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CANADA - NWT

MINERAL DEVELOPMENT AGREEMENT

Giant Yellowknife Mines Limited
Yellowknife Division
Recovery Improvement Project

Volume 1

Canada

Northwest Territories Canada

Canada-NWT

Mineral Development Agreement

Northern Technology Assistance Program

Giant Yellowknife Mines Limited
Yellowknife Division
Recovery Improvement Project

Volume 1

No. SC-265237

March 1990

Prepared by: G.B. Halverson
Mill Superintendent

CANMET Scientific Authority:

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Physical Scientist

GIANT YELLOWKNIFE MINES LIMITED
Yellowknife Division

Recovery Improvement Project
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INTRODUCTION

In the spring of 1989 Giant Yellowknife Mines Limited and the Government of the Northwest Territories entered into a contribution agreement through a Canada - N.W.T. Economic Development Agreement (EDA) and specified under a Northern Technology Association Program (NTAP).

This agreement was for financing a program called the Gold Recovery Improvement Project. The objective of this program was to increase recoveries in the milling of refractory ore.

The project was subdivided into several phases which were to be done sequentially. Phase I was sample gathering, preparation, and distribution to the various labs. Phase II was an in depth mineralogical investigation into the gold association of the Giant ore. Phase III was bench scale testing of the Giant ore to increase recovery. Phase IV was to pilot test any potential results obtained by bench scale testing. Phase V was outside the scope of the program but was to install and commission any new process derived from this project.

The results contained herein are the efforts of several groups who completely analyzed the Giant ore searching for ways to increase recovery.

Appendix A

STATEMENT OF WORK

1. Introduction

During the past 41 years of operation, Giant has utilized several metallurgical processes to recover gold from its refractory ore. The metallurgical steps include crushing, grinding, flotation, roasting cyanidation, merrill-crowe precipitation, electrostatic precipitation and baghouse collection. These processes result in an overall recovery of 86 percent.

This relatively low recovery is due to the fact that the Giant ore is "refractory" (where most gold is invisible and difficult to recover by cyanide leaching). Increasing the recovery by 4% would diminish the cost of mining and milling per kg of gold bullion, also roughly by 4%. This could improve Giant's competitiveness.

Since in the Northwest Territories, other properties contain refractory ore as well (Nerco-Con, Noranda/Getty, Tundra) results of this project, when published, will be of benefit to many of them.

The thrust of an R&D program from the Canada/NWT Northern Technology Assistance Program (NTAP) would be to increase recovery utilizing either improvements in the current process or new available technology. The choice of technologies to be tried will depend on the results of the mineralogical tests. A more detailed program of work for each phase of the project will be established and submitted for the approval of the Scientific Authority and the Management Group after results from the previous phase are available.

This project will herein be called "Gold Recovery Improvement Investigations".

2. Objectives

The results of the investigations will allow implementation of proved technology to enhance the recovery of gold from the Giant operations. This will eventually increase mining activity and employment in the NWT, raise Giant's competitiveness and help other NWT mines to overcome problems in the milling of refractory ores.

3. Scope of Work

Phase One of the project was completed in 1988/89. The remaining work to be done can be broken into several phases as follows:

Phase 2: Mineralogical investigation to determine the mineralogical distribution of gold in a head and tailing sample from Giant Yellowknife.

The objectives are as follows:

1. To identify the minerals and determine their proportions in the samples.
2. To identify the sulphide mineral(s) which concentrate(s) the "invisible" gold by quantitative ion probe microanalysis.
3. To determine a mineralogical balance for gold in the composite sample.
4. To examine the tailings sample and determine the minerals and their proportions.
5. To determine the process mineralogy of gold for the samples and provide suggestions how gold recovery may be improved int he context of the current processing procedures or with the use of alternative technologies.

Phase 3: Bench scale testing to optimize recovery of Giant's current process as well as test new technology.

Phase 4: Pilot testing of the processes identified in Phase 3 which give increased recovery.

Phase 5: Implementation of the Gold Recovery Improvement Investigation.

4. PY Requirements

Phase 2	12 man weeks
Phase 3	30 man weeks
Phase 4	12 man weeks

5. Budget

Phase 2	-will cost an estimated $30,000 to complete, including manpower and laboratory costs.
Phase 3	-will cost an estimated $70,000 to complete, including labour and laboratory costs.
Phase 4	-will cost and estimated $50,000 to complete, including labour, equipment and reagents.
Phase 5	-implementation will be internally funded by Giant.

6. Timetable

Phase 2	April-June 1989
Phase 3	May-August 1989
Phase 4	September-October 1989
Phase 5	1990

7. Investigators

Phase 1	Giant personnel
Phase 2	Western University
Phase 3	Lakefield Research
Phase 4	Research Productivity Council or Coastec Research depending on results obtained from Phase 3.
Phase 5	Giant personnel

SUMMARY

The results of the program has led Giant into several areas of further research. One is upgrading of the scavenger concentrate utilizing column flotation which could improve overall recoveries by 1%. Potential increases in carbon plant recovery are possible by use of lime to remove arsenates which lock up cyanidable gold. Cyanidation of mill tailings indicated higher recoveries of 2% overall but proved to be uneconomical in the mill and detrimental to conventional recoveries at the Tailings Reclaim Plant.

The testwork has shown that a 4% increase in recovery is not an economic reality and the milling operation is performing efficiently with only minor recovery increases being possible. The program has shown however, the importance of mineralogical research into gold analysis to understand the application of unit processes for recovery. The identification of gold association down to 100 angstroms allows for the rationale of our current process and verifies the previous thinking that gold in arsenopyrite is in the form of solid interstitial replacement on a molecular level where an arsenic atom is replaced with a gold atom.

The following conclusions have been summarized by the mineralogical and bench scale testing work:

1.0 MINERALOGICAL (Phase II)

1.1 Feed and Concentrate

- Gold is concentrated in two minerals: native gold and arsenopyrite.
- The average silver content of the native gold is 6.9 wt%.
- The average submicroscopic gold concentration in arsenopyrite is 299 ppm.
- Native gold contributes 38.7% of the assayed gold, arsenopyrite is 59.7%, and pyrite only 1.6%.
- The majority of the native gold is liberated coarse - grained and 67.7% wt floats in the Maxwell cell and rougher concentrate. Over 97% of the native gold is recovered. 10.7% of the native gold is with quartz, 9.8% in pyrite and 12.4% with arsenopyrites.

- Of the associated native gold, two forms are lost to the tailings; relatively coarse grained combined with quartz (high tails), and combined with fine grained aresenopyrite (low tails).

- The fine grained arsenopyrite (avg. 325 mesh) is more enriched in submicroscopic gold (495 ppm) compared to the coarser grained arsenopyrite (153 ppm) (avg. 150 mesh).

- The fine grained arsenopyrite floats slower and accounts for 75.5% of the contained gold in the scavenger concentrate.

- Of the gold lost to tailings, the fine grained arsenopyrite accounts for 80%.

- These results lead to the following potential recovery improvements which are; recover the coarse grained gold associated with quartz either by direct cyanidation or finer grinding and recover more of the fine grained arsenopyrite also by finer grinding.

1.2 Roasting

- In roasting the submicroscopic gold in arsenopyrite accounts for more that 90% and native gold with arsenopyrite is 3%. Pyrite contributes 6.4% of the gold.

- Submicroscopic gold in arsenopyrite is in solid solution and is inhomogeneously distributed.

- The ares of high gold concentration (>1000 ppm) are located in the outer zones of the arsenopyrite grains.

- Some calcine particles have a sintered outer layer which significantly reduced permeability and locks colloidal gold.

- Gold is lost to the calcine residue by:
    1) within most impermeable maghemite particles (regrind will not help)
    2) in the permeable core of goethite/scorodite particles and sintered coating (regrind will improve recovery)
    3) in the sintered coating (regrind will have some effect).

- Gold recovery improves by regrinding of permeable particles with sintered coatings.

1.3 Tailings Material

- Gold in the current tailings and calcine residue is in the following forms:
  1) Native gold combined with quartz
  2) Submicroscopic and native gold with fine grained arsenopyrite
  3) Colloidal gold in maghemite particles
  4) Colloidal gold in more permeable calcine particles
  5) Colloidal gold in sintered rims of calcine particles
  6) Some soluble gold salts

1.4 Gold Distribution

- The following gold distribution analysis is on a sample of mill feed:

a)

Submicroscopic gold in arsenopyrite	59.7%
Submicroscopic gold in pyrite	1.6%
Native gold associated with quartz	4.0%
Native gold enclosed in fine grained arsenopyrite	2.6%
Native gold combined with fine grained arsenopyrite	0.2%
Native gold enclosed in coarse grained arsenopyrite	0.7%
Native gold combined with coarse grained arsenopyrite	1.3%
Native gold enclosed in pyrite	2.4%
Native gold combined with pyrite	1.4%
Native gold liberated	26.1%
	100.0%

b)

Gold associated with arsenopyrite	64.5%
Gold associated with pyrite	5.4%
Gold in a liberated form	26.1%
Gold associated with quartz	4.0%
	100.0%

- The following gold distribution is on a normal sample of flotation tailings:

Submicroscopic gold in arsenopyrite	60.9%
Submicroscopic gold in pyrite	1.7%
Cyanidable gold	37.4%

- The following gold distribution is on samples of flotation concentrate combined:

Submicroscopic gold in arsenopyrite	59.5%
Submicroscopic gold in pyrite	2.1%
Cyanidable gold	38.4%

2.0 BENCH TESTING (Phase III) Lakefield

Full diagnostic testing was done on eight various samples which include chemical analysis on sized fraction and gold association testing. This work verified the mineralogical work and identified where the gold was associated for methods of possible increased recoveries.

Based on this work and mineralogy the bench testing concentrated on grinding - flotation and grinding - cyanidation. The following summaries were made.

2.1 Grinding

- 67.6% of the gold in the calcine residue occurs in the 24-74 micron fraction.
- 2.9% of the gold in the dust treating residue occurs in the -9 micron fraction.
- 55.5% of the gold in the concentrate/calcine products occurs in the 24-74 micron fraction.

2.2 Gold Distribution

- The cyanidable gold content rises from 43.7% in the roaster feed to 81.8% in the transfer dust and 86.4% in the roaster calcine.
- The calcine residue still had 23% available gold.
- The hot cottrell dust residue has 85.6% of the remaining gold locked in as arsenates.
- The flotation tailings have 38.8% available gold.
- The classifier overflow has 30.9% available gold.

2.3 Flotation

Grind/Float

- Gold and sulphur recovery is rapid in the first seven minutes and then tends to flatten out. This indicates a long flotation time is required for maximum recovery and relates to fine grained arsenopyrite after regrind. Microscopic analysis will identify surface problems with the arsenopyrite.

- Gold recoveries of 95.3% were achieved with a sulphur recovery of 91.6% and pyrite recovery of 98.0% and arsenopyrite recovery of 92.0%.

- Gold recovery is linear to both arsenopyrite and pyrite recovery although the ratios are 1.0 and 0.4 : 1.0 respectively.

- To get a 97.5% gold recovery will require a 97.5% arsenopyrite recovery and 98% pyrite recovery.

- The dependence on recovery is directly related to arsenopyrite flotation.

- A series of grind/flotation tests were done and the results indicate that recovery is more dependent on flotation time rather than grind and extensive grinding does not increase recovery significantly.

- Pulling a hard float decreases the grade dramatically but only marginally increases recovery.

- To get maximum recovery without grade suffering will require cleaning of scavenger concentrate.

- Further analysis indicates a 97% gold recovery requires 99% sulphur recovery. The pyrite recovery was as high as 99% but arsenopyrite recovery remained at 92% to 95% maximum.

2.4 Reagents

- Soda ash addition showed no effect and is uneconomical.

- Copper sulphate addition point has not effect on overall recovery.

- Use of sodium silicate proved to lower recovery when used.
- Use of Aerofloat 208 showed no effect on overall recovery as native gold is all floated readily with xanthate.

2.5 Flowsheet Development

- The best analysis of this testing indicated slow pulling rates, scavenger concentrate cleaning and combining cleaner concentrate with rougher concentrate for a final product. Finer rougher grinding did not improve recoveries and a 2nd stage grind gives the best results. Ultra fine grinding did not improve recoveries.
- This led the way to column cell flotation testing for scavenger cleaning. This feed is ideal with a silica gangue and mainly arsenopyrite sulfide concentrate.

2.6 Cyanidation Testing

2.6.1 Mill Feed

- Very consistent recoveries at 52% gold recovery at 90% -200 mesh. This is higher than earlier tests of 38% by Lakefield and Surface Science.

2.6.2 Tailings

- Gold recovery by cyanidation is dependent on arsenopyrite present. The higher the arsenopyrite recovery on flotation the lower the arsenopyrite to tailings and higher recoveries on flotation and cyanidation of tailings.
- Fine grinding had no effect on cyanidation recovery.

2.6.3 Feed/Conc/Tailings

- This indicates free native gold floats primarily in the rougher concentrate.
- Gold in the scavenger concentrate and tailings is not primarily associated with free native gold.

2.6.4 Calcine Residue

- Finer grinding increased the recovery from 17.4% to 32.8% and to 46.1% with grinding up to 96% -10 micron.

- Gold recovery by gravity concentration 4.5% by Mozley concentrating and 27.7% by Wilfler concentrating 50% of the residue. Both results were extremely poor.

CONCLUSIONS

This extensive program did not yield a significant increase in gold recoveries of 4% which was the target, but did identify minor recovery increases. This leads to the conclusion that the recoveries being obtained by Giant Yellowknife Mines are the best obtainable with present technology and economics. Testing did show some promise in flotation circuit optimization and calcine residue grind optimization to obtain minor recovery increases. A pilot plant test on column flotation is being carried out by Lakefield to complete Phase IV of the project and finalize the research.

The program has been a success in the area of refractory ore knowledge and importance of mineralogical work on ore. This program has completely defined the association of gold in the refractory Giant ore. The gold analysis was followed through the process to identify gold association in flotation/ roasting/ and cyanidation unit processes, as well as techniques to recover the gold.

The work done by Surface Science was confirmed by both Giant and Lakefield testing and showed clearly the importance of understanding the nature of the gold in the ore to identify potential problems and solutions to milling. Analysis from Optical Microscopy/Scanning Electron Microscopy and Ion Probe Microanalysis can help future potential mines in the Northwest Territories to successful operations. This report identifies the basic understanding and handling of refractory gold ore and has application for reference for current and future operations in the Northwest Territories.

GIANT YELLOWKNIFE MINES LIMITED
Yellowknife Division

Recovery Improvement Project
#SC-265237

Phase I

VOLUME 1

March 1990

Prepared By:

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ABSTRACT

During the period January 1989 to March 1990, a testwork program was initiated through a Canada - N.W.T. Northern Technology Association Program (NTAP). The majority of this work was carried out by Surface Science Western and Lakefield Research. Sample preparation was done by Giant and during the course of the program several tests were carried out by Giant in conjunction with the program.

The objectives of the program were to allow implementation of proved technology to enhance the recovery of gold from the Giant operation. This would eventually increase mining activity and employment in the N.W.T., and raise Giant's competitiveness and help other N.W.T. mines to overcome problems in the milling of refractory ores.

The Giant program included:

a) Verification of results obtained at Lakefield
b) Cyanide roaster products under various conditions to increase recovery
c) Cyanide #3 thickener underflow to reduce sliming to the roaster
d) Specific sample preparation for Surface Science Western to accelerate the program and identify gold association
e) Carbon analysis work for knowledge of activated carbon loading at Giant
f) Cyanidation of mill tailings combined and separated
g) Flotation circuit mass balancing and sample collection for column flotation pilot testing at Lakefield.

SUMMARY

The Recovery Improvement Project started in January of 1989 and is essentially complete as of March 1990. Giant initiated testwork on roaster material in an attempt to increase recoveries down stream of the roaster. During this time period samples were collected from various locations in the Giant milling process (refer to Figure 1). These samples included:

1) Flotation Feed
2) Flotation Tails
3) Calcine Residue
4) Roaster Feed
5) Transfer Dust
6) Roaster Calcine
7) Hot Cottrell Dust
8) Dust Treatment Residue
9) Baghouse Dust
10) Gold Loaded Carbon
11) Maxwell Cell Concentrate
12) Rougher Cell Concentrate
13) Scavenger Cell Concentrate

A detailed milling flowsheet (refer to Figure 2) shows the complexity of the ore milling at Giant and the need to analyze a wide range of samples in an attempt to increase recoveries.

The samples were distributed to Lakefield Research and Surface Science Western to complete Phase II and III of the project. In order to narrow the area of bench scale testing, Giant continued to wait until Phase II was complete before proceeding to Phase III.

The mineralogical work required sample screening and diagnostics which were provided by Lakefield and Giant. Analysis proceeded slowly at Western University and by September the gold association testwork on flotation feed, tails and concentrate were completed. At this point it was decided to start on bench scale testing at Lakefield. Initial reports from Surface Science allowed devising of a test program to improve recoveries. By November the mineralogical work was 75% complete and interesting results were being obtained by cyanidation at Lakefield. December marked the completion of the mineralogical work and a final report was issued by the end of January 1990. During December, work at Lakefield concentrated on grinding and flotation with marginal successes. Lakefield completed the program in early March with the exception of a mineralogical study on flotation tailings from fine grinding and a pilot scale test on a sample of scavenger concentrate.

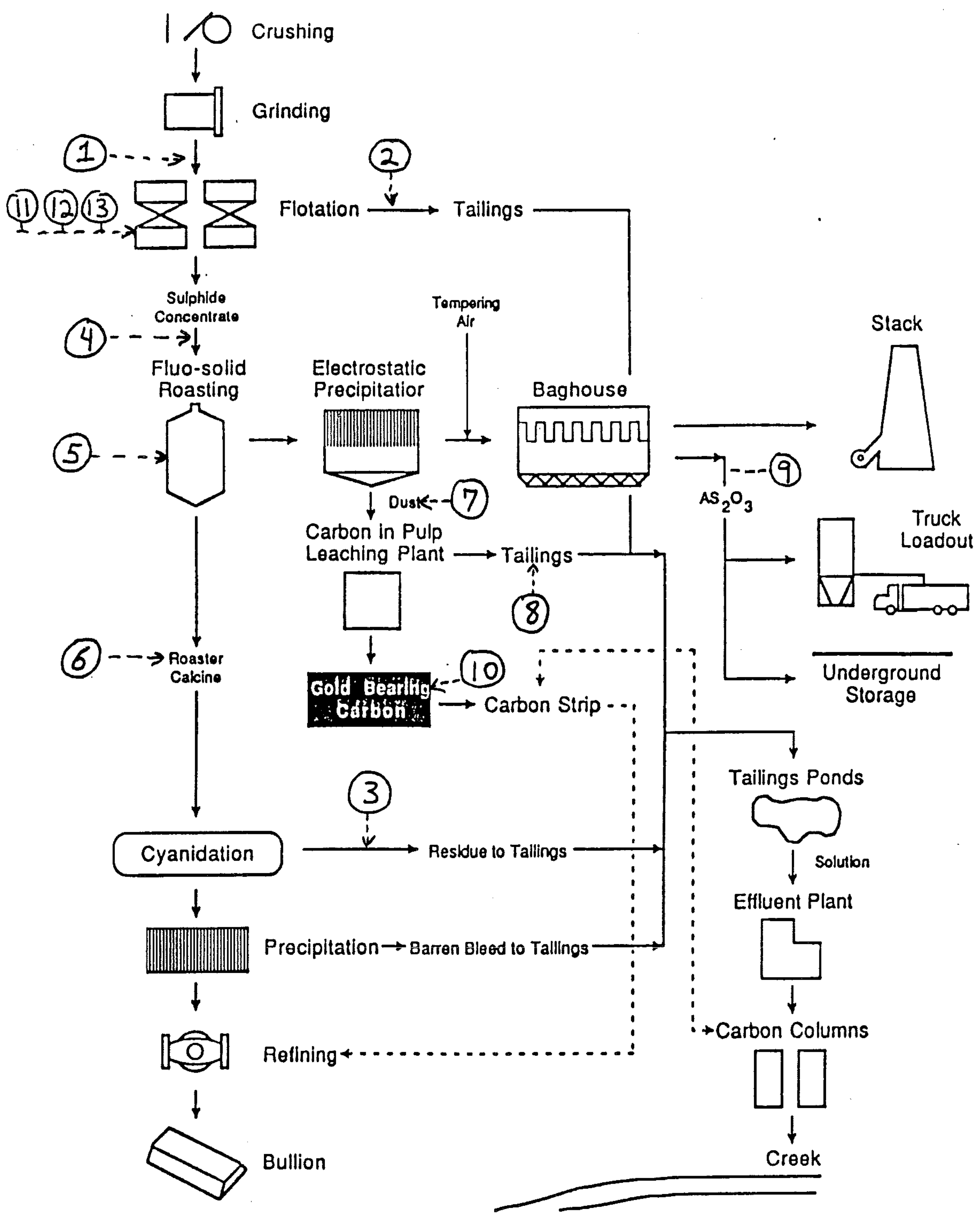

Figure 1: SIMPLIFIED MILL FLOWSHEET

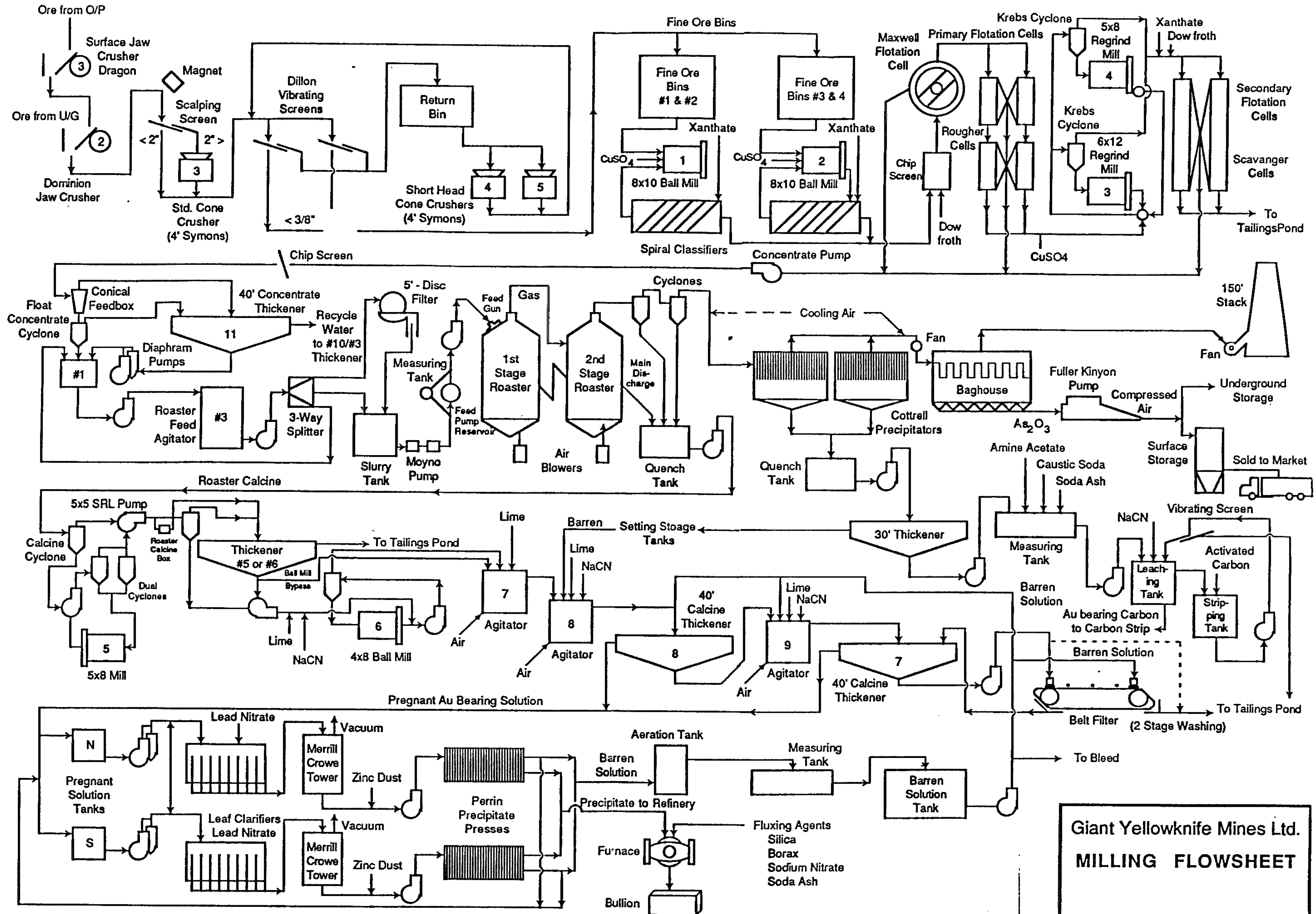

Figure 2: MILLING FLOWSHEET

Progress reports were compiled after periods of significant progress by the research labs. As results were obtained, Giant consulted with Surface Science and Lakefield to direct testing on promising work. Two areas of interest were cyanidation of flotation tailings and combined tailings, and also flotation cleaning to optimize the flotation circuit. Cyanidation tests commenced at Giant to confirm Lakefield tests and to study detailed economics and effects for full scale application. Tests indicated that cyanidation of the flotation tails and combined tails were not economic although recoveries were on the order of 2%.

The flotation cleaning flowsheet development led to a short plant test to mass balance the flotation circuit and obtain a large sample of scavenger concentrate to conduct column flotation work. This work showed a potential increase of 0.5% recovery and a potential higher sulphur grade for optimum roaster recovery.

The following is a summary of results of Giant's testwork done during the project.

1.0 <u>Roasting</u>

- There was some indication that maximum cyanidation recoveries were obtained after 1st stage roasting. This was later disproved by detailed sampling and testing by Giant and Lakefield. Recoveries improve by 5% in the 2nd stage roaster.

- Higher roaster temperatures showed a drop in recovery of approximately 5% at 1100 degrees F = 90.1% recovery and at 975 degrees F = 91.7% recovery. This testwork confirmed the maximum recoveries at 925 degrees F for both stages.

- Tests were done to minimize over roasting in the 1st stage and keeping the 2nd stage water above 2 gpm. This gave excellent results and showed the main control was to keep the roaster feed sulphur above 20% for the best results.

- Tests were done at roasting temperatures below normal at 840 degrees F and 900 degrees F and results showed 925 degrees F was the best operating temperature, at 840 degrees F = 86.2% recovery and 900 degrees F = 89.8% recovery.

- To increase roaster feed sulphur grade, a test was conducted on cyaniding #3 thickener underflow. This material contains fines from flotation concentrate and contains less sulphur. Results indicated recoveries of 58% gold recovery but the high head grade was suspect.

2.0 Diagnostics

- Cyanidation of the classifier overflow achieved a 39.6% recovery. Recoveries were consistent in three size fractions.

- Cyanidation of flotation tails achieved 50% - 53% recovery. Recoveries were the same for finely ground tails and "as is" cyanidation of tails. This started the thinking of potential recoveries by cyaniding tails in the mill or at the Tailings Retreatment Plant.

- Cyanidation tests on the calcine residues gave a 95.5% recovery with optimum roasting conditions.

- Four concentrate samples were cyanided and 1st Maxwell Cell = 23%, 2nd Maxwell Cell = 32%, rougher concentrate = 29% and scavenger concentrate = 25%. Finer grinding of the maxwell concentrate yielded 35% and 36% recoveries respectively and indicated gold enclosed in sulphide minerals.

- Carbon was analyzed by spectra analysis. It identified elements loaded onto carbon but no standards were developed to check concentrations. Arsenic absorbs the deepest into the carbon and then antimony and then gold is closest to the surface. This may explain why arsenic at 2000 ppm in solution has not fouled the kinetics of gold adsorbsion/desorbsion in the carbon plant.

3.0 Tailings

- Cyanidation of mill tailings showed recoveries of 60.1%/63.3% and 79%, but it was felt some contaminants of Treminco ore which is free milling was still present in the tailings. Further testing showed 56.2% gold recovery on mill tailings.

- Cyanidation of flotation tailings gave recoveries of 52.3% and 51.7%.

- Detailed testing was done on samples of flotation tails and mill tailings combined in proportion with TRP tailings. The combination of the two showed a decrease in recovery and a high reagent consumption rate. It was decided not to add the tailings to the Tailings Reclaim Plant because of the fouling characteristics of the material.

4.0 Flotation

- Plant sampling and testing in February showed tails could be lowered to 0.013 oz/T and the scavenger concentrate would require cleaning. This test was repeated on two occasions. Combined with high heads of 0.31 the recovery was 97.2% and 96.3% with a 0.25 head grade.

Giant Yellowknife Mines Limited

Yellowknife Division

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September 22, 1989

Mr. Marek Stefanski
Scientific Authority
FAX: (613) 992-9389

Dear Mr. Stefanski:

Please find the following progress report on the Gold Recovery Improvement Project. No written reports have been received as yet but the following is a result of telephone conversations.

a) Work done at Surface Science: Dr. Stephen Chryssoulis

The gold association testwork is complete for the flotation feed, tails and concentrate samples.

There has not been any progress on the gold association testwork on the roaster calcine material. Delays with the ion implantation process is the cause.

b) Work done at Lakefield Research: Inna Dymov

The diagnostic testwork for the roaster calcine and hot cottrell dust samples is complete. The cyclosizer testwork is also complete. I am awaiting the results possibly by next Tuesday.

Should you require further information on the above please call or fax me.

Yours truly,

GIANT YELLOWKNIFE MINES LIMITED

Brad Starcheski

Brad Starcheski
Metallurgist

BS/sj

c.c. G.B. Halverson

G I A N T
Yellowknife Mines Limited

MEMO TO: G. Halverson

FROM: B. Starcheski

DATE: October 30, 1989

SUBJECT: PROGRESS REPORT ON GOLD RECOVERY ENHANCEMENT PROJECT

The following is a summary of the mineralogical study of the gold association in Giant's flotation circuit. It is essential to know the gold association in order to devise flowsheet changes to improve recoveries. The study on the roaster calcine samples was not complete at the time of our meeting with Dr. Chryssoulis, October 20, 1989.

There was four major mineralogical associations determined for the visible gold;

1) Enclosed/combined with pyrite
2) Enclosed/combined with coarse grained arsenopyrite
3) Enclosed/combined within fine grained arsenopyrite or within arsenopyrite-quartz particles
4) Liberated

Within the arsenopyrite group it was found that the arsenopyrite exists in two forms, coarse grained >20 um and fine grained. The composition of the visible gold is native gold with an average Ag content of 6.9%.

The study also determined the characterization of the visible gold in the classifier O/F, high flotation tails, low assayed flotation tails and the four flotation concentrates.

A) Classifier Overflow

The coarse liberated gold is the major association. Fine grained gold is associated with fine grained arsenopyrite and quartz. This association accounts for 5-10% of the total. Cyanidation tests revealed that thirty-nine percent of the gold in the overflow could be recovered by cyanidation.

B) High Grade Flotation Tails: .019 oz/T

There was a number of small gold grains enclosed in fine grained arsenopyrite-quartz particles. The visible gold was also found combined with quartz and these grains were quite large, 600 um.

C) Low Grade Flotation Tails: .014 oz/T

There was small gold grains enclosed in fine grained arsenopyrite-quartz particles which was also found in the high grade tailings. No quartz-gold grains were found.

The gold loss appears to occur by encapsulation within fine grained arsenopyrite-quartz particles in both high and low grade tails. Cyanidation tests indicate that 50% of the gold can be recovered.

D) Concentrates

The first and second maxwell cell concentrates have the visible gold associated with the coarse grained arsenopyrite. The rougher concentrate has 80% association with fine grained and 20% with coarse grained arsenopyrite. The scavenger concentrate gold is associated with the fine grained arsenopyrite. Cyanidation tests at Giant revealed the following results:

	CYANIDATION RECOVERY
1st Maxwell Conc.	23%
2nd Maxwell Conc.	32%
Rougher Conc.	29%
Scavenger Conc.	20%

The study also characterized the invisible gold in the previous four samples. The major association of invisible gold was arsenopyrite with a very slight 1.5% contribution from pyrite. The following table illustrates the breakdown of the invisible gold in the, coarse grained and the fine grained arsenopyrite.

	COARSE GRAINED (%)	FINE GRAINED (%)
Classifier O/F	25	75
High Grade Flot. Tails	14	86
Low Grade Flot. Tails	18	82
1st Maxwell Conc.	75	25
2nd Maxwell Conc.	72	28
Rougher Conc.	24	76
Scavenger Conc.	12	88

CONCLUSION:

From the results of the gold association we can now devise a test programme to improve the recoveries. Lakefield has been awaiting these results to begin their testing schedule. The focus of the present test program is to improve gold recovery as opposed to improving concentrates. The following schedule has begun at Lakefield.

1) The first test is a lab scale of the present flowsheet with the addition of cyanidation tests on feed, tails and concentrates. From this we can hope to determine the distribution of gold that is amenable to cyanidation.

2) The second test is the current flowsheet with the addition of a tertiary grind to 90%m -200 Mesh. The product would then be floated and the tails assayed then cyanided. This would indicate how the finer liberation size affects the recovery.

3) The third test would utilize the present flowsheet but the scavenger concentrate would be pulled quite hard in order to float as much gold as possible. The sulfide grade of this concentrate would be low so a means of upgrading would be utilized such as cycloning and/or a cleaning cell. Presently we can't pull too hard as it adversely affects our concentrate feeding the roaster.

4) The fourth test would incorporate jigs to recover the large grains of visible gold prior to flotation.

From the results of these tests at Lakefield, we can modify the present flowsheet and run a plant trial.

Brad Starcheski

Brad Starcheski
Metallurgist

BS/sj

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November 2, 1989

Mr. Marek Stefanski
Scientific Authority
CANMET/Ottawa
FAX: (613) 992-9389

Dear Marek:

Re: Progress Report #3 "Gold Recovery Improvement Project"

Late in October, Brad Starcheski and myself were able to gain significant headway by visiting Lakefield Research and Western University.

Dr. Stefen Crysoullis is 75% complete with this project and has completed the study of our flotation circuit. Please find attached a progress report by Brad and Dr. Crysoullis' progress report and some Lakefield tests. With this information we were able to get Lakefield started on bench scale testwork for possible recovery improvements by 1) cyanidation, 2) finer grinding, 3) concentrate recycle/cleaning. We have sent a two ton sample of crusher feed to MPSI to do SAG Mill Amenability by batch testing as a stand alone item.

The mineralogical investigation should be complete and a report made by December 15, 1989. The Lakefield testwork including calcine work should be done by the end of December and reporting in January.

One of the outcomes of this program was identification of significant gold recovery by cyanidation of our tailings. A program to cyanide our tailings through the Tailings Reclaim Plant is being overseen by Doug Bartlett of Giant. He is looking at the cynergistic effects of the tailings on the TRP plant before going to full scale application this spring. This project has a potential value of $1.2 million per year before costs.

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(A member of the Pamour Group of Companies)

We should look at getting together to discuss this work by January/90. I could arrange something during the CMP meeting in January if this is okay with you.

Should you require further information, please call or fax me.

Yours truly,

GIANT YELLOWKNIFE MINES LIMITED

G. Halverson

G.B. Halverson
Mill Superintendent

GBH/sj
Attach.

c.c. B. Starcheski
S. McAlpine

G I A N T
Yellowknife Mines Limited

MEMO TO: G. Halverson

FROM: B. Starcheski

DATE: November 25, 1989

SUBJECT: LAKEFIELD WORK - PROGRESS REPORT

Lakefield has done a series of preliminary flotation tests as per the outlines sent to them.

TEST A: We were hoping to determine the flotation recovery vs grind size and the cyanidation of the tails vs the size of the tail particles.

TEST 21: First test done -- head .336 oz/T, tail .023 oz/T

Grind -200m	Flot. Rec.	Sulfur % Conc
61	78	23.5
83	89	20.1
88	92	17.1
94	93.9	16.9

TEST 22-25: head .269 oz/T, tail .027 oz/T

Grind	Flot. Rec.	Sulfur %	Cyanidation Rec.
61	72	20.6	35.5
83	83	16.6	32.6
88	89	13.4	36.9
94	91.3	11.5	32.9

The finer grind improved flotation recovery of the Au from 89% - 91%. The S recovery was only marginally increased 94% - 96.7% when the grind went from 83% to 94%. This was evident in both tests.

Lakefield will repeat this set. The cyanidation recovery remained around 32% - 35%.

TEST B: Cleaning of a rougher concentrate.
By going to a cleaning stage the sulfur in the concentrate increased from 17% to 23% and 13% to 21%. In test T19 the scavenger tail was refloated to see the effect. There was a 2% increase in Au recovery. Sodium Bicarbonate was used a pH modifier in T20 and the Au recovery was at 94.7% with a tail of .017 oz/T. The pH of T20 was 9.0.

Lakefield will repeat T19 to ensure repeatability. Also I've asked them to try a few more cleaning stages if possible.

TEST C: Normal flotation flowsheet but with cyanidation tests on the 3 streams: feed, conc, tail. They will begin this next week.

Brad Starcheski

Test No	Reagents g/t	% -200 mesh	Products	Weight %	Assays; %, g/t As	S	Spy(calc)	Au	% Distribution As	S	Spy (calc)	Au
21	135 g/t CuSO4	61.4	6 min Rougher Conc	7.9	8.17	23.50	20	114	72.7	88.2	91.6	78.2
	100 g/t A343/350	82.7	9 min Rougher Conc	9.8	7.62	20.10	16.83	104	84.5	94.0	96.1	88.8
		88.1	12 min Rougher Conc	11.4	6.92	17.70	14.7	93	89.1	96.0	97.8	92.1
		94.3	14 min Rougher Conc	12.0	6.67	16.90	14	90	90.5	96.7	98.0	93.9
			6 min Rougher Tail	92.1	0.26	0.27	0.16	2.71	27.3	11.8	8.4	21.8
			9 min Rougher Tail	90.2	0.15	0.14	0.07	1.43	15.5	6.0	3.9	11.2
			12 min Rougher Tail	88.6	0.11	0.09	0.05	1.02	10.9	4.0	2.4	7.9
			14 min Rougher Tail	88.0	0.10	0.08	0.04	0.80	9.5	3.3	2.0	6.1
			Head (calc)	100.0	0.89	2.10	1.72	11.50	100.0	100.0	100.0	100.0
22	as T-21	61.4	6 min Rougher Conc	8.2	7.35	20.60	17.5	94	79.4	90.6	93.0	83.4
			6 min Rougher Tail	91.8	0.17	0.19	0.12	1.67	20.6	9.4	7.0	16.6
			Head (calc)	100.0	0.76	1.86	1.54	9.23	100.0	100.0	100.0	100.0
23	as T-21	61.4	6min Rougher Conc	7.6	6.96	21.50	18.5	94.5	68.8	85.9	89.4	75.7
		82.7	9 min Rougher Conc	9.6	8.35	18.00	15.3	85.4	79.9	91.4	93.8	87.0
			6 min Rougher Tail	92.5	0.26	0.29	0.18	2.48	31.2	14.1	10.6	24.3
			9 min Rougher Tail	90.4	0.17	0.18	0.11	1.36	20.1	8.6	6.2	13.0
			Head (calc)	100.0	0.76	1.89	1.56	9.43	100.0	100.0	100.0	100.0
24	as T-21	61.4	6 min Rougher Conc	7.5	6.92	20.90	17.9	98.8	68.1	85.9	89.7	73.1
		82.7	9 min Rougher Conc	9.4	6.46	17.80	15.1	93.8	79.9	91.9	94.6	86.8
		88.1	12 min Rougher Conc	11.7	5.60	14.80	12.4	79.4	86.1	94.7	96.5	91.8
			6 min Rougher Tail	92.5	0.26	0.28	0.17	2.95	31.9	14.1	10.3	26.9
			9 min Rougher Tail	90.6	0.17	0.16	0.09	1.47	20.1	8.1	5.4	13.2
			12 min Rougher Tail	88.3	0.12	0.11	0.06	0.96	13.9	5.3	3.5	8.4
			Head (calc)	100.0	0.76	1.82	1.50	10.12	100.0	100.0	100.0	100.0
25	as T-21	61.4	6 min Rougher Conc	7.3	6.94	20.60	17.6	91.9	66.3	82.0	85.4	72.0
		82.7	9 min Rougher Conc	9.8	6.03	16.60	14	78.7	77.1	88.4	90.8	83.3
		88.1	12 min Rougher Conc	12.4	5.14	13.40	11.2	65.6	83.7	91.3	92.9	88.5
		94.3	14 min Rougher Conc	14.8	4.47	11.50	9.55	56.9	86.6	92.6	93.9	91.3
			6 min Rougher Tail	92.7	0.28	0.36	0.24	2.79	33.7	18.0	14.6	28.0
			9 min Rougher Tail	90.2	0.19	0.24	0.15	13.7	22.9	11.6	9.2	18.7
			12 min Rougher Tail	87.6	0.14	0.18	0.12	1.21	16.3	8.7	7.1	11.5
			14 min Rougher Tail	85.2	0.12	0.16	0.11	0.94	13.4	7.4	6.1	8.7
			Head (calc)	100.0	0.76	1.83	1.51	9.22	100.0	100.0	100.0	100.0

.269

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Table No Flotation Test Condition and Results

Test No	Reagents g/t	% -200 mesh	Products	Weight %	Assays; %, g/t As	S	Spy(calc)	Au	% Distribution As	S	Spy (calc)	Au
		82.0	10 min Rougher Conc	16.7	-	14.80	-	55.8	-	94.8	-	90.0
			15 min Rougher Conc	22.0	-	11.60	-	44.3	-	97.3	-	94.0
			20 min Rougher Conc	26.0	-	9.90	-	38.0	-	98.0	-	95.1
			Rougher Tailing	74.0	-	0.07	-	0.68	-	2.0	-	4.9
			Head (calc)	100.0	-	2.61	-	10.36	-	100.0	-	100.0
15	85 g/t CuSO4	60.0	5 min Rougher Conc	8.3	-	20.20	-	80.5	-	82.3	-	76.3
	50 g/t A343/350		6 min Rougher Conc	12.3	-	14.30	-	60.4	-	86.8	-	85.2
	50 g/t CuSO4	80.0	7 min Rougher Conc	13.2	-	13.70	-	59.7	-	89.2	-	90.6
	60 g/t A343/350		8 min Rougher Conc	14.2	-	12.90	-	56.7	-	90.1	-	92.2
			11 min Rougher Conc	16.0	-	11.50	-	51.1	-	91.0	-	93.8
			14 min Rougher Conc	19.3	-	9.84	-	42.9	-	91.7	-	95.0
			Rougher Tailing	91.7	-	0.21	-	0.54 (16)	-	8.3	-	5.0
			Head (calc)	100.0	-	2.03	-	8.72	-	100.0	-	100.0
19	85 g/t CuSO4	60.0	Cleaner Conc	6.7	9.78	23.90	19.7	121	83.4	91.6	91.8	86.4
	50 g/t A343/350		Scav Conc Rough	9.7	7.16	17.10	14.0	88.9	88.8	95.4	94.9	90.6
	50 g/t CuSO4	80.0	Cleaner Tail	3.0	1.38	2.13	1.54	12.9	5.3	3.7	3.1	4.2
	60 g/t A343/350		Scav Tail	90.2	0.10	0.09	0.05	0.97	11.2	4.6	5.1	9.4
			Head (calc)	100.0	0.79	1.75	1.4	9.35	100.0	100.0	100.0	100.0
	Refloated Scav Tail		Scav Conc 2	1.9	0.87	0.82	0.5	10.4	2.0	0.9	0.9	2.2
			Scav Tail 2	88.3	0.08	0.08	0.05	0.75	9.2	3.7	4.2	7.2
			Head (Scav Tail)	90.2	0.10	0.09	0.05	0.95	11.2	4.6	5.1	9.4
20	35 kg/t Na2CO3	60-80	Cleaner Conc	7.6	9.02	20.80	16.9	113	90.4	94.0	94.8	91.1
	85 g/t CuSO4		Scav Conc Rough	11.9	8.00	13.70	11.1	74.5	94.5	97.4	96.8	94.7
	50 g/t A343/350		Cleaner Tail	4.3	0.72	1.32	1.01	7.9	4.1	3.4	3.2	3.7
	50 g/t CuSO4		Scav Tail	88.1	0.05	0.05	0.03	0.58 (.017)	5.5	2.8	2.0	5.3
	60 g/t A343/350		Head (calc)	100.0	0.76	1.68	1.35	9.35	100.0	100.0	100.0	100.0

depressant for gangue pH 9.0

Can upgrade.
2 more T19
2 more T22-25

3785-GYM

Cyanidation Test Results

Sample	Test No	Grind % -200mesh	pH	Reagent Cons, kg/t NaCN	Reagent Cons, kg/t CaO	% Rec'y Au	Residue g/t Au	Head(calc) g/t Au	Head (direct) g/t Au
Flot Feed	7	58.5	11.0	0.20	0.60	30.9	7.23	10.50	9.90
Flot Tail	8	84.6	11.0	0.08	0.22	38.8	0.60	0.98	0.73
Mill Feed	11	90.8	11.0	1.05	0.74	51.4	4.63	9.53 .278	9.75 .285
Mill Feed	12	90.8	8.5	1.23	0.00	51.4	4.78	9.83 .282	9.75 .255
6 min Ro Tail(T-22)	22A	61.4	10.0	0.80	0.16	35.5	1.07	1.68 .049	1.67
9 min Ro Tail (T-23)	23A	82.7	10.0	0.80	0.22	32.6	0.97	1.44 .042	1.36
12 min Ro Tail (T-24)	24A	88.1	10.0	0.78	0.22	36.9	0.59 .017	0.94 .027	0.96
14 min Ro Tail (T-25)	25A	95.0	10.0	0.82	0.22	32.9	0.65 .019	0.97 .028	0.94

4

G I A N T
Yellowknife Mines Limited

TO: G. Halverson

FROM: B. Starcheski

DATE: December 7, 1989

SUBJECT: PROGRESS REPORT: GOLD RECOVERY ENHANCEMENT PROJECT

The gold association work is complete at Surface Science. I am awaiting a final report from Dr. Chryssoulis who is away until the third week in December. I hope to have the report by the end of December.

The testwork at Lakefield is coming along quite well. They have run some flotation tests as per our guidelines and have received some promising results.

The test series to determine flotation recovery versus liberation size has illustrated higher recoveries at finer liberation size. Lakefield is presently performing tests to show the repeatability of the results. The results of the first three tests can be seen in Figure 1.

The test series to determine the effects of cleaning a low sulfur grade concentrate are also underway. They have been able to produce a cleaner concentrate at 30% sulfur from a rough/scavenger concentrate of 13%. The gold recovery however was poor and this may force us to recycle the cleaner tails to recover the gold.

There has been some testwork started on the calcine samples such as fine grinding -gravity separation. The results from the preliminary tests were not very promising. I am waiting to receive the gold association results from Chryssoulis before initiating a test programme.

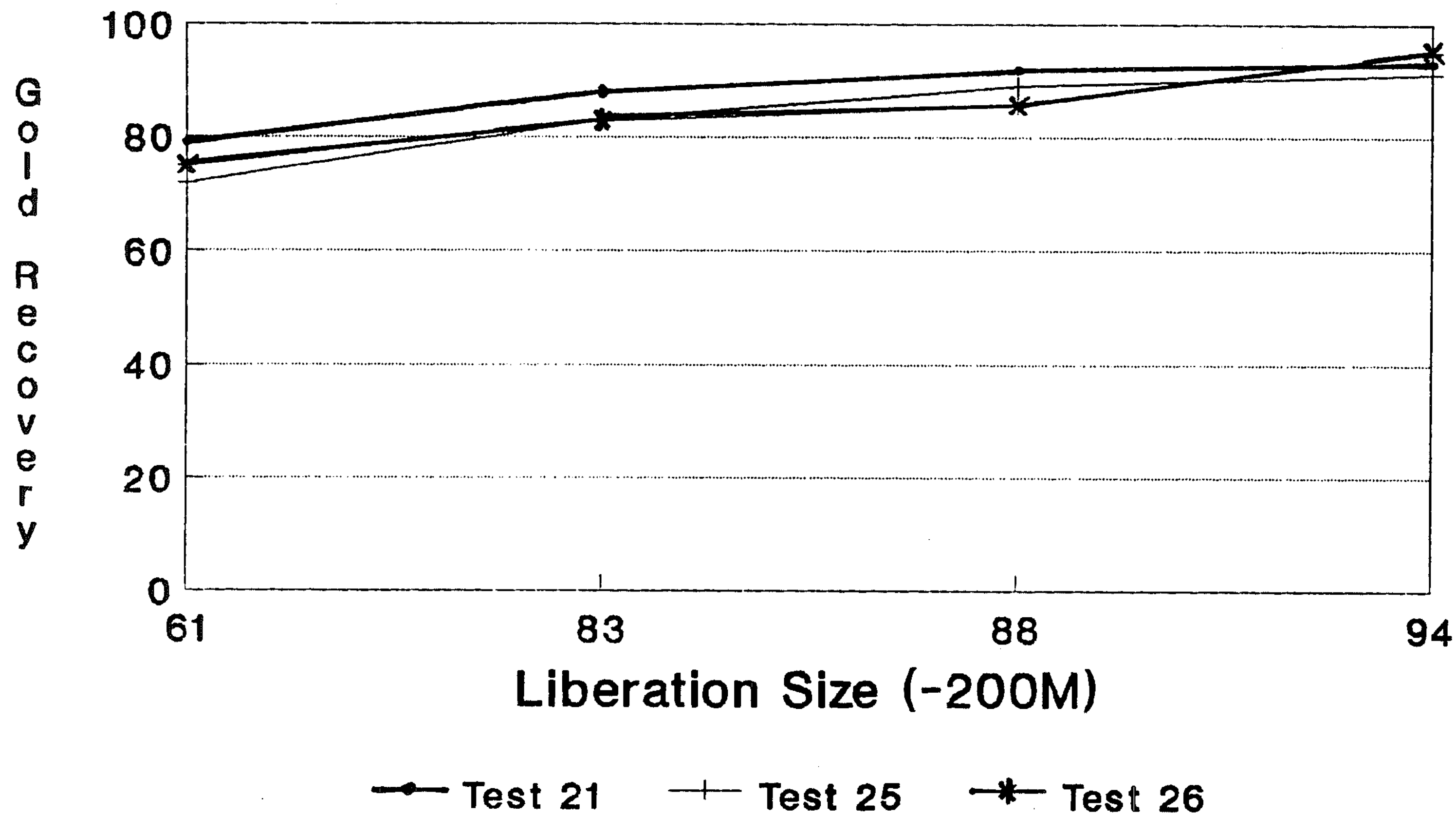
The completion date for the flotation work is December 31, 1989, and for the calcine samples January 30, 1990. The costs update from Lakefield is $14,489.49 which covers research and analytical charges. I have not received a bill from Surface Science as yet.

Brad Starcheski

B. Starcheski
Metallurgist

BS/sj
Attach.

Figure 1
Flotation Recovery vs Grind Size



G I A N T
Yellowknife Mines Limited

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: December 21, 1989

SUBJECT: PROGRESS REPORT ON GOLD RECOVERY ENHANCEMENT PROJECT

Over the month of December quite a few flotation tests were performed at Lakefield and this report is a summary of those tests.

The biggest thing that sticks in my mind is why can't we lower the tails below .015 oz/T. During the course of this testwork there has been only two (2) tests out of eleven (11) which came close to .015/.016 oz/T. The rest have been all over the place. The gold recoveries have ranged from 90%-96% but there has not been anything higher. I was hoping to be able to bring the tails down to .010 - .011 oz/T.

The one positive result so far is the idea of cleaning. It looks very promising to upgrade a low sulfur grade concentrate. Some of the main results are listed below.

1) The affect of finer regrind sizes shows an increase of 93% - 95%.

2) The affect of primary grind size increases the gold recovery from 91% to 96%, the sulfur recovery increases from 95% to 98%. But the grades of both are substantially lower in the concentrates.

3) Cleaning of a 5% S scavenger concentrate to a cleaner concentrate of 35% S. The gold loss in the clean tails was <u>1.86 oz/T</u> which would indicate a recycling of the cleaner tails.

4) The presence of Aeroflot 208 did not improve the free gold recovery.

Results:

TEST A: Affect of regrind size on recovery.

The liberation size has a marginal affect on the flotation recovery. Figure 1 shows the grade/recovery curves for the tests done in this series. T15 is a basis on which the other tests are compared to. T15 was a normal flotation test following the circuit parameters. T21, T25, T26 are all shifted to right and upward which would indicate the trend we hoped to see. T21 and T26 were at higher head grades and this would account for part of the shift. T26 was run longer and the gold recovery increased from 93% to 95% which would indicate an influence of longer flotation, retention time in the circuit. The retention time would be affected by tonnage surges which are present in the mill. T33 shows a higher Au recovery but at the expense of grade. The concentrate was 39% wt which is quite high but the final tails were at .013 oz/T which is encouraging. We may possibly be looking at pulling all the concentrates hard then cleaning them all.

TEST B: Cleaning of low grade concentrate.

Table B contains the results for this series of tests. From Table B it is clear that we can produce a high grade sulfur concentrate from a low grade concentrate. T34 shows a scavenger concentrate at 5% S being upgraded to 35% S. The gold losses are high so the cleaner tail would have to be recycled possibly to the cyclopak.

TEST C: Cyanidation of flotation products.

This test series is at a lower priority than A and B so there is a small quantity of data available. The following cyanidation recoveries were achieved:

Rough Conc.	54%
Scav Conc.	40%
Scav Tails	38%

The rougher and scavenger recoveries are somewhat higher than the ones from Chryssoulis' study. The presence of free gold would be the major cause. The scavenger tail recovery falls in line with Chryssoulis' study but is quite a bit lower than what I've got on plant samples. The plant samples reveal a large discrepancy in the calculated and assayed head grades of 30%. With the assays being the lower values. If one was to use the assayed heads the recoveries would drop from 50% down to 35%.

TEST D: Affect of Aeroflot 208 on the flotation of free gold.

A set of tests were run using Aeroflot 208 to try and float the free gold. There was not significant advantage found. Table D and Figure 2 give a representation of the data.

TEST E: Affect of primary grind on flotation recovery.

The primary grind was varied at 53, 56, 64, 72% -200m in order to determine the affects of recovery. The data is contained in Table E and graphed on Figure 3 for the gold and Figure 4 for the sulfur. From the data it appears that finer primary grind increases the recovery of both gold and sulfur.

Gold from 91% to 96%
Sulfur from 95% to 98%

The drawback of the finer grind is that the concentrates are very low grade. The finer grinds produced more gangue which floated off thereby dropping the Au and S grades.

Table A.

Test No.	% -200M	Products	Wt %	Assay %,g/t As	Assay %,g/t S	Assay %,g/t Au	% Distribution As	% Distribution S	% Distribution Au
21	61	6 min R Conc	7.9	8.17	20.5	114	72.7	88.2	78.2
	83	9 min R Conc	9.8	7.62	[illegible]	104	84.5	94	88.8
	88	12 min R Conc	11.4	6.92	17.7	93	89.1	96	92.1
	94	14 min R Conc	[illegible]2	[illegible].67	16.9	[illegible]	90.5	96.7	93.9
		6 min R Tail	92.[illegible]	0.2[illegible]	0.27	2.71	27.3	11.8	21.8
		9 min R Tail	90.[illegible]	[illegible]	0.14	1.40	15.5	6	11.2
		12 min R Tail	88.[illegible]	[illegible]	[illegible]	[illegible].02	10.9	4	7.9
		14 min R Tail	[illegible]	[illegible]	[illegible]	0.8	9.5	3.3	[illegible]
		HEAD CALC	100	[illegible]	2.1	11.5	100	100	100
25	61	6 min R Conc	7.3	6.94	20.6	91.9	66.3	82	72
	83	9 min R Conc	9.8	6.03	16.6	78.7	77.1	88.4	83.3
	88	12 min R Conc	12.4	5.14	13.4	65.6	83.7	91.3	88.5
	94	14 min R Conc	14.8	4.47	11.5	56.9	86.6	92.6	91.3
		6 min R Tail	92.7	0.28	0.36	2.79	33.7	18	28
		9 min R Tail	90.2	0.29	0.24	13.7	22.9	11.6	16.7
		12 min R Tail	87.6	0.14	0.18	1.21	16.3	8.7	11.5
		14 min R Tail	85.2	0.12	0.16	0.94	13.4	7.4	8.7
		HEAD CALC	100	0.76	1.83	9.22	100	100	100
26	61	6 min R Conc	8.8	7.12	19.3	89.2	78.3	90.6	75.4
	83	9 min R Conc	[illegible]	[illegible]	[illegible]	[illegible]	85.[illegible]	94.2	82.9
	88	12 min R Conc	11.8	5.56	15.5	75.8	88.2	95.7	85.6
	94	14 min R Conc	13.5	5.33	13.8	71.9	90.2	97.4	92.9
		16 min R Conc	15.3	4.84	12.4	65.1	92.6	99.1	95.1
		6 min R Tail	91.2	0.19	0.2	2.82	21.7	9.4	24.6
		9 min R Tail	89.6	0.13	0.12	2	14.9	5.8	17.1
		12 min R Tail	88.2	0.11	0.09	1.71	11.8	4.3	14.4
		14 min R Tail	86.5	0.09	0.06	0.86	9.8	2.6	7.1
		16 min R Tail	84.7	0.07	0.02	0.61	7.4	0.9	4.9
		HEAD CALC	100	0.8	1.92	10.5	100	100	100
30	61	1st R Conc							
	83	2nd R Conc	21.7	3.1	8.5	40	90.2	96	91.5
	88	3rd R Conc	28.8	2.42	6.5	31.1	93.5	97.4	94.6
	94	4th R Conc	34.5	2.05	5.4	26.5	94.8	98	96.4
		5th R Conc	39.2	1.83	4.8	23.5	96.1	98.4	97.2
		1st R Tail	83.6	0.19	0.21	2.17	21.2	9.2	19.2
		2nd R Tail	78.3	0.09	0.1	1.03	9.8	4	8.5
		3rd R Tail	71.2	0.07	0.07	0.71	6.5	2.6	5.4
		4th R Tail	65.5	0.06	0.06	0.52	5.2	2	3.6
		5th R Tail	60.8	0.048	0.05	0.43	3.9	1.6	2.8
		HEAD CALC	100	0.75	1.92	9.48	100	100	100

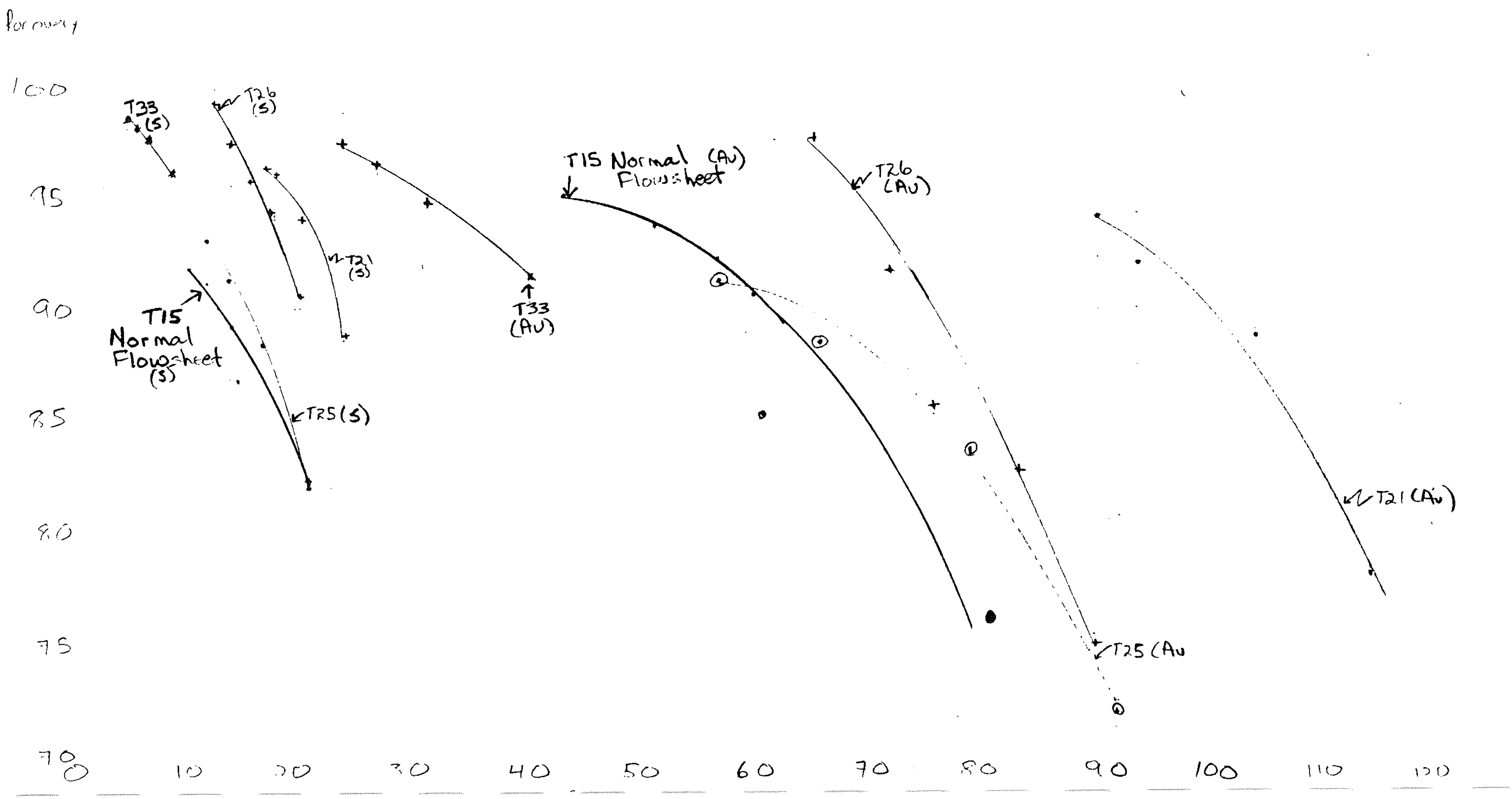
FIGURE 1 GRADE RECOVERY CURVE
Lakefield Flotation Test 21, 25, 26
FINER REGRIND
NORMAL PRIMARY 60% -74 um

Test 21

Sulfur %	Sulfur Rec	Gold g/t	Gold Rec
23.5	88.2	114	78.2
20	94	104	88.8
17.7	96	93	92.1
16.9	96.7	90	93.9

head grade .336 g/t

tails grade .023 g/t



[illegible] SERIES 6: Affect of Cleaning on the Sulfur in the Concentrate

TABLE B

Test No:	% -200M	Products	Wt %	Assay %,g/t Ag	Assay %,g/t S	Assay %,g/t Au	% Distribution Ag	% Distribution S	% Distribution Au
19	60	Clean Conc	6.7	9.73	20.9	121	83.4	91.8	85.
		Scav Conc	9.7	7.16	17.1	86.9	88.8	95.4	90.
	80	Clean Tail	3	1.38	2.13	12.9	5.3	3.7	4.
		Scav Tail	90.2	0.1	0.09	0.27	11.2	4.6	9.
		HEAD CALC	100	0.79	1.75	9.35	100	100	10
Refloated Tail	Scav	Scav Conc2	10	0.07	0.02	10.4	2	0.9	2.
		Scav Tail2	80.3	0.08	0.08	0.75	9.2	3.7	7.
		Head Scav1	90.2	0.1	0.09	[illegible]	11.2	4.6	9.
[illegible]	80	Clean Conc	[illegible]	9.02	20.0	[illegible]	90.4	94	91.
Added		Scav Conc	[illegible]	[illegible]	[illegible]	[illegible]	94.5	97.4	94.
Na2CO3	80	Clean Tail	4.3	0.72	1.32	7.9	4.1	3.4	3.
		Scav Tail	88.1	0.05	0.05	0.56	5.5	2.6	5.
		HEAD CALC	100	0.76	1.68	9.05	100	100	10
29	61	2nd Clean Conc	5.4	11.3	29.8	125	75.3	87.5	76.
(T19)	83	1st Clean Conc	6.7	9.72	20.8	106	80.3	90.9	8
2 Cleaning Stages		Rough Conc	13.5	5.47	13.4	59.4	90.9	98.6	91.
		2nd Clean Tail	1.3	3.15	4.8	28.3	5.1	3.4	4.
		1st Clean Tail	6.8	1.27	2.1	12.1	10.6	7.7	10.
		Rough Tail	86.5	0.09	0.03	0.9	9.1	1.4	8.
		HEAD CALC	100	0.81	1.84	8.8	100	100	10
34		3rd Clean Conc	4.1	12	34.9	148	63.9	78.6	70.
3 Cleaning Stages		2nd Clean Conc	4.4	11.62	33.1	141.4	67.4	81.4	73.
		1st Clean Conc	9.1	6.13	16.9	72.3	72.6	84.7	7
		Rough Conc	33.7	2.18	5.3	24.3	95.8	98.2	9
		3rd Clean Tail	0.4	7.36	13.6	67.9	3.5	2.8	2.
		2nd Clean Tail	4.6	0.86	1.32	6	5.2	3.4	3.
		1st Clean Tail	24.6	0.72	0.99	6.6	23.1	13.5	19.
		Rough Tail	66.3	0.05	0.049	0.51	4.2	1.8	
		HEAD CALC	100	0.77	1.81	8.52	100	100	10(

[illegible]
[illegible] Flotation [illegible]
[illegible]

TABLE C.

Test No.	% -200M	Products	Wt %	Assay % oz/t			% Distribution			Cya Rec
				As	S	Au	As	S	Au	
[illegible]	60	5 min R Conc	8.3		20.2	60.6		82.3	78.2	
		[illegible] min R Conc	[illegible]		14.3	60.4		86.8	85.2	
	80	7 min R Conc	10.2		13.7	59.7		89.2	90.6	
		8 min R Conc	14.2		12.9	56.7		90.1	92.2	
		11 min R Conc	16		[illegible]	[illegible]		91	93.8	
		14 min R Conc	19.2		9.64	42.9		91.7	95	
		Rough Tail	81.7		0.21	0.54		8.3	5	
		HEAD CALC	100		2.03	8.72		100	100	
30	60	Rougher Conc	7.5	7.75	21.5	99.4	76.4	88.4	79.8	54.
		Scav Conc	6.2	1.87	2.46	19.9	15.1	8.3	13.1	40.
		Combined Conc	13.7	5.1	12.9	63.6	91.5	96.7	92.9	--
	80	Scav Tails	86.3	0.075	0.07	0.77	8.5	3.3	7.1	37.
		HEAD CAL	100	0.77	[illegible]	[illegible]	100	100	100	

[illegible]

TABLE D

[illegible] .wri

Test No.	Grind	Products	Wt %	Assay			Distribution			
36	[illegible]	R Conc 1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	R Conc 2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 88.1	[illegible]	86.2
		Scav Conc 1	[illegible]	[illegible]	[illegible]	11.5	[illegible]	[illegible] 96.7	[illegible]	93.2
aerofloat		Scav Conc 2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 98.6	[illegible]	97.8
addition		Scav Conc 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 99.3	[illegible]	98.9
		Scav Tail	[illegible]	[illegible]	0.07	0.40	[illegible]	[illegible]	[illegible]	
		HEAD CALC	100	[illegible]	1.05	[illegible] .264	[illegible]	[illegible]	[illegible]	
37	[illegible]	R Conc 1	[illegible]	[illegible]	20.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	R Conc 2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 88.6	[illegible]	86
		Scav Conc 1	[illegible]	[illegible]	[illegible]	[illegible]		96	[illegible]	91.1
[illegible]		Scav Conc 2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	98.5	[illegible]	97.7
[illegible]		Scav Conc 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 98.9	[illegible]	98.2
		Scav Tail	[illegible]	[illegible]	0.07	[illegible]	[illegible]	[illegible]	[illegible]	
		HEAD CALC	100	[illegible]	[illegible]	[illegible] .267	100	100	100	
38	80	R Conc 1	[illegible]	[illegible]	16.[illegible]	60.[illegible]	67.4	81.7	[illegible]	
an/Aero	80	R Conc 2	5.6	[illegible]	[illegible]	20.7	14.6	[illegible] 90.8	[illegible]	88.7
740		Scav Conc 1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 95.9	[illegible]	91
		Scav Conc 2	4.4	[illegible]	0.64	[illegible]	[illegible]	[illegible] 98.5	[illegible]	91.9
		Scav Conc 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 99.1	[illegible]	98.7
		Scav Tail	[illegible]	[illegible]	0.07	[illegible]	[illegible]	[illegible]	[illegible]	
		HEAD CALC	100	[illegible]	[illegible]	[illegible] .218	[illegible]	[illegible]	[illegible]	

FIGURE 2

Gold Grade/Recovery Curve
Affect of using Aeroflot 208/Xanthate

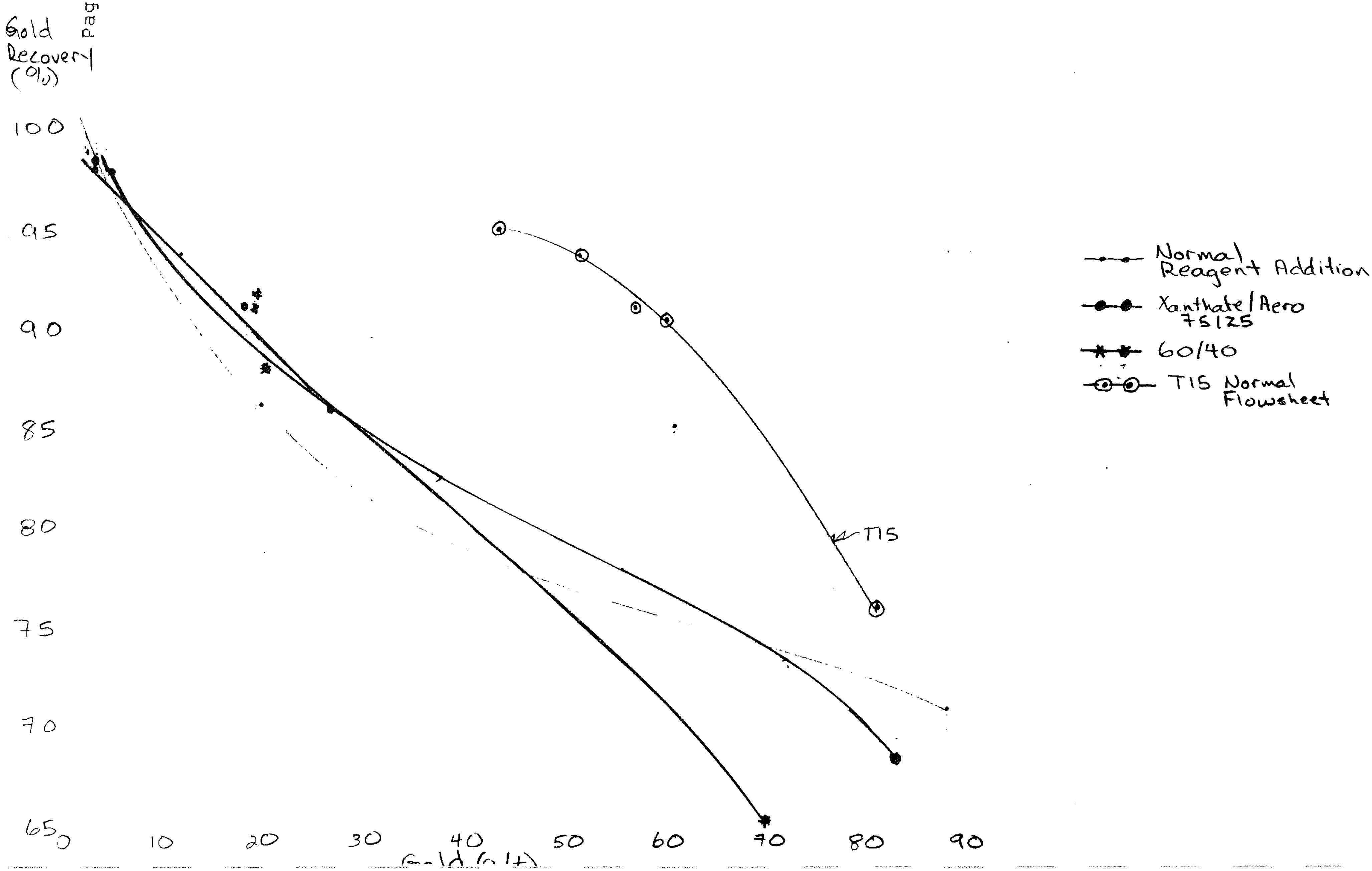


TABLE E

Test No	Grind	Products	Wt %	Assay Au	Assay [illegible]	Assay [illegible]	% Distribution As	% Distribution S	% Distribution Au
[illegible]	40	R Conc 1							
		R Conc 2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		R Conc 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].1	[illegible]
		R Conc 4	[illegible]	[illegible]	[illegible]	[illegible]	85	92.[illegible]	85
		R Conc 5	[illegible]	3.25	0.40	[illegible]	88.6	94.3	88.6
		R Conc 6	24.[illegible]	[illegible]	[illegible]	34.6	90.5	95.4	90.5
		R Tail	75.[illegible]	[illegible]	0.11	[illegible]	9.5	4.6	9.5
		HEAD CALC	100	0.77	1.03	[illegible] ·268	100	100	100
40	56	R Conc 1							
		R Conc 2	[illegible].4	4.08	14.7	62.5	70.[illegible]	83.9	76.7
		R Conc 3	17.5	3.72	10.3	46.[illegible]	86.0	93.4	88.5
		R Conc 4	[illegible]	3.[illegible]	[illegible].46	42.[illegible]	[illegible]	94.0	90.4
		R Conc 5	24.7	2.82	7.75	34.0	[illegible]	96	[illegible]
		R Conc 6	30.7	[illegible].48	[illegible].77	[illegible]	[illegible]	97.[illegible]	94.5
		R Tail	[illegible]	[illegible]	[illegible]	[illegible].74	9.0	[illegible]	[illegible]
		HEAD CALC	100	0.76	1.08	[illegible] ·270	100	100	100
41	64	R Conc 1							
		R Conc 2	[illegible].0	4.06	[illegible]	70.4	62	74	71.8
		R Conc 3	15.2	4	11.0	51.6	81.5	91	85
		R Conc 4	18.0	3.52	[illegible].72	44.7	86.4	93.9	89.4
		R Conc 5	24.5	2.70	7.43	34.7	91.4	96.4	92.9
		R Conc 6	29.2	2.39	6.32	22.6	93.4	97.[illegible]	94.4
		R Tail	70.[illegible]	0.07	0.07	0.70	6.6	2.6	5.6
		HEAD CALC	100	0.75	[illegible].9	[illegible] ·267	100	100	100
[illegible]	72	R Conc 1							
		R Conc 2	[illegible].5	4.72	[illegible].7	[illegible]	64.3	7[illegible]	75.7
		R Conc 3	[illegible]	3.01	10.9	[illegible]	84.0	[illegible]	90.4
		R Conc 4	20.[illegible]	3.[illegible]	[illegible]	[illegible]	[illegible].6	95	[illegible]
		R Conc 5	27.0	2.61	7.04	33.6	92.6	97	94.9
		R Conc 6	32.6	2.[illegible]	5.95	27.[illegible]	94.5	98	96.1
		R Tail	67.4	0.053	0.06	[illegible].34	5.5	2	3.9
		HEAD CALC	100	0.77	1.08	[illegible] ·274	100	100	100

FIGURE 3'

Gold GRADE/RECOVERY CURVE

Dec 18/89

Affect of Primary GRIND ON Gold Recovery/Grade

Sulfur %	Sulfur Rec	Gold g/t	Gold Rec
20.2	82.3	80.5	76.3
14.3	86.8	60.4	85.2
13.7	89.2	59.7	90.6
12.9	90.1	56.7	92.2
11.5	91	51.1	93.8
9.8	91.7	42.9	95

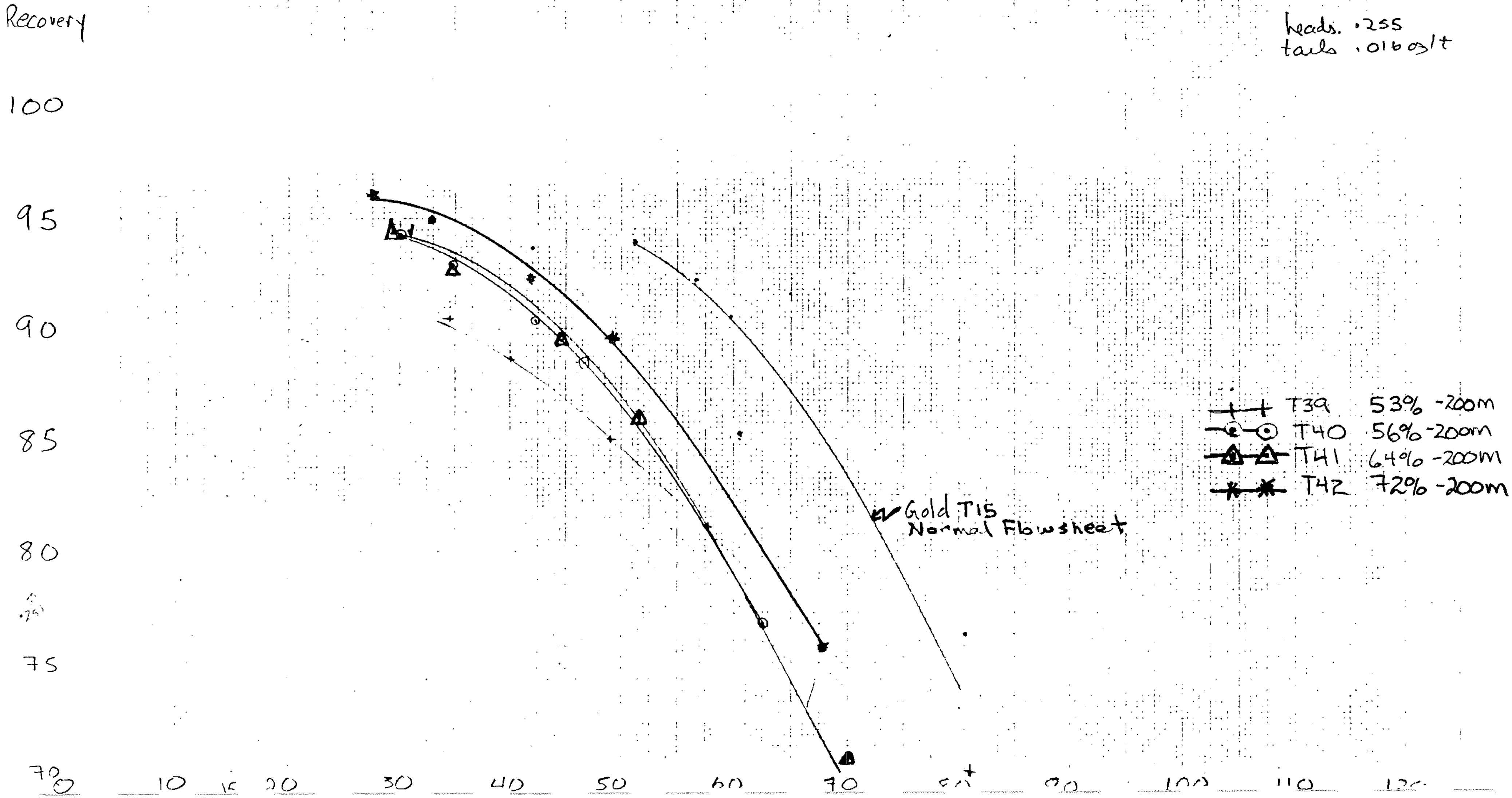
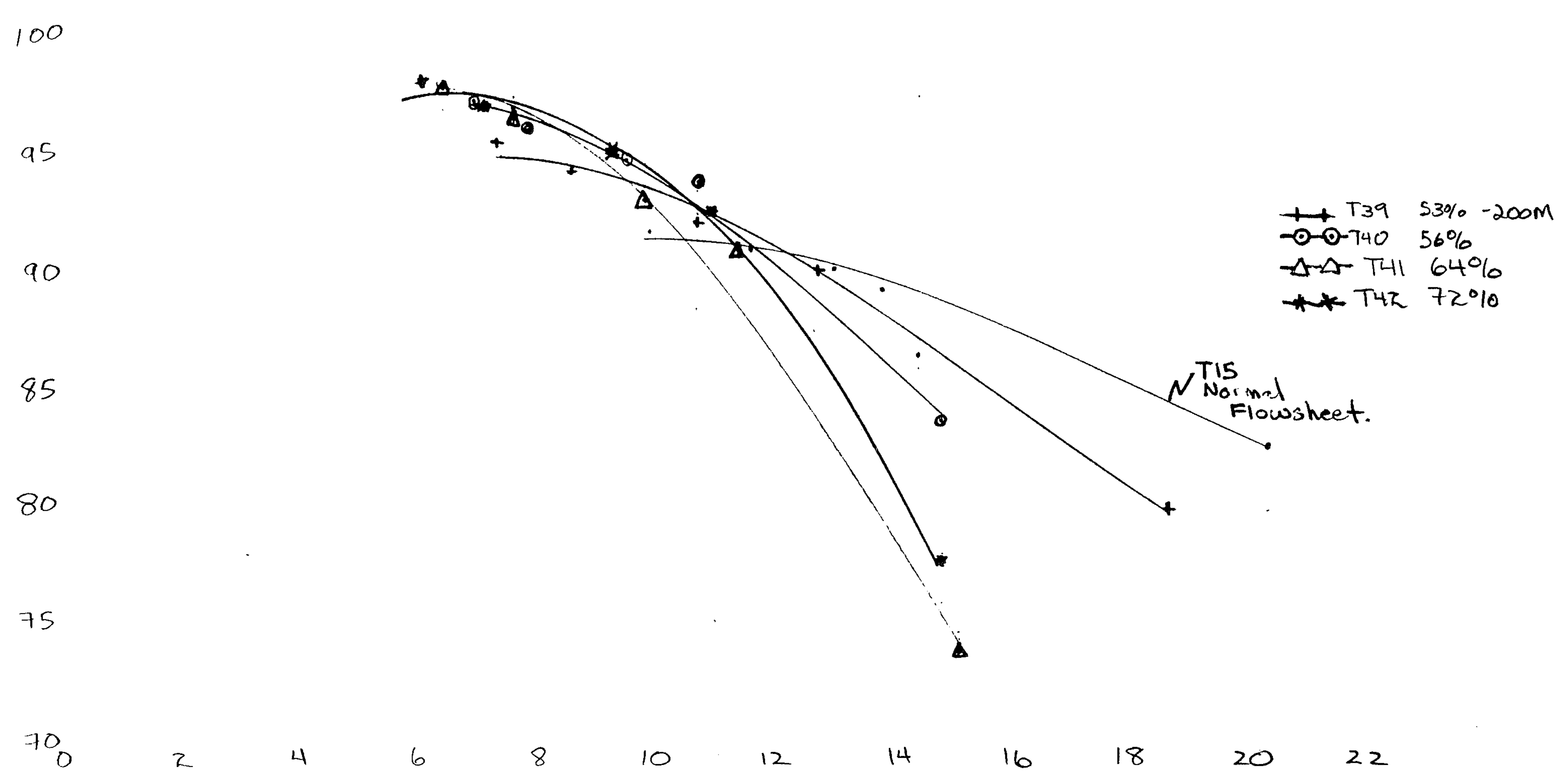


FIGURE 4: Sulfur GRADE/RECOVERY CURVE
Affect of Primary Grind on Sulfur Recovery/Grade.

Dec 18/89.



Giant
YELLOWKNIFE MINES LIMITED

TO: G.B. Halverson

CC: B. Starcheski

FROM: M.E. Goodfellow

DATE: January 27, 1989

SUBJECT: Roaster Product Cyanidation Testwork

Reverification of samples sent to Lakefield

Summary:

Testwork was conducted on samples of transfer dust and roaster discharge to verify gold cyanidation recoveries obtained on split samples sent to Lakefield.

The transfer dust samples which underwent standard cyanidation obtained the highest gold recovery at 92.24% Au after 24 hours of leaching. Lakefield results, obtained 94.5% Au after 24 hours leaching. The roaster discharge sampled obtained 91.84% Au while Lakefield test obtained 86.3% Au. The results of this gold testwork verify Lakefield's testwork of cyanidation recoveries. Further testwork is required to verify that single stage roasting is more efficient than two stage roasting in terms of gold recovery.

Purpose:

To verify gold cyanidation recovery results obtained by Lakefield Research on samples of roaster discharge and transfer dust and roast discharge samples.

Procedure:

Standard cyanidation tests were run on 2 - 200g samples of transfer dust and 1 - 200g roaster discharge sample. The procedure followed is attached. No prewash was conducted on one sample of transfer dust (TD1). The Winchester acid bottles were rolled uncapped for the entire 48 hour test.

CYANIDATION TESTWORK

A) STANDARD METHOD

1. Weigh 2 - 200g samples for duplicate cyanidation testwork.

2. Wash and filter each sample with 500 - 1,500 mL water.

3. Retain filtrates for the Au and As assay. Assay for Fe also if filtrate is highly coloured.

4. Weigh the wet filter cakes to determine their moisture content and place in a Winchester acid bottle. Pump with tap water to 33% solids. If the sample is dry, pulp with 400 mL of tap water.

5. Add lime (CaO) to raise the pH to 10.5.

6. Add 10 lb/ton sodium cyanide (NaCN) for calcines and concentrates.

7. Roll sample for 1.0 hour.

8. Withdraw samples to check pH to 10.5. Add sodium cyanide to maintain a free cyanide strength of 1.0 lb/ton for calcines and concentrates.

9. Roll samples for a further 23 hours. (24 hours total)

10. Follow Step 8 again but submit a sample (~60 mL) for the Au and As analysis. (if required)

11. Roll the samples for a final 24 hours for a total leach time of 48 hours.

12. Filter samples to separate pregnant solution.

13. Wash the filter cake with 1,000 mL tap water. Obtain a separate wash sample.

14. Assay both solution samples and solid residues for Au and As.

15. Determine the cyanide (NaCN) strength and pH for each pregnant solution.

16. Data and calculations for this testwork should be reported in the form CYANID.FRM.

17. All assays should be recorded in the mill testing assay report (MILLASSY.FRM).

NOTE: The winchester acid bottles are rolled uncapped for the entire test.

Results:

Test and assay results are attached.

For the transfer dust sample with no prewash, gold recovery after 48 hours leaching was calculated to be 88.78% Au with a residue assay of 0.300 oz/ton Au. The calculated headgrade was 2.674 oz/ton Au. The assayed headgrade was 2.127 oz/ton Au. The calculated recovery after 24 hours leaching was 89.04% Au. For this sample 18.5 lb/ton CaO and 8.5 lb/ton NaCN were consumed.

For the transfer dust sample which was prewashed, gold recovery after 48 hours leaching was calculated to be 91.84% Au with a residue assay of 0.200 oz/ton Au. The calculated headgrade was 2.450 oz/ton Au. The assayed headgrade was 2.127 oz/ton Au. The calculated recovery after 24 hours leaching was 92.24% Au. For this sample 7.5 lb/ton CaO and 8.7 lb/ton NaCN was consumed.

The roaster discharge sampled achieved 90.68% Au recovery after 48 hours leaching with a residual assay of 0.21 oz/ton Au. The calculated headgrade was 2.255 oz/ton Au. The assayed headgrade was 2.303 oz/ton Au. The calculated recovery after 24 hours leaching was 91.26% Au. For this sample 5.0 lb/ton CaO and 8.65 lb/ton NaCN were consumed.

Conclusions:

1. The transfer dust which had been prewashed obtained the highest cyanidation recovery at 92.24% after 24 hours leaching. The roast discharge sample achieved 91.26% Au after 24 hours leaching. Lakefield testwork on transfer dust achieved 94.5% Au recovery after 24 hours. Lakefield testwork on roaster discharge obtained 86.3% Au recovery after 24 hours.

2. The results of this testwork are slightly lower than the gold recoveries obtained from the samples sent to Lakefield. In both tests, the transfer dust material obtained a higher gold recovery than the roaster discharge sample. The gold recovery results obtained by Lakefield on roaster transfer dust and discharge samples are verified in this testwork.

3. Calculated reagent consumptions were as follows:

	CaO(lb/ton)	NaCN(lb/ton)
TD1(no prewash)	18.5	8.5
TD2	8.7	8.7
R1	5.0	8.65
Trans. dust Lakefield	9.44	4.8
Roaster Disch. Lakefield	3.60	7.52

For the testwork conducted at Giant, cyanide consumption was similar for all samples. Without the prewash stage, which is analagous to Giant's wash thickener, lime consumption doubles. In Lakefield testwork, less lime and cyanide were consumed.

4. Further testwork should be conducted on samples of transfer dust and roaster discharge material to verify that single stage roasting is more efficient than two stage roasting in terms of gold recovery.

Discussion

The results of this testwork verify the results obtained by Lakefield on samples of transfer dust and roaster discharge. Lakefield obtained slightly higher gold recoveries than the Giant testwork. Lakefield added oxygen to the samples by an air lance. No oxygen was added to the samples tested at Giant. The extra oxygen may acocunt for the higher recoveries obtained by Lakefield.

Further testwork is required to verify that single stage roasting is more efficient than two stage roasting in terms of gold recovery.

M.E. Goodfellow

M.E. Goodfellow
Project Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: November 21, 1988

ple: TRANSFER DUST

Sample Code #: TD1

REF: CYANID1.FRM

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 200.0 g					
pH = 5.5	CaO = 1.45 g	pH = 10.0	pH = 10.0	pH = 10.1	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 2.10 lb/t	CN^- = 1.65 lb/t	CN^- = 1.50 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 80 mL	Tit = ---- mL	Tit = mL
Other=	pH to 10.3	Other =	Other =	Other =	Other =
		Added 0.2 g CaO pH to 10.7	Added 0.2 g CaO pH to 11.0		

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Preg	422 mL	34.935 mg/L	14.743 mg	80.48 %	25.90 mg/L	10.930 mg	0.33 %
Wash	1,000 mL	1.521 mg/L	1.521 mg	8.30 %	6.90 mg/L	6.900 mg	0.21 %
Total	1,422 mL	11.437 mg/L	16.264 mg	88.78 %	12.54 mg/L	17.830 mg	0.54 %
Residue	200 g	10.275 mg/L	2.055 mg	11.22 %	1.64 %	3,280.000 mg	99.46 %
Calc Head	200 g	91.595 g/t	18.319 mg	100.00 %	1.65 %	3,297.830 mg	100.00 %
Assay Head	200 g	72.838 g/t	14.568 mg		1.44 %	2,880.000 mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: November 21, 1988

Sample: TRANSFER DUST

Sample Code #: TD2

REF: CYANID1.FRM

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 6.8	CaO = 0.45 g	pH = 9.9	pH = 10.1	pH = 9.7	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 2.10 lb/t	CN^- = 1.70 lb/t	CN^- = 1.30 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 80 mL	Tit = ---- mL	Tit = mL
Other=	pH to 10.6	Other =	Other =	Other =	Other =
		Added 0.2 g CaO pH to 10.9	Added 0.1 g CaO pH to 10.5		

Sample Calculations:

		Gold			Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	500 mL	0.007 mg/L	0.003 mg	0.02 %	30.0 mg/L	15.000 mg	0.45 %
Preg	422 mL	33.908 mg/L	14.309 mg	85.25 %	34.4 mg/L	14.517 mg	0.44 %
Wash	1,000 mL	1.103 mg/L	1.103 mg	6.57 %	8.7 mg/L	8.217 mg	0.26 %
Total	1,922 mL	8.020 mg/L	15.415 mg	91.84 %	19.88 mg/L	38.217 mg	1.15 %
Residue	200 g	6.850 mg/L	1.370 mg	8.16 %	1.64 %	3,280.000 mg	98.15 %
Calc Head	200 g	83.925 g/t	16.785 mg	100.00 %	1.66 %	3,318.217 mg	100.00 %
Assay Head	200 g	72.838 g/t	14.568 mg		1.44 %	2,880.000 mg	

e: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: December 6, 1988

Sample: ROASTER DISCHARGE

Sample Code #: R1

REF: CYANID1.FRM

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 200.0 g					
pH = 6.7	CaO = 0.25 g	pH = 10.5	pH = 10.0	pH = 10.5	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 2.85 lb/t	CN^- = 1.75 lb/t	CN^- = 1.35 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 80 mL	Tit = ---- mL	Tit = mL
Other=	pH to 10.5	Other =	Other = Added 0.25 g CaO pH to 11.2	Other =	Other =

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Prewash	500 mL	0.007 mg/L	0.003 mg	0.02 %	3.9 mg/L	1.950 mg	0.06 %
Preg	413 mL	29.592 mg/L	12.221 mg	79.13 %	17.0 mg/L	7.021 mg	0.22 %
Wash	1,000 mL	1.781 mg/L	1.781 mg	11.53 %	9.8 mg/L	9.800 mg	0.30 %
Total	1,913 mL	7.321 mg/L	14.005 mg	90.68 %	8.79 mg/L	16.821 mg	0.52 %
Residue	200 g	7.193 mg/L	1.439 mg	9.32 %	1.61 %	3,220.000 mg	98.91 %
Calc Head	200 g	77.218 g/t	15.444 mg	100.00 %	1.63 %	3,255.592 mg	100.00 %
Assay Head	200 g	78.889 g/t	15.778 mg		0.46 %	92.000 mg	

e: Preg (mL) = Preg + Tit

Sample Test Outlines:

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Transfer Dust DATE ASSAYED November 25-88

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	~~Sb~~ RP	Cu
TD 1 Preg 24 Hour	1.05		14.6ppm		23.4ppm	162	
48 Hour	1.02		14.2ppm		25.9ppm	135	
Wash	.0444		2.7ppm		6.9ppm		
TD 2 Preg 24 hour	1.05		19.1ppm	31.2ppm	~~2.2ppm~~	136	
48 hour	.99		21.0ppm		34.4	131	
Prewash	.0002		18.7ppm		30.0ppm		
Wash	.0322		3.8ppm		8.7ppm		
TD 1 Residue	.30 .30		26.00%	5.19	1.64%	.12	
TD 2 Residue	.20 .20		27.25	7.04	1.64	.12	

W.L. Richardson

Giant

YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED December 9-88

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
R1 Prewash	.0002		1.0ppm		3.9ppm		
R1 Preg-24 Hour	.936		38.4ppm		26.6ppm		
48 hour	.864		37.9ppm		17.0ppm		RP: 100
Wash	.052		4.7ppm		9.8ppm		
Residue	.21 .21		28.25	2.35	1.61	.18	

W.L. Richardson

Assayer

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: February 14, 1989

SUBJECT: CYANIDATION TESTS ON LABORATORY ROASTED SAMPLES

SUMMARY:

Testwork was conducted on laboratory roasted roaster feed samples on February 7, 1989. The temperature for this test was 1100F. Duplicate cyanidation tests were conducted. The average gold cyanidation recovery after 48 hours leaching was calculated to be 90.10% Au. The average residue assay was 0.30 oz/ton and the average calculated headgrade was 2.83 oz/ton Au. The assayed headgrade of the sample was 2.46 oz/tn Au. The average reagent consumptions were 10 lb/ton NaCN and 6.0 lb/ton CaO.

Brad Starcheski

B. Starcheski
Plant Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 7, 1989

Sample: ROASTER CALCINE ROASTED AT 1100F

Sample Code #: RC5

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 5.5	CaO = 0.50 g	pH = 10.8	pH = 10.2	pH = 9.9	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.90 lb/t	CN^- = 1.40 lb/t	CN^- = 0.80 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other =	Other =	Other =	Other =
			Added .10gms CaO to pH 10.8		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.020 mg/L	.020 mg	0.10 %	mg/L	mg	%
Preg	370 mL	36.168 mg/L	13.382 mg	79.70 %	mg/L	mg	%
Wash	1,000 mL	3.391 mg/L	3.391 mg	20.20 %	mg/L	mg	%
Total	2370 mL	7.086 mg/L	16.793 mg	89.50 %	mg/L	mg	%
Residue	188 g	10.446 mg/L	1.962 mg	10.50 %	%	mg	%
Calc Head	200 g	93.775 g/t	18.755 mg	100.00 %	%	mg	%
Assay Head	200 g	84.255 g/t	16.851 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 7, 1989

Sample: ROASTER CALCINE ROASTED AT 1100F

Sample Code #: RC6

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 5.5	CaO = 0.50 g	pH = 10.8	pH = 10.0	pH = 10.0	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.70 lb/t	CN^- = 1.60 lb/t	CN^- = 0.95 lb/t	CN^- = lb/t
H20 = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other =	Other =	Other =	Other =
			Added .10gms CaO to pH 10.8		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.024 mg/L	.024 mg	0.10 %	mg/L	mg	%
Preg	430 mL	36.168 mg/L	15.552 mg	85.70 %	mg/L	mg	%
Wash	1,000 mL	2.569 mg/L	2.569 mg	14.20 %	mg/L	mg	%
Total	2430 mL	7.467 mg/L	18.145 mg	90.70 %	mg/L	mg	%
Residue	185 g	10.104 mg/L	1.869 mg	9.30 %	%	mg	%
Calc Head	200 g	100.070 g/t	20.014 mg	100.00 %	%	mg	%
Assay Head	200 g	84.255 g/t	16.851 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: February 14, 1989

SUBJECT: CYANIDATION TESTS ON LABORATORY ROASTED SAMPLES

SUMMARY:

Testwork was conducted on laboratory roasted roaster feed samples on February 7, 1989. The temperature for this test was 975F. Duplicate cyanidation tests were conducted. The average gold cyanidation recovery after 48 hours leaching was calculated to be 91.67% Au. The average residue assay was 0.24 oz/ton and the average calculated headgrade was 2.75 oz/ton Au. The assayed headgrade of the sample was 2.42 oz/tn Au. The average reagent consumptions were 10 lb/ton NaCN and 8.8 lb/ton CaO.

Brad Starcheski

B. Starcheski
Plant Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 7, 1989

Sample: ROASTER CALCINE ROASTED AT 975F

Sample Code #: RC3

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 5.8	CaO = 0.75 g	pH = 10.3	pH = 10.0	pH = 10.0	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.50 lb/t	CN^- = 1.10 lb/t	CN^- = 0.80 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 10.9	Other =	Other =	Other =	Other =
		Added .1gms CaO to pH 10.8	Added .10gms CaO to pH 10.8		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.020 mg/L	.020 mg	0.12 %	mg/L	mg	%
Preg	410 mL	34.113 mg/L	13.986 mg	83.69 %	mg/L	mg	%
Wash	1,000 mL	2.706 mg/L	2.706 mg	16.19 %	mg/L	mg	%
Total	2410 mL	6.934 mg/L	16.712 mg	90.92 %	mg/L	mg	%
Residue	191 g	8.734 mg/L	1.668 mg	9.08 %	%	mg	%
Calc Head	200 g	91.900 g/t	18.380 mg	100.00 %	%	mg	%
Assay Head	200 g	82.885 g/t	16.577 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 7, 1989

Sample: ROASTER CALCINE ROASTED AT 975F

Sample Code #: RC4

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 5.8	CaO = 0.60 g	pH = 10.2	pH = 10.0	pH = 9.8	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.30 lb/t	CN^- = 1.15 lb/t	CN^- = 0.60 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other =	Other =	Other =	Other =
		Added .1gms CaO to pH 10.7	Added .10gms CaO to pH 10.8		

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.020 mg/L	.020 mg	0.11 %	mg/L	mg	%
Preg	410 mL	36.168 mg/L	14.829 mg	83.36 %	mg/L	mg	%
Wash	1,000 mL	2.940 mg/L	2.940 mg	16.53 %	mg/L	mg	%
Total	2410 mL	7.381 mg/L	17.789 mg	92.41 %	mg/L	mg	%
Residue	190 g	7.706 mg/L	1.461 mg	7.59 %	%	mg	%
Calc Head	200 g	96.250 g/t	19.250 mg	100.00 %	%	mg	%
Assay Head	200 g	82.885 g/t	16.577 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

Giant

YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED February 13-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
RC-3 Residue	.25 .26						
RC-4 Residue	.22 .23						
RC-5 Residue	.30 .31						
RC-6 Residue	.29 .30						
RC 3 Prewash	.0006		33.2ppm				
Preg	.996						
Wash	.079						
RC 4 Prewash	~~x~~.0006		35.9ppm				
Preg	1.056						
Wash	.086						
RC 5 Prewash	.0006		29.9ppm				
Preg	1.056						
Wash	.099						
RE 6 Prewash	.0007		29.5ppm				
Preg	1.056						
Wash	.075						

W.L. Richardson

Assaye:

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: March 1, 1989

SUBJECT: Laboratory Roaster Testwork

SUMMARY:

Testwork was conducted on samples of Quench Tank discharge for February 3&6, 1989. Duplicate cyanidation tests were conducted. The average gold cyanidation recovery after 48 hours leaching was calculated to be 91.75% Au for Feb 6. The average residue assay was 0.19 oz/ton and the average calculated head grade was 2.29 oz/ton Au. The assayed headgrade of the sample was 2.53 oz/ton Au. The average reagent consumptions were 10 lb/ton NaCN and 2.5 lb/ton CaO. This sample was taken after the circuit had been run with the minimum water and airflow in the first stage. The average gold cyanidation recovery was 91.10% Au for the Feb 3 sample. The average residue was .26 oz/ton and the average calculated head grade was 2.82 oz/ton. The assayed head grade was 2.66 oz/ton Au. The average reagent consumptions were 10 lb/ton NaCN and 2.25 lb/ton CaO. The February 3 sample was taken at the start of the test run. Table 1 contains the operating data prior to the time of the two samples.

Brad Starcheski

B. Starcheski
Plant Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 20 , 1989

Sample: ROASTER CALCINE February 6, 1989 @ midnite

Sample Code #: RC1

REF: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 200.0 g					
pH = 6.5	CaO = 0.20 g	pH = 10.7	pH = 10.4	pH = 10.3	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 2.15 lb/t	CN^- = 1.60 lb/t	CN^- = 1.15 lb/t	CN^- = lb/t
H2O = 200 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other =	Other = Added .05gms CaO to 10.8	Other =	Other =

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Prewash	1000 mL	0.017 mg/L	.017 mg	.10 %	mg/L	mg	%
Preg	390 mL	31.647 mg/L	12.342 mg	86.70 %	mg/L	mg	%
Wash	1,000 mL	1.884 mg/L	1.884 mg	13.20 %	mg/L	mg	%
Total	2390 mL	5.959 mg/L	14.243 mg	92.00 %	mg/L	mg	%
Residue	190 g	6.508 mg/L	1.235 mg	8.00 %	%	mg	%
Calc Head	100 g	77.390 g/t	15.478 mg	100.00 %	%	mg	%
Assay Head	100 g	86.652 g/t	17.330 mg		%	mg	

Rec 91.75
ass. 2.530
2.285
.19
Res
2.5

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 20 , 1989

ample: ROASTER CALCINE February 6, 1989 @ midnite

Sample Code #: RC2

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 6.5	CaO = 0.20 g	pH = 10.4	pH = 10.4	pH = 10.3	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 2.15 lb/t	CN^- = 1.60 lb/t	CN^- = 1.30 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other =	Other = Added .05gms CaO to 10.8	Other =	Other =

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.017 mg/L	.017 mg	.10 %	mg/L	mg	%
Preg	410 mL	32.058 mg/L	13.144 mg	90.80 %	mg/L	mg	%
Wash	1,000 mL	1.336 mg/L	1.336 mg	9.20 %	mg/L	mg	%
Total	2410 mL	6.008 mg/L	14.480 mg	91.50 %	mg/L	mg	%
Residue	196 g	6.850 mg/L	1.343 mg	8.50 %	%	mg	%
Calc Head	200 g	79.115 g/t	15.823 mg	100.00 %	%	mg	%
Assay Head	100 g	86.652 g/t	17.330 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 20 , 1989

ample: ROASTER CALCINE February 3, 1989 @ noon

Sample Code #: RC3

REF: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 200.0 g					
pH = 6.5	CaO = 0.20 g	pH = 10.8	pH = 10.5	pH = 10.1	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 2.25 lb/t	CN^- = 1.80 lb/t	CN^- = 0.95 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other =	Other =	Other =	Other =

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.034 mg/L	.034 mg	.20 %	mg/L	mg	%
Preg	410 mL	39.867 mg/L	16.345 mg	90.30 %	mg/L	mg	%
Wash	1,000 mL	1.713 mg/L	1.713 mg	9.50 %	mg/L	mg	%
Total	2410 mL	7.507 mg/L	18.092 mg	91.40 %	mg/L	mg	%
Residue	195.5 g	8.734 mg/L	1.707 mg	8.60 %	%	mg	%
Calc Head	200 g	98.995 g/t	19.799 mg	100.00 %	%	mg	%
Assay Head	100 g	91.105 g/t	18.221 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Rec 71.0
[illegible] 2.660
[illegible] 2.614
[illegible] .126
[illegible] -.25
[illegible] 0

ample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 20 , 1989

Sample: ROASTER CALCINE February 3, 1989 @ noon

Sample Code #: RC4

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 6.3	CaO = 0.20 g	pH = 10.9	pH = 10.3	pH = 10.2	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 2.90 lb/t	CN^- = 1.55 lb/t	CN^- = 1.15 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other =	Other = Added .05gms CaO to 10.8	Other =	Other =

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Prewash	1000 mL	0.034 mg/L	.034 mg	.20 %	mg/L	mg	%
Preg	410 mL	37.401 mg/L	15.334 mg	89.80 %	mg/L	mg	%
Wash	1,000 mL	1.713 mg/L	1.713 mg	10.00 %	mg/L	mg	%
Total	2410 mL	7.088 mg/L	17.081 mg	90.80 %	mg/L	mg	%
Residue	194.5 g	8.905 mg/L	1.732 mg	9.20 %	%	mg	%
Calc Head	200 g	94.065 g/t	18.813 mg	100.00 %	%	mg	%
Assay Head	200 g	91.105 g/t	18.221 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM ....Testing.... DATE ASSAYED ....February 23-89....

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
RC-1 Prewash 6th	.0005						
Preg	.924						
Wash	.055						
RC-2 Prewash 6th	.0005						
Preg	.936						
Wash	.039						
RC-3 Prewash 3rd	.0010						
Preg	1.164						
Wash	.043						
RC-4 Prewash 3rd	.0010						
Preg	1.092						
Wash	.050						
RC Head 3rd	2.63 2.00 3.34	2.66	26.25	3.40	1.68	.41	
RC Head 6th	2.38 3.05 2.17	2.53	28.25	3.59	1.71	.44	
CR-1 6th midnight	.18 .21	.19					
CR-2	.20 .20	.20					
CR-3 3rd Noon	.24 .27	.255					
CR-4 3rd	.26 .26	.26					

W.L. Richardson
....Assayer

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: March 2, 1989

SUBJECT: Laboratory Roaster Testwork

SUMMARY:

Testwork was conducted on samples of laboratory roasted roaster feed. The samples were roasted at 840F and 900F. Duplicate cyanidation tests were conducted. The average gold cyanidation recovery after 48 hours leaching was calculated to be 86.19% Au for the sample roasted at 840F. The average residue assay was 0.38 oz/ton and the average calculated head grade was 2.60 oz/ton Au. The assayed headgrade of the sample was 2.55 oz/ton Au. The average reagent consumptions were 14.5 lb/ton NaCN and 5.25 lb/ton CaO. The sample roasted at 900F yielded a recovery of 89.80% Au. The average residue was .28 oz/ton and the calculated head grade was 2.61 oz/ton. The assayed head grade was 2.73 oz/ton. The average reagent consumptions were 11 lb/ton NaCN and 6 lb/ton CaO. Both samples exhibited pH's of 5.3 before lime addition. Previous testwork with similiar roasting conditions showed this acidic nature of the calcine. The recoveries were low and the reagent consumptions were high. This acidic nature was noticed in the mill calcine during the end of January. The calcine residues during this period were .27-.30 oz/ton. The roaster calcine was a reddish color during this time as well.

B. Starcheski
Plant Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 22 , 1989

Sample: ROASTER CALCINE Roasted @ 840F

Sample Code #: RC1

REF: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 200.0 g					
pH = 5.6	CaO = 0.30 g	pH = 10.2	pH = 9.8	pH = 9.9	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.10 lb/t	CN^- = 0.90 lb/t	CN^- = 0.80 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.1	Other = Added .1gms CaO Added .2gms NaCN	Other = Added .10gms CaO to 10.7 Added .2gms NaCN	Other =	Other =

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Prewash	1000 mL	0.03 mg/L	.030 mg	.20 %	mg/L	mg	%
Preg	380 mL	30.825 mg/L	11.713 mg	79.75 %	mg/L	mg	%
Wash	1,000 mL	2.945 mg/L	2.945 mg	20.05 %	mg/L	mg	%
Total	2380 mL	6.171 mg/L	14.688 mg	85.27 %	mg/L	mg	%
Residue	190 g	13.357 mg/L	2.538 mg	14.73 %	%	mg	%
Calc Head	200 g	86.130 g/t	17.226 mg	100.00 %	%	mg	%
Assay Head	200 g	87.337 g/t	17.467 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

86.19
2.55
2.600
.38
NaCN 14.5
CaO 5.25

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 22 , 1989

Sample: ROASTER CALCINE Roasted @ 840F

Sample Code #: RC2

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 5.8	CaO = 0.30 g	pH = 9.8	pH = 9.9	pH = 9.9	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.05 lb/t	CN^- = 0.85 lb/t	CN^- = 0.80 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other = Added .15gms CaO to 11.2 Added .2gms NaCN	Other = Added .10gms CaO to 11.2 Added .3gms NaCN	Other =	Other =

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.031 mg/L	.031 mg	.20 %	mg/L	mg	%
Preg	400 mL	33.291 mg/L	13.316 mg	83.10 %	mg/L	mg	%
Wash	1,000 mL	2.672 mg/L	2.672 mg	16.70 %	mg/L	mg	%
Total	2400 mL	6.675 mg/L	16.019 mg	87.10 %	mg/L	mg	%
Residue	190 g	12.330 mg/L	2.380 mg	12.90 %	%	mg	%
Calc Head	200 g	91.995 g/t	18.399 mg	100.00 %	%	mg	%
Assay Head	200 g	87.337 g/t	17.467 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 22 , 1989

Sample: ROASTER CALCINE Roasted @ 900F

Sample Code #: RC3

REF: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 200.0 g					
pH = 5.3	CaO = 0.35 g	pH = 10.2	pH = 9.8	pH = 9.9	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.25 lb/t	CN^- = 1.15 lb/t	CN^- = 0.90 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other = Added .1gms CaO to 10.5	Other = Added .20gms CaO to 11.5 Added .2gms NaCN	Other =	Other =

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Prewash	1000 mL	0.034 mg/L	.034 mg	.20 %	mg/L	mg	%
Preg	410 mL	34.113 mg/L	13.986 mg	83.80 %	mg/L	mg	%
Wash	1,000 mL	2.672 mg/L	2.672 mg	16.00 %	mg/L	mg	%
Total	2410 mL	6.926 mg/L	16.692 mg	89.80 %	mg/L	mg	%
Residue	190 g	9.933 mg/L	1.887 mg	10.20 %	%	mg	%
Calc Head	200 g	92.895 g/t	18.579 mg	100.00 %	%	mg	%
Assay Head	200 g	93.503 g/t	18.700 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

Rec 89.96
ass 2.[illegible]
Calc 2.61
[illegible] .28
[illegible] 6
[illegible]

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: February 22 , 1989

Sample: ROASTER CALCINE Roasted @ 900F

Sample Code #: RC4

REF: CYANRCC.Frm

Initial					
Size = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 5.6	CaO = 0.35 g	pH = 10.2	pH = 9.8	pH = 9.9	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 1.30 lb/t	CN^- = 1.00 lb/t	CN^- = 1.00 lb/t	CN^- = lb/t
H2O = 400 mL	Other =	Tit = 10 mL	Tit = 10 mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.0	Other = Added .1gms CaO to 10.8	Other = Added .10gms CaO to 11.0	Other =	Other =

Sample Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.034 mg/L	.034 mg	.20 %	mg/L	mg	%
Preg	340 mL	35.346 mg/L	12.018 mg	77.70 %	mg/L	mg	%
Wash	1,000 mL	3.425 mg/L	3.425 mg	22.10 %	mg/L	mg	%
Total	2340 mL	6.614 mg/L	15.477 mg	89.80 %	mg/L	mg	%
Residue	190 g	9.419 mg/L	1.761 mg	10.20 %	%	mg	%
Calc Head	200 g	86.190 g/t	17.238 mg	100.00 %	%	mg	%
Assay Head	200 g	93.503 g/t	18.700 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing (Roasting) DATE ASSAYED February 23-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
RC Roast 840 19th	2.68 2.44 2.61 2.47	2.55	22.75	2.53	1.51	.34	
RC Roast 900	2.64 3.08 2.51 2.71	2.73	22.75	2.33	1.12	.26	
RC Roast 1000	2.63 2.53 2.58 2.75	2.62	22.75	2.02	.78	.24	
RC 1 840 Prewash	.0009		27.2ppm				
Preg	.900						
Wash	.086						
RC 2 840 Prewash	.0009		27.0ppm				
Preg	.972						
Wash	.090						
RC 3 900 Prewash	.0010		29.3ppm				
Preg	.996						
Wash	.078						
RC 4 900 Prewash	.0010		29.6ppm				
Preg	1.032						
Wash	.100						
CR 1 [illegible]	.39 .39	.39					
CR 2	.36 .36	.36					
CR 3	.30 .28	.29					
CR 4	.27 .28	.27					

W.L. Richardson

Assayer

S8/V

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: April 22, 1989

SUBJECT: Cyanidation of #3 Thickener U/F

SUMMARY:

Testwork was conducted on #3 Thickener U/F. The average gold cyanidation recovery after 48 hours leaching was calculated to be 58.37 % Au. The average residue assay was .013 oz/ton and the average calculated head grade was .031 oz/ton Au. The assayed head grade of the sample was .018 oz/ton Au. The average reagent consumptions were 10.0 lb/ton NaCN and 0.50 lb/ton CaO. The sample appears to be a flotation tailings sample. Additional sampling indicates that the gold present is approximately 1.2 to 1.4 oz/t. Further tests will be performed to determine the cyanidation recovery of the gold.

Too low for head assay. - reject

B Starcheski

B. Starcheski
Plant Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: April 5, 1989

Sample: #3 Thickener U/F

Sample Code #: Test1

REF: CYANRCC.Frm

Initial					
Size = 100.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 9.2	CaO = 0.05 g	pH = 11.4	pH = 10.7	pH = 10.5	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 5.10 lb/t	CN^- = 4.2 lb/t	CN^- = 3.10 lb/t	CN^- = lb/t
H2O = 200 mL	Other =	Tit = 10 mL	Tit = --- mL	Tit = ---- mL	Tit = mL
Other=	pH to 10.7	Other =	Other =	Other =	Other =

Sample Calculations:

		Gold			Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.017 mg/L	.017 mg	27.11 %	mg/L	mg	%
Preg	190 mL	0.151 mg/L	.0287 mg	45.77 %	mg/L	mg	%
Wash	1,000 mL	0.017 mg/L	.017 mg	27.11 %	mg/L	mg	%
Total	2190 mL	0.0286mg/L	.0627 mg	57.42 %	mg/L	mg	%
Residue	97 g	0.479 mg/L	.0465 mg	27.11 %	%	mg	%
Calc Head	100 g	1.092 g/t	.1092 mg	100.00 %	%	mg	%
Assay Head	100 g	0.617 g/t	.0620 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: April 5, 1989

Sample: #3 Thickener U/F

Sample Code #: Test2

REF: CYANRCC.Frm

Initial

Size = 100.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 9.2	CaO = 0.05 g	pH = 11.6	pH = 10.5	pH = 10.4	pH =
%-200=	NaCN = 10.0 lb/t	CN^- = 5.20 lb/t	CN^- = 4.2 lb/t	CN^- = 3.10 lb/t	CN^- = lb/t
H2O = 200 mL	Other =	Tit = 10 mL	Tit = --- mL	Tit = ---- mL	Tit = mL
Other=	pH to 10.7	Other =	Other =	Other =	Other =

Sample Calculations:

		Gold			Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
Prewash	1000 mL	0.017 mg/L	.017 mg	26.98 %	mg/L	mg	%
Preg	200 mL	0.144 mg/L	.0290 mg	46.03 %	mg/L	mg	%
Wash	1,000 mL	0.017 mg/L	.017 mg	26.98 %	mg/L	mg	%
Total	2200 mL	0.0286mg/L	.0630 mg	59.32 %	mg/L	mg	%
Residue	97 g	0.445 mg/L	.0432 mg	40.68 %	%	mg	%
Calc Head	100 g	1.062 g/t	.1062 mg	100.00 %	%	mg	%
Assay Head	100 g	0.617 g/t	.0620 mg		%	mg	

Note: Preg (mL) = Preg + Tit

Sample Test Outlines:

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED April 11-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
#3 Thick U/F	.020 .016		3.50	.45	.19	.07	
Test #1 Residue	.014 .014			.31			
Test #2 Residue	.013 .014			.32			
Test #1 Prewash	.0005						
Preg	.0044						
Wash	.0005						
Test #2 Prewash	.0005						
Preg	.0042						
Wash	.0005						

G I A N T
Yellowknife Mines Limited

MEMO TO: G.B. Halverson

CC:

FROM: B. Starcheski

DATE: May 16, 1989

SUBJECT: CYANIDATION TESTWORK FOR MINERALOGICAL STUDY

Purpose

The purpose of the cyanidation testwork was to prepare samples for a mineralogical study at Surface Science.

The level of NaCN was kept high in order to achieve the maximum dissolution of gold.

Discussion

1) The cyanidation of the classifier overflow showed that 39.6% of the gold can be leached out. There was no significant difference in the residue at the three sieve fractions. The residues ran around .150 oz/T as opposed to a head sample of .250 oz/T.

2) The cyanidation of the flotation tails illustrated a 50-53% recovery of the gold. There was no significant difference between the recovery using the pulverized and the unpulverized samples. This trend was evident for the .019 oz/T sample and for the .014 oz/T sample.

   If one uses the 1988 figures based on 53% recovery that would indicate an increase of slightly over $\$1 \times 10^6$/year. The tonnages that would be treated would be roughly 322,000 T. This may need some further investigation.

3) The cyanidation tests on the roaster calcine yielded a 95.54% gold recovery. The residues were .12 oz/T. There was no significant difference between pulverized and unpulverized samples.

B. Starcheski
Metallurgist

Sent to Western

Giant

YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing Account #0990-9355 DATE ASSAYED April 24-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	% Passing Screen
Classifier O'Flow -200	.25 .25 .25		7.25	2.04	.89	.08	80.6
-275	.42 .27 .23		7.75	2.53	.88	.06	78.6
-325	.26 .26 .29		7.25	2.49	.89	.06	80.8

W.L. Richardson

Assayer

Sent to Western

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED April 26-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
CR 1	.124		28.50	4.02	1.30		
CR 5	.126		28.25	4.05	1.33		
HFT Pulverized Cyanided	.010		5.25	.23	.02		
unpulverized	.010		5.00	.24	.02		
-200 A Cyanided	.153		7.75	1.89	.79		
-275	.154 [illegible]	53%	7.00	1.99	.84		
-32~~4~~5	.151 [illegible]	44% rec	5.75	2.02	.85		

W.L.Richardson
Assayer

Sent To
Western

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing Special 0990-9355 DATE ASSAYED April 28-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Flot Tails Head Unpulverized	.019 .019 .020			.25			
HFT Pulverized	.011 .010 .011			.23	.03		
LFT Head Pulverized	.014 .013 .014			.27	.03		

W.L. Richardson
Assayer

Sent to Western

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED April 27-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
~~HFT Unpulverized~~	~~.011~~			~~.15~~	~~.23~~		
LFT Unpulverized Head	.011			.12	.15		
CR Pulverized	.13		30.50	3.00	1.43		
RC Special	2.70 2.78 2.64 2.65		31.25	3.90	1.40	.38	

W.L. Richardson
Assayer

Sent to Western.

Giant

YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing Account #0990-9355 DATE ASSAYED April 24-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	% Passing Screen
Classifier O'Flow -200	.25 .25 .25		7.25	2.04	.89	.08	80.6
-275	.42 .27 .23		7.75	2.53	.88	.06	78.6
-325	.26 .26 .29		7.25	2.49	.89	.06	80.8

W.L. Richardson

Assayer

Sent to Western Univ.

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED May 2-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
1st- Maxwell Conc.	2.98 3.30 3.22		27.50	27.48	11.04		
2nd-Maxwell Conc	3.60 2.94 3.10		34.25	31.98	10.73		
Scavenger Conc.	.77 .74 .74		8.25	5.37	3.04		
Rougher Conc.	2.40 2.34 2.39	2.38	18.75	15.27	8.79		
LFT Pulverized & Cyanided	.007			.15			
LFT not Pulverized Cyanided	.007				.06		
CR Pulverized & Cyanided	.11						

W.L. Richardson
Assayer

Soln's for
Cyanidation tests
for surface science
March 89.

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED September 27-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
-200 Preg A	.0425						
B	.0550						
-275 Preg A	.0490						
B	.0520						
-325 Preg A	.0485						
B	.0525						

W.L. Richardson
Assayer

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM ....Testing.... DATE ASSAYED ....September 29-89....

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Mill Flot Tail	.015						
RC #1 Preg	.840						
#2	.900						
#3	.840						
#4	.816						
#5	.720						
#6	.756						
RC Pulverized A Preg	.888						
B	.900						
CR #2 Preg	.852						
Preg Pulverized A	.0105						
B	.0080						
LFT Pulverized Preg A	.0046						
B	.0040						
Unpulverized Preg A	.0035						
B	.0036						
HFT Pulverized Preg A	.0095						
B	.0087						
Unpulverized A	.0079						
B	.0060						

W.L. Richardson
....Assayer

G I A N T
Yellowknife Mines Limited

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: November 23, 1989

SUBJECT: GOLD RECOVERY ENHANCEMENT PROJECT

After our meeting with Dr. Chryssoulis it was decided to perform cyanidation tests on the four concentrate samples. The cyanidation recoveries were as follows:

1st Maxwell Cell - 23%
2nd Maxwell Cell - 32%
Rougher Conc. - 29%
Scavenger Conc. - 25%

I discussed the results with Chryssoulis and we decided to run another series just using the 1st and 2nd Maxwell Cell concentrates. These samples were fine ground at 100% -200 Mesh. and cyanidation tests were performed. The recoveries were as follows:

1st Maxwell Cell - 35%
2nd Maxwell Cell - 36%

The purpose of the finer grinding was to see if the gold that is associated in the finer particles could be liberated and thus be amenable to cyanidation. The increase in the cyanidation recovery in the second series of tests would indicate this.

B Starcheski

B. Starcheski
Metallurgist

BS/sj
Attach.

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 24, 1989

le: 1st Maxwell Concentrate

le Code #: A

CYANRCC.Frm

tial

e = 100.0 g	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
= 7.5	CaO = 0.30 g	pH = 11.5	pH = 10.0	pH =	pH =
00=	NaCN = 20.0 lb/t	CN^- = 1.5 lb/t	CN^- = 1.8 lb/t	CN^- = lb/t	CN^- = lb/t
= 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
er=		Other =	Other =	Other =	Other =

e Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
ash	500 mL	.024 mg/L	.012 mg	0.79 %	mg/L	mg	%
	210 mL	6.576 mg/L	.130 mg	90.68 %	mg/L	mg	%
	500 mL	0.260 mg/L	0.130 mg	8.54 %	mg/L	mg	%
l	1210 mL	1.259 mg/L	1.523 mg	18.88 %	mg/L	mg	%
due	98 g	66.787mg/L	6.545 mg	81.12 %	%	mg	%
Head	100 g	80.68 g/t	8.068 mg	100.00 %	%	mg	%
y Head	100 g	108.572g/t	10.857 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 24, 1989

e: 1st Maxwell Concentrate

e Code #: B

CYANRCC.Frm

ial					
= 100.0 g	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
= 7.5	CaO = 0.30 g	pH = -----	pH = 10.0	pH =	pH =
)=	NaCN = 20.0 lb/t	CN^- = ---- lb/t	CN^- = 1.5 lb/t	CN^- = lb/t	CN^- = lb/t
= 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
r=		Other =	Other =	Other =	Other =

: Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
ish	500 mL	.024 mg/L	.012 mg	0.51 %	mg/L	mg	%
	200 mL	10.275 mg/L	2.055 mg	87.93 %	mg/L	mg	%
	500 mL	0.538 mg/L	0.270 mg	11.55 %	mg/L	mg	%
	1200 mL	1.948 mg/L	2.337 mg	26.71 %	mg/L	mg	%
ue	98 g	65.417mg/L	6.411 mg	73.29 %	%	mg	%
Head	100 g	87.48 g/t	8.748 mg	100.00 %	%	mg	%
Head	100 g	108.572g/t	10.857 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 24, 1989

le: 2nd Maxwell Concentrate

ıe Code #: A

CYANRCC.Frm

ial	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
e = 100.0 g	CaO = 0.30 g	pH = -----	pH = 10.2	pH =	pH =
= 7.3	NaCN = 20.0 lb/t	CN⁻ = ---- lb/t	CN⁻ = 1.9 lb/t	CN⁻ = lb/t	CN⁻ = lb/t
)0=	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
= 200 mL		Other =	Other =	Other =	Other =
er=					

e Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
ash	500 mL	.021 mg/L	.010 mg	0.37 %	mg/L	mg	%
	200 mL	12.741 mg/L	2.548 mg	93.95 %	mg/L	mg	%
	500 mL	0.308 mg/L	0.154 mg	5.68 %	mg/L	mg	%
l	1200 mL	2.260 mg/L	2.712 mg	31.31 %	mg/L	mg	%
due	98 g	60.622mg/L	5.941 mg	68.66 %	%	mg	%
Head	100 g	86.53 g/t	8.653 mg	100.00 %	%	mg	%
y Head	100 g	109.942g/t	10.994 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 24, 1989

ıple: 2nd Maxwell Concentrate

ıple Code #: B

: CYANRCC.Frm

ıitial	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
ze = 100.0 g					
= 7.5	CaO = 0.30 g	pH = -----	pH = 10.4	pH =	pH =
200=	NaCN = 20.0 lb/t	CN^- = ---- lb/t	CN^- = 3.4 lb/t	CN^- = lb/t	CN^- = lb/t
] = 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
ıer=		Other =	Other =	Other =	Other =

ıle Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
ıwash	500 mL	.021 mg/L	.010 mg	0.35 %	mg/L	mg	%
ıg	200 mL	12.570 mg/L	2.514 mg	87.02 %	mg/L	mg	%
h	500 mL	0.729 mg/L	0.365 mg	12.63 %	mg/L	mg	%
ıal	1200 mL	2.407 mg/L	2.889 mg	31.87 %	mg/L	mg	%
ıidue	98 g	63.020mg/L	6.176 mg	68.13 %	%	mg	%
c Head	100 g	90.65 g/t	9.065 mg	100.00 %	%	mg	%
ıay Head	100 g	109.942g/t	10.994 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 23, 1989

e: Rougher Concentrate

e Code #: A

CYANRCC.Frm

ial					
= 100.0 g	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
= 7.6	CaO = 0.30 g	pH = 11	pH = 10.0	pH =	pH =
O=	NaCN = 20.0 lb/t	CN^- = 4.4 lb/t	CN^- = 1.2 lb/t	CN^- = 3.1 lb/t	CN^- = lb/t
= 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
r=	pH to 11.2	Other =	Other =	Other =	Other =

e Calculations:

		Gold			Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
ash	500 mL	.027 mg/L	.014 mg	.63 %	mg/L	mg	%
	200 mL	8.631 mg/L	1.726 mg	80.28 %	mg/L	mg	%
	1000 mL	0.411 mg/L	0.411 mg	19.12 %	mg/L	mg	%
l	1700 mL	1.265 mg/L	2.15 mg	29.49 %	mg/L	mg	%
due	96 g	53.43 mg/L	5.14 mg	70.51 %	%	mg	%
Head	100 g	72.90 g/t	7.29 mg	100.00 %	%	mg	%
y Head	100 g	81.515 g/t	8.152 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 23, 1989

ple: Rougher Concentrate

ple Code #: B

: CYANRCC.Frm

itial					
ze = 100.0 g	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
= 7.3	CaO = 0.30 g	pH = 11.7	pH = 10.0	pH =	pH =
200=	NaCN = 20.0 lb/t	CN^- = 4.5 lb/t	CN^- = 1.5 lb/t	CN^- = 3.1 lb/t	CN^- = lb/t
O = 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
her=		Other =	Other =	Other =	Other =

ple Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
ewash	500 mL	.024 mg/L	.012 mg	.56 %	mg/L	mg	%
eg	210 mL	8.220 mg/L	1.726 mg	80.96 %	mg/L	mg	%
sh	500 mL	0.788 mg/L	0.394 mg	18.48 %	mg/L	mg	%
tal	1210 mL	1.762 mg/L	2.132 mg	29.01 %	mg/L	mg	%
sidue	97 g	53.77 mg/L	5.216 mg	70.99 %	%	mg	%
lc Head	100 g	73.48 g/t	7.348 mg	100.00 %	%	mg	%
say Head	100 g	81.515 g/t	8.151 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 23, 1989

ıple: Scavenger Concentrate

ıple Code #: A

: CYANRCC.Frm

ıitial					
ıze = 100.0 g	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
= 7.5	CaO = 0.30 g	pH = 12.3	pH = 10.5	pH =	pH =
·200=	NaCN = 20.0 lb/t	CN^- = 4.2 lb/t	CN^- = 1.75 lb/t	CN^- = 3.1 lb/t	CN^- = lb/t
D = 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
her=		Other =	Other =	Other =	Other =

ple Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
ewash	500 mL	.027 mg/L	.014 mg	2.09 %	mg/L	mg	%
eg	210 mL	2.466 mg/L	.518 mg	77.43 %	mg/L	mg	%
sh	500 mL	0.274 mg/L	0.137 mg	20.48 %	mg/L	mg	%
tal	1210 mL	0.553 mg/L	0.669 mg	25.32 %	mg/L	mg	%
sidue	99 g	19.87 mg/L	1.973 mg	74.66 %	%	mg	%
.c Head	100 g	26.42 g/t	2.642 mg	100.00 %	%	mg	%
say Head	100 g	25.69 g/t	2.569 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: October 23, 1989

mple: Scavenger Concentrate

nple Code #: B

F: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
ze = 100.0 g	CaO = 0.30 g	pH = 11.5	pH = 10.3	pH =	pH =
= 7.6	NaCN = 20.0 lb/t	CN^- = 4.5 lb/t	CN^- = 2.0 lb/t	CN^- = lb/t	CN^- = lb/t
200=	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
O = 200 mL		Other =	Other =	Other =	Other =
her=					

ple Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
ewash	500 mL	.024 mg/L	.012 mg	1.87 %	mg/L	mg	%
eg	200 mL	2.466 mg/L	.493 mg	76.79 %	mg/L	mg	%
sh	500 mL	0.274 mg/L	0.137 mg	21.34 %	mg/L	mg	%
tal	1200 mL	0.535 mg/L	0.642 mg	24.96 %	mg/L	mg	%
idue	96 g	20.21 mg/L	1.930 mg	75.04 %	%	mg	%
c Head	100 g	25.72 g/t	2.572 mg	100.00 %	%	mg	%
say Head	100 g	25.69 g/t	2.569 mg		%	mg	

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

AMPLES FROM Testing DATE ASAYED October 30-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Loaded Fresh Carbon	16.19						
Reactivated Carbon	21.91						
Stripped Carbon	17.59						
1st Maxwell A Prewash	.0007						
Preg	.192						
Wash	.0076						
B Prewash	.0007						
Preg	.300						
Wash	.0157						
2nd Maxwell A Prewash	.0006						
Preg	.372						
Wash	.0090						
B Prewash	.0007						
Preg	.367						
Wash	.0213						

W.L. Richardson

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED October 30-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Maxwell Conc 1A Residues	1.93 1.96 1.96						
1B	1.96 1.94 1.82						
2A	1.77 1.79 1.76						
2B	1.80 1.84 1.88						

W.L. Richardson
Assaye

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: November 15,1989

ample: 1st Maxwell Concentrate

imple Code #: A

EF: CYANRCC.Frm

Initial					
ize = 100.0 g	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
H = 7.3	CaO = 0.30 g	pH = 11.7	pH = 10.7	pH =	pH =
-200=	NaCN = 20.0 lb/t	CN^- = --- lb/t	CN^- = 4.6 lb/t	CN^- = lb/t	CN^- = lb/t
20 = 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
ther=		Other =	Other =	Other =	Other =

mple Calculations:

	Units	Gold			Arsenic		
		Assay	Distribution	Recovery	Assay	Distribution	Recovery
revash	---- mL	---- mg/L	----- mg	---- %	mg/L	mg	%
reg	210 mL	12.638 mg/L	2.654 mg	84.71 %	mg/L	mg	%
ash	500 mL	0.959 mg/L	0.479 mg	15.29 %	mg/L	mg	%
otal	710 mL	4.413 mg/L	3.133 mg	34.85 %	mg/L	mg	%
esidue	95 g	61.650mg/L	5.857 mg	65.15 %	%	mg	%
alc Head	100 g	89.90 g/t	8.990 mg	100.00 %	%	mg	%
ssay Head	100 g	115.080g/t	11.508 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: November 15,1989

ample: 1st Maxwell Concentrate

ample Code #: B

F: CYANRCC.Frm

initial	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
ize = 100.0 g	CaO = 0.30 g	pH = 11.4	pH = 10.7	pH =	pH =
H = 7.3	NaCN = 20.0 lb/t	CN^- = --- lb/t	CN^- = 4.5 lb/t	CN^- = lb/t	CN^- = lb/t
-200=	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
20 = 200 mL		Other =	Other =	Other =	Other =
ther=					

aple Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
'ewash	---- mL	---- mg/L	----- mg	---- %	mg/L	mg	%
'eg	230 mL	13.871 mg/L	3.190 mg	89.43 %	mg/L	mg	%
sh	500 mL	0.753 mg/L	0.377 mg	10.57 %	mg/L	mg	%
tal	730 mL	4.886 mg/L	3.567 mg	37.35 %	mg/L	mg	%
esidue	96 g	62.335mg/L	5.984 mg	62.65 %	%	mg	%
lc Head	100 g	95.51 g/t	9.551 mg	100.00 %	%	mg	%
ssay Head	100 g	115.080g/t	11.508 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: November 15,1989

ple: 2nd Maxwell Concentrate

ple Code #: A

: CYANRCC.Frm

itial					
ze = 100.0 g	Reagents	1 Hour Roll	After 48 Hrs.	After Hrs	After Hrs
= 8.7	CaO = 0.30 g	pH = 11.5	pH = 10.0	pH =	pH =
200=	NaCN = 20.0 lb/t	CN^- = --- lb/t	CN^- = 1.5 lb/t	CN^- = lb/t	CN^- = lb/t
0 = 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
her=		Other =	Other =	Other =	Other =

ple Calculations:

		Gold			Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
ewash	500 mL	.031 mg/L	.015 mg	0.50 %	mg/L	mg	%
eg	230 mL	11.200 mg/L	2.576 mg	85.33 %	mg/L	mg	%
sh	500 mL	0.856 mg/L	0.428 mg	14.18 %	mg/L	mg	%
tal	1230 mL	2.454 mg/L	3.019 mg	35.58 %	mg/L	mg	%
sidue	95 g	57.540mg/L	5.466 mg	64.42 %	%	mg	%
c Head	100 g	84.85 g/t	8.485 mg	100.00 %	%	mg	%
say Head	100 g	97.272g/t	9.727 mg		%	mg	

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM ....Testing........ DATE ASSAYED ....Nov 21-89........

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
1 st Maxwell cell A- Res	1.80 1.80 1.82 1.80	1.80	28.75	29.6[illegible]	10.97	2.15 $$$$	
1 st '" " B-Res	1.78 1.80 1.82 1.88	1.82	29.50	30.33	9.74	2.13	
2 nd Maxwell Cell Res	1.70 1.70 1.64 1.70	1.68	26.75	33.93	9.64	2.05	
Roaster Feed	2.80 2.50 2.67 2.50	2.62	24.75	21.29	8.94	.35	

F. Pelechaty

....Assayer

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

AMPLES FROM Testing DATE ASSAYED Nov 17-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
st Maxwell A wash	.028						
Preg	.369						
St Maxwell B wash	.022						
Preg	.405						
nd Maxwell Prewash	.0009						
P wash	.025						
Preg	.327						

F. Pelechaty

Assayer

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM ....Testing.... DATE ASSAYED ....October 30-89....

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Maxwell Conc 1A Residues	1.93 1.96 1.96						
1B	1.96 1.94 1.82						
2A	1.77 1.79 1.76						
2B	1.80 1.84 1.88						

W.L. Richardson
....Assayer

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: Stephen Chryssoulis

CC: G. Halverson

FROM: B. Starcheski

DATE: May 15, 1989

SUBJECT: Samples for Mineralogical Testwork at Surface Science

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The attached sheet contains the results of the cyanidation testwork that was performed at Giant Yellowknife Mines in preparation for your mineralogical study.

The reason for the small amount of head sample was because two sets of tests were run. There was an error in the first test. I hope the sample size will be sufficient for your work.

The missing analysis for some of the samples will be forthcoming ie. Antimony on the classifier overflow samples. If you have any questions please call me.

Regards,
Brad Starcheski
Brad Starcheski P.Eng
Metallurgist

Results:	Marking Code	oz/T Au	Fe	S	As	Sb	weight
Classifier O/F							
Head sample	1	.25	7.25	2.2	.88	.08	813
200 Mesh (as is)	2	.25	7.25	2.04	.89	.08	631
275 Mesh "	3	.25	7.75	2.53	.88	.06	643
325 Mesh "	4	.125	7.25	2.49	.88	.06	643
[illegible]nided -200 Mesh	5	.153	7.75	1.89	.79	.10	479
-275 Mesh	6	.154	7.0	1.99	.84	.09	475
-325 Mesh	7	.151	5.75	2.02	.85	.10	478
						subtotal	4.18 k

Flotation Tails							
High assayed flot tails							
head sample	8	.019	—	.25	—		913
+pulverized but cyanided	9	.010	5.00	.24	.02		448
[pul]verized + cyanided	10	.010	5.25	.23	.02		49[illegible]
						subtotal	1.85

Low assayed flot tails							
head sample	11	.014	—	.27	.03		24[illegible]
pulverized but cyanided	12	.007	—	.15	.06		44[illegible]
[pul]verized + cyanided	13	.007	—	.15	.06		47
						subtotal	1.16

Roaster Calcine		Au	Fe	S	As	Sb	
head sample	14	2.69	31.25	3.9	1.40	.38	5.9
Cyanided as is (calcine residue)	15	.12	28.5	4.0	1.30	.41	2.2
Pulverized, then cyanided	16	"	"	"	"	.43	48[illegible]
[C]yanided, pulverized, cyanided	17	.13	—	—	—	.39	483
						subtotal	9.07

) Flotation CONCENTRATES.

	Au	Fe	S	As	Weight
First Maxwell Cell	3.17	27.5	27.48	11.04	735
Second Maxwell Cell	3.21	34.25	31.98	10.73	512
Rougher Conc.	2.38	18.75	15.27	8.79	400
Scavenger Conc.	.75	8.25	5.37	3.04.	233
					1.88 kg

Total weight 18.14 k

Samples for Surface Science Western

ROASTER CALCINE

a) 6 - 500 g to be cyanided
b) 2 - 500 g to be cyanided, pulverized, and then cyanided. Started 1:00 p.m. Sunday.

3720 + 3230 g Roaster Calcine as is
1700 g of Roaster Calcine to be pulverized then cyanided.

1:00 p.m. Sunday (b) 500 g + 1 l water			11:30 a.m. Monday	CN-
CR1	ph 6.7 12 ml--10.4	need 25 ml NaCN	10.5 + 3 ml	11.4
CR2	ph 6.9 12 ml--10.4	need 25 ml NaCN	10.5 + 3 ml	11.4

10 lb/T	PH	500 g		CN	After 48 hours
CR1	6.7	10.5 + 3 ml 11.4	25 ml	2.3	--
CR2	6.9	10.5 + 3 ml 11.5	25 ml	2.0	4.0

1:00 p.m. Monday					After 48 hours
RC pul A 500 g	ph 7.0	10.8	25 ml CN-	8.5--11.4	3.0 CN-
RC pul B 200 g	ph 7.1	11.3	10 ml CN-	8.4--11.0	3.25 CN-

				START 6:50 pm		48 HOURS	
	Int. pH				CN-	pH	CN-
RC1	7.1	+12 ml	10.7	10.9		10.7	4.0
RC2	7.2	+12 ml	10.8	10.9	2.0	10.8	4.0
RC3	7.2	+12 ml	10.8	10.8	1.75	10.7	4.6
RC4	7.3	+15 ml	11.3	10.7	1.9	10.6	2.2
RC5 a	7.0	6	10.8	10.2 +1	1.35	10.1	3.5
b	6.9	6	10.9	10.2 +1	1.25	10.4	3.4
RC6	6.9	12 ml	10.9	10.9		10.8	4.15

Flot Tails (High) - pulverized

A 500g	9.0	15 ml	10.8	10.1 +3	1.65		5.85
B 200g	9.0	15 ml	11.4	10.5	--		2.50

Flot Tails (High) - unpulverized

A 500g	7.8	12 ml	11.5	11.4	2.75		6.0
B 200g	8.0	8 ml	11.8	11.5	2.75		6.25

NB: LFT after pulverizing was dusty vs the HFT.

	Int. pH	After 17 hours	CN-	Maintain +13 lb/T	48 hours pH	48 hours CN-
-200A (a)	8.3	11.5	3.05	10 ml	11.2	4.0
A (b)	8.2	11.5	2.50	10 ml	11.3	6.2
-200B (a)	8.3	11.1	5.00	8 ml	11.3	6.55
B (b)	8.3	11.4	5.2	8 ml	11.3	7.15
-275A (a)	8.3	11.5	4.3	9 ml	11.1	6.6
A (b)	8.3	11.5	5.05	8 ml	11.4	7.15
-275B (a)	8.3	11.2	5.65	8 ml	11.1	7.75
B (b)	8.3	11.5	4.8	9 ml	11.2	7.0
-325A (a)	8.3	11.2	4.75	9 ml	11.1	6.35
A (b)	8.3	11.2	4.65	9 ml	11.0	6.10
-325B (a)	8.3	11.3	4.35	9 ml	11.1	6.3
B (b)	8.3	11.5	4.65	9 ml	11.1	6.5

		After 24 hours		After 48 hours	
		pH	CN^-	pH	CN^-
LFT A 500 g 8.0 (unpulverized)	11.8	11.8	2.8	11.5	4.25
LFT B 100 g 8.4 (unpulverized)	11.8	--	--	11.5	4.85
LFT B 100 g (pulverized)	11.2	--	--	10.1	2.35
LFT A 500 g 8.9 (pulverized)	11.2	11.6	2.4	11.3	5.75

CR (pulverized)

A 500 g 8.0+17 ml	10.9	11.0	2.5	10.8	4.15
B 100 g 8.1+5 ml	11.4	11.2	4.25	10.9	5.10

RESULTS:

	Marking Code	oz/T Au	Fe	S	As	Sb	Weight kg
Classifier O/F Head Sample	1	.25	7.25	2.2	.88		8.13
-200 Mesh (as is)	2	.25	7.25	2.04	.89		6.31
-275 Mesh (as is)	3	.25	7.75	2.53	.88		6.43
-325 Mesh (as is)	4	.25	7.25	2.49	.88		6.43
Cyanided -200 Mesh	5	.153	7.75	1.89	.79		4.79
Cyanided -275 Mesh	6	.154	7.0	1.99	.84		4.75
Cyanided -325 Mesh	7	.151	5.75	2.01	.85		4.78
					SUBTOTAL		4.18
FLOTATION TAILS High Assayed Flot Tail Head Sample	8	.019		.25			9.13
Not pulverized but cyanided	9	.010	5.00	.24	.02		4.48
Pulverized and cyanided	10	.010	5.25	.23	.02		4.93
					SUBTOTAL		1.85
Low Assayed Flot Tail Head Sample	11	.014		.27	.03		2.40
Not pulverized but cyanided	12	.007		.15	.06		4.47
Pulverized and cyanided	13	.007		.15	.06		4.77
					SUBTOTAL		1.16
ROASTER CALCINE Head Sample	14	2.69	31.25	3.9	1.40	.38	5.91
Cyanided (as is) Calcine Residue	15	.12	28.5	4.0	1.30		2.20
Pulverized/Cyanided	16	.12	28.5	4.0	1.30		4.86
Cyanided/Pulverized/ Cyanided	17	.11					4.83
					SUBTOTAL		9.07
FLOTATION CONCENTRATE 1st Maxwell Cell		3.17	27.5	27.48	11.04		7.35
2nd Maxwell Cell		3.21	34.25	31.98	10.73		5.12
Rougher Conc.		2.38	18.75	15.27	8.79		4.00
Scavenger Conc.		.75	8.25	5.37	3.04		2.33
					SUBTOTAL		1.88
					TOTAL WEIGHT		18.14

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: D. Bartlett

FROM: B. Starcheski

DATE: May 26, 1989

SUBJECT: Carbon Analysis

Please find the attached spectra analysis performed on a sample of reactivated carbon that was taken from our strip circuit. The analysis was also done on samples of fresh and loaded carbon but we haven't received a copy as yet.

I thought it may be of interest to the TRP, if you need your carbon analyzed in the future. It may help troubleshoot loading problems if a baseline was developed using the relatively fresh carbon that you have in your circuit.

The analysis will indicate what has loaded onto the carbon but presently Stephen can't quantitatively determine the amount of the species on the carbon. It wouldn't be too difficult once he developed some standards.

If you have any questions please give me a call or you can contact;

Dr. Stephen Chryssoulis
Surface Science Western
University of Western Ontario
(519) 661-2173

B Starcheski
Brad Starcheski

Surface Science Western

The Surface Science Laboratory, The University of Western Ontario,
Natural Sciences Centre, London, Ontario N6A 5B7
(519) 661-2173

FACSIMILE COMMUNICATIONS COVER SHEET

TO FAX TELEPHONE NUMBER: (403) 873-2980

PLEASE DELIVER THE ATTACHED PAGES TO:

NAME: Brad

COMPANY/INSTITUTION: Giant Yellowknife, Metallurgy

ADDRESS: Yellowknife NWT

PHONE NUMBER/EXT.:

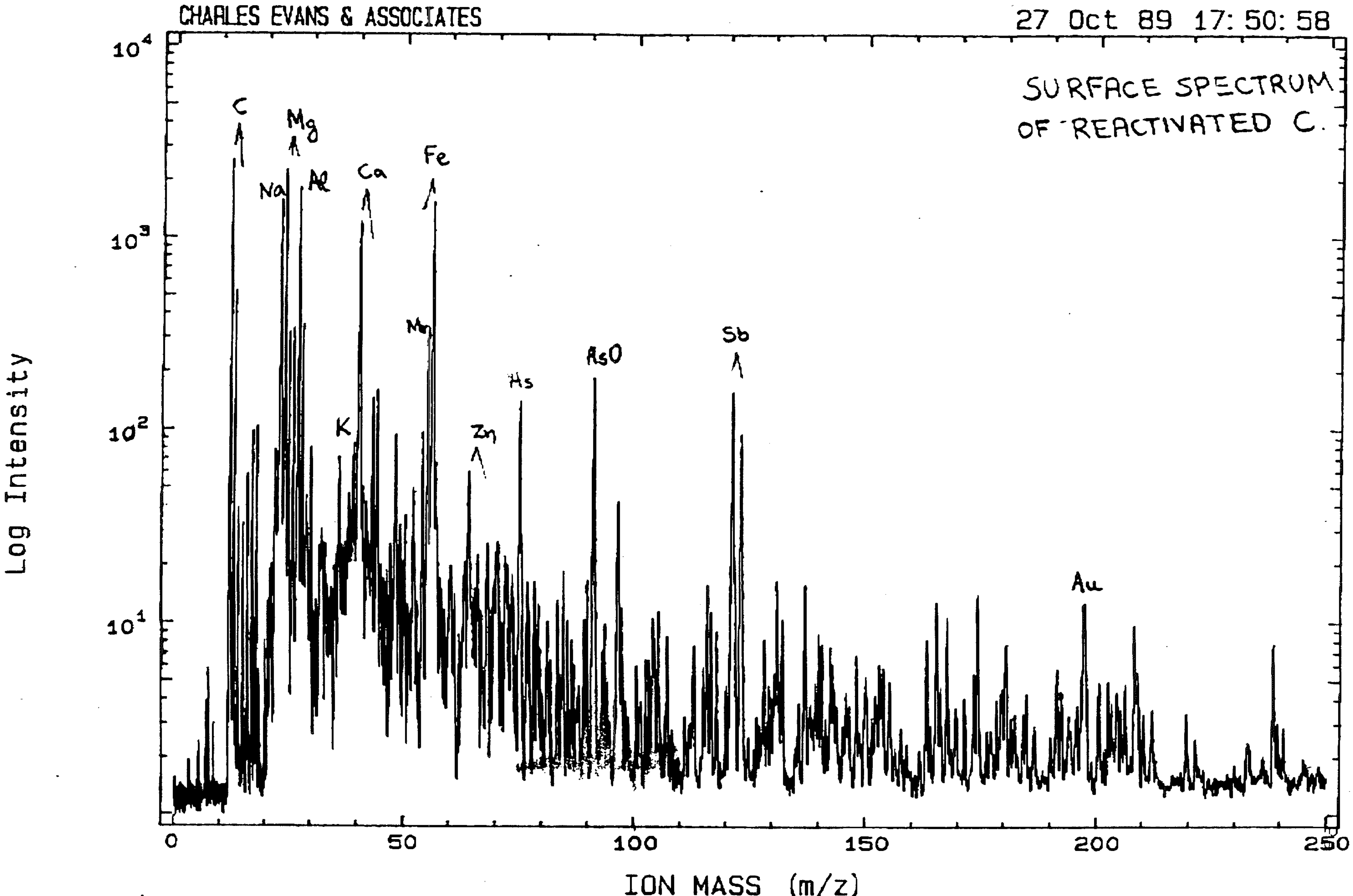
You will receive 3 *page(s) of copy including this cover sheet. If the entire transmission is not received, please contact us as soon as possible. Our operator can be reached at (519) 661-3323.*

FROM: Stephen L Chryssoulis

ADDRESS:

COMMENTS:

Our FAX number is (519) 661-3486, and we are transmitting from a Konica 400 Fascimile



CMS/SINGH/PAI; 500 ns
REACT. C; + IONS
CMS749

FIGURE_

Surface Spectrum of reactivated carbon

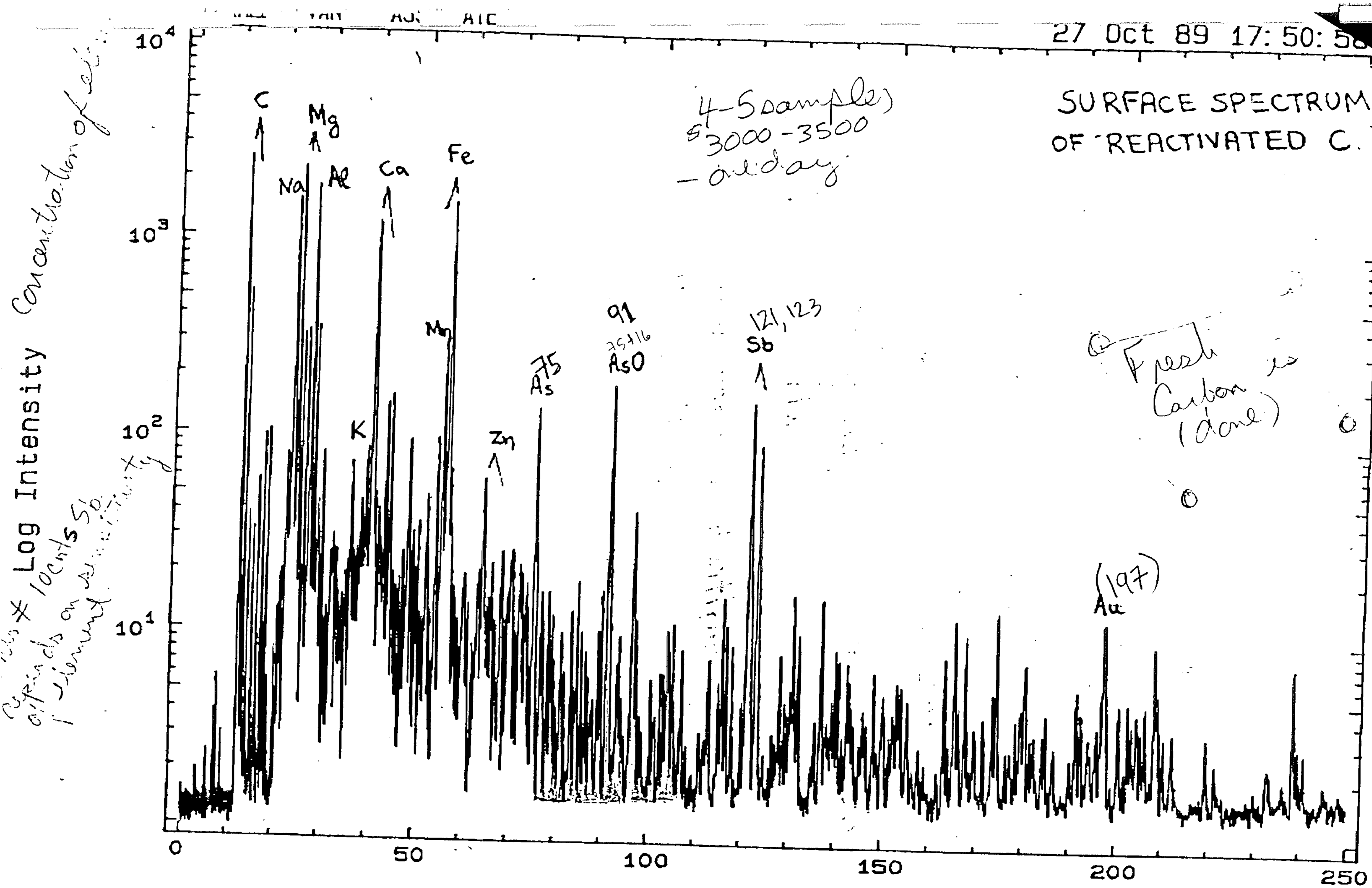
- Inorganic species readily identifyable:

  Na, Mg, Al, Ca, Fe, As, AsO, Sb and Au.

- By probing into the carbon particle:

  first disappears the Au, then the Sb and last the As.

  Mercury was not identified on the surface of this particle.



CMS/SINGH/PAI; 500 ns
REACT. C; + IONS
CMS749

FIGURE_

Atomic weight of / Charge of element

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED September 8-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Reactivated Carbon to Western University	6.29						

W.L. Richardson
Assayer

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: June 6, 1989

SUBJECT: Cyanidation of mill tailings

combined

SUMMARY:

Testwork was conducted on a sample of tailings . The average gold cyanidation recovery after 48 hours leaching was calculated to be 60.10% Au. The average residue assay was .039 oz/ton and the average calculated head grade was .098 oz/ton Au. The assayed head grade of the sample was .070 oz/ton Au. The average reagent consumptions were 10.0 lb/ton NaCN and 3 lb/ton CaO.

B. Starcheski
Plant Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: May 28, 1989

...mple: Mill Tailings Discharge to the Northwest pond

...mple Code #: Tails 1

...: CYANRCC.Frm

...itial

...ize = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
= 7.5	CaO = 0.30 g	pH = -----	pH = 11.2	pH = 10.9	pH =
...200=	NaCN = 10.0 lb/t	CN^- =------ lb/t	CN^- = 3.50 lb/t	CN^- = 3.10 lb/t	CN^- = lb/t
...O = 400 mL	Other =	Tit = 10 mL	Tit = --- mL	Tit = ---- mL	Tit = mL
...her=	pH to 11.1	Other =	Other =	Other =	Other =

...le Calculations:

		Gold			Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
...wash	----- mL	------ mg/L	------ mg	----- %	mg/L	mg	%
...g	360 mL	0.911 mg/L	0.328 mg	81.40 %	mg/L	mg	%
...	1,000 mL	0.075 mg/L	0.075 mg	18.60 %	mg/L	mg	%
...al	1360 mL	0.297 mg/L	0.403 mg	60.20 %	mg/L	mg	%
...idue	199 g	1.336 mg/L	0.266 mg	39.80 %	%	mg	%
Head	200 g	3.345 g/t	0.669 mg	100.00 %	%	mg	%
...ay Head	200 g	2.398 g/t	0.480 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: May 28, 1989

ple: Mill Tailings DIscharge to the Northwest pond

ple Code #: Tails 2

: CYANRCC.Frm

itial					
ze = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
= 7.5	CaO = 0.30 g	pH = -----	pH = 11.2	pH = 11.0	pH =
200=	NaCN = 10.0 lb/t	CN^- =------ lb/t	CN^- = 3.60 lb/t	CN^- = 3.00 lb/t	CN^- = lb/t
0 = 400 mL	Other =	Tit = 10 mL	Tit = --- mL	Tit = ---- mL	Tit = mL
ier=	pH to 11.3	Other =	Other =	Other =	Other =

le Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
vash	----- mL	------ mg/L	------ mg	----- %	mg/L	mg	%
g	360 mL	0.904 mg/L	0.326 mg	81.30 %	mg/L	mg	%
)	1,000 mL	0.075 mg/L	0.075 mg	18.70 %	mg/L	mg	%
al	1360 mL	0.295 mg/L	0.401 mg	60.10 %	mg/L	mg	%
idue	199 g	1.336 mg/L	0.266 mg	39.90 %	%	mg	%
Head	200 g	3.345 g/t	0.669 mg	100.00 %	%	mg	%
ay Head	200 g	2.398 g/t	0.480 mg		%	mg	

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED 31-89 May

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Tails Head	.070		8.25	.66	.19	.02	
Tails Residue #1	.039						
Tails Residue #2	.039						
Tails Preg #1	.0266						
Wash	.0022						
Tails Preg #2	.0264						
Wash	.0022						

W.L. Richardson
Assayer

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: July 18, 1989

SUBJECT: Cyanidation of Mill Tailings

SUMMARY:

Testwork was conducted on a sample of mill tailings the average gold cyanidation recovery after 48 hours leaching was calculated to be 63.28% Au. The average residue assay was .039 oz/ton and the average calculated head grade was .101 oz/ton Au. The assayed head grade of the sample was .071 oz/ton Au. The average reagent consumptions were 20 lb/ton NaCN and 3 lb/ton CaO.
The sample was taken on July 7, 1989 and may have had some tails containing Treminco residues. Another test will be done using the present tails. There has not been any Treminco ore milled since July 4, 1989.

B Starcheski

B. Starcheski
Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: July 10, 1989

Sample: Mill Tailings

Sample Code #: FT1

REF: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 100.0 g					
pH = 7.5	CaO = 0.60 g	pH = ----	pH = ----	pH = 10.2	pH =
%-200=	NaCN = 20.0 lb/t	CN^- = ----- lb/t	CN^- =----- lb/t	CN^- = 4.2 lb/t	CN^- = lb/t
H2O = 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
Other=	pH to 11.2	Other =	Other =	Other =	Other =

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Prewash	500 mL	.099 mg/L	.049 mg	22.90 %	mg/L	mg	%
Preg	200 mL	0.596 mg/L	0.119 mg	55.61 %	mg/L	mg	%
Wash	500 mL	0.092 mg/L	0.046 mg	21.49 %	mg/L	mg	%
Total	1200 mL	0.178 mg/L	0.214 mg	61.49 %	mg/L	mg	%
Residue	98 g	1.37 mg/L	0.134 mg	38.51 %	%	mg	%
Calc Head	100 g	3.48 g/t	0.348 mg	100.00 %	%	mg	%
Assay Head	100 g	2.400 g/t	0.240 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: July 10, 1989

amole: Mill Tailings

Sample Code #: FT2

.EF: CYANRCC.Frm

Initial					
Size = 100.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
pH = 7.7	CaO = 0.60 g	pH = ----	pH = ----	pH = 10.5	pH =
-200=	NaCN = 20.0 lb/t	CN^- = ----- lb/t	CN^- =----- lb/t	CN^- = 4.3 lb/t	CN^- = lb/t
H2O = 200 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
ther=	pH to 11.2	Other =	Other =	Other =	Other =

.mole Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
rewash	500 mL	.099 mg/L	.049 mg	20.29 %	mg/L	mg	%
Preg	200 mL	0.719 mg/L	0.144 mg	59.02 %	mg/L	mg	%
.ash	500 mL	0.103 mg/L	0.051 mg	20.90 %	mg/L	mg	%
tal	1200 mL	0.203 mg/L	0.244 mg	65.07 %	mg/L	mg	%
Residue	98 g	1.336 mg/L	0.131 mg	34.93 %	%	mg	%
lc Head	100 g	3.75 g/t	0.375 mg	100.00 %	%	mg	%
Assay Head	100 g	2.400 g/t	0.240 mg		%	mg	

Giant
YELLOWKNIFE MINES LIMITED

MEMO TO: G.B. Halverson

FROM: B. Starcheski

DATE: September 7, 1989

SUBJECT: Cyanidation of mill tailings

Further cyanidation tests performed on the mill tailings indicate that 78.98% recovery was achieved. The sample was taken from the mill discharge into the northwest pond. The assayed head was .026 oz/T Au. The calculated head was .053 oz/T Au. The residues from the testwork assayed to be .011 oz/T Au. Previous head samples taken indicated that the gold values in the mill tailings were at .070 oz/T. The higher values can be attributed to the presence of Treminco ore in the tailings.

Results from the test show that acceptable recoveries can be achieved with conventional tails. Further tests will be performed to verify this.

Brad Starcheski

Brad Starcheski
Metallurgist

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: August 11,1989

ample: Mill Tailings

ample Code #: FT1

EF: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 100.0 g	CaO = 0.20 g	pH = ----	pH = ----	pH = 10.	pH =
pH = 8.2	NaCN = 10.0 lb/t	CN^- = ----- lb/t	CN^- =----- lb/t	CN^- = 2.50 lb/t	CN^- = lb/t
%-200=	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
H2O = 200 mL	pH to 11.0	Other =	Other =	Other =	Other =
Other=					

ample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
rewash	----- mL	----- mg/L	----- mg	----- %	mg/L	mg	%
Preg	200 mL	0.363 mg/L	0.073 mg	64.03 %	mg/L	mg	%
Wash	500 mL	0.082 mg/L	0.041 mg	36.05 %	mg/L	mg	%
otal	700 mL	0.163 mg/L	0.114 mg	75.50 %	mg/L	mg	%
Residue	98 g	0.377 mg/L	0.0369 mg	24.50 %	%	mg	%
alc Head	100 g	1.51 g/t	0.151 mg	100.00 %	%	mg	%
ssay Head	100 g	0.890 g/t	0.089 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: August 11,1989

Sample: Mill Tailings

Sample Code #: FT2

REF: CYANRCC.Frm

Initial	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
Size = 100.0 g	CaO = 0.20 g	pH = ----	pH = ----	pH = 10.7	pH =
pH = 8.2	NaCN = 10.0 lb/t	CN^- = ----- lb/t	CN^- =----- lb/t	CN^- = 2.30 lb/t	CN^- = lb/t
% -200=	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
H_2O = 200 mL	pH to 11.0	Other =	Other =	Other =	Other =
Other=					

Sample Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
Prewash	----- mL	----- mg/L	----- mg	----- %	mg/L	mg	%
Preg	190 mL	0.685 mg/L	0.130 mg	74.71 %	mg/L	mg	%
Wash	500 mL	0.089 mg/L	0.044 mg	25.29 %	mg/L	mg	%
Total	690 mL	0.253 mg/L	0.174 mg	82.46 %	mg/L	mg	%
Residue	98 g	0.377 mg/L	0.0369 mg	17.54 %	%	mg	%
Calc Head	100 g	2.11 g/t	0.211 mg	100.00 %	%	mg	%
Assay Head	100 g	0.890 g/t	0.089 mg		%	mg	

G I A N T
Yellowknife Mines Limited

MEMO TO: G. Halverson

FROM: B. Starcneski

DATE: October 2, 1989

SUBJECT: CYANIDATION OF MILL TAILINGS

Cyanidation tests were performed on mill tailings on September 20, 1989. The cyanidation recovery after 48 hours was 56.2% Au. The calculated head assay was .032 oz/T. The assayed head assay was .015 oz/T. The results of this series of tests are consistent with the results of previous cyanidation tests done this summer.

Brad Starcheski

Brad Starcheski
Metallurgist

BS/sj

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: September 20.1989

..ole: Mill Tailings

ple Code #: FT1

`F: CYANRCC.Frm

'nitial

ze = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
I = 8.5	CaO = 0.30 g	pH = ----	pH = 10.9	pH = 10.5	pH =
200=	NaCN = 10.0 lb/t	CN^- = ----- lb/t	CN^- = 3.3 lb/t	CN^- = 2.9 lb/t	CN^- = lb/t
`O = 400 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
`ther=	pH to 11.0	Other =	Other =	Other =	Other =

.ple Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
..wash	1000 mL	.024 mg/L	.024 mg	18.46 %	mg/L	mg	%
g	370 mL	0.130 mg/L	0.048 mg	36.92 %	mg/L	mg	%
sh	1000 mL	0.058 mg/L	0.058 mg	44.62 %	mg/L	mg	%
.il	2370 mL	0.055 mg/L	0.130 mg	59.35 %	mg/L	mg	%
..sidue	200 g	.445 mg/L	0.089 mg	40.65 %	%	mg	%
..c Head	200 g	1.095g/t	0.219 mg	100.00 %	%	mg	%
Head	200 g	0.514 g/t	0.103 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: September 20,1989

ple: Mill Tailings

ple Code #: FT2

: CYANRCC.Frm

tial

ze = 200.0 g	Reagents	1 Hour Roll	After 24 Hrs.	After 48 Hrs	After Hrs
= 8.7	CaO = 0.30 g	pH = ----	pH = 11.0	pH = 10.6	pH =
200=	NaCN = 10.0 lb/t	CN^- = ----- lb/t	CN^- = 3.35 lb/t	CN^- = 3.1 lb/t	CN^- = lb/t
20 = 400 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
er=	pH to 11.2	Other =	Other =	Other =	Other =

le Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
ash	1000 mL	.031 mg/L	.031 mg	26.72 %	mg/L	mg	%
g	380 mL	0.134 mg/L	0.051 mg	43.97 %	mg/L	mg	%
sh	1000 mL	0.034 mg/L	0.034 mg	29.31 %	mg/L	mg	%
l	2380 mL	0.049 mg/L	0.116 mg	52.97 %	mg/L	mg	%
sidue	200 g	.514 mg/L	0.103 mg	47.03 %	%	mg	%
Head	200 g	1.095g/t	0.219 mg	100.00 %	%	mg	%
ay Head	200 g	0.514 g/t	0.103 mg		%	mg	

G I A N T
Yellowknife Mines Limited

MEMO TO: G. Halverson

FROM: B. Starcheski

DATE: December 15, 1989

SUBJECT: CYANIDATION OF FLOTATION TAILS

Cyanidation tests were performed on two separate flotation tails samples. The first test was performed November 27, 1989. The average cyanidation recovery was 52.33%. The calculated head grade was .025 oz/ton and the assayed head grade was .009 oz/ton. There is quite a discrepancy in this test so another test was run.

The second text was run December 6, 1989. The cyanidation recovery was 51.72%. The calculated head was .017 oz/ton and the residue was .0085 oz/ton. The assayed head was .011 oz/ton.

The same trend has shown in the cyanidation of the flotation tails (i.e.: The calculated heads have been 30% higher than the assayed heads). These is a serious problem in the determination of the gold in the flotation tails.

The cyanidation recoveries are in line with those of previous tests.

B Starcheski

B. Starcheski
Metallurgist

BS/sj
Attach.

GIANT YELLOWKNIFE MINES LIMITED

DYANIDATION TESTS

Date of Test: November 17, [illegible]

Flotation Tails

Code [illegible]

DYAN[illegible]

[illegible]:

[illegible] = [illegible] g	Reagents	[illegible] hour [illegible]	After [illegible] hrs.	After hrs	After hrs
= 7.5	CaO = 0.30 g	pH = 11.[illegible]	pH = 10.8	pH =	pH =
-200=	NaCN = [illegible]	CN = -- lb/t	CN = [illegible]	CN = lb/t	CN = lb/t
= 100 mL	Other =	[illegible] = ---- mL	[illegible] = --- mL	[illegible] = ---- mL	[illegible] = mL
[illegible]=		Other =	Other =	Other =	Other =

[illegible] Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
[illegible]wash	----- mL	----- mg/L	----- mg	------ %	mg/L	mg	%
[illegible]	190 mL	[illegible].106 mg/L	.020 mg	40.48 %	mg/L	mg	%
[illegible]	500 mL	[illegible].051 mg/L	0.026 mg	55.52 %	mg/L	mg	%
[illegible]al	590 mL	[illegible].067 mg/L	0.046 mg	61.33 %	mg/L	mg	%
[illegible]idue	98 g	0.295 mg/L	0.029 mg	38.67 %	%	mg	%
[illegible] Head	100 g	0.750 g/t	0.075 mg	100.00 %	%	mg	%
[illegible]ay Head	100 g	0.295 g/t	0.029 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: November [illegible]

...ple: Flotation Tails

...ple Code #: FT8

...: CYAN800.Frm

...itial

...ize = 100.0 g	Reagents	1 Hour Roll	After [illegible] hrs	After hrs	After hrs
... = 7.5	CaO = 0.30 g	pH = 11.0	pH = 10.0	pH =	pH =
...00=	NaCN = 20.0 lb/t	CN^- = --- lb/t	CN^- = 1.5 lb/t	CN^- = lb/t	CN^- = lb/t
...O = 100 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
...her=		Other =	Other =	Other =	Other =

...ple Calculations:

	Units	Gold Assay	Gold Distribution	Gold Recovery	Arsenic Assay	Arsenic Distribution	Arsenic Recovery
...ewash	----- mL	----- mg/L	----- mg	------ %	mg/L	mg	%
...	180 mL	0.106 mg/L	.019 mg	44.19 %	mg/L	mg	%
...h	500 mL	0.048 mg/L	0.024 mg	55.81 %	mg/L	mg	%
...tal	680 mL	0.063 mg/L	0.043 mg	43.33 %	mg/L	mg	%
...idue	99 g	0.582 mg/L	0.056 mg	56.67 %	%	mg	%
...c Head	100 g	0.990 g/t	0.099 mg	100.00 %	%	mg	%
...ay Head	100 g	0.295 g/t	0.029 mg		%	mg	

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED November 30-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Preg Soln	.180						
FT Preg A	.0031						
WASH	.0015						
FT Preg B	.0031						
Wash	.0014						

W.L. Richardson
Assayer

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: Dec 6 , [illegible]

[illegible] Flotation Table

[illegible] Code [illegible] TTA

[illegible]

[illegible]

[illegible]	Reagents	[illegible] Hour [illegible]	After 48 Hrs.	After Hrs	After Hrs
[illegible] = [illegible] g	CaO = [illegible] g	pH = 11.[illegible]	pH = 11.2	pH =	pH =
[illegible]	NaCN = 20.0 lb/t	CN = --- lb/t	CN = [illegible].7 lb/t	CN = lb/t	CN = lb/t
[illegible] = [illegible] mL	Other =	Tit = ---- mL	Tit = -- mL	Tit = ---- mL	Tit = mL
[illegible]		Other =	Other =	Other =	Other =

[illegible] Calculations:

		Gold			Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
Wash	----- mL	----- mg/L	----- mg	------ %	mg/L	mg	%
[illegible]	190 mL	0.10[illegible] mg/L	.020 mg	[illegible]4.52 %	mg/L	mg	%
[illegible]	500 mL	0.021 mg/L	[illegible].011 mg	[illegible].4[illegible] %	mg/L	mg	%
[illegible]al	690 mL	0.045 mg/L	0.031 mg	50.82 %	mg/L	mg	%
[illegible] Residue	98 g	0.308 mg/L	0.030 mg	49.18 %	%	mg	%
[illegible] Head	100 g	0.610 g/t	0.061 mg	100.00 %	%	mg	%
[illegible] Head	100 g	0.377 g/t	0.038 mg		%	mg	

GIANT YELLOWKNIFE MINES LIMITED

CYANIDATION TESTS

Date of Test: Dec 6, ...

mple: Flotation Tails

mple Code #: FTB

: CYANROC.Frm

itial

te = 100.0 g	Reagents	1 Hour Sol.	After 48 Hrs.	After hrs	After hrs
= 7.5	CaO = 1.00 g	pH = 11.1	pH = 11.0	pH =	pH =
200=	NaCN = 10.0 lb/t	CN^- = -- lb/t	CN^- = 3.0 lb/t	CN^- = lb/t	CN^- = lb/t
= 100 mL	Other =	Tit = ---- mL	Tit = --- mL	Tit = ---- mL	Tit = mL
ters		Other =	Other =	Other =	Other =

ple Calculations:

	Gold				Arsenic		
	Units	Assay	Distribution	Recovery	Assay	Distribution	Recovery
ewash	----- mL	----- mg/L	----- mg	------ %	mg/L	mg	%
g	180 mL	0.089 mg/L	.016 mg	53.33 %	mg/L	mg	%
h	500 mL	0.027 mg/L	0.014 mg	46.67 %	mg/L	mg	%
tal	680 mL	0.044 mg/L	0.030 mg	52.63 %	mg/L	mg	%
idue	98 g	0.274 mg/L	0.027 mg	47.37 %	%	mg	%
lc Head	100 g	0.570 g/t	0.057 mg	100.00 %	%	mg	%
y Head	100 g	0.377 g/t	0.038 mg		%	mg	

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED December 13-89

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
FT A Solid	.009						
B	.008						
FT Head	.011						
FT Preg A	.0031						
Wash	.0006						
FT Preg B	.0026						
Wash	.0008						

W.L. Richardson
Assayer

GIANT YELLOWKNIFE MINES LIMITED

MEMO TO : G. Halverson

COPY TO : B. Wakabayashi, S. McAlpine

FROM : B. Longmore

DATE : Mar. 5, 1990

SUBJECT : Cyanidation of Mill Tailings
Interim Report

Part One

Cyanidation tests were performed on the following Mill Tailings; Flotation Tailings (FT), Calcine Residue Tailings (CR), Dust Treatment Residue Tailings (DTR), and a composite of all three (CT) in accordance with the Mill's through-put. A 24 and 48 hour leach test was done for each sample while varying the cyanide addition only.

Based on the 48 hour leach tests the calculated extractions were as follows; FT 38.41%, CR 12.23%, DTR 14.19%, and CT 21.48%.

The CR and DTR low extraction rates indicate that the Conventional Mill is handling these solids efficiently. The CR and DTR solids have already undergone one cyanidation and a further cyanidation at a lower cyanide addition level (TRP mill cyanide addition is 0.85 lb/t) should not produce results as good as the leach tests when cyanide additions were 6.8 lb/t. The accompanying solution with the CR and DTR solids contain undesirables such as Sulphides, Thiosulphates and Arsenics. These undesirables are oxygen and cyanide robbing which would hinder the TRP's cyanidation, gold absorption and enhance carbon fouling. Though the amounts of the solutions are small in comparison with the TRP's make-up solution, any extra contaminants are unwanted and unneeded. I believe it would be better to avoid processing the CR and DTR tailings at the TRP. Any further work involved to recover more of the gold from these tailing should be attempted at the Conventional Mill.

Daily extractions of DTR solids; best case,

20t/day x 0.24 oz/t x 14% x 95% gives 0.64 oz/day

Daily extraction of CR solids; best case,

80t/day x 0.18 oz/t x 12% x 95% gives 1.64 oz/day

Daily extraction of FT solids; best case,

1000t/day x 0.016 oz/t x 41% x 95% gives 6.2 oz/day

The Composite sample (CT) extractions were lower than the expected extraction rates of the combined individual samples (90% FT + 8% CR + 2% DTR) for both the 24 and 48 hour leach tests. This could reflect a poisoning from one or more of the samples involved on the other sample(s). Thus a composite Tailings sample was ignored and further testswork was carried out on the Flotation Tailings only.

Part Two

Further cyanidation tests were carried out with the Flotation Tailings and a TRP feed composite (hole 88-14). Separate tests were done on the Flotation Tailings and the TRP feed and a combination of the two tailings were used to produce a 10% FT plus 90% TRP sample and a 20% FT plus 80% TRP sample.

Based on 48 hour leach times calculated gold extractions were as follows; FT 34.38%, TRP Feed 36.62%, 10%FT 34.02, and 20%FT 32.63%.

Results indicate that with the addition of the Flotation Tailings to the TRP feed composite the extraction rates decrease. On comparing the dilution effect with the actual assayed and calculated head extractions the Flotation Tailings lowered the expected extractions by 5.3% - 7.7% and 2.4% - 3.5% respectively.

From these results it would be ill advised to add Flotation Tailings to the TRP feed as already lower than expected extractions occur and any further decrease would be depremental. Please note these observations are based on one particular TRP composite hole.

Giant Yellowknife Mines
Conv. Mill Leach Tests
Part 1

Sample Dates
Feb. 5, 1990
Feb. 13, 1990

	Solid oz/t	Sol'n oz/t
Flot Head	0.016	
Flot Head 1	0.017	
Flot Head 2	0.014	
DTR Head	0.240	
CR Head	0.180	
Comp Head	0.016	
24 hr Flot	0.009	0.0032
24 hr Flot 1	0.012	0.0040
24 hr Flot 2	0.010	0.0041
24 hr DTR	0.250	0.0102
24 hr CR	0.180	0.0101
24 hr Comp	0.019	0.0042
48 hr Flot	0.010	0.0033
48 hr Flot 1	0.014	0.0046
48 hr Flot 2	0.012	0.0045
48 hr DTR	0.200	0.0124
48 hr CR	0.160	0.0111
48 hr Comp	0.030	0.0040

	Weight Solids g	Volume Sol'n ml	% Solids	NaCN Added lb/t	End Free CN lb/t
24 hr Flot	168.5	340.9	49.43	6.78	4.4
24 hr Flot 1	163.5	342.6	47.72	1.20	0.6
24 hr Flot 2	155.5	345.4	45.02	0.80	0.5
24 hr DTR	135.5	352.5	38.44	6.78	4.2
24 hr CR	156.5	345.1	45.35	6.78	3.5
24 hr Comp	155.5	345.4	45.02	6.78	4.4
48 hr Flot	178.5	337.4	52.91	6.78	3.9
48 hr Flot 1	162.5	343.0	47.38	1.20	0.6
48 hr Flot 2	166.5	341.6	48.74	0.80	0.35
48 hr DTR	132.5	353.5	37.48	6.78	3.6
48 hr CR	169.5	340.5	49.78	6.78	3.7
48 hr Comp	166.5	341.6	48.74	6.78	3.9

	Calc Head oz/t	Assay Head oz/t	Assay Tail oz/t	% Extrac Calc	% Extrac Assay
24 hr Flot	0.015	0.016	0.009	41.84	43.75
24 hr Flot 1	0.020	0.017	0.012	41.13	29.41
24 hr Flot 2	0.019	0.014	0.01	47.67	28.57
24 hr DTR	0.277	0.24	0.25	9.59	-4.17
24 hr CR	0.202	0.18	0.18	11.01	0.00
24 hr Comp	0.028	0.016	0.019	32.93	-18.75
48 hr Flot	0.016	0.016	0.01	38.41	37.50
48 hr Flot 1	0.024	0.017	0.014	40.95	17.65
48 hr Flot 2	0.021	0.014	0.012	43.48	14.29
48 hr DTR	0.233	0.24	0.2	14.19	16.67
48 hr CR	0.182	0.18	0.16	12.23	11.11
48 hr Comp	0.038	0.016	0.03	21.48	-87.50

Giant Yellowknife Mines
Conv. Mill Leach Tests
Part 2

Sample Date
Feb. 26, 1990

--TRP Feed Leach Tests (Hole 88-14 Composite)
--Feb.26,1990 Flotation Tailings Leach Tests
--TRP Feed plus 10 %, and 20 % Flot Tails Addition
Leach Tests

	Solid oz/t	Sol'n oz/t
TRP-FLOT HEAD	0.014	
TRP-88-14 HEAD	0.082	
TRP-FLOT-24	0.013	0.0034
TRP-FLOT-48	0.013	0.0037
TRP-88-14-24	0.060	0.0227
TRP-88-14-48	0.057	0.0204
TRP-10FT-24	0.060	0.0192
TRP-10FT-48	0.058	0.0183
TRP-20FT-24	0.058	0.0177
TRP-20FT-48	0.056	0.0162

	Weight Solids g	Volume Sol'n ml	% Solids	NaCN Added lb/t	End Free CN lb/t
TRP-FLOT-24	175	338.6	51.68	1.00	0.5
TRP-FLOT-48	182.5	336.0	54.32	1.00	0.6
TRP-88-14-24	203.5	328.6	61.93	1.00	0.6
TRP-88-14-48	203.5	328.6	61.93	1.00	0.5
TRP-10FT-24	197.5	330.7	59.72	1.00	0.6
TRP-10FT-48	201.5	329.3	61.19	1.00	0.65
TRP-20FT-24	200.5	329.6	60.82	1.00	0.6
TRP-20FT-48	197.5	330.7	59.72	1.00	0.5

	Calc Head oz/t	Assay Head oz/t	Assay Tail oz/t	% Extrac Calc	% Extrac Assay
TRP-FLOT-24	0.020	0.0140	0.013	33.60	7.14
TRP-FLOT-48	0.020	0.0140	0.013	34.38	7.14
TRP-88-14-24	0.097	0.0820	0.060	37.92	26.83
TRP-88-14-48	0.090	0.0820	0.057	36.62	30.49
TRP-10FT-24	0.092	0.0752	0.060	34.89	20.21
TRP-10FT-48	0.088	0.0752	0.058	34.02	22.87
TRP-20FT-24	0.087	0.0684	0.058	33.41	15.20
TRP-20FT-48	0.083	0.0684	0.056	32.63	18.13

G I A N T
Yellowknife Mines Limited

MEMO TO: G.B. Halverson

C.C.:

FROM: P.M. O'Hara

DATE: March, 1990

SUBJECT: FLOTATION CIRCUIT BALANCE AND COLLECTION OF SCAVENGER CONCENTRATE SAMPLE

On Feb. 13 and 14 the flotation circuit was sampled and metallurgical balances calculated (attached). On the 13th the circuit was run under normal operating conditions. On the 14th the circuit was run with the scavenger cells being pulled as hard as possible and all other cells being run under normal operating conditions. As a result the weight % of scavenger concentrate went from 0.4% on the 13th to 1.6% on the 14th and the distibution of gold increased slightly from 1.0% on the 13th to 1.1% on the 14th. For the 13th the assayed feed grade was 0.27 oz/T with a final tail of 0.014 oz/T and on the 14th the assayed feed grade was 0.31 oz/T with a final tail of 0.013 oz/T.

Results from both days show that due to low sulphur content both the scavenger concentrate and the secondary rougher concentrate would benefit from futher cleaning. For the scavenger concentrate the sulphur grade was 4.3% on the 13th and 2.88% on the 14th. For the secondary rougher concentrate the sulphur grade was 6.71% on the 13th and 6.39% on the 14th.

A bulk sample of scavenger concentrate was collected on Feb 14th, 22nd and March 6th (200 - 300 kg). This sample was sent to Lakefield Research for column flotation testwork. Results from sampling on Feb. 22nd and Mar. 6th compared favorably with those on the 14th as shown below:

Date	Flowrate(tph)	Scav Conc Assays Au	S	As	Feed Grade	Flotation Tails
Feb 14	0.8	0.26	2.28	1.09	0.31	0.013
Feb 22	0.8	0.24	1.48	1.02	0.25	0.013
Mar 6	N/A	0.23	1.48	1.22	N/A	N/A

GIANT YELLOWKNIFE MINES LTD

TABLE 1 : METALLURGICAL BALANCE
FEB 13/90

Product	Wt	Wt %	ASSAYS Au	ASSAYS S	ASSAYS As	UNITS/DAY Au	UNITS/DAY S	UNITS/DAY As	DISTRIBUTION Au	DISTRIBUTION S	DISTRIBUTION As
#1 Max Conc	4.2	9.3	2.700	21.71	10.96	289.80	23.30	11.76	77.0%	81.4%	80.0%
#2 Max Conc	0.5	1.1	2.040	17.64	8.48	26.07	2.25	1.08	6.9%	7.9%	7.4%
Pri Rough Conc	0.3	0.7	3.480	16.82	11.53	26.68	1.29	0.88	7.1%	4.5%	6.0%
Sec Rough Conc	0.5	1.1	1.250	6.71	5.50	15.97	0.86	0.70	4.2%	3.0%	4.8%
Scavenger Conc	0.2	0.4	0.730	4.33	3.47	3.73	0.22	0.18	1.0%	0.8%	1.2%
Calc Flot Conc	5.7	12.7	2.487	19.17	10.03	362.25	27.92	14.61	96.3%	97.5%	99.3%
Asyd Flot Conc	5.7	12.7	2.620	19.02	10.13	381.65	27.71	14.76	101.4%	96.8%	100.3%
Final Tails	39.3	87.3	0.014	0.07	0.01	14.06	0.70	0.10	3.7%	2.5%	0.7%
Calc Feed	45.0	100.0	0.327	2.49	1.28	376.31	28.63	14.71	100.0%	100.0%	100.0%
Assayed Feed	45.0	100.0	0.270	2.79	0.99	310.50	32.09	11.39	100.0%	100.0%	100.0%
#1 Max Conc	4.2	9.3	2.700	21.71	10.96	289.80	23.30	11.76	79.7%	88.5%	81.3%
#1 Max Tails	40.8	90.7	0.071	0.29	0.26	74.03	3.02	2.71	20.3%	11.5%	18.7%
Calc #1 Max Feed	45.0	100.0	0.316	2.29	1.26	363.83	26.33	14.47	100.0%	100.0%	100.0%
Asyd #1 Max Feed	45.0	100.0	0.270	2.79	0.99	310.50	32.09	11.39	100.0%	100.0%	100.0%
#2 Max Conc	0.5	1.2	2.040	17.64	8.48	26.07	2.25	1.08	32.7%	45.7%	28.8%
#2 Max Tails	40.3	98.8	0.052	0.26	0.26	53.55	2.68	2.68	67.3%	54.3%	71.2%
Calc #2 Max Feed	40.8	100.0	0.076	0.47	0.36	79.62	4.93	3.76	100.0%	100.0%	100.0%
Asyd #2 Max Feed	40.8	100.0	0.071	0.29	0.26	74.03	3.02	2.71	100.0%	100.0%	100.0%
Pri Rough Conc	0.3	0.7	3.480	16.82	11.53	26.68	1.29	0.88	44.6%	28.9%	35.4%
Sec Rough Conc	0.5	1.2	1.250	6.71	5.50	15.97	0.86	0.70	26.7%	19.2%	28.2%
Calc Rough Conc	0.8	2.0	2.086	10.50	7.76	42.65	2.15	1.59	71.3%	48.0%	63.6%
Asyd Rough Conc	0.3	0.7	2.630	14.32	10.29	20.16	1.10	0.79	33.7%	24.6%	31.6%
Rough Tails	39.5	98.0	0.017	0.23	0.09	17.16	2.32	0.91	28.7%	52.0%	36.4%
Calc Rough Feed	40.3	100.0	0.058	0.43	0.24	59.81	4.47	2.50	100.0%	100.0%	100.0%
Asyd Rough Feed	40.3	100.0	0.051	0.31	0.17	52.52	3.19	1.75	100.0%	100.0%	100.0%
Scav Conc	0.2	0.5	0.730	4.33	3.47	3.73	0.22	0.18	21.0%	23.9%	63.8%
Scav Tails	39.3	99.5	0.014	0.07	0.01	14.06	0.70	0.10	79.0%	76.1%	36.2%
Calc Scav Feed	39.5	100.0	0.018	0.09	0.03	17.79	0.92	0.28	100.0%	100.0%	100.0%
Asyd Scav Feed	39.5	100.0	0.017	[illegible]	0.09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED February 18-90

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Flot Conc 13th	2.68 2.63 2.55	2.62		19.02	10.13		
Prime Rougher Conc	3.54 3.42 3.47	3.48		16.82	11.53		
Rougher Conc	2.68 2.61 2.60	2.63		14.32	10.29		
1st- Maxwell Conc	2.90 2.48 2.72	2.70		21.71	10.96		
2nd Maxwell Conc	2.01 2.06 2.04	2.04		17.64	8.48		
Sec. Rougher	1.25 1.24 1.27	1.25		6.71	5.50		
Scavenger Conc	.73 .74 .73	0.73		4.33	3.47		
#1 COF	.255 .255 .255	0.255 > 0.27		3.20	.91		
#2 COF	.29 .29 .27	0.28		2.37	1.06		
Rougher Feed	.051			.31	.17		
Rougher Tails	.017			.23	.09		
#1 Maxwell Tails	.071			.29	.26		
#2 Maxwell Tails	.052			.26	.26		
Final Tails	.014			.07	.01		

W.L. Richardson Assayer

GIANT YELLOWKNIFE MINES LTD

TABLE 1 : METALLURGICAL BALANCE
FEB 14/90

Product	Wt	Wt %	ASSAYS Au	ASSAYS S	ASSAYS As	UNITS/DAY Au	UNITS/DAY S	UNITS/DAY As	DISTRIBUTION Au	DISTRIBUTION S	DISTRIBUTION As
#1 Max Conc	5.8	11.8	2.680	21.78	7.26	364.81	29.65	9.88	80.9%	80.7%	78.7%
#2 Max Conc	0.9	1.8	1.770	14.33	5.81	37.39	3.03	1.23	8.3%	8.2%	9.8%
Pri Rough Conc	0.4	0.8	2.760	14.19	8.69	25.91	1.33	0.82	5.7%	3.6%	6.5%
Sec Rough Conc	0.2	0.4	1.130	6.39	3.14	5.30	0.30	0.15	1.2%	0.8%	1.2%
Scavenger Conc	0.8	1.6	0.260	2.28	1.08	4.88	0.43	0.20	1.1%	1.2%	1.6%
Calc Flot Conc	8.1	16.5	2.306	18.27	6.46	438.29	34.73	12.28	97.2%	94.5%	97.7%
Asyd Flot Conc	8.1	16.5	1.680	14.75	5.45	319.37	28.04	10.36	70.9%	76.3%	82.5%
Final Tails	40.9	83.5	0.013	0.21	0.03	12.48	2.02	0.29	2.8%	5.5%	2.3%
Calc Feed	49.0	100.0	0.392	3.20	1.09	450.77	36.75	12.56	100.0%	100.0%	100.0%
Assayed Feed	49.0	100.0	0.310	3.14	0.73	356.50	36.11	8.40	100.0%	100.0%	100.0%
#1 Max Conc	5.8	11.8	2.680	21.78	7.26	364.81	29.65	9.88	82.6%	85.9%	79.6%
#1 Max Tails	43.2	88.2	0.076	0.48	0.25	77.05	4.87	2.53	17.4%	14.1%	20.4%
Calc #1 Max Feed	49.0	100.0	0.394	3.00	1.08	441.86	34.51	12.42	100.0%	100.0%	100.0%
Asyd #1 Max Feed	49.0	100.0	0.310	3.14	0.73	356.50	36.11	8.40	100.0%	100.0%	100.0%
#2 Max Conc	0.9	2.1	1.770	14.33	5.81	37.39	3.03	1.23	40.6%	52.1%	38.2%
#2 Max Tails	42.3	97.9	0.055	0.28	0.20	54.60	2.78	1.99	59.4%	47.9%	61.8%
Calc #2 Max Feed	43.2	100.0	0.091	0.57	0.32	91.99	5.81	3.21	100.0%	100.0%	100.0%
Asvd #2 Max Feed	43.2	100.0	0.076	0.48	0.25	77.05	4.87	2.53	100.0%	100.0%	100.0%
Pri Rough Conc	0.4	0.9	2.760	14.19	8.69	25.91	1.33	0.82	56.5%	60.0%	64.9%
Sec Rough Conc	0.2	0.5	1.130	6.39	3.14	5.30	0.30	0.15	11.6%	13.5%	11.7%
Calc Rough Conc	0.6	1.4	2.217	11.59	6.84	31.21	1.63	0.96	68.0%	73.5%	76.6%
Asyd Rough Conc	1.0	2.4	1.870	10.23	6.04	43.89	2.40	1.42	95.6%	108.2%	112.8%
Rough Tails	41.7	98.6	0.015	0.06	0.03	14.68	0.59	0.29	32.0%	26.5%	23.4%
Calc Rough Feed	42.3	100.0	0.046	0.22	0.13	45.89	2.22	1.26	100.0%	100.0%	100.0%
Asyd Rough Feed	42.3	100.0	0.053	0.28	0.27	52.62	2.78	2.68	100.0%	100.0%	100.0%
Scav Conc	0.8	1.9	0.260	2.28	1.08	4.88	0.43	0.20	28.1%	17.5%	41.3%
Scav Tails	40.9	98.1	0.013	0.21	0.03	12.48	2.02	0.29	71.9%	82.5%	58.7%
Calc Scav Feed	41.7	100.0	0.018	0.25	0.05	17.36	2.44	0.49	100.0%	100.0%	100.0%
Asyd Scav Feed	41.7	100.0	0.015	0.06	0.03	14.68	0.59	0.29	100.0%	100.0%	100.0%

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Test Work - Flotation DATE ASSAYED February 19-90

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Flot Conc 14th	1.62 1.65 1.78	1.68		14.75	5.45		
1st Maxwell Conc	2.68 2.64 2.73	2.68		21.78	7.26		
2nd Maxwell Conc	1.76 1.78 1.77	1.77		14.33	5.81		
Rougher Conc.	1.80 1.93 1.87	1.87		10.23	6.04		
Primary Rougher Conc.	2.78 2.74 2:77	2.76		14.19	8.69		
Scavenger Conc.	.26 .26 .26	0.26		2.28	1.08		
Sec Rougher Conc.	1.14 1.13 1.12	1.13		6.39	3.14		
COF #1	.26 .23 .255	0.25 0.31		3.07	.77		
COF #2	.355 .375 .39	0.37		3.21	.68		
Rougher Feed	.053			.71	.27		
Rougher Tails	.015			.06	.03		
#1 Maxwell Tails	.076			.48	.25		
#2 Maxwell Tails	.055			.28	.20		
Final Tails	.013			.21	.03		

W.L. Richardson
Assayer

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Testing DATE ASSAYED February 27-90

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Scavenger Conc Feb 22nd	.24 .24 .24	0.24		1.48	1.02		
COF #1	.25 .25 .25	0.25					
#2	.25 .275 .265	0.26					
Final Tails	.013	0.013					

W.L. Richardson
Assayer

Giant
YELLOWKNIFE MINES LIMITED

MILL TESTING ASSAY REPORT

SAMPLES FROM Flotation Tests DATE ASSAYED March 7-90

Sample Number	Au Oz/Tn	Ag Oz/Tn	Fe	S	As	Sb	Cu
Scavenger Conc 6th	.265 .235 .185			1.48	1.22		

W.L. Richardson
Assayer