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REPORT ON THE
JESMOND LIMESTONE PROJECT
OF
MALIBU METALS LTD. (N.P.L.)
LILLOET LAND DISTRICT
CLINTON MINING DIVISION
BRITISH COLUMBIA

15 DECEMBER 1971

BY

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REPORT ON THE
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OF
MALIBU METALS LTD. (N.P.L.)
LILLOET LAND DISTRICT
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BRITISH COLUMBIA

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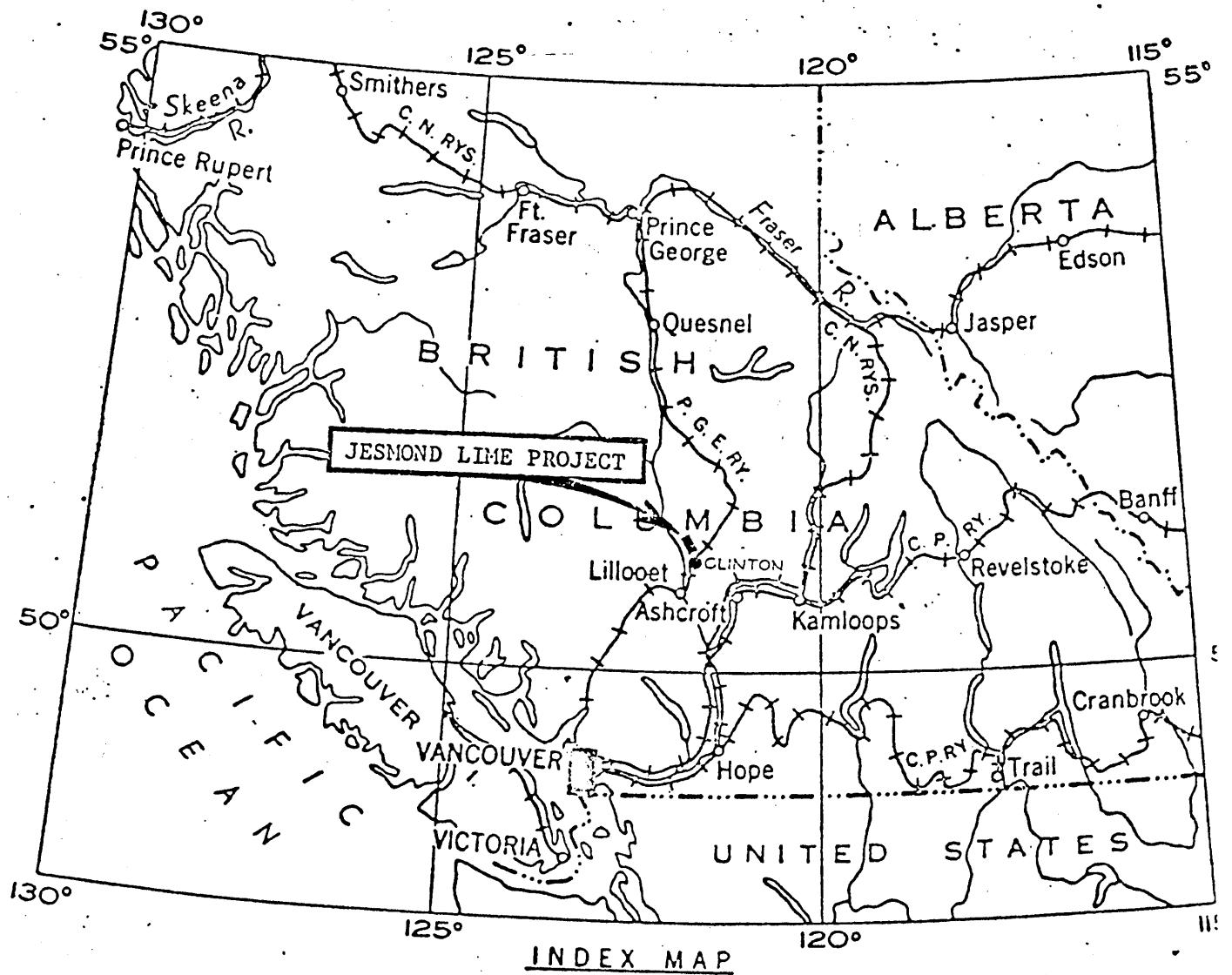
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- ANNEX: A-1 to A-9 Excerpts Bulletin #44, British Columbia Department of Mines and Petroleum Resources, 1961 - "Geology of the Fraser River Valley Between Lillooet and Big Bar Creek" by Hans Peter Trettin.
- ANNEX: B-1 to B-4 Letter-Report dated 30 June 1971, by W. G. Wahl Limited, Consultants, Toronto, Ontario.
- ANNEX: C-1 to C-3 Letter dated 12 August 1971 and Assay Cert. No. 62918-1 dated 2 August 1971, Kennedy Van Saun Corporation, Danville, Pennsylvania.

ILLUSTRATIONS

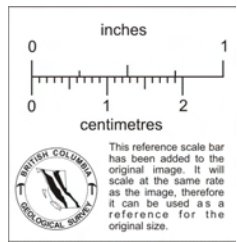
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LOCATION

JESMOND LIME PROJECT
 CLINTON MINING DIVISION
 LILLOOET LAND DISTRICT
 BRITISH COLUMBIA



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REPORT ON THE
JESMOND LIMESTONE PROJECT
OF
MALISU METALS LTD. (N.P.L.)
LILLOET LAND DISTRICT
CLINTON MINING DIVISION
BRITISH COLUMBIA

1.0 INTRODUCTION:

This report presents an evaluation of the Jesmond Limestone Property, Clinton Mining Division, Lilloet Land District, British Columbia. Independent studies have been made under my direction of the various disciplines involved, including geological, metallurgical, survey control and related aspects.

Contained herein is an estimate of the resources of limestone as referenced to the limited scope of the investigations carried out to date.

Geological mapping supplemented by 1000 feet of diamond drilling has been completed. Additional surface and sub-surface geological investigations are required before a definitive estimate may be made of assured reserves.

Surface topographical and boundary control surveys have been completed of the leases area by a British Columbia Land Surveyor.

Metallurgical tests have been completed by accredited analysts and by Kennedy Van Saun. Kennedy Van Saun have also submitted their estimate of capital cost for supply of the equipment less erection, construction and engineering costs for alternatively sized lime kilns of 200-220 and 300-330 tons per day capacity.

Preliminary operating costs for the support quarry and lime kiln operation are given as well as the estimates of capital costs for the purchase of land area, trackage site, leases and related components as well as the sums required for the supplementary investigation.

Methods of financing or related economic considerations for the project are not presented.

2.0 PROPERTY:

The Jesmond Limestone Property under investigation-exploration assessment comprises two parcels of land, designated as Lots 1284 and 1285, currently under lease disposition application to the Department of Lands, Forests and

REPORT ON THE JESMOND Limestone PROJECT OF MALIBU METALS LTD. (N.P.L.):

2.0 Property (continued):

Water Resources. The boundaries have been surveyed by Antony C. Loach and Associates, British Columbia Land Surveyors of North Vancouver and submitted to the Provincial Government for approval. The leases involve each - an area of 640 acres or a total of 1280 acres. Reference is to Figures: 1 and 2 for location details, but it is considered that only Lot 1284 need be retained. Malibu Metals have an option dated 30 April 1971 for procurement of these lots from the applicant Ernest John Taylor-Smith of Vancouver, British Columbia.

3.0 LOCATION:

The leases area is located about 12 miles westerly from Clinton and on the Kelly Lake-Jesmond secondary road. They are in the Lillooet Land District, Kamloops Land Registry District and Clinton Mining Division. The geographic reference is latitude $51^{\circ}07'$ North and longitude $121^{\circ}52'$ West. The reference maps are Topographical "Clinton" #92.P/4E and #92.P/SW (Edition 1) 1967, Department of Energy Mines and Resources, Ottawa; map #R.92.P/SW, Department of Lands, Forests and Water Resources, Victoria, British Columbia and Geological map #3-1966 "Bonaparte River" see Figures: 1 and 2.

4.0 ACCESSIBILITY:

The leases are accessible from Clinton, British Columbia by automobile road following westerly from Clinton along the gravelled road Clinton-Kelly Lake for a distance of 11 miles, then northerly along the Kelly Lake-Jesmond road for a distance of 9 miles. The route is shown on Figure: 2. Access from the road to the workings is via a bulldozed section bearing northeasterly across the British Columbia Hydro Transmission right-of-way, a distance of about half a mile, see Figure: 3. This last section of the road requires crushed rock surfacing to permit passage to trucks during wet weather periods. The Clinton-Jesmond section is passable year-round except during heavy snow-fall periods. It is maintained by the British Columbia Department of Highways. Telephone communication facilities are available with a telephone located on Lot 4415, about a mile distance from the lease.

The Pacific Great Eastern Railway's main line connects the Kelly Lake area to Clinton, Vancouver and the Prince George-Fort St. John-Dease Lake (projected) areas of British Columbia. Helicopter service is available from Kamloops. The concentrate rail loading station of Bethlehem Copper Corporation Ltd. is located about half way between Kelly Lake and Clinton and there is a switching yard of the Pacific Great Eastern located on Lot 9, see Fig: 2.

5.0 CLIMATE:

The Jesmond-Clinton area lies in the dry belt of the interior of British Columbia. The average annual precipitation is about 12 inches with about 3 feet of snowfall during the year. The summers are hot and the winters cool. Extremes range from about 10° to 106° F. with average about 47° . At the

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.):

5.0 Climate (continued):

present time due to access limitations, work is restricted to the April-November period but, under operations, work could be carried out throughout the year.

6.0 PHYSIOGRAPHY:

The leases are located within the Marble Range and on the east side of the Fraser River. Elevations on the lease areas range from 5000 to over 7500 feet above sea level. The easterly section of the leases is very rugged with mostly bare rock exposed, being above timber line. On Lease 1284, elevations range from about 5000 feet at the southwest corner to over 7000 feet in the northeast corner. The central section of this lease comprises a northwesterly trending ridge. Reference is to Figure: 3 illustrating topographic contours; and to Figure: 4, an enlarged aerial photograph. A topographic map has been made including the area along the base line, see Figure: 3.

There are several small creeks traversing the lease area, some of which yield run-off most summer months. These are tributary to Porcupine Creek. With improvements sufficient water would be available to meet the needs of a limestone quarry operation as well as camp facilities.

Vegetal cover is relatively sparse in the elevations above 6000 feet. The remainder of the lease area is covered by jackpine, spruce, balsam and fir. Tree growth is dense in the valley and low-lying sections.

Depth of overburden ranges from a few inches to ten or more feet in the draws. This is composed of sand-gravel and till. Most of this material is ideal for road construction purposes.

7.0 LOCAL RESOURCES:

Local supplies of timber, gravel and water on the lease area are generally sufficient to support most quarrying development and operational needs. However, rights to commercial stands of timber would have to be obtained and similarly for the use of stream water. All other requirements such as building materials, equipment, supplies and labour would have to be procured in the Clinton area and/or through the Lower Mainland centres. The British Columbia Hydro 500KV HV DC and 230KV AC transmission lines right-of-ways adjoin the western boundary of Lot 1284. Sub-station step-down facilities would have to be installed to avail electric power to the lease area from the 230KV line. Petroleum bulk facilities are available in Clinton or by tank car at Hydro Station on the Pacific Great Eastern Railway. Natural gas lines connecting the Gas Fields in Northern British Columbia to the Lower Mainland areas service Clinton.

From a resource availability standpoint, the lease area is ideally situated for the procurement of support requirements for limestone quarrying and lime kiln production purposes.

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.):

7.0 Local Resources (continued):

Truck and rail haul facilities are readily available at Clinton. Current costs for truck haul are \$0.06 per ton mile and range from \$3.20 to \$3.60 per ton by Pacific Great Eastern to Quesnel-Prince George-Vancouver and \$4.80 to McKenzie, B.C. as reported by the P.G.E.

Markets for the sale of limestone and kiln lime are available in the Interior pulp mills and mining operations, see Figure: 5.

8.0 HISTORY:

Prospecting for limestone suitable for kiln lime purposes has been carried out for several years in the Clinton area. Under the sponsorship of E. Taylor-Smith of Vancouver, detailed prospecting of the Jesmond designated area, Lots 1284-1285 and extending southeasterly toward Clinton was carried out in 1968-1970. Several sections were investigated and disposition was applied for in 1969 covering the areas of Lots 1284 and 1285, with reserves established on 12 leases encompassing 12,000 acres as shown on Figure: 6. In April of 1971, Malibu Metals optioned the rights to the leases from E. Taylor-Smith and, since that time, have carried out an investigation programme involving access road improvement, topographical surveys, sampling and geological survey, including 1000 feet of diamond drilling. The purpose of that programme was to assess the suitability of the deposit for limestone quarry and kiln-lime production purposes.

Application has been made to the Department of Lands and Forests of British Columbia for alienation of the requisite areas for quarrying purposes. At the date of this report, approval has not been received.

9.0 GEOLOGY:

REGIONAL GEOLOGY:***

The regional setting of the Jesmond Limestone Deposit is within the sedimentary and volcanic rocks of the Cache Creek Group. The area has been mapped in more detail than in most parts of British Columbia. Reference is to Bulletin #44, "Geology of the Fraser River Valley Between Lillooet and Big Bear Creek", by Hans Peter Tuttin, 1961, of the British Columbia Department of Mines and Petroleum Resources. Annex: A embodies the sections of that report treating with the Jesmond Deposit area, and Figure: 7 portrays the relating geological map.

The presented Table of Formations in Bulletin #44, relating to the Jesmond Deposit follows.

***Geology by E. S. Asano, B.Sc., F.G.A.C. (see References)

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.):

9.0 Geology
Regional Geology (continued):

ERA	PERIOD	GROUP	FORMATION ASSEMBLAGE	MEMBER	LITHOLOGY
PALEOZOIC	UPPER PERMIAN			4	Chert, Argillite Limestone, Tuff, Volcanic Flows
	MID-UPPER PERMIAN	CACHE CREEK GROUP	MARBLE CANYON FORMATION	3	Limestone
	MIDDLE PERMIAN		SOUTHERN MARBLE RANGE	2	Chert, Argillite Limestone, Tuff, Volcanic Flows
				1	Limestone With Interbedded Chert
	Conformable Contact				
	MIDDLE OR OLDER PERMIAN		MT. SOUES DIVISION		Chert, Argillite Tuff, Volcanic Flows & Limestone

(British Columbia Department of Mines, Bulletin #44, 1961)

The Marble Canyon limestones form a northwesterly trend that extends from the Cornwall Hills to the northwest in the vicinity of Hat Creek where Tertiary rocks cover most of the Marble Canyon limestones. The limestone belt is flanked on both sides by older rocks and it is believed that the regional structure is a major syncline with minor inside folds or a synclinorium. It is within this synclinal structure divided into two units, encompassing two successions of argillites, that the Marble Canyon limestones are found.

The total thickness of the Cache Creek Group is probably between 10,000 and 24,000 feet thick. Dawson (1895) established a total thickness of 10,000 feet and Armstrong (1949) established a section of 24,000 feet near Fort St. James. The thickness of the Marble Canyon varies between 3,000 to 6,000 feet thick. In the southern part, where thickness of the Marble Canyon formation is 6,000 feet, it forms a northwest trending anticlinorium overturned to the northeast. The rocks to the west of the Marble Range and Pavilion Mountains are believed to overlie the Marble Canyon conformably.

MARBLE CANYON FORMATION			
	MEMBER	THICKNESS	LITHOLOGY
OLDER SEQUENCE	I	200 to 300'	Limestone and Ribbon Chert
	II	500 to 1,000'	Chert, Argillite, Tuff and Beds of Limestone and Volcanic Flows
	III	1,000 to 3,000'	Mainly Limestone but Locally Contains Small Amounts of Interbedded Chert and Argillite
	IV	3,000 to 6,000'	Argillite, Chert, Limestone, Tuff, Tuffaceous Sandstone and Volcanics

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.):

9.0 Geology

Regional Geology (continued):

The structural forces controlling the Marble Canyon Formation have been subjected to flowage folding and faulting. Faulting has taken place on the crests of the anticlines or in the troughs of synclines. The folding was accomplished by some flowage but much fracturing of the beds. Throughout the Marble Canyon belt the crests or troughs are characterized by irregular contortions.

It appears that the depositional environment was a restricted basin with the source being of low relief. The various methods of origin are as follows depending on the member:

- (1) Accumulation of free floating calcareous organisms.
- (2) Slow deposition with solution and re-crystallization.
- (3) Inorganic precipitation.
- (4) Formation of reefs.
- (5) Algae structures in a reef.

LOCAL GEOLOGY:

Three different members of the Marble Canyon Formation are exposed in the Jesmond Limestone Deposit, see Annex: A and Figure: 7. The oldest is the limestone sub-member of Member II, then Members III and IV. Within the established grid system, two types of beds of limestone were found on the surface. Member IV is found to the south (903- 910) and Member II is found outcropping to the north (911-925), see Figure: 3.

The local geology is interpreted from field mapping on a 1:200' scale within the grid system and logging of four diamond drill holes of 250' depths which penetrated the structure in the southern part of the grid, see Figure: 3.

It appears from field surveys that the origin of the limestone deposits in the Jesmond area, are of two categories. One theory postulates that the deposits are formed from the slow and gentle accumulation of calcareous organisms on the outer fringes of a restricted basin. There is a lack of recognizable fossils in the immediate area and this could be due to dissolving of the fossils before they fell to the ocean floor or while in suspension or the obliterating effect of subsequent metamorphism on the beds. Secondly, it appears that the effect of solutions and recrystallization upon consolidation have played a role since evidence from drilling shows consistent sections of recrystallized limestone. The basin of formation could not have been shallow due to the lightness of the colour and absence of fossil structure. The dark sections were possibly impurities from volcanic action which gave rise to the tuff and argillite lenses. The environment was probably then at optimum Ph conditions. Subsequent fluctuating Ph and Eh conditions gave rise to calcarenite depositions and gradational changes.

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (I.P.L.):9.0 GeologyLocal Geology (continued):

The limestones within the lease area are pure and massive. The colour grades from a light grey to a dark grey-brown. They are usually found alternating in light to dark layers. The drilled cores indicated various interfingering borders, slight facies change, intraformational breccias and slight graded bedding. The intraformational breccias in many cases should flow along breaks. A lense of tuff-argillite was intersected in two drill holes at depth of 200 feet.

The local trend is a generally northwest-southeast and dips to the southwest. The trend was established by mapping of weathering and erosional lines. Some member beds have developed weathering benches which are topographically manifested. Member IV appears to overlie Member III conformably and is separated not by an erosional conformity but an interfingering and gradational conformity. The beds are massive and vast tonnages of commercial limestone are indicated. Further testing is required to block out reserves both as to quantity and quality.

10.0 LIMESTONE RESERVES:

Because of the initial stage of the investigations carried out to date on the Jesmond Limestone deposits, only geologically inferred or indicated tonnages may be presented in this assessment.

Assessment is made only for limestone reserves on Lot: 1284. No investigations were carried out on Lot: 1235, which is very rugged and inaccessible.

As shown on Figure: 3, the deposits revealed to date on Lot: 1234, have been designated as three zones, A, B and C. Geologically, Zone: A is considered to be a separate formation bed to Zones: B and C. For the purposes of calculation, Zone: B is separated from Zone: C because of the 2,000 feet distance between the faces. They may be separate strata, but this may only be confirmed by further tests.

ZONE: A: Warren H. Westphal (see Reference) in his Report of 1970, calculated a reserve of 4,000,000 tons, based on a face 400' long, 500' back and 400' in height. The tenor of this limestone as graded by him in which he combined his sampling results with those of J. W. McCammon of the British Columbia Department of Mines, was set at:

CaO - 55.17%; CaCO₃ - 98.40%; Al₂O₃ - 0.23%; Fe₂O₃ - 0.08%
MgO - 0.27%; SiO₂ - 0.35%; S. - 0.002%; MnO - 0.003%
H₂O - 0.06%; and Loss on Ignition - 43.57%

He further gave an estimate of 16,000,000 tons potential reserve on the 640 acre lease area.

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.)

10.0 Limestone Reserves:
Zone: A (continued):

Check sampling by Malibu Metals and W. G. Wahl, P.Eng., see Figure: 3 yielded analyses with corresponding grades to the Westphal and McCammon sampling.

The face of Zone: A has been blasted and as there is little overburden back from the face, assessment of continuity of the formation is permitted. No diamond drilling has been carried out on this zone, although 30' percussion air-trac holes were drilled in establishing the face.

Access facilities would have to be improved before major workings could be carried out. It is to be noted that this zone is at elevation 5900' plus compared with Zones: B and C at 5200' to 5500'.

ZONES: B and C: These zones relate to the northwesterly-southeasterly trending ridge situated in the south central area of Lot: 1204. For the purposes of this report, they have been separately identified with Zone: B designated for the northwestern face and Zone: C as the southeasterly face. See Figure: 3.

The dimensions of the ridge are about 2500 feet in length, 500 feet in width and the average tested visible depth - 200 feet. Extensions are recognizable as to length, width and depth. There are additional face opportunities along the easterly side of the ridge for quarrying opportunities, see Figure: 3.

W. G. Wahl, P.Eng. in his Letter-Report of 30 June 1971 (see Annex: B) presented a reconnaissance estimate of 4,000,000 tons of high purity limestone grading approximately: CaO - 55.30%; MgO - 0.82%; Fe₂O₃ - 0.077%; Al₂O₃ - 0.074%; SiO₂ - 0.23%; S. - 0.021% and with loss on ignition 43.45%.

Zone: B has been drilled and blasted and a face 150 feet wide and 60 feet high established and has been cleared a distance of 200 feet back from the face. The volume of rock in this section is calculated to be of the order of 300,000 tons.

Sampling of the face and surface returned these analyses:

Kennedy Van Saun test (across the face):

SiO₂ - 0.10%; Fe₂O₃ - 0.02%; CaO - 55.44%; S. - 0.005%;
Undetermined - 0.33%; Loss on Ignition - 44.1%
(see Figure: 3 and Annex: C)

Crest Laboratories Ltd analysis of surface sample #36628 yielded:

SiO₂ - 0.25%; Fe₂O₃ - 0.18%; MgO - 0.47%; CaO - 55.22%
and Loss on Ignition - 43.60%
(see Figure: 3)

Zone: C has been mapped in detail, surface sampled and diamond drilled (4 holes 250 feet in length, see Figure: 3).

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.):

10.0 Limestone Reserves:

Zones: B and C (continued):

W. G. Wahl, P.Eng. has presented a Quarry Pit Layout for this section inferring a tonnage of 300,000 tons (see References) with an approximate analysis of:

CaO - 53.17%; MgO - 0.97%; SiO₂ - 0.96%; Al₂O₃ - 0.54%;
Fe₂O₃ - 0.40%; S. - 0.05% and Loss on Ignition (calculated - 43.9%)

Extensions to this zone are possible but quality of the stone will have to be proven by further tests.

In summary and on the basis of available information, the reserves of limestone of commercial grade that may be considered to be potentially available in Zones: A, B and C are set at the following:

ZONE: A - 4,000,000 tons plus additional tonnages.
ZONE: B - 300,000 tons plus possible extension in depth and longitude.
ZONE: C - 300,000 tons plus possible extension in depth and longitude.

Further tests are required to confirm the suitability of the 40,000,000 tons residual in the Zones: B - C ridge as well as to reveal whether there are additional zones of commercial grade on the lease area.

11.0 METALLURGY:

Metallurgical testing has been completed in so far as representative source material is available from the deposit faces now opened. These tests have included chemical analyses from various sections of the limestone deposit as well as a bulk sample from Zone: B which was tested by Kennedy Van Saun Corporation, Danville, Pennsylvania.

The results of this test are given in Annex: C. As noted thereon, viz:

"The above results show that this limestone can be handled in a KVS preheater system without excessive breakdown and that the resulting quicklime has sufficient strength for application of a contact type cooler. Attached chemical analysis show the limestone to be of a high quality, extremely white, strong, and of low sulphur contents."

The chemical analyses recorded:

SiO₂ - 0.100%; Fe₂O₃ - 0.020%; CaO - 55.44%; S. - 0.005%;
Loss on Ignition - 44.1% and Undetermined - 0.330%

In addition, Kennedy Van Saun have submitted a detailed proposal for the lime burning facility designed to use Jesmond Limestone for alternatively

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11.0 Metallurgy (continued):

sized capacity operations of 200-220 tons per day and 300 tons per day, based on using residual oil as a fuel source.

It is my opinion that it would be desirable at this time to defer final selection of the lime kiln plant until more information may be procured relating to possible new designs which have a lower and more efficient heat rate.

The design submitted by Kennedy Van Saun proposes a heat rate of 5.3 to 5.8×10^6 BTU's per ton of product. According to technical information, other designs are now being developed with heat rates between 4.0 to 5.0×10^6 BTU's per ton. Because of the increasing cost of fuel throughout the world, every consideration has to be given to this cost item of production.

The location of the proposed kiln site is shown on Figures: 2 and 4, which is ideally situated for rail haul, water and power resources and other facilities.

Costing of producing lime would be in the \$10.00 - \$14.00 range per ton dependent upon plant capacity and rate of production.

12.0 MINING:

Quarrying operation would be carried out from one or more faces on a bench method. Details of the mining methods would have to be finalized in accordance with the location of the pits and the rate of mining (tons per day). In turn, these features would depend upon market opportunities. A tonnage block is presently drilled ready for blasting in Zone: B.

Use of maximum sized drilling, loading, crushing and stockpiling equipment is contemplated. Details and selection of the equipment would have to be finalized prior to commencement of operations.

Costing of quarrying and crushing would be in the \$0.75 to \$1.50 range per ton dependent on volume produced.

13.0 MARKETS:

Studies have been carried out during the past year with respect to limestone rock and kiln lime market outlets in British Columbia in general, as well as those immediately accessible for Jesmond products in Central British Columbia.

Currently, in British Columbia, the annual market for lime and limestone according to the British Columbia Minister of Mines Reports is in the 2,000,000 ton range with a market value of \$3,350,000.00 (1969).

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13.0 Markets (continued):

No commercial lime is manufactured in British Columbia apart from that produced by the pulp and paper companies for their own consumption. Bulk supplies are imported from Tacoma, Washington and Kananaskis, Alberta and, in the future, may possibly be supplied from the currently proposed Port Kells Plant in Surrey, British Columbia.

Figure: 5 depicts the relationship of the Jesmond property to lime consuming industries in British Columbia.

According to current studies, there is a market for 50,000 - 100,000 tons of quality limestone in Central British Columbia, supplying the pulp and paper industry, the glass, agricultural and other wholesale outlets.

Currently, the pulp and paper industry in British Columbia purchases or consumes approximately 25,000 tons per year, which will increase to 60,000 tons per year by 1975. The plants located in Central British Columbia serviceable from Clinton either by truck haul or rail haul along the Pacific Great Eastern consume 15,000 tons of lime per year which will increase to 30,000 tons by 1975. The location of these plants is shown on Figure: 8.

Currently, the mining industry in British Columbia consumes 10,000 tons of lime per year, which will increase to about 60,000 tons per year by 1975. Several mines are directly serviceable from Clinton, see Figure: 9 and are projected to have a lime consumption of about 30,000 tons per year by 1975 with planned expansion.

Other markets for the glass, agricultural and wholesale outlets consume some 10,000 - 15,000 tons per year.

The marketing value of limestone in the Clinton area is \$3.50 - \$5.00 per ton and for lime \$20.00 - \$25.00 per ton.

14.0 SCHEDULE:

Subject to controlling technical, economic and financial factors relating to feasibility considerations, a works schedule for carrying out the definitive investigations, initiation of limestone quarry operations, and considerations for a lime kiln design and construction engineering studies and construction-in-operation phases, would involve the following periods of time from the date of validation for the project.

Definitive Investigation.....	3 months
Limestone Quarry Operations.....	1 month
Design and Construction Studies for Lime Kiln.....	3 months
Construction and In-Operation Phasing for Lime Kiln.....	12 months

Acceleration of this schedule could be possible but would depend primarily upon the degree of risk assumed and the availability of markets for the products and financing of the project.

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.)15.0 CAPITAL REQUIREMENTS:

The financing that would be required for the project through to lime production is estimated at the following amounts, exclusive of purchase and rental costing for the lease.

A. DEFINITIVE INVESTIGATIONS:

1.	Diamond Drilling, 2000 feet.....	\$ 20,000.00	
2.	Geological & Engineering Studies.....	5,000.00	
3.	Analyses and Tests.....	1,500.00	
4.	Administration & Miscellaneous.....	3,500.00	\$ 30,000.00

B. QUARRY OPERATION (assumes Sub-Contractor engaged to process limestone material and stockpile at pit, haulage and delivery charges to be borne by Purchaser):

1.	General Preparation.....	\$ 3,000.00	
2.	Administration & Controls (6 months)...	5,000.00	
3.	Miscellaneous.....	2,000.00	\$ 10,000.00

C. LIME KILN 200-220 T.P.D. CAPACITY:***

1.	Plant & Equipment.....	\$350,000.00	
2.	Construction & Erection.....	600,000.00	
3.	Engineering & Design.....	150,000.00	
4.	Miscellaneous Equipment & Supplies.....	100,000.00	
5.	In-Service Costs.....	50,000.00	\$1,750,000.00

*** Costing for 300-330 T.P.D. would approximate \$2,000,000.00

D. PLANT AREA, TRackage AND LOADING FACILITIES:

1.	Land, 15 Ac. on Trackage.....	\$ 15,000.00	
2.	Track & Right-Of-Ways.....	5,000.00	
3.	Loading Facilities.....	10,000.00	
4.	Offices & Sheds.....	20,000.00	
5.	Miscellaneous.....	10,000.00	\$ 60,000.00

TOTAL..... \$1,850,000.00


It is to be noted that the sum of \$1,850,000.00 exclusive of lease purchase is the total requirement for a composite limestone-lime kiln producing operation. It must be recognized that progressive development may be undertaken viz. a quarry limestone supply phase and ultimately, if appropriate markets develop, for a limestone-lime complex producing-marketing operation.

REPORT ON THE JESMOND LIMESTONE PROJECT OF MALIBU METALS LTD. (N.P.L.)

16.0 SOURCE OF FUNDS:

The requisite programme to be used as the basis for the source of funds is not proposed in this submission. Undoubtedly, it will be on an equity-debt basis.

Respectfully submitted,

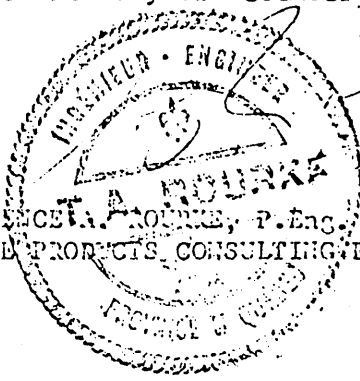
A circular professional seal for a Mechanical Engineer. The outer ring contains the text "MECHANICAL ENGINEER" at the top and "PROVINCIAL ENGINEER" at the bottom. The center of the seal features a gear and a compass. The name "T.A. ROUTKE" is stamped across the center in large, bold letters.
TERENCE A. ROUTKE, P.Eng. (P.Q.)
LINE PRODUCTS CONSULTING ENGINEER

CERTIFICATE OF QUALIFICATIONS

I, Terence A. Rourke, P.Eng. (P.Q.), Lime Products Consulting Engineer, of Upper Long Beach Road, R.R.#3, Nelson, British Columbia hereby certify that:

1. I am a graduate of Mining Engineering of Queen's University, Kingston, Ontario, B.Sc., 1948 and have been practising my profession for 23 years.
2. I am Vice-President of Dominion Lime Ltd., a company incorporated in the Province of Quebec and have been responsible since 1950 for the design and operations of the quarrying and lime calcining production facilities and the marketing therefrom of the products in Eastern Canada and North Eastern United States.
3. I am a member of the Corporation of Engineers of Quebec.
4. I am a member of the Canadian Institute of Mining and Metallurgy.
5. I am a member of the Engineering Institute of Canada.
6. I am a member of the American Society of Testing Materials.
7. I have been a Director of the National Lime Association and of the Canadian Lime Association.
8. I have no direct or indirect interest whatsoever in Jesmond Lime Products Properties or Associations, or in Malibu Metals Ltd. (N.P.L.), nor do I expect to receive any interest, direct or indirect in the properties of Jesmond Lime Products or Associations or Malibu Metals Ltd. (N.P.L.) or any affiliate or any security of the companies or affiliates.
9. The findings of the accompanying report are based on my personal examinations of the Jesmond Limestone Deposit during the summer of 1971 and review of all available information relating thereto.

DATED at Vancouver, British Columbia, this 15th day of December 1971.



 TERENCE A. ROURKE, P.Eng. (P.Q.)
 LIME PRODUCTS CONSULTING ENGINEER

REFERENCES

1. Warren H. Westphal, Jesmond Lime Products Operational Plan, 22 October 1970.
2. Terence A. Rourke, Jesmond Lime Products, 14 April 1971.
3. E. S. Asano, B.Sc., F.G.A.C., Geology Jesmond Property, December 1971.
4. W. G. Wahl Limited, Report on Jesmond Limestone Quarry, 9 November 1971.
5. Kennedy Van Saun Corporation, Proposed Lime Burning Facility, Clinton, British Columbia, 8 October 1971.
6. Keith Fidgett, Survey of Lime - Limestone Markets, 18 November 1971.
7. British Columbia Minister of Mines Report, 1969.
8. British Columbia Financial and Economic Review, 1970.

SINCE 1907

KENNEDY VAN SAUN CORPORATION

A SUBSIDIARY OF McNALLY PITTSBURG

DANVILLE, PENNA., U.S.A. 17821
 TELEPHONE 717/275-3050
 CABLE: JEKENGINE, DANVILLE
 TELEX NUMBER 841-410
 August 12, 1971

Weymark Eng. Ltd.
 1063 Balfour St.
 Vancouver 9, B. C., Canada

ATT: Mr. W. J. Weymark, Director

Subject: Limestone Evaluation Tests
 Malibu Metals, Ltd. (N.P.L.)

Dear Mr. Weymark:

We have completed the following evaluation tests on the sample of limestone submitted by Dominion Lime, Ltd.

(A) Visual Inspection:

Sample of stone received in burlap sack showed no appreciable breakdown during transportation. Medium grey color, fine grain, uniform structure, and no adherent surface dust.

(B) Apparent Density of Limestone:

Average 2.67 gms/cm³

(C) Loss on Ignition of Limestone:

Average 44.02%

(D) Apparent Density of Lime:

Average 2.56 gms/cm³

(E) Potential Decrepitation of Limestone:

<u>Temp. °F</u>	<u>Results</u>
500	No cracks, dust, or decrepitation
750	" " " " "
1000	" " " " "
1200	" " " " "
1500	" " " " "
1700	Slight cracking, no dust or decrepitation
1800	" " " " "
2000	" " " " "

(F) Abrasion of Limestone:

Breakdown 1st 500 revolutions = 3.3%

Breakdown 2nd 500 revolutions = 1.9%

Weymark Eng. Ltd.

- (.) Abrasion of Lime:
Breakdown 1st 500 revolutions = 10.2%
Breakdown 2nd 500 revolutions = 3.7%
- (:!) Volume Change during Calcination:
Average 41.60% Shrinkage
- (I) Chemical Analysis of Limestone:
(SEE ATTACHED LAB. REPORT)

The above potential decrepitation tests are conducted by shock heating the stone at the temperatures listed, and lime produced at 2200°F for lime abrasion tests.

COMMENTS: The above results show that this limestone can be handled in a KVS preheater system without excessive breakdown and that the resulting quicklime has sufficient strength for application of a contact type cooler. Attached chemical analysis show the limestone to be of a high quality, extremely white, strong, and of low sulfur contents.

Please evaluate the above results, and advise if you have any further questions.

Very truly yours,

KENNEDY VAN SAUN CORPORATION

J. Wilver
J. Wilver
Manager of Test Facilities

JW/sw

ATTACH/

KENNEDY VAN SAUN MFG. & ENG. CORP.

DANVILLE, PENNSYLVANIA

LABORATORY REPORT NO. 62918-1

Weymark Eng./Malibu Metals

DATE: 8-2-71

Limestone

DESCRIPTION: Medium grey color, fine grain, uniform, no surface dust.

CHEMICAL ANALYSIS

SAMPLE	No. 1	No. 2	No. 3	No. 4	REMARKS
	0.100				
	0.020				
<i>% CaO</i>	55.440				
	Nil				
	0.005				
Ignition	44.100				
WATER	0.330				
	100.000				

Very pure calcium carbonate rock, lime produced extremely white of excellent quality.

Respectfully submitted,

KENNEDY VAN SAUN MFG. & ENG. CORP.

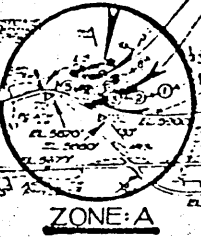

 CHIEF CHEMIST

UNSURVEYED
CROWN LAND

SAMPLE	CODE	MOISTURE	REL. HUM.	TEMP.	WIND	WIND DIR.	WIND S.P.	WIND S.D.	WIND S.E.	WIND S.W.	WIND S.N.	WIND S.E.	WIND S.W.	WIND S.N.	WIND S.E.	WIND S.W.	WIND S.N.
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10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

SAMPLE	CODE	MOISTURE	REL. HUM.	TEMP.	WIND	WIND DIR.	WIND S.P.	WIND S.D.	WIND S.E.	WIND S.W.	WIND S.N.	WIND S.E.	WIND S.W.	WIND S.N.	WIND S.E.	WIND S.W.	WIND S.N.
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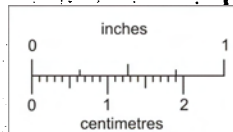
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D.L. 1284
640 ACRES

SAMPLE	CODE	MOISTURE	REL. HUM.	TEMP.	WIND	WIND DIR.	WIND S.P.	WIND S.D.	WIND S.E.	WIND S.W.	WIND S.N.	WIND S.E.	WIND S.W.	WIND S.N.	WIND S.E.	WIND S.W.	WIND S.N.
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D.L. 1285



BRITISH COLUMBIA
GEOLOGICAL SURVEY

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Property File

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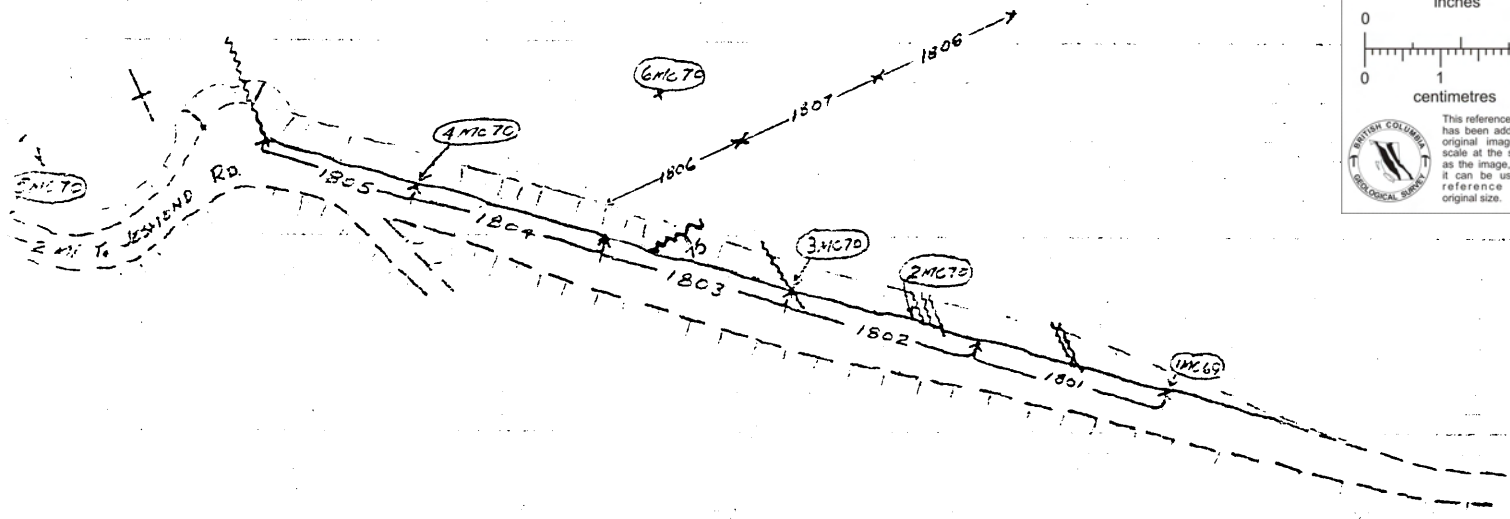
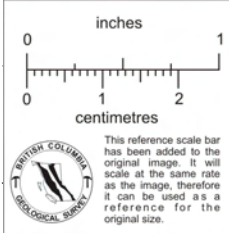
JESMOND LIMESTONE CORPORATION

QUARRY

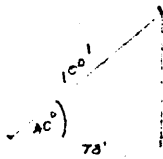
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1802	55.46	0.35
1803	55.11	0.37
1804	54.91	0.65
1805	53.21	0.58
1806	55.37	0.42
1807	55.34	0.39
1808	55.26	0.37

1" = 100'

TRUE



1801 SAMPLE @ 5' INT
 (1MCTD) SPECIMEN

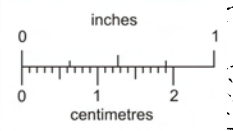


4 JUN 70

John Cannon

JESMOND LIMESTONE
CORPORATION QUARRY
JUNE 1970

92 P 4



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