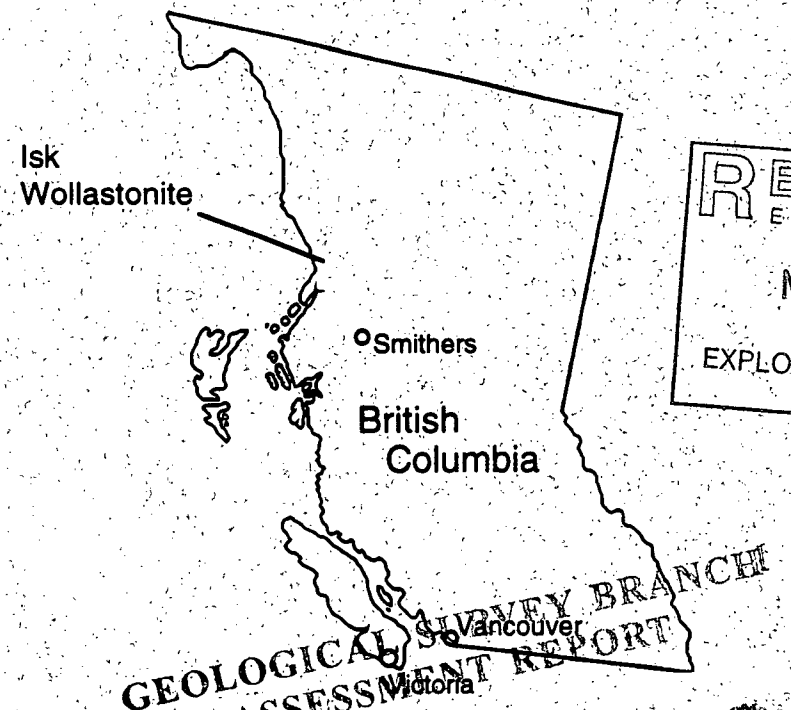
ISK Wollastonite

- northwest British Columbia

Super Twins Resources Ltd

Preliminary Evaluation

November, 1995



MineStart™
Management Inc.

27 October, 1995

Super Twins Resources Ltd
612-475 Howe Street
Vancouver
BC V6C 2B3

Attn: Mr. Allen W. Achilles, President

Dear Mr Achilles,

WOLLASTONITE PROJECT – PRELIMINARY EVALUATION

We are pleased to forward your report on the preliminary evaluation of your ISK wollastonite project.

Your belief in the project potential was well justified. Based on the scoping beneficiation trials the wollastonite samples from the Cliff deposit show an overall 85% yield and gave a 97% pure concentrate with a brightness of 87.3 ISO. Our preliminary estimate for the above ground portion gives an inferred two million tonnes of raw wollastonite in the Cliff deposit.

These results are excellent and demonstrate the existence and recovery of high grade wollastonite which combined with the potential tonnage and the proximity to tidal water for shipping form a base for a potential profitable operation. The existence of at least three other deposits with a similar quality could mean you have all the makings for a world class project.

Continuation with this project is, in our professional opinion, fully justified and we look forward to submitting the detailed evaluation later this year when the full laboratory results of the detailed samples are available and we have reviewed the mining and transport opportunities.

Yours sincerely
MineStart™ Management Inc

Bryan A. Slim, BSc, MBA, PEng
Consulting Mining Engineer

T13\95100.303
Attach.

1763 Scott Road, North Vancouver, B.C., Canada, V7J 3J4
Phone: (604) 986-7014
Fax: (604) 986-7017

CONCLUSIONS

Based on our five weeks site work in July and August, 1995, sampling as carried out under our direction, professional laboratory testing, examination of company files, discussions with company principals and other as noted, secondary data sources, experience and our professional engineering and marketing judgement it is the opinion of MineStart™ Management that:

- beneficiation trials on samples from one deposit –the Cliff – at ISK wollastonite indicates the existence of high grade wollastonite which can be concentrated and recovered by standard magnetic separation and flotation
- the mean yield of four trials gave 85% with a 97% pure concentrate and a brightness of 87% ISO
- there is an inferred two million raw tonnes of wollastonite above ground in the Cliff Deposit sampled for the scoping trials
- three additional large deposits have been identified as well as one probable
- mining of the Cliff deposit could be carried out using standard equipment
- proximity to tidal water in the Stikine River offers the opportunity for low cost shipping
- the above factors all combine to offer the opportunity for a profitable commercial operation

RECOMMENDATIONS

The positive indications in the conclusion justify the continuation of the studies underway. These are covering:

- detailed beneficiation runs for 250 samples
- evaluation of sample grinds to investigate market type product potential
- development of a conceptual project outline
- provision of an initial economic evaluation, and
- proposal of an implementation strategy

SUMMARY

The ISK wollastonite project is located in north-western British Columbia some 240 km north west of the town of Smithers and about 70 km northeast of Wrangell, Alaska. Super Twins Resources Ltd Resources Ltd presently holds 78 modified mineral claim units covering about 1 950 hectares; further staking is underway.

Previous field work in 1993 identified two wollastonite deposits and a 1995 field programme by Super Twins Resources Ltd confirmed the 1993 deposits, discovered a further two deposits and a probable fifth. Scoping beneficiation trials on samples from the Cliff deposit indicate an 85% yield and 97% concentrate purity with a 87% ISO brightness. The Cliff deposit has an inferred two million tonnes of raw wollastonite above ground. Geological mapping was carried out on the outcrops of the Cliff and Glacier deposits.

Mining using standard surface equipment would be appropriate and beneficiation by standard magnetic separation and flotation is indicated from the scoping trials.

The proximity to tidal water offers the opportunity for low cost shipping.

The combined results to-date offer the opportunity for a profitable commercial operation and justify the detailed programme now underway to characterise the deposits, develop a project concept outline and complete a preliminary economic evaluation and thus provide input for completion of a market opportunity analysis.

TABLE OF CONTENTS

TABLE

FIGURE

PLATE

1 INTRODUCTION

1.1 THIS REPORT

Super Twins Resources Ltd are in the exploration stage of developing their ISK wollastonite project situated in north western British Columbia and have retained MineStart Management Inc to :

- design and direct a sampling programme to provide for a statistical validity
- arrange for appropriate laboratory testing
- develop a conceptual project outline and
- provide an initial economic evaluation.

Unless otherwise stated the units of measurement in this report conform to SI metric measurements[1] as adopted by Canada in the Weights and Measures Act of 1971. Reference to these measurements in the text is by use of the approved international symbols and spellings with one exception and that is use of the period to signify the decimal point. Given the international aspects of this project the use, meaning and spelling of words conform to the Oxford English Dictionary thus allowing for full translation without the need for interpretation.

1.2 WOLLASTONITE

Wollastonite, named after W.H. Wollaston. an English chemist and mineralogist, is a calcium metasilicate having the chemical formula $CaSiO_3$ and has the theoretical composition of 48.3% CaO and 51.7% SiO_2. Wollastonite is chemically inert but can be digested in concentrated hydrochloric acid.

Although having a short history of industrial use Wollastonite is the only naturally occurring, non-metallic, white acicular mineral. Because of its unique cleavage properties wollastonite breaks down during crushing and grinding into lath-like or needle-shaped particles of varying acicularity This particle morphology imparts high-strength and is, therefore, of considerable importance in many markets including replacement for short-fibre milled fibreglass and short-fibre asbestos and as a reinforcing filler. Wollastonite is used in applications ranging from ceramic tile to vehicle brake-pads, from bowling-balls to car bumpers and from thermal insulation board to paints and protective industrial coating.

The combination of high brightness and low gas release when heated creates a major demand in the ceramics industry and the brilliant whiteness and natural high paste pH of 9.9 are of major importance to its use in the coatings industry and filler markets.

[1] international symbol for Système International d'Unités, now commonly referred to as the metric system

1.3 ACKNOWLEDGEMENTS

Many persons and companies have been of great help in the progress made to date. Specifically we acknowledge the financial grant from the Explore B.C. Program funded by the Ministry of Energy, Mines and Petroleum Resources, management and directors of Super Twins Resources Ltd Resources Ltd and the diligence of Bart Jaworski, geology student of University of British Columbia. The visit by Cal Kilby and Gerry Ray of the Geological Survey Branch provided a great opportunity to share knowledge (and the fogs). Trapper Dave was always willing to pass on his knowledge and experiences and helicopter pilots and Harry the camp cook were always welcome at the end of a day in the snow. The crew of the Snip hovercraft kindly allowed a return trip on the vessel to Wrangell to view the Iskut and Stikine waterways. It was always a toss up between the drillers pulling ahead of the samplers or the samplers trying to beat their previous daily tally. We were all grateful to Merlyn Royen General Manager and the Cominco staff of the Snip mine for use of the recreation facilities and access to the Bronson Club and Jan Brun and crew in Smithers who bought the supplies and kept the planes flying.

Last and by no means least we remember our friends the bears, ravens and marmots who kept us company from time to time.

2 PROPERTY

2.1 PREAMBLE

Section 2 – Property describes the claims, location and access, topography and infrastructure.

2.2 CLAIMS

221 THE CLAIMS

Four 4 post claims cover the project area; details are presented in Table 2-1 below and Plate 2-1 shows the claims on a background of the NTS topography. Further claims are being staked to enlarge the holdings.

Claim Name	Tenure No	Good To	Units
ISK 1	334360	5 Mar 1996	4N x 5W
ISK 2	334361	5 Mar 1996	4S x 5W
ISK 3	334362	5 Mar 1996	5N x 4E
ISK 4	334363	5 Mar 1996	6S x 3E

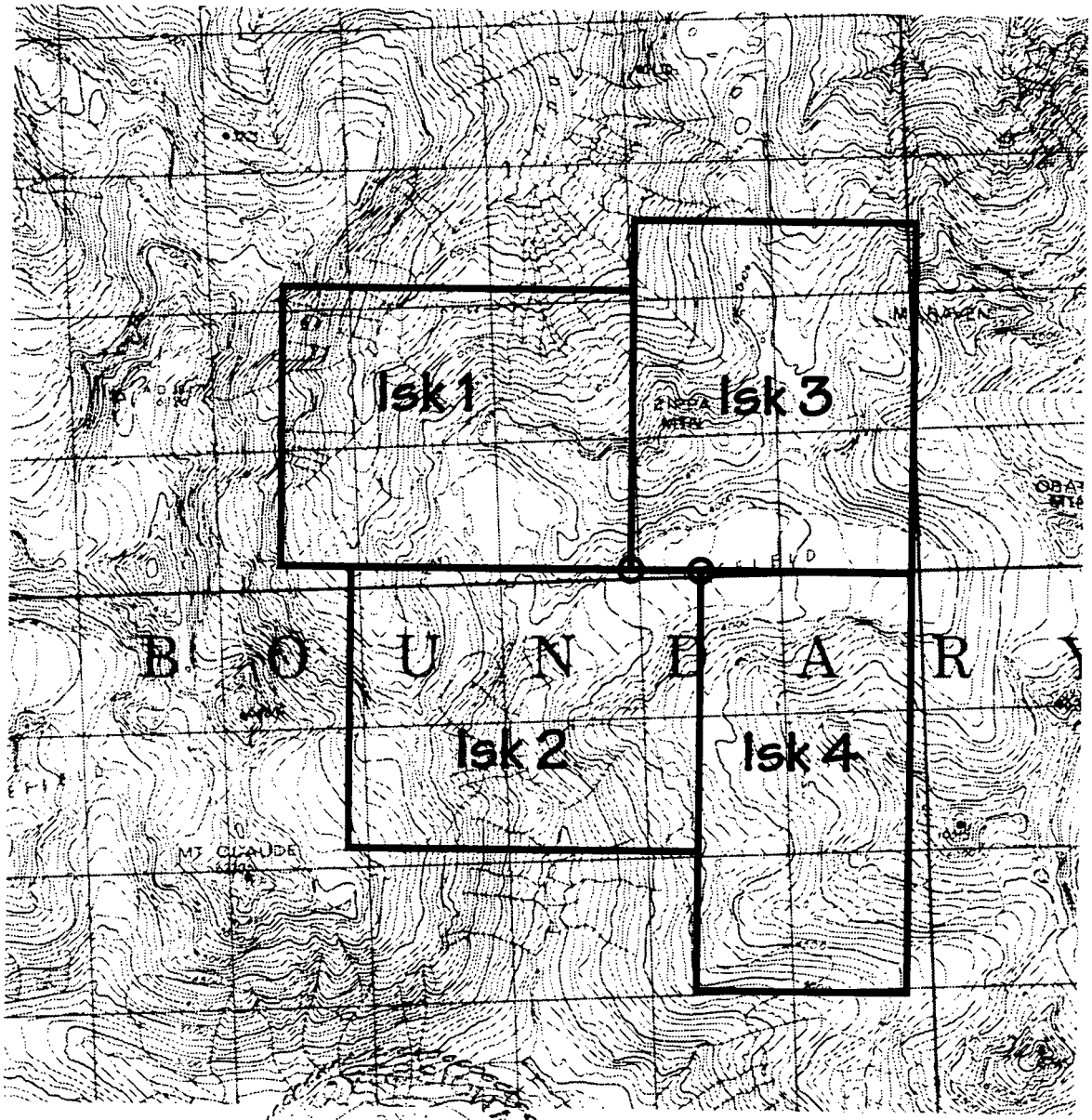
Table 2-1 Mineral Claim Data

222 OWNER

The claims are registered 100% in the name of Super Twins Resources Ltd Resources Ltd.[2] Production revenue is subject to a 20% npi with an option for buy out of 10% of the npi for $1 million.[3]

[2] Mineral Titles office, Vancouver 3 November, 1995

[3] as advised B. A. Lueck, Director ,Super Twins Resources Ltd



ISK WOLLASTONITE
Super Twins Resources Ltd

ISK mineral claims on NTS base

Base:	NTS	Scale:	1:50 000
Region:	Iskut, BC	Date:	Nov 1995
M.D.:	Liard	Plate:	2-1

2.3 LOCATION AND ACCESS

231 LOCATION

The property is located in the Iskut region of north-east British Columbia about 240 km northwest of Smithers BC – report cover. The approximate latitude is 56° 39 ′ 10 ″ N and longitude 131° 18 ′ 37 ″ W at about 14 km due west of the Bronson airstrip and the Snip gold mine and some 75 km west of the Stewart Cassiar highway.

Topographic maps references, for the Cliff Deposit, are:

NTS 1:50 000 series 104B/11 - Craig River	– NAD 27,UTM 9 – 359372E, 6280881N
TRIM 1:20 000 series 104B.064 digital	– NAD 83,UTM 9 – 359265E, 6281079N.

232 ACCESS

Access to the region is by charter flight with fixed wing landing available at Bronson Creek airstrip (nominal 1 500 m runway) at

UTM 9 – NAD 27	372903E	6284170N
UTM 9 – NAD 83	372796E	6284362N
Lat/Long	56° 41 ′ 16 ″ N	131° 16 ′ 23 ″ W

From here a helicopter is essential to get to the property. Winter snows are probably heavy and access should be considered for only the summer months of July to September.[4,5] Low cloud can restrict the access in summer because of the prevailing winds from the northwest.

The only alternative access to Bronson Creek is by boat along the Iskut river. This is a braided river and very shallow and has many bars which are continually shifting and may not be navigable except for shallow draught boats for most months of the year either because of ice or too low a water level. We note that the Snip gold mine uses a hovercraft, excluding the winter months when a DC4 plane is employed, for transporting gold and concentrates to and fuel oil from Wrangell, Alaska.

2.4 PHYSIOGRAPHY

The claim blocks cover a variety of glaciers, mountains, alpine meadows and ice fields where the relief is about 800 m ranging from 1 000 to 1 800 m ASL. Regional elevation highs are probably about 2 200 m. Plate 2-2 shows this area in 100 ft contours. The terrain can best be described as extremely rugged and, apart from a small area on the south flanks of the Iskut river, is all above the tree line – see Plates 4-4, 4-6 to 4-9.

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[4] The nearest reporting weather station is Bronson Creek but no reports have been made since 1992, the next nearest is Bob Quinn but at about 1 000 m lower elevation and 75 km to the E. NE

[5] Kerr in his 1948 report advises mid October as a final date for work in the region but was, presumably, referring to the lower river valleys

The tree line in this region and on the claims seems to be at about 1 000 m. Although the lower parts of the Glacier deposit are below this elevation the combination of north facing aspect and the lateral moraine has precluded the growth. In general vegetation is grass, pink and white heathers and various small alpine plants and shrubs none more than 150 to 300 mm high.

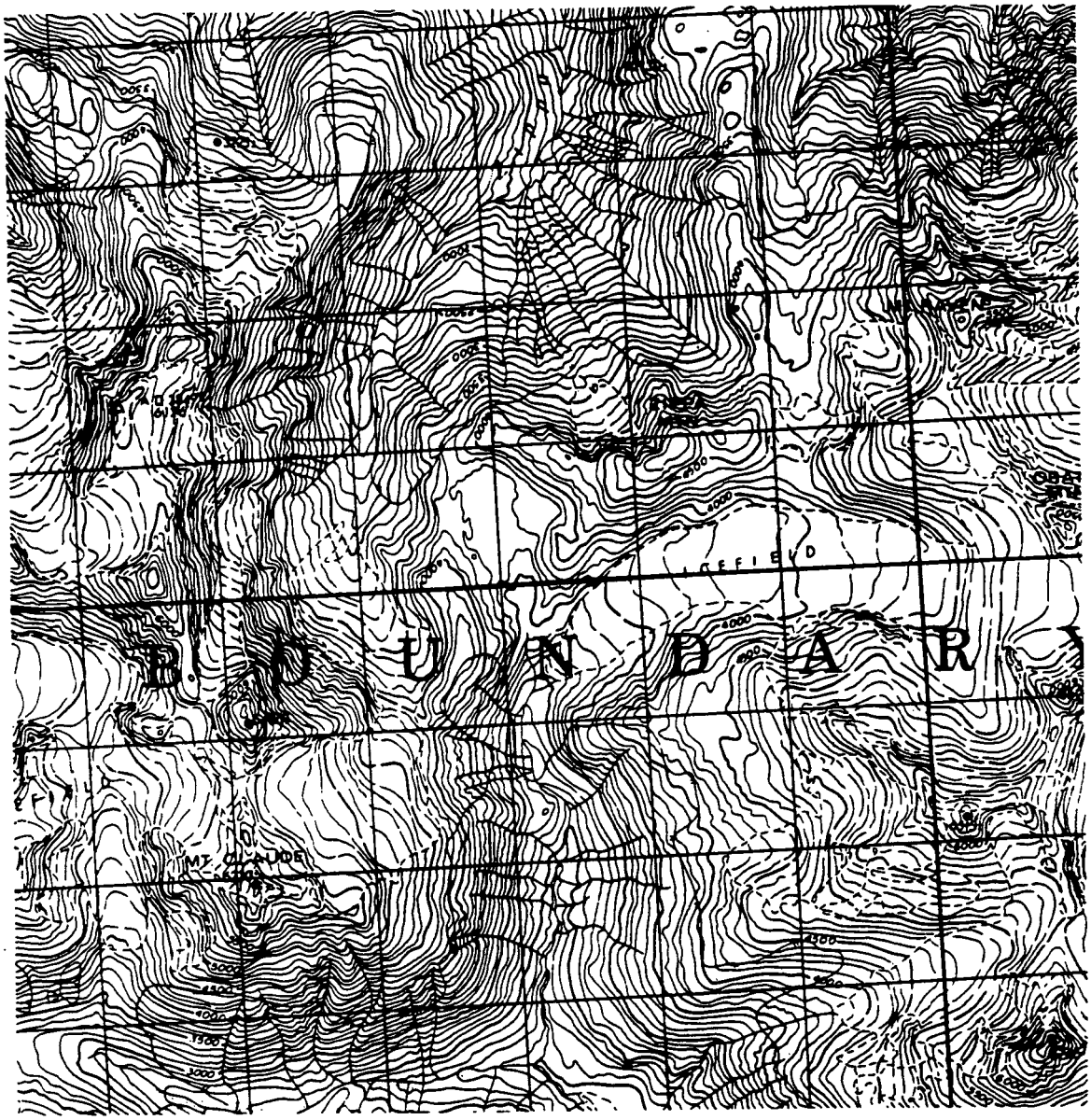
Care should be exercised using the topographic maps as we note that glaciers have receded as much as 200 m[6] or more since the base data was collected for TRIM in 1982 and that the time base for the NTS is 1965.

2.5 INFRASTRUCTURE

The claims have no road access and the nearest public services are at Wrangell Alaska about 65 km or 20 minutes flying time to the southwest. Apart from the landing facilities at Bronson Creek airstrip there is the Snip and Pamicon camps and Snip mining operation.

Nearest regional road access at the Eskay Creek mine and the alternative of the Stewart -Cassiar highway at Bob Quinn lake about 20 minutes flying time for a helicopter at 75 km to the east-northeast.

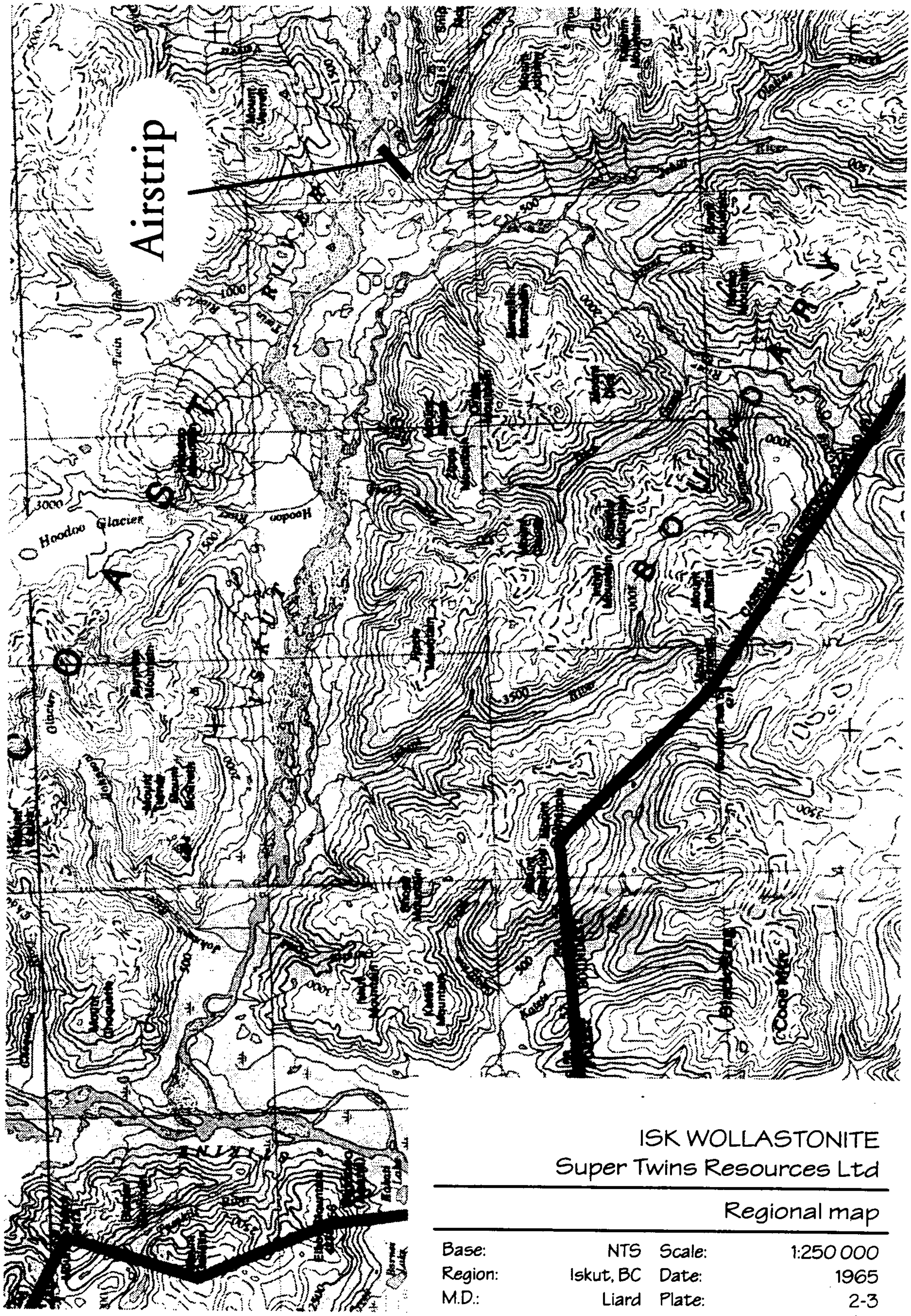
[6] eg the glacier on the south west flank of Mount Raven the toe of which covers part of the probable BryS deposit



ISK WOLLASTONITE
Super Twins Resources Ltd

Topography map

Base:	NTS	Scale:	1:50 000
Region:	Iskut, BC	Date:	1965
M.D.:	Liard	Plate:	2-2



ISK WOLLASTONITE

Super Twins Resources Ltd

Regional map

Base:	NTS	Scale:	1:250 000
Region:	Iskut, BC	Date:	1965
M.D.:	Liard	Plate:	2-3

3 HISTORY

3.1 DISCOVERY

First reference to the occurrence of wollastonite was by Kerr who in the 1920's in his mapping of the region noted the alteration of the limestone to wollastonite.[7] No site specific references to wollastonite are noted until the 1993 fieldwork of Brian Lueck PGeo who discovered the two deposits subsequently named the Cliff and BriL.[8,9] Three further discoveries were made in 1995 – Plate 3-1.

3.2 PRODUCTION

No production of any minerals is known on the claim area.

3.3 PROPERTY EXPLORATION

Only regional mapping is noted until 1993 when Brian Lueck during a mapping programme identified two deposits – Plate 4-1. The intrusions comprising the igneous complex of Zippa Mountain, Mount Raven and Seraphim Mountain plutons were first mapped in 1948[10] and further described in 1991[11] and 1993[12]. The original descriptions for these sequentially emplaced plutons derive from the work of Anderson.[13]

The 1995 work concentrated on systematic sampling and mapping of the two most accessible deposits – the Cliff discovered in 1993 and Glacier discovered in 1995 – and limited sampling of the BriL found in 1993 and BartNick and BryS found in 1995 – see § 441 and Plate 3-1.

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7 Kerr, F.A.; "Lower Stikine and western Iskut river areas, BC". Geological Survey of Canada, Memoir 246, 94 pp (1948)

8 Lueck, B.A.; "Geological evaluation of a wollastonite resource: geological report for the ISK 1-4 claims". private report. (1 Apr 1995)

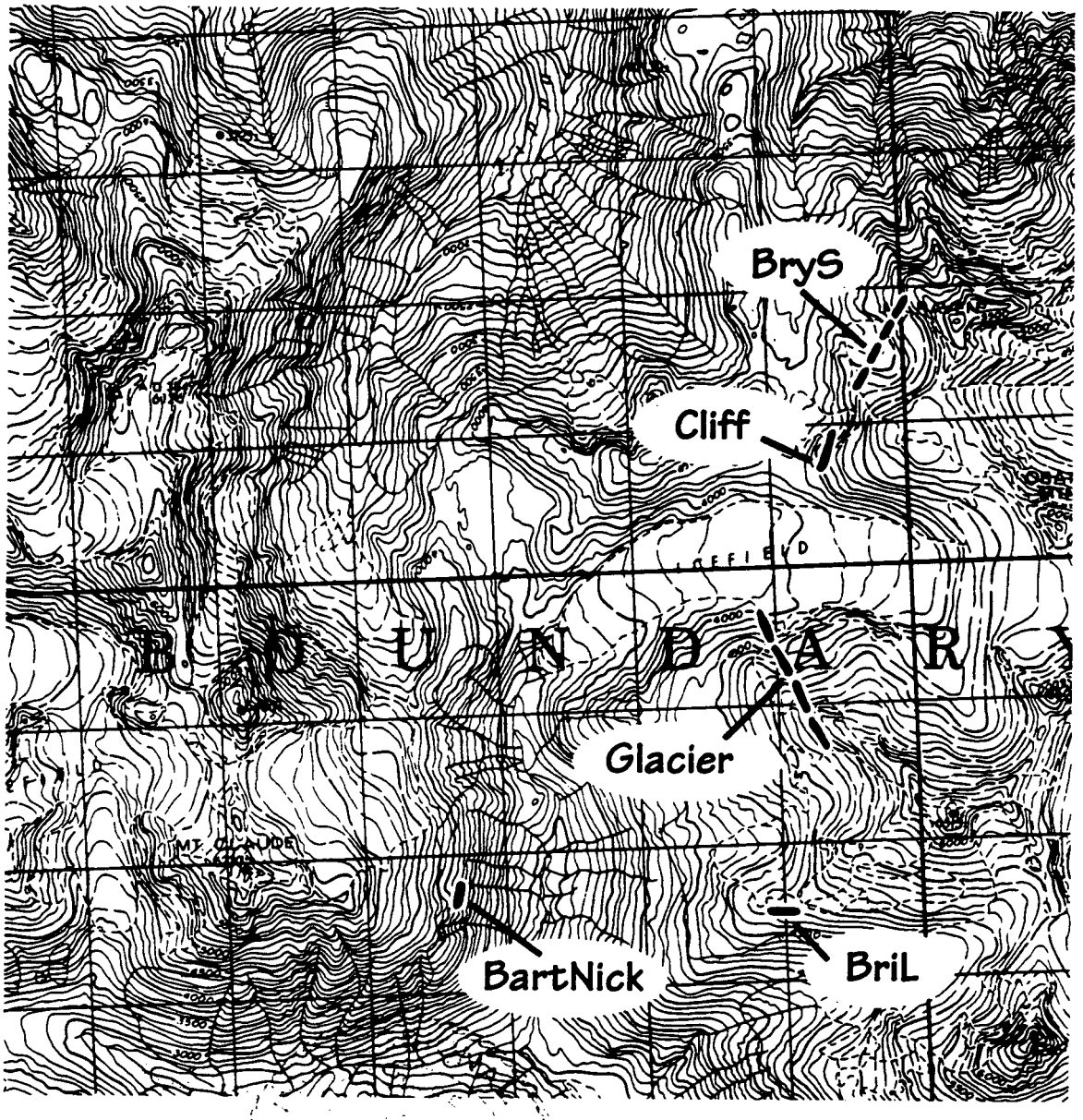
9 names were set during the 1995 field exploration programme

10 Kerr, F. A..; "op cit.

11 Woodsworth. G. A., Anderson, R G., and Armstrong. R L.; "Geology of the Cordilleran Orogen in Canada". Gabrielse, H., and Yorath, C.J., eds Chapter 15, Canada Geological Survey, Geology of Canada, no. 4 pp 491-531.(1991) as cited Lueck, B.A.; "Geological evaluation of a wollastonite resource: geological report.. for the ISK 1-4 claims". private report. (1 APR 1995)

12 Anderson, R G.; "A Mesozoic stratigraphic and plutonic framework for north-western Stikinia (Iskut River area), north-western British Columbia, Canada". In G. Dune and K., (eds.), Mesozoic Paleogeography of the Western United States – II, Society of Economic Palaeontologists and Mineralogists, Pacific Section, vol. 71, pp 477-494.(1993) as cited Lueck, B.A.; (1995)

13 Idem



ISK WOLLASTONITE
Super Twins Resources Ltd

Wollastonite deposits so far discovered

Base:	NTS	Scale:	1:50 000
Region:	Iskut, BC	Date:	Sep 1995
M.D.:	Liard	Plate:	3-1

4 GEOLOGY

4.1 PREAMBLE

Section 4-Geology provides an overview of the region and property, a summary of results of the 1995 exploration and the geological maps for two deposits. For both the regional and property descriptions we acknowledge the work by Brian Lueck PGeo and the two deposit geology maps by Bart Jaworski of UBC.

4.2 REGIONAL

The region is dominated by three plutons – Zippa Mountain, Mount Raven and Seraphim Mountain – which collectively comprise the Zippa Mountain igneous complex.

The Zippa Mountain pluton has an elliptical out-crop of about 3.5 by 5 km. The intrusion which is zoned and layered is characterised by well-developed planar mineral fabrics and, based on modal mineralogy, is strongly silica undersaturated. The Mount Raven and Seraphim Mountain plutons are younger, latest Triassic, spatially and temporally associated intrusions – Plate 4-1.

These plutons intrude into complexly deformed and metamorphosed Paleozoic limestone and calcareous siltstone of the Stikine Terrain. These attributes are found in a significant number of other Cordilleran alkaline intrusions[14,15] as, for example, Mesozoic alkaline plutons that are zoned from syenite to pyroxenite, trachytic and strongly undersaturated occur in both Stikinia and Quesnellia.[16]

The Zippa Mountain pluton has an age of ~210 Ma based on U-Pb dating of zircon.[17] The Mount Raven pluton is undated but older than the Seraphim Mountain intrusion which is dated at 213 ± 4 Ma by K-Ar on hornblende.[18] The Seraphim Mountain pluton intrudes into the Triassic Stuhini Group volcanic rocks and also crosscuts and brecciates rocks of the Mount Raven pluton. Furthermore, field relationships indicate the Zippa Mountain pluton is older than the Mount Raven pluton, making it the oldest intrusion recognised in the igneous complex.[19]

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14 Woodsworth, G. A., Anderson, R G., and Armstrong, R L. op cit.

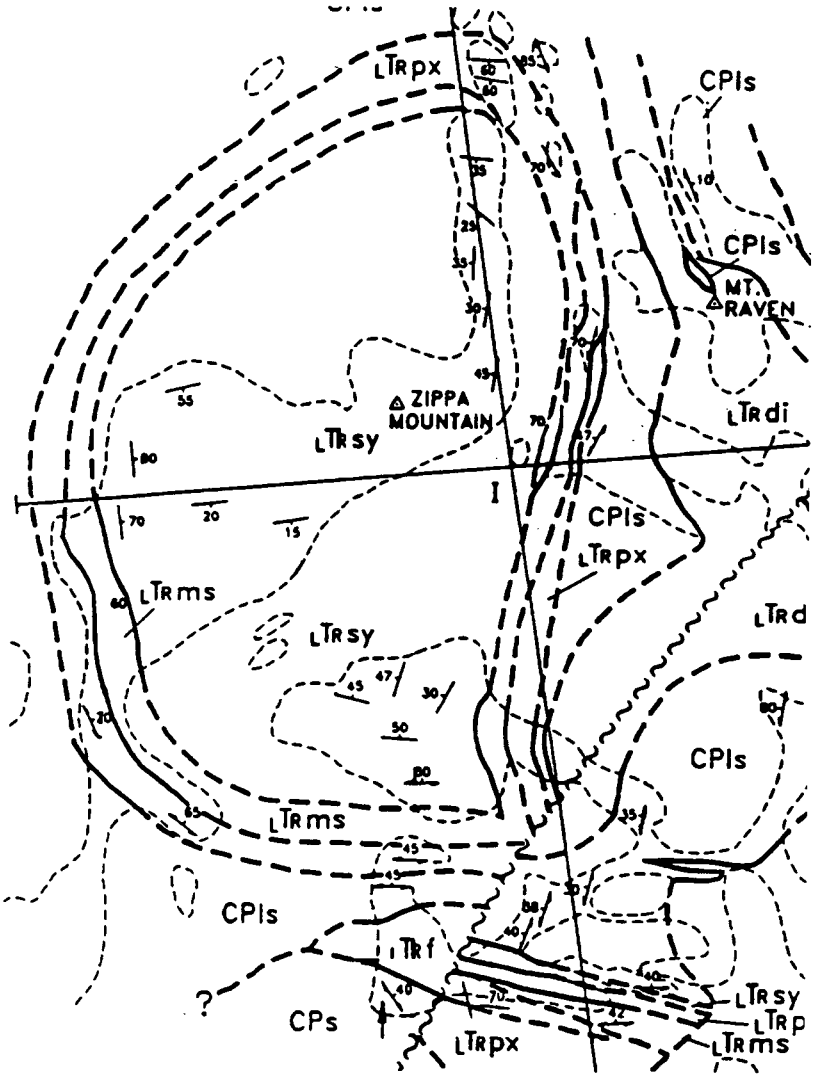
15 Lueck, B. A., Neil. I., Russell, J. K.;"The Rugged Mountain Pluton: an example of the Melanite Bearing Pyroxenite Syenite Association". Geological Association of Canada-Mineralogical Association of Canada, Programs with Abstracts, v. 18, p A61.(1993)

16 Lueck, B. A., Neil, I., Russell, J. K.; op cit.

17 Bevier, M.L.; private communication

18 Anderson, R.G.; "A compilation of K-Ar ages". Report 20. as cited Hunt, P. A. and Roddick, J. C.; in Radiogenic age and isotope studies: Report 4. Geological Survey of Canada, Paper 90-2, p 122. [analysis GSC 90-40]. (1991)

19 Lueck, B.A.; op cit.



LEGEND

- LTRg — Seraphim pluton: equigranular biotite-hornblende granite
- LTRdi — Mt. Raven pluton: equigranular or hornblende feldspar porphyritic diorite; local gabbro
- LTRf — felsic syenite: equigranular syenite with little or no mafic minerals
- LTRsy — Zippa Mtn. K-feldspar syenite: layered and trachytic syenite and vishnevite-cancrinite pegmatite
- LTRms — Zippa Mtn. mela-syenite: syenite with >40% mafic minerals: pyroxene, melanite and biotite
- LTRpx — Zippa Mtn. pyroxenite: equigranular to pegmatitic aegirine-augite pyroxenite
- TRv — Stuhini Group: layered tuffaceous volcanic rocks and pyroxene porphyritic flows
- CPIs — limestone, calc-silicate rocks, shale, thinly laminated calc-silicate and recrystallized limestone with interbedded calcareous shale
- CPs — chert, shale, graphitic shale with interbedded, massive chert
- CPsc — schist, phyllite derived from CPs; mica schist at margin of Seraphim pluton

SYMBOLS

- cumulate layering
- transposed layering, schistosity
- mineral lineation
- fault
- geological contact: defined, approximate
- limit of outcrop

ISK WOLLASTONITE
Super Twins Resources Ltd

Local geology

Base:	Lueck	Scale:	sketch
Region:	Iskut, BC	Date:	1993
M.D.:	Liard	Plate:	4-1

4.3 PROPERTY

431 GENERAL

The property is dominated by the Mount Zippa Pluton, an elliptical laccolith about 14 km^2 in area comprising three main rock types: pyroxenite, syenite and mela-syenite – Plate 4-1. The pluton is zoned from a pyroxenite border phase to mela-syenite and to trachytic K-feldspar syenite in the core. The silicic undersaturated nature of the pluton is manifest in abundant and widespread vishnevite-cancrinite[20] and melanite garnet showing strong oscillatory zoning.[21]

The pyroxenite forms an inwardly-dipping marginal phase which grades through mela-syenite to the core syenite . The most extensive rock type is syenite which commonly shows a strong planar alignment of platy K-feldspar. The planar alignments of K feldspar and acicular pyroxene define a concentric, inward-dipping foliation that shallows towards the interior of the intrusion. Large-scale petrological zoning, small scale mineral layering and a clear and distinct igneous foliation suggest that these rocks were dominantly formed by gravitational settling of minerals crystallising from a strongly undersaturated alkaline magma.

432 MINERALIZATION

The Wollastonite occurs as skarn formations round the margins of the Mount Zippa pluton – see Plate 4-1.

Sub-samples of the raw wollastonite from beneficiation trials, after an intial crushing and screening at 20 and 48 mesh, were sent for petrographic examination to provide direction for the trials. The report, in part, says:

> "Samples have a moderately variable texture and mineralogy between fragments. Mineral intergrowths are best seen in the two coarser fractions; the -48 fraction is mainly of single grains. Many fragments are dominated by wollastonite with minor to moderately abundant clinopyroxene and minor garnet. A few fragments are dominated by clinopyroxene and a few by garnet-(calcite). A few fragments are dominated [by] one or more of calcite, K-feldspar and quartz. Minor minerals include sphene, plagioclase, and opaque. Opaque probably is mainly pyrite, which was identified in the offcut block of samples S3 (+20) and S1 (-48). Carbonate occurs in two main textures. Calcite with low relief forms replacement patches and veinlets. Carbonate with high relief occurs in extremely fine grained aggregates in part with garnet, possibly as a replacement of other silicates. In the modal analyses, this carbonate was not distinguished from calcite.
>
> Coarser size-fractions tend to have more abundant clinopyroxene, garnet and feldspars than finer fractions, whereas wollastonite increases in abundance with increasing fineness. This is probably because wollastonite was more readily fractured than the other minerals, and therefore it would be concentrated in the finer fractions."[22]

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[20] by XRD

[21] by optical microscope

[22] Payne, J.G.; "Wollastonite – analyses of samples S1 to S4". (Sep 1995)

4.4 RESULTS OF 1995 EXPLORATION

441 PROSPECTING

Although the Cliff deposit, because of its size and exposure, offers the potential for a long production life, it was deemed important to investigate the claim potential by prospecting. The BriL – Plate 3-1, identified in 1993 by Brian Lueck, offers further large tonnage potential although not so accessible as the Cliff.

However, extensive prospecting was restricted by the mountainous terrain, ice fields and glaciers and weather conditions but two other deposits were found and, from sampling, confirmed – Glacier and BartNick and a fifth – BryS considered probable. These deposit locations are shown on Plate 3-1, marked on the geology map Plate 4-1 and shown in photographs in Plates 4-2, 4-4 and 4-6 to 4-9.

In the case of the Glacier deposit an estimated 60% was covered by snow and ice even at the end of August and reliance was placed on two nunatuks to demonstrate continuity from the lower outcrops to the ridge – Plate 4-6. The BryS, which is probably some form of extension of the Cliff, lies partially under the present toe of a receding glacier.

442 MAPPING

Geological mapping of both the Cliff and Glacier outcrops was carried out. These maps are presented in Plates 4-3 and 4-5.

443 SAMPLING

For the scoping trials four 30 kg samples were collected from the four separate scree piles along the base of the Cliff deposit – Plate 4-4 shows two of the scree piles – and a fifth was a composite of 16, 1 x 1 m panel samples taken on the south west top corner of the Cliff immediately below the dyke which cuts off the deposit – Plates 4-2 and 4-7.

Detailed sampling for both the Cliff and Glacier was carried out in consecutive one metre panels with a typical sample mass being 4-5 kg.[23] In the case of the Cliff this was on the scree at the then snow line – Plate 4-2. For the Glacier the panel sampling was in broken rock, blasted in trenches as part of the field programme. Several samples were collected from the BriL and BartNick but only one sample was taken from the BryS.

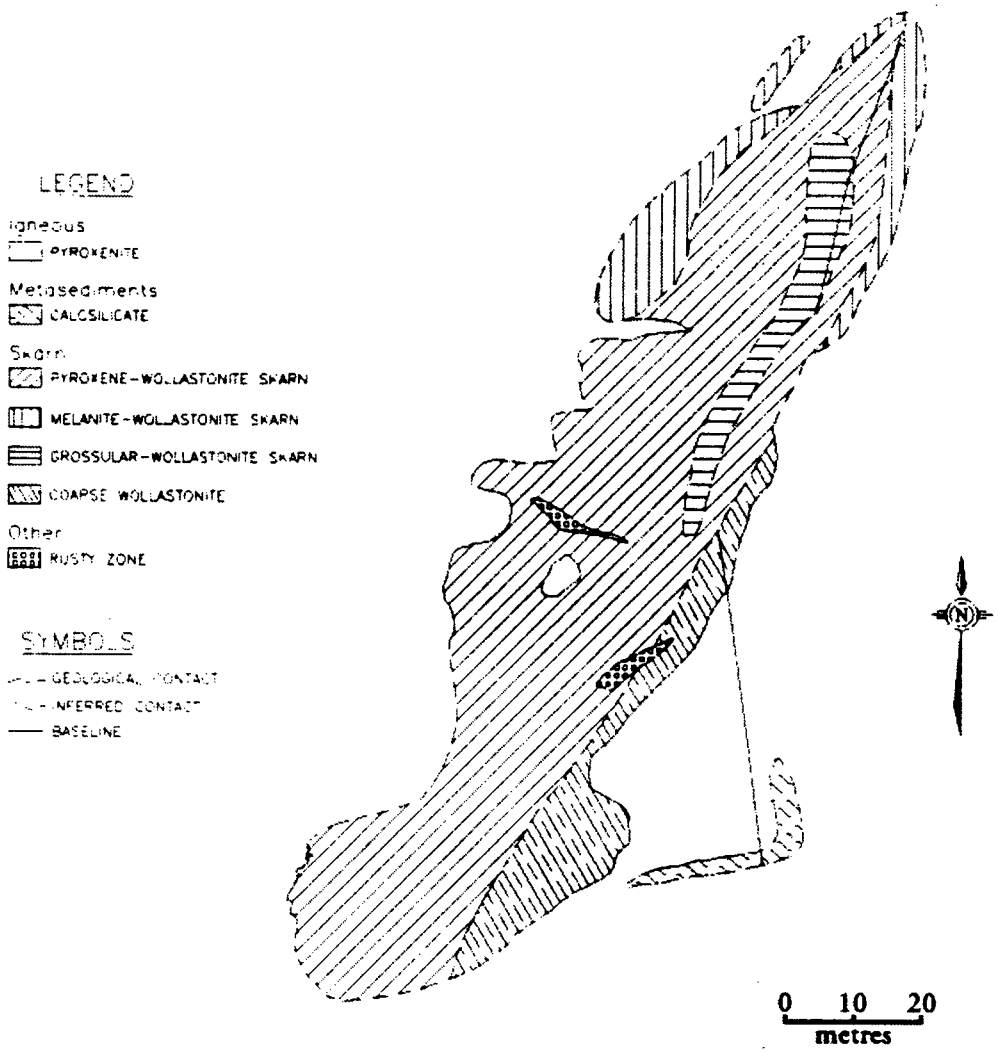
The sampling of the scree piles was adequate and representative for both the scoping trials and the sampling for the detailed tests – in fact the weathering because it had penetrated in parts up to 10 m or more into the face allowed for a nominal three dimensional sampling. Safety precluded an insitu sampling programme at the Cliff because of the vertical face and loose rock. – Plate 4-4

The separate scree piles arose because of varying weathering characteristics of the face. This has led to some dilution of the wollastonite scree from the pyroxenite pods and dykes which will have also

[23] panel sampling, where a sequence of areas are sampled, is the preferred technique as it recognises the area as being more representative than a line as in channel sampling

weathered. Because of this dilution and the run-of-mine basis of sampling, the wollastonite content will at times be understated. However, an examination of the vertical face of the Cliff showed, in our judgement, that selective mining would be possible to avoid the pods or dykes to produce a high grade raw wollastonite. As such we can, if necessary, apply an adjustment factor to the test results.

Plate 4-2 Photographs of sampling



ISK WOLLASTONITE
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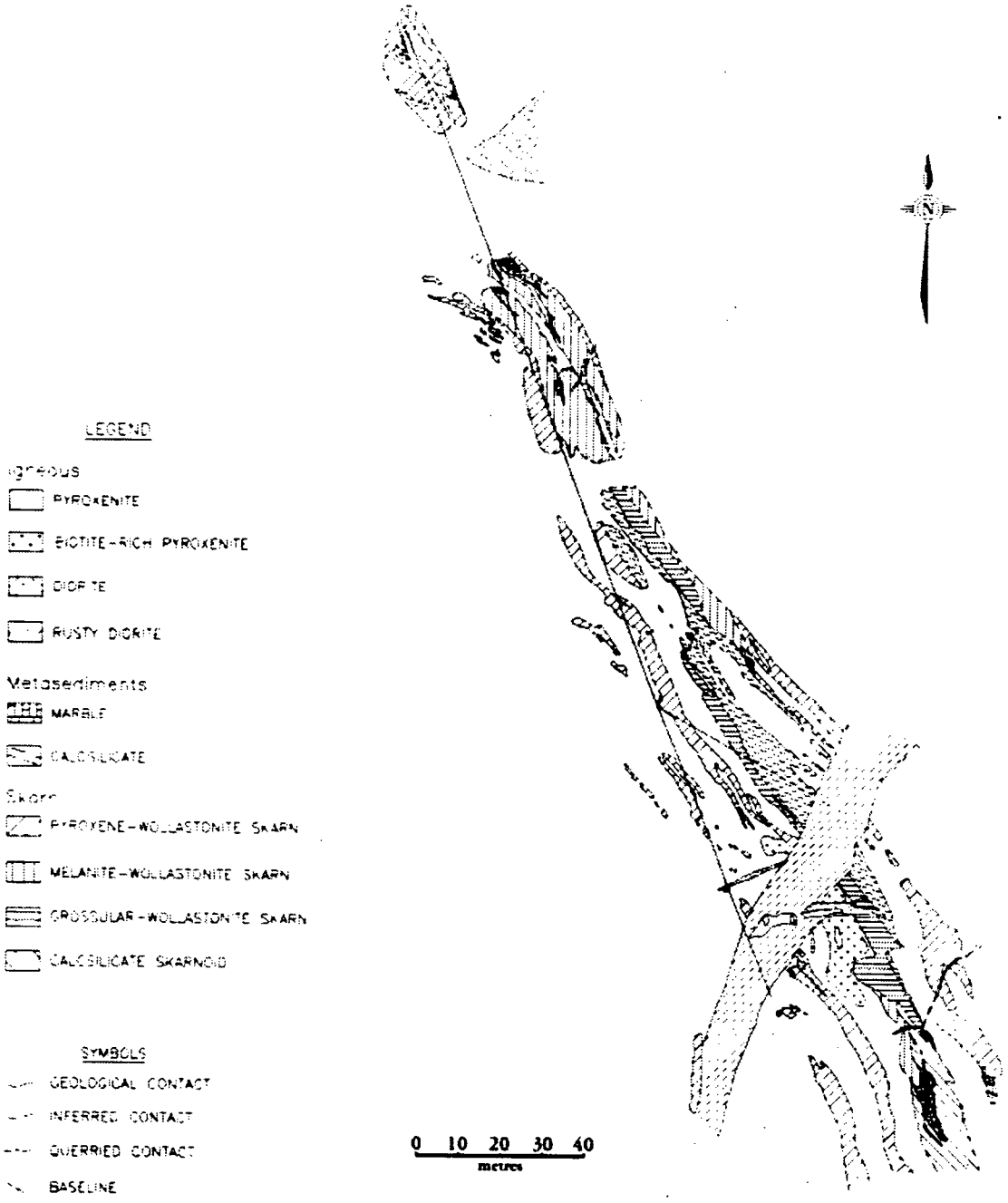
Cliff deposit - geology map

Base:	Jaworksi	Scale:	scale bar
Region:	Iskut, BC	Date:	Aug1995
M.D.:	Liard	Plate:	4-3

Plate 4-4 Photograph looking south at the Cliff deposit



ISK WOLLASTONITE
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Glacier Deposit - geology map of exposed lower portion

Base:	Jaworski	Scale:	scale bar
Region:	Iskut, BC	Date:	Aug 1995
M.D.:	Liard	Plate:	4-5

Plate 4-6 Photograph looking south to the Glacier deposit

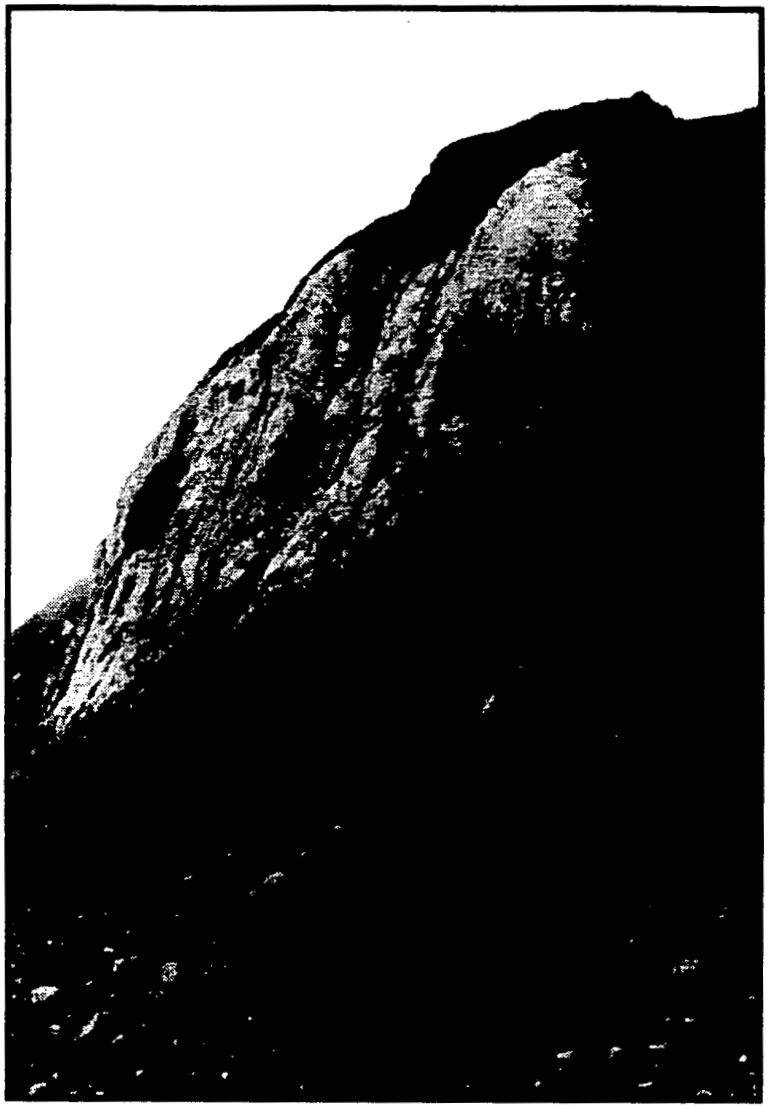

Plate 4-7 Photograph of the cliff deposit showing dyke at south end

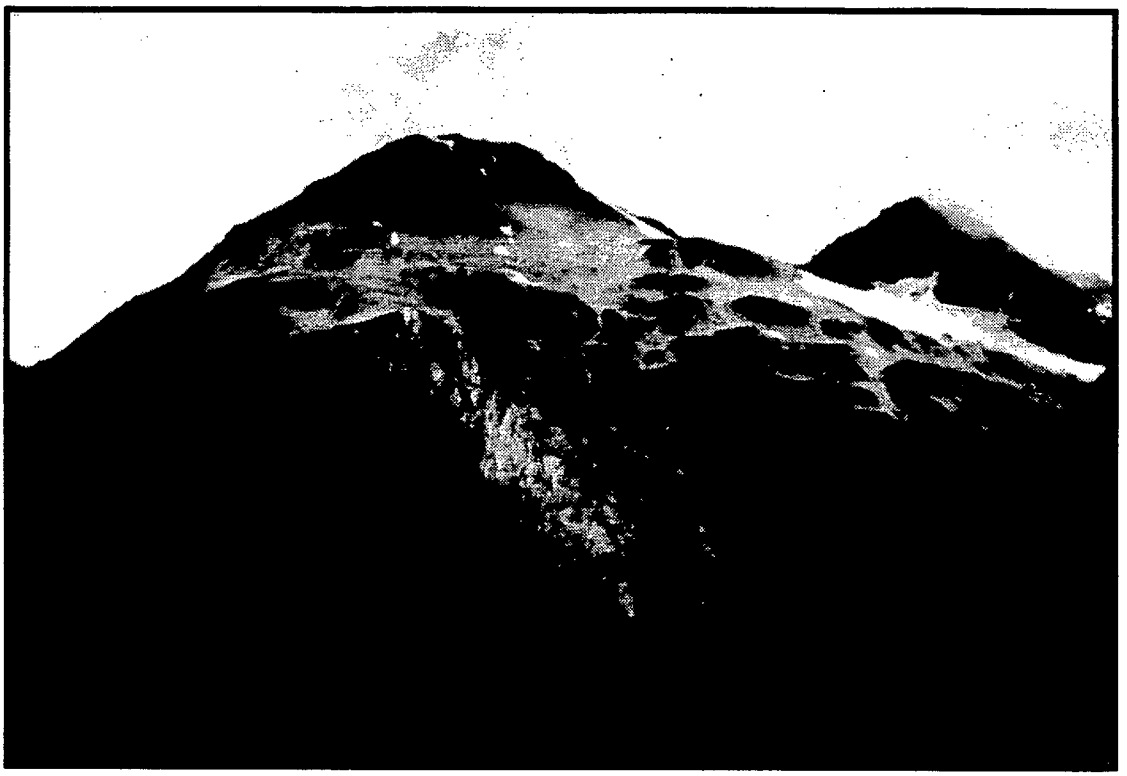

Plate 4-8 Photograph of the BartNick deposit

Plate 4-9 South end of the probable BryS deposit seen from the Cliff deposit

5 BENEFICIATION AND CHARACTERISATION

5.1 PREAMBLE

Section 5- Beneficiation and Characterisation describes the testing and results of the scoping trials. It is not intended to document the technology of the testing.

For wollastonite to be prepared into market type products there are four essential steps: concentration and recovery of wollastonite from the raw wollastonite[24] and grinding and sorting of the concentrate into various size fractions.

Wollastonite markets cover various grades related to chemical purity, particle size and the specific attribute of acicularity – needle-like – which is described by the aspect ratio and measured as length : width. Determination of these potential market type product grades is the first essential step in understanding and qualifying the deposits as having merit since not all may have the characteristics to allow for the production of all grades. The concentration and extraction is measured by the yield – percentage of the raw material removed – and described with the resulting concentrate purity – see §523.

5.2 BENEFICIATION

521 TERMINOLOGY

The term *beneficiation* means the treatment of ore or raw material to improve its properties.[25] Use of the term for ISK wollastonite in this report means specifically the concentration by magnetic separation and/or flotation.

522 SCOPING TRIALS

Prior to any test work it is important to undertake an initial evaluation to determine the scope of the treatment. For ISK we collected, as part of the initial site evaluation in late July, five large samples for the scoping beneficiation evaluation.

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[24] as opposed to the beneficiated or product wollastonite

[25] the term raw material is preferred for industrial minerals and consistent with industry and market use

523 RESULTS

Table 5-1 lists the yields and purities for the four scree samples collected.

Sample	yield %	product purity % wollastonite
S1	79.5	97.1
S2	89.8	97.3
S3	94.4	97.1
S4	74.1	97.3
a. mean	84.5	97.2

Table 5-1 Cliff Deposit – scoping trials yields and purities

These are excellent values and indicate the potential, from selective mining, for a high purity deposit.

5.3 CHARACTERISATION

531 TERMINOLOGY

Characterisation is the measurement of parameters essential for the market acceptance. These vary according to the specific market type product.

532 TESTING

Concentrates from flotation and magnetic separation from the four scree samples were tested for iron and calcium oxide by ICP (in a technique to avoid measuring the CaO component of wollastonite) given that a low iron and loss on ignition are specific criteria. At this initial stage these two items are the most critical. Also important for a filler grade is a good brightness – Table 5-2.

The often quoted *aspect ratio* is applicable only to the final products when they have been produced from grinding – an action which separates out the individual needles. Prior measurements will understate the potential when the crystals remain in the lath bundles. To illustrate this in Figure 5-1 are sets of preliminary measurements for both the raw material and concentrates. The shift to higher value aspect ratio is clearly shown as crushing has advanced from the raw material to the concentrate. Both series of results indicate a Poisson type distribution.

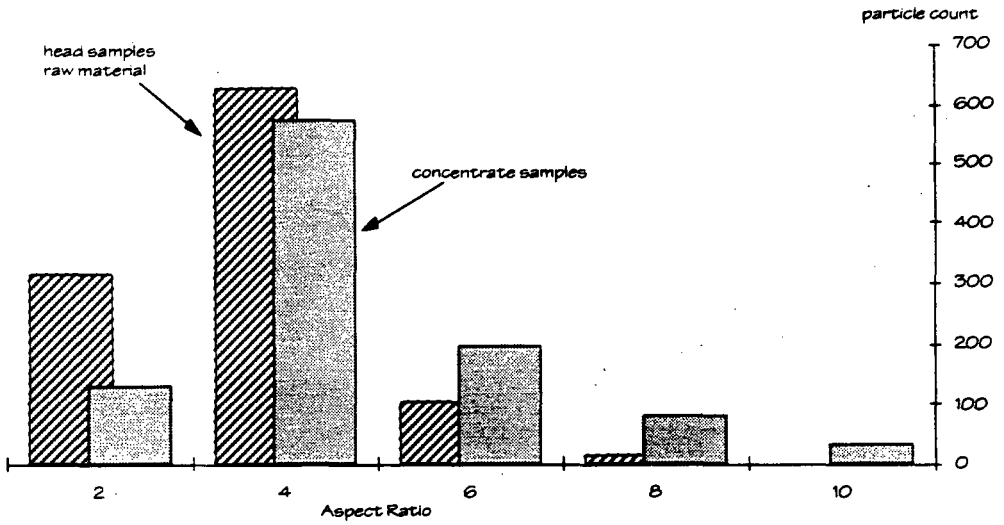

Figure 5-1 Increasing aspect ratio with increasing crushing

533 RESULTS

The results tabulated below are very good for preliminary values and indicate typical market standards of less than 1% iron and LOI can be expected to be met. The sum of the arithmetic means of wollastonite purity plus iron plus carbonate is a nominal 100%.

By standard calculation the LOI can be estimated at about 0.89%.

The brightness at 87 % ISO measured from a composite of the four scree samples is excellent for what for now would be a coarser grind than the final screen grades and an increase into the low 90's is not unreasonable to expect. Brightness is quoted as ISO in the international scale which is about 2 points lower than the north American GE scale.

Sample	product purity % wollastonite	Fe_2O_3 %	$CaCO_3$ %	Brightness ISO
S1	97.1	1.2	1.7	
S2	97.3	0.9	1.8	
S3	97.1	1.6	1.3	
S4	97.3	1.0	1.6	
a. mean	97.2	1.2	1.6	87.3

Table 5-2 Basic attributes of the ISK Cliff deposit from scoping trials

6 EVALUATION STRATEGY

6.1 PREAMBLE

In Figure 6-1 we present the outline of the strategy being followed by MineStart™ for the 1995 programme

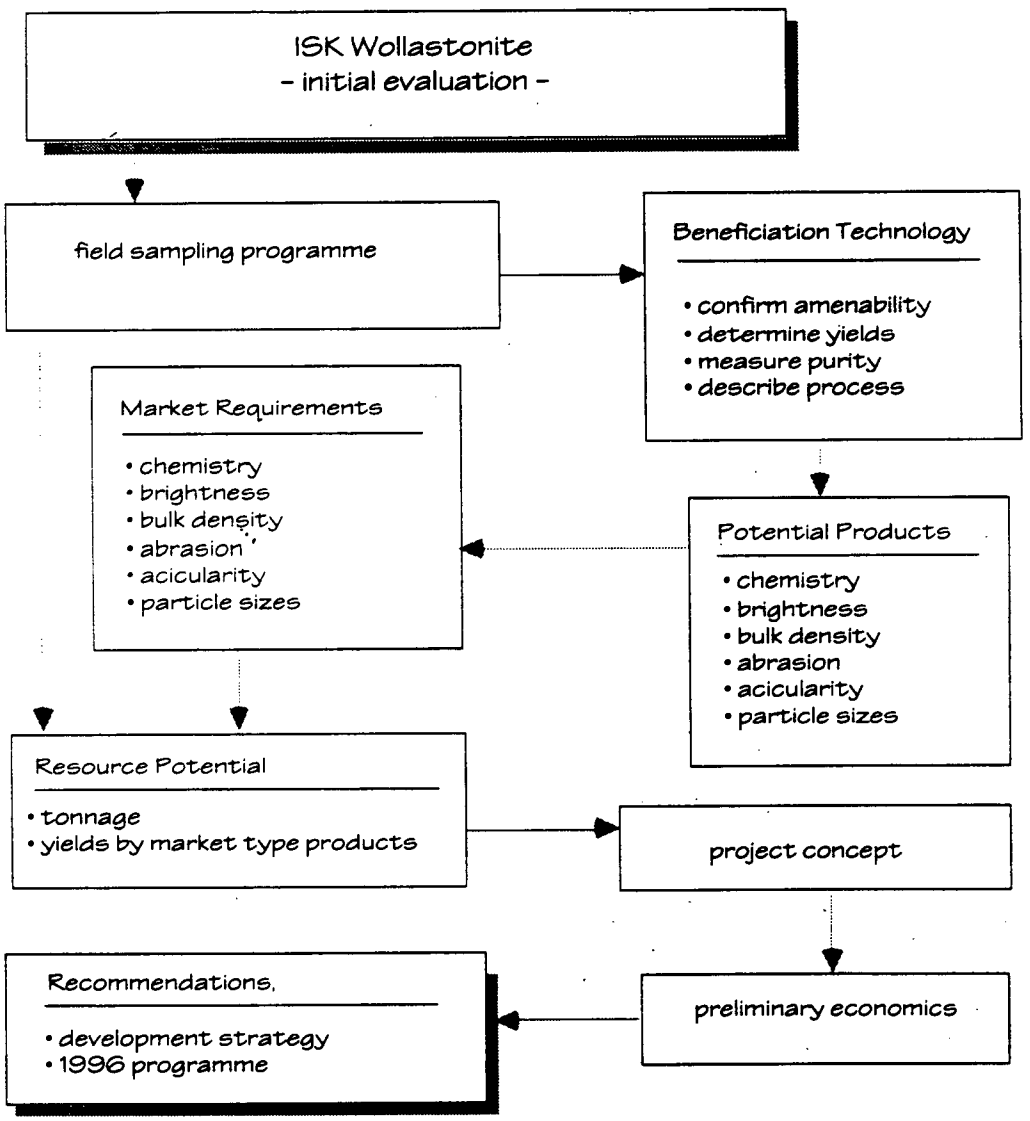

Figure 6-1 1995 Investigation Strategy

The exploration strategy for 1995 rested on two needs. First a sampling programme which can provide a statistical confidence level which calls for a sufficient number of samples that the distribution model can be determined and means and standard deviations can be estimated. Second a focus on the mineral market which means characterisation of the market attributes.

With the completion of the scoping trials the results of which are given and discussed in this report the systematic testing of the 250 panel samples has now begun using technology refined during the trials.

ENGINEER'S CERTIFICATE

I, Bryan A. Slim, do hereby certify that:

1 I am a consulting mining engineer and a principal of MineStart Management Inc with a business address at 1763, Scott Road, North Vancouver, British Columbia, Canada, V7J 3J4. telephone (604) 986-7014, fax (604) 986-7017

2 My qualifications and professional associations are:

- M.B.A. Simon Fraser University
- B.Sc. Mining Engineering, University of London.
- A.R.S.M. Associate of the Royal School of Mines
- Mine Managers Certificate of Competency, Republic of South Africa
- member of the Association of Professional Engineers and Geoscientists in the Province of British Columbia, Canada
- Chartered Engineer in England
- Member of the Institution of Mining and Metallurgy
- Member of the Canadian Institute of Mining and Metallurgy
- Member of the American Institute of Mining, Metallurgical and Petroleum Engineers.

3 I have been professionally active in my career in Canada, Africa, South America, Asia and U.S.A. since 1963.

4 This study for Super Twins Resources Ltd Resources Ltd is based on my site work from 14 to 25 July and 4 to 20 August, 1995, sampling as carried out under my direction, professional laboratory testing, examination of company files, discussions with company principals and other as noted, secondary data sources, experience and my professional engineering and marketing judgement.

5 As author of this report I consent to its exclusive use by Super Twins Resources Ltd Resources Ltd for their legitimate needs. Neither the report nor any information contained herein or otherwise supplied by MineStart in connection with the study shall be released by Super Twins Resources Ltd Resources Ltd or used by others in any connection without the express written consent of MineStart Management Inc and any use which a third party makes of this report, or any reliance on or decisions to be made based on it are the responsibility of such third parties. MineStart™ accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Signed and sealed in North Vancouver, Canada, this 10 day of Nov 1995.

Bryan A. Slim, BSc, ARSM, MBA, MIMM, CEng, PEng.