITED

WAROX JOINT VENTURE PROPOSAL

APRIL 6, 1990

GIANT YELLOWKNIFE MINES LIMITED

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TABLE OF CONTENTS

SECTION A

WAROX PROJECT PROPOSAL

SECTION B

REQUEST FOR INTERIM FINANCING

INTRODUCTION

The Yellowknife Division of Giant Yellowknife Mines Ltd. has examined a number of potential sources of revenue from what could be described as non-conventional resources. The Tailings Reclaim Project is one such resource, and it is the belief of those involved with the WAROX project that recovery of baghouse dust from underground storage could be another major source of revenue for many years to come.

Giant Mines has what is probabably the world's richest stockpile of gold bearing arsenic trioxide dust and is in a very favourable position to reclaim and market the contained products. The following report describes how and why this should be accomplished.

EXECUTIVE SUMMARY

The 221,000 tons of baghouse dust presently stored in underground chambers contains approximately 132,000 oz. Au and 173,000 tons of arsenic trioxide. This material, containing high gold concentrations, was placed during the early years of the operation when feed grades were very high and recovery methods were relatively crude.

Technology has recently been developed that will permit a highly efficient separation of pure arsenic trioxide from the dust, resulting in a saleable form of arsenic trioxide and a gold bearing residue from which the gold can be readily extracted.

Marketing of the arsenic trioxide product, registered by Giant in the USA and Canada as WAROX, an acronym for White ARsenic OXide, has been the subject of a full scale study, and, though a large market exists for the product, producers have recently become quite competitive and a relatively conservative marketing schedule has therefore been used in the detailed financial analysis for the project.

It is anticipated that a plant having production capacity of about 7,000 stpy, using up to 15,000 stpy of crude baghouse dust as feedstock, will be adequate, at least for the first ten years of operation. During the first two years of operation, bulk trailer or drum packaging will be used. As tonnages increase, a bulk rail transfer facility will significantly reduce operating costs, half of which are taken up in shipping costs.

The capital cost for the plant, including underground reclaim installation, underground ramp and drift development, suface purification plant, and rail transfer facility, is approximately $10,500,000. It is proposed that the project be undertaken immediately, to be in full scale production by January, 1991. Construction and plant commissioning will take place during all of 1990. Construction of the transfer facility will be delayed until summer of 1992.

The in-situ value of the gold and arsenic components of the dust at prices of C $465/oz for gold and C $0.33/lb for arsenic is $61 million and $114 million respectively. In addition, there is about $6 million in recoverable gold contained in surface accessible crown pillars surrounding some of the storage chambers, that would otherwise not be available. $15 to $20 million in antimony oxide is contained in the dust but so far there is no proof that this can be recovered in a saleable concentration. Indications during antimony elimination testwork were that a two stage hot filter technique could produce a high quality antimony concentrate, but further work is required.

The current cost of storing baghouse dust is $200,000/yr; commitment to the WAROX project will eliminate this operating cost from the conventional mining operation. Preparing the storage chambers for permanent abandonment following mine closure is potentially a high cost item and removal of the dust will eliminate the need for this.

Overall, a 9.5 year financial projection indicates that revenues of about $74.5 million at an operating cost of $32.2 million can be expected. It is interesting to note that the project does not rely on WAROX sales to be profitable. During the first seven years of operation, gold sales from baghouse dust reclaim will total $31,739,000 and if WAROX is not sold, the gold will be produced at an operating cost of $12,233,000. Capital cost of a gold recovery plant would be perhaps 35% less than that for an arsenic purification plant complete with transfer facility, say $7,115,000. The full scale plant has a payback period of only 1.3 years, an after tax NPV of $8,969,000 using a 15% discount rate and an after tax IRR of 58 %.

The project is quite insensitive to changes in parameters. For example if gold or arsenic prices are reduced by as much as 50%, or if capital or operating costs increase by 50% or more, the project still has a positive NPV.

PROJECT HISTORY

Mining operations at Giant began in 1948 but prior to this, metallurgical testwork showed that the complex ore would require special treatment to liberate the gold from the arsenopyrite with which it was intimately associated. In those days, the most practical treatment for refractory sulphide ores was autogenous roasting of the concentrate followed by calcine cyanidation. This was the process that was selected for Giant and, though equipment modifications have been made over the years, this is still the preferred method.

Roasting of arsenopyrite concentrates results in the formation of impure arsenic trioxide vapours which are subsequently condensed and captured as a byproduct in fabric filters. Arsenic bearing dust from roaster exhaust gas has been stored in underground chambers at Giant since 1951 and today there are some 221,000 tons of dust in storage, containing approximately 132,000 oz. Au and 173,000 tons arsenic trioxide. The reserves listed by storage stope are listed below.

During the early 1980's, a serious effort was made to market a portion of the crude arsenic trioxide being produced at the time and a surface storage and bulk loading facility was built for the purpose. However, it was found that the product was incompatible with the client's process and shipments were stopped after a period of intermittent operation.

Prior to this, there was a major testing program done in 1979-80 to determine a practical means of upgrading the product to render it marketable and to recover the gold contained in the resulting residue. The testing program was quite comprehensive and involved pilot testing of the hot water leach/crystallization process that was subsequently installed at what is now the Nerco Con mine, as well as a series of fuming/condensation tests in lab scale done by Falconbridge Metallurgical Laboratory.

Both methods worked quite well on currently produced Giant baghouse dust, achieving product grades exceeding 99.4% As_2O_3 in the case of HWL and 99.7% using the fuming method.

STOPE	TONS DUST	% As	Oz/t Au	TONS As_2O_3	Oz Au
B2-30-36	65,501	46.48	1.255	40,200	82,260
B2-08	32,369	65.66	0.354	28,062	11,468
B2-12/13/14	65,355	61.75	0.452	53,285	29,576
C-12	18,679	65.60	0.172	16,179	3,214
C-9	20,276	67.48	0.124	18,067	2,512
C-10	10,548	66.83	0.134	9,307	1,408
B-11	6,459	67.41	0.139	5,749	896
B-12	2,015	60.00	0.228	1,596	459
TOTAL	**221,202**	**59.04**	**0.594**	**172,834**	**131,793**

TECHNOLOGY OF PROCESS

In 1980, Giant approached Falconbridge Metallurgical Labs to conduct laboratory scale testwork to investigate the technical feasibility of fuming of baghouse dust to produce a high purity arsenic trioxide product.

A sample of baghouse dust of the following composition was provided for the test.

Wt%			
As_2O_3	Fe	SiO_2	Sb
91.5	1.8	3.4	0.14

FML Fuming Tests

Seven fuming tests were carried out with modifications following each test. In general, nitrogen was preheated indirectly to 600-700° C in a stainless steel heat exchanger and passed through a 1" stainless steel fluid bed reactor. The arsenic bearing dust was fed with a fluidized bed feeder into the fuming reactor. The off gases and entrained dust from the reactor were passed through a flanged copper canister 6" dia X 12" long. At the flange there was a fibreglass cloth backed by a "Fibrefrax" felt filter paper, 1/8" thick.

A punched S.S. plate was used to support the filters and a 1/2" thick "Fibrefrax" blanket was used to insulate the hot filter from the condenser cooling coils in the other half of the canister. The cooled gas was then passed through a cold fabric filter followed by a caustic scrubber.

To carry out the tests, the furnace for the preheater was turned on and air was passed through the heat exchanger until the input air to the fuming reactor was at a constant maximum temperature, 600-700° C. Nitrogen was then used to replace this for the final run. The dust was added batchwise to the feeder, which was then sealed and the feeding was begun.

Some conclusions determined from the testwork were as follows:

1. The fuming of arsenious oxide from Giant Yellowknife baghouse dust in a fluid bed reactor appears to be technically feasible.

2. Product purity is excellent at 99.7% ***As_2O_3*** ***Fe*** ranged from 0.006 to 0.009%, ***Zn*** <0.001 to 0.002% and ***Sb*** 0.06%.

3. The fluidizer was quite clean after each test showing no signs of deposits in and around the dust entry point. The sand bed was virtually the same after

each run as at the beginning with no sign of ash fusing to the bed.

4. Pressure drop across the hot filter rose continuously throughout the tests, partially through intermittent overfeeding of the reactor and partially through condensation of arsenic trioxide between the "Fibrefrax" filter and the S.S. support plate. Temperatures maintained at >300° C appear to be adequate to prevent condensation of As_2O_3 in the hot filter.

5. Elutriation tests showed that even at 0.50 m/sec space velocity, only 50% of the dust is lost in 10 minutes, from a -14 + 65 m sand bed.

Research Productivity Council - Pilot Fuming Test

Following the FML testing, a rudimentary design and flowsheet for a 100 lb/hr pilot plant was produced. This design formed the basis for pilot testing performed by RPC during the summer of 1988.

Research and Productivity Council is a commercial testing facility in Fredericton, N.B. that was set up in 1962 and originally funded by the provincial government. It now operates independently and recovers operating costs by charging fees for its work. RPC has developed an expertise in fluid bed technology over the past 15 years and now has a number of various sized fluid bed reactors available for pilot testing. In addition to roasting of complex base metal sulphides, RPC has examined a number of other fluid bed processes including removal of arsenic from copper concentrates and roasting of antimony sulphide to produce an upgraded antimony oxide product.

In August of 1987, Giant examined the feasibility of building and staffing a pilot plant on site. It quickly became apparent that a pilot plant with the degree of sophistication required would be very expensive. It would also be difficult to staff with full time professionals. In considering alternatives, RPC was contacted and discussions indicated that pilot testing in RPC's facility would be preferable to building and operating a plant on site. Details for doing the testwork were ironed out and approximately 12 tons of baghouse dust collected from various locations underground were sent to New Brunswick as feed for the plant.

Pilot Plant Description

One of the fluosolids reactors at RPC, a 6" dia. model, was just the right size for the test program, capable of operating at a 1.2 ft/sec space velocity and a 20 - 30 lb/hr feed rate. Major modifications to the plant were required, however, and as a consequence, a rather lengthy delay to permit design, fabrication and installation of the specialized equipment was experienced.

Eventually plant modifications were complete and shakedown testing began in May, 1988. The plant equipment consisted of the following:

A 1 ton feed bin equipped with a vibrating bottom and a variable speed screw feeder

A fluosolids reactor with a 6" dia X 60" deep bed section and a 8" dia. X 96" freeboard. A selection of bed overflow heights was available

A propane burner to provide a hot, relatively inert gas stream to the windbox of the reactor

A hot baghouse equipped with 3M "Nextel" bags capable of operating at temperatures up to 1250° F. (later equipped with Mott nominal 0.5 micron sintered metal filter elements)

A condenser consisting of an S.S. cylinder through which the hot gas was introduced axially at one end, blending with cold air injected tangentially at several points along the length of the cylinder

A cold baghouse of conventional design

A rotary vacuum blower downstream of the baghouse

A wet gas scrubber using ferric sulphate solution as the scrubbing medium.

Pressure and temperature sensors throughout the system

Fuming Process Pilot Plant Results

Operation of the pilot plant was very successful, product grades exceeding 99.5% As_2O_3 being consistently achieved regardless of feed grade. Arsenic recoveries ranged from 99.6 to 99.9% with arsenic trioxide concentrations in the hot baghouse residue ranging from 1% to 5%. After some initial startup problems the plant proved to be very flexible and forgiving, permitting a wide range of operating conditions with few circuit upsets.

Testwork on gold bearing residues from the HWL pilot plant yielded recoveries of approximately 85% but these should not be directly compared with what recoveries might be expected from fuming plant residues. Gold recovery was not included in the FML lab scale fuming testwork but RPC pilot testwork indicates that recoveries in the high 80's can be expected.

Antimony elimination testwork using 3M "Nextel" filters with nominal 5 micron openings was not successful because of the very fine antimony oxide particle size, though these filters worked very well in removing all other particulate matter that could contaminate the WAROX product. Further testing using nominal 0.5 micron sintered metal filter elements was successful in collecting almost 97% of the antimony originally contained in the feed (reprocessed purified product), though single stage filtration resulted in a low purity (maximum 20%) antimony oxide concentrate, due to the necessity of using a filter cake from earlier testing to achieve the high pressure drop necessary for effective fine particulate capture. Two stage filtration using a 0.2 micron second stage filter would likely effect a high particle capture efficiency combined with a high purity antimony oxide product without the need for cake buildup to achieve a high pressure drop.

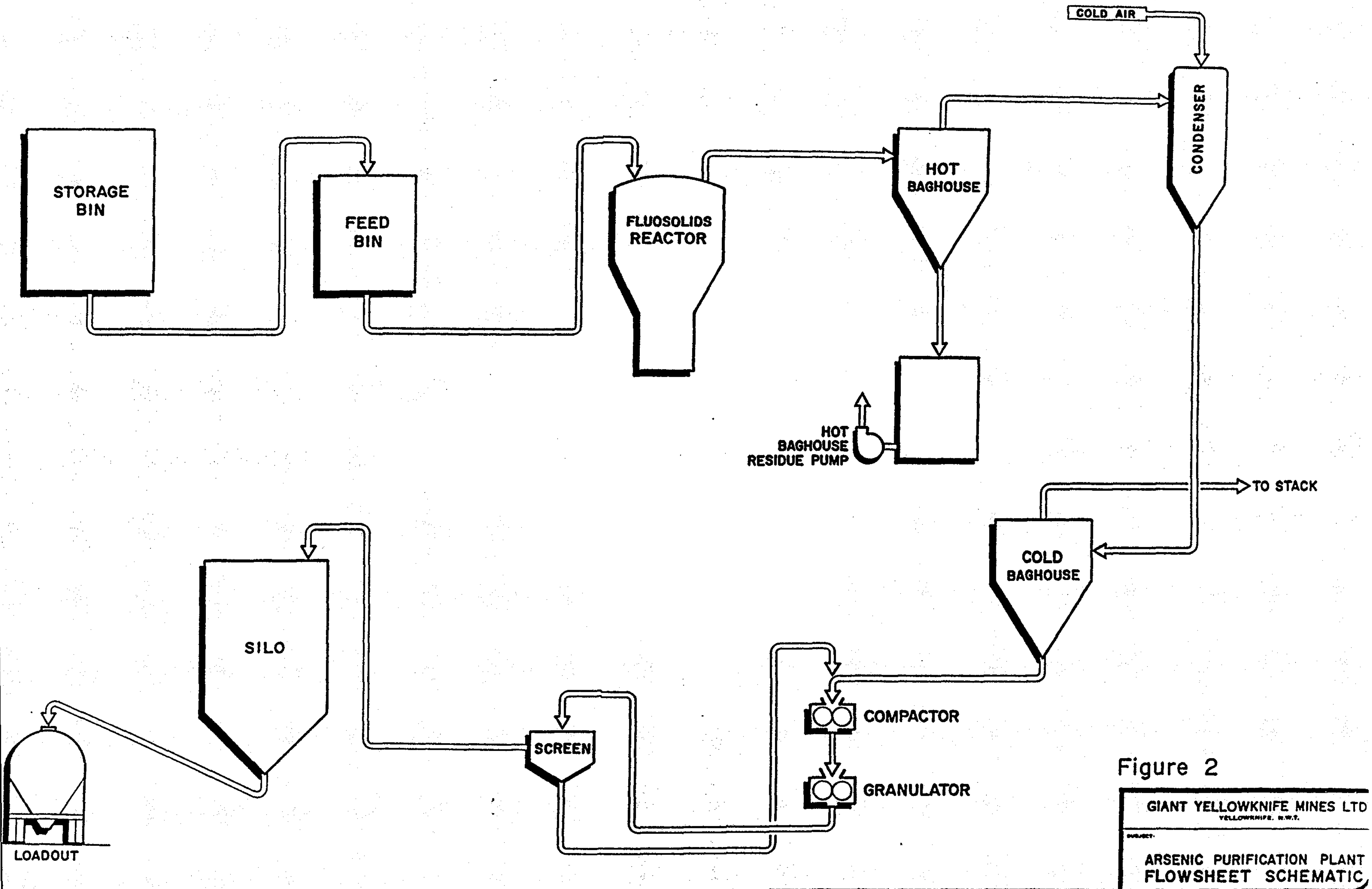

COLD AIR
CONDENSER
STORAGE BIN
FEED BIN
FLUOSOLIDS REACTOR
HOT BAGHOUSE
HOT BAGHOUSE RESIDUE PUMP
TO STACK
COLD BAGHOUSE
SILO
COMPACTOR
GRANULATOR
SCREEN
LOADOUT
GIANT YELLOWKNIFE MINES LTD
ARSENIC PURIFICATION PLANT
FLOWSHEET SCHEMATIC

Figure 2

UNDERGROUND RECLAIM

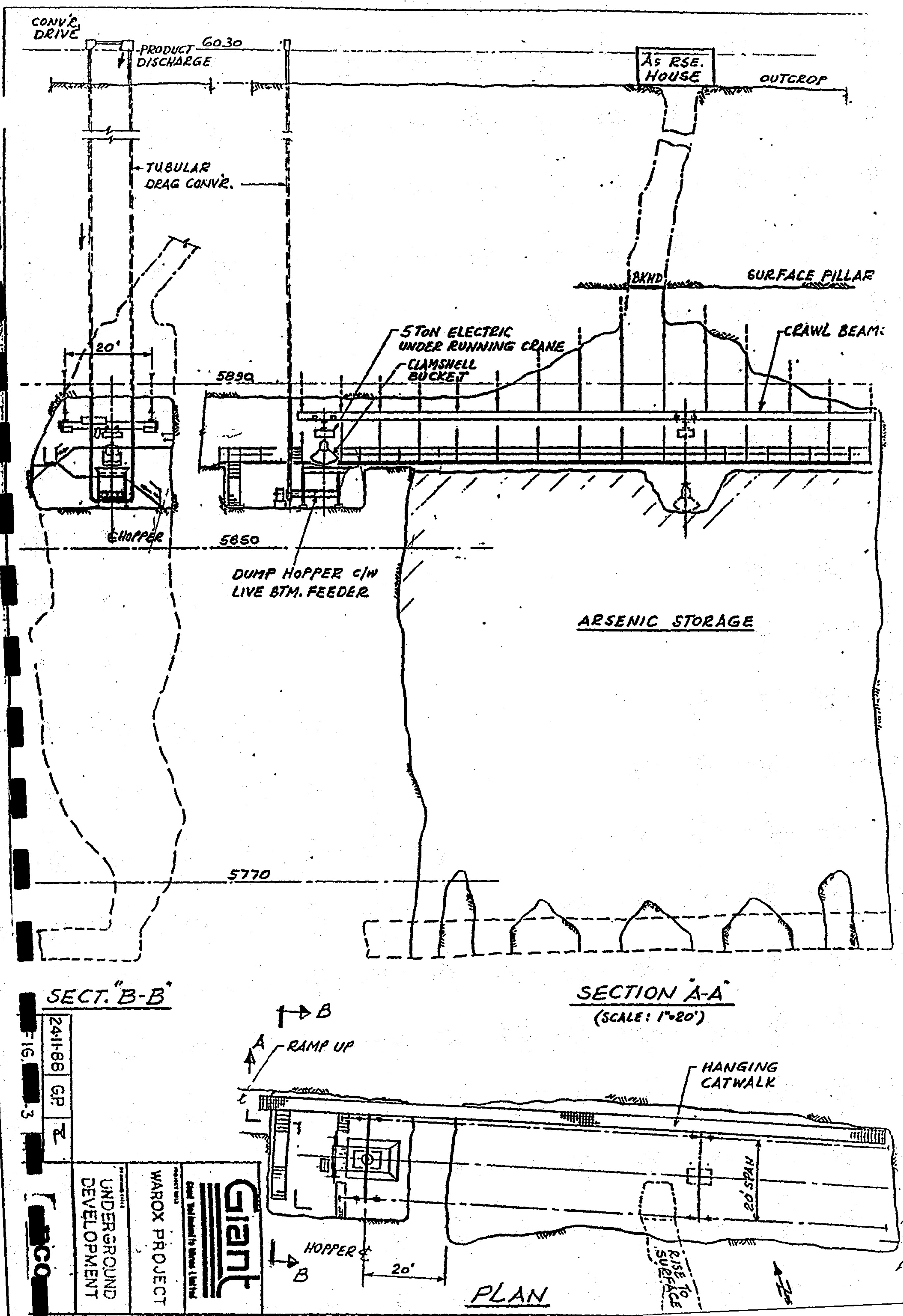
The reclaim method proposed for the project is similar to that used for bulk unloading of concentrate ships. In this case the entire system consists of four main components, a clamshell grab bucket, a double drum overhead crane, a vibrating feeder and a tubular drag conveyor. The 1 cu.yd. grab bucket is capable of recovering material of any consistency. The variable speed hoist will be sized so that cycle time under the most difficult of conditions will still permit recovery of a full day's supply of feed in less than one operating shift.

Operation of the equipment is expected to be very simple. The grizzly equipped vibrating feeder will receive the baghouse dust from the grab bucket and feed it into the tubular drag conveyor at a controlled rate. The tubular drag conveyor will transfer the material to surface and discharge into the surface storage silo or a surface conveying system.

The system is to be remotely controlled from the surface control room and the risk of arsenic exposure to workmen wil be limited to periods of installation or maintenance. The equipment will be selected so that maintenance requirements will be minimal and there will be very little exposure risk, workmen being required to wear special protective clothing and external air supply while they are in the arsenic storage chambers.

Installation of the equipment requires advancing a suspended platform to create a catwalk along the full length of the storage chambers. Once the catwalk is in place, installation of the overhead crane and other equipment can proceed. Installation of the tubular drag conveyor requires the drilling of 10" holes from surface to permit the 8" conveying pipelines to be installed.

In operation, the material reclaimed from underground storage will be stored in a 300 ton surface silo, allowing some extra capacity for maintenance and other interruptions to production. During the first few years of operation the tubular drag conveyor will discharge into the silo but, as distances increase due to reclamation from more distant storage chambers, a surface conveying system will be required. This may be either a pneumatic or mechanical system.


CONV'R. DRIVE
PRODUCT DISCHARGE
6030
AS RSE. HOUSE
OUTCROP
TUBULAR DRAG CONV'R.
BKHD
SURFACE PILLAR
5 TON ELECTRIC UNDER RUNNING CRANE
CLAMSHELL BUCKET
CRAWL BEAM
20'
5890
HOPPER
5850
DUMP HOPPER c/w LIVE BTM. FEEDER
ARSENIC STORAGE
5770
SECT. "B-B"
SECTION "A-A"
(SCALE: 1"=20')
B
A
RAMP UP
HANGING CATWALK
20' SPAN
HOPPER ℄
20'
RISE TO SURFACE
PLAN
FIG. [redacted] 3
24-11-88
G.P.
Giant
WAROX PROJECT
UNDERGROUND DEVELOPMENT
[redacted]CO

WAROX MARKETING

Although the WAROX project has the potential to earn good profits for the next several years even without sales of WAROX product, full scale operation relies upon reasonable arsenic trioxide market conditions and Giant's marketing agent, Dan Zeraldo, wastherefore asked to visit with potential customers for the purpose of arranging purchase commitments.

The original marketing study undertaken in 1988 focussed on the wood preservative market almost exclusively, and five of the seven customers contacted control almost all of the arsenical wood preservative industry in North America. The other two companies use only relatively small amounts of arsenic trioxide for other chemical processes.

Overall, the seven companies have an annual requirement for at least 36,000 st of product, all of which originates outside of the USA. During January, 1989, Zeraldo visited the seven potential users of WAROX, and tried to obtain letters of intent to purchase Giant's product. Since Giant does not yet have a purification plant producing high grade WAROX, he had only limited success in securing purchase commitments. He did have some interesting responses, however, and the likelihood exists that all of Giant's proposed production capability of 7000 stpy will be used to meet the demand.

Pennwalt Corporation agreed to purchase 200 stpy for the next 5 years at a price of $0.30/lb US. They can only receive product in drums.

Chemical Specialties Inc. (CSI) indicated an interest in purchasing all of Giant's output (>5000 stpy). Since Zeraldo's visit, they have contacted Giant with a written response. The response was very encouraging and confirmed that Giant would probably be able to reach an agreement with CSI whereby CSI would purchase all of Giant's production.

Osmose will consider purchasing some product once Giant is in production. They use 7000 stpy and can receive in bulk truck, rail or drums.

Voluntary Purchasing Group will consider purchasing some product from Giant, once Giant's plant is in production. VPG uses 6000 tpy and can receive in bulk rail, truck or drums.

Koppers' Wolman division is presently being bought by Hickson International. When the deal is accomplished, Hickson will become the world's largest producer of CCA. Until the transaction is complete, issuance of a letter of intent to purchase cannot be considered. (Zeraldo's follow-up report of June 1989 indicates that this transaction has now been completed but that there has been no perceptible change in the market as a consequence).

Big River Zinc agreed to purchase 200 stpy in 440 lb. drums at a price of $0.31/lb. US. They will provide a letter of intent.

Applied Research uses 6000 stpy but purchasing is done from the U.K. It was suggested that Giant contact Applied Research's purchasing agent in the U.K. Applied Research receives product in drums only.

All potential customers contacted expressed more than a casual interest in Giant's product and there is no doubt that at least 3000 stpy of WAROX can be sold at current prices. In fact it is likely that the proposed plant production capacity of 7000 stpy will very shortly be insufficient to meet the demand. A follow-up survey of the market done by Zeraldo in June 1989 indicated no significant change to the situation existing during the January survey. With the recent closure of the Nerco Con plant, there are only two other North American suppliers of arsenic trioxide. These are two smelters in Mexico which produce about 7000 stpy of lower grade material. Giant will be capable of producing a large amount of high grade product at low cost, and is thus in an advantageous position to secure a dominant position in North American arsenic trioxide production. Another of Giant's advantages is the ability to reprocess arsenic bearing sludges from CCA production, minimizing disposal expenses.

PLANT CAPACITY, PRODUCTION QUANTITIES, AND SCHEDULES

The current production plan anticipates production of 7,000 stpy regardless of tonnage of WAROX sold. Unsold WAROX will be stored underground until required. The reason for full production, regardless of WAROX market conditions, is to maximize gold recovery during the early years of the project. During the first full year of operation (1991/92), for example, 14,738 tons of crude dust from underground will be treated to produce 26,885 oz. of gold and 7,000 tons of WAROX. The anticipated market for WAROX during the first full year of operation is 4,750 tons, the excess being returned underground for storage.

Market projections expect that an additional 500 tons/yr can be sold annually until plant capacity is achieved in 1996/97. During the remainder of the project, a steady 7,000 tons/yr will be sold, unless market conditions indicate the need for a plant expansion.

To produce 7,000 tpy, a daily plant capacity of almost 20 tons of final product is required. Lowgrade feedstock of approximately 50% contained arsenic trioxide will be used during the first two years of operation, requiring a plant feedrate of almost 40 tpd.

CAPITAL COSTS AND TIMETABLE FOR EXPENDITURES

Plant capital costs are distributed among three separate unit operations; the underground reclaim facility, the purification plant, and the transfer facility. Included in the underground cost is 500 feet of ramp and drift development at a cost of $500/ft. This development is required to provide access to the first five storage chambers without risking contamination of the mine workings.

The capital cost estimates have been included in a feasibility study performed by Fenco Engineering of Toronto in December 1988 following visits to various plants and test facilities relating to Giant's process development. It is worth noting that Ron Hatch, the metallurgical engineer assigned to the project by Fenco, was closely involved with the original fuming and hot water leach testing done by Giant and FML in the late '70's and early '80's.

The overall capital cost estimate, including underground development and installation of a transfer facility at Enterprise, is $10,500,000, to be spent over a three year period. The decision to build the $2,500,000 transfer facility will not be made until the plant has been in operation for two years, at which time WAROX sales volumes will either have reached the point where bulk rail shipments are necessary, or sales volume has not reached projected levels and there will be no justification for building the transfer facility.

Assuming the project is approved by October 1, 1989, engineering, construction and commissioning will be completed by January 1, 1991. Detailed engineering, shop drawings, etc. will be produced by December 30, 1989. Equipment selection will be completed and orders placed by January 30, 1990, and sitework and building erection will begin by March 15, 1990. The plant will be ready for commissioning by October, 1990, allowing about three months to achieve full production by January 1, 1991.

There is a big advantage in doing thorough preparatory work during the coldest winter months, so that the project can proceed rapidly and efficiently when weather conditions are more favourable.

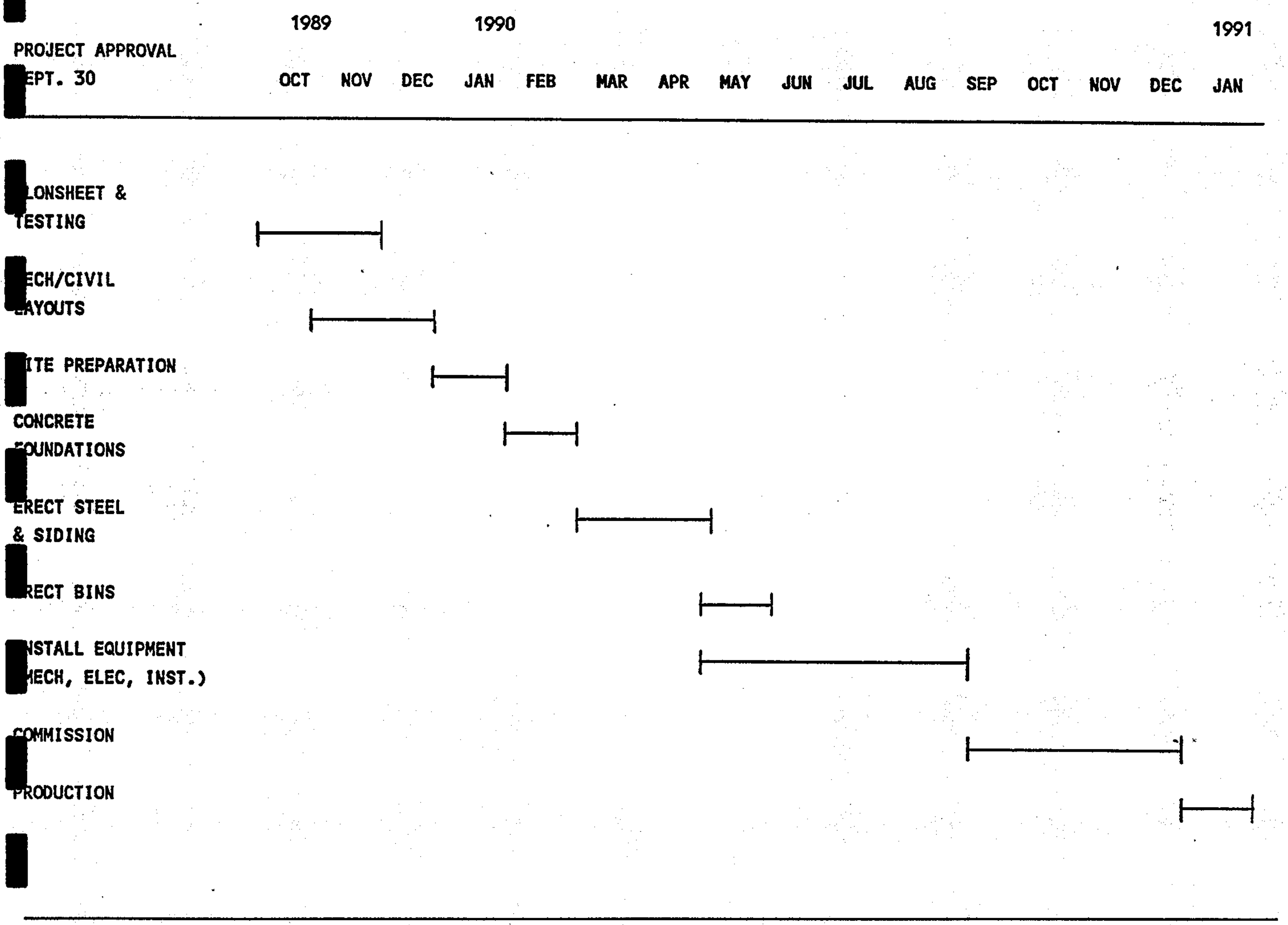
Capital expenditures will be loaded heavily toward the tail end of the project under this schedule, as follows.

2nd quarter Oct-Dec,89	3rd quarter Jan-Mar,90	4th quarter Apr-Jun,90	1st quarter Jul-Sep,90	2nd quarter Oct-Dec,90
5%	10%	25%	40%	20%
$400,000	$800,000	$2,000,000	$3,200,000	$1,600,000

Engineering and construction of the transfer facility, if required, will be done according to a similar though slightly shorter schedule.

3rd quarter Jan-Mar,92	4th quarter Apr-Jun,92	1st quarter Jul-Sep,92	2nd quarter Oct-Dec,92
5%	*25%*	*45%*	*25%*
$125,000	$625,000	$1,125,000	$625,000

WAROX PROJECT
CONSTRUCTION SCHEDULE



REVENUE AND OPERATING COSTS

Under the rather conservative marketing schedule used for this proposal, revenues will average $7,838,000 annually at an operating cost of only $3,788,000. This will be accomplished by operating the plant at the full production rate of 7,000 tpy, even though sales of this tonnage of WAROX are not expected to be achieved until 1996/97. Surplus product will be stored underground until market conditions permit profitable retrieval.

Value of WAROX sales during the first 9.5 years of operation will be $39,294,000 ($0.333/lb sold), which represents 59,000 tons sold while 66,500 tons will be produced. 7,500 tons will be returned to underground storage.

Gold grades in the crude feedstock used during the first few years of production are very high ranging from 2.1 to 0.7 oz/ton Au, and the payback period of only 1.3 years is achieved by high throughput of this material as quickly as possible. A feed grade averaging more than 2.0 ounces/ton is expected during the first full year of operation, and if production targets are reached, almost 27,000 ounces of gold will be produced.

Fixed operating costs account for about 50% of the total, while the variable costs are largely taken up in shipping of the WAROX product. Each component of the project has been broken out to show where operating costs will be incurred.

Cost of retrieval of baghouse dust from underground is estimated at $249,000/yr.

Operation of the purification plant, not including any costs related to bulk transfer of product, is estimated at $1,547,000/yr.

Cost of operating the transfer facility at Enterprise, NWT., including cost of shipping product to Enterprise from Yellowknife, is estimated at $542,000/yr.

Cost of shipping product by rail to markets in southeastern USA, is expected to peak at $1,120,000/yr or $0.08/lb sold. During the period prior to construction of the transfer facility, shipping costs will be $0.15/lb sold.

RATE OF RETURN AND PAYBACK CALCULATIONS

A number of possible production and marketing scenarios have been prepared, with financial analyses done on each. In this proposal, project engineering is assumed to begin January 1990, the plant to be in operation January 1991 under the following conditions.

1. Arsenic trioxide production rate is 7000 stpy.
2. WAROX sales: 1991 = 4500 tons
   1992 = 5000 tons
   1993 = 5500 tons
   1994 = 6000 tons
   1995 = 6500 tons
   1996+ = 7000 tons per year
3. The arsenic trioxide not sold is stored underground.
4. The arsenic dust is reclaimed from underground in the orderof decreasing gold grades.
5. 2200 tons of current production dust is used for plant startup and commissioning.
6. The value of the antimony produced is not considered.
7. The value of the gold is $465/oz. Cdn.
8. The value of WAROX is $0.333/lb. Cdn.

The following table summarizes the results of the analysis.

Before tax

NPV (9.5 years)	$14.889 M
Payback period	1.1 years
IRR	81.03%

After tax

NPV (9.5 years)	$8.969 M
Payback period	1.3 years
IRR	58%

GIANT YELLOWKNIFE MINES LIMITED
WAROX PLANT
PRELIMINARY ECONOMIC STUDY (4500 - 7000 TPY AS2O3 SALES)

SUMMARY OF RESULTS

YEAR	1989/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	TOTAL
PRODUCTION												
Tons Feed From Mill	0	2,305	0	0	0	0	0	0	0	0	0	2,305
Tons Feed From U/G	0	2,211	14,738	12,257	9,979	9,979	9,979	9,438	8,156	8,156	8,156	93,049
Tons Feed Processed	0	4,516	14,738	12,257	9,979	9,979	9,979	9,438	8,156	8,156	8,156	95,354
Tons As2O3 Produced	0	3,500	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	66,500
Tons As2O3 Sold	0	2,250	4,750	5,250	5,750	6,250	6,750	7,000	7,000	7,000	7,000	59,000
Ounces Gold Produced	0	3,655	26,885	13,605	6,506	6,506	6,506	4,595	2,454	2,454	2,454	75,620
REVENUES ($1,000)												
Revenue Arsenic	0	1,499	3,164	3,497	3,830	4,163	4,496	4,662	4,662	4,662	4,662	39,294
Revenue Gold	0	1,700	12,501	6,326	3,025	3,025	3,025	2,137	1,141	1,141	1,141	35,163
Total Revenue	0	3,198	15,665	9,823	6,855	7,188	7,521	6,799	5,803	5,803	5,803	74,457
Revenues/ton Feed	0	708	1,063	801	687	720	754	720	712	712	712	7,588
Revenues/ton As2O3	0	914	2,238	1,403	979	1,027	1,074	971	829	829	829	11,094
OPERATING ($1,000)												
Total Operating	0	1,674	3,595	3,774	3,149	3,238	3,327	3,360	3,360	3,360	3,360	32,198
Operating/Ton Feed	0	371	244	308	316	324	333	356	412	412	412	3,488
Operating/Ton Sold	0	744	757	719	548	518	493	480	480	480	480	5,698
Total Capital	3,780	3,780	0	2,569	0	0	95	75	0	0	0	10,299
Cash Flow Before Tax	(3,780)	(2,256)	12,070	3,480	3,706	3,950	4,099	3,364	2,443	2,443	2,443	31,961
Total Taxes	0	4	3,100	1,584	779	1,024	1,218	1,007	750	790	818	11,074
Net Cash Flow	(3,780)	(2,260)	8,970	1,896	2,927	2,926	2,881	2,356	1,693	1,653	1,625	20,887
Discount Rate	15.0%											
Aft Tax Discounted Cash Flow	(3,780)	(1,965)	6,783	1,247	1,674	1,455	1,245	886	554	470	402	8,969
Cum. Discounted Cash Flow	(3,780)	(5,745)	1,038	2,284	3,958	5,412	6,658	7,543	8,097	8,567	8,969	

BEFORE TAX

Net Present Value $14,889 of first 9.5 years of operation.

Payback Period 1.1 Years

IRR 81.03%

AFTER TAX

Net Present Value $8,969 of first 9.5 years of operation.

Payback Period 1.3 Years

IRR 58.0%

Date Printed: 14-Sep-89

Engineering Department,Yellowknife Division.

\WAROX\ECONOMIC\BUDGET4
BUILD TRANSFER FACILITY IN 1992/93

GIANT YELLOWKNIFE MINES LIMITED
WAROX PLANT
PRELIMINARY ECONOMIC STUDY (4500 - 7000 TPY AS203 SALES)
PRODUCTION RATES AND PRODUCT PRICES

YEAR	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	TOTAL
VOLUME PARAMETERS												
Tons As203 Produced	0	3,500	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	66,500
Tons As203 Sold	0	2,250	4,750	5,250	5,750	6,250	6,750	7,000	7,000	7,000	7,000	59,000
Feed Grade As	73.00%	59.29%	36.33%	43.69%	53.66%	53.66%	53.66%	56.74%	65.66%	65.66%	65.66%	
Feed Grade As203	96.39%	78.29%	47.97%	57.69%	70.85%	70.85%	70.85%	74.92%	86.70%	86.70%	86.70%	
As Recovery	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	
Tons Feed	0	4,516	14,738	12,257	9,979	9,979	9,979	9,438	8,156	8,156	8,156	95,354
PRODUCTION DATA												
ARSENIC												
Feed % As203	96.39%	78.29%	47.97%	57.69%	70.85%	70.85%	70.85%	74.92%	86.70%	86.70%	86.70%	
Recovery (%)	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	
Tons As203	0	3,500	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	66,500
GOLD												
Feed Grade (oz/ton)	0.137	0.952	2.146	1.306	0.767	0.767	0.767	0.573	0.354	0.354	0.354	
Recovery (%)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	
Ounces Gold	0	3,655	26,885	13,605	6,506	6,506	6,506	4,595	2,454	2,454	2,454	75,620
PRODUCT PRICES												
As203 / lb CDN	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	
Gold / oz CDN	465	465	465	465	465	465	465	465	465	465	465	
REVENUES												
As203	0	1,499	3,164	3,497	3,830	4,163	4,496	4,662	4,662	4,662	4,662	39,294
Gold	0	1,700	12,501	6,326	3,025	3,025	3,025	2,137	1,141	1,141	1,141	35,163
TOTAL REVENUES	0	3,198	15,665	9,823	6,855	7,188	7,521	6,799	5,803	5,803	5,803	74,457

Date Printed: 14-Sep-89

Engineering Department,Yellowknife Division.

\WAROX\ECONOMIC\BUDGET4
BUILD TRANSFER FACILITY IN 1992/93

GIANT YELLOWKNIFE MINES LIMITED
WAROX PLANT
PRELIMINARY ECONOMIC STUDY (4500 - 7000 TPY AS203 SALES)
OPERATING COSTS

YEAR	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	TOTAL
UNIT COSTS U/G $/ton As203	N/A	36	36	36	36	36	36	36	36	36	36	
Plant $/ton As203	N/A	221	221	221	221	221	221	221	221	221	221	
Plant $/ton Residue	N/A	0	0	0	0	0	0	0	0	0	0	
Transfer $/ton As203	N/A	0	0	0	86	83	80	77	77	77	77	
Freight $/ton As203	N/A	358	358	358	132	132	132	132	132	132	132	
Tails $/ton As203	N/A	1,402	1,402	1,402	1,402	1,402	1,402	1,402	1,402	1,402	1,402	
UNITS (Tons) U/G As203	0	1,300	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	66,500
Plant As203	0	3,500	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	66,500
Residue	0	0	0	0	0	0	0	0	0	0	0	0
Transfer	0	0	0	5,250	5,750	6,250	6,750	7,000	7,000	7,000	7,000	52,000
Freight	0	2,250	4,750	5,250	5,750	6,250	6,750	7,000	7,000	7,000	7,000	59,000
As203 to Tails	0	35	70	70	70	70	70	70	70	70	70	665
COSTS U/G	0	47	249	249	249	249	249	249	249	249	249	2,288
Plant	0	773	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	14,696
Residue	0	0	0	0	0	0	0	0	0	0	0	0
Transfer	0	0	0	0	496	519	542	542	542	542	542	3,725
Freight	0	806	1,701	1,880	759	825	891	924	924	924	924	10,557
Tails	0	49	98	98	98	98	98	98	98	98	98	932
Additional Operating	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL OPERATING COSTS	0	1,674	3,595	3,774	3,149	3,238	3,327	3,360	3,360	3,360	3,360	32,198
NET OPERATING PROFIT	0	1,524	12,070	6,049	3,706	3,950	4,194	3,439	2,443	2,443	2,443	42,260
CAPITAL U/G RECLAIM	480	480	0	69	0	0	95	75	0	0	0	1,199
SURFACE PLANT	3,050	3,050	0	0	0	0	0	0	0	0	0	6,100
TRANSFER FACILITY	0	0	0	2,500	0	0	0	0	0	0	0	2,500
EXTRA CAPITAL	250	250	0	0	0	0	0	0	0	0	0	500
TOTAL CAPITAL	3,780	3,780	0	2,569	0	0	95	75	0	0	0	10,299
CASH FLOW BEFORE TAX	(3,780)	(2,256)	12,070	3,480	3,706	3,950	4,099	3,364	2,443	2,443	2,443	31,961
TOTAL TAXES	0	4	3,100	1,584	779	1,024	1,218	1,007	750	790	818	11,074
NET CASH FLOW	(3,780)	(2,260)	8,970	1,896	2,927	2,926	2,881	2,356	1,693	1,653	1,625	20,887
CUMULATIVE NET CASH FLOW	(3,780)	(6,040)	2,930	4,826	7,753	10,679	13,559	15,916	17,609	19,262	20,887	
DISCOUNT RATE	15.00%											
BEF TAX DISCOUNTED CASH FLOW	(3,780)	(1,962)	9,127	2,288	2,119	1,964	1,772	1,265	799	694	604	14,889
CUMUL DISCOUNTED	(3,780)	(5,742)	3,385	5,673	7,792	9,756	11,528	12,792	13,591	14,285	14,889	
AFT TAX DISCOUNTED CASH FLOW	(3,780)	(1,965)	6,783	1,247	1,674	1,455	1,245	886	554	470	402	8,969
CUMUL DISCOUNTED	(3,780)	(5,745)	1,038	2,284	3,958	5,412	6,658	7,543	8,097	8,567	8,969	

PAYBACK: 1.3 YEARS IRR: 57.98%

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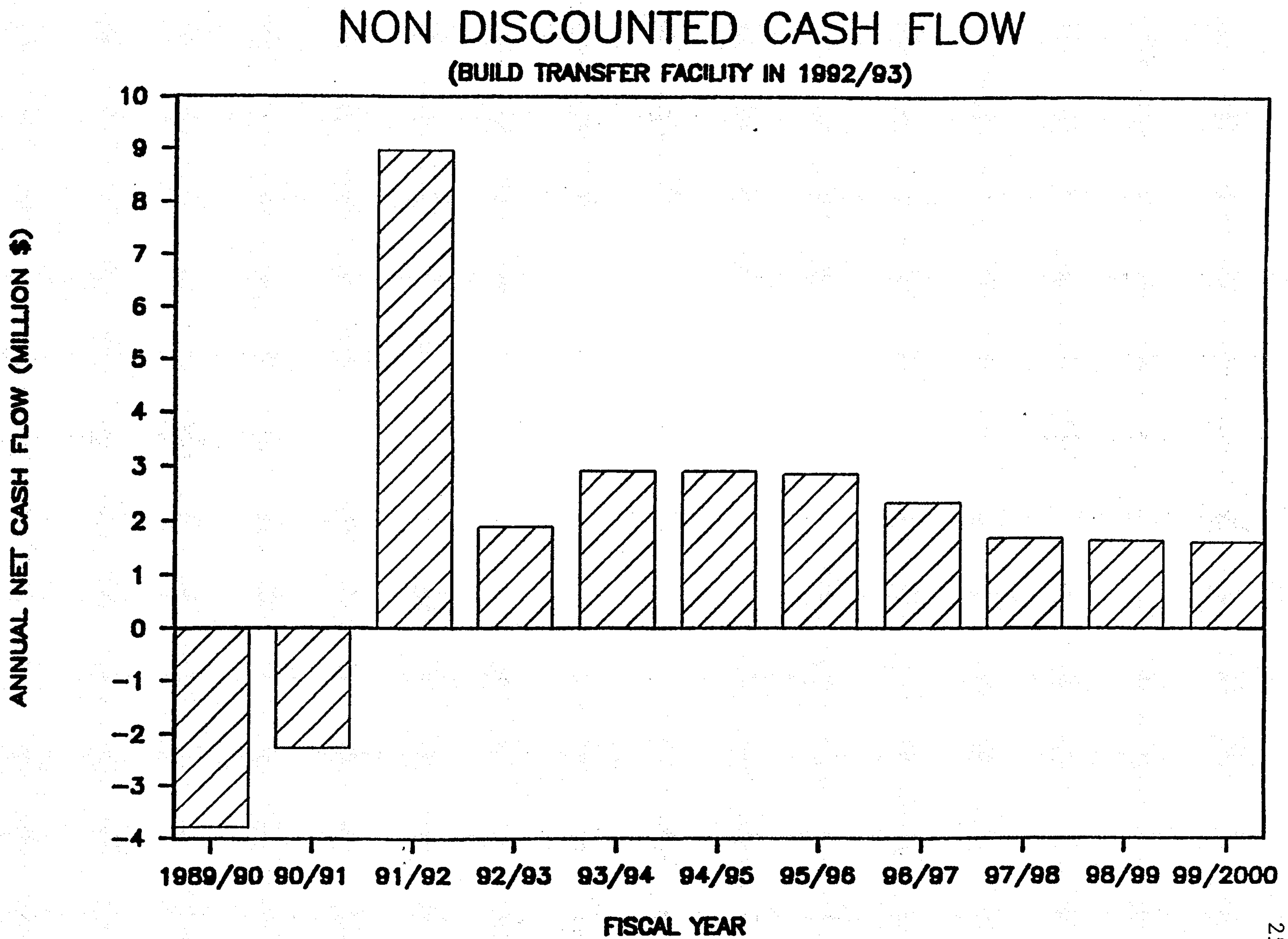
Engineering Department,Yellowknife Division.


NON DISCOUNTED CASH FLOW
(BUILD TRANSFER FACILITY IN 1992/93)
ANNUAL NET CASH FLOW (MILLION $)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
1989/90
90/91
91/92
92/93
93/94
94/95
95/96
96/97
97/98
98/99
99/2000
FISCAL YEAR

SENSITIVITY ANALYSIS

This sensitivity analysis shows the effects of changing one parameter in the economic analysis while holding all the other parameters constant. The four parameters which have been varied in this analysis are the WAROX price, the gold price, the operating costs and the capital costs. The impact on the net present value (over 9.5 years), the rate of return and the payback period have been tabulated. This analysis does not reflect the probability of occurrence of changes in any of the parameters.

The accompanying graph visually represents the impact of the changes on the net present value. The sensitivity of the parameter is directly correlated with the steepness of the line representing that parameter. A flat line would indicate that the net present value is insensitive to changes in the parameter whereas a close to vertical line would indicate extreme sensitivity to changes in the parameter.

For the case study shown, the 9.5 year NPV is most sensitive to the gold price, followed by the WAROX price, the operating costs and finally, the capital costs. A 20% reduction in either the WAROX or the gold price will reduce the NPV by 26% and 30% respectively. A 20% increase in either the operating or capital costs results in a respective 22% and 16% reduction in the NPV. It is worth noting that a 50% negative change to any one parameter will still result in a positive NPV while a 50% positive change increases the NPV by 33% to 74%.

BUILD TRANSFER FACILITY IN 1992/93

Warox Price ($/lb)	NPV (9.5 Years) (Million $)	IRR %	Payback (Years)
.133	1.7	28.4	2.7
.200	4.4	40.6	1.6
.267	6.7	49.8	1.4
.333	9.0	58.0	1.4
.400	11.2	65.5	1.3
.466	13.4	72.2	1.2
.533	15.7	78.6	1.2

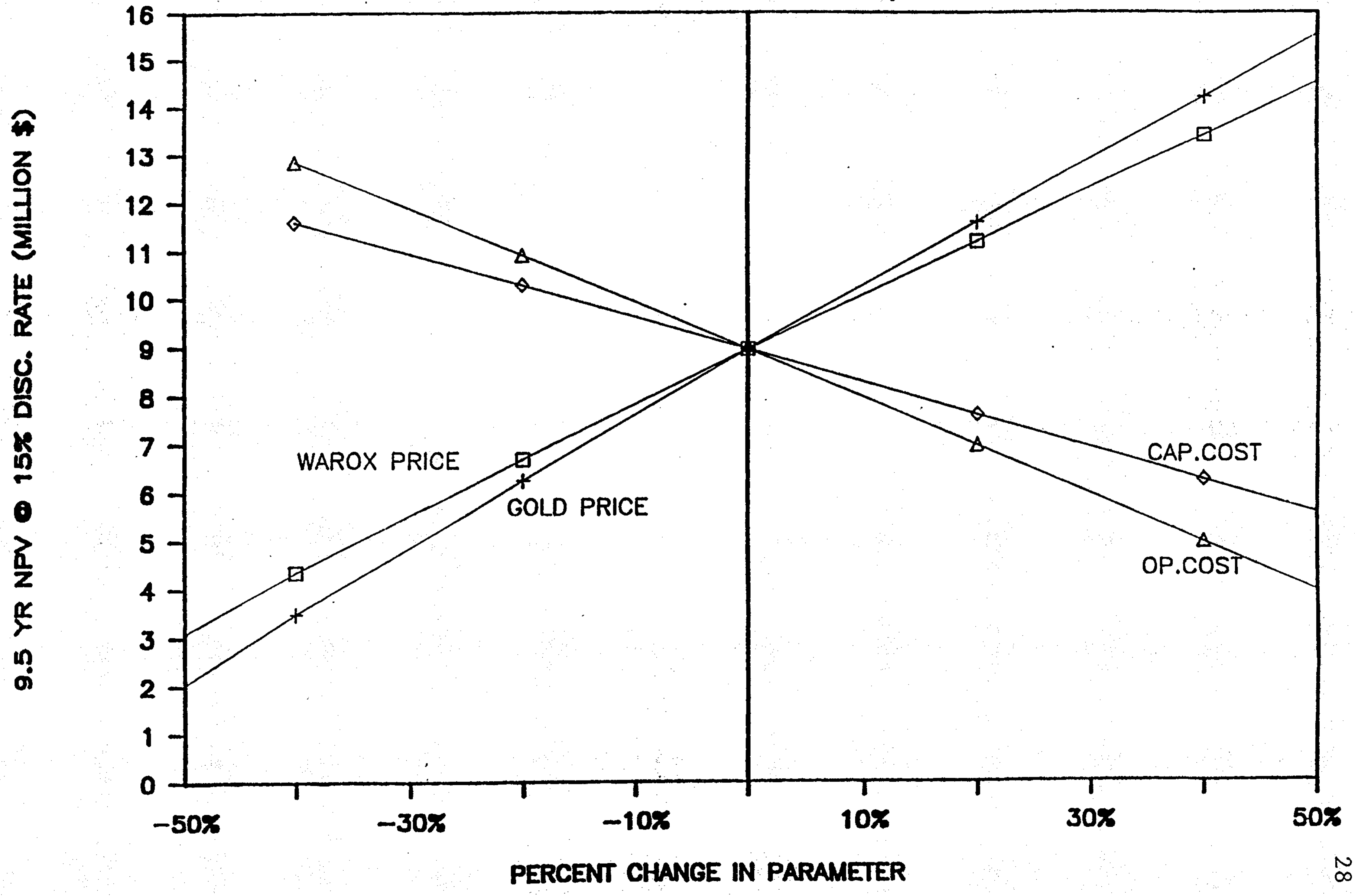
Gold Price ($/oz)	NPV (9.5 Years) (Million $)	IRR %	Payback (Years)
186	0.6	17.4	7.7
279	3.5	30.4	4.0
372	6.3	44.1	2.1
465	9.0	58.0	1.4
558	11.6	71.5	1.2
651	14.2	84.3	1.1
744	16.8	96.8	1.0

Operating $ (% of base)	NPV (9.5 Years) (Million $)	IRR %	Payback (Years)
60	12.9	72.4	1.2
80	10.9	65.5	1.3
100	9.0	58.0	1.4
120	7.0	49.9	1.4
140	5.0	41.4	1.8
160	2.9	31.9	3.0

Capital $ (% of base)	NPV (9.5 Years) (Million $)	IRR %	Payback (Years)
60	11.6	103.9	1.0
80	10.3	76.0	1.2
100	9.0	58.0	1.4
120	7.6	45.6	1.8
140	6.3	36.6	2.9
160	4.9	29.9	3.8

NPV SENSITIVITY TO CHANGES

BUILD TRANSFER FACILITY IN 1992/93



SECTION B

REQUEST FOR INTERIM FINANCING

1. SUMMARY
2. NEED
3. BENEFITS
4. CONCLUSIONS
5. RECOMMENDATIONS

1. SUMMARY

The sum of $100,000 is requested, to complete pilot scale testwork for final design of the high temperature filtration system, and to expand the project feasibility to include recovery of antimony oxide.

This sum will be expended during September, 1989 or as soon as the necessary modifications to the existing pilot plant can be completed.

A request for financial assistance for this project has been made through the Canada/NWT Economic Development Agreement as well. If the project is approved under this program, Giant's contribution will be only 25% of the total. Unfortunately the uncertainty and the usual delays associated with government grants require that a duplicate request be made within the company.

2. NEED

The $100,000 requested is needed for three reasons.

1. To complete detailed filtration testwork for the purpose of full scale design of the filtration system.
2. To test and demonstrate the concept of two stage filtration for the purpose of recovering a marketable antimony oxide product.
3. To include two stage filtration in full scale design of the filtration system.

3. BENEFITS

Benefits to be realized from proceeding with the testwork are, at the very least, substantial, and may be extremely important.

1. Testwork to date has demonstrated that a high purity arsenic trioxide product can be produced through high temperature ultrafiltration techniques. The program wasnot intended to provide detailed design data to enable a full scale filtration system to be built. Data collected so far is quite comprehensive, proving the feasibility of the process, but it would be risky to build a full scale plant without testing the actual filter media proposed at pilot scale first. This could not be done earlier because pilot scale sintered metal filter elements in a properly engineered blowback system were not available.

2. Antimony elimination testing using ultrafine high temperature gas filtration demonstrated that approximately 97% of the antimony oxide that passed through the first

stage of filtration could be captured at the second stage. The residue from the second stage filter, at 20% Sb_2O_3, was not considered to be of high enough purity to be marketable. Contaminants in the residue were from the iron oxide filter cake that was required to achieve the high pressure drop across the filter that enabled high efficiency particulate recovery. Use of a larger surface area of finer screen elements may permit good particulate recovery without the need to contaminate the residue with iron oxide filter cake.

Antimony oxide grades of up to 4% in the feed may easily translate into additional revenues exceeding $1,000,000/yr at a very small increase in capital and operating cost. During the first full year of operation for example, if one assumes an antimony oxide recovery of 80%, and a value of $1.75/lb, recovered value of the concentrate will be $1,650,000.

3. Demonstration of the feasibilty of recovering Sb_2O_3 in a two stage filter system at this time, will permit the necessary additional equipment to be included in the final plant design. This would be much better than retrofitting the equipment if the feasibility testwork were to be delayed (or worse, to miss the opportunity of antimony recovery because the feasibility testwork does not get done at all).

4. CONCLUSION

The $100,000 requested for the testwork is important for detailed design of one of the most important unit operations in the plant. The money spent in advance on careful design is likely to be repaid many times over in improved operating efficiency, product recovery, etc.

It is also possible that a large increase in cash flow for the project will result from testing of the two stage filter technique for antimony oxide recovery.

5. RECOMMENDATION

In view of the potential benefits to be gained from additional high temperature gas filtration testing at RPC's pilot plant. It is recommended that the necessary funds be allocated to the project so that the testwork can be completed without delay. The information gained from the testwork will permit detailed design of the gas filtration system and enable the full scale purification plant to be built without the need for further testing.

— Warox (spare copy)

from Steck at Y/kf 6 April

GIANT YELLOWKNIFE MINES LIMITED

WAROX JOINT VENTURE PROPOSAL

Introduction

Some recent non-conventional gold recovery projects have not been as successful as originally expected, and this has led to a reluctance on the part of GYK boardmembers to embark on further high risk ventures, which is how the WAROX project is perceived at the corporate level.

In order to remove some of the risk, and to help provide the capital necessary to proceed with the project, it has been proposed that Giant examine the alternative of entering into a joint venture agreement with an interested partner.

The ideal joint venture agreement would be one in which:

-Giant would not be required to contribute any capital funding;

-the partner would have marketing and/or CCA production expertise;

-Giant would retain controlling interest;

-Giant would be operating manager.

Before the joint venture proposal can be discussed with interested parties however, a number of details must be clarified. These matters are discussed below.

Summary

There are several items that need attention before a final proposal to form a joint venture partnership can be presented to interested parties.

1. Update the capital and operating costs of the project;
2. Prepare a development and production schedule;
3. Prepare a schedule of capital expenditures;
4. Define the kind of partnership agreement we want, what corporate structure, what value to place on our resource;
5. Prepare a list of potential partners;
6. Review the capital and operating cost estimates for underground reclaim;
7. Confirm gold recoveries from hot filter residues.

Though items six and seven may appear to be outside of the scope of this discussion, the company must be confident that costs and production rates will be as presented to potential partners, and there is presently some uncertainty about these two items.

Discussion

Each of the items summarized above is discussed in detail in this section.

1. Project Capital Cost

It has been suggested that there may be a psychological advantage to keeping the capital cost of the project to less than $10,000,000, and this would require either modifying or downscaling the project, or leaving the transfer facility out of the proposal. Since there is an advantage to maintaining high production rates, especially during the first few years of the operation, it is not recommended that the plant be downscaled. Similarly, the plant was not designed with any frills, and it would be difficult to suggest any modifications that would not impair production or compromise plant safety. It is therefore proposed that the transfer facility not be included in phase one of the project, but that the need for the transfer facility be reexamined after the plant goes into production. If the transfer facility is found to be required, capital funding may then come from cash flow.

The capital cost has been recalculated using Chemical Engineering's October 1989 Plant Cost Index of 357.4 vs the October 1988 index of 347.7 (1959 = 100). Extrapolating this index, the increase in plant capital cost over the past fifteen months is 3.4%. By July 1990, the increase over the original capital cost estimate will be 4.3%.

Using the Fenco capital cost estimates of November 1988 for the Process Plant, $6.1 m, plus working capital of $500,000, the new estimate is $6.9 m. The underground portion has been re-estimated at just over $2.0 m. for construction of the first reclaim system. A new financial analysis reflecting these changes has been appended to this report.

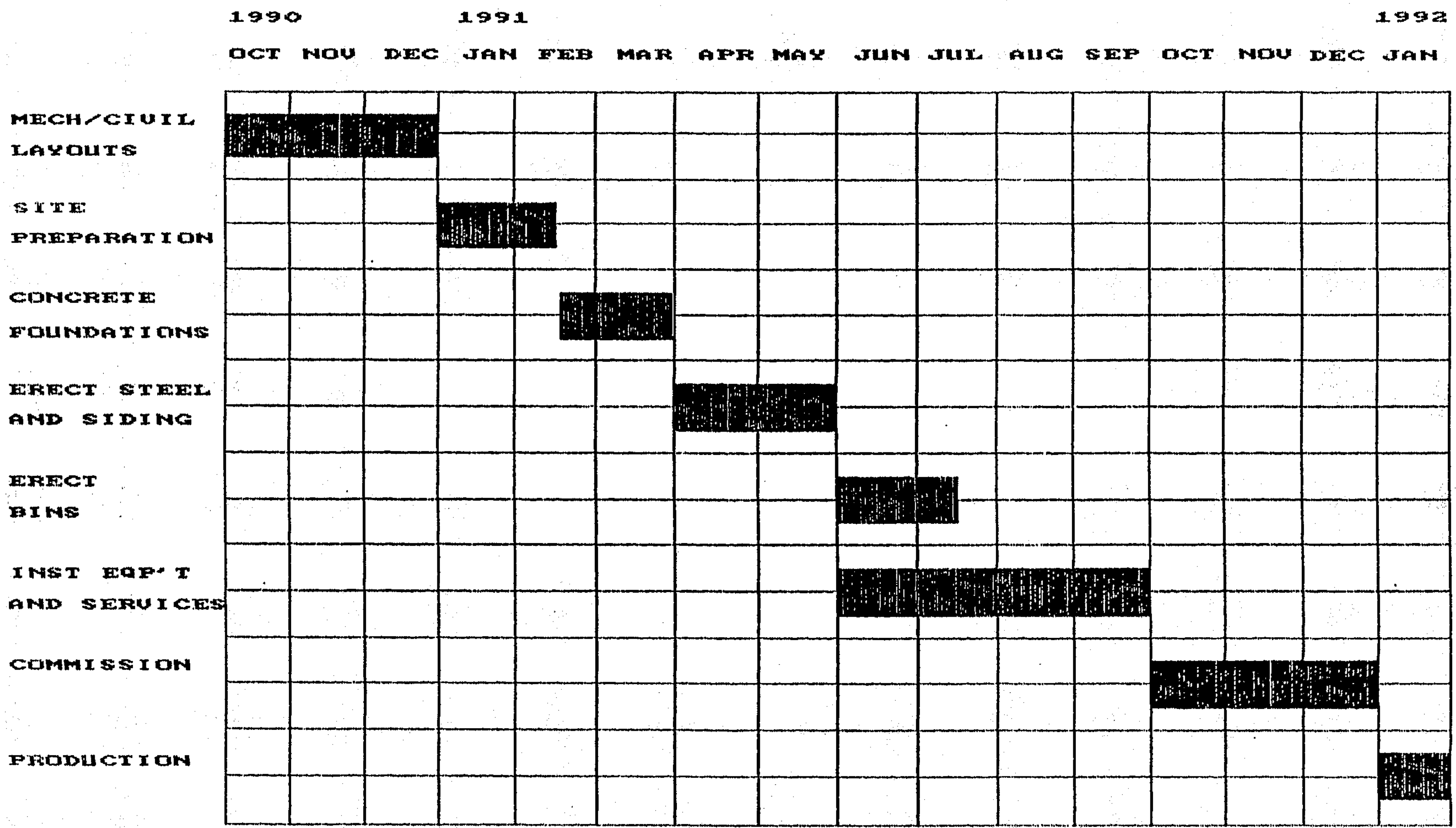
Operating costs have been adjusted in the financial analysis by the same percentage. (4.3%)

2. Development and Production Schedule

Assuming that a joint venture partnership can be formed during the third quarter of 1990, engineering and plant construction should be planned for the fourth quarter of 1990 with construction and commissioning taking place during the whole of 1991. The plant would begin production in January, 1992, using feed from underground following the same reclaim sequence as has already been established. ie. area #1, B2-34, B2-33, B2-35, B2-36, B2-30.

A breakdown of the construction schedule is approximately as shown on the following page.

WAROX PROJECT
CONSTRUCTION SCHEDULE



The production schedule must satisfy both partners, but it is important to Giant that the material containing the best gold values be treated first, and at a high rate of production. It is expected that the current production plan, updated to reflect the new operating schedule, will be satisfactory to both parties. The appended financial analysis details the proposed production schedule.

3. Schedule of Capital Expenditures

In accordance with normal construction practice, capital expenditures will be loaded toward the tail end of the project, approximately as follows.

4th quarter Oct-Dec, 90	1st quarter Jan-Mar, 91	2nd quarter Apr-Jun, 91	3rd quarter Jul-Sep, 91	4th quarter Oct-Dec, 91
5%	10%	25%	40%	20%
$447,150	$894,300	$2,235,750	$3,577,200	$1,788,600

4. Type of Partnership Agreement

As mentioned earlier, the ideal partnership arrangement would be one in which Giant would not be required to contribute any capital funding but would still have a controlling interest in the venture. Giant's contribution would be the crude feed stockpile, the plant design, and the operating expertise. Under this arrangement, GYKM would be the senior partner and operating costs and revenues would be shared in proportion to the interest held by each. It would be necessary to estimate the in-situ value of the resource in order to calculate the cash value of Giant's contribution.

Another possibility would be for GYKM to form an affiliated company to enter into a partnership agreement. The partners would then buy crude feed from GYKM. The drawback here is that the affiliate would likely have to put up some portion of the capital for the plant.

It is suggested that Frank Van de Water be asked to examine the alternatives and make a recommendation.

5. List of Potential Partners

During the past few years, a number of parties have shown an interest in gaining some kind of interest in Giant's crude arsenic stockpile, beginning with Koppers in 1978, and most recently in February of this year with a European manufacturer of arsenicals, BMES, whose African source of supply has dried up.

In 1986, there were meetings with The Applied Research Group, a large producer of copper arsenate, to discuss various alternatives for purchase of Giant's crude arsenic. One possibility was a joint venture agreement in the production of copper arsenate. Another was an exclusive sales agreement between ARG and Giant.

The following is a summary of those firms that may be interested in investing in the disposal of Giant's arsenic stockpile:

Hickson Corporation, formerly the Wolman division of Koppers Company Inc. Contact Don Marion, Manager of Markets and Transportation, or Frank Klasnick, Vice President of Operations at Conley, Georgia;

The Applied Research Group, Inc. Contact W.F.(Bill) Drinkard, Jr., Charlotte, North Carolina;

William Blythe and Co. Ltd.. Contact Jeffery Wilkinson, Research and Development Director, Blythe, Church, Accrington, Lancashire, U.K. K. Thomas met with this group in 1986 to discuss suitability of Giant's crude product for use in Blythe's CCA process;

BMES, Europe, Contact Shiva Vencat, phone 212 679 5858;

Locke Enterprises, Contact Brian Locke, President, 3rd Floor Marine Building, 355 Burrard St., Vancouver, B.C., V6C 2G8, phone 604 669 2606;

Zeraldo Minerals, Contact Dan Zeraldo, 186 Heathwood Heights Drive, Aurora, Ontario, L4G 4X4, phone or fax 416 727 1769 (Zeraldo has also offered his services in seeking out a suitable partner for Giant).

Some of the other major users of arsenic trioxide may be interested in securing a North American source of supply and may therefore entertain joint venture proposals.

Companies in this category should be capable of using most or all of Giant's production capacity. The following are included in this group:

Osmose Wood Preserving, Inc.. Contact W.P.(Bill) O'Brien, Vice President of Manufacturing, 980 Ellicott St. Buffalo, N.Y., 14209 Phone 716 882 5905

Chemical Specialties, Inc, Mineral Research and Development Corp. Contact Mr. O'Connell, Highway 49 (at Rocky River), Harrisburg, N.C. 28075 (Zeraldo thinks this company is one of the most likely);

Voluntary Purchasing Group, Contact Mr. Mike Smith, P.O. Box 460, Hwy 82 West, Bonham, Texas, 75418

Marketing agents seeking crude feedstocks for European manufacturers have been in touch with Giant from time to time, but the high costs of shipping crude dust to Europe has precluded the possibility of tapping this market. The marketing agents that have been in contact are:

Amalgamet Limited, Contact Bruce Murray, Amalgamet Canada, 111 Richmond St West, Suite 418, Toronto, Ont, M5H 2GH, phone 416 366 3954;

Oxyde Chemicals B.V., Contact J.H. den Otter, postbus 7886 - 1008 AB Amsterdam, Netherlands, Fax (20) 46 41 99;

6. Review of Capital Cost of Underground Reclaim Facility

Fenco's estimate of $860,000 for installation of underground equipment, ie. an overhead crane, clamshell bucket, vibrating feeder, tubular drag conveyor, etc., is a factored estimate that appears to have been arrived at by multiplying the purchased equipment cost by 2.0. This is a very low factor for this kind of process, but it is partly justified because there is no need for complex installed sevices or an insulated building. On the other hand, the estimate does not consider hygeine facilities, remote control capability, or underground development, which includes the chamber containing the vibrating feeder and tubular drag conveyor.

There will undoubtedly be several difficulties encountered when installing the equipment, and a factor of 3.1, which is commonly used for construction of solids handling plants, may be more appropriate. Using this factor, combined with the most recent plant cost index, the new capital cost estimate for the first underground reclaim facility is $1,417,000. In addition, the original $600,000 estimate for underground development should be increased to $626,000.

Since the first 5 chambers are quite small, it is necessary to duplicate much of the the reclaim system (additional equipment cost, approximately $300,000) so that when one chamber is depleted, the next is ready to go with no disruption in production. It is estimated that installation costs for each subsequent chamber may be as much as $500,000 and the installation costs over the 10 year life of the project may be as much as $2,500,000. The total capital cost for the underground portion will therefore be $4,843,000, though $2,800,000 will come from cash flow later in the life of the project.

7. Gold Extraction From Hot Filter Residues

During the test program at RPC, the focus was on purification of arsenic trioxide, and gold recovery was not thoroughly examined. Part of the reason for this is because RPC was not capable of obtaining consistent assay results. In order to have some confidence in the results obtained, three samples of hot filter residue were tested by Lakefield Research, and there is some indication that gold extraction will exceed 90% as long as arsenic concentrations in the residue are kept below 3%. (Ref. memo and test results, Appendix A).

It is recognized that results from such a limited test program are not conclusive, and further extraction testing must be done during the current pilot program. At the same time RPC has been contacted to determine if they are able to identify hot filter residues that they have in storage. If so, then another set of samples will be sent to Lakefield for more extraction testing.

APPENDIX A

GOLD EXTRACTION
FROM HOT FILTER RESIDUES

MEMORANDUM

TO: S. McAlpine

CC: K. Blower

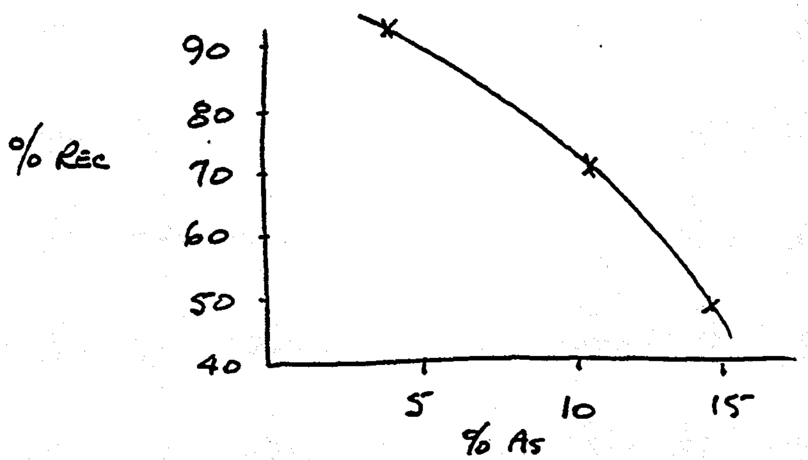
FROM: K. Morton

DATE: February 12, 1989

SUBJECT: GOLD EXTRACTION FROM HOT FILTER RESIDUE

Three samples of hot filter residue were tested at Lakefield Research for gold extraction. As expected, arsenic concentration has a major effect on extraction efficiency.

The three samples had arsenic concentrations of 3.9%, 10.1% and 14.3% respectively. Corresponding gold extractions were 89.8%, 70.8% and 48.0% as shown on the graph below.



Interestingly, the pH modifiers used, soda ash and sodium hydroxide, had a consumption rate inversely proportional to the arsenic concentration, while the NaCN consumption rate was not affected by either gold or arsenic concentration.

Au oz/t	As %	NaCN kg/t	Na2CO3 kg/t	NaOH kg/t	Au rec
34.2	3.9	3.6	104	20.8	89.8
106.0	10.1	2.15	68.8	13.8	70.8
98.6	14.3	3.98	55.0	11.0	48.0

Arsenic in the hot filter residue affects both gold recovery and the cost of tailings treatment. It is clear, therefore, that hot filter design must focus not only on purity of the WAROX product, but also on purity of the hot filter resdidue. Arsenic contamination can result from precipitation of arsenic out of the gas stream and may be caused by air leaks, inadequate insulation, insufficient pulse jet heating, etc..

K. Morton

An Investigation of

THE RECOVERY OF GOLD

from Hot Baghouse Residue Samples

submitted by

GIANT YELLOWKNIFE MINES LIMITED

Summary of Results

1. Sample Description

Three samples of hot baghouse residue were received at Lakefield Research (Reference numbers LR 8831105 and LR 8931160). A representative head sample was riffled out of each residue and 200 gram test charges were prepared. The head samples were analysed for gold and arsenic.

Head Analyses

	Gold, g/t Au	Arsenic, % As
Composite A	103	14.6
Composite B	35.9	4.03
Composite C	110	10.4

2. Cyanidation Testwork

Cyanidation tests were performed in duplicate to investigate the recovery of gold following the conditions provided by Giant Yellowknife Mines Limited. These conditions included; conditioning at 33% solids with amine acetate at pH 10.5 adjusted with sodium hydroxide and soda ash (1:5 ratio); followed by the addition of 3 g/L NaCN for a total of 47 hours of leaching. The pH was maintained after 1 hour and 24 hours and the free cyanide level was checked after 24 hours. A sample of pregnant solution was removed after 24 hours to estimate gold recovery at this point. The tests were conducted in bottles on rolls. The results are summarized in Table No. 1.

The results of duplicate tests showed good reproducibility. The extraction of gold was related to the amount of arsenic in the sample. Gold recovery increased from 48% from Composite A (14% As) to 90% from Composite B (4% As).

Project No. MLR-064 Date Jan. 23, 1989

SUMMARY OF TEST RESULTS

Test	Reagent Cons., kg/t			Recovery, %				Residue, g/t, %		Calc. Head, g/t, %	
				24 hours		48 hours					
	NaCN	NaOH	Na2CO3	Au	As	Au	As	Au	As	Au	As
A-1	3.95	11.0	55.2	43	13	48.0	26.6	56.3	11.5	98.9	14.3
A-2	4.00	11.0	54.8	44	14	47.9	25.7	56.3	11.6	98.2	14.2
Average	3.98	11.0	55.0	44	14	48.0	26.2	56.3	11.6	98.6	14.3
B-1	3.40	20.2	101	92	9	89.6	15.9	3.78	3.46	34.4	3.91
B-2	3.80	21.3	107	91	9	90.0	18.0	3.57	3.37	34.0	3.91
Average	3.60	20.8	104	92	9	89.8	17.0	3.68	3.42	34.2	3.91
C-1	2.15	14.0	70.0	68	10	70.6	17.6	33.2	8.82	106	10.1
C-2	2.15	13.5	67.5	69	10	70.9	17.2	32.7	8.85	106	10.1
Average	2.15	13.8	68.8	69	10	70.8	17.4	32.9	8.84	106	10.1

APPENDIX B

FINANCIAL ANALYSIS

MEMORANDUM

TO: K. Morton

FROM: Barbara Mossop, Planning Engineer

DATE: Mar. 13, 1990

TOPIC: WAROX Project Economic Analysis @ $465/oz. Au

An economic analysis has been performed on the WAROX Project for the condition of refining the dust at a rate of 7000 tons per year, although selling lesser amounts in the first years. The capital cost of the processing plant has been increased to $6.4 million. The underground capital cost has been reestimated to be $2.043 million for the initial chamber plus an additional $500,000 and the appropiate development expenses for each subsequent chamber. Operating costs have been increased by 4.3%. The Project is assumed to begin construction in early 1991 and production in June 1992.

The following is a list of conditions used for this scenario:

1. Arsenic trioxide production rate is 7000 tons per year.
2. WAROX sales: 1992 = 4500 tons
   1993 = 5000 tons
   1994 = 5500 tons
   1995 = 6000 tons
   1996 = 6500 tons
   1997+ = 7000 tons per year.
3. The arsenic trioxide not sold is stored underground.
4. The arsenic dust is removed from underground in the order of decreasing gold grades.
5. 2200 tons of current production is used for the plant start up.
6. The value of the antimony produced is not considered.
7. The value of gold is $465/oz. Cdn.
8. The value of As_2O_3 is $0.333/lb. Cdn.

The following table summarizes the results of this analysis:

<u>Before Tax</u>

NPV (10 Years)	$10,384,000
Payback Period	1.1 Years
IRR	59.01 %

<u>After Tax</u>

NPV (10 Years)	$ 5,938,000
Payback Period	1.5 Years
IRR	40.8 %

\WAROX\ECONOMIC\BUDGET6
NO TRANSFER FACILITY

GIANT YELLOWKNIFE MINES LIMITED
WAROX PLANT
PRELIMINARY ECONOMIC STUDY (4500 - 7000 TPY AS2O3 SALES)

SUMMARY OF RESULTS

YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
PRODUCTION												
Tons Feed From Mill	0	2,305	0	0	0	0	0	0	0	0	0	2,305
Tons Feed From U/G	0	8,922	14,572	10,287	9,979	9,979	10,315	8,304	8,156	8,156	8,156	96,826
Tons Feed Processed	0	11,227	14,572	10,287	9,979	9,979	10,315	8,304	8,156	8,156	8,156	99,131
Tons As2O3 Produced	0	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	70,000
Tons As2O3 Sold	0	4,500	5,000	5,500	6,000	6,500	7,000	7,000	7,000	7,000	7,000	62,500
Ounces Gold Produced	0	15,671	22,487	7,466	6,506	6,506	6,646	2,649	2,454	2,454	2,454	75,294
REVENUES ($1,000)												
Revenue Arsenic	0	2,997	3,330	3,663	3,996	4,329	4,662	4,662	4,662	4,662	4,662	41,625
Revenue Gold	0	7,287	10,457	3,472	3,025	3,025	3,090	1,232	1,141	1,141	1,141	35,012
Total Revenue	0	10,284	13,787	7,135	7,021	7,354	7,752	5,894	5,803	5,803	5,803	76,637
Revenues/ton Feed	0	916	946	694	704	737	752	710	712	712	712	7,592
Revenues/ton As2O3	0	1,469	1,970	1,019	1,003	1,051	1,107	842	829	829	829	10,948
OPERATING ($1,000)												
Total Operating	0	3,573	3,841	4,028	4,214	4,401	4,587	4,587	4,587	4,587	4,587	42,994
Operating/Ton Feed		318	264	392	422	441	445	552	562	562	562	
Operating/Ton Sold	0	794	768	732	702	677	655	655	655	655	655	6,951
Total Capital	8,943	800	1,069	0	0	595	575	0	0	0	0	11,982
Cash Flow Before Tax	(8,943)	5,911	8,876	3,107	2,807	2,358	2,590	1,307	1,216	1,216	1,216	21,661
Total Taxes	0	1,184	2,324	483	546	687	795	216	268	314	346	7,163
Net Cash Flow	(8,943)	4,727	6,552	2,624	2,261	1,672	1,795	1,091	948	902	869	14,498
Discount Rate	15.0%											
Aft Tax Discounted Cash Flow	(8,943)	4,111	4,955	1,725	1,292	831	776	410	310	256	215	5,938
Cum. Discounted Cash Flow	(8,943)	(4,832)	122	1,847	3,140	3,971	4,747	5,157	5,467	5,723	5,938	

BEFORE TAX

Net Present Value $10,384 of first 10 years of operation.

Payback Period 1.1 Years

IRR 59.01%

AFTER TAX

Net Present Value $5,938 of first 10 years of operation.

Payback Period 1.5 Years

IRR 40.8%

\WAROX\ECONOMIC\BUDGET6
NO TRANSFER FACILITY

GIANT YELLOWKNIFE MINES LIMITED
WAROX PLANT
PRELIMINARY ECONOMIC STUDY (4500 - 7000 TPY AS2O3 SALES)
PRODUCTION RATES AND PRODUCT PRICES

YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
VOLUME PARAMETERS												
Tons As2O3 Produced	0	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	70,000
Tons As2O3 Sold	0	4,500	5,000	5,500	6,000	6,500	7,000	7,000	7,000	7,000	7,000	62,500
Feed Grade As	0.00%	47.70%	36.75%	52.05%	53.66%	53.66%	51.91%	64.49%	65.66%	65.66%	65.66%	
Feed Grade As2O3	0.00%	62.98%	48.52%	68.73%	70.85%	70.85%	68.55%	85.15%	86.70%	86.70%	86.70%	
As Recovery	0.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	
Tons Feed	0	11,227	14,572	10,287	9,979	9,979	10,315	8,304	8,156	8,156	8,156	99,131
PRODUCTION DATA												
ARSENIC												
Feed % As2O3	0.00%	62.98%	48.52%	68.73%	70.85%	70.85%	68.55%	85.15%	86.70%	86.70%	86.70%	
Recovery (%)	0.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	
Tons As2O3	0	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	70,000
GOLD												
Feed Grade (oz/ton)	0.000	1.642	1.816	0.854	0.767	0.767	0.758	0.375	0.354	0.354	0.354	
Recovery (%)	0.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	
Ounces Gold	0	15,671	22,487	7,466	6,506	6,506	6,646	2,649	2,454	2,454	2,454	75,294
PRODUCT PRICES												
As2O3 / lb CDN	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	
Gold / oz CDN	465	465	465	465	465	465	465	465	465	465	465	
REVENUES												
As2O3	0	2,997	3,330	3,663	3,996	4,329	4,662	4,662	4,662	4,662	4,662	41,625
Gold	0	7,287	10,457	3,472	3,025	3,025	3,090	1,232	1,141	1,141	1,141	35,012
TOTAL REVENUES	0	10,284	13,787	7,135	7,021	7,354	7,752	5,894	5,803	5,803	5,803	76,637

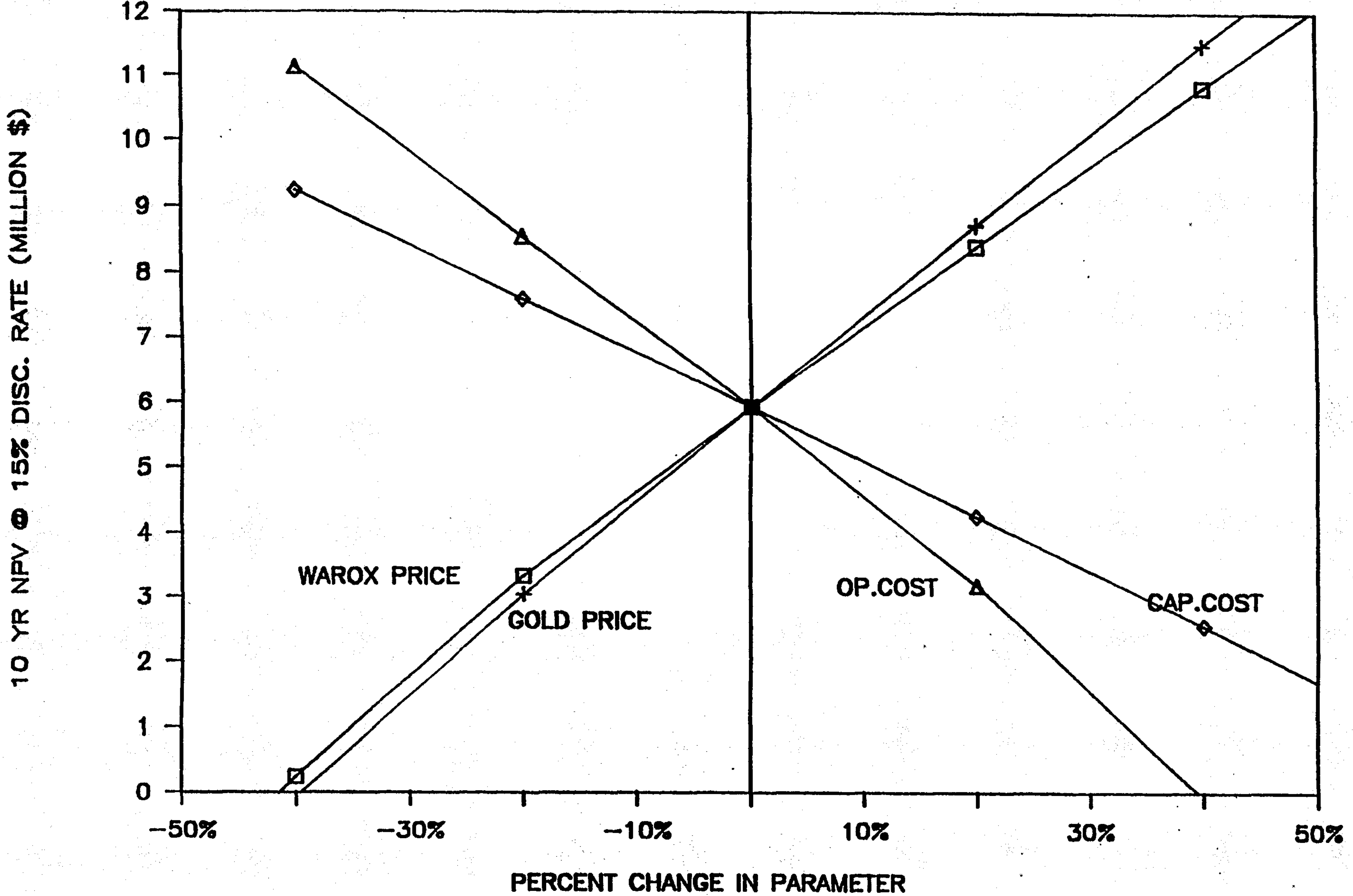
\WAROX\ECONOMIC\BUDGET6
NO TRANSFER FACILITY

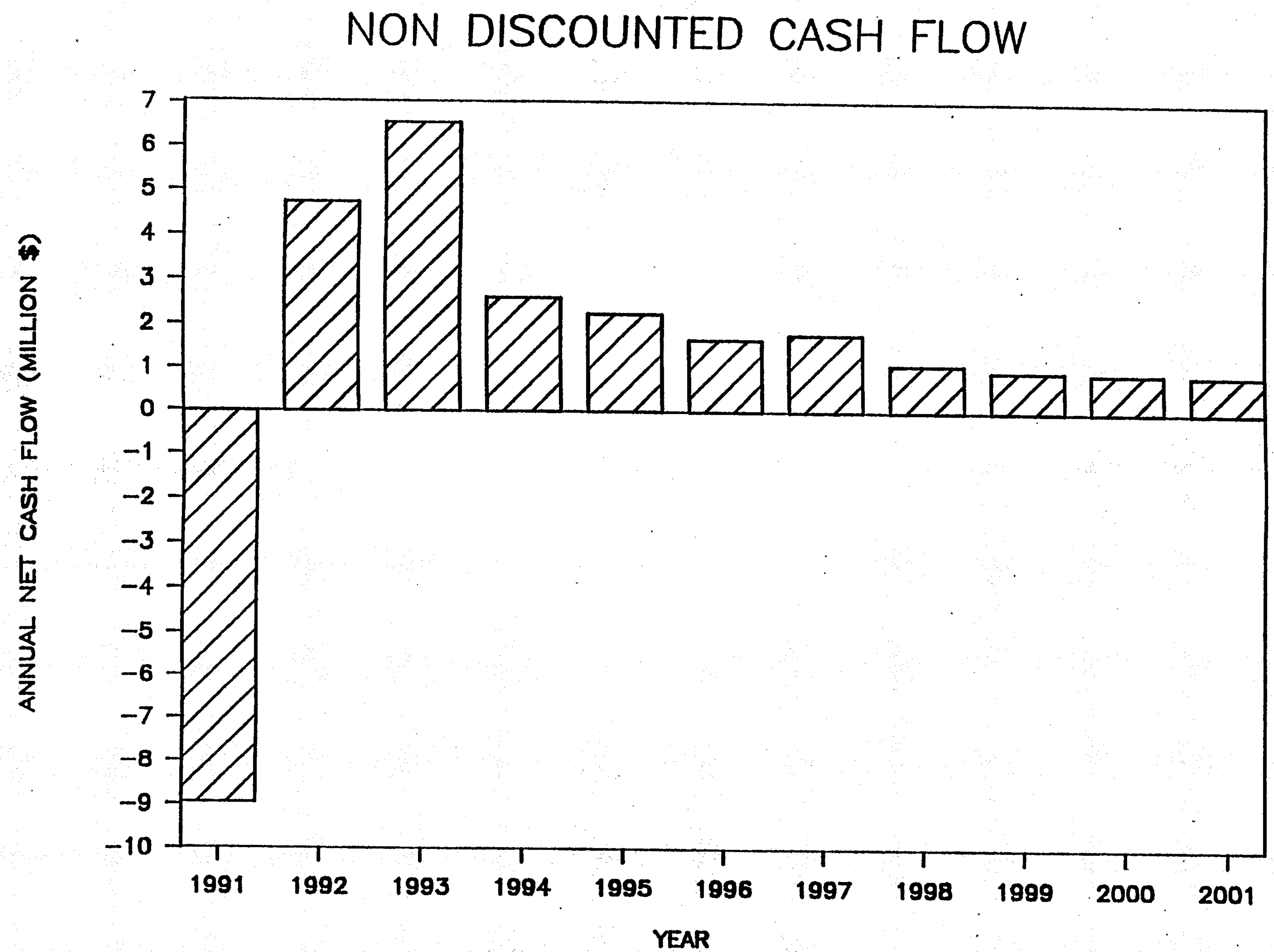
GIANT YELLOWKNIFE MINES LIMITED
WAROX PLANT
PRELIMINARY ECONOMIC STUDY (4500 - 7000 TPY AS2O3 SALES)
OPERATING COSTS

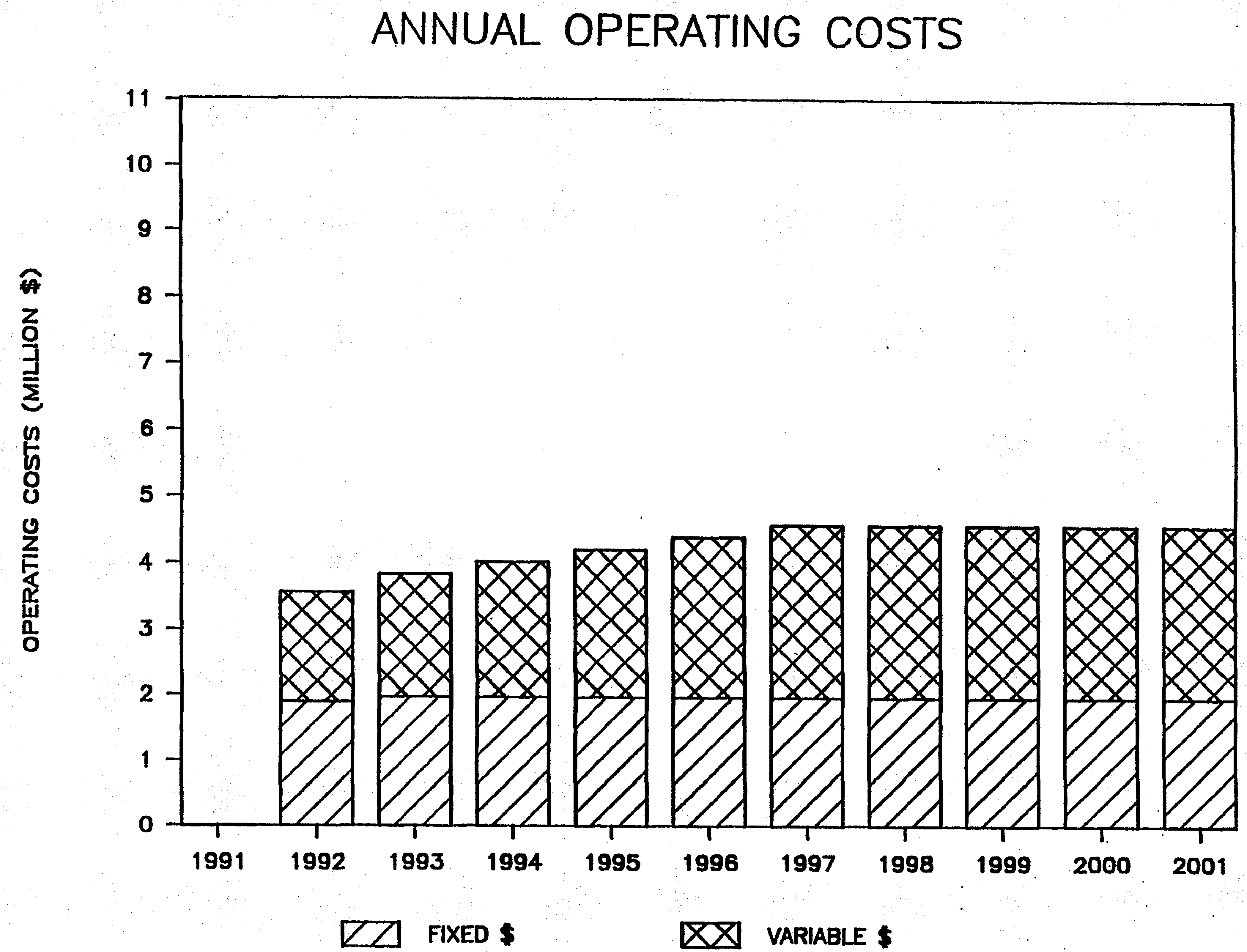
YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
UNIT COSTS U/G $/ton As2O3	N/A	37	37	37	37	37	37	37	37	37	37	
Plant $/ton As2O3	N/A	231	231	231	231	231	231	231	231	231	231	
Transfer $/ton As2O3	N/A	0	0	0	0	0	0	0	0	0	0	
Freight $/ton As2O3	N/A	373	373	373	373	373	373	373	373	373	373	
Tails $/ton As2O3	N/A	1,462	1,462	1,462	1,462	1,462	1,462	1,462	1,462	1,462	1,462	
UNITS (Tons) U/G As2O3	0	4,800	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	70,000
Plant As2O3	0	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	70,000
Transfer	0	0	0	0	0	0	0	0	0	0	0	0
Freight	0	4,500	5,000	5,500	6,000	6,500	7,000	7,000	7,000	7,000	7,000	62,500
As2O3 to Tails	0	70	70	70	70	70	70	70	70	70	70	700
COSTS U/G	0	178	260	260	260	260	260	260	260	260	260	2,518
Plant	0	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	16,140
Transfer	0	0	0	0	0	0	0	0	0	0	0	0
Freight	0	1,679	1,865	2,052	2,238	2,425	2,611	2,611	2,611	2,611	2,611	23,313
Tails	0	102	102	102	102	102	102	102	102	102	102	1,023
Additional Operating	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL OPERATING COSTS	0	3,573	3,841	4,028	4,214	4,401	4,587	4,587	4,587	4,587	4,587	42,994
NET OPERATING PROFIT	0	6,711	9,945	3,107	2,807	2,953	3,165	1,307	1,216	1,216	1,216	33,643
CAPITAL U/G RECLAIM	2,043	800	1,069	0	0	595	575	0	0	0	0	5,082
SURFACE PLANT	6,400	0	0	0	0	0	0	0	0	0	0	6,400
TRANSFER FACILITY	0	0	0	0	0	0	0	0	0	0	0	0
EXTRA CAPITAL	500	0	0	0	0	0	0	0	0	0	0	500
TOTAL CAPITAL	8,943	800	1,069	0	0	595	575	0	0	0	0	11,982
CASH FLOW BEFORE TAX	(8,943)	5,911	8,876	3,107	2,807	2,358	2,590	1,307	1,216	1,216	1,216	21,661
TOTAL TAXES	0	1,184	2,324	483	546	687	795	216	268	314	346	7,163
NET CASH FLOW	(8,943)	4,727	6,552	2,624	2,261	1,672	1,795	1,091	948	902	869	14,498
CUMULATIVE NET CASH FLOW	(8,943)	(4,216)	2,336	4,960	7,221	8,892	10,687	11,778	12,726	13,628	14,498	
DISCOUNT RATE	15.00%											
BEF TAX DISCOUNTED CASH FLOW	(8,943)	5,140	6,712	2,043	1,605	1,173	1,120	491	397	346	301	10,384
CUMUL DISCOUNTED	(8,943)	(3,803)	2,909	4,952	6,557	7,729	8,849	9,340	9,738	10,083	10,384	
AFT TAX DISCOUNTED CASH FLOW	(8,943)	4,111	4,955	1,725	1,292	831	776	410	310	256	215	5,938
CUMUL DISCOUNTED	(8,943)	(4,832)	122	1,847	3,140	3,971	4,747	5,157	5,467	5,723	5,938	

PAYBACK: 1.5 YEARS IRR: 40.78%

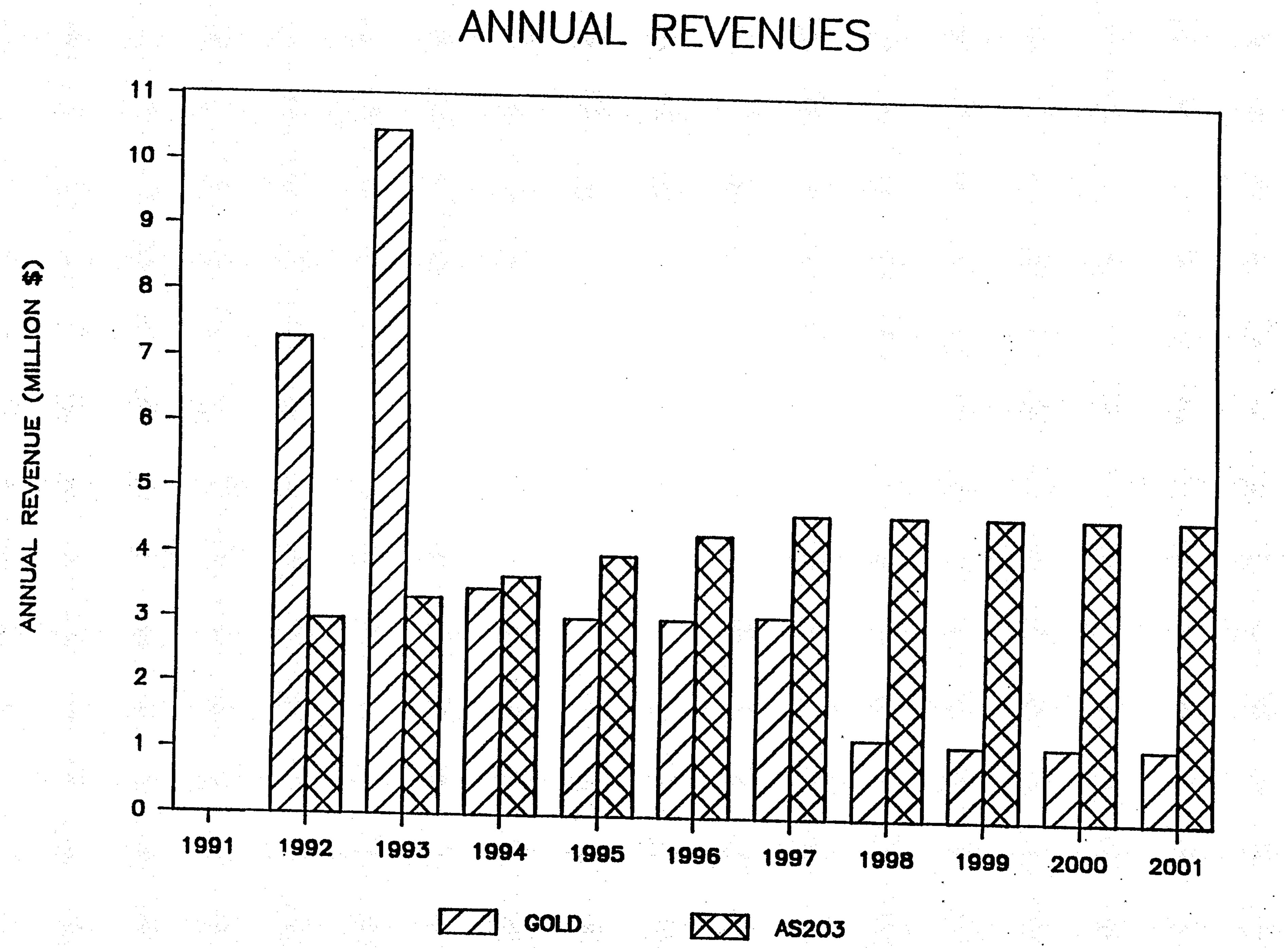
NPV SENSITIVITY TO CHANGES




NON DISCOUNTED CASH FLOW
ANNUAL NET CASH FLOW (MILLION $)
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
YEAR



ANNUAL OPERATING COSTS
OPERATING COSTS (MILLION $)
0
1
2
3
4
5
6
7
8
9
10
11
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
FIXED $
VARIABLE $



ANNUAL REVENUES
ANNUAL REVENUE (MILLION $)
0
1
2
3
4
5
6
7
8
9
10
11
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
GOLD
AS2O3

Confidential

Copy Kent Moore
Joe Wals

MEMORANDUM

TO: **WAROX FILE**

CC: K. Blower, F. van de Water, B.D. Simmons, S. McAlpine

FROM: A. Fleming

DATE: 12 March 1990

RE: **WAROX DEVELOPMENT STRATEGY**

Testwork currently underway on the Warox project will complete the process development in the next few months. At that time, from a technical viewpoint, commitment to development could be made.

A commitment by Giant Yellowknife Mines to the Warox project must, however, be evaluated in terms of, (1) its priority compared to other capital activities which the Company is considering and (2) the project risk.

Two other developments clearly rank ahead of Warox, namely the Supercrest Mine at Yellowknife and the Nighthawk Lake project at Timmins. Giant Yellowknife should be able to fund these activities from cash flow during 1990 and 1991. The $10 million odd required for Warox is beyond the Corporation's capacity. Risks associated with the Warox project are principally technical and marketing. The Board's present view, I believe, is that Warox is an unconventional activity for the Company, somewhat similar to TRP, and is hence unlikely to be approved by Directors in the short term.

Notwithstanding the above, the Warox project as we presently perceive it is financially very attractive with pay back of less than two years, N.P.V. (15%) of $10 million and I.R.R. of +50%.

Following discussion in Yellowknife on March 7 activity has been initiated to determine what alternative options are open for development of the project. The obvious approach is to seek outside financing in the form of project funding with no recourse to Giant Yellowknife or a joint venture partner.

Several parties have expressed an interest in taking a position in the venture and a list is being compiled.

In the next few weeks, Management should develop a strategy on Warox with the objective of reaching serious negotiations with a financier or funding partner by mid year.

AWF

MEMORANDUM

TO: S. McAlpine

CC: K. Blower, G. Halverson

FROM: K. Morton

DATE: April 27, 1990

SUBJECT: WAROX PROJECT - SUMMARY OF RECENT EVENTS

Introduction

During the past several weeks, a number of possible revisions to the original WAROX proposal have been considered, revisions that permit the primary objectives of the project to be achieved, but at much lower initial cost and at lower risk. Completing the plant in stages, to be funded partially from project cash flow, is one of the attractive features of the new proposal, especially when one considers that Stage One, replacement of the cottrells with sintered metal filters, is a stand alone project that will generate excellent returns, even if subsequent stages are not followed up.

The opportunity to secure a 7,000 tpy niche in the arsenic trioxide market has been presented to Giant, and this too serves to reduce the risk element for the project. The client, Hickson Corporation, is one of the major users of purified As2O3 in North America.

Summary

Stage One

As mentioned, Stage One of the proposal is replacement of the cottrells with sintered metal filters. This has several immediate benefits in addition to being a prerequisite for purification of reclaimed baghouse dust.

1. Reduced concentration of arsenic reporting to carbon plant. This in turn results in improved carbon plant gold recovery and reduced wastewater treatment costs.

2. Reduced operating and maintenance costs. Much smaller, simpler installation than cottrells.

3. 3000 tons/yr high purity, saleable WAROX produced, resulting in substantial arsenic revenues and reduced baghouse dust underground storage costs.

4. Gold presently reporting to baghouse dust will be captured in the sintered metal filter for subsequent treatment in carbon plant.

The overall revenue improvement resulting from the changeover to sintered metal filters is presently estimated to be approximately $1,200,000 annually. The estimated capital cost is $750,000.

Delivery of sintered metal filters is approximately 5 to 6 months, during which time preparations can be made for quick installation when the filters arrive on site.

<u>Stage Two</u>

Stage Two of the project is reclaim and purification of stored baghouse dust from underground. This is a much larger step, involving as it does, development of access drifts, installation of reclaim equipment, design and installation of a fuming reactor, and marketing of an additional 4000 tons/yr of WAROX. Some compromises to the original WAROX proposal have been made, ie. no feed dryer, no compaction equipment, no special building or sophisticated instrumentation, etc.. These compromises do not affect product purity, market volume or gold recovery in the early years of the operation, and it is expected that necessary equipment can be added later as required.

Stage Two will begin as soon as Stage One has been completed and reliable operating information has been collected. Approximately six months lead time is required for underground development before installation of underground reclaim equipment can take place. Installation of roasting equipment, surface conveyors, surface storage bins, etc, is expected to take approximately 9 months from the time the drawings are approved.

The benefits of reclaiming baghouse dust from underground are as follows:

1. Revenues from gold recovered from baghouse dust

2. Revenues from arsenic recovered from baghouse dust.

3. Eventual access to gold bearing crown pillars.

The overall revenue from reclaim and purification of baghouse dust is estimated at $7,600,000 during the first year of operation. This does not include the $1,200,000 annual benefit of installing sintered metal filters. The estimated capital cost of Stage Two is $2,383,000. Annual operating cost is estimated at $665,200.

<u>Stage Three</u>

Stage Three is construction and operation of a transfer facility at Enterprise to reduce shipping costs and to provide a better customer service, bulk rail delivery.

The financial benefit is a transportation cost saving of approximately $0.08/lb of WAROX sold, from $0.19 to approximately $0.11/lb. This amounts to an annual cost improvement of approximately $1,120,000 at a shipping rate of 7,000 tons/yr. The savings increase as shipping volume increases.

The capital cost of the transfer facility is estimated at $2,625,000 and the annual operating costs are estimated at $542,000. This operating cost has been included in the $0.11/lb. transportation cost shown above.

The transfer facility should be built early on in the project to take maximum advantage of cost savings. Construction can be completed in about the same time period as Stage Two, about nine months, and should, if possible, be undertaken concurrently.

Overall Project

During the period May '90 to May '91, filter testing and installation will cost approximately $750,000. The annual benefit of $1,200,000 will begin immediately after installation is complete. Stage II will cost $2,383,000 in capital over the period May '91 to Apr '92. Annual benefit following Stage II is estimated to be $6,935,000 plus the $1,200,000 benefit contributed from Stage I. Stage III will cost $2,625,000 in capital cost over the same period as Stage II, May '91 to Apr '92. Annual benefit following Stage III is expected to be $1,120,000 plus $6,935,000 contributed by Stage II and $1,200,000 contributed by Stage I.

Overall, capital outlay during the two year construction period is estimated at $5,758,000. $1,200,000 will be earned from the project during this period, and $9,255,000 will be earned during the first full year of operation beginning in May '92.

Schedule

Before the sintered metal filters can be ordered, the current pilot test to define correct filter specification should be completed. Tentative scheduling for completion of the test is mid July of this year. If test results are as expected, confirming RPC pilot test results as to gold collection and arsenic purification, we will be in a position to order sintered metal filters of the correct porosity and face velocity for our plant. The installation should be oversized by about 25% to provide for the Stage Two expansion of the project.

Installation of the filters could be completed by May 1991, allowing an early start to have stages Two and Three completed early in 1992

Kent Morton

POSSIBLE SCHEDULE

	MAY 1990	MAY 1991	MAY 1992
Test, Install Filters	[-$750,000]	+ $1,200,000/yr --->	
Stage II U/G Reclaim Roaster		[- 2,383,000]	+$6,935,000/yr --->
Stage III Transfer Facility		[- 2,625,000]	+$1,120,000/yr --->