

80-11653-118

REPORT ON GEOLOGICAL MAPPING
MAGNETOMETER AND SOIL SAMPLING
SURVEYS OF SPHAL 7-12, 19-33,
KIM 1-10, 38, 40 and 42
SPHAL FRACTION

LIARD MINING DIVISION

NTS 104 G/3W

131°20' Longitude
57°03' Latitude

Owner: Silver Standard Mines
Operator: Teck Explorations

Peter G. Folk, P. Eng.
and
Wayne Spilsbury
Vancouver, B.C.

October , 1980

8424

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INTRODUCTION

i) Location and Access

The Sphaler Creek property is located in the Stikine River drainage astride Sphaler Creek within the Coast Mountains. The approximate centre of the property is 131°20' longitude and 56°03' latitude.

Access is by helicopter only, from Schaft Creek, 30km to the northeast, which is serviced by fixed wing aircraft from Terrace, about 300km to the southeast.

Topography is rugged with Sphaler Creek in a V-shaped valley being heavily wooded at the bottom with the tree line at 4,000'.

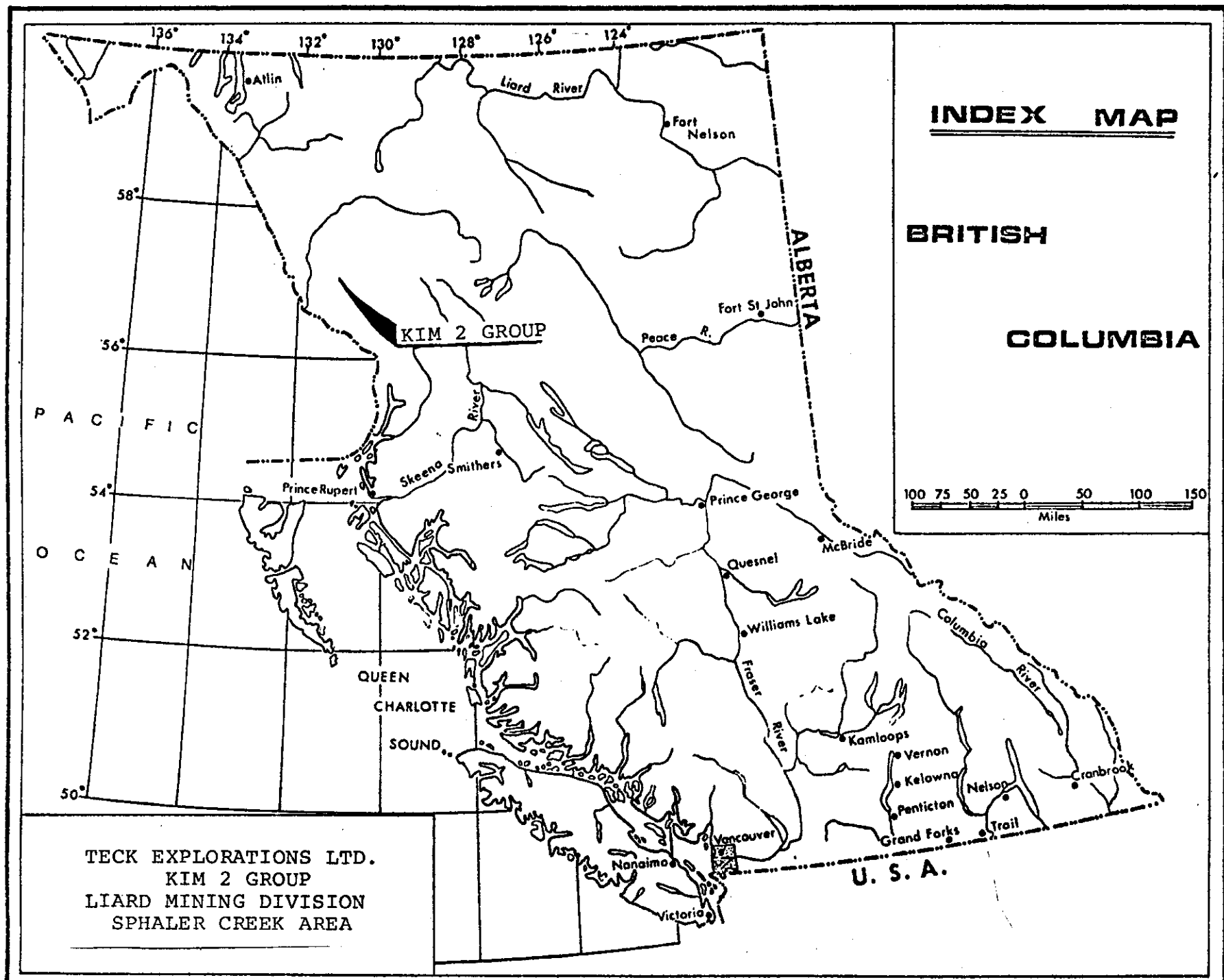
ii) Property Definition

The Sphaler Creek property consists of the following claims owned by Silver Standard Mines and operated by Teck Explorations:

<u>Claims</u>	<u>Record Numbers</u>
Sphal 7, 8, 9, 10, 11, 12	32673, 74, 75, 76, 77, 78
Sphal 19 - 33	32681 - 95
Kim 1-10	11318 - 27
Sphal Fraction	32700,
Kim 38, 40, 42	48662, 64, 66

The property has a number of chalcopyrite showings over an area of approximately 5km long and 1.5km wide. Locally these showings grade up to 1% Cu over 30m widths. Potential exists for "porphyry-copper" type ore deposits.

Some marketable timber exists on the valley floor but is presently far removed from active logging operations.

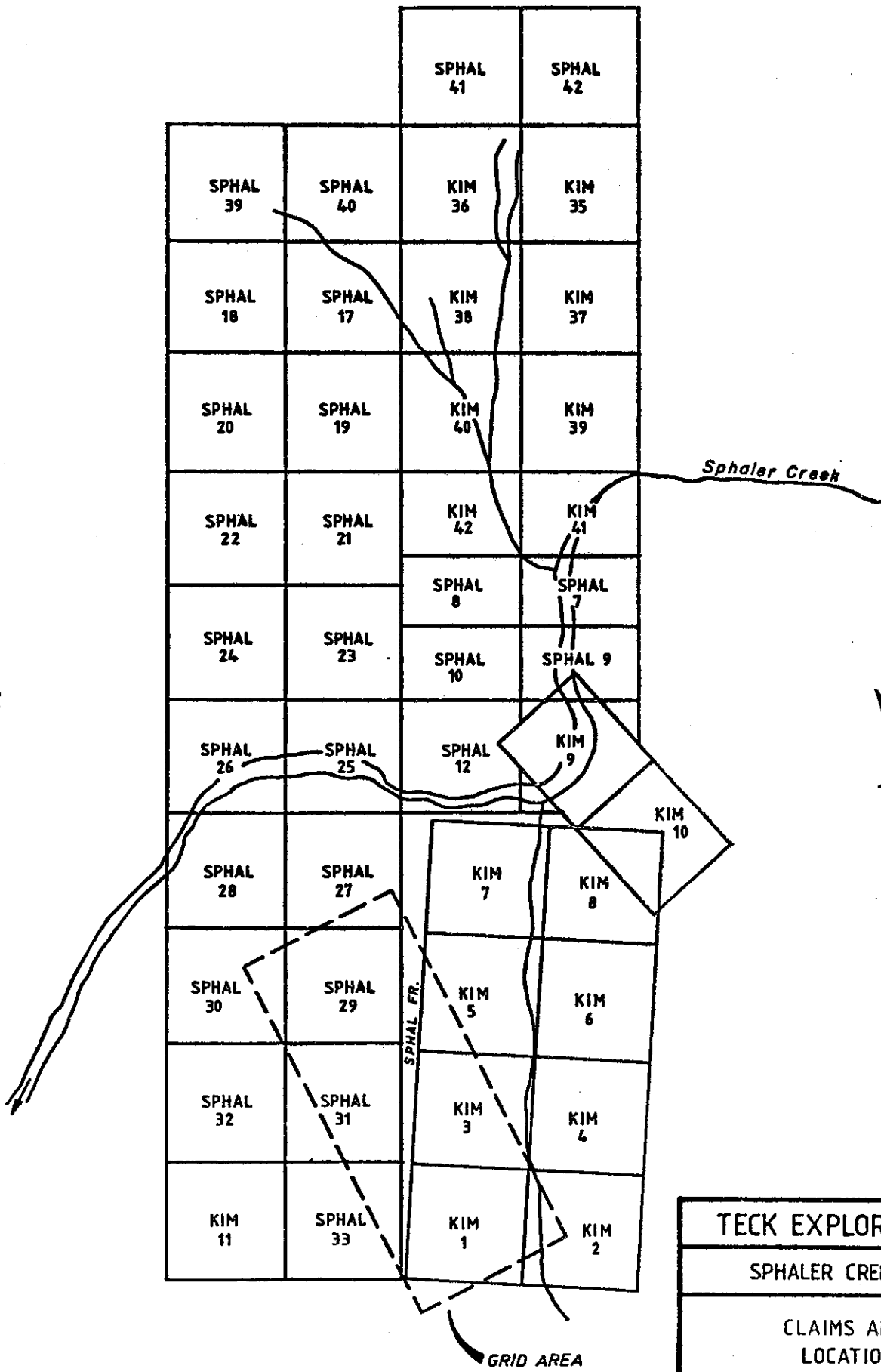


INDEX MAP

BRITISH
COLUMBIA



TECK EXPLORATIONS LTD.
KIM 2 GROUP
LIARD MINING DIVISION
SPHALER CREEK AREA



TECK EXPLORATIONS LTD.

SPHALER CREEK PROJECT

CLAIMS AND GRID LOCATION MAP

Fig. 2

0 500 1000 m

The property was staked by the Bik Syndicate and Kennco in 1962 and 1963. During 1963, a small crew spent a month prospecting, chip sampling and silt sampling the property.

In 1964, seven men spent three months geological mapping, trail cutting, hand trenching and chip sampling.

In 1965, about 3km of ground magnetic and induced polarization surveys were carried out.

During 1970, detailed geological mapping and diamond drilling was carried out. 7 holes were drilled totalling about 1,600' using AX equipment.

iii) Summary of Assessment Work

June 9, July 9, 1980 - Rock and silt sampling, geological reconnaissance north side of Sphaler Creek on the Kim 38, 40, 42 claims.

August 3rd to 9th, 1980:

- a) Geochemical Survey - 201 soil samples collected along with 12 rock chip samples.
- b) Geophysical Survey - 11.8km of ground magnetics.
- c) Geological Survey - 105 hectares mapping on a 1:1,000 scale.
- d) Grid Establishment - 11.8km of grid was flagged.

iv) Objectives

G.H. Rayner for Kennco Explorations Ltd. reported on the Sphaler Creek property (1966) and indicated that the "Camp Zone" may have some potential for a low grade-large tonnage deposit. The current program attempted to test this possibility. The property was mapped in detail to determine: a) structural controls; b) alteration phases; and c) mineralized localities. Ground magnetics were carried out to outline structural and lithological trends.

A geochemical soil sampling survey was to define several mineralized zones and outline previously discovered Ag and Cu anomalies.

These activities were carried out on claims:

Sphal 29 (32691), Sphal 30 (32692), Sphal 31 (32693), Sphal 32 (32694), Sphal 33 (32695) and Sphal Fraction (32700) Kim 1, 2, 3, 5 (11318 - 11320 and 11322).

DETAILED TECHNICAL DATA AND INTERPRETATION

i) Geological Survey

a) Geology - South Side of Sphaler Creek

The southern portion of the claim group is underlain by Upper Triassic volcanic rocks consisting of augite andesite flows and agglomerates, and limy tuffs. These have been intruded by small irregular bodies that trend north-south and have a monzonitic composition. In the most southerly portion of the property a granodiorite intrusion of Jurassic age is in sharp contact with the volcanics.

b) Lithology

Triassic Volcanics:

The volcanics that occur on the Sphaler Creek property are part of a large sequence found throughout the Stikine area. They are the host for several mineral deposits including Galore Creek and Schaft Creek.

Within the property area tuffs predominate in the southeastern corner and are interbedded with fine grained andesite flows which

grade out into a sequence of augite andesite flows and agglomerates to the west. The following are field descriptions:

1. Tuff - dark grey, fine-grained, moderately banded, limy (particularly on fractures) and invariably have small disseminated pyrite cubes. Near the contact with granodiorites, considerable pyritization and skarning occurs in the form of small diopside /quartz/ grossularite lenses with light green epidote haloes.
2. Andesite Flows and Agglomerates - these two units are difficult to distinguish except in weathered outcrop where fragments are discernable. On a fresh surface these rocks appear as fine to medium grained with a green chloritized groundmass surrounding clusters of short white feldspar phenocrysts.
3. Augite Andesite - on the weathered surface these rocks are identified by their spotty appearance as the augite weathers white. They have a light green aphanitic groundmass with dark well crystallized augite equally spaced throughout. Several dykes of similar composition were noted and are probably part of the feeder system.
4. Monzonites - are medium grained anhedral, pyroxene-rich (usually altered to chlorite) with ubiquitous calcite fracturing and minor accessory magnetite. Locally these grade into a light colored fine grained mafic-free rocks, tentatively named "felsite".

5. Granodiorite - is a light colored, euhedral biotite/hornblende - 15% rock which usually contains small mafic rich xenoliths.

c) Structure

The volcanics strike north-northwesterly and dip steeply to the west. The dominant structural feature is the presence of two small parallel northerly trending faults which are expressed as linear erosion features on the surface. The monzonite intrusions and most of the mineralized showings are located on or near these faults.

Coarse breccias are developed around the monzonite intrusive where numerous small dykes and veinlets invade the country volcanics.

d) Mineralization

The "Camp Zone" consists of numerous but small showings that have the following modes of occurrence:

1. blebs of chalcopyrite in leucocratic felsites bordering the monzonite intrusives (such as those located on B.L. + 03 S and chip sampled by Sphal 9).
2. disseminated chalcopyrite in monzonites and contacting andesites.
3. minor chalcopyrite along fractures in small shear zones of the andesites.
4. small (20cm and less) quartz/calcite lenses with patchy chalcopyrite (vesicule replacement or infilling?).

Occurrences of type 1 and 2 are located near the baseline in the northern half of the grid. Type 4 is found in a small zone centered at baseline + 60 S and type 3 seemed to occur at random throughout.

<u>Sample No.</u>	<u>Width Metres</u>	<u>Cu%</u>	<u>Zn%</u>	<u>Ag oz/T</u>	<u>Au oz/T</u>
Sphal # 1 (4401)	30	.67	.01	.07	.053
Sphal # 2 (4402)	1	1.22	.01	.11	.062
Sphal # 3 (4403)	15	.91	.01	.09	.019
Sphal # 4 (4404)	1	.05	1.12	.58	.017
Sphal # 5 (4405)	1	.96	.15	1.14	.013
Sphal # 6 (4406)	2	.29	.02	.10	.006
Sphal # 7 (4407)	10	.74	.02	.39	.011
Sphal # 8 (4408)	8	.51	.01	.12	.002
Sphal # 9 (4409)	3	.62	.01	.12	.019
Sphal #10 (4410)	10	.72	.04	.16	.022
Sphal #11 (4411)	1	.63	.02	.13	.020
Sphal #12 (4412)	0.5	.27	.02	.33	.012

Locations for the above rough chip samples
are plotted on the accompanying geology
map.

e) Geology - North of Sphaler Creek

A small amount of geological reconnaissance was undertaken to the north of Sphaler Creek in the "North zone" and "Lower North zone". High grade copper showings are associated with a N-S trending fault zone of unknown displacement. This fault which cuts the Upper Triassic volcanics, small monzonitic intrusions and a limestone layer, occupies strongly linear creek valleys on both sides of Sphaler Creek. Bedrock along these creeks is brightly stained with iron oxides and subordinate malachite. In addition, closer inspection of the north creek reveals a bright red lichen which grows on some of the copper showings. The best mineralization is located on the KIM 38, 40, 42 claims.

Small intrusive breccia bodies and zones of intensely fractured volcanic material are located along the fault and are in some locations well mineralized with chalcopryrite and pyrite. A sample of material taken in the vicinity of the abandoned drill site on the north showing assayed 1.82% Cu, .18 oz/T Ag and .008 oz/T Au. A silt sample taken near the bottom of the creek ran Mo-5ppm, Cu-360ppm, Zn-110ppm, Ag-0.6ppm, Au 0.160ppm.

The north showings are largely unexplored due to precipitous terrain, dense undergrowth and remote location but there would appear to be some potential for economic mineralization. Unfortunately, further exploration will be very difficult and expensive due to the remoteness of the location and local topographic conditions.

ii) Geophysical Survey

a) Method and Procedure

A Scintrex MF-2 Magnetometer was used for the magnetometer survey. Readings were taken at 50m intervals along survey lines in a series of loops which started and ended at previously established base stations. The readings were then corrected for diurnal shift. The readings are presented in the form of a contoured map on a scale of 1cm = 50m.

b) Results and Conclusions

Results of the magnetometer survey do not present a clear picture but several tentative associations can be made.

1. A mag-high at the south end of the grid corresponds to the contact of the volcanics with the granodiorite.
2. A mag-high centered at BL + 00 corresponds to the occurrence of a mineralized felsite phase of the monzonite intrusive.
3. A mag-high at L 60 S + 5 E corresponds to a zone of copper mineralization in andesites.
4. Mag-lows at L 20 N + 5 W and L 50 S + 5 W are related to the northerly trending faulting.

iii) Geochemical Survey

a) Method and Procedure

201 soil samples were collected over the grid at intervals of 50m where soil was available. The soil is generally a fine, brown residual soil which varies in thickness from 5cm to 50cm. Little

glacial till remains on this portion of the property and results can be expected to express the near surface rock geochemistry. Wherever possible the "B" horizon was sampled.

The soil samples were tested by Acme Analytical Laboratory of Vancouver for Cu, Zn, Au, Ag and Mo using standard analytical methods (See Appendix II for details).

b) Results

Results of the geochemical survey are plotted on Figures 3, 4 and 5.

Mo

Molybdenum results are low and sporadic with a high value of 59ppm. The values are plotted on Figure 3 but are not contoured.

Cu

Copper results are consistently high over about a third of the grid (Figure 3). The 200ppm contour was arbitrarily chosen to be anomalous and indicates an open ended, alongate, N-S zone of copper enrichment covering about one third of the grid area. A peak value of 6,500ppm was obtained at 605 S, 50 E. The copper anomaly covers a substantial area and corresponds fairly well with the known copper showings as shown on the geology map.

Au, Ag

Gold and silver values are plotted on Figure 4 and are arbitrarily contoured: Ag-1.0ppm, Au 0.100ppm.

The anomalies outlined are approximately coincidental and correspond to the main copper anomaly. Maximum values are: silver-13.0ppm, gold-2.5ppm. These results indicate a precious metal association with the copper mineralization.

Zn

The zinc geochemical map (Figure 5) shows a slight increase in zinc towards the south and west of the grid, more or less on the west flank and overlapping the Cu, Au, Ag anomalies. With a peak value of 650ppm, there is no suggestion of any economic zinc mineralization but there is a suggestion of a geochemical zinc haloe around the copper anomaly which would correspond with the porphyry model of copper mineralization.

iv) Conclusions

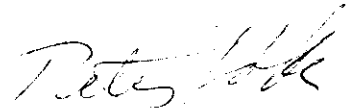
Most of the mineralization, south of Sphaler Creek, is on and peripheral to the two fault zones and appears to be related to the monzonite intrusives. Although the showings are numerous they are not very extensive (the largest being about 20m in width and probably of only moderate grade, .5%). Outcrop coverage is good (about 20%) and thus the chances of an ore-deposit on or near surface is not good. Also, alteration of the host rocks is not very intensive being only propylitic phase.

The geochemical survey confirms the extent of the copper showings and indicates a relatively high precious metal content. A weak haloe of zinc enrichment is also indicated.

The magnetometer survey did little to advance the geologic knowledge of the deposit.

On the north side of Sphaler Creek, some relatively unexplored occurrences appear to have some potential for economic mineralization. Unfortunately, local topographic conditions make a quick evaluation impossible.

Respectfully submitted by

A handwritten signature in cursive script, appearing to read "P. Folk".

P. Folk, P. Eng.

W. Spilsbury

APPENDIX I

Statement of Costs

a) Wages		
i) Geologists @ \$110/day x 8 days		\$880.00
ii) Soil Sampler @ \$50/day x 6 days		300.00
iii) Line Cutter @ \$37/day x 6 days		222.00
iv) Magnetometer Operator @ \$50/day x 6 days		300.00
b) Food and Accommodations		
Groceries (4 men x 6 days x \$15 day/man)		\$360.00
c) Transportation		
Helicopter 7.5 hours at \$450/hour		\$3,375.00
Mobilization 4 men		400.00
Demobilization 4 men		400.00
d) Instrument Rental		
Radio @ \$15/day x 6		\$90.00
e) Geochemical Analyses		
i) 201 soil sample analysed for Cu, Au, Ag, Zn, MoS ₂ @ \$6/sample		\$1,206.00
ii) 12 rock chip sample assayed for Cu, Au, Ag, MoS ₂ @ \$8/sample		\$96.00
f) Preparation of Report		\$750.00
g) Freight Charges		\$126.00
		<hr/>
		\$8,605.00
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APPENDIX II

Analytical Methods



Geochemical Analysis of Mo, Cu, Zn & Ag

Sample preparation

Soil samples are dried at 75°C and sieved to -80 mesh.

Rock samples are ground to -100 mesh.

Digestion

A .50 gram sample is digested with dilute Aqua Regia in boiling water bath and diluted to 10 mls with demineralized water.

Determination

All the above elements are determined by Atomic Absorption from the solution.

* With background correction.

Geochemical Analysis of Au

Digestion and extraction

A 10 gram sample which has been ignited over night at 600°C is digested hot with dilute Aqua Regia, and the clear solution is extracted with Methyl Isobutyl ketone.

Determination

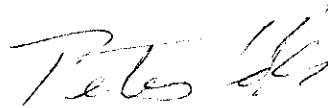
Au is determined by AA from the MIBK extractant with background correction.

APPENDIX III

STATEMENT OF QUALIFICATIONS

I, Peter G. Folk, P. Eng., certify that:

1. I graduated with a B.A.Sc. degree in geological engineering from the University of British Columbia in 1971.
2. I have worked since graduation as an exploration and mine geologist at various locations in Canada and the United States.
3. I am a member of good standing of the Association of Professional Engineers of the Province of British Columbia.
4. The work described here was done under my direct supervision.



P. Folk, P. Eng.

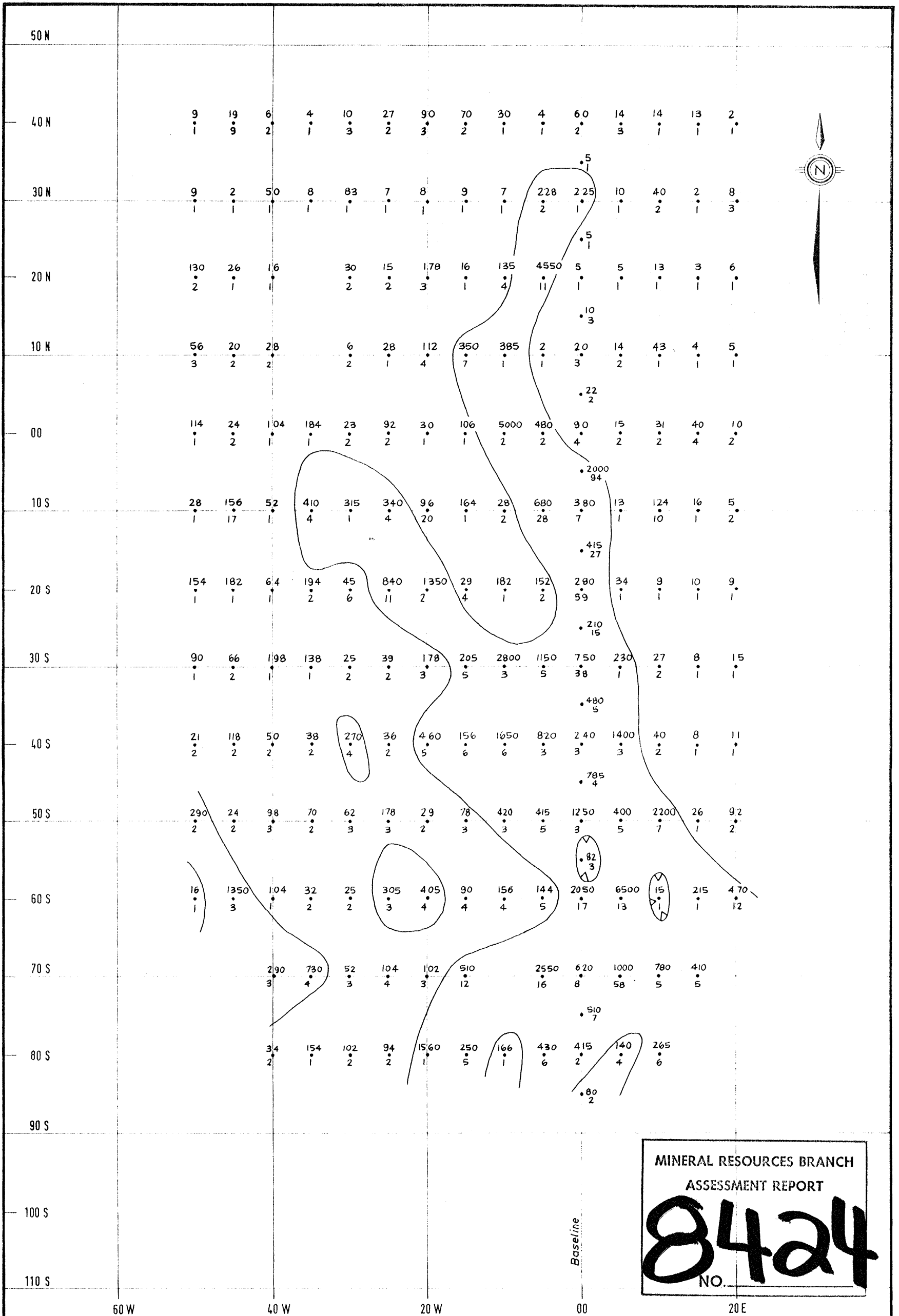
APPENDIX IIISTATEMENT OF QUALIFICATIONS

I, Wayne Spilsbury of the Municipality of Cranbrook,
British Columbia,

Hereby Certify:

1. That I graduated with a B.Sc. degree in Honors Geology from the University of British Columbia in 1973.
2. That since my graduation I have practised my profession as a Geologist during seven field seasons in Canada and the United States.
3. That I have personally examined the "Sphaler Creek Property" from August 5th, 1980 to August 9th, 1980.
4. That I have no financial interest in Silver Standard Mines or Teck Corporation.

Wayne Spilsbury



MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
8424
 NO.

Cu, Mo

EXPLANATION

eg: $\begin{matrix} \leftarrow & \text{Cu} \\ \leftarrow & \text{Mo} \end{matrix}$

ALL RESULTS ARE IN P.P.M.

CONTOUR AT 200 P.P.M.

TECK EXPLORATIONS LTD.

SPHALER CREEK PROJECT
 STIKINE AREA
 GEOCHEMICAL SURVEY

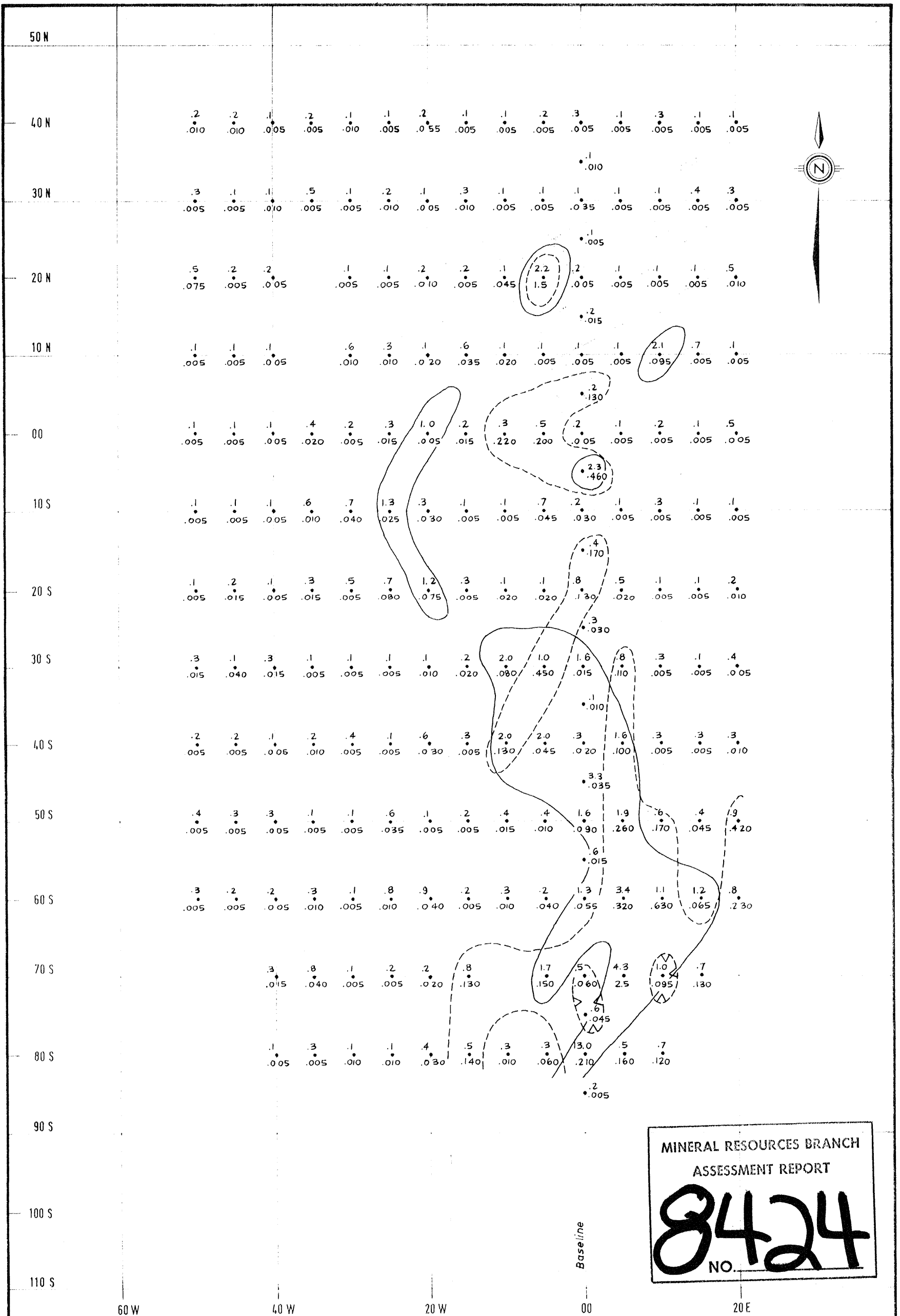
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DRAWN:
S.A./SEPT '80

COMPILED BY:
W. SPILSBURY

JOB NO: 1274

DWG. NO: 3



MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8424
NO.

Ag, Au

EXPLANATION

eg: .1 ← Ag
.010 ← Au

ALL RESULTS ARE IN P.P.M.

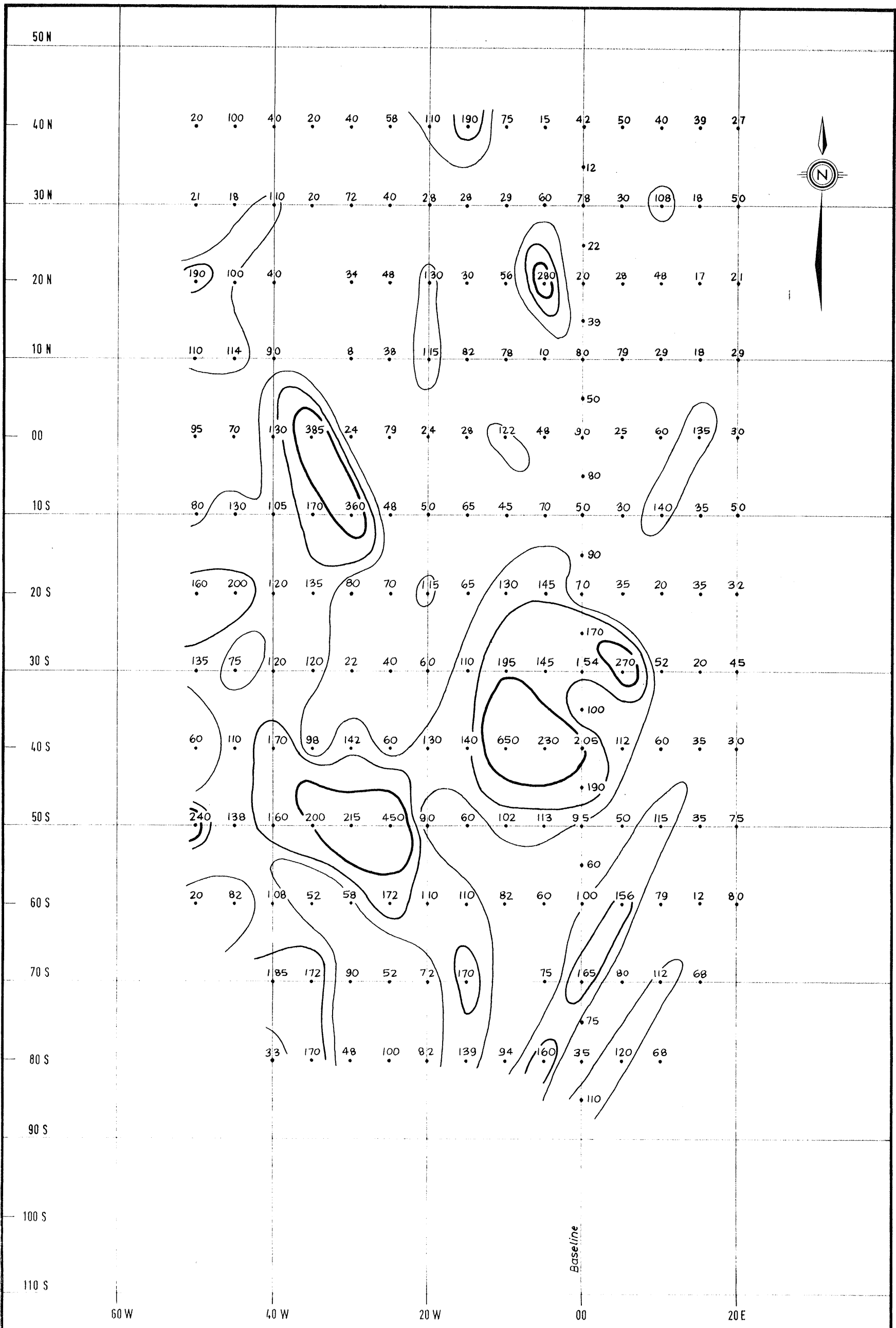
○ 1.0 P.P.M. Ag
○ 100 P.P.M. Au

TECK EXPLORATIONS LTD.

SPHALER CREEK PROJECT
STIKINE AREA
GEOCHEMICAL SURVEY

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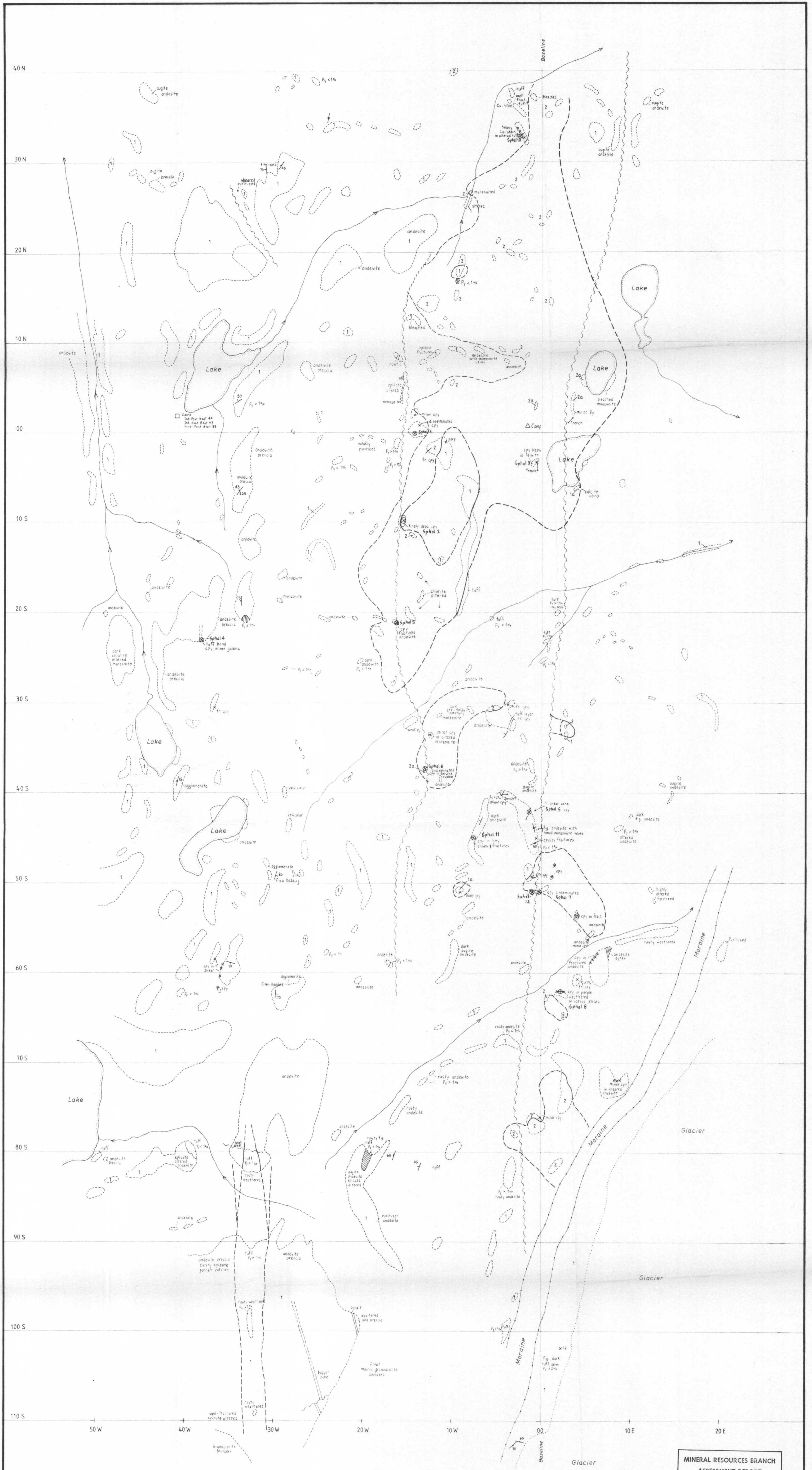
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MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
8424
 NO. _____

Zn
 ALL RESULTS ARE IN P.P.M.
 CONTOUR INTERVALS AT: 200 P.P.M.
 150 P.P.M.
 100 P.P.M.

TECK EXPLORATIONS LTD.			
SPHALER CREEK PROJECT STIKINE AREA GEOCHEMICAL SURVEY			
0 50 100 150 200 250 300 350 m			
DRAWN: S.A./SEPT. 80	COMPILED BY: W. SPILSBURY	JOB NO.: 1274	DWG. NO.: 5



LEGEND

- 1 TRIASSIC VOLCANICS - ANDESITE BRECCIA, AGGLOMERATE AND VESICULAR FLOWS, QUARTZ FELDSPAR PORPHYRY (ALTERED ANDESITE NEAR CONTACT WITH MONZONITE)
- 2 JURASSIC INTRUSIVES - GRANDIORITE
- 3 CRETACEOUS INTRUSIVES - MONZONITES, AND PYRIFEROUS FELSITE (2a)

- FAULT OR SHEAR ZONE - - - - -
- BEDDING - - - - -
- MINERAL SHOWING - x
- Py - PYRITE
- CONTACT - - - - -
- OUTCROP - - - - -
- SPHAL 1,2,3 etc - CHIP SAMPLE LOCATION - ⊙
- cpy - CHALCOPYRITE

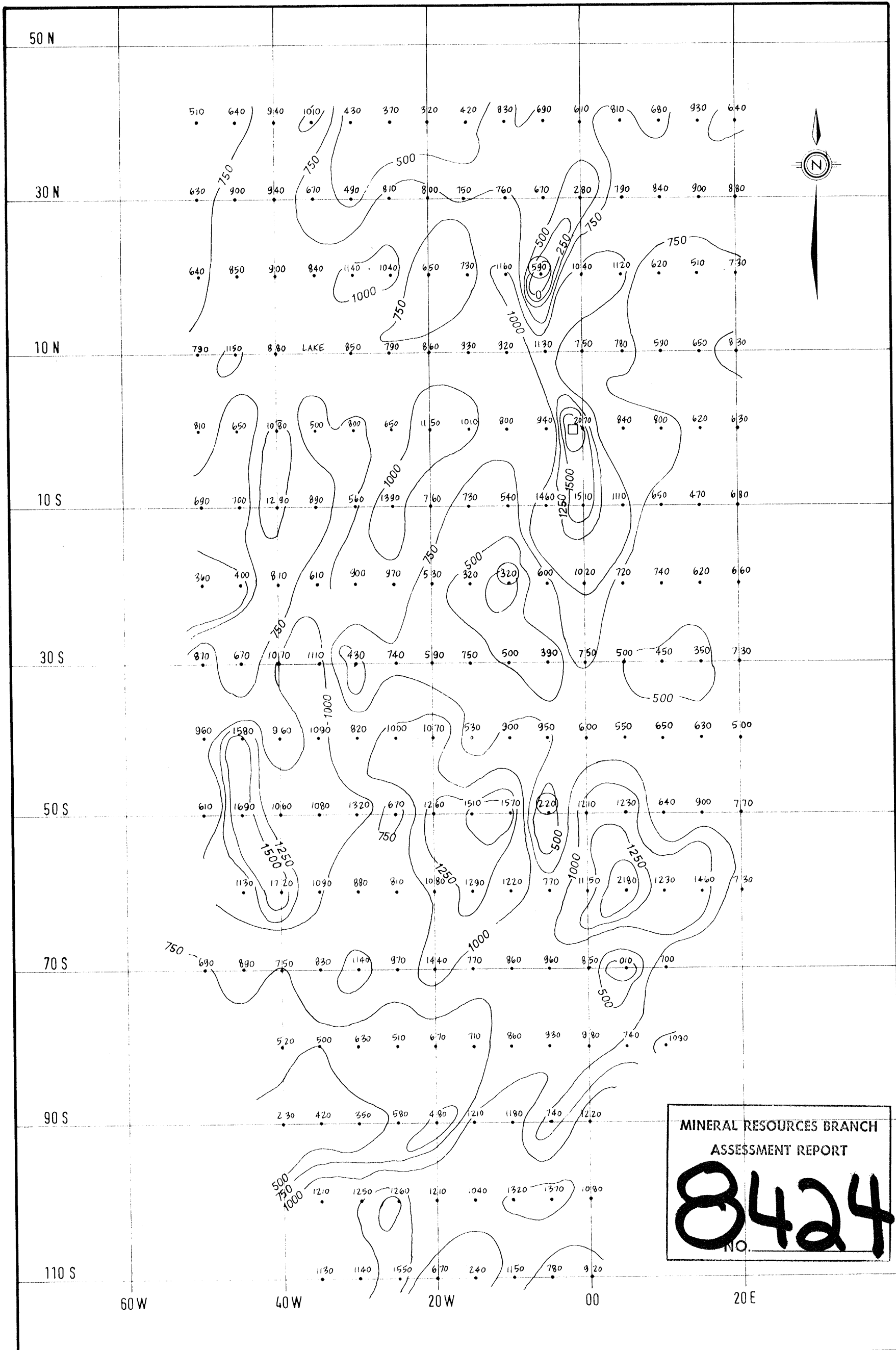
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ASSESSMENT REPORT
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NO.

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SPHALER CREEK PROJECT
STIKINE AREA
GEOLOGICAL SURVEY

0 50 100 150 200
m

DRAWN: S.A. / SEPT. 80	COMPILED BY: W. SPILLSBURY	JOB NO: 1274	DWG NO: 6
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MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
8424
 NO.

LEGEND
 CONTOUR INTERVALS 250 GAMMAS
 ○ NEGATIVE VALUES
 □ CAMP

TECK EXPLORATIONS LTD.
 SPHALER CREEK PROJECT
 STIKINE AREA
 MAGNETOMETER SURVEY

0 50 100 150 200 250 300 350 m

DRAWN: S.A. / AUG. 80	COMPILED BY: W. SPILSBURY	JOB NO: 1274	DWG. NO: 7
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