Treelined Lake Graphite Deposit

Beneficiation Study

Treelined Lake Area

NTS: 52L/8 SW

Kenora Mining Division

Jan. 29, 2002
R. Kuehnbaum
G. Zebruck

Table of Contents

List of Figures

Appendices

OVERVIEW OF THE TREELINED LAKE GRAPHITE PROSPECT KENORA DISTRICT, ONTARIO

Location and Access

The Treelined Lake graphite prospect has also been referred to as the *"Trout Lake"*, *"Black Sturgeon"* and *"Harrison"* graphite occurrences. It is located 80 km north of Kenora and 60 km north of the village of Redditt which is situated on the transcontinental tracks of the CNR. The English River Road, an all-weather loose-surface logging haulage way, passes within 2 km of the claims. Access is by an un-maintained logging road and skidder or ATV trail entering the property from the east. Geographic coordinates are: 50°17'54"N and 94°27'28"W.

Property

The present property consists of eight mining claims jointly held by Robert M. Kuehnbaum (50%) and George R. Zebruck (50%). Originally staked in 1987 prior to the revision of Mining Act in 1991, they are four-post claims of a nominal 40 acres (16 hectares) each. The claims are in good standing until March 2002. One to two years' additional credit is available from recent, un-applied metallurgical test work. The claims were inspected and certified in 1988.

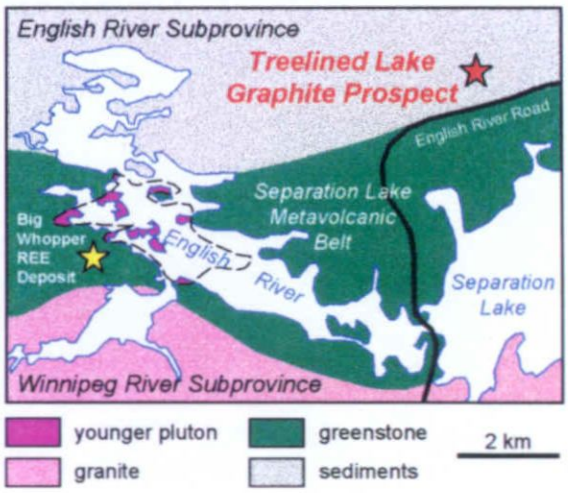
Disclaimer

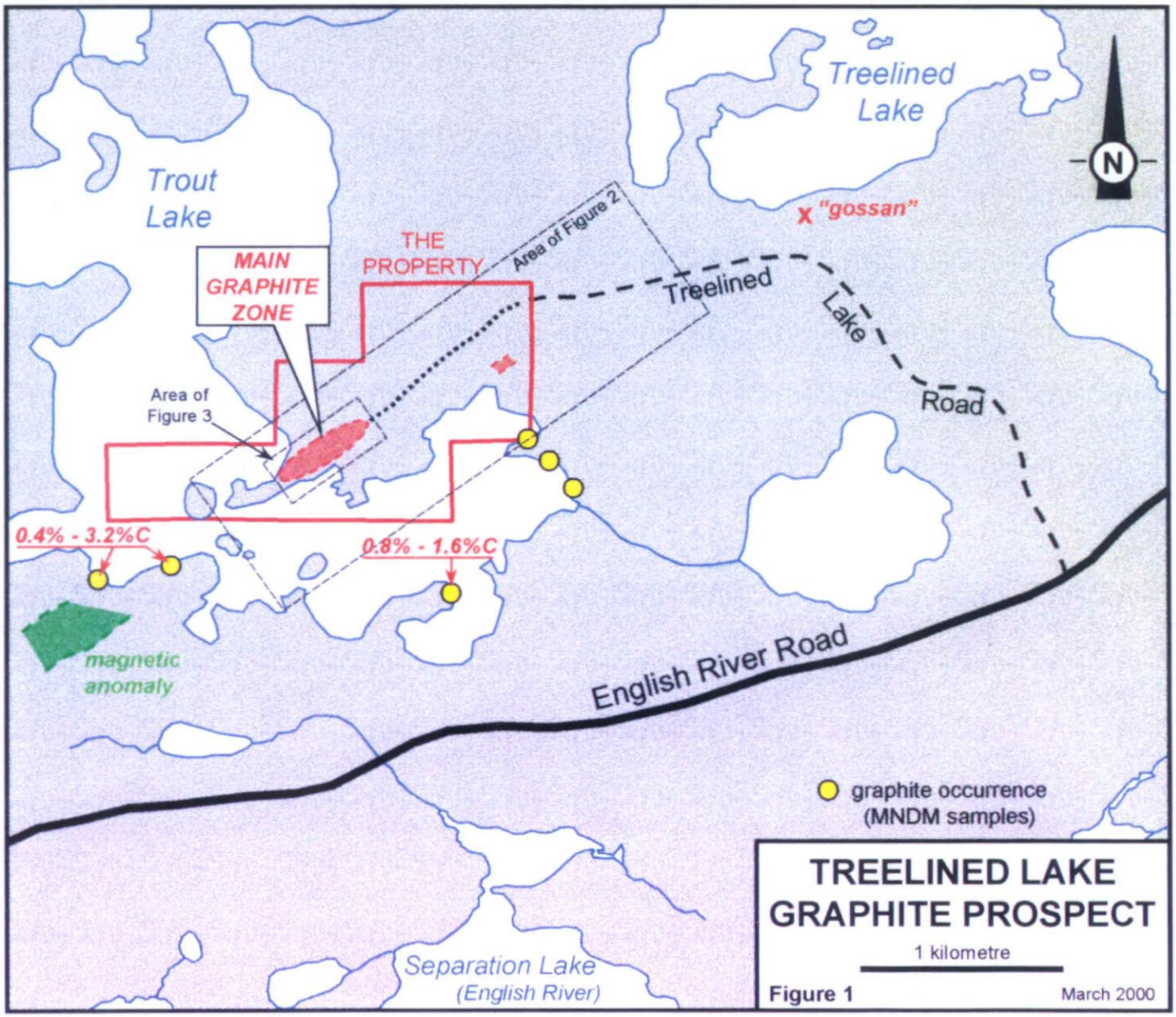
This summary report is intended only for distribution to parties potentially interested in acquiring the Treelined Lake property. It summarizes sampling and exploration work carried out by government geologists and a former publicly-traded mineral exploration company. The co-owners have visited the property on several occasions, but have only carried out a limited amount of independent sampling or re-sampling (noted herein); the co-owners have therefore not confirmed the results of other work and therefore do not warrant its accuracy or reliability. Consequently, this report may not be quoted as a reference nor used as a "Technical Report" for the purpose of public financing. The data cited herein are taken from technical material listed in "Available Reports and Sources of Information" at the end of this report. Except for a 1998 metallurgical report, all of those materials are in the public domain, either as government reports or within the assessment files of Ministry of Northern Development and Mines in Kenora.

History

1968. Discovered and staked by Linklater, a local prospector. Stripping to test a radiometric anomaly.
1976. Restaked and several pits dug by J. Harrison and G. Perkins.
1986. Examination of pits by MNDM. Crude but encouraging preliminary metallurgical tests. Sampling around shorelines (Storey, 1990; Redden, 1993). Test geophysical survey.
1987. Staking of 20 mining claims by present co-owners, preliminary sampling.


MAN.
Red Lake
ONTARIO
TREELINED LAKE
Kenora
U.S.A.
Thunder Bay
QUEBEC
Timmins
Sudbury
Ottawa
Toronto
500 km


English River Subprovince
Treelined Lake Graphite Prospect
English River Road
Separation Lake Metavolcanic Belt
Big Whopper REE Deposit
English River
Separation Lake
Winnipeg River Subprovince
younger pluton
granite
greenstone
sediments
2 km


Treelined Lake
Trout Lake
N
"gossan"
THE PROPERTY
Area of Figure 2
MAIN GRAPHITE ZONE
Treelined Lake Road
Area of Figure 3
0.4% - 3.2%C
0.8% - 1.6%C
magnetic anomaly
English River Road
graphite occurrence (MNDM samples)
Separation Lake (English River)
TREELINED LAKE GRAPHITE PROSPECT
1 kilometre
Figure 1
March 2000

Search by: ○ G-Plan Numbers ○ Township/Area Names ○ Claims ○ Dispositions

Search! Help

Begin your search by clicking on one of the radio buttons (G-Plan, Township/Area, Claim, or Disposition). Then enter your search criteria in the text box and click on the search button.

Select from a list below and press its "Go" button to jump to the specified view.

Mining Division GO G-Plan # GO Township / Area GO

View Reports: Select Claim GO Order Map Download Current View

The centre of your map is in: **Division:** Kenora **Township:** TREELINED

Map Tools

Go to Ontario View.

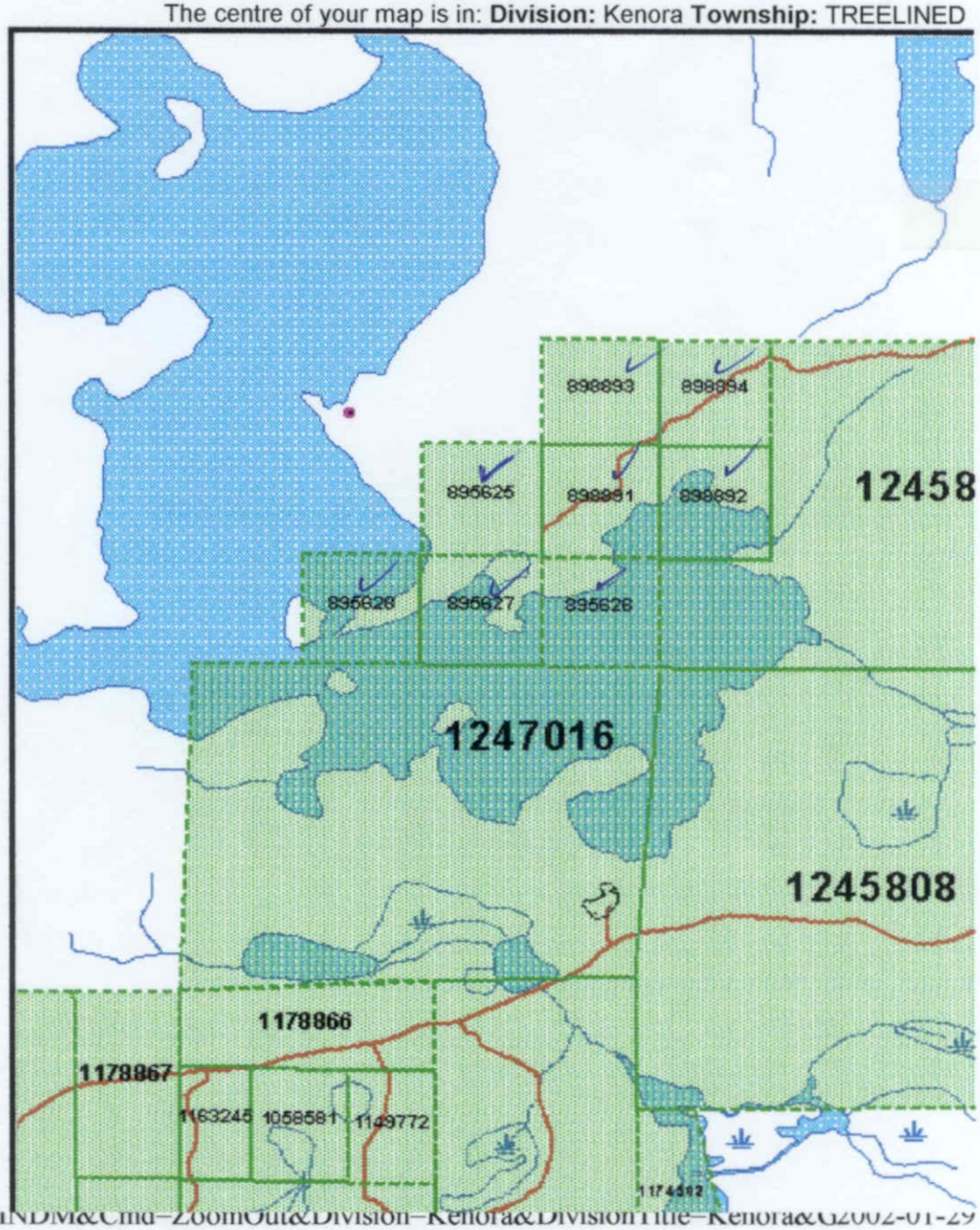
4x Zoom Factor.

Zoom In Zoom Out

Pan Identify Alienation

Identify Disposition Identify Claim

Legend Help



.../esrimap.dll?Name=MNDM&Cmd=ZoomOut&Division=Kenora&DivisionTitle=Kenora&G2002-01-29

1987. Option to purchase granted to Bellwether Resources Ltd. of Vancouver. Magnetic and EM (MaxMin) surveys, geological mapping, mechanical stripping, trenching (2 trenches) and blasting and channel sampling.

1988 Continued work by Bellwether: trenching, blasting and channel sampling along 500 m strike length of main geophysical anomaly and other minor anomalies. Option terminated November 1989.

1990 Partial re-sampling of trenches by the co-owners under an Ontario Prospectors Assistance Program grant.

1998 Metallurgical study by Lakefield Research.

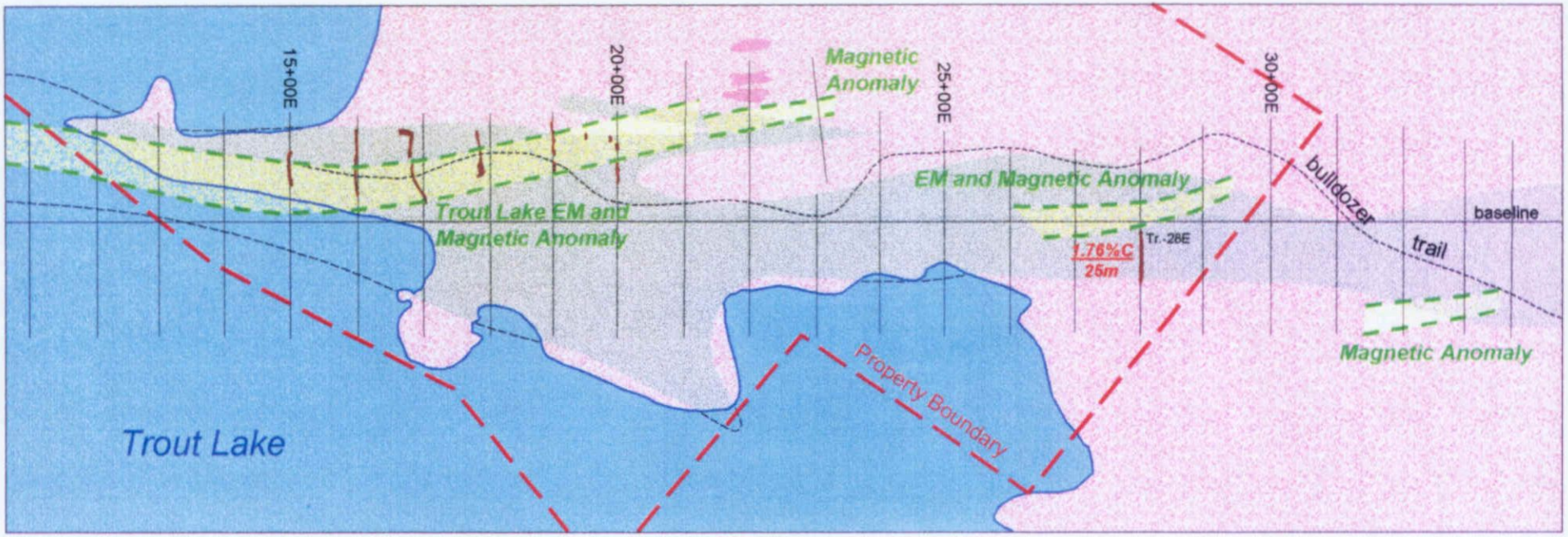
Geology and Mineralization

The Trout Lake graphite prospect occurs within a series of high-grade metamorphic meta-sedimentary rocks (schists and gneisses) and granitoid rocks of the Archean-aged English River subprovince, also known as the English River gneiss belt (Blackburn and Young, 2000). In the main grid area, the host rock is a meta-arkose which trends northeast and dips steeply southeast to vertical. It is bounded by pegmatite, gneiss and granitized metasedimentary rock, and is cut by pegmatite bodies which locally dilute the graphite mineralization. The graphite occurs almost entirely within the meta-arkose as disseminated flakes, rosettes and small clusters. The host unit also contains pyrrhotite, pyrite and chalcopyrite.

Figure 3 shows the results of sampling in the main trenched areas between lines 15+00E and 20+00E. Trenches near lines 17+00E and 18+00E were the original trenches done by Bellwether, and were sampled later in 1988 when other trenches were excavated. Bellwether's individual channel samples were quite large (67 kg), but were prepared (crushed and split to six 2.2 kg samples) at an on-site facility; two of the six samples were sent for analysis. It cannot be ascertained how on-site preparation may have affected the reliability of analyses, but O'Flaherty (1988c) noted that assay results from the second phase sampling were generally about 2/3 of those taken in the first phase. Blackburn and Young (2000) noted that "the differing values for carbon obtained by various sampling techniques on the property indicate the inherent difficulties in sampling graphitic zones in which high grade metamorphism, including migmatization, has recrystallized and redistributed carbon in metasedimentary rocks."

The original "Harrison" showing was sampled twice by the co-owners. Results of 4.31% C_{total} across 2.5 m and 5.32% C_{total} across 2 m were obtained in 1987 and 1990, respectively. Redden (1993) reported 3.7% graphite over 2.4 m (average of 8 specimens). Bellwether's sampling, however, returned variable carbon contents in that part of the line 17+00 trench: 2.90%C over 3.05 m in the first sampling (Cardinal, 1988) and <0.3%C over 5 m in the second phase (O'Flaherty, 1988b). This supports O'Flaherty's contention of, at least on a local scale, lower assay results in the second phase.

The central part of a trench south of a separate geophysical anomaly on line 28+00E also contained graphite mineralization: 1.76% C_{total} across 25 m (*see* Figure). The main part of the anomaly remains to be tested. In a trench excavated on a magnetic anomaly on line 32+00E east of the present claim boundary, the bedrock consists of gneiss. O'Flaherty (1988b) concluded that "the anomaly [is] not sufficiently explained."



Legend

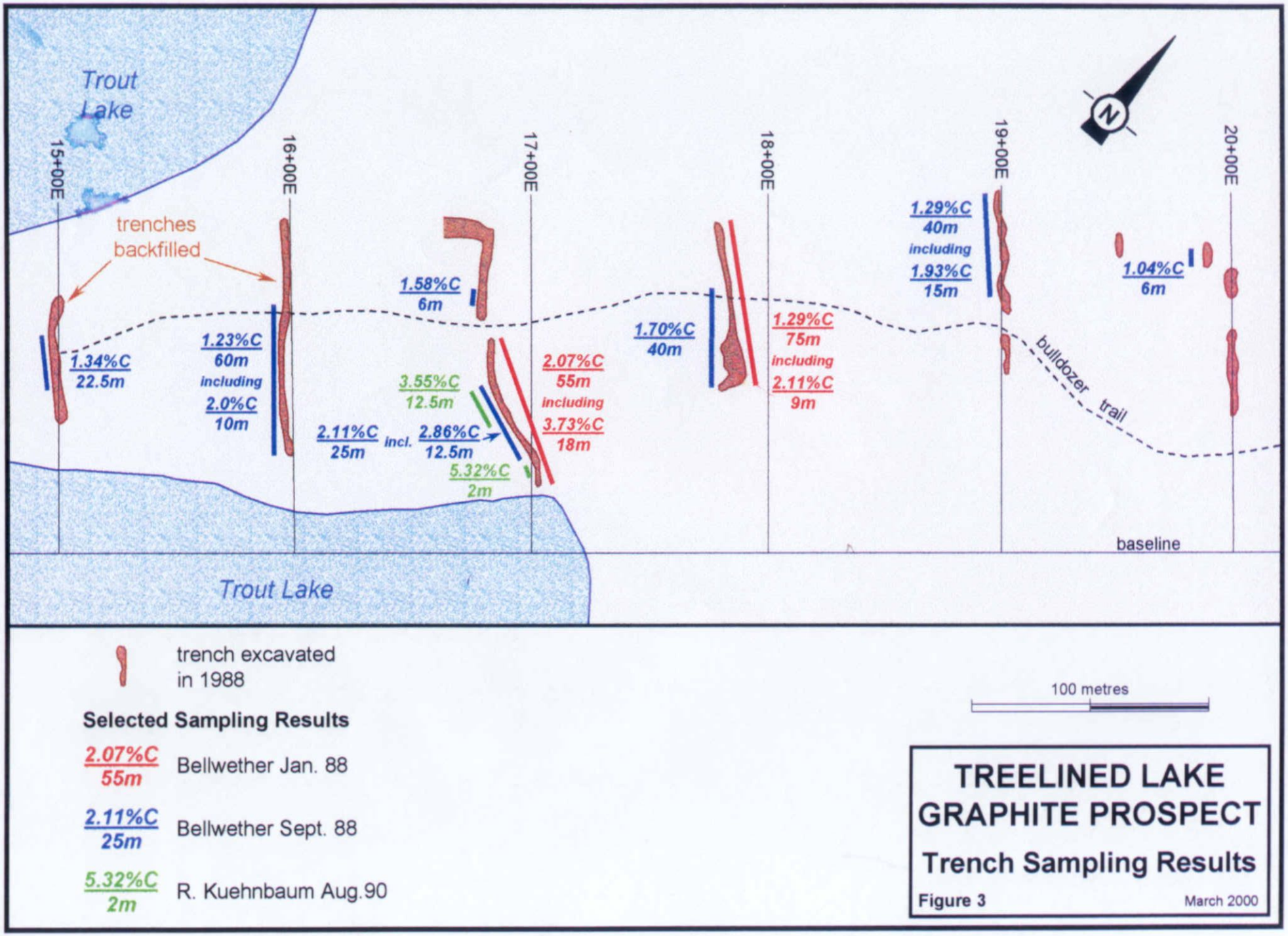
- quartz monzonite to granite, gneiss
- pegmatite
- meta-arkose, granitized sediments
- trench excavated in 1988
- EM conductor and/or magnetic anomaly

250 metres

TREELINED LAKE GRAPHITE PROSPECT

Generalized Geology, Trench Locations and Geophysical Anomalies

Figure 2 March 2000


Trout Lake
15+00E
16+00E
17+00E
18+00E
19+00E
20+00E
trenches backfilled
1.34%C 22.5m
1.23%C 60m including 2.0%C 10m
1.58%C 6m
3.55%C 12.5m
2.11%C 25m incl. 2.86%C 12.5m
5.32%C 2m
2.07%C 55m including 3.73%C 18m
1.70%C 40m
1.29%C 75m including 2.11%C 9m
1.29%C 40m including 1.93%C 15m
1.04%C 6m
bulldozer trail
baseline
Trout Lake
trench excavated in 1988
Selected Sampling Results
2.07%C 55m Bellwether Jan. 88
2.11%C 25m Bellwether Sept. 88
5.32%C 2m R. Kuehnbaum Aug.90
100 metres
TREELINED LAKE GRAPHITE PROSPECT
Trench Sampling Results
Figure 3
March 2000

It is noteworthy that the trenching was done with a fairly small backhoe which limited the depth of excavation. The limit of trenching was often determined by more deeply eroded bedrock, the recessive nature of which could reflect higher graphite contents.

In the 1980s, the Ministry of Northern Development and Mines sampled the Trout Lake shoreline. There is fairly widespread graphite on the southwest shore (*see* location map); one limonite-stained, 6-10 m thick zone was estimated to contain 1-2% graphite, with up to 5% locally. Grab samples to the west of this contained 0.4-3.2% C. Although clearly an extension of the mineralization in the trenched area, this has not been systematically studied or sampled, although some trenching was apparently done to the southwest (by Harrison?) in the 1970s. Other occurrences are lower grade, but a hitherto unexamined "gossan" (Fe oxide-stained zone) was noted from the air to the northeast of the Harrison occurrence on the south shore of Treelined Lake (Redden, 1993; see diagram).

Because of the conductivity of graphite mineralization (as demonstrated by Redden, 1993) and the presence of pyrrhotite, Bellwether attempted to trace the graphitic zone by MaxMin-EM and magnetic surveys. A 4-kilometer long base line was established from the south shore of Trout Lake to Treelined Lake. Cross-lines were quite short, but nevertheless detected magnetic anomalies along about 500 m on the south shore, probably outlining the graphite-sulphide mineralization; MaxMin was not done that far south. The possibility of graphitic zones parallel to the known mineralization was not tested.

Subsequent to the second phase of trenching and sampling, O'Flaherty (1988c) recommended 600 m of HQ diamond drilling in 3 holes to determine accurate grade, depth potential and obtain samples for metallurgical test work.

Metallurgical Study

In June, 1998, a 25 kilogram composite grab sample was taken by Gary Pearce on behalf of Avalon Minerals. The sample was obtained on lines near 17+00E and 18+00E from remaining exposed bedrock where trenches had not been backfilled. Processing test work was done at Lakefield Research Limited in Lakefield, Ontario. The material contained 3.8% C_{total} and 1.8% S, the latter probably being largely due to about 4.5% pyrrhotite.

About 70% of the graphite was in the form of coarse flecks (48 to 100 m). The remaining 30% consisted of fine inclusions in other gangue minerals which could not be easily liberated. Pyrrhotite could be removed with screening and by use of a pyrrhotite depressant. Lakefield produced a graphite concentrate of 84% C_{total} in preliminary tests. Further tests with increased grinding and varying types of frothing agent were also done, and a graphite concentrate with up to 94% C_{total} was obtained. Lakefield concluded that, in spite of the complexity of the mineralization, a saleable grade of graphite concentrate, with perhaps up to 98% C_{total}, could be produced, and they recommended additional tests on reagents and fineness of grinding (Lakefield Research Limited, 1998).

Available Reports and Sources of Information

Blackburn, C.E., and Young J. B., 2000, Precambrian geology of the Separation Lake area, northwestern Ontario. Ontario Geological Survey, Open File Report 6001.

Cardinal, D. G., 1988. A preliminary evaluation report on the Black Sturgeon graphite property, Kenora mining division, *for* Bellwether Resources Ltd., February 15, 1988. Unpublished.

Hinz, P., and Landry, R.M., 1994. Industrial mineral occurrences & deposits in northwestern Ontario. Ministry of Northern Development and Mines, Open File Report 5889, p. 23-26.

Kuchnbaum, R. M., 1990. Report on prospecting and sampling, Treelined Lake graphite property, Kenora Mining Division. Report submitted to Ministry of Northern Development & Mines in fulfilment of requirements of Ontario Prospectors' Assistance Program, December 11, 1990. Unpublished.

Lakefield Research Limited, 1998. An investigation of the recovery of graphite from ore *[sic]* samples submitted by Avalon Ventures Limited, Progress Report No. 1. Unpublished.

Millar, J.F.V., 1988. Final report, preliminary exploration program, Black Sturgeon graphite deposit, *for* Bellwether Reources Ltd., February 12, 1988. Unpublished.

Moria Mining Services, 1988. MaxMin profiles (444, 1777 and 3555 Hz) and total field magnetic contours, 1:2500 scale, *for* Bellwether Resources Ltd., February 1988. Unpublished.

O'Flaherty, K. F., 1988a. Preliminary geological mapping, Black Sturgeon graphite deposit, *for* Bellwether Resources Ltd., October 20, 1988. Unpublished.

O'Flaherty, K. F., 1988b. Geological report, Black Sturgeon graphite deposit, Trout Lake, Kenora district, Ontario, *for* Bellwether Resources Ltd., December 2, 1988. Unpublished.

O'Flaherty, K. F., 1988c. Economic assessment of the 1988 work program and proposed further work on the Black Sturgeon graphite deposit, Trout Lake, Kenora district, Ontario, *for* Bellwether Resources Ltd. and Millar Western Engineering Ltd., December 6, 1988. Unpublished.

Redden, J., 1993. Industrial minerals project, Sioux Lookout - Dryden area, parts of Kenora and Patricia mining divisions. Ontario Geological Survey Open File Report 5766, p. 49-58.

Storey, C. C., 1990. An evaluation of the industrial mineral potential of parts of the districts of Kenora and Rainy River. Ontario Geological Survey Open File Report 5718, p.80-83, 95-97.

An Investigation of

THE RECOVERY OF GRAPHITE

from ore samples
submitted by

AVALON VENTURES LIMITED

Progress Report No. 1

Project No. L.R. 5315

NOTE:

This report refers to the samples as received.

LAKEFIELD RESEARCH LIMITED
185 CONCESSION STREET, POSTAL BAG 4300
LAKEFIELD, ONTARIO KOL 2HO
TEL: (705) 652-2017
FAX: (705) 652-5213

October 2, 1998

Table of Contents

Abstract

This report describes the results of the preliminary testwork conducted on graphite ore submitted by Avalon Ventures Limited. The ore used in the study assayed 3.8% total carbon and 1.81% sulphur. The sulphur in the ore was represented mostly by pyrrhotite. The graphite ore was a fine-grained ore, where a portion of graphite was disseminated with quartz.

The results of the laboratory testwork permit the following interpretation:

- Production of a high-grade graphite concentrate of about 98% C may be possible after development and optimization of the flowsheet and reagent scheme. In the preliminary testwork, a concentrate grade assaying 94.2% $C_{(T)}$ was obtained. The results are shown in Table 1.

Table 1 : Preliminary Batch Flotation Results Obtained on Graphite Ore

Test No.	Product	Weight %	Assays %		% Distribution	
			$C_{(T)}$	S	$C_{(T)}$	S
10	Graphite 5th Cleaner Conc	4.13	94.2	3.55	92.8	8.0
	Graphite 1st Cleaner Conc	4.66	87.4	4.23	97.1	10.8
	Graphite Rougher Conc	8.18	50.5	6.75	98.5	30.2
	Graphite Rougher Tail	91.18	0.07	1.39	1.5	69.8
	Head (Calc)	100.00	4.19	1.83	100.0	100.0

- The major contaminants of the graphite cleaner concentrate were quartz with fine inclusions of graphite and pyrrhotite.

- Fineness of grind and type of frothing reagent had a significant effect on graphite concentrate grade. A graphite recovery of over 98% $C_{(T)}$ was readily achieved in the batch tests.

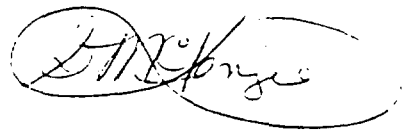
Introduction

In a meeting held at Lakefield Research, Mr. Gary Pearse of Avalon Ventures Limited requested preliminary laboratory testwork on graphite ore from the Kenora region. The objectives of the testwork were as follows:

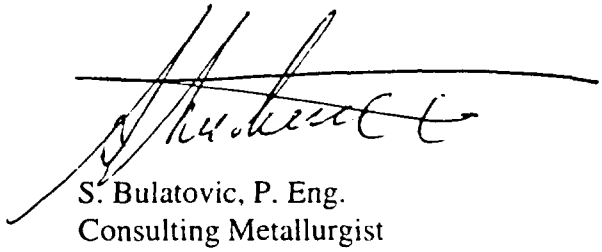
- To determine if a high-grade graphite concentrate can be produced from the ore.
- To produce a sample of graphite concentrate for preliminary market evaluation.

The results of the laboratory testwork were discussed with Mr. Pearse in regular telephone conversations.

LAKEFIELD RESEARCH LIMITED



C.A. Fleming, Ph. D.,
Vice President & Chief Operating Officer



S. Bulatovic, P. Eng.
Consulting Metallurgist

Experimental Work By: *T. Jessup, D. Lang*
Report Preparation By: *S. McKenzie*

Summary & Discussion

1. Description of the Samples Used in the Laboratory Testwork

About 25 kilograms of graphite ore were received on May 15th, 1998 for laboratory testwork. The ore was stage crushed to 10 mesh and laboratory test charges were prepared. The ore assayed 3.8% $C_{(T)}$ and 1.8% sulphur. The ore contained about 4.5% pyrrhotite.

2. Processing Characteristics of the Ore

About 70% of the graphite was in the form of coarse flecks (i.e. between 48m and 100m). The remaining 30% of the graphite was in the form of fine inclusions with other gangue minerals. Because of these fine inclusions of graphite with gangue minerals, problems were experienced rejecting these middlings during graphite upgrading. Regrinding of the rougher concentrate before cleaning helped to some degree, but regrinding was not sufficient to achieve liberation. Another problem associated with processing of the ore was the presence of stained silicate, which was difficult to reject during upgrading of the graphite rougher concentrate.

Pyrrhotite, after grinding, was relatively fine and could be rejected with the use of a pyrrhotite depressant. Because the pyrrhotite is much finer than the graphite flakes, a portion of the pyrrhotite could be removed by screening.

The results of the preliminary studies have indicated that production of a high-grade graphite concentrate with high recovery is possible.

3. Laboratory Testwork

3.1. Preliminary Tests

Preliminary tests were performed to examine the effect of lime additions on pyrrhotite rejection. In these tests, the ore was ground to K_{80} = 124 µm in the presence of frother and fuel oil. The conditions and results for these tests are summarized in Table 2.

Table 2 : Preliminary Graphite Flotation Tests on Avalon Ore

Test No.	Test Conditions	Product	Wt %	Assays %		% Distribution	
				$C_{(t)}$	S	$C_{(t)}$	S
1	Grind K_{80} = 124 µm CaO = 250 g/t Na_2SiO_3 = 1200 g/t MIBC/Fuel Oil = 26 g/t	Graphite 3rd Cl Conc Graphite 1st Cl Conc Graphite Rougher Conc Graphite Rougher Tail	4.99 5.25 7.91 92.09	72.0 68.9 47.2 0.020	2.04 2.23 3.91 1.66	95.9 96.6 99.5 0.5	5.5 6.4 16.8 83.2
		Head (Calc)	100.00	3.75	1.84	100.0	100.0
2	Grind K_{80} = 124 µm CaO = 1100 g/t Na_2SiO_3 = 1200 g/t MIBC/Fuel Oil = 20 g/t	Graphite 3rd Cl Conc Graphite 1st Cl Conc Graphite Rougher Conc Graphite Rougher Tail	4.52 4.87 8.72 91.28	84.0 78.6 44.1 0.03	4.02 4.22 3.63 1.77	98.0 98.8 99.3 0.7	9.4 10.6 16.4 83.6
		Head (Calc)	100.00	3.87	1.93	100.0	100.0
3	Grind K_{80} = 124 µm CaO = 2500 g/t Na_2SiO_3 = 1200 g/t MIBC/Fuel Oil = 22 g/t	Graphite 3rd Cl Conc Graphite 1st Cl Conc Graphite Rougher Conc Graphite Rougher Tail	4.68 5.21 9.09 90.91	81.7 74.6 43.0 0.02	4.47 5.03 4.52 1.70	97.5 99.0 99.5 0.5	10.7 13.4 21.0 79.0
		Head (Calc)	100.00	3.92	1.96	100.0	100.0

From the results obtained, the following conclusions are made:

- A graphite concentrate grade of 84% $C_{(t)}$ was achieved in Tests 1 and 2 with high graphite recovery (i.e. over 99% rougher recovery).
- Higher lime additions improved graphite recovery, but were not effective in rejection of pyrrhotite.

3.2. Effect of Fineness of Grind

Comparative flotation tests were conducted to examine the effect of fineness of primary grind on graphite flotation and upgrading (Table 3).

Table 3 : Effect of Fineness of Grind on Graphite Flotation and Upgrading

Test No.	Grinding Fineness	Product	Wt %	Assays %		% Distribution	
				$C_{(T)}$	S	$C_{(T)}$	S
1	K_{80} = 124 µm	Graphite 3rd Cl Conc	4.99	72.0	2.04	95.9	5.5
		Graphite 1st Cl Conc	5.25	68.9	2.23	96.6	6.4
		Graphite Rougher Conc	7.91	47.2	3.91	99.5	16.4
		Graphite Rougher Tail	92.09	0.02	1.66	0.5	83.2
		Head (Calc)	100.00	3.75	1.84	100.0	100.0
4	K_{80} = 190 µm	Graphite 3rd Cl Conc	5.55	62.7	0.95	86.6	2.9
		Graphite 1st Cl Conc	7.12	51.4	1.33	91.1	5.3
		Graphite Rougher Conc	10.11	37.0	1.84	93.3	10.4
		Graphite Rougher Tail	89.89	0.30	1.79	6.7	89.6
		Head (Calc)	100.00	4.01	1.80	100.0	100.0
5	K_{80} = 160 µm with coarse graphite prefloat from the 10 mesh fraction	Graphite 3rd Cl Conc	4.68	70.7	1.37	85.6	3.8
		Graphite 1st Cl Conc	6.12	58.5	1.53	92.7	5.6
		Graphite Rougher Conc	7.54	48.8	2.25	95.2	10.0
		Graphite Rougher Tail	92.46	0.20	1.66	4.8	90.0
		Head (Calc)	100.00	3.87	1.70	100.0	100.0

The results obtained showed that at the coarser primary grind (Test 4), both concentrate grade and graphite recovery were significantly reduced. In Test 5, a graphite prefloat from the 10 mesh ore was attempted. The coarse graphite prefloat was not beneficial in producing a high-grade graphite concentrate.

3.3. Effect of Type of Frothing Agent

Several tests were performed (Table 4) to examine the effect of frothing agents on graphite flotation and upgrading. The MIBC/Fuel oil mixture and Accoal E11/Fuel oil mixture were evaluated. The results obtained, indicated that both mixtures (Tests 1 and 7) gave similar results at the same addition levels.

Table 4 : Effect of Type of Frothing Agents on Graphite Flotation and Upgrading

Test No.	Frother Type	Product	Wt %	Assays %		% Distribution	
				C_m	S	C_m	S
1	MIBC/Fuel Oil = 26 g/t	Graphite 3rd Cl Conc	4.99	72.0	2.04	95.9	5.5
		Graphite 1st Cl Conc	5.25	68.9	2.23	96.6	6.4
		Graphite Rougher Conc	7.91	47.2	3.91	99.5	16.4
		Graphite Rougher Tail	92.09	0.02	1.66	0.5	83.2
		Head (Calc)	100.00	3.75	1.84	100.0	100.0
7	Accoal E11/Fuel Oil = 26 g/t	Graphite 3rd Cl Conc	4.95	76.3	1.25	96.9	3.6
		Graphite 1st Cl Conc	5.51	69.2	1.66	97.9	5.3
		Graphite Rougher Conc	9.32	41.6	4.15	99.5	22.4
		Graphite Rougher Tail	90.68	0.02	1.48	0.5	77.6
		Head (Calc)	100.00	3.90	1.73	100.0	100.0
8	Accoal E11/Fuel Oil = 14 g/t	Graphite 3rd Cl Conc	3.13	90.6	1.86	67.5	3.2
		Graphite 1st Cl Conc	4.36	80.5	2.99	89.1	7.4
		Graphite Rougher Conc	7.57	51.6	3.53	99.1	15.1
		Graphite Rougher Tail	92.43	0.040	1.62	0.9	84.9
		Head (Calc)	100.00	3.95	1.76	100.0	100.0
10	Accoal E11/Fuel Oil = 12 g/t	Graphite 3rd Cl Conc	4.13	94.2	3.55	92.8	8.0
		Graphite 1st Cl Conc	4.66	87.4	4.23	97.1	10.8
		Graphite Rougher Conc	8.18	50.5	6.75	98.5	30.2
		Graphite Rougher Tail	91.82	0.07	1.39	1.5	69.8
		Head (Calc)	100.00	4.19	1.83	100.0	100.0

Lower additions of Accoal E11/Fuel oil mixture resulted in improved graphite concentrate grade in both the rougher and cleaner concentrates.

4. Conclusions

- The graphite ore used in this study contained pyrrhotite and a portion of the graphite as fine inclusions with non-sulphide gangue. This represented a problem in efficient upgrading of the graphite concentrate.
- In spite of the complexity of the ore, the results obtained in the preliminary tests showed that a saleable grade of graphite concentrate could be produced.

- The floatability of graphite was sensitive to fineness of grind and level of frothing agent used. Using a coarse grind (i.e. K_{80} >120 μm), a high-grade graphite concentrate was not produced. Lower additions of frothing agent gave improved graphite concentrate grade without losses in recovery.

Recommendations

Recommendations proposed in this section are based on the results of the preliminary testwork. Based on these results, the following development testwork is recommended:

1. Reagent Scheme Evaluation

Development testwork on reagent scheme evaluation would include the following:

- Selection of a more selective frothing agent
- Selection and evaluation of different pyrrhotite and gangue depressants
- Selection and evaluation of type of pH modifier and flotation pH.

2. Flowsheet Evaluation

The major elements in the flowsheet that should be examined would include the following:

- Fineness of primary grinding
- Fineness of regrind of the total concentrate or a portion of the concentrate
- Sizing of the concentrate and gravity upgrading of a portion of the concentrate.

Details of Tests

TEST NO. 1

Purpose: A preliminary test to examine graphite flotation and cleaning.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne			Time, minutes			pH
	Na_2SiO_3	MIBC/Fuel Oil	$Ca(OH)_2$	Grind	Cond.	Froth	
Grind	500	20	-	30	-	-	6.8
C Rougher 1	-	-	-	-	-	2	-
2	100	6	-	-	1	2	-
C 1st Cleaner	200	-	150	-	1	2	10.5
C 2nd Cleaner	200	-	50	-	1	2	10.5
C 3rd Cleaner	200	-	50	-	1	1.5	10.5
Mozley gravity separation of the C 3rd Cleaner Conc.							

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	Mozley Conc.	81.9	4.12	84.00	2.00	92.3	4.5
2	Mozley Tail	17.4	0.87	15.70	2.23	3.7	1.1
3	C 3rd Cl. Tail	1.7	0.09	15.90	4.43	0.4	0.2
4	C 2nd Cl. Tail	3.5	0.18	6.63	6.45	0.3	0.6
5	C 1st Cl. Tail	52.8	2.65	4.11	7.24	2.9	10.5
6	C Ro. Tail	1832.5	92.09	0.020	1.66	0.5	83.2
	Head (calc)	1989.8	100.0	3.75	1.84	100.0	100.0

Combined Products

1-2	C 3rd Cl. Conc	4.99	72.03	2.04	95.9	5.5
1-3	C 2nd Cl. Conc	5.08	71.09	2.08	96.3	5.7
1-4	C 1st Cl. Conc	5.25	68.93	2.23	96.6	6.4
1-5	C Ro Conc.	7.91	47.17	3.91	99.5	16.8

TEST NO. 2

Purpose: To repeat Test 1, but add lime to the primary grind and regrind the rougher concentrate prior to cleaning.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne			Time, minutes			pH
	$Ca(OH)_2$	Na_2SiO_3	MIBC/Fuel Oil	Grind	Cond.	Froth	
Grind	500	500	20	30	-	-	7.2
C Rougher	800	-	-	-	-	3	10.5
Regrind (PM)	500	200	-	10	-	-	11.2
C 1st Cleaner	-	-	-	-	-	2	-
C 2nd Cleaner	-	200	-	-	1	2	10.5
C 3rd Cleaner	x	200	-	-	1	1.5	10.5
Mozley gravity separation of the C 3rd Cleaner Conc.							

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	Mozley Conc.	86.4	4.33	85.70	4.06	95.8	9.1
2	Mozley Tail	3.9	0.20	45.20	3.10	2.3	0.3
3	C 3rd Cl. Tail	1.8	0.09	19.90	10.00	0.5	0.5
4	C 2nd Cl. Tail	5.1	0.26	4.26	5.84	0.3	0.8
5	C 1st Cl. Tail	76.9	3.85	0.52	2.88	0.5	5.7
6	C Ro. Tail	1821.6	91.28	0.030	1.77	0.7	83.6
	Head (calc)	1995.7	100.0	3.87	1.93	100.0	100.0

Combined Products

1-2	C 3rd Cl. Conc	4.52	83.95	4.02	98.0	9.4
1-3	C 2nd Cl. Conc	4.61	82.70	4.14	98.5	9.9
1-4	C 1st Cl. Conc	4.87	78.58	4.22	98.8	10.6
1-5	C Ro Conc.	8.72	44.10	3.63	99.3	16.4

TEST NO. 3

Purpose: To repeat the general conditions of Test 2, but increase the lime from 500 to 2000 g/t.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne			Time, minutes			pH
	$Ca(OH)_2$	Na_2SiO_3	MIBC/Fuel Oil	Grind	Cond.	Froth	
Grind	2000	500	20	30	-	-	10.3
C Rougher	-	-	-	-	-	3	-
Regrind (PM)	500	200	-	10	-	-	11.5
C 1st Cleaner	-	200	-	-	1	2	-
C 2nd Cleaner	-	200	-	-	1	2	10.5
C 3rd Cleaner	x	200	-	-	1	1.5	10.5

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	C Cl. Conc	93.1	4.68	81.70	4.47	97.5	10.7
3	C 3rd Cl. Tail	4.0	0.20	19.30	10.40	1.0	1.1
4	C 2nd Cl. Tail	6.5	0.33	6.13	9.80	0.5	1.6
5	C 1st Cl. Tail	77.3	3.88	0.59	3.84	0.6	7.6
6	C Ro. Tail	1809.1	90.91	0.020	1.70	0.5	79.0
	Head (calc)	1990.0	100.0	3.92	1.96	100.0	100.0

Combined Products

1-3	C 2nd Cl. Conc	4.88	79.13	4.71	98.4	11.8
1-4	C 1st Cl. Conc	5.21	74.55	5.03	99.0	13.4
1-5	C Ro Conc.	9.09	42.95	4.52	99.5	21.0

TEST NO. 4

Purpose: To repeat Test 1, but reduce the grinding time from 30 to 15 minutes and clean 5 times.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 15 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	Na_2SiO_3	MIBC / Fuel Oil	$Ca(OH)_2$	MIBC	Grind	Cond.	Froth	
Grind	500	20	-	-	15	-	-	6.7
Graphite Rougher	-	-	-	4		-	2	-
Graphite 1st Cl	200	-	150	4	-	1	2	10.5
Graphite 2nd Cl	200	-	50	4	-	1	2	10.5
Graphite 3rd Cl	200	-	50	4	-	1	1.5	10.5
Graphite 4th Cl	200	-	50	4	-	1	1.5	10.5
Graphite 5th Cl	200	-	50	4	-	1	1.5	10.5
Pass the graphite 5th cleaner conc through the Eriez at 5 amps.								

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	Graphite Cl. Conc	77.4	3.90	71.80	0.54	69.8	1.2
2	Mag Conc	3.1	0.16	18.40	6.86	0.7	0.6
3	Graphite 5th Cl. Tail	2.0	0.10	39.50	2.89	1.0	0.2
4	Graphite 4th Cl. Tail	27.6	1.39	43.70	1.29	15.1	1.0
5	Graphite 3rd Cl. Tail	11.1	0.56	15.40	2.37	2.1	0.7
6	Graphite 2nd Cl. Tail	20.2	1.02	9.42	2.85	2.4	1.6
7	Graphite 1st Cl. Tail	59.2	2.98	2.88	3.06	2.1	5.1
8	Graphite Ro. Tail	1784.0	89.89	0.300	1.79	6.7	89.6
	Head (calc)	1984.6	100.0	4.01	1.80	100.0	100.0

Combined Products

1-2	Graphite 5th Cl. Conc	4.06	69.74	0.78	70.5	1.8
1-3	Graphite 4th Cl. Conc	4.16	69.01	0.83	71.5	1.9
1-4	Graphite 3rd Cl. Conc	5.55	62.67	0.95	86.6	2.9
1-5	Graphite 2nd Cl. Conc	6.11	58.34	1.08	88.8	3.7
1-6	Graphite 1st Cl. Conc	7.12	51.35	1.33	91.1	5.3
1-7	Graphite Ro. Conc	10.11	37.04	1.84	93.3	10.4

TEST NO. 5

Purpose: To repeat Test 4, but with a coarse graphite scalp prior to grinding.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 20 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	Na_2SiO_3	MIBC Fuel Oil	$Ca(OH)_2$	MIBC	Grind	Cond.	Froth	
Condition	-	5	-	-	20	2	-	-
Graphite Scalp	-	-	-	12	-	1	3	-
Treat the graphite scalp conc on the Mozley gravity separator. Grind the scalp tail.								
Grind	1000	15	-	-	20	-	-	7.2
Graphite Rougher	-	-	-	4	-	1	2	-
Combine Ro Conc + Mozley Cl Tail for graphite 1st cleaner.								
Graphite 1st Cl	200	-	150	4	-	1	2	10.5
Graphite 2nd Cl	200	-	50	4	-	1	2	10.5
Graphite 3rd Cl	200	-	50	4	-	1	1.5	10.5
Graphite 4th Cl	200	-	50	4	-	1	1.5	10.5
Graphite 5th Cl	200	-	50	4	-	1	1.5	-

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	Graphite Cl. Conc	42.8	2.17	72.40	0.34	40.6	0.4
2	Mozley Conc	28.2	1.43	79.60	3.45	29.4	2.9
3	Graphite 5th Cl. Tail	16.7	0.85	58.20	0.55	12.7	0.3
4	Graphite 4th Cl. Tail	4.7	0.24	45.90	1.10	2.8	0.2
5	Graphite 3rd Cl. Tail	20.1	1.02	19.50	1.65	5.1	1.0
6	Graphite 2nd Cl. Tail	8.3	0.42	17.60	3.54	1.9	0.9
7	Graphite 1st Cl. Tail	28.0	1.42	6.90	5.23	2.5	4.4
8	Graphite Ro. Tail	1824.2	92.46	0.200	1.66	4.8	90.0
	Head (calc)	1973.0	100.0	3.87	1.70	100.0	100.0

Combined Products

1-2	Graphite 5th Cl. Conc	3.60	75.26	1.58	70.1	3.3
1-3	Graphite 4th Cl. Conc	4.45	72.01	1.38	82.8	3.6
1-4	Graphite 3rd Cl. Conc	4.68	70.68	1.37	85.6	3.8
1-5	Graphite 2nd Cl. Conc	5.70	61.54	1.42	90.8	4.7
1-6	Graphite 1st Cl. Conc	6.12	58.52	1.56	92.7	5.6
1-7	Graphite Ro. Conc	7.54	48.81	2.25	95.2	10.0

TEST NO. 6

Purpose: To repeat the conditions of Test 1, but clean the rougher concentrate 5 times.

Procedure: As for Test 1.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	Na_2SiO_3	MIBC Fuel Oil	$Ca(OH)_2$	MIBC	Grind	Cond.	Froth	
Grind	500	20	-	-	30	-	-	6.8
Graphite Rougher	-	-	-	4	-	1	2	10.5
Graphite 1st Cl	200	-	150	4	-	1	2	10.5
Graphite 2nd Cl	200	-	50	4	-	1	2	10.5
Graphite 3rd Cl	200	-	50	4	-	1	2	10.5
Graphite 4th Cl	200	-	50	4	-	1	1.5	10.5
Graphite 5th Cl	200	-	50	4	-	1	1.5	10.5
Pass the graphite cleaner conc through the Eriez at 5 amps.								

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	Graphite Cl. Conc	79.2	4.00	78.70	0.31	81.0	0.8
2	Mag Conc	1.9	0.10	23.30	3.94	0.6	0.2
3	Graphite 5th Cl. Tail	7.9	0.40	57.90	0.88	5.9	0.2
4	Graphite 4th Cl. Tail	7.5	0.38	31.00	1.29	3.0	0.3
5	Graphite 3rd Cl. Tail	8.6	0.43	19.90	2.76	2.2	0.8
6	Graphite 2nd Cl. Tail	15.7	0.79	12.50	3.27	2.6	1.6
7	Graphite 1st Cl. Tail	30.8	1.55	5.69	5.22	2.3	5.2
8	Graphite Ro. Tail	1829.6	92.35	0.100	1.55	2.4	90.9
	Head (calc)	1981.2	100.0	3.88	1.58	100.0	100.0

Combined Products

1-2	Graphite 5th Cl. Conc	4.09	77.40	0.40	81.6	1.0
1-3	Graphite 4th Cl. Conc	4.49	75.67	0.44	87.5	1.2
1-4	Graphite 3rd Cl. Conc	4.87	72.20	0.50	90.6	1.6
1-5	Graphite 2nd Cl. Conc	5.30	67.92	0.69	92.8	2.3
1-6	Graphite 1st Cl. Conc	6.10	60.72	1.02	95.3	4.0
1-7	Graphite Ro. Conc	7.65	49.54	1.88	97.6	9.1

TEST NO. 7

Purpose: To repeat the conditions of Test 1, but use Fuel Oil/Accoal E11 in place of MIBC/Fuel oil and add NaCN to the cleaners.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	Na_2SiO_3	Accoal E11 / Fuel Oil	$Ca(OH)_2$	NaCN	Grind	Cond.	Froth	
Grind	500	20	-	-	30	-	-	-
Graphite Rougher	-	-	-	-	-	1	2	6.8
Graphite Scavenger	100	6	-	-	-	1	2	-
Graphite 1st Cl	200	-	x	50	-	1	2	10.5
Graphite 2nd Cl	200	-	x	50	-	1	2	-
Graphite 3rd Cl	200	-	x	50	-	1	2	-
Mozley gravity separation on the graphite 3rd cleaner conc.								

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	Mozley Conc.	83.8	4.20	86.90	1.07	93.6	2.6
2	Mozley Tail	15.0	0.75	16.90	2.25	3.3	1.0
3	C 3rd Cl. Tail	2.9	0.15	9.78	6.36	0.4	0.5
4	C 2nd Cl. Tail	8.3	0.42	5.66	4.92	0.6	1.2
5	C 1st Cl. Tail	55.3	2.77	1.68	3.25	1.2	5.2
6	C Scav Conc	20.7	1.04	1.81	19.90	0.5	11.9
7	C Ro. Tail	1808.9	90.68	0.020	1.48	0.5	77.6
	Head (calc)	1994.9	100.0	3.90	1.73	100.0	100.0

Combined Products

1-2	C 3rd Cl. Conc	4.95	76.27	1.25	96.9	3.6
1-3	C 2nd Cl. Conc	5.10	74.38	1.39	97.3	4.1
1-4	C 1st Cl. Conc	5.51	69.19	1.66	97.9	5.3
1-5	C Ro Conc.	8.29	46.61	2.19	99.1	10.5
1-6	C Ro+Scav Conc.	9.32	41.62	4.16	99.5	22.4

TEST NO. 8

Purpose: To repeat Test 7, but reduce the frother addition to the grind and regrind the graphite rougher conc for 10 minutes prior to cleaning.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	Na_2SiO_3	Accoal E11 Fuel Oil	$Ca(OH)_2$	NaCN	Grind	Cond.	Froth	
Grind	500	10	-	-	30	-	-	-
Graphite Ro 1	-	-	-	-	-	1	2	-
2	-	4	-	-	-	1	1.5	-
Regrind (PM)	-	-	-	-	10	-	-	-
Graphite 1st Cl	200	-	x	50	"	1	2	10.5
Graphite 2nd Cl	200	-	x	50	"	1	2	10.5
Graphite 3rd Cl	200	-	x	50	"	1	2	10.5
Mozley gravity separation on the graphite 3rd cleaner conc.								

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	Mozley Conc.	63.2	3.08	91.10	1.84	66.6	3.1
2	Mozley Tail	1.2	0.06	64.60	3.10	0.9	0.1
3	C 3rd Cl. Tail	4.0	0.19	49.30	11.00	2.3	1.2
4	C 2nd Cl. Tail	18.5	0.90	52.20	5.19	11.2	2.5
5	C 1st Cl. Tail	63.9	3.11	12.30	4.26	9.1	7.2
6	C Scav onc	63.9	3.11	12.30	4.26	9.1	7.2
7	C Ro. Tail	1840.4	89.55	0.040	1.62	0.9	78.8
	Head (calc)	2055.1	100.0	4.21	1.84	100.0	100.0

Combined Products

1-2	C 3rd Cl. Conc	3.13	90.61	1.86	67.5	3.2
1-3	C 2nd Cl. Conc	3.33	88.19	2.40	69.8	4.3
1-4	C 1st Cl. Conc	4.23	80.53	2.99	81.0	6.9
1-5	C Ro Conc.	7.34	51.62	3.53	90.1	14.1

TEST NO. 9

Purpose: To produce graphite concentrate.

Procedure: Repeat the flotation conditions of Test 8.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	Na_2SiO_3	Accoal E11 Fuel Oil	$Ca(OH)_2$	NaCN	Grind	Cond.	Froth	
Grind	500	10	-	-	30	-	-	-
Graphite Ro 1	-	-	-	-	-	1	2	-
2	-	4	-	-	-	1	1.5	-
Regrind (PM)	-	-	-	-	10	-	-	-
Graphite 1st Cl	200	-	x	50	-	1	2	10.5
Graphite 2nd Cl	200	-	x	50	-	1	2	10.5
Graphite 3rd Cl	200	-	x	50	-	1	2	10.5

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	C Cl Conc	83.0	4.18	91.6	3.93	84.6	9.1
2	C 3rd Cl. Tail	3.8	0.19	59.5	6.19	2.5	0.7
3	C 2nd Cl. Tail	69.8	3.51	14.8	10.30	11.5	20.0
4	C 1st Cl. Tail	11.2	0.56	1.37	8.95	0.2	2.8
5	C Ro. Tail	1819.0	91.55	0.060	1.33	1.2	67.4
	Head (calc)	1986.8	100.0	4.52	1.81	100.0	100.0

Combined Products

1-2	C 2nd Cl. Conc	4.37	90.19	4.03	87.1	9.7
1-3	C 1st Cl. Conc	7.88	56.59	6.82	98.6	29.8
1-4	C Ro Conc.	8.45	52.90	6.97	98.8	32.6

TEST NO. 10

Purpose: To produce graphite concentrate.

Procedure: Repeat the flotation conditions of Test 8.

Feed: 2000 grams of minus 10 mesh graphite ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	Na_2SiO_3	Accoal E11 Fuel Oil	$Ca(OH)_2$	NaCN	Grind	Cond.	Froth	
Grind	500	10	-	-	30	-	-	-
Graphite Ro 1	-	-	-	-	-	1	2	-
2	-	2	-	-	-	1	1.5	-
Regrind (PM)	-	-	-	-	10	-	-	-
Graphite 1st Cl	200	-	x	50	-	1	2	10.5
Graphite 2nd Cl	200	-	x	50	-	1	2	10.5
Graphite 3rd Cl	200	-	x	50	-	1	2	10.5

Metallurgical Results

Product		Weight		Assays,%		% Distribution	
		g	%	C(T)	S	C(T)	S
1	C Cl Conc	62.4	4.13	94.2	3.55	92.8	8.0
2	C 3rd Cl. Tail	2.7	0.18	63.6	5.89	2.7	0.6
3	C 2nd Cl. Tail	5.3	0.35	18.8	11.40	1.6	2.2
4	C 1st Cl. Tail	53.1	3.52	1.65	10.10	1.4	19.4
5	C Ro. Tail	1387.1	91.82	0.070	1.39	1.5	69.8
	Head (calc)	1510.6	100.0	4.19	1.83	100.0	100.0

Combined Products

1-2	C 2nd Cl. Conc	4.31	92.93	3.65	95.5	8.6
1-3	C 1st Cl. Conc	4.66	87.35	4.23	97.1	10.8
1-4	C Ro Conc.	8.18	50.50	6.75	98.5	30.2

Work Report Summary

Transaction No: W0210.00208 **Status:** APPROVED
Recording Date: 2002-FEB-06 **Work Done from:** 1998-JUN-20
Approval Date: 2002-FEB-06 **to:** 2002-JAN-29

Client(s):

154280 KUEHNBAUM, ROBERT MARTIN
211314 ZEBRUCK, GEORGE RICHARD

Survey Type(s):

BENEF

Work Report Details:

Claim#	Perform	Perform Approve	Applied	Applied Approve	Assign	Assign Approve	Reserve	Reserve Approve	Due Date
K 895625	$0	$0	$800	$800	$0	0	$0	$0	2004-MAR-02
K 895626	$0	$0	$800	$800	$0	0	$0	$0	2004-MAR-02
K 895627	$5,317	$5,317	$800	$800	$4,517	4,517	$0	$0	2004-MAR-02
K 895628	$0	$0	$800	$800	$0	0	$0	$0	2004-MAR-02
K 898891	$0	$0	$800	$800	$0	0	$0	$0	2004-MAR-02
K 898892	$0	$0	$400	$400	$0	0	$0	$0	2003-MAR-02
K 898893	$0	$0	$400	$400	$0	0	$0	$0	2003-MAR-02
K 898894	$0	$0	$517	$517	$0	0	$0	$0	2003-MAR-02
	$5,317	$5,317	$5,317	$5,317	$4,517	$4,517	$0	$0	

Status of claim is based on information currently on record.

52L08SW2010 2.22903 TREELINED LAKE

900

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Ontario

Date: 2002-FEB-25

GEOSCIENCE ASSESSMENT OFFICE
933 RAMSEY LAKE ROAD, 6th FLOOR
SUDBURY, ONTARIO
P3E 6B5

Tel: (888) 415-9845
Fax:(877) 670-1555

GEORGE RICHARD ZEBRUCK
R.R. #1 AIRPORT RD.
KENORA, ONTARIO
P9N 3W7 CANADA

Submission Number: 2.22903
Transaction Number(s): W0210.00208

Dear Sir or Madam

Subject: Approval of Assessment Work

We have approved your Assessment Work Submission with the above noted Transaction Number(s). The attached Work Report Summary indicates the results of the approval.

At the discretion of the Ministry, the assessment work performed on the mining lands noted in this work report may be subject to inspection and/or investigation at any time.

If you have any question regarding this correspondence, please contact STEVEN BENETEAU by email at steve.beneteau@ndm.gov.on.ca or by phone at (705) 670-5855.

Yours Sincerely,

Ron Gashinski
Senior Manager, Mining Lands Section

Cc: Resident Geologist

Robert Martin Kuehnbaum
(Claim Holder)

George Richard Zebruck
(Assessment Office)

Assessment File Library

George Richard Zebruck
(Claim Holder)

MINISTRY OF NORTHERN DEVELOPMENT AND MINES

PROVINCIAL MINING RECORDER'S OFFICE

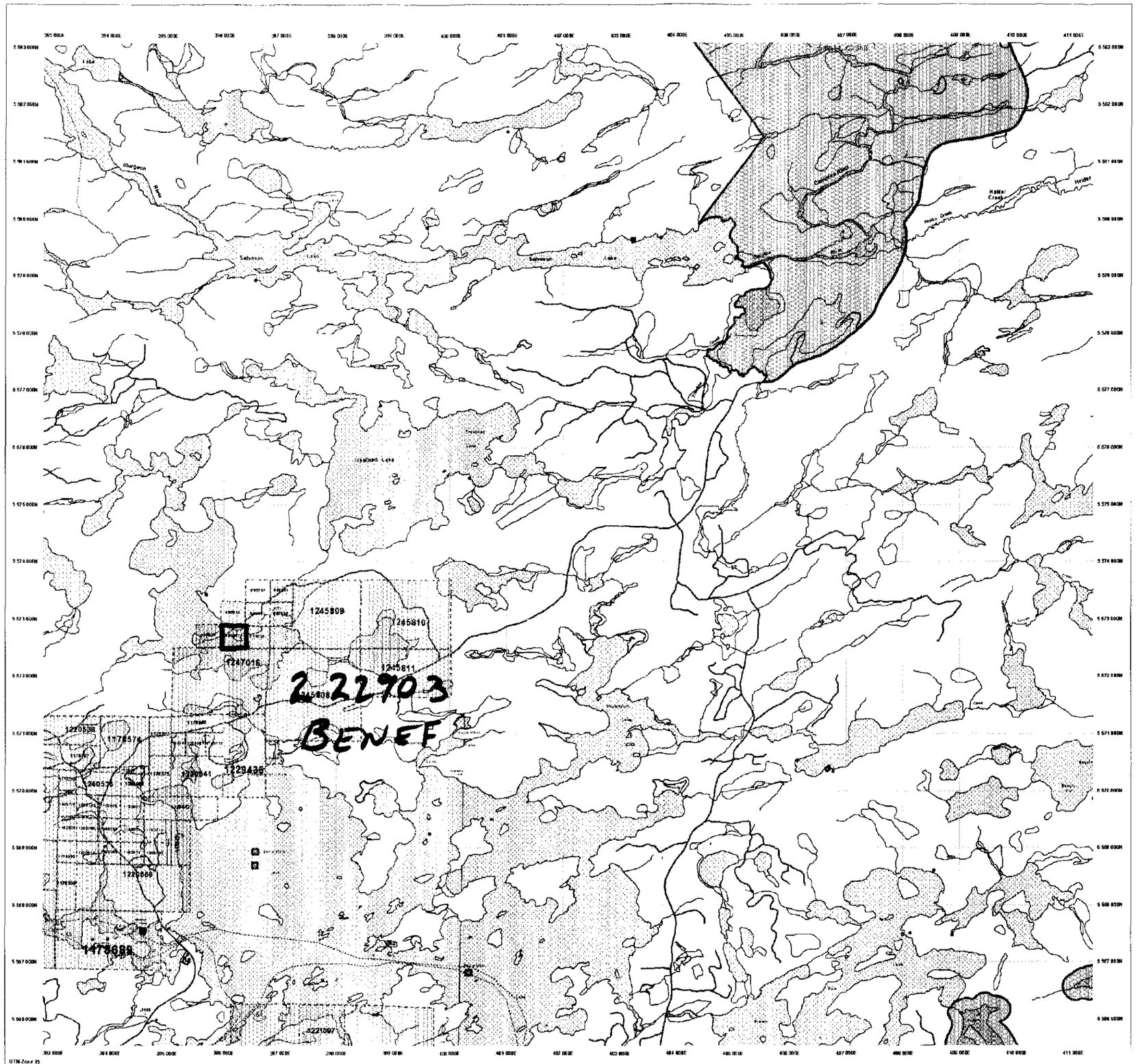
MINING LAND TENURE MAP

Date / Time of Issue Jan 18 2002 08:55h Eastern

TOWNSHIP / AREA	PLAN
TREELINED LAKE	G-2651

ADMINISTRATIVE DISTRICTS / DIVISIONS

Mining Division	Kenora
Land Titles/Registry Division	KENORA
Ministry of Natural Resources District	KENORA



UTM Zone 15
1:00km Grid

TOPOGRAPHIC

- Administrative Boundaries
- Township
- Concession Line
- Provincial Park
- Indian Reserve
- Claim Blocks
- Contour
- Contour - Approx. Depth/Elevation
- Shaft
- Mine Headframe
- Railway
- Road
- Trail
- Natural Gas Pipeline
- Hydro Line
- Communications Line
- Wooded Area
- Monument - Cadastral, Historical, Hydro, Control

LAND TENURE

Freehold Patent
- Surface And Mining Rights
- Surface Rights Only
- Mining Rights Only

Leasehold Patent
- Surface And Mining Rights
- Surface Rights Only
- Mining Rights Only

Licence of Occupation
- Class not Specified
- Surface And Mining Rights
- Surface Rights Only
- Mining Rights Only

- Land Use Permit
- Order in Council
- Water Power Lease Agreement
- 3238587 Mining Claim

LAND TENURE WITHDRAWALS

1234 Areas Withdrawn from Disposition Mining Act Withdrawal types
- Wsm Surface and Mining Rights Withdrawn
- Ws Surface Rights Only Withdrawn
- Wm Mining Rights Only Withdrawn

Order in Council Withdrawal Types
- W*sm Surface and Mining Rights Withdrawn
- W*s Surface Rights Only Withdrawn
- W*m Mining Rights Only Withdrawn

Mp IMPORTANT NOTICES

0 Km 30 Km

LAND TENURE WITHDRAWAL DESCRIPTIONS

Modifier	Type	Date	Description
694	Wsm	Jan 1 2001	FLOODING H.E.P.C. ELEVATION: 1049 FT FILE: 54179 PLAN: U-237 H.E.P.C. PLAN: 800-3989
695	Wsm	Jan 1 2001	FLOODING ELEVATION: 5 FT FILE: 54179 & 80397
719	Wsm	Jan 1 2001	FLOODING H.E.P.C. ELEVATION: 1049 FT. TERM 99 YRS FROM 26 MAY 1966 FILE: 54179 VOL3
WLL C2385	Wsm	Nov 21 2001	Mining and Surface rights withdrawn Section 35 of the Mining Act R90 1990 Order # WLL-280181 ONT, Nov. 21, 2001 Note: this bound ary closely represents the area that is being proposed for regulation and may be subject to further change.
WLL C2386	Wsm	Nov 21 2001	Mining and Surface rights withdrawn Section 35 of the Mining Act R90 1990 Order # WLL-280181 ONT, Nov. 21, 2001 Note: this bound ary closely represents the area that is being proposed for regulation and may be subject to further change.

IMPORTANT NOTICES

Areas under which special regulations, limitations or conditions exist that affect normal prospecting, staking and mineral development activities.

Those wishing to stake mining claims should consult with the Provincial Mining Recorders' Office of the Ministry of Northern Development and Mines for additional information on the status of the lands shown hereon. This map is not intended for navigational, survey, or land title determination purposes or the information shown on this map is compiled from various sources. Completeness and accuracy are not guaranteed. Additional information may also be obtained through the local Lands Titles or Registry Office, or the Ministry of Natural Resources.

The information shown is derived from digital data available in the Provincial Mining Recorders' Office at the time of downloading from the Ministry of Northern Development and Mines web site.

General Information and Limitations

Contact Information:
Provincial Mining Recorder's Office — Toll Free
Mines Ontario Mines Centre — Tel.: 1 (888) 415-9845
933 Ramsey Lake Road — Fax.: 1 (877) 670-1444
Sudbury, ON P3E 6B5
Home Page: www.gov.on.ca/MNDM/MINES/LANDS/landsmpge.html

Map Datum: NAD 83
Projection: UTM (6 degree)
Topographic Data Source: Land Information Ontario
Mining Land Tenure Source: Provincial Mining Recorders' Office

This map may not show all registered land tenure and interests in land including certain subsoils, leases, easements, right of ways, flooding rights, licenses, or other forms of disposition, or rights and interest from the Crown. Also certain land tenure and land uses that result in or prohibit or vary to water mining claims may not be illustrated.

52L08SW2010 2.22903 TREELINED LAKE 200