Property File

092GNW031

APPENDIX B

008159

CANDOL DEVELOPMENT LTD.

SECHELT MINERAL CLAIMS

PRIMARY REPORT

PROJECT No.1272 SEPTEMBER 1983

WRIGHT ENGINEERS LIMITED
Vancouver Canada

(EXCERPTS ONLY - COMPLETE REPORT AVAILABLE UPON REQUEST.)

SECTION 1

INTRODUCTION

Candol Developments, Ltd. (Candol) has commissioned Bechtel's Mining and Metals Division to perform a preliminary evaluation of capital and operating costs for a new project based on surface mining of Candol's dolomite resource in the Sechelt Peninsula region of British Columbia, Canada. The basis of this study is a Magnetherm process plant to treat 174,057 tons per year (1) of Candol dolomite to produce 15,000 tpy of magnesium ingot for sale.

The Pechiney Magnetherm process was selected because it is the only commercialized process offered for license and which uses dolomite as its primary starting material. Three plants have been built which use this process, one each in France, Yugoslavia and the USA and they range in size from 5,000 tpy to 24,000 tpy. The size of the plant for this study was selected by Candol at 15,000 tpy on considerations of market penetration and total project cost.

Essential to the project are an abundant and inexpensive supply of raw materials and low cost electric power. Beside dolomite, the principal raw material of importance in the Pechiney Magnetherm process is ferrosilicon (FeSi). The FeSi is used to reduce the magnesium oxide in dolomite to magnesium metal. Two options were studied: manufacture of 78% ferrosilicon on the site or purchase from existing suppliers. Importing of ferrosilicon is less expensive by 7 cents/lb of FeSi, so this option was retained.

This study provides preliminary estimates of the cost to mine dolomite, a factored capital cost estimate for a Magnetherm production plant, operating costs to produce magnesium metal using purchased ferrosilicon and, optionally, to produce metal from captive ferrosilicon production. The study relies on information supplied by Candol, information and cost data supplied by Pechiney for their Magnetherm process and the latest plant operating experience, electric power costs supplied by B.C. Hydro and on Bechtel-derived costs or allowances for the balance of the estimates.

The estimates are in 2nd quarter 1986 US dollars. Unit production costs are stated in US dollars per pound of magnesium ingot metal to correspond with the US industry pricing.

Note (1) - In this report all tons are U.S. short tons. (1 ton = 2000 lb) and all currency is reported in U.S. dollars, except as specifically noted.

SECTION 2

SUMMARY

2.1 MINING COST SUMMARY

A conceptual mine operation plan for the production of dolomite and haulage to the plant site has been developed. The total operating cost, including equipment rental, is estimated to be US$2.04 per ton of dolomite delivered to the magnesium plant facility.

2.2 CAPITAL COST SUMMARY

The capital cost estimate developed by Bechtel is US$ 57 million. In addition, the cost of a transmission line and connection to the B.C. Hydro electrical grid is estimated at US$2.4 million.

Although not recommended, should Candol decide to produce ferrosilicon at the site, the additional capital for a ferrosilicon electric furnace facility is on the order of US $40 million.

The above capital costs exclude land, license fee, site preparation, infrastructure (water supply, roads, etc.), financing and interest charges, Owner's administrative costs, environmental and ecological studies and permits, start-up and operator training and prior project development costs.

2.3 OPERATING COST SUMMARY

The total direct operating cost estimate FOB the plant gate is estimated to be US$0.8761 per pound of metal ingot. Allowing for write-off of the capital charges at an annual rate of 18% adds another $0.3564 per pound to the production cost to yield a total production cost of $1.233 per pound of magnesium metal. This estimate includes allowances for head office expenses, cost of sales, insurance, local taxes, plant services and 3 cents/lb of metal as royalty to Pechiney.

2.4 COST OF FERROSILICON

For captive production of ferrosilicon, Bechtel has developed an estimate of capital and operating costs based on information supplied by Lectromelt and Elkem, both manufacturers of the plant equipment and, in the case of Elkem, also a seller of ferrosilicon.

The capital cost was cited above to be about $40 million. The total operating costs for producing ferrosilicon (raw materials, labor, utilities, maintenance and fixed costs), plus annual capital write off charges at 18%, amount to $0.39/lb of 78% FeSi.

Elkem has offered to sell ferrosilicon at a quoted price of $0.40 per pound of contained silicon, or $0.40 x 0.78 = $0.312/lb of ferrosilicon landed in Vancouver. Adding $10/t for freight to the plant site brings the total price to $0.317/lb of 78% FeSi. This is a savings of over 7 cents/lb, so the option to manufacture ferrosilicon is not considered viable at this time.

2.5 COST AND SELLING PRICE SUMMARY

As noted in Section 2.3, the production cost of magnesium ingot FOB the plant gate is estimated to be $1.233 per pound. The present quoted selling price is $1.48 per pound delivered. The apparent profit before taxes of $0.25 per pound would seem to indicate that this project could very well fit into Candol's plans to develop the dolomite reserves into a profitable project to produce magnesium metal.

2.6 FUTURE INVESTIGATIONS

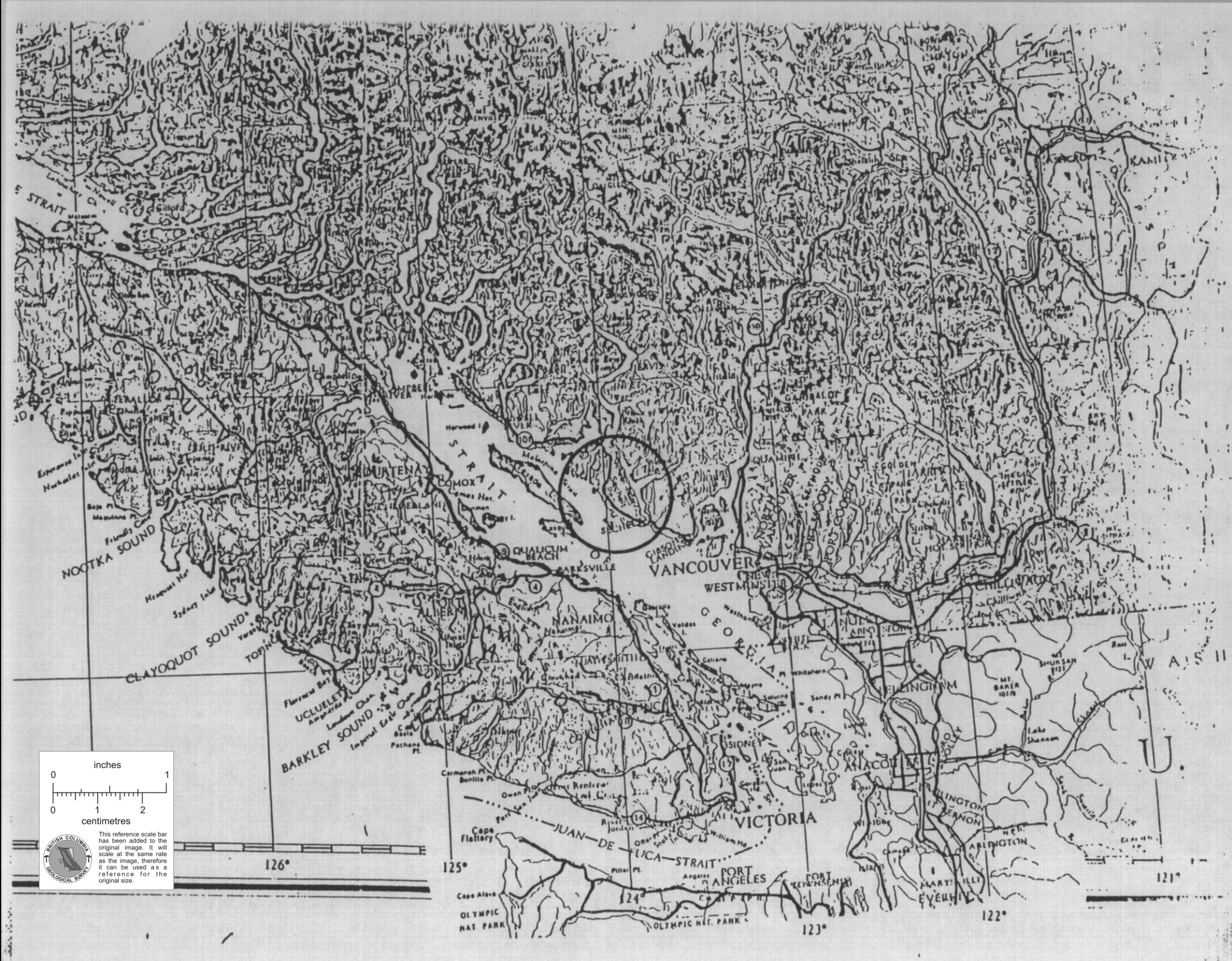
Before further economic study of this project is undertaken, Bechtel recommends the following:

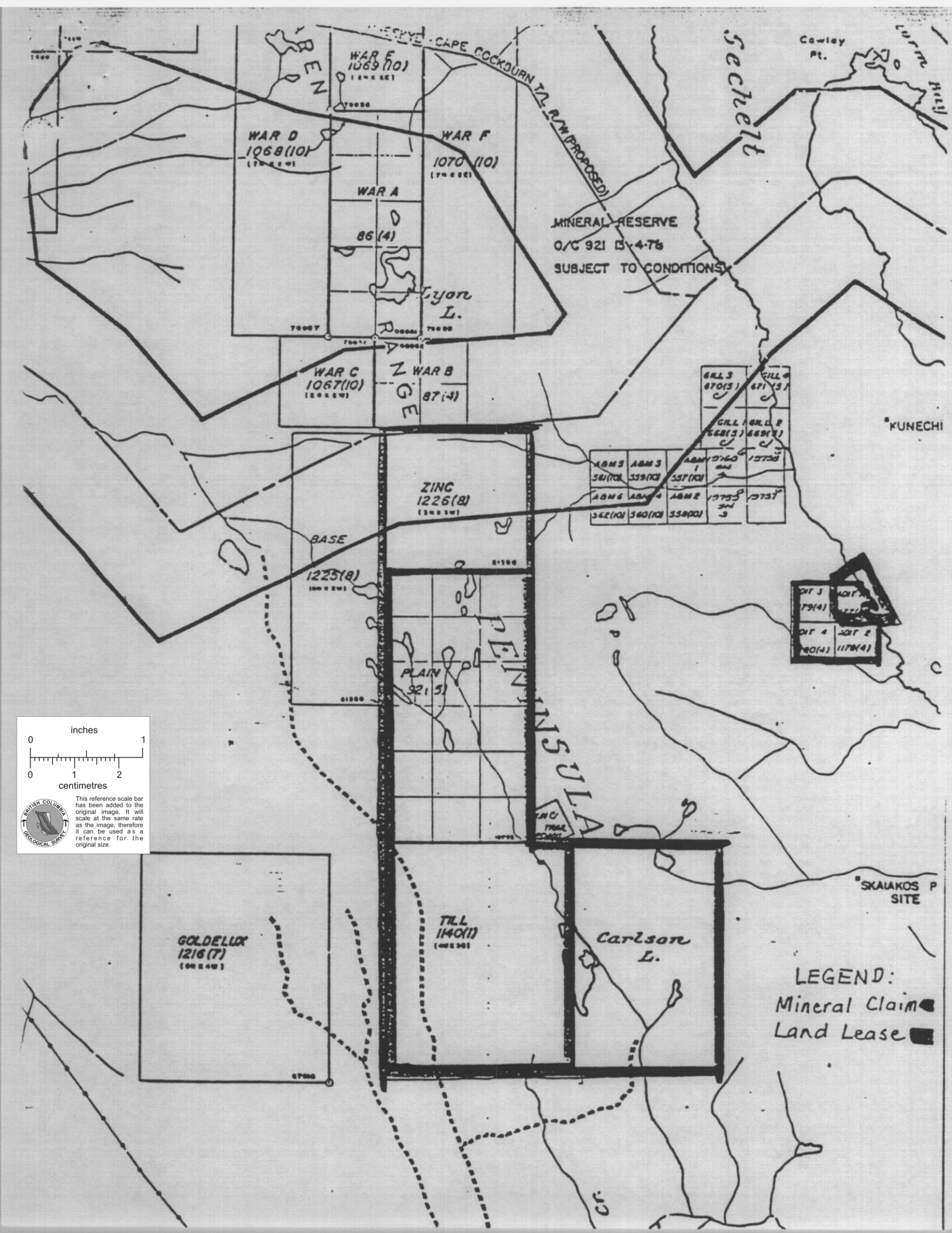
- Negotiate a firm electric power cost with the B.C. government and B.C. Hydro.
- Establish a firm license and royalty price with Pechiney Electrochimie (licensor of the Magnetherm process).
- Complete sufficient geological and exploration work to confirm the presence of the required tonnage of dolomite and its quality as a feed material for the magnetherm process.
- Initiate detailed site study work to identify capital cost items excluded from this study because they are presently unknown. This includes:
  - topographic mapping of mine and plant site
  - soils testing at plant site location
  - site access requirements
  - water supply
- Identify means and cost (or revenues) for disposal of furnace slag and spent 20% ferrosilicon.

- Furnish sufficient Candol dolomite to Pechiney for an assessment of its qualities and applicability to the Magnetherm process, with special emphasis on minor metals content (Cu, Zn, Mn, etc.) and content of alkali metals (Na + K + Li, etc.).

- A market study.

Bechtel is most interested to assist Candol in executing these and other pertinent tasks as part of Candol's activities to advance this project.


inches
0
1
0
1
2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
BRITISH COLUMBIA GEOLOGICAL SURVEY
VANCOUVER
VICTORIA
NANAIMO
PORT ANGELES
JUAN DE FUCA STRAIT
GEORGIA
STRAIT
NOOTKA SOUND
CLAYOQUOT SOUND
BARKLEY SOUND
QUALICUM BEACH
PARKSVILLE
COMOX
CAMPBELL RIVER
DUNCAN
SIDNEY
ANACORTES
BELLINGHAM
MT. BAKER
MT. SHUKSAN
OLYMPIC NAT. PARK
126°
125°
124°
123°
122°
121°


WAR E
1069 (10)
WAR D
1068 (10)
WAR F
1070 (10)
WAR A
86 (4)
WAR C
1067 (10)
WAR B
87 (4)
MINERAL RESERVE
O/C 921 B-4-75
SUBJECT TO CONDITIONS
Tyon L.
ZINC
1226 (8)
BASE
1225 (8)
PLAIN
921 (5)
PENINSULA
TILL
1140 (1)
GOLDELUX
1216 (7)
Carlson L.
KUNECHI
SKALAKOS P
SITE
Cowley Pt.
Secheli
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
LEGEND:
Mineral Claim
Land Lease

SECTION 2

SITE DESCRIPTION

The mineral claims and land leases of CANDOL are located in southwestern British Columbia, on the Sechelt Peninsula, about 67 km (42 miles) West-Northwest from Vancouver. Present access to the properties is 10 km from Halfmoon Bay on paved road and on gravelled logging road. Halfmoon Bay can be reached on 35 km paved highway from Langdale which is served by ferryboat from Horseshoe Bay, near West Vancouver.

An access road to connect the properties and a prospective barge loading facility in the Sechelt Inlet is also under construction.

The properties are about 850 m to 1000 m above sea level, on a gently rolling plateau of the Caren Range hills which, despite the moderate climate of the coastal region, remain covered with snow in the short winter season. The year round mean temperature is about 10° C. Precipitation is also moderate, ranging from 750 mm to 1000 mm.

There are several small, swampy mountain lakes in the area, draining into each other and into the Sechelt Inlet by creeks. The most voluminous water flow is in the Carlson Creek, crossing nearly the entire property and providing more than sufficient water for potential diamond drilling operations.

Most of the area has been cleared by logging and some areas are covered by young coniferous trees of second and third growth.

The infrastructure is well developed to alleviate any future quarry operation. A high voltage transmission line is planned to cross the properties; timber and water are available for construction on the site; labor, materials, equipment, transport, communications are all available at Halfmoon Bay or in Vancouver.

SECTION 3

MINERAL CLAIMS

The Sechelt properties of Candol consist of 42 mineral calim units as follows:

Mineral Claim	Units	Record Number	Date
Plain	18	92	May 31, 1976
Till	20	1140	Jan. 12, 1972
Adit 1	1	1177	Apr. 15, 1982
Adit 2	1	1178	Apr. 15, 1982
Adit 3	1	1179	Apr. 15, 1982
Adit 4	1	1180	Apr. 15, 1982

According to the Mineral Claim Map last updated on August 18, 1983, the claims are in good standing.

In addition to the mineral claims, CANDOL has applied for leases in the Land Recording District of New Westminster of the Ministry of Lands, Parks and Housing of British Columbia for the expressed purposes of dolomite and limestone quarrying and for the establishment of dock facilities for barge shipments of dolomite and limestone.

The land leases cover a larger area than the mineral claims, as indicated by the attached documents.

SECTION 4

GEOLOGY

The basic formations are coast intrusions of granodiorite, quartz diorite and some remnants of metasediments and metavolcanics, locally designated as the Jarvis Group of the Triassic Period, hosting the limestone and dolomite members.

On the surface, widths of 150 m or more are exposed, the member strata extending for several miles towards north. Rock outcrops are pronounced along ledges, the dolomite strata being more erosion resistant, and on steep slopes. Generally, the overburden is shallow, excepting the low elevations where peat and clay deposits are imbedded.

In one area of the property, an electromagnetic survey indicated a high anomaly. Outcrops in that area show sulphide mineralisations which may reach commercial grades in a potential exploration program, (see Primary Report by Weymark Engineering Ltd., April 1983).

Since no systematic diamond drilling was carried out to date, there are no "measured" geological reserves from the purely technical point of view. The "indicated" and "inferred" reserves, projecting the outcrops to a minimum depth of 50 m and to a more likely or probable depth of 300 m respectively on the basis of strata sequence and dip angles observed on the surface, are as follows:

	Geological Reserves (tonnes)		
Mineral	**Indicated**	**Inferred**	**Total**
Dolomite	17,500,000	100,000,000	117,500,000
Limestone	7,500,000	20,000,000	27,000,000
Peat	5,000	15,000	20,000

The assays of composite chip samples taken from outcrops earlier, indicated better than "high purity" dolomite quality as follows:

Mineral	Min. %	Max. %	Av. %	Class Limit of "High Purity"	Theoretical Max. Purity
MgO	20.4	21.1	20.7	20.7	21.8
CaO	30.7	31.1	30.9	29.8	32.6
SiO_2	0.7	1.1	0.9	1.3	--
Fe_2O_3	0.2	0.5	0.3	0.7	--
Al_2O_3	--	0.4	0.2		--
L.O.I.	46.6	46.8	46.7	44.5	45.6
			100.0	100.0	100.0
$CaMg(CO_3)_2$ purity:			98.3	95.0	100.00

Other impurities, constituting less than 0.1%, were as follows:

Element	Average ppm
Mn	380
Sr	109
Ti	80
Ba	5
B	not detected

WEL has collected a group of 5 new composite chip samples in the field recently at the locations indicated on the attached map. The assay results are presented on the following page. To the best of WEL's knowledge, there are no known dolomite deposits of equal quality in the Western U.S. or Western Canada.

ASSAYS OF COMPOSITE CHIP SAMPLES TAKEN BY WEL
SEPT. 19, 1983

Mineral	SAMPLES A	B	C	D	E	Average	"High Purity" Limit	Theoretical Max. Purity
MgO	21.40	19.90	17.10	18.20	21.80	19.68	20.70	21.80
CaO	31.60	31.00	30.20	34.20	31.80	31.76	29.80	32.60
SiO_2	0.40	1.03	0.70	0.89	0.98	0.80	1.30	--
Fe_2O_3	0.42	0.43	0.36	0.42	0.37	0.40	0.70	--
Al_2O_3	0.57	0.59	0.89	0.76	0.78	0.72	2.00	--
Na_2O	0.02	0.02	0.02	0.02	0.02	0.02	0.05	--
K_2O	0.01	0.01	0.05	0.02	0.01	0.02	0.05	--
Others	0.64	0.83	0.66	0.84	0.84	0.76	0.90	--
L.O.I.	44.94	46.12	50.02	44.65	43.40	45.84	44.50	45.60
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Purity of $CaMg(CO_3)_2$	97.94	97.09	97.32	97.05	97.00	97.28	95.00	100.00

The absence of boron as well as the low combined silica and iron content make this dolomite particularly suitable for caustic calcined magnesia (periclase) and magnesium metal production. There seems to be no need for a concentration process, due to the purity of the raw dolomite.

As the dolomite would be recovered from the prospective quarry, limestone would also have to be removed. Ten assays of 10 composite limestone samples taken from various outcrops by Weymark Engineering Ltd. in different areas of the property were analysed as follows:

Mineral	Min. %	Max. %	Av. %	Class Limit of "High Purity"	Theoretical Max. Purity
CaO	53.9	55.9	55.3	53.3	56.1
MgO	0.3	1.4	0.5	1.0	--
SiO_2	0.3	1.4	0.7	2.0	--
R_2O_3	0.1	0.4	0.2	1.0	--
L.O.I.	42.4	43.5	43.3	42.7	43.9
			100.0	100.0	100.0
$CaMg(CO_3)_2$ purity:			99.1	97.0	100.0

The limestone necessarily removed with the dolomite as raw byproduct could be used to produce quicklime, hydrated lime, calcium carbide, white Portland cement or other special products.