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REPORT ON
THE MARBLE DEPOSIT
OF
KNIGHT INLET RESOURCES LTD.(NPL)

By:

ALLEN GEOLOGICAL ENGINEERING LTD.
507 - 789 West Pender Street
Vancouver 1, B.C.

October 28th. 1970.

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THE MARBLE DEPOSIT
OF
KNIGHT INLET RESOURCES LTD. (N.P.L.)

INTRODUCTION

For the past year the writer has directed a works programme on the vari-coloured marble deposit of Knight Inlet Resources, located on the steep east slopes of Matsiu Creek one and one half miles from tidewater.

From October 5th. to 12th., last, the writer and assistants T. Thomas and R. Thomas examined all showings and workings and, using chains and transit, mapped the area.

A camp, comprising two wood-frame buildings, has been established at the beach. A road has been constructed to the marble zone. In addition to the four adit tunnels which were excavated on the marble zone in the 1920's, trenching and diamond drilling have recently been employed to provide additional information preparatory to finalizing production plans.

The purpose of this report is to correlate all data acquired to date, and to recommend a works programme considered to be most practicable to bring the project to the production stage.

LOCATION AND ACCESSIBILITY

The marble deposit of Knight Inlet Resources is located on the north side of Knight Inlet. It is a short distance west from the sharp swing from an easterly to northerly direction of that fiord-like waterway. It is on the east side of Matsiu Creek, one and one half miles north of the beach.

Geographic location is 125°- 49' - 00" west longitude and 50°- 43' - 40" north latitude.

Access is via boat or aircraft from Campbell River, fifty miles to the southwest on Vancouver Island.

PROPERTY

The following located mineral claims are held by Knight Inlet Resources Ltd.(N.P.L.) or in trust for same.

Catherine	1-3	inclusive
Catherine	5-8	inclusive
George	1-3	inclusive
Kelly	1-3	inclusive
Bill	1	
KIR	1-7	inclusive
Bill	2	
John	1	Fr
John	1	and 2
Marble	1	and 2

The claim posts have been examined by the writer and are staked in accordance with the British Columbia Mineral Act.

Campsite, road and quarry licenses have been arranged.

HISTORY

Prior to 1920; the Princess Copper Mining Company held the ground and established trails and camps as well as excavating several open cuts and adit tunnels.

The exploratory work was directed toward exposing the sparse and widely scattered sulphide mineralization in skarn and marble.

In 1928 Cambria Copper Company took on the search, and before abandoning the property, completed number one tunnel to 100 feet, number two to 410 feet, number three an estimated 40 feet (it is now caved near the portal), and the upper or number four tunnel 15 feet.

In 1966 the property was acquired by P.B.M. Exploration Ltd. (N.P.L.). Exploratory work was directed toward investigation of the marble.

In 1969 Knight Inlet Resources Ltd. (N.P.L.) was formed to develop the marble potential of the property.

TOPOGRAPHY

The Knight Inlet area is mountainous. The property lies on the lower west slopes of Mount Catherine. The steep slopes of the mountain are scarred by narrow, deeply incised creek valleys extending to Matsiu Creek which flows southerly into Knight Inlet.

The marble zone has been exposed from the number one adit tunnel, elevation 950 feet, up the steep sidehill to Marble Creek, elevation 1,900 feet. It is known to extend to higher elevations, but appears to bottom near the number one tunnel level.

CLIMATE

The climate is typical of the British Columbia coast area. Rainfall is moderate to heavy. Logging and mining operations can be carried on continuously throughout the year.

GEOLOGY

Knight Inlet is located within the Coast Range batholith, a granitic mass 50 to 100 miles wide extending the full length of the British Columbia coast. Entrapped within this granitic material is an irregularly-shaped body of older rock. The

latter has been altered by tremendous heat and pressure exerted by the former, and the original mineral constituents recrystallized and otherwise changed. This is particularly evident in a band of limestone which has been converted to a hard, compact, multi-coloured marble.

The shape and extent of the entire older rock mass has not been determined but the marble zone has been traced for a considerable distance along the west slope of Mount Catherine. It strikes north-west and dips steeply southwest. There is evidence to indicate that it may not extend down the mountainside much below the lowest adit tunnel, and that between this and the number two tunnel it is twisted and split into narrow bands separated by skarn. It has been intermittently exposed in outcrops, trenches and tunnels up the steep slopes to the southeast, however, and has been mapped over a distance of fifteen hundred feet measured horizontally and one thousand feet vertically. It is believed to extend far beyond the headwaters of Marble Creek.

The marble is fine to medium grained, compact and relatively free of fractures. It is coloured white, grey, greenish grey, cream, brown and light azure blue. In places the various colours are banded, and in others the pure clear white, grey or blue extends over widths in excess of ten feet.

Throughout the marble there are a few bands and lenses of skarn and other impurities, particularly in the adit tunnels where small lamprophyre dykes were noted, and very small and limited streaks, fracture fillings and disseminations of pyrite, chalcopyrite, bornite, sphalerite, galena and pyrrhotite occur. For the most part, probably 80% of the marble zone is free of impurities.

The wall rocks are skarn, composed chiefly of garnet, epidote and calc-silicates; banded metadiorite and metagranodiorite; and fine-grained siliceous rock containing considerable finely disseminated pyrite and pyrrhotite. Both walls of the marble zone are sharply defined. The marble and the wall rocks hold well and there is a minimum of caving in either the tunnels or on the steep surface exposures.

THE MARBLE ZONE

The marble zone strikes northwest, dips steeply southwest, and has been mapped in excess of 1,500 feet horizontally and 1,000 feet vertically. It appears to be a fairly uniform body 50 to 100 feet thick.

The best surface exposure is in the bed of Marble Creek 1,700 to 1,900 feet above sea level. There,

Starting on the hangingwall and proceeding up the creek bed to the footwall, the sequence is as follows:

Actual hangingwall contact not well exposed.

A narrow, probably 2-foot, zone of grey marble.

Ten feet of banded light grey, cream and brown marble with the one-inch to two-inch bands slightly curved but clearly defined.

Fifteen feet of blue marble.

Four feet of white marble.

Ten to twenty feet of brown, hard, compact skarn.

Thirty feet of white and light grey marble, with some bands of blue marble.

Four feet of white to light grey marble.

Footwall well exposed, dipping 80 degrees southwest, containing about one-half inch of black scaly fine-grained rock grading into hard metadiorite.

Between Marble Creek and the upper or number 4 adit there are numerous outcrops of marble. At the number four adit the zone is well exposed as follows:

On the hangingwall, 12 feet of skarn and marble overlain by hard grey altered metadiorite with narrow pink granitic phases.

Eight feet of fine-grained skarn made up chiefly of brown garnetiferous rock, and containing scattered narrow veins of quartz and sulphides. The adit is driven southeast 15 feet along the footwall of this zone.

Forty feet of gray, blue and white marble. The footwall is a grey metamorphic complex rock with what appear to be narrow elongated xenoliths of metadiorite, parallelling the contact. The contact is clearly defined and both the marble and footwall rocks are extremely competent.

There is an exposure of fine blue marble along with some white, in the number three trench close to the hangingwall of the zone 200 feet lower in elevation than the number 4 tunnel. The trench is 22 feet long and exposes only the surface 2 or 3 feet of the zone where it is noticeably affected by surface weathering.

Underground in the number two tunnel, which was directed southerly across the marble zone for about 400 feet, there is the following sequence from hanging to footwall:

A hard well-defined metadiorite wallrock. This lies against a fault zone, striking southeast and dipping 80 degrees to the northeast. On the footwall side of the fault there is six feet of skarn underlain by 5 feet of grey and white marble. This lies against a 12-foot zone of mixed skarn and metadiorite which shows a small amount of copper mineralization at the contact with what appears to be the actual massive marble zone.

The contact with an impure white and grey 20 foot band of marble appears to dip southwest at 45 degrees.

A band of about 30 feet of white marble and skarn.

A 20 foot band of white and light grey marble with 10 feet of skarn near the middle.

Twenty feet of blue marble.

Ten feet of white marble with some grey banding.

The footwall is a mixture of marble and skarn underlain by metadiorite and a flinty hard fine-grained rock with considerable disseminated pyrite.

The lowest or number one tunnel appears to be directed into and along the hangingwall of a narrow zone of grey, brown and cream banded marble. This grades into skarn and altered wall-rock for 30 feet and then into metadiorite.

Towards the footwall side there are narrow bands of marble and fine-grained siliceous rock with much disseminated pyrite for 40 feet, then a covered zone 50 feet wide, and Tunnel creek where the bedrock is granodiorite.

It would appear that the marble zone terminates a short distance below this number one tunnel.

CAMP

Two frame buildings 16 by 20 and 16 by 12 feet, with Duroid roofing and aluminum sash windows have been built at the mouth of Matsiu Creek on tidewater.

BEACH LOADING FACILITIES

There is a beach near camp which is protected by a rock wall on the east and mounds of boulders on the west. This has been used for barging recently.

For continuous use, a small excellent harbour may be made by bulldozing the beach boulders into the inlet a short distance at low tide to form a breakwater, and placing log bumpers on the steep rock face.

By the use of a standard barge ramp, equipment and supplies may be unloaded, and marble slabs may be trucked directly onto the barge.

ROAD FROM BEACH TO MARBLE ZONE

A road has been constructed from the camp at tidewater to the marble zone. It is a distance of one and one-half miles and a climb of 1,000 feet. With gravel surfacing on some sections this road will be suitable for the transportation of marble from a quarry directly onto a barge at the beach.

STRIPPING AND TRENCHING

Several small trenches, and three main trenches were excavated near the adit tunnels to expose the marble for examination.

The longest trench, number one, was located between tunnels 1 and 2. Over a length of 300 feet bedrock was mined to a maximum depth of 10 feet. Except for a narrow band of marble at the south end of the trench, the projected marble zone was found to be chiefly light grey skarn and highly altered and silicified wall rock. This information suggests that the marble zone bottoms at or just below the elevation of the number one adit tunnel.

The number two trench was started on an outcrop of marble. It is 50 feet southeast and up the steep sidehill from the south end of trench number one. At this location the marble was found to be confined to a narrow band surrounded by skarn. The entire outcropping is badly weathered. The trench was abandoned after excavating to a depth of 10 feet.

The number three trench was excavated at or near what is considered to be the hangingwall of the marble zone, 250 feet southeast of and 200 feet higher in elevation than the number two adit tunnel. The trench is 25 feet long in a north-south direction and up to 6 feet into bedrock. Several skarn bands were exposed and the rock is badly weathered, but several feet of excellent blue marble was exposed.

ADIT TUNNELS

Three of the four old adit tunnels which were mined by hand methods into the marble and skarn in search of copper mineralization are in good condition, and were examined and mapped.

The number one adit is located at elevation 950 feet above sea level about 100 feet south of Tunnel Creek. It was directed southeasterly into the hangingwall of a narrow marble zone. This appears to be at or near the lowest extremity of the marble zone on Mount Catherine.

The number two adit, located up the steep sidehill from number one adit at an elevation of 1,214 feet above sea level, is directed almost south into the hillside and acutely across the marble zone. It is 410 feet long and there are two short crosscuts 10 to 15 feet long. An 80-foot zone of marble is opened up with a 20-foot band of blue near the middle, grey on the footwall, and grey, brown and white, with some skarn, on the hangingwall.

Number three adit tunnel is caved at the portal. It is believed to be about 40 feet long. It is southeast of number two, at elevation 1,307 feet above sea level.

Number four adit is in skarn and marble on the hangingwall of the marble zone at elevation 1,635 feet above sea level. It was mined southeast into the steep sidehill on several $\frac{1}{2}$ inch stringers of

copper mineralization. Adjacent to it is 40 feet of marble, white, grey and blue in colour and very slightly folded.

DIAMOND DRILLING

Three diamond drill holes were cored to test the marble zone in the vicinity of the number two adit tunnel.

Hole one was collared about 100 feet south of the portal of number two adit tunnel. It was drilled in an east direction at an angle of -38 degrees. It started near the hangingwall of the marble zone and penetrated to what appears to be the skarn and impure marble of the footwall.

The log is as follows:

<u>From Feet</u>	<u>To Feet</u>	<u>Rock penetrated</u>
0	11	skarn and metadiorite
11	84½	grey, blue and white marble 28-28½ lamprophyre dyke 33-38 skarn 48½-50 skarn
84½	87	impure marble and skarn, footwall(?)

Hole two was collared 120 feet southeast of the number two adit portal, on what appears to be the footwall of the marble zone. In an attempt to drill into and down the zone it was directed south at -45 degrees. Badly broken and weathered marble and skarn were encountered and the hole was stopped at a depth of 25 feet.

Hole three was located $51\frac{1}{2}$ feet south 75 degrees from hole one, up the steep sidehill at the portal of caved number three adit tunnel. It was believed to be on the marble zone a short distance northeast of the hangingwall. It was drilled at -45 degrees for 67 feet, as follows:

<u>From Feet</u>	<u>To Feet</u>	<u>Rock penetrated</u>
0	$11\frac{1}{2}$	Grey and greenish grey marble with several very thin skarn bands
$11\frac{1}{2}$	$12\frac{1}{2}$	Grey and buff coloured skarn
$12\frac{1}{2}$	13	Grey marble
13	23	Skarn
23	26	White and grey marble
26	$27\frac{1}{2}$	Skarn
$27\frac{1}{2}$	$39\frac{1}{2}$	Grey, grey-green and blue banded marble
$39\frac{1}{2}$	63	Grey and white banded marble
63	67	Light coloured skarn, green and brown garnets, footwall(?)

The cored marble is hard, compact and finely crystalline. It is not badly fractured and has a colour range from white, to brown, grey, grey-green and blue.

TRANSIT SURVEY

In order that the marble zone may be located with relation to the local topography and adit tunnels, a chain and transit survey was made from below tunnel

number one up to Marble creek.

Tied into this, chain and Brunton compass surveys were made from the number one tunnel to Matsiu Creek, from the beach camp up the road to the number two tunnel and across the marble zone in the bed of Marble Creek.

The data acquired by the surveys was used to compile the maps and sections accompanying this report.

WATER

Matsiu Creek provides an excellent flow of water all year. Tunnel and Marble creeks may be reduced to very small flows during the one or two driest summer months.

MARKETS

The market for quality marble for architectural purposes is growing, as evidenced by Italian production which expanded from 600,000 tons in 1950 to 2,000,000 tons in 1968. Italian marble bears a transportation cost of about \$40.00 per ton landed on the West coast of America.

An Italian authority, L.S. Marchesi, when interviewed in Vancouver in December 1968, stated that a local price of \$60.00 per ton for rough quarried marble would not be an unreasonable figure. He also stated that the blue marble will obtain a ready preference as comparable stone is not readily available.

A survey by market specialists, followed up by promotional and sales programmes, will be necessary to provide for the disposal of the Knight Inlet marble.

It would appear, however, from preliminary inquiries, that the economics of the project will be such as to provide a sizeable annual profit for many years.

SUMMARY AND CONCLUSIONS

A marble deposit is located one and one-half miles from tidewater on Knight Inlet, 150 miles from Vancouver.

Using a newly constructed road, marble may be transported directly from a quarry onto a barge and towed to Vancouver.

The marble zone has been surveyed over an exposed length of 2,000 feet and it is known to extend farther up the steep westerly slopes of Mount Catherine.

The quality of the stone has been pronounced as excellent by an Italian authority, L.S. Marchesi of Carrara, who advised that the light colouration, particularly the blue tones, should command a premium price.

It is concluded that the Knight Inlet marble deposit, by reason of its large available quantity and excellent quality, be prepared for production.

RECOMMENDATIONS

It is herewith recommended that the Knight Inlet marble deposit be prepared for production in a three-phase programme.

<u>Phase #1.</u>	<u>Estimated Costs</u>
<u>1.</u> Arrange with marketing specialists to conduct a survey and advise regarding the market potential for the marble	\$15,000.00
<u>2.</u> Provide the following equipment for Knight Inlet,	
(a) A small but seaworthy boat for transporting personnel and supplies from Kelsey Bay or Campbell River to Matsiu Creek	
(b) A 4-wheel-drive truck for transporting men, supplies and equipment between the beach and quarry	
(c) A shovel loader for general use at quarry, road and beach	
(d) Compressor, drilling and other equipment, and tools for quarrying	
(e) A small electric generating plant	40,000.00
<u>3.</u> Office and overhead	1,500.00
<u>4.</u> Contingencies	3,500.00
	<u>\$60,000.00</u>

<u>Phase #2.</u>	<u>Estimated Costs</u>
<u>1.</u> Quarry planning, lay-out and preparation	\$27,000.00
<u>2.</u> Road surfacing, using local gravel	8,000.00
<u>3.</u> Improvement of facilities for barge-loading at the beach	4,000.00
<u>4.</u> Office, accounting legal, overhead and supervision	5,000.00
<u>5.</u> Contingencies	6,000.00
	<u>\$50,000.00</u>
 <u>Phase #3.</u>	
<u>1.</u> Production testing, marketing and sales promotion	10,000.00
<u>2.</u> Operating Capital	17,000.00
<u>3.</u> Office, overhead and supervision	12,000.00
<u>4.</u> Contingencies	1,000.00
	<u>\$40,000.00</u>
The total estimated capital requirements amount to	<u>\$150,000.00</u>

Barging from Knight Inlet to Vancouver and preparation of the marble to comply with customer specifications, can be negotiated well in advance of production.

Vancouver, B.C.
October 30th. 1970.

Respectfully submitted,
ALLEN GEOLOGICAL ENGINEERING LTD.
Per Alfred B. Allen P. Eng.

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ALLEN GEOLOGICAL ENGINEERING LTD.

507 - 789 WEST PENDER STREET
VANCOUVER 1, B.C.

October 30th. 1970.

C E R T I F I C A T E

I, Alfred R. Allen, certify that:

I am a graduate of the University of British Columbia and hold the following degrees therefrom:

BASc Geological Engineering 1939

MASc Geological Engineering 1941

I am a member of the Association of Professional Engineers of the Province of British Columbia.

I have practised my profession for the past twenty-eight years.

I hold no interest in the properties or securities of Knight Inlet Resources Ltd. (N.P.L.), or affiliates thereof, nor do I expect to receive any, directly or indirectly.

My report of October 30th. 1970, entitled "Report on the Marble Deposit of Knight Inlet Resources," is based upon field examination, October 6th to 12th inclusive, 1970, and numerous previous examinations during 1969 and 1970.

I consent to this report being filed with the British Columbia Securities Commission.

I have examined most of the claims and am of the opinion that they are staked in accordance with the British Columbia Mineral Act.

 P. Eng.

Alfred R. Allen