

# 2746

GEOCHEMICAL REPORT

On

FLATHEAD AREA CLAIMS

LAT. 49° 07' LONG. 114° 20'

In

FORT STEELE M.D.

For

ANN MARK

ALEX MacOILLIVARY

THOR EXPLORATIONS LTD., (N.P.L.)

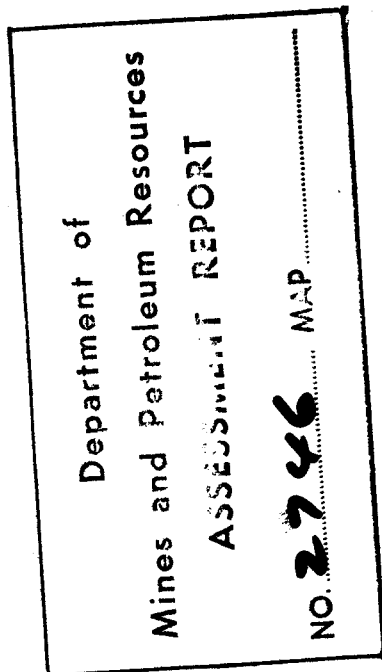
MARK V MINES LTD., (N.P.L.)

By

STRATO GEOLOGICAL LTD

And

C.H. Donaldson, P. Engineer



November 19, 1970

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	<u>Scale</u>
#2 Geochem Map GH I Claims	1" = 400'
#3 " " JKL Claims	1" = 400'
#4 Geol. Map A.B.C.	1" = 375'
#5 Sections Examined Or Sampled	1" = 25'
#6 Geol. + Geochem Map A.B.C. DEF Claims	1" = 500'

## Introduction

Mrs. Ann Mark and Alex MacBilivary together with the directors of Mark V Mines Ltd., (N.P.L.) and Thor Explorations Ltd., (N.P.L.) requested Strato Geological Ltd., mineral exploration contractors, and C.H. Donaldson, Professional Engineer, to carry out a geochemical survey and prospecting programme on their claims in the Flathead area, south of Fernie B.C. The results on the three properties to be covered by a single report.

The 164 claims owned by the three parties are located in the Clarke Range of mountains, east of the Flathead River, extending from about two miles to nine miles north of the International Boundary, at approximately  $49^{\circ} 07' N$  Latitude and  $114^{\circ} 20' W$  Longitude.

The claim area is in precipitous mountains with elevations ranging from 4450 feet to over 8000 feet above sea level.

The favorable beds strike North - South and dip to the east. The outcrops of the beds occur at or near the top of the mountain range. The series forms the west rim of a large geosyncline.

The series is cut by a number of streams. These were silt sampled and results recorded. In addition, geochemical rock chips and soil samples were taken across the formations.

## Property

The total property comprises 164 claims held as follows:

- A. The Ann Mark claims known as the A group consists of 24 claims:

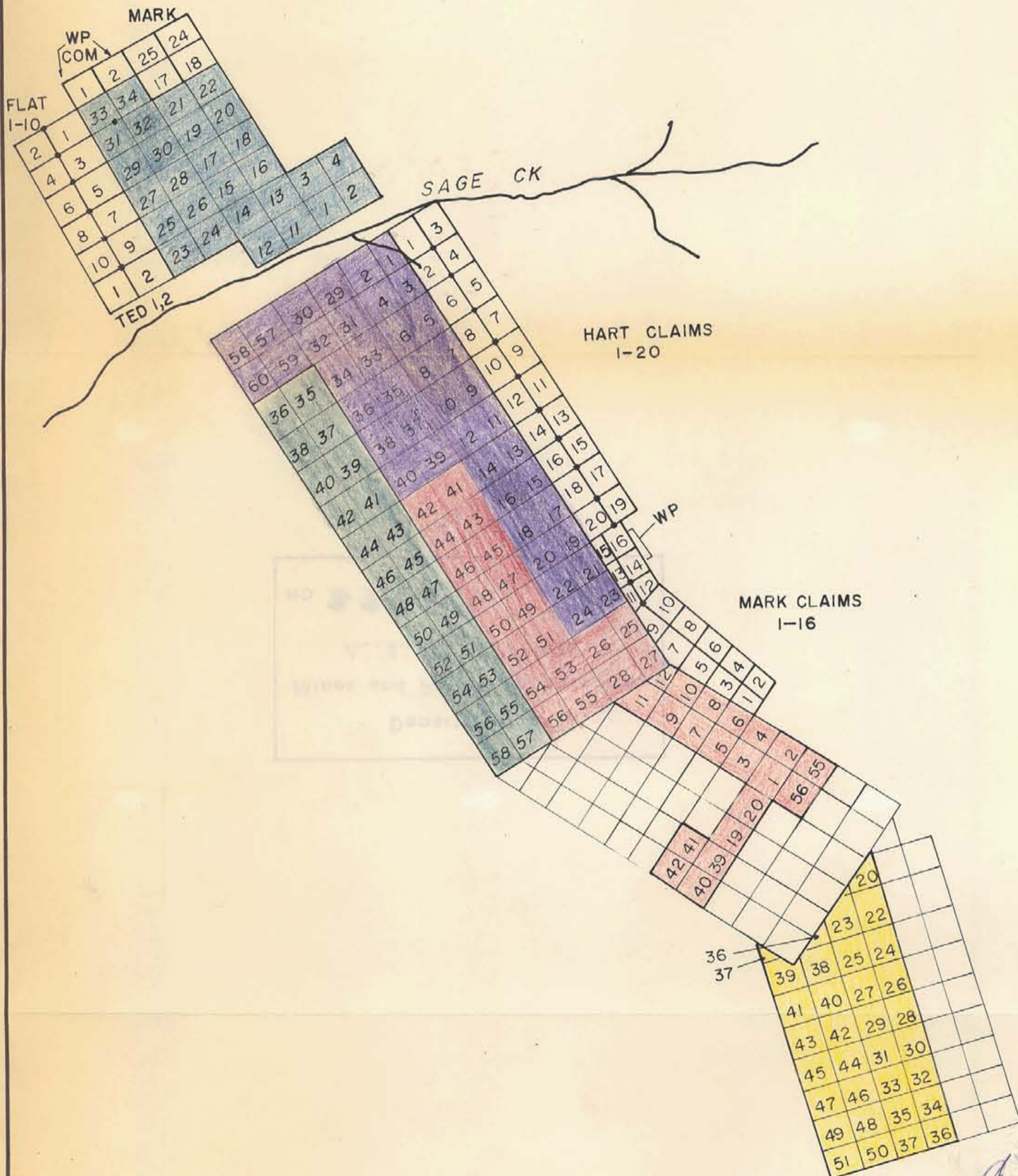
A.B.C. 35 - 58      Record Nos. 14910 - 14913

- B. The Mark V Mines Ltd., (N.P.L.) claims known as the ABC group contains 28 claims:

ABC 1 - 4      Record Nos. 14910 - 14913

114°22'

49°10'



- A Group
- ABC Group
- Ann Group
- Les Group
- JKL Group



*Donaldson*

OLD & NEW CLAIMS  
IN  
FLATHEAD AREA

SCALE 1"=1mile DATE-OCT, 70



Property (Continued)

ABC 11 - 35

Record Nos. 14920 - 14943

C. Thor Explorations Ltd., (N.P.L.) claims consist of 2 groups, namely the Ann group of 40 claims and the Les group of 40 claims.

<u>Claim</u>	<u>Record No</u>
Ann Group	
DEF 1 - 24	14831 - 14854
29 - 40	15062 - 15073
57 - 60	15090 - 15093
Les Group	
DEF 25 - 28	14855 - 14858
DEF 41 - 56	15074 - 15089
GHI 1 - 12	15002 - 15013
GHI 19 - 20	15020 - 15021
GHI 39 - 42	15040 - 15043

D. The Alex MacOillivary claims known as the J.K.L. group consists of 32 claims.

JKL 20 - 51

14878 - 14909

All claims are held by location and are contiguous except for a narrow strip along Sage Creek.

Location and Access

The claim groups are located along the Clarke Range from about two to nine miles north of the International Boundary, east of the Flathead River, at approximately 49° 07' N. Latitude and 114° 20' W. Longitude.

Access is from Fernie or Michell B.C. with the Fernie access slightly shorter. From Fernie, access is seven miles west on Highway No. #3, then 51 miles south by gravel road which extends across the border

Location and Access (Continued)

Forestry roads on the property provide access from the north-south gravel road.

Geology

The Geological Survey of Canada has mapped the area and has published a report "Flathead Map - Area, British Columbia and Alberta"; Memoir 336 by R.A. Price. The G.S.C. shows the Grinell formation to be in the Precambrian series.

ERA	PERIOD or EPOCH	FORMATION or GROUP	LITHOLOGY	THICKNESS
		Rooseville	Green argillite, siltstone, sandstone, stromatolitic, dolomite	3500 +
		Phillips	Red sandstone, siltstone, argillite	500 - 700
P	Purcell	Gateway	Argillite, argillaceous	
R		upper member	siltstone, dolomite, dolomitic argillite and sandstone	500 - 700
E		Sheppard	Quartzitic and dolomitic	
C		lower member of gateway	sandstone, dolomite, volcanic dolomite, argillite, siltstone	
A			pillowed andesite	150 - 900
M			<u>EROSIONAL UNCONFORMITY IN PART</u>	
B		Purcell	Chloritized andesite, amygdaloidal andesite flows; pillowed andesite	0 - 600
R		Siyeh	Limestone, dolomite, argillaceous and sandy limestone and dolomite, argillite, stromatolitic limestone	
I				1130 - 300
A				
N		Grinell	Red argillite, sandstone and siltstone	350 - 1700

Geology Continued

Appokuny	Argillite sandstone and siltstone	1500 - 2000
Altyn	Argillaceous limestone and dolomite, sandy dolomite argillite and stromatolitic dolomite	500 - 400
Waterton	Limestone and dolomite, argillite and argillaceous dolomite	1500 +

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The Grinell Formation is part of a series of rocks forming a very large syncline known as the Akamina Syncline. The south western outcrop of the Grinell Formation commences in Montana, U.S.A. and continues north along higher altitudes of the Clarke Range, east of the Flathead River for a distance of about 26 miles to the closed end of the syncline. The east limb of the syncline extends south eastward about 11 miles to the Canadian U.S. Boarder and on into Montana.

The Purcell strata is cut by intrusive chloritized diorite sills and dykes known as the Mayie intrusive. The sills may be recognized in cliff faces as black bands with white bands on either side of them.

The geo-syncline is bounded on the east by a major thrust fault known as the Lewis Thrust fault and on the west by the major Flathead fault.

Within the syncline there are many normal faults and block faults.

The Thor Explorations Ltd., (N.P.L.) claims are on the west limb of the syncline between the Kishenena and Sage Creeks. The claim group on Kishinena Creek is 4 miles due north of the Canadian - U.S. border. The claim group extends north west along the Grinell Formation outcrop for a distance of approximately 7 miles.

The Grinell Formation can be readily distinguished by its red colour and is seen at or near mountain crests between Sage and Kishenena Creeks.

### Geology (Continued)

At Sage Creek, a block fault occurs with a vertical displacement of about 600 feet. Kishinena Creek apparently follows a minor normal fault.

### Geochemical Survey

Strato Geological Ltd., conducted a preliminary geochemical investigation of copper mineralization on the sedimentary rocks, (characterized by red band in the Purcell formation of the Precambrian).

The Grinell formation has been regarded to be a potential host rock by some prospectors for several years. The prime target of the examination was to seek additional data by actual field examination and geochemical assays to ascertain the extent of mineralization.

During the project, Heino Leis (manager), Uno Leis (operations manager), Edward Thorburn (field supervisor), Chang Ju Cho (local geologist), Lawrence Hicks, Steven Habart, Laurie Todd, Gary Mcaster, David Lynch, Derrel Bucky, Mervin Harris, Steven Bridges, David Samson, Raymond Bourque, Dan Angus, Mike Sullivan, Dave Hildebrant, Derek Carney, John Giles, Les Van Koughnett and David Sinden (samplers), participated in the field work from August 3, 1970 to October 10, 1970.

The field work was carried out in three stages:

1. Stream sediment (silt) geochemical surveys
2. Rock chip sampling for geochemical investigation
3. Soil sampling

Persistent stratigraphic subdivisions were recognized and described in detail while sampling.

For examining mineralization in rock samples, 10 x and 12 x magnification lenses were used by prospecting crews. When mineralization was observed,  $H_2SO_4$  tests were used to verify any chalcocite presence by a coating



### Geochemical Survey (Continued)

reaction on a knife blade. Twenty well marked lines were established for the rock sampling. The lines extended from 300 feet to 500 feet in length, marked by ribboning on trees and red paint on rock faces along the sampled lines.

The outcrops in general formed typical cliff strata, providing an excellent condition for sampling.

Silt sampling was done along Sage Creek, Ruby Creek and their tributaries. Rock chip samples were taken for assaying purposes along 20 lines located approximately 1,300 feet apart, running perpendicular to the N.W. strike of the Grinnel formation.

The field crews examined and sampled each strata for mineralization (noting rock type, colour and thickness), along the Grinnel formation. The maps show the assay results of sampled areas.

Soil samples were taken in "B" horizon with shovels and placed in standard sampling bags and delivered to T.S.L. for analysis by hot aqua regia extraction method.

### Costs

#### A. Ann Mark

A Group, September 22, 1970 to October 10, 1970

Labour	\$ 1,400.00
Assays and field equipment	221.25
Equipment rental	80.00
Room and Board	155.44
Transportation	422.00
Engineer's report	300.00
	<hr/>
	\$ 2,578.69

#### B. Mark V Mines Ltd., (N.P.L.)

A.B.C. Group, August 3 - 28, 1970

Labour	\$ 1,975.00
Assays	73.75
Mapping	177.23
Transportation	312.54

Costs (Continued)

Room and board	291.34
Miscellaneous expenses	17.15
Engineer's report	<u>2,352.38</u>
	\$ 5,352.39

C. Thor Explorations Ltd., (N.P.L.)  
Les Group and Ann Group, August 31, 1970 - September 21, 1970

Labour	\$ 4,835.00
Assays and geochem	376.25
Field equipment	192.50
Equipment rental	210.00
Miscellaneous expenses	289.45
Room and board	466.42
Mapping	161.23
Engineer's reports	2,265.93
Transportation	<u>1,145.06</u>
	\$ 9,941.84

D. J.K.L. Group, September 22, 1970 - October 10, 1970  
(Alex MacGillivray)

Labour	\$ 3,635.00
Assays	379.75
Equipment rental	100.00
Transportation	52.73
Mapping	50.00
Room and board	<u>97.22</u>
	\$ 4,313.70

Cost Recap

A. Ann Mark, A Group	\$ 2,578.69
B. Mark V Mines Ltd., (N.P.L.) ABC Group	5,352.39
C. Thor Explorations Ltd., (N.P.L.) Les and Ann Groups	9,981.44
D. JKL Group, (Alex MacGillivray)	<u>4,314.70</u>
	\$22,227.22

Results and Conclusions

The enclosed plans show the plotted results of the geochemical survey. It is noted that anomalous results occur in an erratic pattern in the overlying Siyeh and underlying Appekuny formations.

Similar syngenetic mineralization has led to the discovery of major ore deposits. Examples are the Mount Isa copper deposit and the MacArthur

Results and Conclusions (Continued)

River zinc deposit in North Queensland, Australia and the recent development of Kennecott's Spar Lake property.

The latter is located approximately 150 miles south of the groups reported Lerein and is in quartzites of the Proterozoic Reville Group of rocks (Purcell equivalent).

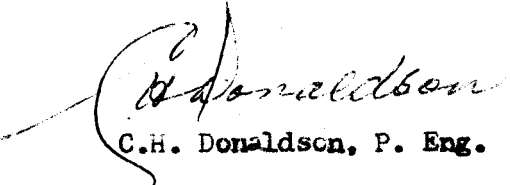
The presence of well mineralized quartzite bands in the Grinnel, Siyeh and Appekuny formations on the claims owned by Ann Mark, Mark V Mines Ltd., (N.P.L.), Thor Explorations Ltd., (N.P.L.), and Alex MacGillivray, offer the inducement to seek a concentration of quartzite bands or a massive quartzite deposit within the groups of claims.

Recommendations

I recommend that all the 164 claims be amalgamated into a simple unit and the owners endeavor to interest a major company in an underwriting to investigate the property.

Failing this, I suggest that further prospecting be done during 1971, in areas of interest as indicated by the geochemical survey.

Respectfully submitted,

  
C.H. Donaldson, P. Eng.

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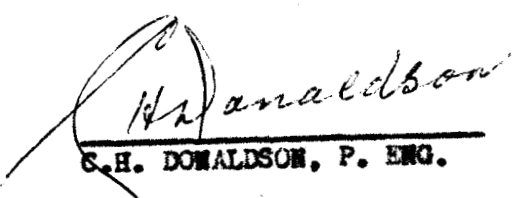
References

1. Geological Survey of Canada, Memoir 336
2. Strato Geological Maps

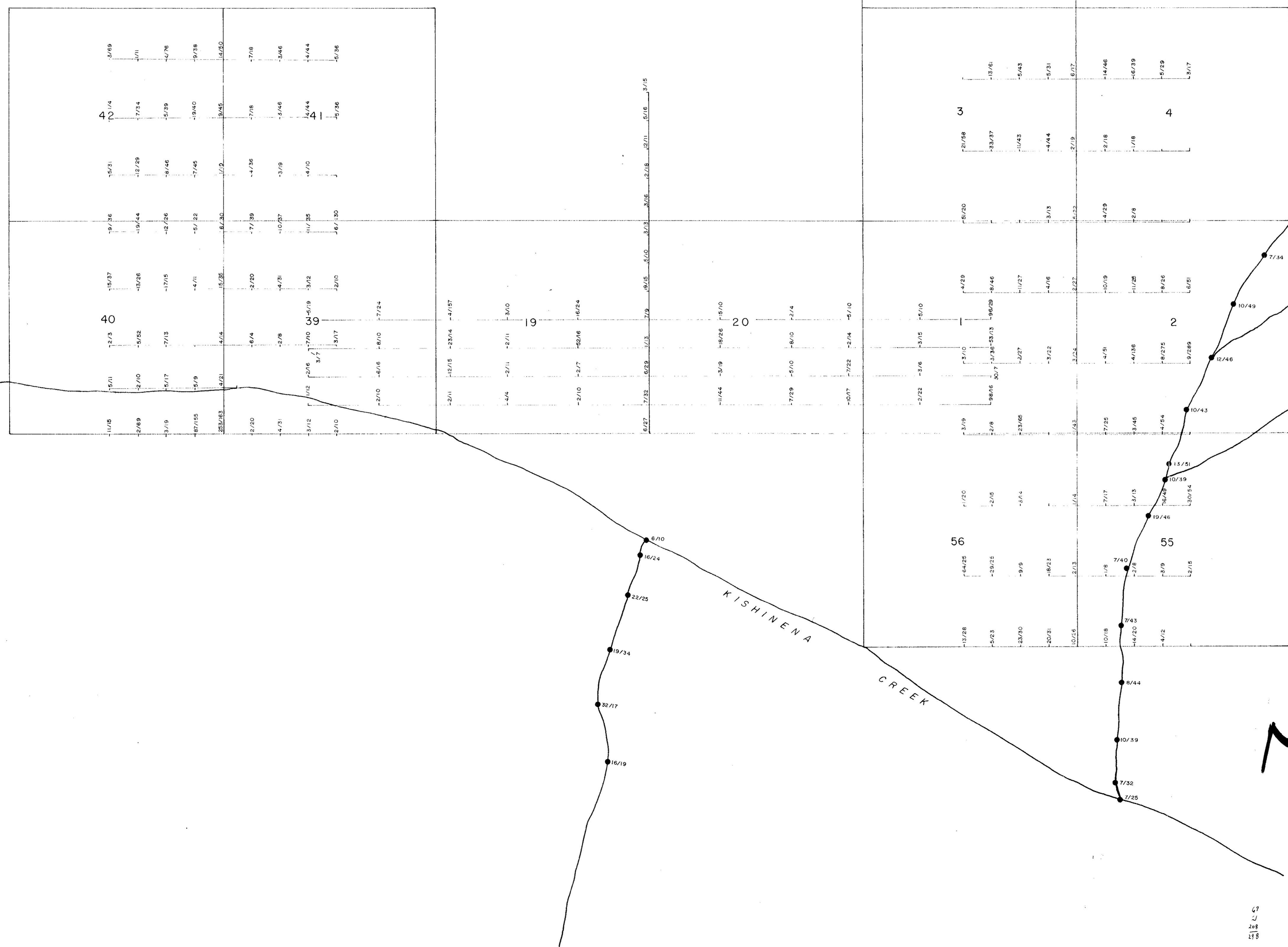
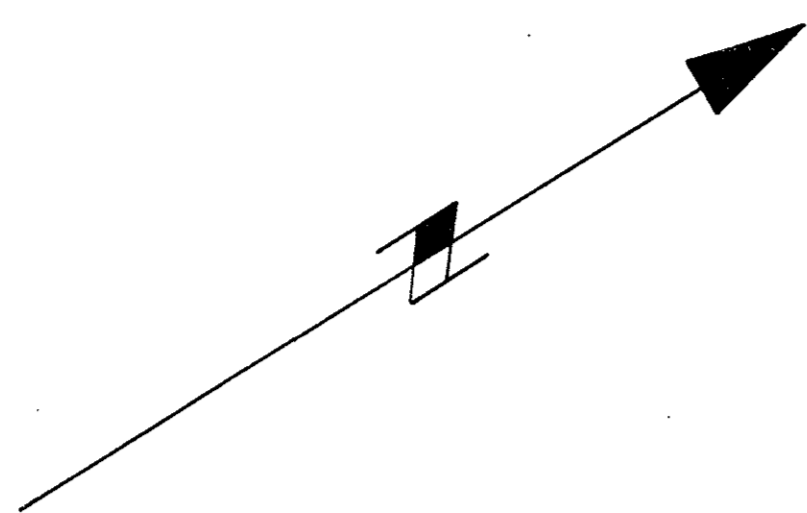
**CERTIFICATION:**

I, Clarence H. Donaldson of the City of Vancouver in the Province of British Columbia, hereby certify as follows:

1. That I am a Registered Professional Engineer of the Province of British Columbia and reside at Suite 101, Brentwood Apartments, 2050 Barclay Street, Vancouver 5, British Columbia.
2. That my mining experience embraces all phases of the mining industry and I have worked throughout Canada, Australia, South Seas and parts of the U.S.A. and Mexico.
3. That I have no interest directly or indirectly in the claims or securities of Mark V Mines Ltd., (N.P.L.) or Thor Explorations Ltd., (N.P.L.), nor do I expect to receive any.
4. That the information contained herein was obtained through examination of the plans and assays supplied by Strato Geological Ltd., as well as my personal examination of the area.

  
C.H. DONALDSON, P. ENG.

VANCOUVER, B.C.  
NOVEMBER 20, 1970



Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
2746 #2

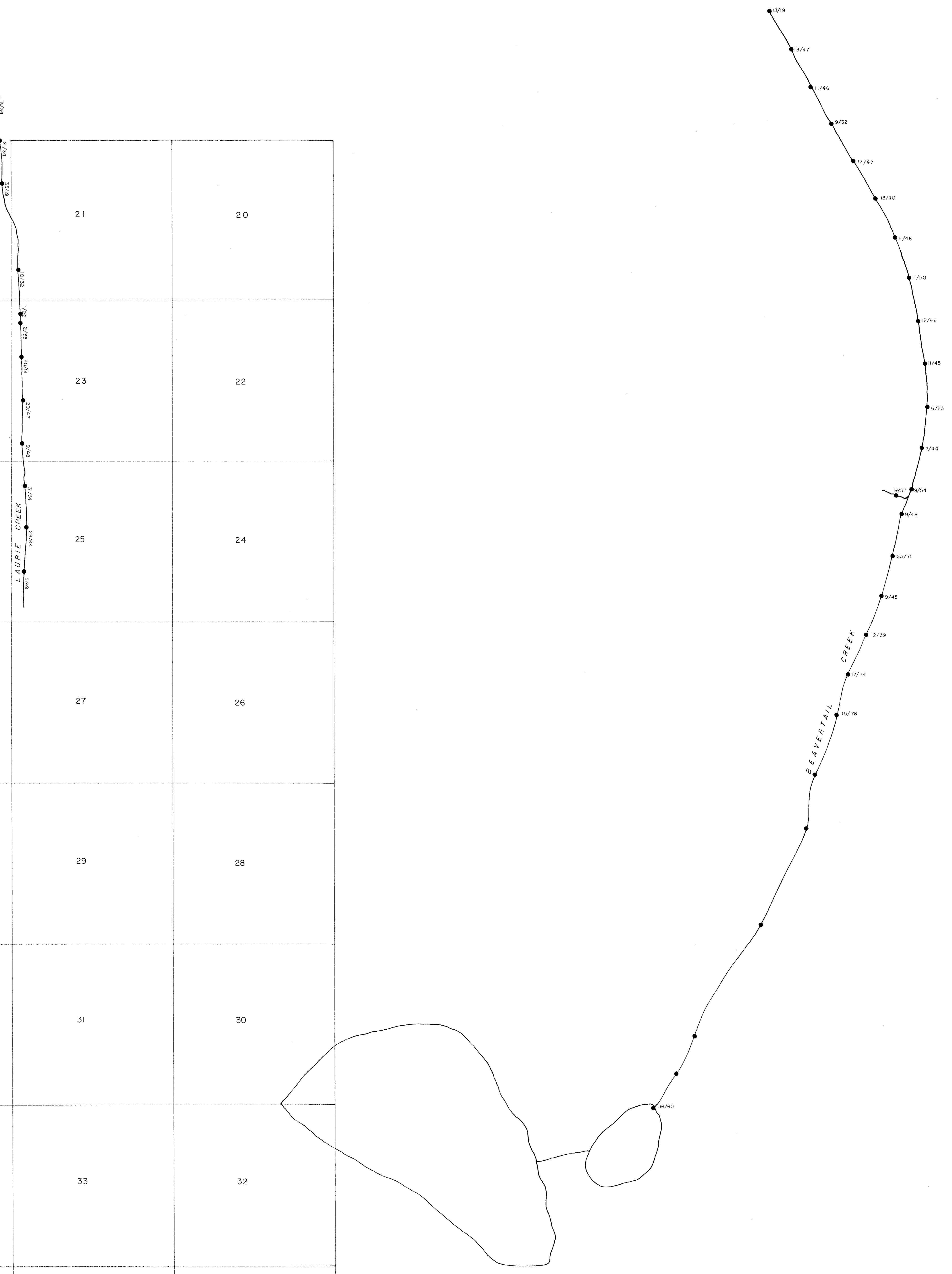
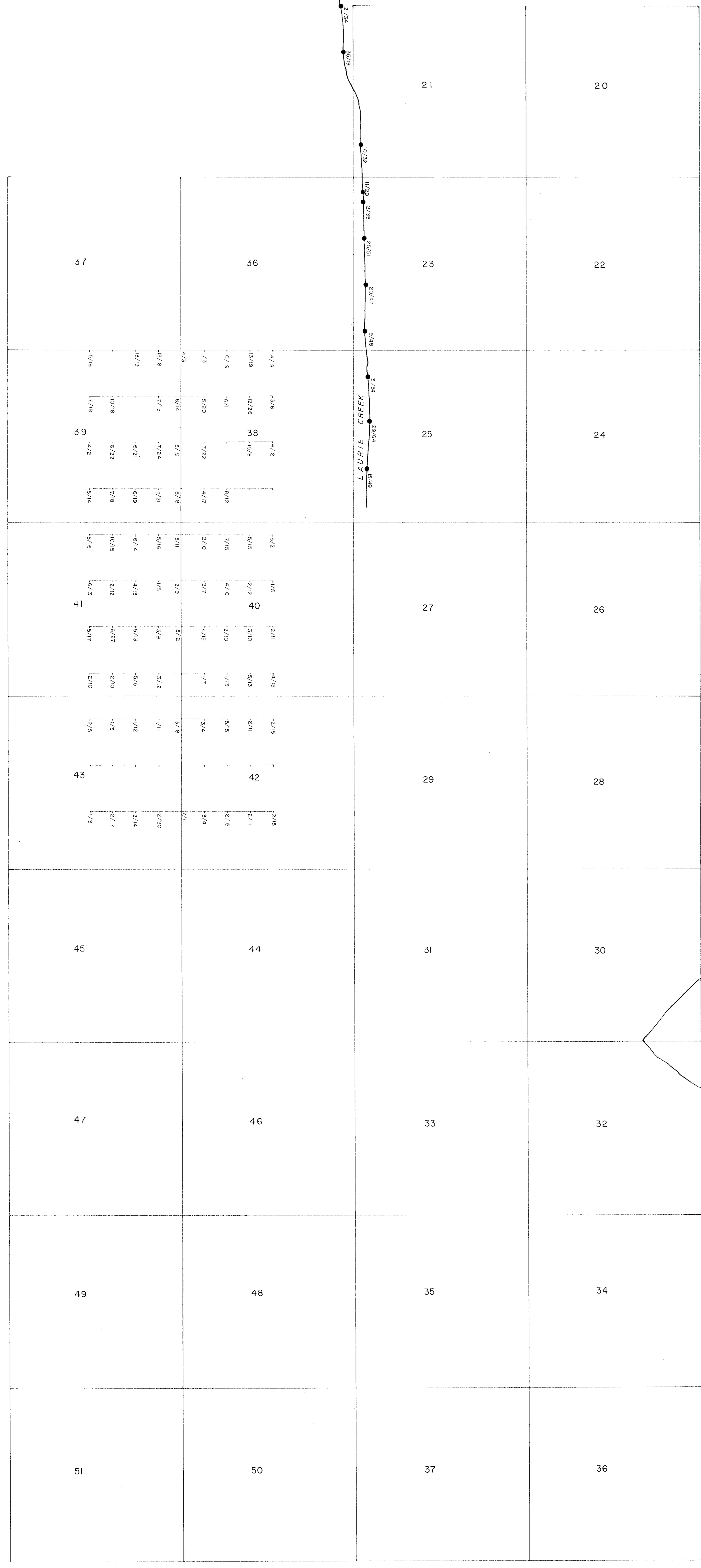
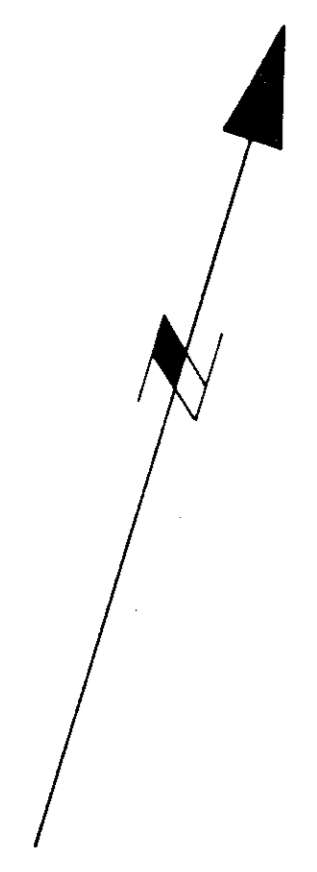
6/Si Cu/Zn IN ppm.  
7/34 SILT SAMPLE

2746

M-2

To accompany report by C.H. Donaldson P. Eng.  
*C.H. Donaldson*

GEOCHEMICAL MAP  
GHI CLAIMS  
FORT STEELE M.D.  
FLATHEAD AREA, B.C.  
SCALE: 1" = 400' DATE:



2746 M-3

Department of  
Mines and Petroleum Resources  
ACCIDENT REPORT  
2746 M-3

To accompany report by C.H. Donaldson, P. Eng.  
*C.H. Donaldson*

GEOCHEMICAL MAP  
JKL CLAIMS  
FORT STEELE M.D.  
FLATHEAD AREA, B.C.  
SCALE 1"= 400'  
DATE:



**LEGEND**

- 1 [Purple Box] SIYEH FORMATION
- 2 [Green Box] GRINNELL FORMATION
- 3 [Brown Box] APPEKUNNY FORMATION
- [Creek Line] CREEK
- [Dashed Line] GEOLOGICAL CONTACT
- [Circle with Dot] SOIL SAMPLE
- [Circle with Arrow] SILT SAMPLE

MARK V MINES LTD. (N.P.L.)

**GEOLOGICAL MAP**

A.B.C. CLAIMS

FLATHEAD AREA, B.C.

SCALE — 1" = 375'

DATE —

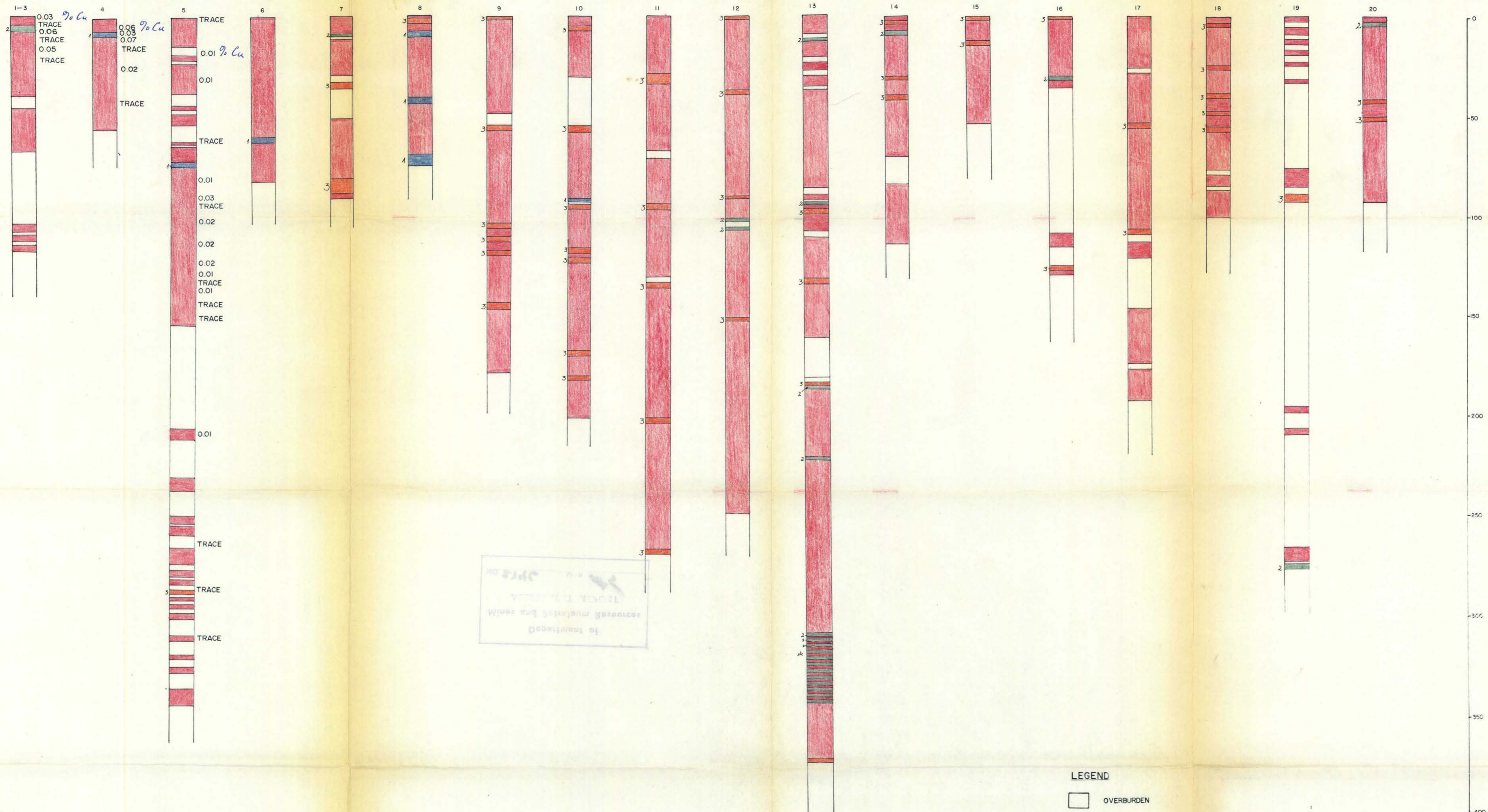
*H. Donaldson*

2746 M-4

2475

2475 M-4





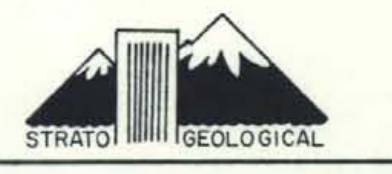
to be investigated  
 for the purpose of  
 determining the  
 extent of the  
 deposit

LEGEND

- OVERBURDEN
- 1 ■ APPEKUNNY
- 2 ■ GREEN ARGILLITE
- RED ARGILLITE
- 3 ■ SANDSTONE

2746 M-5  
*R. Donaldson*

THOR EXPLORATIONS LTD (N.P.L.)		
SCALE: 1"=20'	APPROVED BY	DRAWN BY
DATE:		
SECTIONS EXAMINED OR SAMPLED		
FLATHEAD AREA, B.C.		DRAWING NUMBER







- LEGEND**
- 1 [Green shaded box] SIYEH FORMATION
  - 2 [Purple shaded box] GRINNEL FORMATION
  - 3 [Brown shaded box] APEKUNNY FORMATION
  - [Dashed line] DYKE
  - [Dotted line] GEOLOGICAL CONTACT
  - [Line with arrow] DIP & STRIKE
  - [Circle with dot] ROCK SAMPLING, CUT LINES NUMBER & LOCATION
  - [Arrow with dot] STREAM SAMPLE SITES Cu/Zn

THOR EXPLORATIONS LTD (NPL)

**GEOLOGICAL & GEOCHEMICAL MAP**

ABC & DEF CLAIMS

FORT STEELE M.D.

FLATHEAD AREA, B.C.

SCALE: 1"=500 FT.      DATE: 20 OCT, 1970

*Handwritten:* 2746 M-6

