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Report on Julian Iron Property of Canadian Javelin Ltd.

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REPORT

ON

JULIAN IRON PROPERTY

OF

CANADIAN JAVELIN LTD.

Montreal, Que. September 7, 1973.

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PROPERTY AND LOCATION

The property held by Julco Iron Corporation, within which the Julian iron deposit is located, consists of 1.29 square miles held under mining lease from the Newfoundland Government. The lease is held by Nalco which has sublet it to Julco Iron Corporation, a wholly-owned subsidiary of Canadian Javelin Ltd.

The Julian iron deposit is situated at the north end of Wabush Lake, Labrador section of Newfoundland, about 20 road miles from the townsof Wabush and Labrador City. (See Location Map - Plate I)

ACCESSIBILITY AND FACILITIES

Present access to the property is from the town of Wabush by a provincial road, a distance of approximately 20 miles. There is a regular airline service from Montreal to Wabush, a distance of approximately 650 miles. There is also rail transportation from Seven Islands to Wabush with freight moving from Montreal to Seven Islands by truck or boat and thence north by rail to Wabush.

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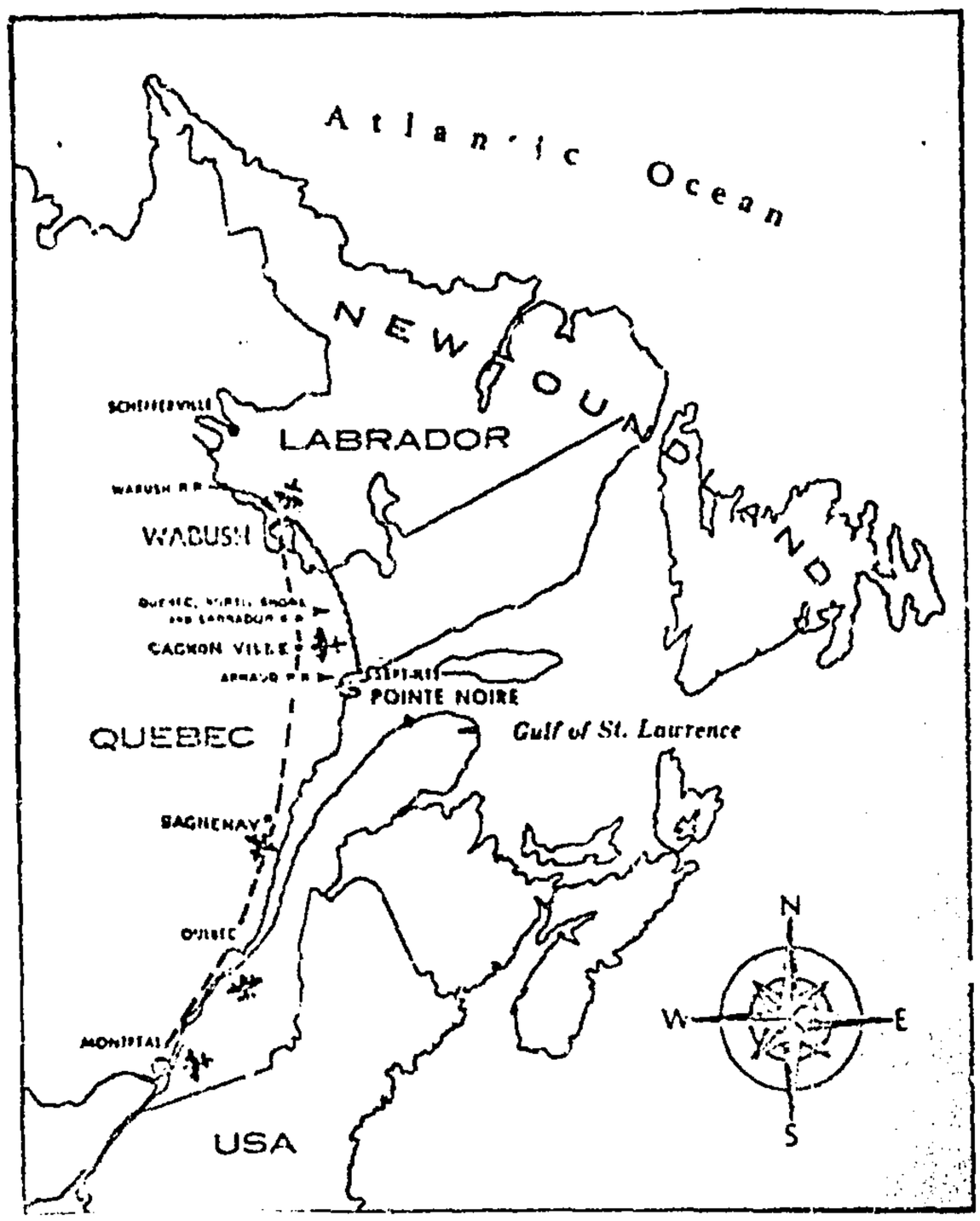

Electric power is available in Wabush and there would be adequate capacity to serve the needs of the property through a short extension to the existing facilities. Ordinary services and supplies and such facilities as banking, telephone, and hospital are available at Wabush where large concentrating and pelletizing plants are in operation by the Iron Ore Company of Canada and Wabush Mines Ltd.

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HISTORY

Canadian Javelin Ltd. is a Canadian Company formed in 1951 that has been engaged principally in the development of natural resources. The Julian deposit was first noted during 1953 in a reconnaissance program by Nalco but it was not until 1955 that any serious investigation was made of the deposit.

In 1956, the geological staff of Canadian Javelin Ltd. carried out geological mapping and sampling that formed the basis of a drilling program conducted in 1957 and 1958. This work was followed by metallurgical investigations and evaluations from 1959 to 1963

From 1966 onwards, feasibility studies were made by various engineering firms and market studies were conducted on behalf of Canadian Javelin Ltd.

GEOLOGY

The iron deposits in the Wabush Lake district are part of the southern extension of the Labrador Trough. This Proterozoic belt of sedimentary rocks has been traced from north to south for a distance of some 700 miles.

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In the southern portion where the Julian deposit is located, the unit consists of metamorphosed sediments lying unconformably on the older gneissic rocks of early Precambrian age. Due to metamorphism, only quartzite and iron formation can be distinguished in the sedimentary rocks.

The Wabush Lake iron formation is believed to be a continuous stratigraphic horizon throughout the southern part of the trough. The iron formation consists of four principal mineral facies, namely, quartz-specular hematite, quartz-magnetite, iron silicate, and quartz ankerite. It has been noted that the oxide facies is generally underlain by quartzite whereas the silicate-carbonate facies of the iron formation is generally underlain by marble. The latter facies is not presently of any economic interest.

The iron formation in the southern part of the trough has undergone intense folding and multiple deformation. This has resulted in complex plunging structures and on the Julian property the iron formation has been folded into a northeast trending, canoe-shaped overturned syncline. The iron formation trends through the peninsula and extends into Wabush and Julienne Lakes on either side

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(See Plate II). The rocks in most outcrops are dipping southeast and the depth to the bottom of the syncline is unknown although one hole indicates a minimum depth of 700 feet.

Quartz, specular hematite and martite (oxidized magnetite) account for over 90% of the material in the deposit. The remainder of the material is composed of variable amounts of fine grained specular hematite, red hematite, geothite, limonite and locally secondary manganiferous materials.

DEVELOPMENT

Although the Julian property was examined initially in 1953, no investigation was made until 1956. At that time geological mapping, magnetic surveys, and sampling were carried out and provided the basis for drilling programs in 1957 and 1958.

The drilling consisted of nine holes with a total footage of 3,477, all drilled on the land portion of the property, as shown on the Surface Plan (Plate III). A summary of the drill holes is carried below. No further drilling was carried out but in 1962 an area extending

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across the deposit was stripped (See Surface Plan) and a magnetic and sounding program was carried out on the lake. This data, combined with information obtained from numerous test pits, was sufficient to make calculations of ore reserves and grade. Additional diamond drilling will be required for pit layouts and tonnage confirmation.

SUMMARY OF DRILL HOLES

JULIAN IRON DEPOSIT

Hole No.	Inclination	Depth Overburden (ft.)	Iron Formation Footage	% Iron Wt.Average	% Core Recovery
J-1	Vertical	3	3-596	34.70	51.6
J-2	"	18	20-360	37.50	54.2
J-3	"	42	47-301	33.70	37.6
J-4	"	16	20-255	37.49	49.0
J-5	50°	12	12-154	39.3	
J-6	Vertical	10	10-323	40.1	
J-7	"	12	12-379	35.5	
J-8	"	26	26-356	30.6	
J-9	"	138	138-261	36.3	

ORE RESERVES

Reserves of this type of iron deposit are basically in direct proportion to the gross volume of the iron formation present, subject only to such restrictions as

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operational mining or metallurgical limitations may impose. These considerations cannot be definitively evaluated until the ore body has been completely outlined by further drilling and large scale pilot plant tests completed. However, there is no evidence anywhere in the deposit of intrusive dykes or other geologic features which would distract from the aasumption that the entire body of iron formation constitutes a large volumetric reserve. On this assumption and a comparison with Wabush, it is estimated that at least 90% of the bulk volume of the deposit can be economically mined and treated. Plate IV shows a typical section C-C across the deposit.

Present estimates of the reserve potential available for open pit mining, calculated to lie between sections 7,000 and 13,500 east (See Plate III) and down to elevation 1,200 feet (530 feet below lake level) are in the order of 500 million tons of crude ore. Approximately 125 million tons of these reserves exist above lake level. These reserves are located in that 6,500 foot portion of the deposit on which the diamond drilling and other surface work was performed. In addition, there is over 8,000 feet

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of magnetically indicated iron formation beyond these limits under the lake, as shown on Plate II. There is no reason why the iron formation underlying the lake and debris should be significantly different from that exposed on the peninsula. The amount of this material which could be included in potential reserves will be a matter of mining feasibility and the economics of overburden removal.

The waste to ore ratio is quite low as it is estimated that overburden removal amounts to 27.5 million yards and about 10 million tons of rock stripping would be required on the south side. Allowing 1 ton per yard of overburden, the waste to ore ratio is 0.73.

GRADE

During the development work on the deposit, a great many samples have been taken from pits and from drill core and the results of the sampling are shown in the table below:

Type of Sample	Number of Samples	% Iron
Outcrop	28	37.15
Drill core	9 holes - Wt. Av.	35.2
	- Arith. Av.	34.2
5 Pits	40 tons	36.75
Trench	100' intervals	35.71
12 Pits	150 tons	32.55

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From the above it is anticipated that an average grade of approximately 35% iron could be expected.

An average analysis of the ore has been obtained by taking an arithmetic average from all sources, as shown below:

Soluble iron	36.330%	260 samples
Insolubles (SiO_2)	46.850%	195 "
Manganese	0.340%	252 "
Phosphorus	0.014%	195 "
Sulphur	0.005%	98 "
Calcium oxide	0.026%	17 "
Magnesium oxide	0.028%	17 "
Titanium oxide	0.046%	48 "
Aluminum oxide	0.198%	12 "

METALLURGY

Since all of the iron ore deposits in the area are quite similar, Canadian Javelin Ltd. has been able to utilize the performance data and flow sheet information from the Carol Lake and Wabush Mine deposits as a guide in the test work on the Julian Lake ore deposit.

Initial metallurgical testing was conducted on a 40 ton sample collected in 1960. This showed that the ore could be readily separated from the quartz through grinding and gravity concentration. This is the same procedure that

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is presently in use in the district and the tests indicated that a concentrate of 64% iron could be produced with a minimum recovery of 80%. The ratio of concentration was 2.5 using crude ore with an average grade of 35% iron. Electrostatic or other sophisticated processes could be used to raise the concentrate grade to about 66%. The concentrate contains only traces of impurities and the silica content is less than 5%.

More recently, a full scale test program was carried out by Ferro-Magnetics Ltd. using the Jones Wet High Intensity Magnetic Separator. The objectives of this test program was to produce iron concentrate with 65% Fe at a recovery above 80% and obtain data from which projections could be made relating to the performance and operating data for commercial plant operation. The results and conclusions of this test program are carried in a detailed report by Ferro-Magnetics Ltd., dated August 6, 1973.

The material used in the test program was a 200 lb. sample that was typical Julian Mine iron ore with an analysis similar to that outlined on page 10. The technical data on the tests is included in the report by Ferro-Magnetics

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Ltd. and only the major conclusions and recommendations are included in this report.

The test program demonstrated that an iron concentrate with over 65% iron can be produced with recovery above 85% using the Jones Separator. For satisfactory liberation, the ore should be ground to -60 mesh and the recirculated middling product to -150 mesh.

The report made the following recommendation: The Jones Separator is efficient, well proven, simple and most probably the cheapest process for concentration of the Julian deposit iron ore. This is largely evident by the excellent results achieved in this test program. Based on the test data, a flow sheet can be designed and equipment required specified for production of iron concentrate from all the materials. Also included in the report are preliminary operating and capital investment costs related to the proposed flow sheets.

From all test work carried out to date, it is known that iron ore pellets can be produced having the following chemical analysis:

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Iron	65.60% average
Silica	5.00%
Phosphorus	0.02% maximum
Sulphur	0.02% maximum
Manganese	0.30% maximum
Alumina + lime + magnesia	0.50% maximum

FEASIBILITY STUDIES

Several feasibility reports have been made covering beneficiation and electric smelting processes. In addition, studies have been made on flow sheets, plant layout and related facilities including transportation and loading facilities.

In 1967, Kilborn Engineering Ltd. presented a report covering a Preliminary Estimate of Capital and Operating Costs for a Mining, Concentrating and Pelletizing Plant, located at Julienne Lake, Labrador, of 4,000,000 long tons per year of iron ore pellets and the expansion of this plant to 6,000,000 long tons per year. The estimate was based on current costs at that time and for use now would have to be revised to allow for present day costs.

In November, 1970, another feasibility study was carried out by Kilborn Engineering Ltd. on a combined production project using the Julian iron deposit and the

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Star-O'Keafe Lake deposits owned by Dominion Jubilee Corporation which is controlled by Canadian Javelin Ltd. and its subsidiaries. In this study, the proposed rate of production is 12,000,000 long tons per year of ground concentrate of which 9,000,000 long tons would come from the Julian deposit. The proposal at that time was to transport the concentrates by pipeline to a pelletizing plant in the Seven Islands area.

All of the feasibility studies presented conclude that production can be attained on a profitable basis.

CONCLUSIONS

The development programs carried out on the Julian iron deposit have been sufficient to outline approximately 500 million tons of concentrating type iron ore with an average grade of 35% iron and only traces of impurities. The deposit is amenable to open pit mining and the waste to ore ratio is approximately 0.73 which should give relatively low mining costs.

Extensions of the deposit under the shallow waters of Wabush Lake are in the vicinity of 400 million tons

to a depth of 530 feet. The amount of this material that can be added to reserves depends on the economics of mining and waste removal.

Metallurgical tests have shown that commercial grade concentrates and pellets containing 65% iron and 5% silica can be produced. The commercial feasibility of production from this deposit has been indicated by studies carried out by independent engineering firms. It is further indicated by the existence of two large concentrating and pelletizing plants in the Wabush-Carol Lake area, 13 miles from the Julian deposit.

Several production proposals have been made in the past for the deposit but the final analysis will vary with the method of transportation chosen. Because of the large tonnages involved, transportation costs and dependability of the transportation system are critical variables that affect the venture.

World demand for iron ore continues strong and new pellet capacity is needed each year to keep up with demand. As long as these conditions continue, production from the Julian deposit in the near future could be a reality. The

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final decision, however, on production, plant size, etc. will depend on the outcome of market studies presently underway. The writer understands negotiations are underway for sales to Japan and also in Europe. Following a thorough investigation of all the markets for concentrate and/or pellets, it will be necessary to make a new feasibility report based on present day prices to determine the optimum plant capacity, transportation system, and plant layout.

Respectfully submitted,

H.J. Bergmann, P. Eng.

Montreal, Que.,
September 7, 1973.

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LIST OF REFERENCES:

1. Julian and Star-O'Keefe Iron Ores - Canadian Javelin Ltd., 1970 and associated technical literature in Canadian Javelin Ltd. Engineering Report files.

2. The Julian Deposit Guide - Julco Iron Corporation Ltd. - 1970.

3. A geologic Summary Report - The Julian Deposit by David M, Knowle , Canadian Javelin Ltd., July 26, 1966.

4. Feasibility Study - Julian and Star-O'Keefe Iron Ores, by Kilborn Engineering Ltd., Nov. 12, 1970, Vols. I and II.

5. The Julian Star-O'Keefe Project - Feasibility Assessment, By Technical Economists Ltd., Nov. 1970.

6. Report on Full Scale Test Program for Canadian Javelin Ltd. using the Jones Web High Intensity Magnetic Separator on Julian Deposit, by Ferro-Magnetics Ltd., August 6, 1973.

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CERTIFICATE OF QUALIFICATION

I, H.J. Bergmann, of the City of Montreal, in the Province of Quebec, hereby certify:

1. That I am a Consulting Mining Engineer and reside at 3518 Vendome Ave., Montreal, Que.

2. That I am a registered Professional Engineer of the Provinces of Ontario and Quebec.

3. That I am a graduate of the University of Alberta and hold a Bachelor of Science degree in Mining Engineering.

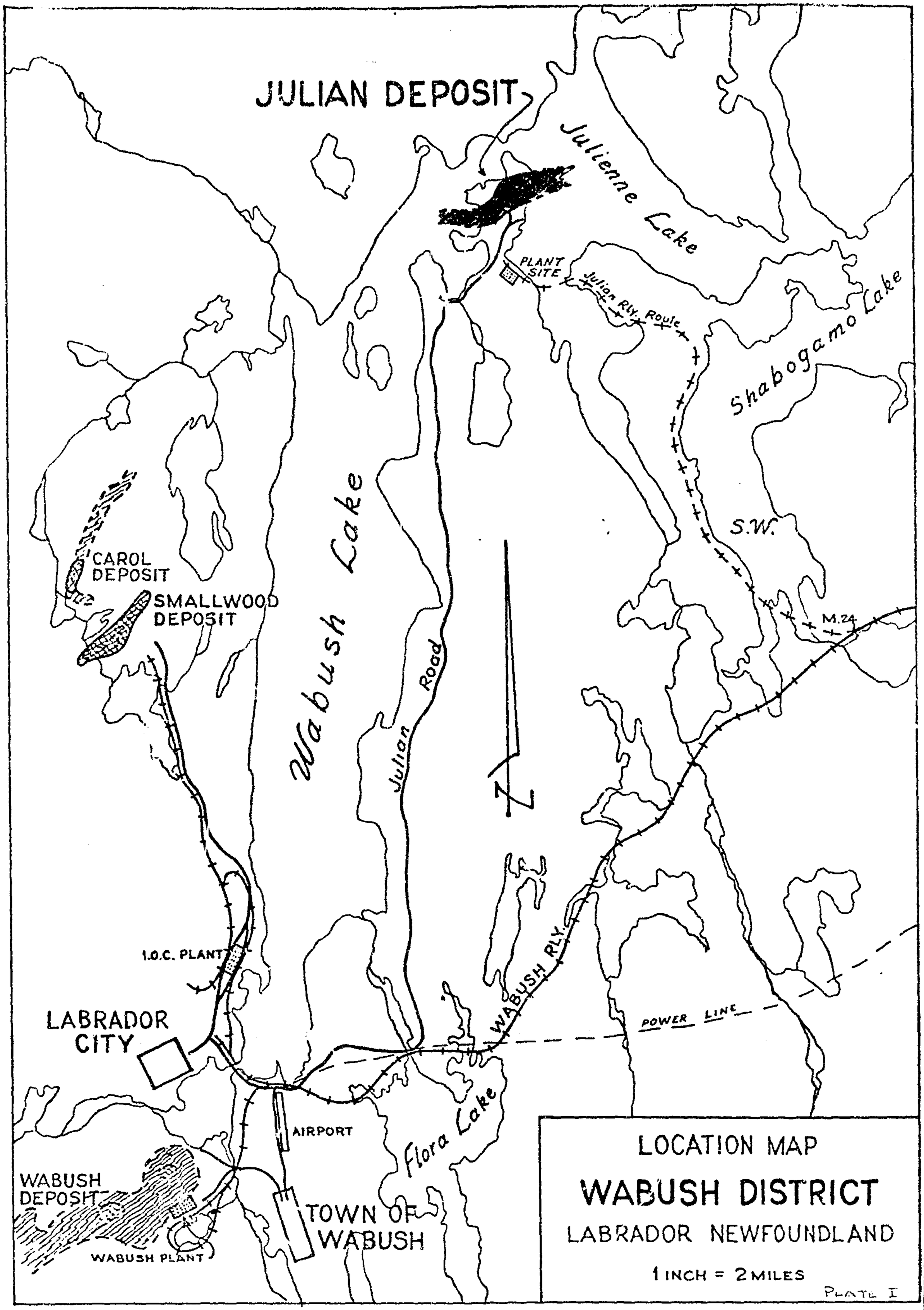
4. That I have been practising my profession as a Mining Engineer since 1938 and during the past twenty years as a Consulting Engineer.

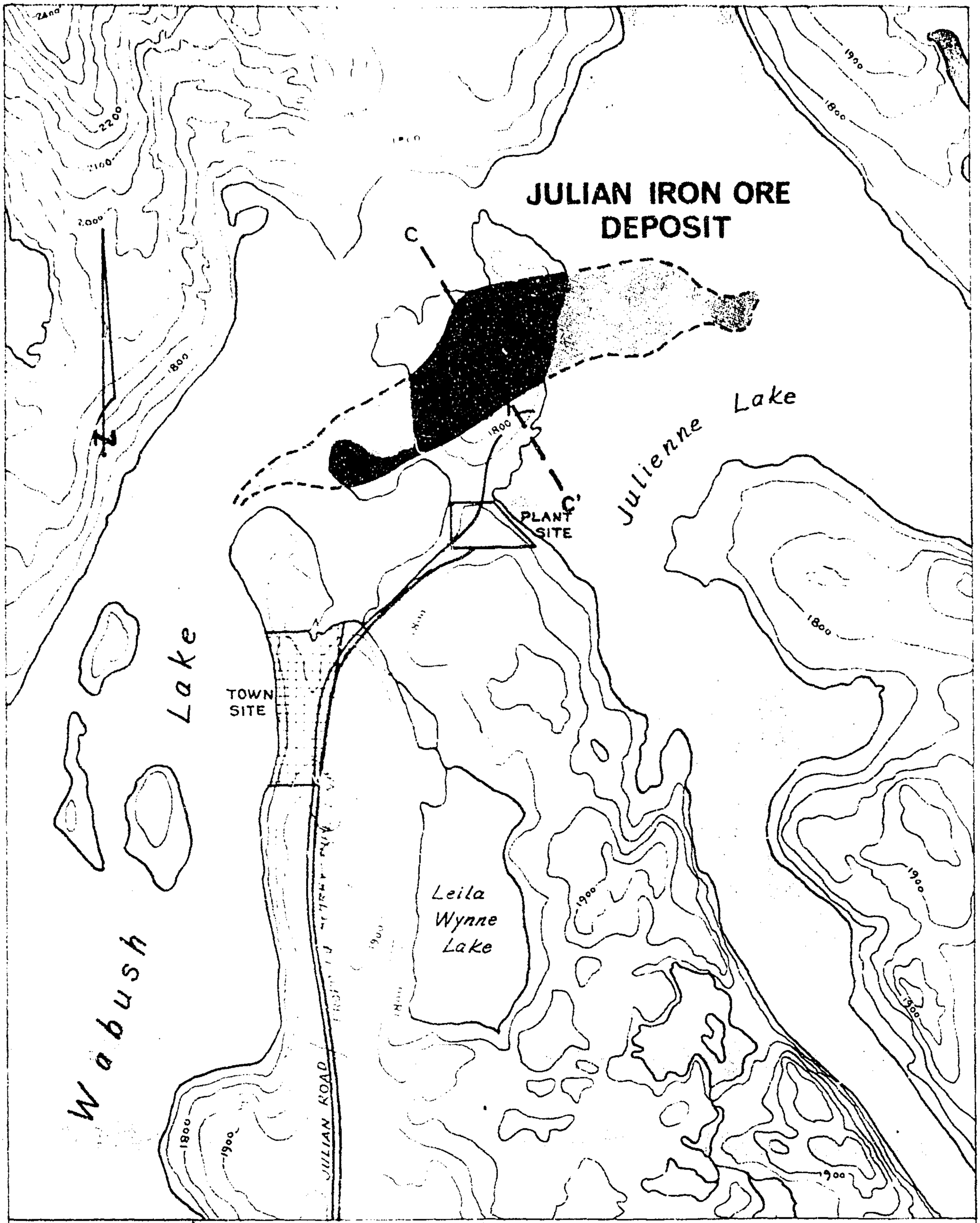
5. That I have no interest, either direct or indirect, in the properties or securities of Canadian Javelin Ltd. and do not expect to receive, either directly or indirectly, any interest in the securities of the Company.

6. That the accompanying report is based on a study of all data pertaining to the properties described in the report and the writer's personal experience in the areas.

Dated at Montreal this 7th day of September, 1973.

H.J. Bergmann, P. Eng.

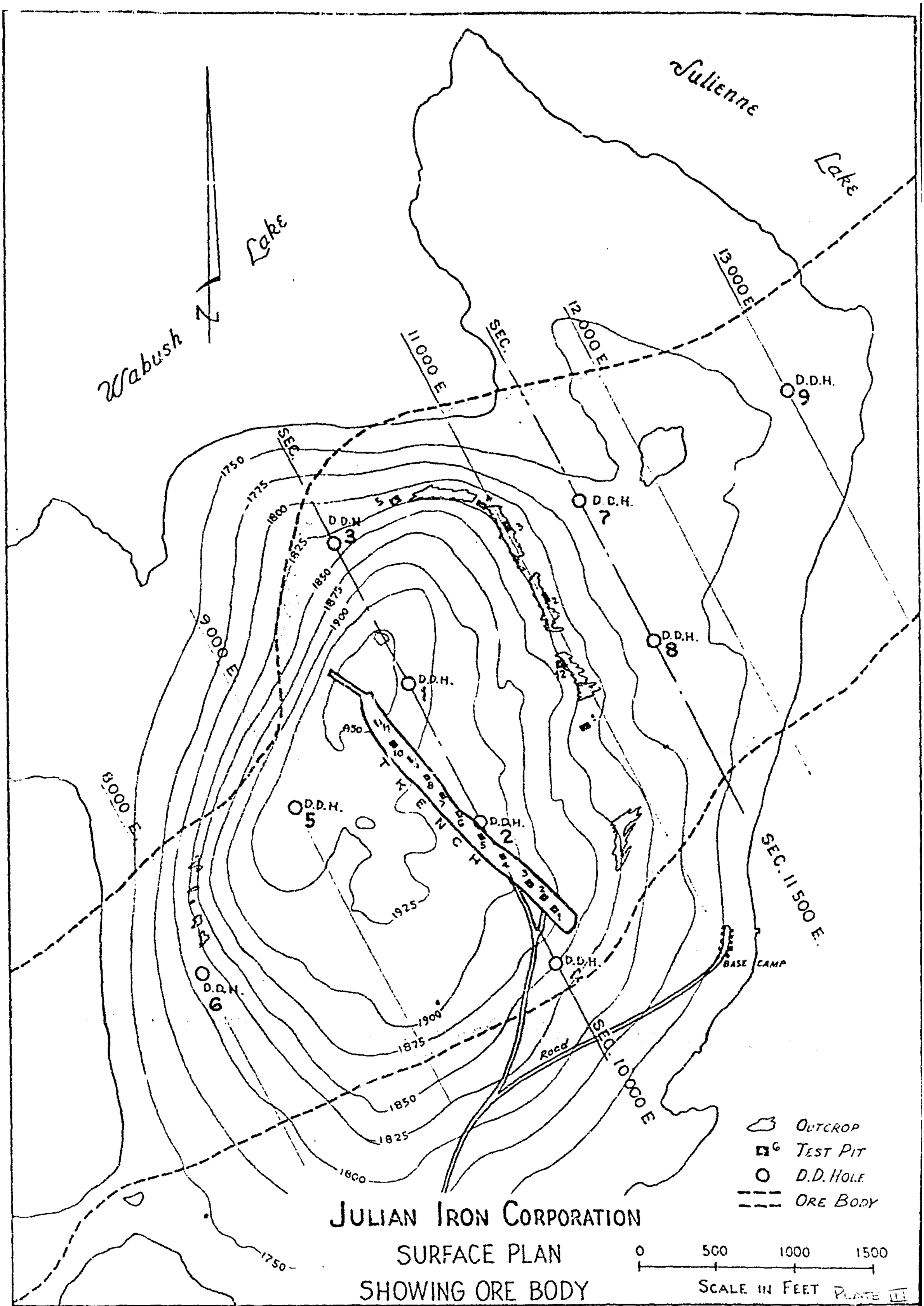




Julco Iron Corporation Limited

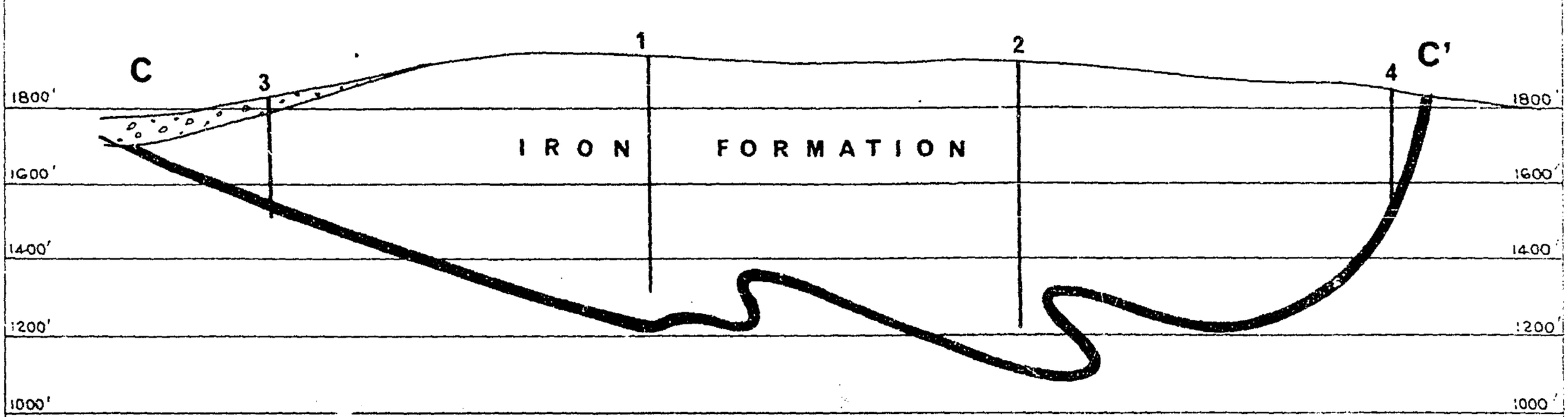
JULIAN IRON DEPOSIT

PLATE II



TYPICAL CROSS-SECTION
LOOKING N.E.

JULIAN IRON ORE DEPOSIT



Scale: 1 inch = 400 feet

PLATE IV.