CREIGHTON-0015

LOAD: 16 mm
35 mm

A COMPILATION OF REPORTS

On

ONTARIO PYRITES COMPANY LIMITED

By

The Technical Staff of Ventures Limited

June 16th, 1948

ONTARIO PYRITES COMPANY LIMITED

The prevailing prices for Cu, Pb, Zn, Au and Ag as at this date (June 16th, 1948) have focused attention on the copper-lead-zinc ore-bodies of the Sudbury Basin Area of Ontario. The following summaries have been compiled in an attempt to arrive at the economic value of the ore and to set out the potentialities of the deposits. The geology and many of the important aspects of the ground have been described in the technical reports by Dr. H.C. Conolly (1930) and Dr. Paul Armstrong (1946). These reports should be referred to for details not found in this summary.

Much interest in the area is discernable just now by the fact that at least two large American companies have approached Ontario Pyrites for the opportunity to look into the data of the previous operation.

LOCATION

The outline of the holdings is shown on the accompanying map entitled "Sudbury Basin Area". The western part of the property covers part of the south shore of Vermilion Lake and most of the lake itself. The eastern part comprises the old holdings of the Treadwell Yukon property located in Balfour and Creighton Townships, known as the Errington mine. The west central part comprises the north shore of Vermilion Lake, (for protection purposes), and is held under mining licenses and options for Ontario Pyrites.

HISTORY

It might suffice to say that the eastern part of the present holdings was developed by Treadwell Yukon Company Limited during the years 1927 to 1930. A pilot mill was erected in 1928 and operated until the Fall of 1930.

The actual figures on the quantities of metals produced are not available, so the following data are given as an alternative:

		Yr. 1928	Yr. 1929	Yr. 1930
Ore Milled (dry tons)		32,092	89,221	64,859
Average Assay				
Au	oz./Ton	.029	.028	.038
Ag	"	1.79	1.64	1.74
Cu	%	1.02	1.04	1.13
Pb	%	1.12	.99	1.25
Zn	%	5.75	4.49	4.19

The western part of the present holdings, (Vermilion Lake ground), belonging to Sudbury Basin Mines Limited, was examined and drilled by this Company during 1928-29-30. Subsequently and finally the present Ontario Pyrites Company Limited acquired the ground, together with that of the former Treadwell Yukon Company Limited, in 1942.

ORE FOUND

-Errington Mine

Before going underground, the Treadwell Yukon Company drilled a total of 53,500 ft. in approximately 103 holes from surface, 56 of them, prefixed "B", in the No.1 and No. 2 shaft area in Creighton Township, 47, prefixed "A", in No.3 shaft area in Balfour Township. Of these 103 holes, 11 of the "B" and 4 of the "A" series found ore and another 12 holes in the "B" group found assayable material. The average of the total of 23 "B" group holes was-

Au	Ag	Cu	Pb	Zn
.03 oz.	1.96 oz.	1.43%	.69%	3.81%

In the years 1928 to 1930 the Treadwell Yukon Company sank Nos. 1, 2 and 3 shafts to 620', 676' and 1572' respectively. The plans available indicate that levels were established and run on the 200', 300', 500' and 600' from No.1 shaft, on the 200', 300', 500' and 1500'

from No.2 shaft, the drifts connecting No.1 and No.2 shafts on the 500' and 600' levels.

Diamond drill stations were cut only on the 1000', 1250' and 1500' levels at No.2 shaft.

No.3 shaft was located considerably to the east and only one level established at 400'.

Eleven stopes were started and mined in the No.1 and No.2 shaft area, the Ollier stop being the largest. A total of 22,000 ft. of lateral exploratory diamond drilling was done underground in addition to the drifts, etc.

From April, 1928, to November, 1930, the pilot mill treated 186,172 tons of ore which averaged -

Au	Ag	Cu	Pb	Zn
.03 oz.	1.70 oz.	1.07%	1.10%	4.60%

and apparently a further 69,000 tons of broken ore of the same grade were left in the stopes.

- Vermilion Lake Mine

A total of 63,913 ft. of diamond drilling in 88 holes was completed from surface in the western area. Of these, 26 holes cut ore or assayable material within a continuous length of contact-fault-zone of 1470 ft. and consisting of seven orebodies aggregating, (according to Conolly), 1,000,000 tons, after allowing for 1:1 dilution, averaging -

Au	Ag	Cu	Pb	Zn
.02 oz.	1.6 oz.	1.5%	1.0%	4.7%

GRADE OF ORE

The grade of ore indicated at Vermilion Lake and opened up at the Errington Mine has been subjected to considerable calculation.

The Sudbury Basin annual report of 1930 gives an average of (eliminating ore 250' immediately beneath the lake, for protection):

	Tons	Au	Ag	Cu%	Pb%	Zn%
Eastern Section	347,000	.027	1.84	2.44	1.20	5.47
Western Section	486,000	.031	2.06	3.10	1.69	6.04

H.C. Conolly, in his supplementary report of February 26th, 1931, in comparing the above ore with the experience at Errington, cut the above averages down, based on allowing 1:1 dilution with waste containing low values, to:

Tons	Au	Ag	Cu%	Pb%	Zn%
1,000,000	.02	1.60	1.50	1.00	4.70

At the same time Conolly comments that it would be possible to better the above cut average by selective mining.

The average of all samples assayed from surface diamond drill holes on the Errington and Vermilion Lake properties, which represented ore (49 holes) is:

Au	Ag	Cu%	Pb%	Zn%
.03 oz.	1.78 oz.	1.53	.93	4.64

The above estimated and calculated grades are close enough to safely place the mineable ore, after allowing for plenty of dilution at the average handled by the pilot mill, which (as mentioned before) was:

Au	Ag	Cu%	Pb%	Zn%
.03 oz.	1.70 oz.	1.07%	1.10%	4.60%

GEOLOGY AND POTENTIALITIES

The ore occurrences lie along and in close proximity to the slate-tuff contact on the south limb of the Sudbury Basin syncline, which coincides with a persistent and pronounced fault extending from Vermilion Lake on the West, far into the Basin to the East. Much folding and movement has taken place along the fault-contact. Conolly states that an easterly pitch is indicated, that the sulphides are scattered irregularly through imposing vein systems of quartz, carbonate and pyrite, deposited under conditions of moderate temperature and pressure. The veins occur along sheared and brecciated walls of tuff folds, in many places invading and replacing the entire tuff core and that the solutions presumably originated from the micro pegmatite which is considered to underlie the Basin.

Dr. Paul Armstrong considers that olivine diabase dikes, (one or two of which have been disclosed in close proximity to and cutting the fault-contact on the Vermilion Lake property), are of structural importance. He considers that the ore solutions "rising along the flanks of the dikes, made use of the existing vein structure to form by replacement of the dolomitic portions of the veins and their walls, ore lenses such as the various orebodies of the Vermilion Lake property".

One or the other theory may be right. The important point is that the slate-tuff-fault contact is economically mineralized with zinc, lead and copper minerals of importance, and the structure is traceable for 9 miles through the Ontario Pyrites ground and extends much further to the East. Given success on the initial development, a very large tonnage of ore could be outlined. Given sufficient tonnage, a suitable plant could be installed to effect high recoveries, of all metals in the ore, including iron, sulphur, cobalt and nickel.

METALLURGY

Based on a period in the early part of 1929, when the concentrator at the Errington mine had obtained some stability in operation, the following results were recorded, using differential flotation and making three products for shipment.

		ASSAYS					DISTRIBUTION %		
		Au	Ag	Cu	Pb	Zn			
Product	Wt.%	oz/t	oz/t	%	%	%	Cu	Pb	Zn
Heads	100.00	.018	1.40	1.28	1.48	5.21	100.00	100.00	100.00
Cu Conc.	4.74	.18	9.97	17.20	3.80	5.50	58.24	13.52	5.96
Pb Conc.	1.46	.21	18.27	4.10	39.52	6.48	4.63	38.92	1.90
Zn Conc.	7.79	.02	2.92	.68	1.20	46.78	4.15	6.48	69.94
Tails	86.01	.005	.51	.49	.70	1.34	32.98	41.08	22.20

present day flotation methods would do somewhat better than the above, owing for the most part, to better reagents with which to work.

VALUE OF CONCENTRATES

Copper Concentrates - with gold @ $35.00 per oz., silver @ 70¢ per oz., copper @ 21¢ per lb., as set out in the above table, would have a value , as at the present time (June, 1948) of:

Payment	Per Ton of Concentrate
Gold - 0.18 x .9675 x 34.91	$ 6.08
Silver - 9.97 x .95 x .70	6.63
Copper - (17.2 - 1.3) x 20 x (.21 - .02)	60.42
Total Payment	$ 73.13

Less Deductions

Treatment charges	$ 9.00	
Duty - 344 lts. x .02	6.88	
Total Deductions		15.88
		$ 57.25

Less Freight

Sudbury to smelter est. @ $8.00 / T	8.00
NET VALUE PER TON OF CONCENTRATE	$ 49.25

Lead Concentrates - with gold @ $35.00 per oz., silver @ 70¢ per oz. and lead @ 17¢ per lb., as obtained in the table, would have a value (June, 1948) of:

Payment		Per Ton of Concentrate
Gold - 0.21 x .9675 x 35.00		$ 7.10
Silver - 18.27 x .98 x .70		12.53
Lead - (39.52 - 2.5) x 20 x .95 (17 ÷ .0065)		124.15
	Total Payment	$143.78
Less Deductions		
Treatment charges	$ 30.03	
Duty - 790 x .0075	5.92	
	Total Deductions	35.95
		$107.83
Less Freight		19.62
	NET VALUE PER TON OF CONCENTRATE	$ 88.21

Zinc Concentrates - with zinc @ 12¢ per lb., as outlined in the table, would have a value (June, 1948) of the following, except that 46.8% zinc concentrates are difficult to sell:

payment		Per Ton of Concentrate
Zinc - 936½ x .78 x .12		$ 87.61
Less Deductions		
Treatment charges $38.50 + 3.00	$41.50	
Duty - 936½ x .0075	7.02	
Iron Penalty - 1.00 x (13 - 10)	3.00	
Lead Penalty - .50 x (1.20 - .50)	3.50	
	Total Deductions	$ 55.02
		$ 32.59
Less Freight		
Sudbury to smelter est.		7.00
	NET VALUE PER TON OF CONCENTRATE	$ 25.59

POSSIBLE PROFIT USING DIFFERENTIAL FLOTATION TREATMENT OF ORE

Based on a milling rate of 1000 tons of ore per day averaging the heads as set out in the table above and at the prices for metals as above mentioned - gold at $35.00 per oz., silver at 70¢ per oz., copper at 21¢ per lt., lead at 17¢ per lb. and zinc at 12¢ per lb., - the estimated earnings would be:

Production	Per Year	Per Ton Milled
Copper Concentrates	$ 1,265,222.13	$ 3.46
Lead Concentrates	768,203.62	2.10
Zinc Concentrates	2,491,015.13	6.83
	$ 4,522,440.88	$12.39
Less: Marketing and treatment	2,030,701.09	5.56
	$ 2,491,739.79	$ 6.83
Freight on Concentrates	441,993.98	1.21
	$ 2,049,745.81	$ 5.62
Operating Costs		
Development	$ 182,500.00	$ .50
Mining	912,500.00	2.50
Milling	365,000.00	1.00
Assaying	10,950.00	.03
Hauling Concentrates	32,850.00	.09
Mine Office and Supervision	47,450.00	.13
General Expense	146,000.00	.40
Head Office and Administration	10,950.00	.03
	$1,708,200.00	$ 4.68
ESTIMATED OPERATING PROFIT (before taxes, depreciation, etc.)	$ 341,545.81	$ .94

PYROMETALLURGICAL METHODS AND POSSIBLE PROFITS

Given sufficient tonnage, (a minium of 3,000,000 tons - 1,000,000 at Vermilion Lake and 2,000,000 at Errington Mine), a bulk concentrate could be floated from the ore and treated by pyrometallurgical methods to obtain much greater recoveries. Using a grade of ore previously mentioned in this report, (the average of all samples assayed from the surface diamond drill holes - 49 in number - which returned ore intersections), the following might be expected, according to Lyall J. Lichty, metallurgist, Ventures Limited:

	Au	Ag	Cu	Pb	
Grade of ore	.02oz.	1.78oz.	1.53 %	.93%	4.64 %
Recovery in bulk flotation conc.	97.1%	86.5 %	92.8 %	85.5%	96.5 %
Metal Recovery in bulk concentrate in lbs. and ozs.	.019oz.	1.54oz.	26 lb.	16 lb	89 lb.
Expected prices after allowing for refining charges, sales costs etc.	$35	71¢	12¢	12¢	9¢
NET RETURN PER TON	.66	1.09	1.92	1.92	8.01
					- $15.32

Assuming the cost of installing plant, developing mine, (bearing in mind that shafts have already been sunk on Errington and are in good shape, a railroad bed is in existence to the property and power will be available a short distance away), erecting mill, smelter and other attendant buildings will amount to $5,000,000 the following costs and profits might be looked for -

(see following page)

Value of Ore (per ton U.S.)		$ 15.32
Smelting treatment per ton of ore mined, based on 2:1 ratio of concentration	$ 2.25	
Milling (1000 tons per day)	1.00	
Mining and Development	1.00	
Mine and smelter, general	1.00	
	$ 7.25	
Allowance for depreciation and mine pre-production etc., 15% or $715,000 per year against 365,000 tons per year, based on treatment of 2,555,000 tons in 7 years and expenditures of $5,000,000	1.96	
Costs - including write-offs		9.21
profit before taxes		$ 6.11
Taxes (allowance of 3301/2% depletion and tax rate of 30%) - 20%		1.22
NET PROFIT PER TON		$ 4.89

The possible results which might be expected from differential flotation treatment and from pyrometallurgical methods have been given for comparative purposes.

Some test work has been done on the ores by L. H. Duschak, of San Francisco, using hydrometallurgical methods. In this work the ore was subjected to a controlled roast and then to leaching of the calcine with water and 10% sulphuric acid. The residue from the water and acid treatments was leached with hot brine. Actually, cold brine subsequently yielded the same extraction results. The tests resulted in the following extradtion -

Zinc	80 to 90%
Copper	70%
Lead	100%
Silver	80%
Gold	40%

It is stated in the report by Buschak that by further manipulation, better results could be expected.

While it is not suggested in this summary that any particular treatment method be used, it is fairly clear that given sufficient tonnage, satisfactory recoveries can be made from the ores.

TREADWELL YUKON CORPORATION LIMITED
Crocker Building
San Francisco, California

AIR MAIL

June 18, 1948

Mr. J.N. Cunningham-Dunlop, Vice-President,
Ventures Limited,
25 King Street west,
Toronto, Ontario, Canada.

Dear Mr. Cunningham-Dunlop:

I have your air-mail letter of the 15th inst., and regret very much that we have no recent information concerning Vic Clauson. It seemed to us that he just dropped from sight completely several years ago.

Regarding the information you desire concerning the old operation we conducted at the "Errington Mine", I can give you the following data as to our production and costs during our two years of milling operations:

	Year 1928	Year 1929	Year 1930
Ore Milled (dry tons)	32,092	89,221	64,859
Average Assay:			
AU oz. per ton	.029	.028	.037
AG " " "	1.79	1.64	1.74
CU %	1.02	1.04	1.13
PB %	1.12	.99	1.25
ZN %	5.75	4.49	4.19
Costs per ton Milled:			
Mining (incl. Development)		$4.97	$5.78
Milling		1.88	2.29
All Other at Mine		.30	.14
		$7.15	$8.21
Average Metal Prices Received:			
AG		52.60¢	33.25¢
CU		17.775¢	10.61¢
PB		4.70¢	3.45¢
ZN		4.47¢	3.24¢

The mill commenced operations April 21, 1928 and was shut down on November 13, 1930. In connection with the concentrate production for the portion of the year 1928, a fairly substantial portion was of such low grade as to be unmarketable. Three separate concentrates were produced, as you probably know: copper, zinc, and lead.

I regret to say that my records do not disclose what ore reserves were left when the property was shut down. It might be of interest to you to examine our printed annual reports for the years 1928 to 1932 in this connection. A complete file was sent to Mr. Connell's office some time ago

Yours very truly,

"D. L. Feathers"

DLF:FF

October 19,1951

LIST OF SUDBURY BASIN AND ERRINGTON MINE MAPS

RETURNED TO 2810, 25 KING ST. WEST, from

J.E. THOMSON, ONT. DEPT. OF MINES

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1. SUDBURY BASIN MINES, coloured plan of 435-foot Horizon and Longitudinal Section, 1" = 100'.

2. Linen tracings of VERMILION LAKE sections,
   D.D.H. 28-29
   D.D.H. 7 - 9 - 35
   D.D.H. 23-25 - 38
   D.D.H. 34 — 50' = 1"

3. Linen tracing of two plans showing D.D.H's and horizontal projection and assays.
   VERMILION LAKE property.
   Scale 50' = 1"

4. ERRINGTON MINE SECTIONS: B- 43
   B- 20-18
   B- 30
   B- 14 and 16
   B- 49 — 100' = 1"

2810
25 KING STREET WEST
TORONTO

May 18, 1951

Mr. J. E. Thomson
Assistant Provincial Geologist
Department of Mines
Parliament Buildings
TORONTO 2, Ontario

Dear Mr. Thomson:

We wish to follow up our letter to you of last March in regard to a report that you are preparing on the lead and zinc deposits of Ontario.

You will please find herewith one copy of each of a Summary Report on the Frontenac Lead Property and a Report on Exploration of the Frontenac Lead Property, both by Philip Eckman. We would appreciate your returning these to us when they have served your purpose.

We are sorry to say that we were unable to locate a composite map of the Errington and Vermillion Lake property, nor have we a composite level plan of the Errington mine. The most useful maps to illustrate the geology and mode of occurrence of the ore would appear to be:

Sudbury Basin Property - Plan at Horizon 435' below lake level and Longitudinal Section 1" = 100'

Errington Mine - Sections B14 & 16; B18 & 20; B30; B43; B49 - all 1" = 100'

Please let us know if the above maps could be of help in the instance, and if so, we will gladly mail them on to you.

Yours very truly,

HOYLE MINING COMPANY LIMITED

J. M. Cunningham-Dunlop
President

/mtm

Att. (2)

Oct. 19, 1951

Mr. J. M. Cunningham-Dunlop
President, Hoyle Mining Company
2810, 25 King Street West
Toronto 1.

Dear Mr. Cunningham-Dunlop :

By messenger I am returning the plans and sections covering the Sudbury Basin and Errington properties of Ontario Pyrites Limited. Most of these were forwarded to me last May. I regret that absence from my office has prevented an earlier return of these plans.

I want to thank you and the directors of Hoyle Mining Company Limited for providing this information to our Department.

A list of the maps being returned is enclosed.

Yours very truly :

J. E. Thomson
Assistant Provincial Geologist

enc;.

Oct.19,1951

Mr. J.M.Cunningham-Dunlop,
President, Hoyle Mining Company,
2810, 25 King Street West,
Toronto 1.

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Yours very truly,

J.E.Thomson
Assistant Provincial Geologist

enc.

Balfour Twp.

FAIRBANK TWP.

SNIDER TWP.

VI

V

IV

III

II

I

WHITSON R.

DAM

EMMA LAKE

LEVEY CREEK

MOORE L.

VERMILION R.

DAM

Ont Pyrites Co Ltd.

THE TOWNSHIP
OF

CREIGHTON

DISTRICT of SUDBURY

SUDBURY MINING DIVISION

SCALE: 1 INCH TO 40 CHAINS

12 11 10 9 8 7 6 5 4 3 2 1

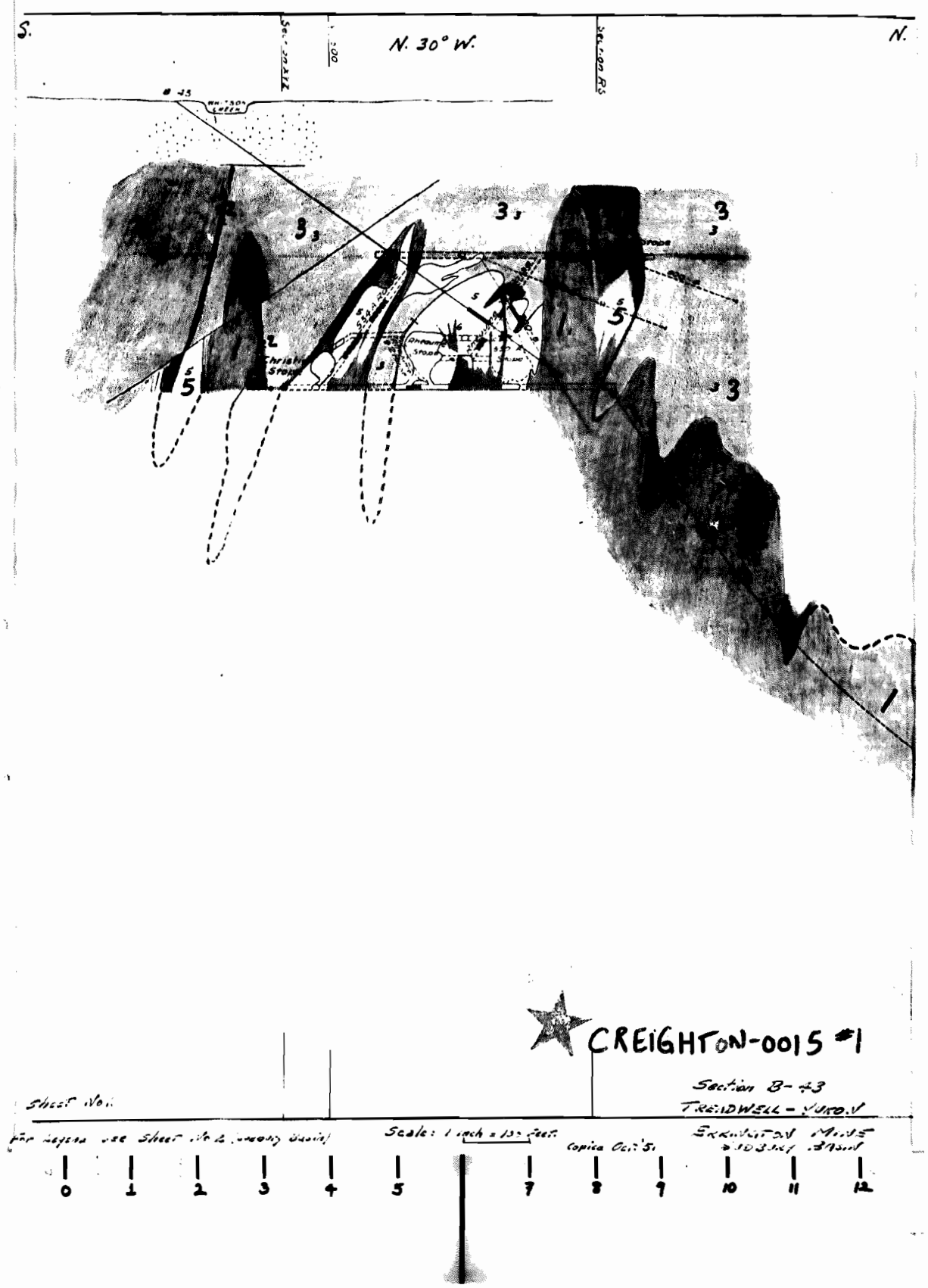
Graham Twp.

FOR ADDITIONAL

INFORMATION

SEE MAPS:

CREIGHTON-0015 #1,2,3,4.


S.
N. 30° W.
N.
CREIGHTON-0015 #1
Section B-43
TREIDWELL - YUKON
Scale: 1 inch = 1320 feet
0
1
2
3
4
5
7
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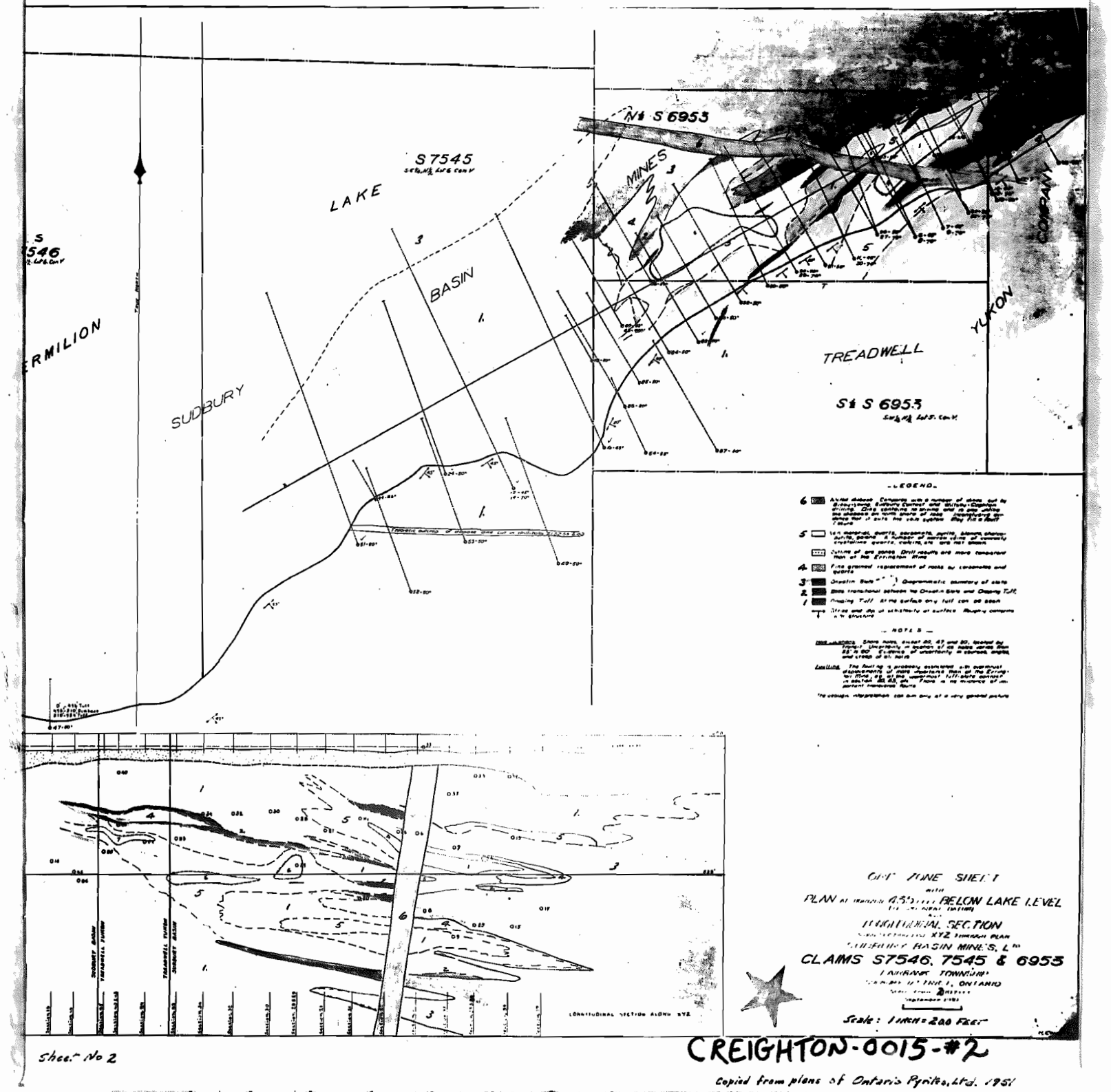
11
12



CUT LINE SHEET

with

PLAN at [illegible] BELOW LAKE LEVEL

and

LONGITUDINAL SECTION

looking [illegible] XYZ [illegible] PLAN

SUDBURY BASIN MINES, LTD.

CLAIMS S7546, 7545 & 6955

[illegible] TOWNSHIP

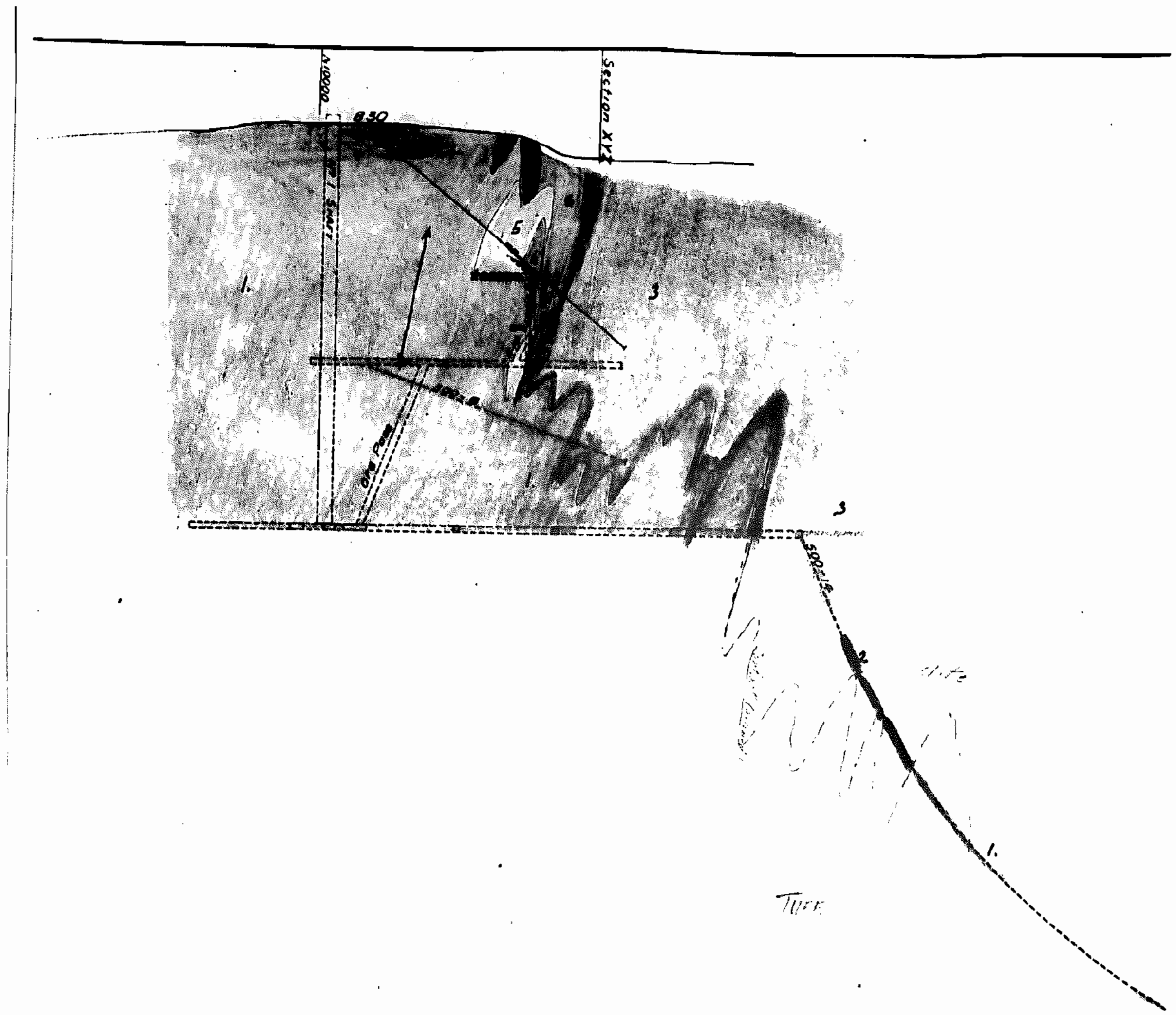
[illegible] DISTRICT, ONTARIO

Scale: 1 INCH = 200 FEET

Sheet No 2

CREIGHTON-0015-#2

Copied from plans of Ontario Pyrites, Ltd. 1951



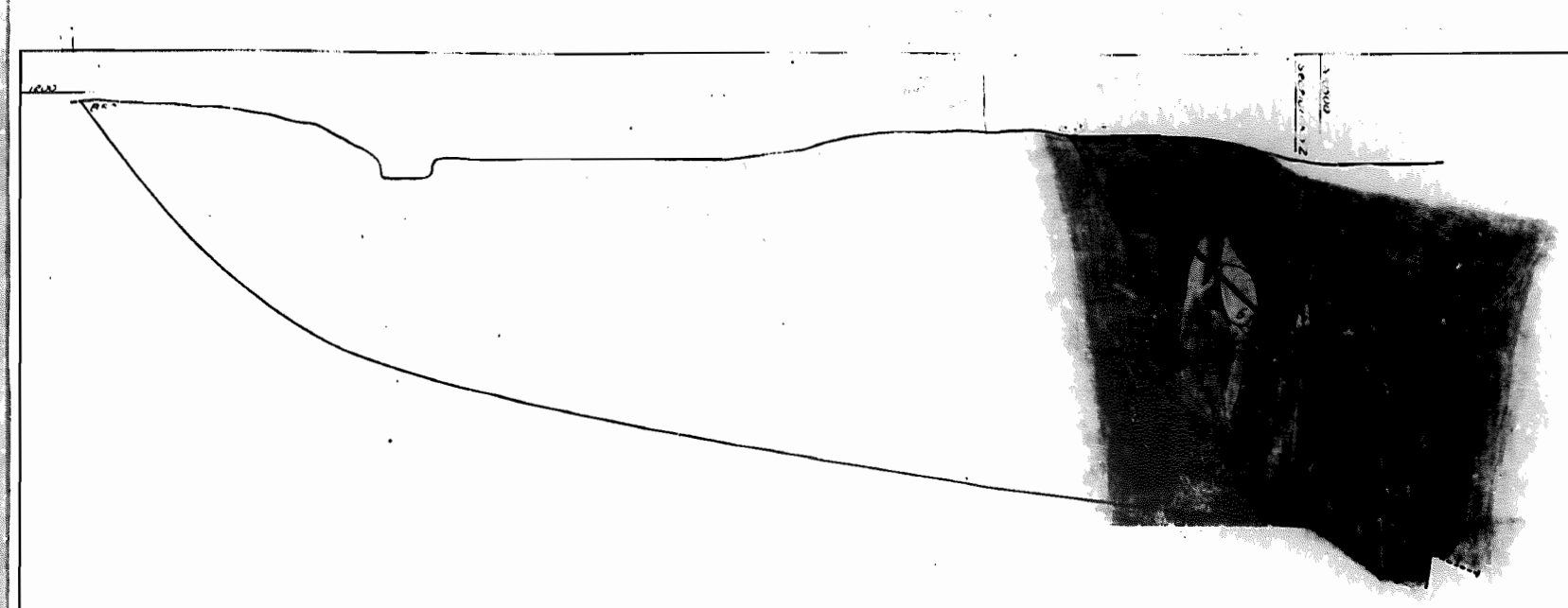
For Legend see Sudbury Basin Plan.

Section in Vicinity of Ollier Stope.

Scale: 100' = 1"

CREIGHTON-001S #3

Section B-30
Errington Mine



Section B 20-18

Scale : 100' = 1"

Errington Mine
Ollier Stope Area.
No 1 shaft

Courtesy Ontario Pyrites, Ltd. 1951

For legend see Sudbury Basin Plan

CREIGHTON-0015-#4

C 0 1 2 3 4 5 7 8 9 10 11 12 C