

ccs per J.J.C. advice Letterhead
Typing by Mrs Clarke.

March 18, 1974

President & Directors,
Swain Lake Mines Ltd. (N.P.L.),

800880
ZINCTON EXPL.
PROJECT
821C

Gentlemen:

With this, the undersigned are pleased to submit this "REPORT-ZINCTON EXPLORATION PROJECT, SLOCAN MINING DIVISION, B.C." pursuant to your recent request.

Information and recommendations contained in this report result from the writers' geological compilations of the considerable amount of data resulting from former mine operations, from exploration and investigations by the writers ~~his associates~~ during 1971-72, and from early reports by Government geologists. In addition, helpful background information was acquired through discussions with ^{outside} geologists and engineers personally familiar with the Lucky Jim mine operation.

The Zincton Exploration Project

This group of claims covers the former producing zinc mine operated successfully for many years by Sheep Creek Gold Mines and the extensions thereof.

The recent strengthening in the world prices of lead and zinc, coupled with the continuing advances in underground trackless mining equipment, encourage the possibilities of re-initiating profitable production at Zincton.

Several attractive exploration targets have recently been outlined at Zincton. These are directed toward the discovery of further large limestone sulphide replacement-type orebodies containing from 6% to ^{12%} 14% zinc and, in some areas, appreciable quantities of lead and silver.

Our recommendations involve an expenditure of \$57,095 ^{75,300} for the first stage of exploration. Should successful results be obtained, from \$150,000 to \$200,000 should be provided to continue the work.

Yours very truly,

ccs per J.J.C. advice Letterhead
typing by Mrs Clarke.

March 18, 1974

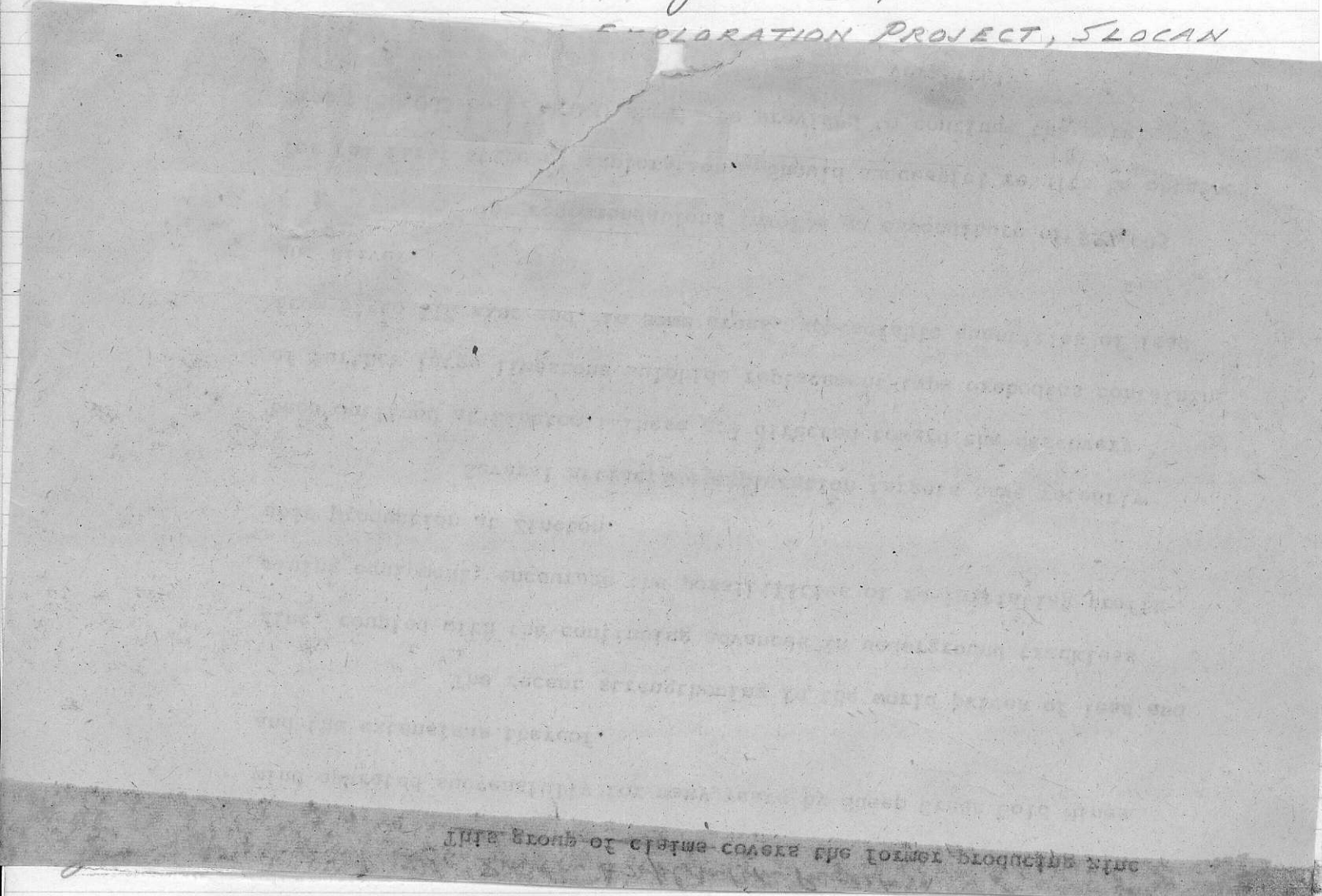
President & Directors,
Swim Lake Mines Ltd. (N.P.L.),

800880
ZINCTON EXPL.
PROJECT
821K

Gentlemen:

With this, the undersigned are pleased to submit

EXPLORATION PROJECT, SLOCAN



Respectfully submitted,

{ J. J. Brownhurst, P. Eng.
W. M. Sharp, P. Eng.

cc'd to:
John Parker
Matt Hedley
Steve Dudley

REPORT

on the

ZINCTON EXPLORATION PROJECT

(on ~~the~~ Seaton Creek
Lat. $50^{\circ}-02'N$, Long. $117^{\circ}-13'W$)

in the

SLOCAN MINING DIVISION, B.C.

for

SWIM LAKE MINES LTD. (N.P.L.),

by

J. J. Crowhurst, P. Eng.

W. M. Sharp, P. Eng.

March, 1974

SUMMARY & CONCLUSIONS

¶ The Zincton property, located in the Slocan silver-lead-zinc mining district, is approximately 10 miles east of New Denver, B.C. The mining claims are contiguous, and together comprise one block covering an area of about 2 square miles. The property includes the mined interval of the Lucky Jim limestone and its extensions, plus potentially mineralized intervals of the unexplored 'Upper' limestone bands. Nine additional surface lots ensure adequate space for mining and milling plant. From New Denver, the property is reached by nine miles of highway; within the property, the mine workings and upper exploration areas are readily accessible via mining roads and connecting trails. The property includes the former Lucky Jim zinc mine and The Snap, Chickadee and other relatively undeveloped silver-lead-zinc prospects - all occurring within a $2\frac{1}{2}$ mile strike-interval of the 'Lucky Jim' limestone.

¶ The initial discovery of silver-lead-zinc ore on the property was made in 1892. Small scale shipments of sorted and milling ore were made until about 1928, in which year milling first commenced on the property. Excepting periods of very low metal prices, the Lucky Jim mine operated until 1953, and at a

rate of 300 - 350 tons per day during the latter 12 years. During this period, gross operating costs were only about \$5 per ton of ore mined and milled - this very creditable performance being possible by reason of the large size and continuity of the ore deposits, the strength and stability of the limestone, and by efficient supervision and management.

The Lucky Jim sulphide ore and mineralization - predominantly sphalerite - pyrite aggregates with minor to appreciable amounts galena and associated silver, occurs as replacement bodies within crumpled, brecciated, and fractured bands and masses of limestone. The Lucky Jim and Upper limestone units occur within the slate / argillite formation comprising the 'Zincton' member. The limestone throughout the productive part of the mine is involved in a west-plunging complex 'fold'. Within this structure it has been significantly but inconsistently thickened by a combination of folding, buckling, and rock flowage. Late fracturing opened and conditioned the rock for sulphide mineralization.

Total production from the Lucky Jim, including high-grade lead-zinc and low-grade zinc-iron milling ore, totals about 1,175,000 tons. Most of this derived from major Zn-Fe sulphide replacements below No. 5 level.

Ore was mined over a pitch-length of some 2800 feet. Individual orebodies ranged up to 800 feet in length, to 150 feet in width, and to 80 feet in height.

The operation was continuously profitable, although mined prior to the advent of the current low-cost underground trackless mining methods.

During 1971-72 Swin Lake Mines Ltd. mapped accessible workings of the lucky Jim mine and the adjacent surface areas, and soil-sampled sections of the property containing the S.E. extension of the lucky Jim limestone and upper lime band. This phase of field exploration was concluded via a modest program of trenching and diamond drilling on near-surface targets indicated by this work - with generally encouraging results. All of the available geological information was systematically compiled on appropriately scaled sets of plans and cross-sections. Possibilities of discovering zinc, or zinc-lead mineralization in five distinct zones are indicated from interpretations and evaluations of the of the above geological data - reduced for current reference on the accompanying drawings. These are as follows, in order of apparent importance:

- Area #1 (1) The immediate extension of the mine limestone downwards and southwesterly from No. 9 level.
- Area #2 (2) The upward extension, or repetition of ore zones from the stopping areas on No. 1 level. The ore-grade and near-ore grade intersections by four out of six drill-holes are indicative of a substantial block of partly oxidized ore.
- Area #3 (3) Continuation or repetition of the ore zones downwards and northwesterward from the workings in Nos 10 and 11 levels. Two intersections by hole # 642, amounting to 7.0' @ 6.8% zinc and 13.0' @ 8.3% zinc remain unexplored. Previous mining experience would indicate that these intersections might be developed into a minable block.

Current structural interpretations indicate that the lucky Jim limestone may well be quite close to the surface farther north and west than presently explored by diamond drilling (K6400W). Confirmation of this, ^{without actual drilling,} may be possible via surface geological mapping westward along the old K&S railroad grade down Seaton Creek valley.

Her

(4) Strike and dip extensions of the upper (hangingwall) limestone beyond the short interval tested in 1972, and indicated by the long, broad geochemical anomaly flanking upper Lucky Jim Creek. This might be advantageously explored ^{by diamond drilling} from hangingwall crosscuts on 9-level.

Her

(5) The southeasterly extension of the lucky Jim limestone from the No. 1 stop area and across the Snap mineral claim. Lead-zinc mineralization is exposed in the Snap adit and adjacent trenches, but elsewhere the limestone is almost completely obscured by overburden.

Previous diamond drill holes and additional holes, completed by Swim Lake Mines during 1971 and 1972, outlined a ~~farther~~ zone above the No. 1 level, extending upwards along the limestone. This zone, in excess of 300' long and apparently 25' to 30' in cross-section, has an indicated grade of 5 ounces of silver per ton, 3% to 4% lead and 7% zinc. Previous mining experience would indicate that these intersections could develop with a mineable block of ore, some 18,000 to 20,000 tons in size.

At the time the mine was closed in mid 1953, as conservatively estimated on the basis of past experience by the Sheep Creek management, between 40,000 and 50,000 tons averaging about 6% zinc and 0.3% lead still remained in or adjacent to the mine workings. Sixteen different places are involved, any one or all of which provide chances for expansion. A sudden drop in metal prices in 1953 precluded further mining at a profit at that time.

In summary, the Lucky Jim mine and the adjoining ground offers several attractive exploration possibilities concerning finding *additional large tonnages of zinc/lead mineralization like that previously mined* ~~as much~~ mineralization again as has already been mined, by the application of careful and systematic methods.

RECOMMENDATIONS

Exploration should be conducted in stages, each one contingent on and subject to change, depending on the results of the first stage,

STAGE 1

Area #1 - 9 Level Downward Extensions

Underground diamond drilling should be completed from the present 9 level workings, which are accessible and in good repair. This would be between sections 0+00W and 08+00W.

The estimated cost is as follows:

2840' of EX diamond drilling (holes ranging from 100' to 480') @ \$4.50/ft. direct cost	800	\$12,700
Rehabilitate level - install pipelines, etc.	1,000	
Surveying & engineering - 2 mos. @ \$1500/mo.	3,000	
Support costs - living expenses, move-in & out, overhead, etc.	3,000	800
		\$19,700

Area #2 - Upward Extensions from 1 Level Stopes

Underground diamond drilling should be conducted

to prove or disprove continuity of known mineralization as

Area #2 - Upward extensions of No 1 adit mineralization

The estimated cost is as follows:

No 1 adit should be extended in the footwall area a distance of 200', and underground diamond drilling completed from the face of the adit

The estimated cost is as follows:

200' of adit @ \$85/foot -	17,000
1000' of EX underground diamond drilling @ \$4.50/foot	4500.
Surveying & engineering	1200.
Support costs as above	1500.
	<u>\$24,200</u>

Area #3 - Geological surface mapping followed by short hole surface diamond drilling is recommended.

The estimated cost is as follows:

Geological mapping & plotting	\$800	
Geochemical assays & supplies	200	
3 holes - 1000' of EX surface diamond drilling @ \$8.00/ft.	8,000	
Support costs, as above	<u>1,500</u>	\$10,500

Area #4 - It is recommended that the geophysical work be

conducted and that the work be spread farther up the hill

to the east and down the hill to the west from the drilled

Area No 4 Hanging wall limestone

Underground Diamond drilling from 9 level crosscuts.

EX in size,

2 holes each 1000 ft - total of 2000' @ \$4.50 /ft \$ 9,000

Geology, surveying & assaying 1,000.

Support costs 1,000

\$ 11,000

Support costs

1,000

9,500

Area #5 - 4 miles, An allowance should be made for surface prospecting, & geological mapping

Estimated cost

1,500

3,000.

SUMMARY ESTIMATED COSTS

Area #1	800 \$19,780	19,800
Area #2	10,625	24,200
Area #3	10,500	10,500
Area #4	9,500	11,000
Area #5 ^{*1-4, incl.}	1,500	3,000
Total	\$51,905	68,500
Plus contingencies @ 10%	5,190	6,800
	\$57,095	<u>75,300</u>

INTRODUCTION

P. Between the 1953 shut-down date of the Lucky Jim mine operations and late 1971 no significant exploration of the property was carried out. During September, 1971 the writer commenced geological mapping and soil-sampling of surface areas above the upper mine portals. During the latter part of October, ¹⁹⁷¹, bulldozer exploration of a major geochemical anomaly near upper Lucky Jim Creek was carried out, but was unsuccessful in reaching bedrock. Detailed geological mapping of Lucky Jim 9-level was carried out in December, 1971, and during the spring of 1972 the writer systematically compiled and correlated the recent geological data and the considerable amount of geological information accumulated during the 1941-53 period of mining and exploration - this being accomplished via sets of plans and cross-sections on appropriate scales.

P. During the summer of 1972 the surface geological and soil-sample coverage was extended, and preliminary diamond drill exploration of some of the indicated targets was carried out. As a result of the 1971-72 ^{and general} investigations,

several attractive exploration targets have been indicated within the Zimston property - these relating to the possible occurrence and discovery of large sulphide replacements in limestone, and containing from 6% to 12% zinc with appreciable values in lead and silver.

Recommendations made in this report involve an expenditure of \$75,300 for the next stage of exploration. If this work is successful, a minimum expenditure of \$150,000 for follow-up exploration and mine-development would be warranted.

GENERAL HISTORY

P The initial Lucky Jim claim group was located in 1892, and by 1898 about 900 tons of sorted lead ore had been shipped. The property lay idle until 1903. Between 1903 and 1911 small shipments of sorted lead and zinc ore were made. Lucky Jim Mines Ltd. was formed in 1911, and small-scale mining operations were continued into the year 1919.

P Between 1923 and 1940 the property was worked by Lucky Jim Lead & Zinc Company, Limited. A 200 t.p.d. mill was built in 1927-28, ^{by the Victoria Syndicate, who had acquired a large interest in the company.} This was operated until 1930, and in 1937-38.

P In 1940, Linton Mines Limited bought the property and rehabilitated the mine and plant; the capacity of the mill was raised to about 350 t.p.d. During its period of operation this company carried out extensive exploration and development work. A low-cost mining operation was possible by reason of the large size and continuity of the orebodies, the strength and stability of the limestone host rocks, and efficient supervision and management.

P Up to 1937 most mining was done above No. 5 level; since then, most of it has been done between No's. 5 and 11 levels. Corresponding with this, the

earlier production contained significant amounts of galena, and the latter only a very minor amount of the mineral. The ^{recorded ore} production from the Lucky Jim mine is summarized as follows:

1893 - 1945 - - - - 514,913 tons @ approx. $11\frac{1}{2}\%$ Zn

1946 - 1953 - - - 658,822 " @ " 6% Zn

Total - - - - 1,173,735 tons @ approx 8.4% Zn

During the 1946-53 period the lead and silver content averaged less than $\frac{1}{2}\%$ and 1 oz/Ton, respectively.

The combined effect of low ore grade and falling metal prices caused the termination of operations in 1953.

GEOLOGY & MINERALIZATION

The property is underlain by rocks of the Triassic Slocan Series. Locally, and in a N.E. to S.W. direction, these comprise the 'footwall-slates', the 'Zincton' member of banded argillites, impure limestone, and limestone, and a hanging wall unit of massive to thickly-bedded dark argillites. The prevailing strike is northwesterly, and dips range from steep to flat southwesterly. The Lucky Jim limestone, occurring in the Zincton member, is the host rock for the Lucky Jim Fe-Zn-Pb-Ag mineralization. This unit is involved in a W.N.W. - plunging fold structure, with an average pitch of about 20 degrees, and within which it is locally thickened, brecciated, and fractured.

P The bulk of the past production of Fe-Zn-Pb-Ag replacement ore, derived from orebodies occurring within the more closely fractured and/or folded parts of this structure. Ore was mined over a pitch-length of some 2800 feet. Individual orebodies ranged up to 800 feet in length, to 150 feet in width, and to about 80 feet in (vertical) height.

P A second, or 'hanging wall' band of limestone is exposed within an up-stream interval of Lucky Jim Creek. This lies at some 700-1000 feet stratigraphically above, and to the southwest of the Lucky Jim limestone.

P The Lucky Jim limestone has been traced through southeast of the mine workings as far as Chickadee ridge, for a distance of about $1\frac{1}{4}$ miles. It has been inferred to extend an additional $1\frac{3}{4}$ miles to Jackson Creek, where strong outcrops of similar limestone occur on its S.E. strike-projection. Where undeformed, the limestone has an average thickness of about 30 feet, has a faintly banded to massive appearance, a finely crystalline texture, and dark grey to black colour. Where strongly deformed, as it is throughout the productive section of the Lucky Jim mine, it has been greatly thickened by close folding and ~~through~~ rock-flowage, ~~caused by~~ differential pressure effects. As a result, most of the limestone so involved has been precciated and,

locally, fractured.

P The general structure controlling the Lucky Jim mineralization is the W.N.W.- plunging fold-complex ^(Lucky Jim fold) which can be traced from the highest to lowest levels of the mine. This is usually referred to as the 'Lucky Jim fold'. On successive cross-sections ^{the mine fold} varies considerably in size and outline. Within the upper, southeasterly parts of the mine it is essentially an irregularly drag-folded, buckled, and thickened interval of the limestone bed with a general southwesterly dip of about 40 degrees. Within the lower, northwesterly workings it is a wide, thick ^{complexly folded} pinching-and-swelling mass of limestone relating to a broad, flat warp in the generally southwesterly-dipping section. The resulting deformation has produced the characteristic breccia structure, and thicknesses ranging from 50 to 150 feet or more.

P The most apparent structural controls of the ore mineralization are: (a) are:

(a) Vertical cross fractures, or cross-fracture zones.

These strike at approximately 90 degrees to the average regional strike of the bedding formations. The fractures themselves are mineralized to varying degrees, as are their limestone walls. Pervasive replacements on ~~of~~ zones of cross-fractures produced near-vertical tabular orebodies with widths of up to 40 feet, and

lengths related to the local widths of limestone traversed by the cross-fractures. Above No. 5 level, significant amounts of galena occur with the iron and zinc sulphides.

(b) Plunging fold or buckle apex, with the replacement mineralization occurring as streaks, masses, and disseminations within the limestone (breccia).

(c) Vertical longitudinal fractures, or zones of fracturing. These are roughly parallel to the general strike of the limestone within the lower mine workings, and are, ^{apparently} less important as ore controls than (a) and (b).

(d) Combinations of the above-noted controls. These probably account for the bulk of the mineralization below No. 5 level, and probably comprise the operative controls of such mineralization as occurs within unexplored depth-extensions of the Lucky Jim limestone.

Insert MINING.

RECENT EXPLORATION

A. This summarizes field and office work carried out in 1971 and 1972. It also comprises the preliminary phase of the larger program which was recommended, and which is directed towards the eventual resumption of mining operations at the Zincton property:

Mining at Zincton was entirely by open stoping. The limestone was very competent and required no ground support. Mining was carried out with drifters mounted on tripods and the broken ore was transferred to loading chutes by scrapers.

The large stopes and the good ground gave Zincton Mines Ltd. low costs. The table below shows the mine, mill and overall cost performance for the last three years of Zincton operation.

Labour costs have tripled since the operation closed in 1953; however, under similar mining circumstances, trackless mining **largely** with its low manpower requirements **should**/offset the increase in wages.

<u>Year</u>	<u>Tons Milled</u>	<u>Mine Cost</u>	<u>Mill Cost</u>	<u>Tons Rate Daily</u>	<u>Total Plant Exp. <i>Per ton of ore</i></u>
1950	93,151	\$2.980	\$1.495	258	\$5.020
1951	85,644	4.008	1.820	234	6.542
1952	109,918	2.639	1.469	300	4.637

- (a) Transit surveys for general exploration and mapping control; road rehabilitation and construction.
- (b) Surface and underground mapping in upper claims area.
- (c) Soil sampling in upper claims area; 1800' x 150'-600' Zn anomaly.
- (d) Bulldozer trenching on Lucky Jim Creek geochemical anomaly - no resulting bedrock exposures.
- (e) Office compilations of data resulting from 1941-53 mine operations and miscellaneous geological mapping.
- (f) Preliminary diamond-drill exploration of ore extensions above No. 1 level and the Snap zone mineralization - six holes totalling 930 feet intersected oxidized and leached Fe-Pb-Zn sulphides, as follows:

Hole No.	Indicated Width, ft.	Ag, oz/ton	Pb, %	Zn, %
1.	3.5	1.98	2.24	1.20
1.	4.2	0.66	0.72	2.84
1.	1.0	52.10	37.20	20.10
2.	2.2	Fe oxides only, no assays		
2.	6.3	"	"	"
3.	2 @ 0.5	"	"	"
4.	8.0	5.66	5.2	7.23
4.	2.7	0.64	0.45	8.20
5.	2 @ 3.0	oxidized, no assays		
6.	1.0	trace Pb only, " "		
old #139	14.5	-	2.50	7.70
(#) #141 (Stopped in ore)	7.0	-	3.80	8.50

- (g) Diamond drilling for a preliminary investigation of the Lucky Jim Creek soil-zinc anomaly: Two holes, totalling about 700 ft., intersected successive bands of limestone and very limy argillite within a general slaty-argillite section.

ORE POTENTIAL

(A) Lower Mine Section

- (1) Possible ore extensions beyond the walls of existing stopes.
- (2) Possible 'blind' orebodies within unexplored parts of the mine fold - particularly the immediate dip-extensions of the limestone on No. 9 level.
- (3) Possible 'blind' orebodies on northwesterly to westerly depth (plunge) extensions of the fold beyond the lower stope walls.

(g) Possible anomalous regions

(B) Upper Mine Section

lead-zinc mineralization

(1) Diamond drilling has indicated relatively oxidized, which may relate to either the up-dip extension of the existing No. 1 level stope or of this plus one or more parallel cross-fracture (N.E.) zones within the No. 1 adit - Snap interval of the lime band.

(C) Other Exploration Targets

- (1) Possible favourable structural situations or more distant extensions of the Lucky Jim limestone west of the lower mine area.
- (2) Similar situations on the little-known 'hanging wall' lime band, which locally outcrops along upper Lucky Jim Creek.

Respectfully submitted,

W. M. Sharp, P. Eng.

CERTIFICATE

I, William M. Sharp, with business and residential addresses in North Vancouver, British Columbia, DO HEREBY CERTIFY THAT:

1. I am a graduate of the University of British Columbia with an M.A.Sc. (1950) degree in Geological Engineering
2. I am a registered Professional Engineer in The Province of British Columbia.
3. I have practiced my profession since 1950, and in a consulting capacity since 1964.
4. I have personally examined Swin Lake Mines Ltd.'s Linton property and have made use of available references in preparing this report
5. I do not have any direct or indirect interest in the properties or securities of Swin Lake Mines Ltd. (S.L.M.), nor do I expect acquire any such interest.
6. The 'key' claims of the group are all surveyed Crown-granted mineral claims.

W. M. Sharp, P. Eng.

North Vancouver, Canada

March 18, 1974.