

REPORT ON THE  
SEMI-DETAILED RECONNAISSANCE  
STREAM SEDIMENT SURVEY  
MOUNT ARTHURS AREA, B.C.  
FOR KELVIN ENERGY LTD.  
CALGARY, ALBERTA

'79-#48-# 7160



PART  
7 OF 9

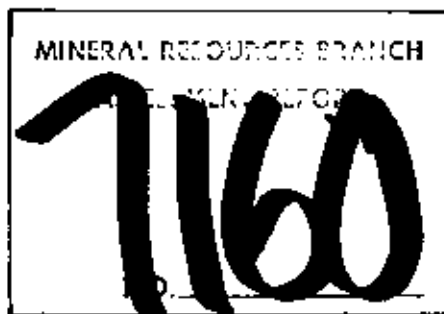
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STREAM SEDIMENT SURVEY  
MOUNT ARTHURS AREA, B.C.  
FOR KELVIN ENERGY LTD.  
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Claims: MIDWAY 1 - 19

Location: Located on Maps 82E/10, 82E/9 and 82L/15 bounded approximately by longitudes 118°43', 118°28' and latitudes 49°47', 49°41' in the Greenwood Mining District



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SUMMARY

Barringer Magenta Limited undertook a geological reconnaissance and a semi-detailed reconnaissance stream sediment survey over a set of claims at and proximal to Mount Arthurs. These claims were staked by Kelvin Energy Limited during August and September, 1978, and are located in the Greenwood Mining District.

The sampling was carried out in three phases during the months of July and September. Composite samples were collected at 500 metre intervals along all principal streams. The difficult access of the area necessitated the use of a helicopter support.

All samples were analysed for uranium, copper, lead, zinc, silver, nickel or molybdenum in Barringer Magenta's laboratory in Calgary, Alberta. Forty-eight stream sediment samples were also analysed in the field using a uranium field kit. The latter analytical technique provides semi-quantitative uranium results in the field. Analysis was generally undertaken the same day as sample collection.

Threshold and anomalous levels were selected from frequency histograms of the data in this report plus the histograms of the data from an adjoining semi-detailed survey immediately to the north (Lahti, 1978). Geochemical anomalies were outlined on an interpretation map and classified according to amplitude, continuity, size and geological setting.

One large first order north-south trending uranium anomaly was outlined just to the east of Mount Arthurs. This strongly anomalous zone is found within a larger zone with uranium values greater than 20 ppm which, in turn, is surrounded by weaker but still anomalous values of 8.1 - 19.9 ppm uranium.

The large intense uranium anomaly is thought to be related to mineralized shears, faults and joints or disseminated uranium mineralization in a particular phase of the Valhalla intrusive. A weak third order uranium anomaly is found just to the north of a plateau type Tertiary basalt.

None of the unranked base metal geochemical features are believed to be related to any significant base metal mineralization but the association of lead and zinc with parts of the uranium anomaly may have significance.

It is recommended that semi-detailed stream sediment sampling be undertaken to close off the anomaly to the south and a comprehensive follow-up program be initiated to find the source of the uranium in the Valhalla intrusives located just east of Mount Arthurs and to examine in detail the periphery of the Tertiary volcanic cap to the west of Mount Arthurs.

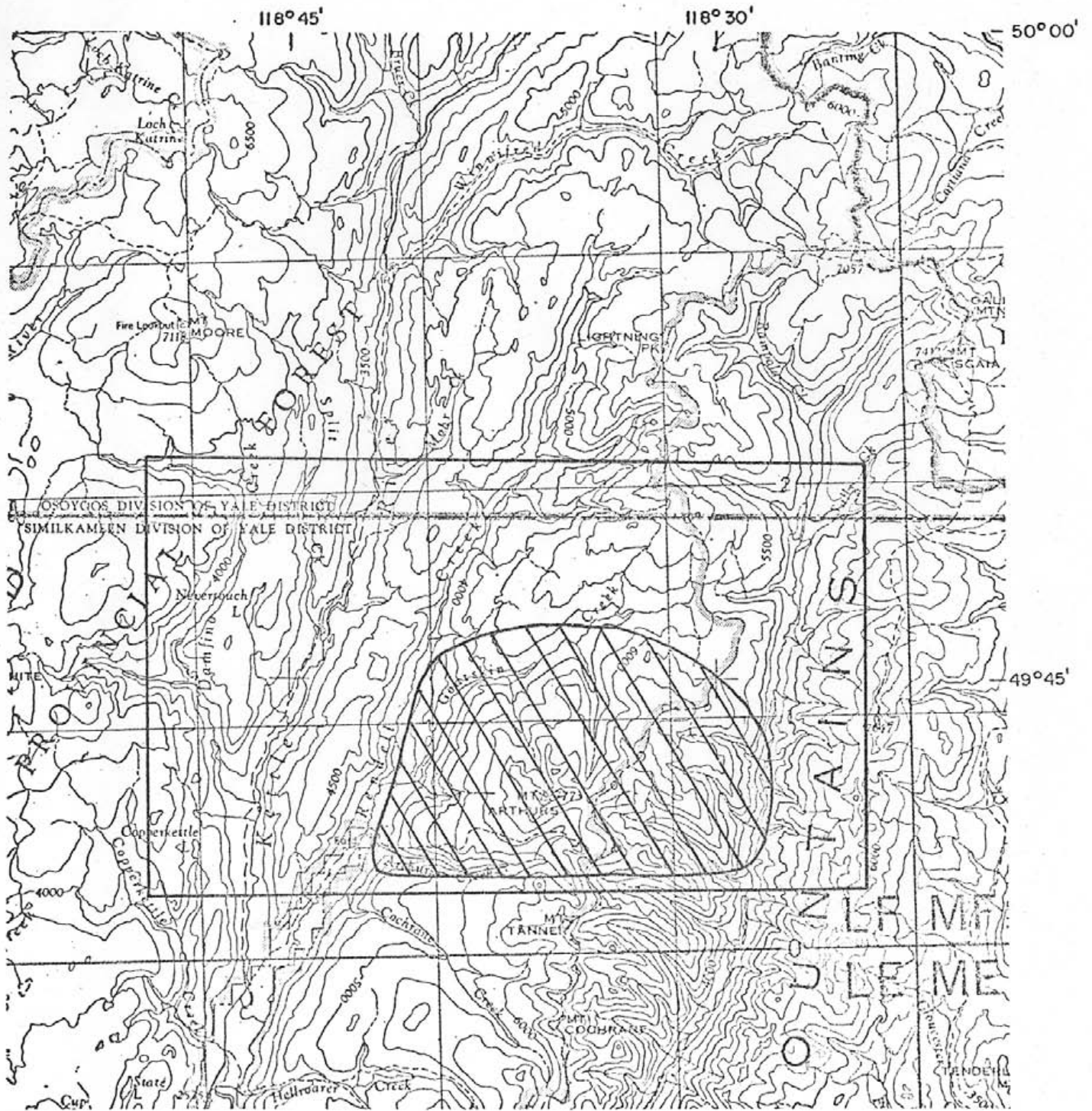
## 1. INTRODUCTION

### 1.1 GENERAL STATEMENT

The mineral claims referred to in this report were staked by Kelvin Energy Limited during August and September, 1978 and lie within the Greenwood Mining District. The mineral claims contained in this report are listed in Table 1.

The streams draining from Mount Arthurs were sampled in three phases. Sampling was initially completed within the originally staked ground to the north which covered a part of the Mount Arthurs drainage system and is discussed in a previous report (Lahti, 1978). The initial survey indicated a uranium anomaly open to the south. Therefore, the next phase of work consisted of sampling the anomalous streams to the headwaters near Mount Arthurs and sampling streams draining to the west. During the last phase of work, the main drainage system flowing to the south and east was sampled.

The semi-detailed sampling outlined a large area of very anomalous uranium values extending in a northwest-southeast direction for about 4 km. The high uranium values have not been positively correlated with any known geological, structural or environmental feature. It is postulated, however, that the uranium values are related either to large, low grade uranium mineralization in the granitic rock (Valhalla) and/or to mineralized north-south striking faults. A large low grade uranium deposit may exist in this area and follow-up work should be directed towards locating this type of deposit.



Location Map for  
Mount Arthurs Stream  
Sediment Survey Area

N.T.S. REF. 82 E

Fig. 1



Table 1

## Claim Statistics for Kettle River Claim Block

<u>Claim No.</u>	<u>No. of Units</u>	<u>Date of Recording</u>	<u>Record No.</u>	<u>Mining Division</u>
MIDWAY 1	15	September 28, 1978	1327	Greenwood
" 2	15	"	1328	"
" 3	18	"	1329	"
" 4	18	"	1330	"
" 5	14	"	1331	"
" 6	14	"	1332	"
" 7	14	"	1333	"
" 8	18	"	1334	"
" 9	18	"	1335	"
" 10	18	"	1336	"
" 11	18	"	1337	"
" 12	18	"	1338	"
" 13	18	"	1339	"
" 14	18	"	1340	"
" 15	18	"	1341	"
" 16	18	"	1342	"
" 17	18	"	1343	"
" 18	18	"	1344	"
" 19	18	"	1345	"
SIM 7	20	June 9, 1978	1112	"
SIM 13	20	June 9, 1978	1134	"

## 1.2 LOCATION AND ACCESS

The Mount Arthurs area is situated in south-central British Columbia about 75 km. north of the United States-Canada border (Fig. 1). The survey area extends from the Grandby River in the east to the Rendell Creek and the Goatskin Creek in the west and north, respectively. The area is approximately bounded by longitudes  $118^{\circ} 43'$ ,  $118^{\circ} 28'$  and latitudes  $49^{\circ} 47'$ ,  $49^{\circ} 41'$ .

There is a passable gravel road along the Grandby River part way up to the Mount Arthurs area. The remainder of the distance can be traversed by foot or by horse along a trail developed to a point approximately due east of Mount Arthurs. Another trail (horse) extends from the Rendell Creek north of the Mount Arthurs Creek but its condition is not known. Because access is very difficult, all work done in the Mount Arthurs area was accomplished by using a Bell 206-B Jet Ranger helicopter based in Penticton, B.C.

## 2. GEOLOGY

The predominant rock unit in the Mount Arthurs area consists of (Unit 7) non-porphyrific rocks of the Valhalla Intrusion (Little, 1957). These rocks have been dated as late Jurassic to Cretaceous. The Valhalla can be distinguished from the Nelson Intrusion (Unit 6) to the north by the presence of smokey quartz, the rarity of hornblende and the olotrimorphic texture in the former.

Two kilometres to the southwest and just to the north of Mount Arthurs lies a small capping of Miocene, plateau-type, basalt (Unit 11).

A large area of Paleozoic (including Upper Proterozoic and Trassic) rocks lie northeast of Mount Arthurs in the northeast to central part of the claim block. This unit (3) consists of basaltic and andesitic lavas, greenstones, tuff, quartzite, limestone and argillite (Little, 1957).

A reconnaissance traverse from Mount Arthurs to the Goatskin Creek was accomplished by following the ridges to the east of Mount Arthurs. The bedrock along the length of this traverse was the Valhalla intrusive, in places cut by strong north-south shears and faults. The faults, which form scarps up to 15 metres higher and which vary from less than a metre to greater than 10 metres in width, were frequently observed up to three kilometres east of Mount Arthurs where the traverse turned north. The highest gamma radiation (total count) was located in strong north-south shears and faults.

The recently discovered uranium deposits found to the southwest of Mount Arthurs occur in unconsolidated fluvial or lacustrine carbonaceous sediments capped by impermeable Pliocene or Miocene plateau basalts or by low permeability sediments. They all occur at an approximate elevation of 1270 metres (Christopher, personal communication). Within the present report area one of the most promising locations for uranium mineralization occurs under or adjacent to the plateau type basalt southwest of Mount Arthurs. However, the basalt occurs at an elevation of  $1820 \pm 60$  metres. Nevertheless, with a high uranium background in the Valhalla Intrusive Rock and the large basaltic capping, the higher elevation with regard to the other deposits in the Beaverdell area should not, at this time, detract from this target area.

### 3. TOPOGRAPHY, CLIMATE, DRAINAGE, VEGETATION

#### 3.1 TOPOGRAPHY

Mount Arthurs (2355.5 m.) is located in the approximate centre of the claim block within the north-northeast striking Midway Range Mountains. The area is characterized by deeply dissected valleys formed by the main drainage (i.e., the Grandby and Kettle Rivers and Rendell and Goatskin Creeks). Tributaries to the main drainage have not cut down rapidly except the tributaries draining to the east from the Midway Range Mountains into the Grandby River. Apparently, the Grandby River follows a major fault resulting in rapid lowering of its base level and consequent rapid down-cutting of its tributaries.

The micro-topography can be very severe with small and innumerable north-south faults forming scarps. Also, in areas with deep glacial till or reworked gravels and sands, streams have usually cut through the surficial deposit forming steep "v" shaped valleys.

#### 3.2 CLIMATE

The climate is wet and cool with the snow level varying greatly with elevation. Frost, snow and hail can occur during any month of the year with snow remaining on the northern slopes until late July. The area is only free from snow for several weeks every year. For short periods during July and August, the temperatures can exceed 30°C.

### 3.3 DRAINAGE

The drainage is characterized by a few large, well developed, streams that have numerous small, steep gradient, tributaries. The main streams flow all year but many of the smaller ones are seasonal. Most streams have a very steep gradient at their headwaters but quickly change to a much reduced gradient in the larger valleys.

The streams are fast flowing with little silt size sediment accumulations in the stream-beds. The stream load is predominantly rock flour, rock fragments and water soaked tree litter. Most stream waters have a pH range of 6.0 to 6.2.

### 3.4 VEGETATION

The area above 1820 metres consists of rocky ridges and spurs with numerous peaty bogs and meadows in depressions and flat areas. Stunted fir trees can be found almost to the top of Mount Arthurs. The lower slopes have good stands of fir with an underbrush consisting of alders, willows and a variety of shrubs. Cedar and hemlock are found at lower elevations along the larger streams.

## 4. GEOCHEMISTRY

### 4.1 GENERAL STATEMENT

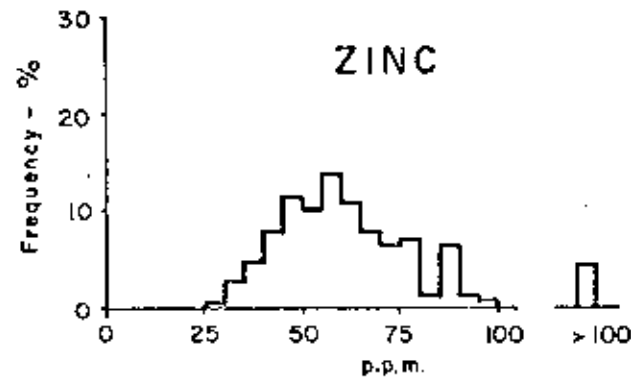
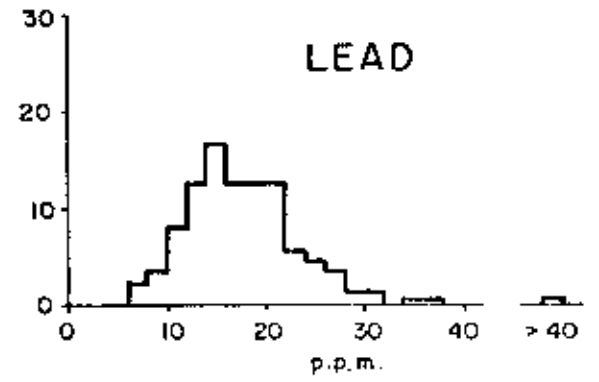
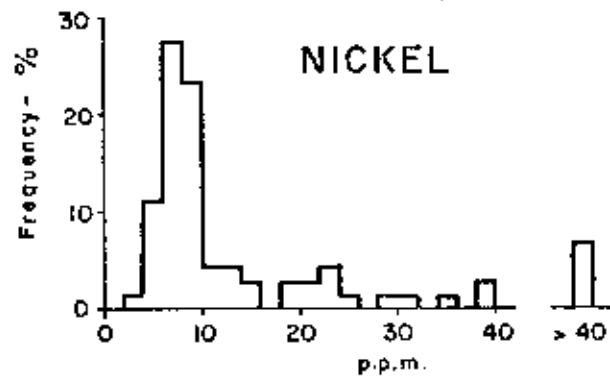
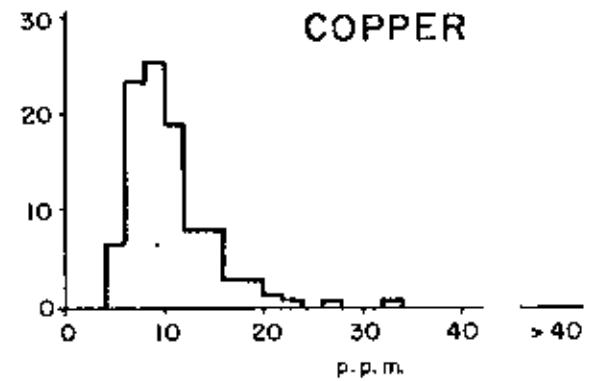
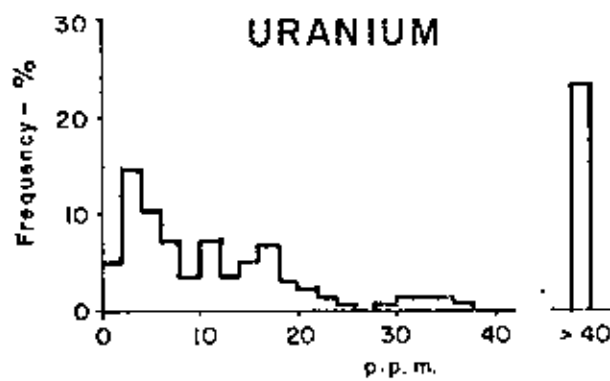
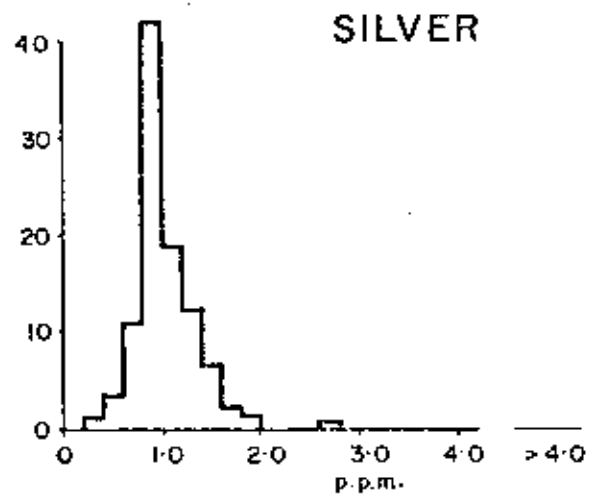
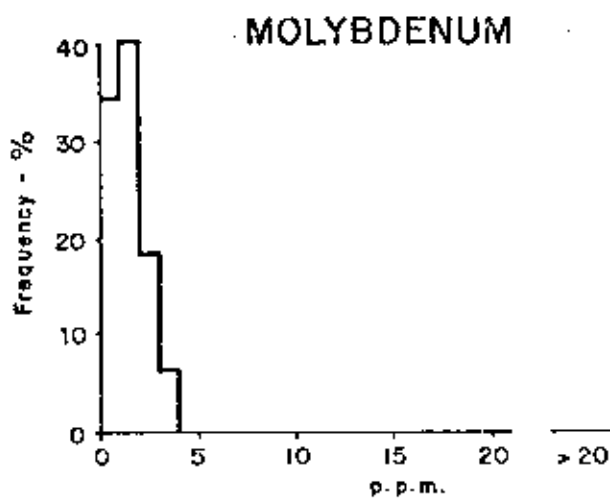
Reconnaissance stream sediment sampling of the original claim block to the north of Mount Arthurs indicated a strong uranium source to the south of the staked area in the Mount Arthurs region. Subsequently, in two phases, the remainder of the eight principal streams (Dwg. 208-42-101) were sampled and analysed for uranium, copper, lead, zinc, silver and molybdenum or nickel.

The object of the survey was to close off the anomaly and isolate the uranium source so that a cost effective follow-up program could be initiated. To assist in determining the limits of the anomalous uranium values, a Barringer Magenta Uranium Field Kit was employed to provide rapid semi-quantitative analysis in the field.

A total of 130 stream sediment samples were collected of which 48 were analysed for uranium in the field. Details on Field Methods and Laboratory Techniques are found in Appendix III.

### 4.2 RESULTS

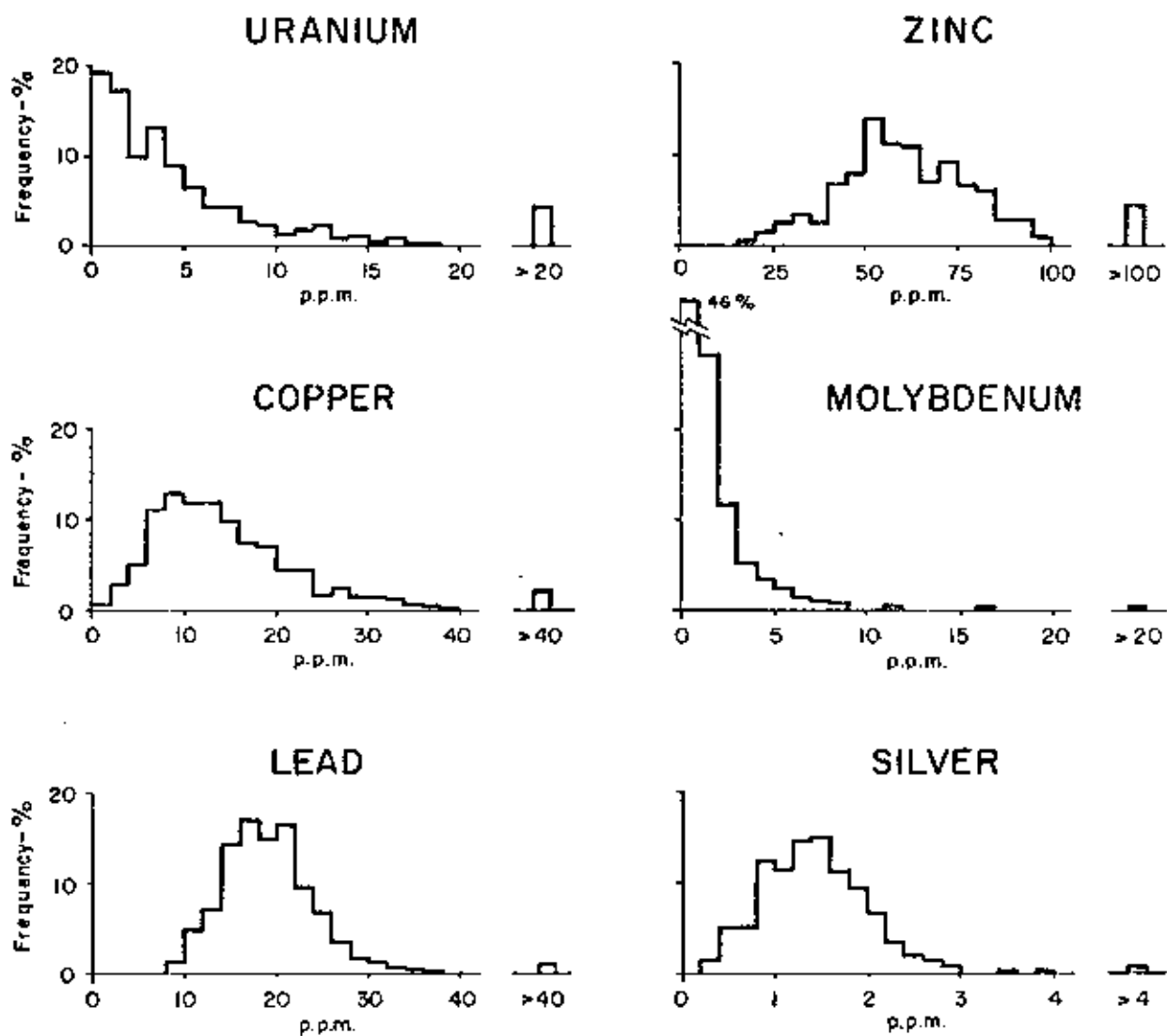
The results for uranium, copper, lead, zinc, silver, molybdenum and nickel and the uranium determined by the Uranium Field Kit are listed in Appendix IV. The plots of the individual elements (Dwgs. 208-42-102 to 208-42-109 inclusive) plus a sample location and claim boundary map (Dwg. 208-42-101) are located in the back of the report. The base maps (scale 1:50,000) were prepared from an enlargement of NTS map 82E which is at a scale of 1:250,000.



FREQUENCY DISTRIBUTION OF MOLYBDENUM, SILVER, URANIUM, COPPER, NICKEL, LEAD AND ZINC IN STREAM SEDIMENTS, MOUNT ARTHURS AREA.

FIG. 2





REGIONAL  
 FREQUENCY DISTRIBUTION OF  
 URANIUM, ZINC, COPPER,  
 MOLYBDENUM, LEAD AND SILVER  
 IN STREAM SEDIMENT SAMPLES

(AFTER LAHTI, 1978)

The three individual element maps for molybdenum, nickel and uranium (Field Kit) (Dwgs. 208-42-107, 208-42-109 and 208-42-103) have incomplete data. During the general stream sediment reconnaissance program to the north, it was found that molybdenum did not give definitive results so it was dropped in favour of nickel for the follow-up program and subsequent resumption of reconnaissance stream sediment sampling south and east of Mount Arthurs. From previous studies, it was found that generally, nickel was a powerful tool in identifying mafic to ultramafic bedrock occurrences. The Uranium Field Kit was only used during the second phase of sampling. Due to time constraints it could not be used during the third and final phase in September.

#### 4.3 INTERPRETATION

The selection of threshold and anomalous levels was made from the histograms of the reconnaissance stream sediment survey immediately to the north (Fig. 3) (Lahti, op. cit.) as well as histograms for the Mount Arthurs region (Fig. 2). The inclusion of the northern data is essential as the data set from the Mount Arthurs areas is too small for adequate population characterization. In addition as such a high percentage of the Mount Arthurs samples are anomalous, selection of anomalous levels by either statistical or graphical methods from this small data set alone would be completely misleading. The anomalous levels used in this interpretation are listed in Table 2.

The interpretation in this report is based on threshold and anomalous values for individual elements as determined from the local and regional data base, the raw data maps and the limited geological and physiological information. An interpretation map outlining the uranium anomalies (Dwg. 208-42-110) and a separate one identifying base metal features (Dwg. 208-42-111) are found in the back of the report.

TABLE 2

THRESHOLD AND ANOMALOUS LEVELS  
FOR INDIVIDUAL ELEMENTS

	<u>Threshold</u> <u>(ppm)</u>	<u>4th Order</u> <u>Anomalous</u> <u>(ppm)</u>	<u>3rd Order</u> <u>Anomalous</u> <u>(ppm)</u>	<u>2nd Order</u> <u>Anomalous</u> <u>(ppm)</u>	<u>1st Order</u> <u>Anomalous</u> <u>(ppm)</u>
U	8	8.1 - 20	20.1 - 40	41.1 - 60	> 60
Cu	20	--	21 - 24	25 - 40	> 40
Pb	18	--	19 - 27	28 - 38	> 38
Zn	75	--	76 - 100	101 - 150	> 150
Ag	1.6	--	1.7 - 2.4	2.5 - 3.2	> 3.2
Mo	7.0	--	-- --	8 - 14	> 14
Ni	16	--	17 - 24	25 - 32	> 32

Anomalies are outlined on the basis of the number of anomalous values, their absolute value, their spatial relationship and geological environment and are indicated by the "letter" part of the anomaly label. The numerical part of the anomaly label indicates the priority or order in which the anomalies should be followed up. Geochemical features that are unlikely to be related to economic mineralization are indicated on the interpretation map but are not ranked. To facilitate discussion, unnamed streams are numbered on the interpretation maps.

#### 4.3.1 Uranium

The regional data have a threshold of 8 ppm uranium and any value exceeding 20 ppm was considered first order anomalous. However, detailed examination of all available data suggests three populations: a background population from 0-8 ppm with a mode between 2.1 - 4.0 ppm; two high background or weakly anomalous populations from 8.1 - 14.0 ppm and 14.1 - 20 ppm which have been considered together on Table 2 and a large anomalous population greater than 20 ppm. The anomalous population can be conveniently divided into three levels, 20.1 - 40.0, 40.1 - 60.0 and greater than 60 ppm. These populations are determined empirically and are tentative due to the small number of samples. The highly anomalous uranium values (>60 ppm) should not be over emphasized at the expense of the slightly anomalous values 8-20 ppm. Consideration of low value anomalies is as valid here as in the area to the north and their source must be investigated.

Anomaly 1A (Dwg. 208-42-110) is the most dominant feature covering the central third of the surveyed area. This anomaly is closed in all directions except the south. The maximum values which are found on the west branch of stream 7 agree

favourably with those reported by the G.S.C. (open file 409). Similar values were found on the central part of stream 2. From the available data, four sub-parallel zones indicating possible axis of the source are indicated on the interpretation map. These axes are drawn with sketchy information and must only be regarded as a provisional model.

The anomalous zones lie entirely within the Valhalla pluton and the indicated axis cross-cuts the known regional structure at a very low angle. No obvious source of the uranium was encountered during the sampling. However, this part of the granite is quite clearly anomalous with respect to the rest of the granitic rock and the most probable source of the uranium is the shear zones. A single scintillometer traverse from Mount Arthurs to the east for 3 km. and down to the Goatskin Creek tends to support the above contention. It was found that many of the shear zones and faults, where exposed, had on the average two to five times the background radiation of approximately 75 cps.

A number of third and fourth order anomalous samples are located in streams 6, 8 and in lesser numbers in streams 3, 4 and 5 (Dwg. 208-42-102). These samples appear to represent dispersion downstream from the main anomaly and do not warrant further examination.

Anomaly 2B is formed by one small fourth order anomalous sample on a southern tributary of stream 5. Normally an anomaly of this low magnitude and restricted extent would be ignored but in this case the fourth order anomalous value occurs in a stream originating from a Miocene basaltic cap. As pointed out in section 2, this cap is topographically higher than those known to cover significant mineralization elsewhere in the

Beaverdell area, but until proven otherwise, this remains a prime geological setting for economic mineralization. For this reason, it is considered imperative that a detailed follow-up survey be considered.

#### 4.3.2 Copper

Copper in the Mount Arthurs area (Dwg. 208-42-104) shows a similar distribution of values to the reconnaissance data to the north and the same threshold and anomalous levels are used.

There are no copper anomalies in the Mount Arthurs area considered worth following up. However, one minor feature (Dwg. 208-42-111) located on stream 6 to the south of the Miocene basalt warrants mention. The coincident high nickel values indicate downslope migration of the two metals from the basaltic cap. No direct economic importance is attached to this feature.

#### 4.3.3 Lead

Both the regional and Mount Arthurs lead frequency histograms (Fig. 2 and 3) indicate two possible normal populations with a threshold of 18 for the lower most population.

Third order anomalous values form a large anomaly (Dwg. 208-42-111) in the headwaters of streams 2, 3, 4 and 7 which coincide quite closely with a part of the main north-northwest trending uranium anomaly 1A. The large size and low level anomalous values are tentatively interpreted to reflect a large number of weakly mineralized fractures and faults. Although it is unlikely that the lead is related to economic mineralization, it may be found that there is good correlation between lead and uranium, at least in some areas, which may aid in defining drill targets during the follow-up phase. The spot high of 31 ppm lead on stream 8 with a coincident high uranium value may be significant from this point of view.

The spot highs of 54 and 36 ppm lead on streams 2 and 4, respectively, appear to be related to a small, local, uneconomic source. This is supported by the lack of any significant dispersion train.

#### 4.3.4 Zinc

The frequency histogram for the regional and Mount Arthurs zinc data show an overall similarity but the regional data show a more pronounced indication of sub-populations. The threshold (75 ppm) and the different anomalous levels are listed in Table 2.

Almost all of the zinc values greater than 74 ppm occur in streams 7, 8 and 9 (Dwg. 208-42-6). There is a good correlation of zinc with uranium in stream 7 which forms a part of the main uranium anomaly 1A and no correlation between high zinc with uranium in streams 8 and 9 (Dwg. 208-42-110 and 208-42-111). The zinc anomalies on streams 8 and 9 do not appear to originate from a very large source as no significant dispersion train was detected. However, stream 7 should be sampled to the Grandby River to determine if a significant dispersion train exists. Neither of the zinc anomalies nor any of the spot highs are believed to be indicative of significant mineralization.

The correlation of zinc with uranium in one part of the area and lead with uranium in another may be important during the follow-up phase of work if it can be established that one multi-element association relates to uranium mineralization while the other does not.

#### 4.3.5 Silver

Evaluation of the silver raw data map (Dwg. 208-42-107) and frequency histograms did not reveal any significant geochemical features. The only second order anomalous value (2.6 ppm) is found on the lower part of stream 4 coincident with anomalous lead and zinc values. Because the sample was collected just above the exit into the Goatskin Creek a dispersion train cannot be determined. This makes it very difficult to estimate the significance of this single point anomaly. However, sampling above and below this sample site may help in resolving whether this is a geochemical feature of any significance.

#### 4.3.6 Molybdenum

Only the samples from streams 1, 2, 3, 4 and 5 were analysed for molybdenum. As mentioned elsewhere in this report, after termination of the reconnaissance survey to the north, it was determined that nickel would give more geological information than molybdenum and thus, molybdenum was not determined during the last phase of stream sediment sampling south of Mount Arthurs. Sixty-four (64) samples were analysed for molybdenum and none exceeded the regional threshold value of 7.0 ppm (Dwg. 208-42-108).

#### 4.3.7 Nickel

Seventy-two (72) stream sediment samples from streams 7, 8 and 9 were analysed for nickel. The frequency histogram shows a third order anomalous population from 17 to 24 ppm nickel separate from the general background population whose mode is approximately 8 ppm and threshold 16 ppm. The general background values are attributed to mafic-basic rocks, probably dykes and the Miocene basaltic cap, occurring central and just north of stream 6. In fact, all nickel values greater than 17 ppm occur along stream 6 with the highest values located just



south of the basaltic cap (Dwg. 208-42-109) and probably related to this rock unit. The association of copper with nickel anomalies (Dwg. 208-42-111) has already been noted and is not thought to have any economic significance. Other anomalous nickel values occur in the headwaters of stream 6 east of Mount Arthurs and are thought to be related to a local geological feature such as an intermediate to mafic dyke(s). The lack of a dispersion train substantiates this hypothesis. No further work is recommended to follow-up the nickel anomalies.

## 5. CONCLUSIONS

1. Semi-detailed stream sediment sampling has located 4 large zones of highly anomalous uranium values that trend north to north-northwest and form one large anomaly.
2. The above anomaly is located within a much larger zone with values greater than the regional threshold of 8.0 ppm uranium.
3. The second and third order anomalous uranium values are concentrated in the form of a halo around the uranium anomaly and extend downstream in dispersion trains.
4. The possible source of the large uranium anomaly is either large low grade disseminated uranium mineralization in a phase of the Valhalla Intrusive or mineralization in the large number of north-south faults and subsidiary fractures.
5. There is general correlation between lead and uranium in one part of the main anomaly and zinc and uranium in another. The significance of this has yet to be determined.
6. There are several coincident lead, zinc and/or silver anomalies that do not appear to be related to significant mineralization.
7. Anomalous nickel and to a lesser degree copper values reflect mafic portions of the Valhalla Intrusive rocks, mafic dykes and the Miocene plateau basalt southwest of Mount Arthurs.
8. The copper and nickel values are not believed to be related to any significant mineralization.
9. There are no significant molybdenum or silver features.
10. All above conclusions are based on available information. If additional geological or geophysical or other information becomes available then the data must be re-evaluated.

6. RECOMMENDATIONS

1. Semi-detailed stream sediment sampling should be undertaken to the south of Mount Arthurs to close off the uranium anomaly.
2. Semi-detailed stream sediment sampling of stream 7 should be completed.
3. The anomalous streams in Anomaly 1A as defined on the uranium interpretation map by the 8.1 ppm uranium boundary, should have all tributary streams sampled at 100 metre intervals. Similarly, streams 2, 3, 4, 7 and 8 should be sampled at 100 metre intervals.
4. All tributaries, springs and seepage areas around the basalt cap (Anomaly 2B) should be sampled.
5. Before starting soil sampling, the detailed stream sediment data should be interpreted so the area to be covered by soil sampling can be restricted as far as possible.
6. Consideration should be given to undertaking an airborne EM, magnetic and gamma-ray survey over the main uranium anomaly.
7. In areas of good bedrock exposure, a rock chip sampling program should be initiated to determine local variations in bedrock uranium and in what form the uranium occurs.
8. All soil, stream sediment and rock chip samples should be analysed for uranium, lead and zinc.

REFERENCES

1. Dept. of Energy, Mines and Resources and B.C. Ministry of Mines and Pet. Res. (1977). Regional stream sediment and water geochemical reconnaissance data, southern British Columbia (NTS 82), Open File 409 (NGR-S-76).
2. Lahti, H. (1978). Report on the Semi-detailed stream sediment sampling survey, Kettle River Area, British Columbia, prepared by Barringer Magenta for Kelvin Energy Limited.
3. Little, H.W. (1957). Geology of Kettle River (East Half), Geol. Surv., Canada, Map 6-1957.



APPENDIX I

STATEMENT OF QUALIFICATIONS

I, Howard Reino Lahti of Toronto, do certify that:

1. I graduated from the University of New Brunswick, Fredericton, New Brunswick in May, 1978 with a Doctor of Philosophy in Geology (Applied Geochemistry).
2. I graduated from the University of New Brunswick with a B.Sc. in Geology in 1968 and M.Sc. in Geology (Applied Geochemistry) 1971.
3. I have worked with Barringer Magenta Limited of Toronto, Ontario since June 1975 as a geologist/geochemist.
4. I have worked as a geologist, geochemist or attended university since 1964.
5. I am a Member of the Association of Exploration Geochemists.



H.R. Lahti, Ph.D.

Geologist-Geochemist

Barringer Magenta Limited

APPENDIX II

ASSESSMENT REPORT

STATEMENT OF COST

a) Days Worked:

Supervisor: H.R. Lahti, Ph.D., July and September =	14 days
Geochemical Technician: Geoff White, July =	2 days
Senior Sampling Assistant: Craig Shearer, July =	3 days
Junior Sampling Assistant: Kerry Wisser, July =	2 days
Junior Sampling Assistant: Reg Balford, July =	2 days
Consultant: Peter Bradshaw, Ian Thomson (total)	2 days
Prospector: Carrie Wainwright	5 days
Junior Assistant Sampler: John Backer	5 days
Junior Assistant Sampler: Dave Pyke	5 days

b) Cost of Wages:

Supervisor: \$220 x 14 =	\$ 3,080.00
Geochemical Technician: \$119 x 2 =	\$ 238.00
Senior Sampling Assistant: \$108 x 2 =	\$ 216.00
Junior Sampling Assistants:	
\$96 x 3 x 2 days =	\$ 576.00
Prospector: \$50 x 5 =	\$ 250.00
Junior Assistant Samplers:	
\$50 x 1 x 5 days =	\$ 250.00
Consulting: \$300 x 2 =	\$ 600.00
TOTAL	\$ 5,210.00



g) Cost of Report Preparation:

i) Drafting and Compilation

Compilation: H. Lahti, 1 day =	\$ 220.00
P. Lawrence, 4 days =	\$ 320.00
Drafting: R. Marcroft =	\$ 250.00
Data Graphics: M. Herz =	\$ 300.00

ii) Report Writing

H. Lahti =	<u>\$ 1,980.00</u>
TOTAL	\$ 3,070.00

h) Miscellaneous:

Sample shipments, telephone calls, telexes, miscellaneous materials, xerox costs, hotel in Vernon, etc.	\$ 1,300.00
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TOTAL COST INCURRED DURING TIME TO COMPLETE WORK AT MOUNT ARTHURS AREA	<u>\$18,282.90</u>
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## APPENDIX III

### Field and Laboratory Techniques

#### 1. Field Methods

A Bell 206B Helicopter was used to fly in sampling crews to the Mount Arthurs area.

Most streams have a steep gradient with little fine sediment available for sampling. In order to obtain enough sample (500 grams), the sampler had to collect material from 3 to 5 locations. The sample bags used were high, wet-strength, Kraft paper bags with dimensions 9 mm. x 16 mm. All samples were collected by hand rather than spoons or any other mechanical devices. Samples were collected at 500 m. intervals with the distance calculated by pacing using airphotos at a scale of 1:50,000. Where the stream gradient was very severe, a pocket altimeter was used.

#### 2. Laboratory Techniques

All of the stream sediment analyses were done at the Barringer Magenta Limited Laboratory in Calgary, Alberta. The samples were first oven dried at a temperature of 45°C. The samples were then sieved through an 80 mesh nylon screen. A .500 gm. portion of this was placed in a glass test tube and perchloric-nitric acid was added. The test tube was then placed in an aluminum heating jacket and heated for 4 hours. After cooling and diluting to the final volume, the solution then was directly aspirated into a Varian Techtron atomic absorption spectrophotometer and Cu, Pb, Zn, Ag and Mo were read directly in ppm. The uranium was determined fluorimetrically by using the following procedure. A .250 gm. sample was weighed into a glass test tube and 5 ml. of nitric acid was added. The

samples were digested on a sand bath for 2-1/2 hours. After cooling and diluting to the final volume, an aliquot of solution was pipetted onto a platinum dish and evaporated to dryness. Flux was added to the dish and then fused with the sample. After cooling, the disc was then compared with fresh standards using a Jarrell-Ash Fluorometer.

The limit of detection for Cu, Pb, Zn, Ag, Mo and U are 1, 1, 1, .2, 1 and .2 respectively.

### 3. Uranium Field Kit

The Barringer Magenta Limited Uranium Field Kit is designed to give rapid semi-quantitative results in the field and is not a substitute for accurate and precise laboratory analyses.

The stream sediment or soil samples are first air dried then passed through a -80 mesh nylon sieve. A 5 mg. sample (a calibrated aluminum scoop is provided in the kit) is placed on a fluoride-carbonate disc contained in a platinum dish. The sample is heated with a propane torch until the sample with the flux is completely dissolved. The disc is cooled to the ambient air temperature and then placed in a housing containing an ultraviolet lamp and several standards. The uranium content can be estimated by comparing the fluorescence of the sample discs with that of the standards (provided with kit). The detection limit is 5 ppm.

APPENDIX IV

DATA LISTING OF U (URANIUM FIELD KIT) AND

U (FLUOROMETRIC)

Cu, Pb, Zn, Ag, Mo and Ni (ATOMIC ABSORPTION)

APPENDIX IV

URANIUM RESULTS  
(Analysis by Uranium Field Kit)

<u>Sample No.</u>	<u>U ppm</u>	<u>Sample No.</u>	<u>U ppm</u>
NLR - 753	40	NLR - 777	3
754	40	778	1
755	40	779	6
756	45	206	-
757	45	207	3
758	35	208	8
759	60	209	7
760	30	210	11
761	18	211	8
762	55	212	3
763	90	213	8
764	50	214	4
765	40	215	15
766	50	216	12
767	4	217	6
768	< 1	218	10
769	< 1	219	4
770	< 1	220	8
771	< 1	924	2
772	4	925	2
773	< 1	926	1
774	< 1	927	1
775	1	928	3
776	< 1	929	4

# Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Mo ppm	Ag ppm				
172	6.4	7	25	71	2	1.5				
173	26.0	8	21	49	1	1.4				
174	5.4	8	36	100	2	2.6				
175	6.6	8	22	64	2	1.7				
176	9.6	8	20	49	2	1.6				
177	5.6	7	22	70	2	1.4				
178	8.4	8	20	53	2	1.4				
206	15.6	15	26	47	3	1.2				
207	14.8	13	28	56	2	1.2				
208	17.6	14	29	56	2	1.1				
209	16.4	11	21	43	2	1.0				
210	17.2	11	19	56	4	1.1				
211	32.0	10	19	34	4	1.2				
212	44.0	10	21	51	2	1.0				
213	24.0	8	19	40	2	1.1				
214	34.0	21	28	62	2	1.2				
215	19.6	22	26	59	3	1.5				
216	19.8	13	26	41	1	1.0				
217	32.0	12	22	49	3	1.2				
218	20.0	10	21	47	3	1.1				
219	14.8	14	24	84	2	1.7				
220	11.6	9	22	31	2	1.0				
221	3.6	6	22	60	1	9				
233	16	13	59	1.8	7	12.0				
234	10	17	89	1.0	8	15.8				
235	13	31	76	1.6	7	4.0				
236	7	14	63	1.0	6	10.6				

# Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Mo ppm	Ag ppm				
LR- 237	15	19	78	1.4	7	80.0				
238	9	13	69	1.0	7	17.0				
239	10	17	77	1.2	10	11.8				
240	12	16	72	1.4	7	15.8				
241	10	15	69	1.0	11	13.2				
242	10	15	80	1.2	10	8.0				
243	12	20	86	1.4	10	8.2				
244	11	18	76	1.0	8	17.2				
245	9	18	70	1.0	7	10.4				
246	10	15	77	1.0	9	14.0				
247	10	13	67	1.0	8	11.8				
248	11	13	66	1.0	9	11.8				
671	22.0	11	28	77	2	1.6				
672	110.0	9	22	58	3	1.4				
673	46.0	13	29	73	3	1.9				
674	60.0	9	23	62	3	1.6				
675	30.0	12	54	94	4	2.0				
676	72.0	9	22	53	4	1.5				
677	36.0	7	16	49	2	1.1				
678	24.0	5	13	42	1	.8				
753	64.0	15	32	69	2	1.2				
754	72.0	11	28	64	2	1.2				
755	48.0	10	26	70	3	1.0				
756	58.0	8	24	64	2	.9				
757	52.0	8	23	61	3	.9				
758	76.0	8	24	62	3	1.0				
759	100.0	7	21	60	2	.9				

# Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Mo ppm	Ag ppm				
NLR- 760	94.0	8	22	54	2	1.0				
761	52.0	7	21	61	3	1.0				
762	118.0	6	17	49	2	1.0				
763	130.0	6	16	46	1	1.0				
764	50.0	6	16	48	1	.8				
765	76.0	7	22	58	2	1.0				
766	48.0	6	16	34	1	.9				
767	161.0	11	16	28	2	.9				
768	18.0	10	20	44	2	1.0				
769	2.4	9	19	42	1	.9				
770	1.4	10	21	49	1	.8				
771	1.9	8	21	43	1	.8				
772	1.3	7	16	38	1	.4				
773	3.6	8	17	40	1	1.0				
774	9.6	15	19	45	1	1.0				
775	12.0	12	18	43	1	1.0				
776	3.2	11	19	42	1	.7				
777	7.4	12	19	43	1	.9				
778	4.4	10	16	37	1	.6				
779	6.4	12	18	42	1	.8				
794	11	17	58	1.0	7	3.8				
795	15	15	89	1.0	10	8.0				
796	11	13	73	1.0	10	9.8				
797	12	15	87	1.0	9	5.8				
798	14	15	140	0.8	12	5.2				
799	7	23	49	0.6	4	5.6				
800	13	20	93	1.0	7	13.8				
801	12	15	120	1.2	9	2.4				

# Geochemical Laboratory Report /

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm				
NLR 802	12	13	89	1.0	9	2.6				
803	11	17	135	1.0	9	4.0				
804	10	11	63	1.0	9	2.4				
805	7	8	52	0.6	7	2.0				
806	9	12	84	1.0	10	1.6				
807	8	8	56	0.6	7	1.4				
808	8	10	57	0.6	7	2.8				
809	7	11	61	0.8	7	2.8				
810	8	18	34	0.4	6	18.0				
811	9	23	59	0.8	5	200.0				
812	27	23	57	0.8	6	36.0				
813	6	18	65	1.0	10	200.0				
814	13	20	90	1.0	14	172				
815	9	28	79	1.2	7	106				
816	10	26	71	1.0	9	118				
817	14	38	110	1.4	8	86				
818	7	16	75	0.8	6	72				
819	16	16	87	1.0	7	34				
820	7	13	86	1.2	7	46				
821	19	26	40	1.4	5	72				
822	9	13	87	1.0	7	28				
823	13	12	130	1.2	8	18				
824	10	20	57	1.4	6	220				
825	9	12	105	1.4	9	22				
826	7	13	70	1.4	6	88				
827	10	23	62	1.2	24	38				
828	10	15	58	1.0	36	22				
829	11	17	76	1.2	31	16.0				



# Geochemical Laboratory Report /

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm				
WLR-830	6	15	70	1.2	14	15.2				
831	7	13	60	1.0	14	13.6				
832	6	13	50	1.0	11	10.2				
833	8	16	77	1.4	15	5.4				
834	6	16	53	1.0	9	14.0				
835	10	19	63	1.0	16	19.2				
836	9	14	58	1.0	22	10.6				
837	7	12	54	1.2	24	10.6				
838	11	16	72	1.2	57	5.2				
839	16	14	74	1.4	55	5.4				
840	34	12	51	1.6	47	2.8				
841	23	13	57	1.2	47	6.0				
842	20	11	53	1.4	39	5.0				
843	19	10	53	1.6	40	2.8				
844	15	13	51	1.4	29	6.2				
845	--	--	--	--	--	N.S.				
846	17	12	67	1.4	41	2.4				
847	12	11	55	1.2	23	4.8				
848	12	8	51	1.0	26	3.6				
849	10	10	48	1.2	19	4.4				
850	10	11	49	1.0	22	3.0				
851	9	9	52	1.0	19	1.6				
924	3.2	7	18	36	2	.9				
925	4.0	8	19	49	1	.8				
926	6.0	9	19	63	1	.8				
927	2.8	8	16	36	1	.7				
928	6.2	8	16	49	1	.7				
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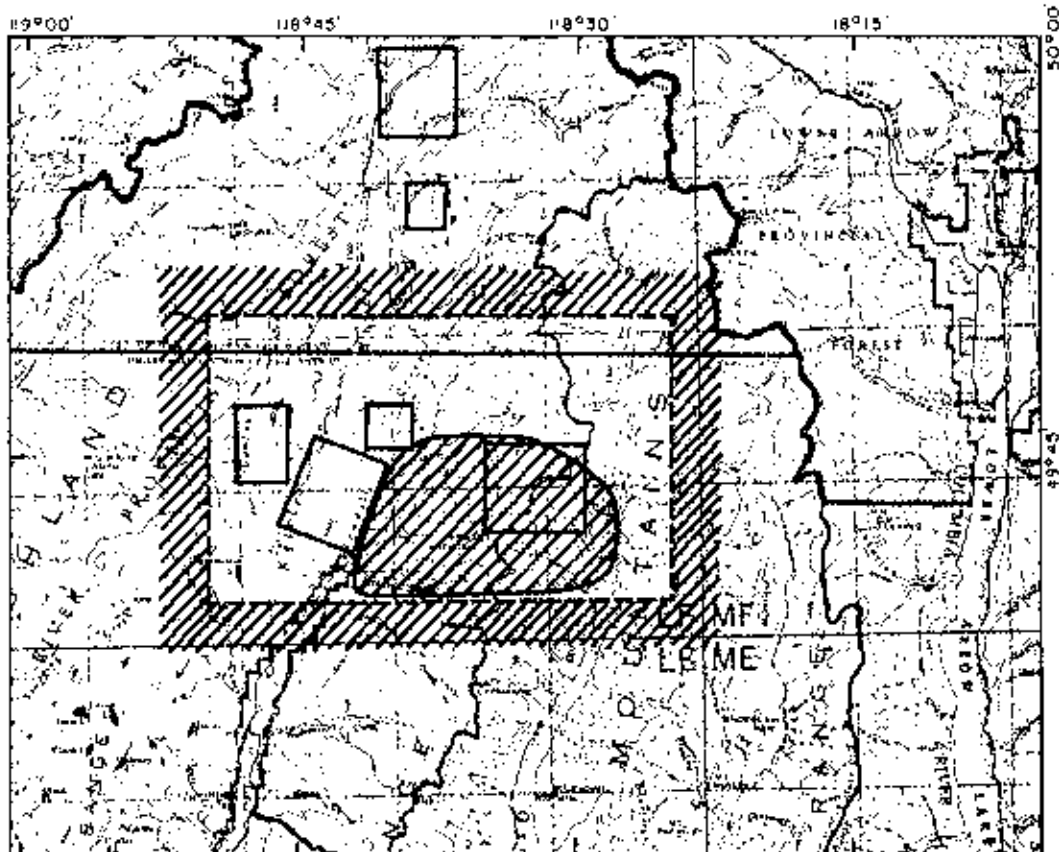
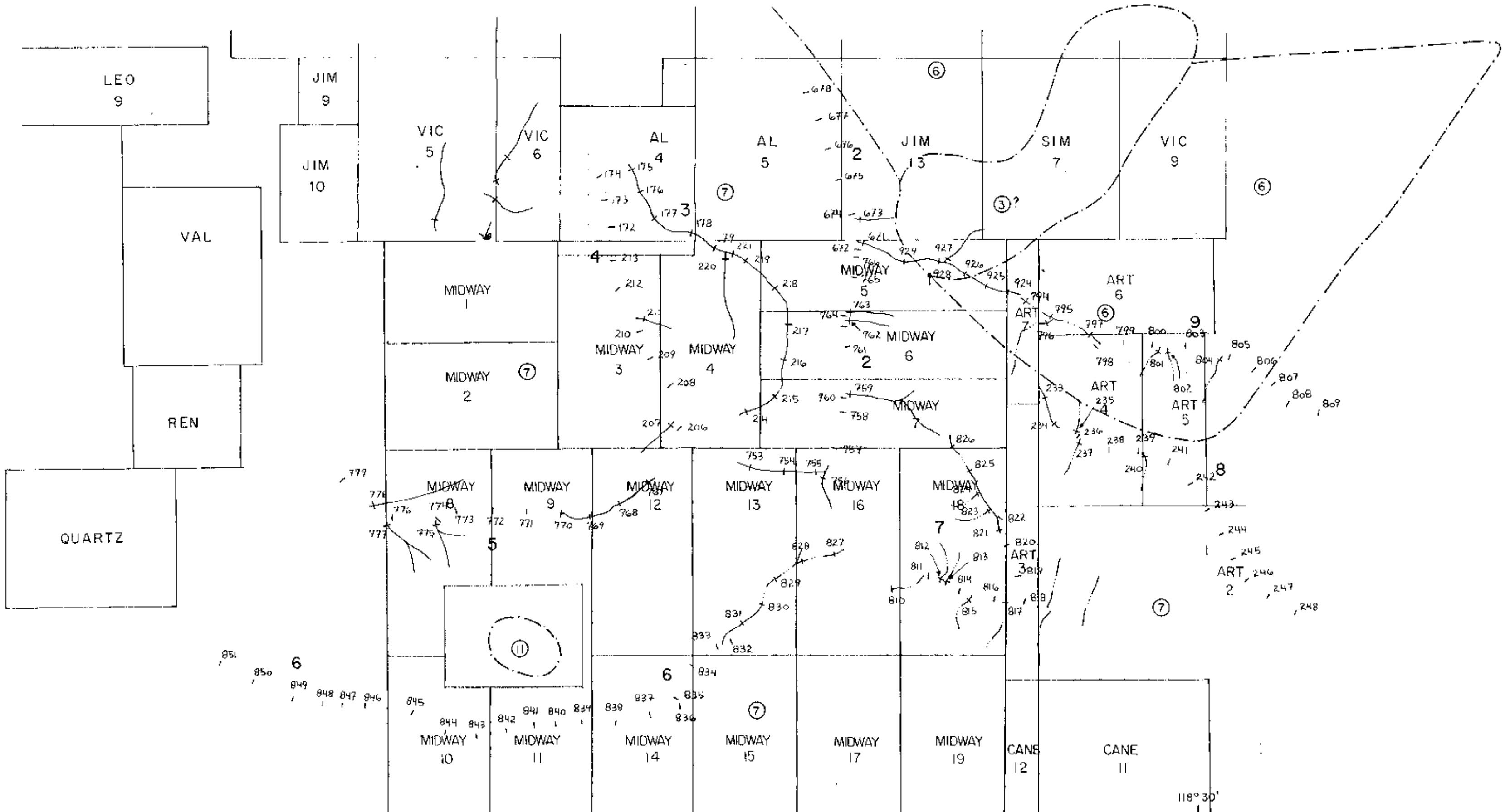
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49° 45'

118° 45'

118° 30'



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- Sample number
- element value in p.p.m.
- JIM 8 Claim boundary with name and number
- ⑦ Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

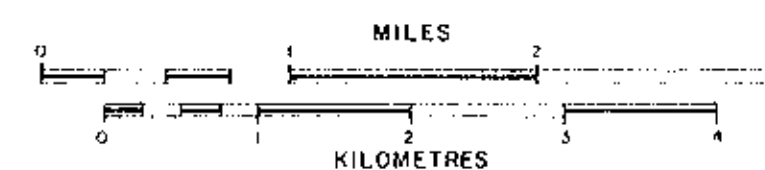
KELVIN ENERGY LIMITED  
 MOUNT ARTHURS AREA, B.C.  
 GEOCHEMICAL SURVEY  
 DRAINAGE RECONNAISSANCE

PART 7 OF 9

7160

SAMPLE LOCATION AND NUMBER

SCALE 1:50,000



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AUGUST-SEPTEMBER 1978  
 N.T.S. REF. 82-E9, 10, 15, 16

118°45'

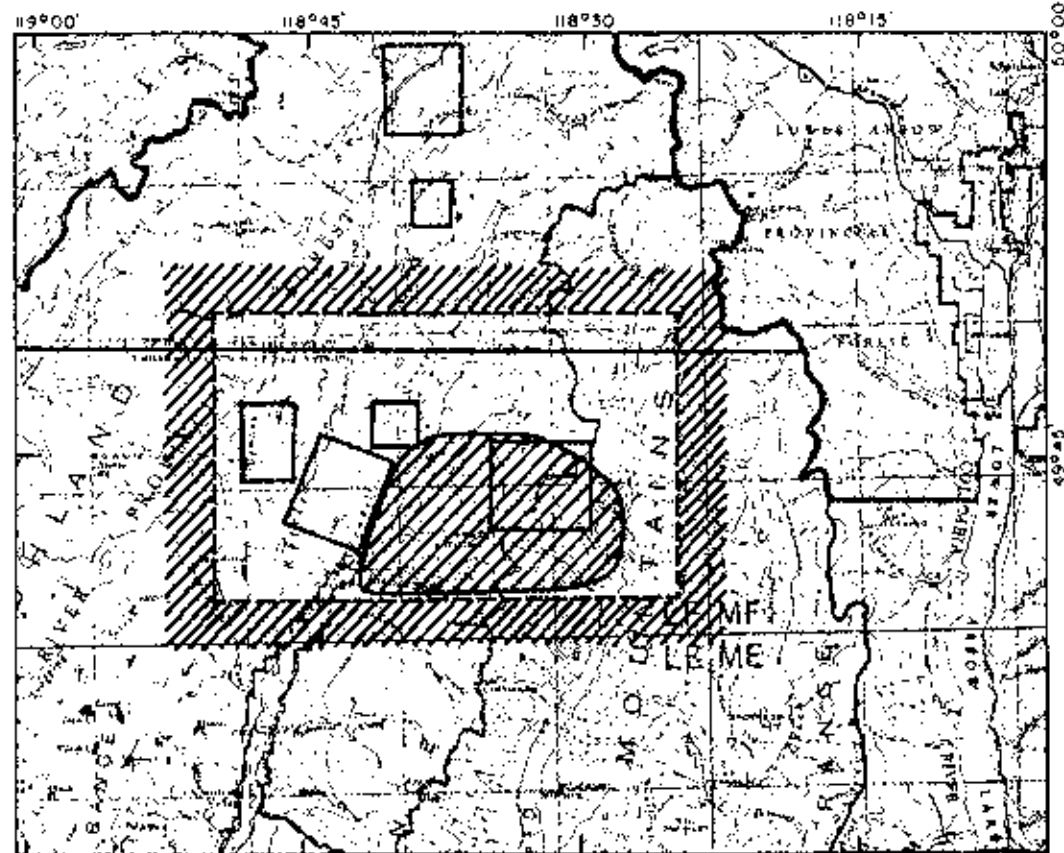
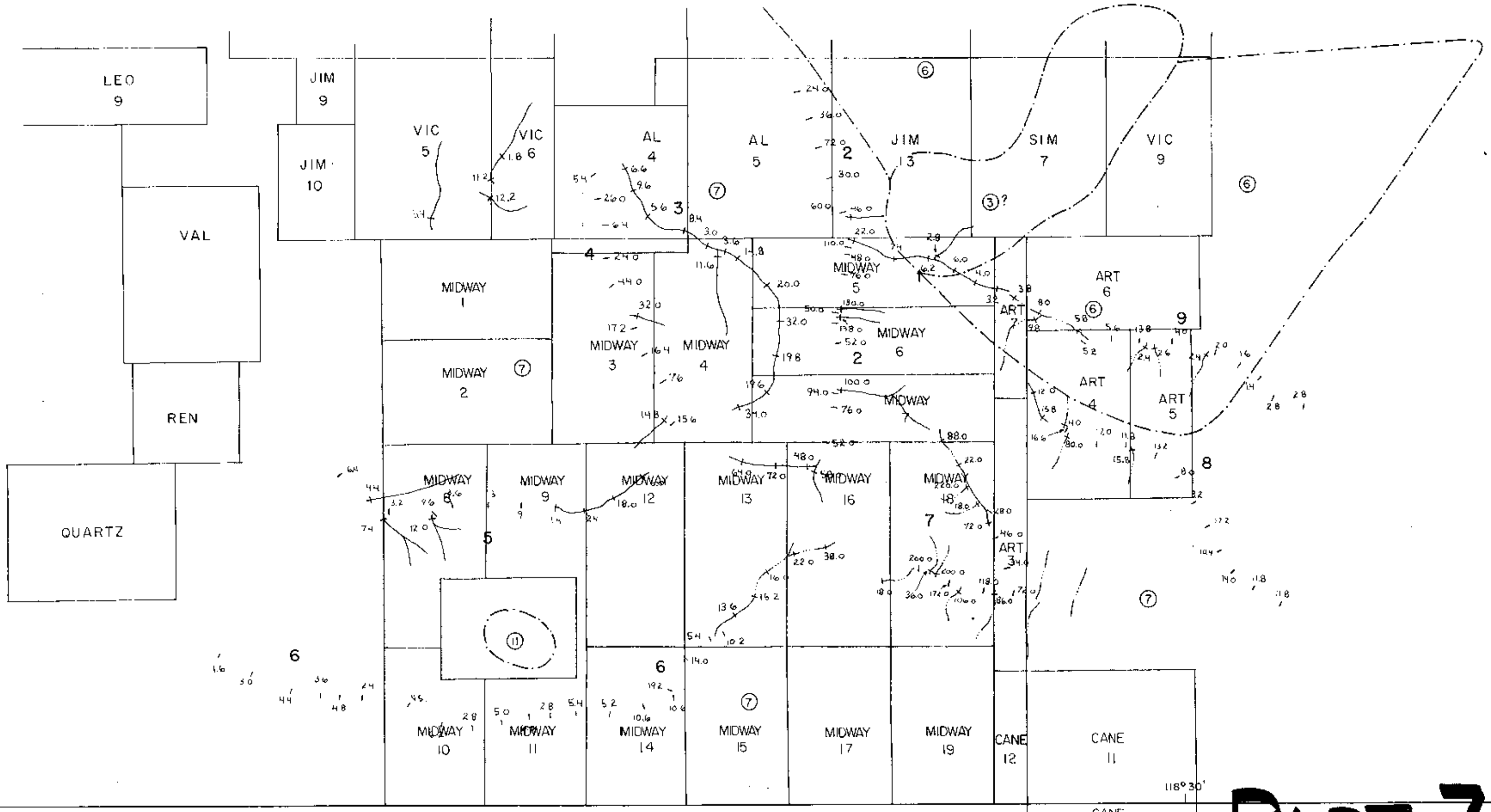
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49°45'

118°45'

118°30'



LOCATION MAP

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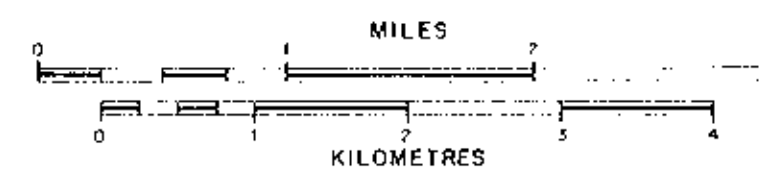
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- JIM 8 Claim boundary with name and number
- ⑦ Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

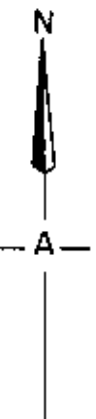
KELVIN ENERGY LIMITED  
 MOUNT ARTHURS AREA, B.C.  
 GEOCHEMICAL SURVEY  
 DRAINAGE RECONNAISSANCE

**URANIUM**

SCALE 1:50,000



**PART 7 OF 9**  
 MINERAL REVENUE DEPARTMENT  
**7160**  
 NO.



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118° 45'

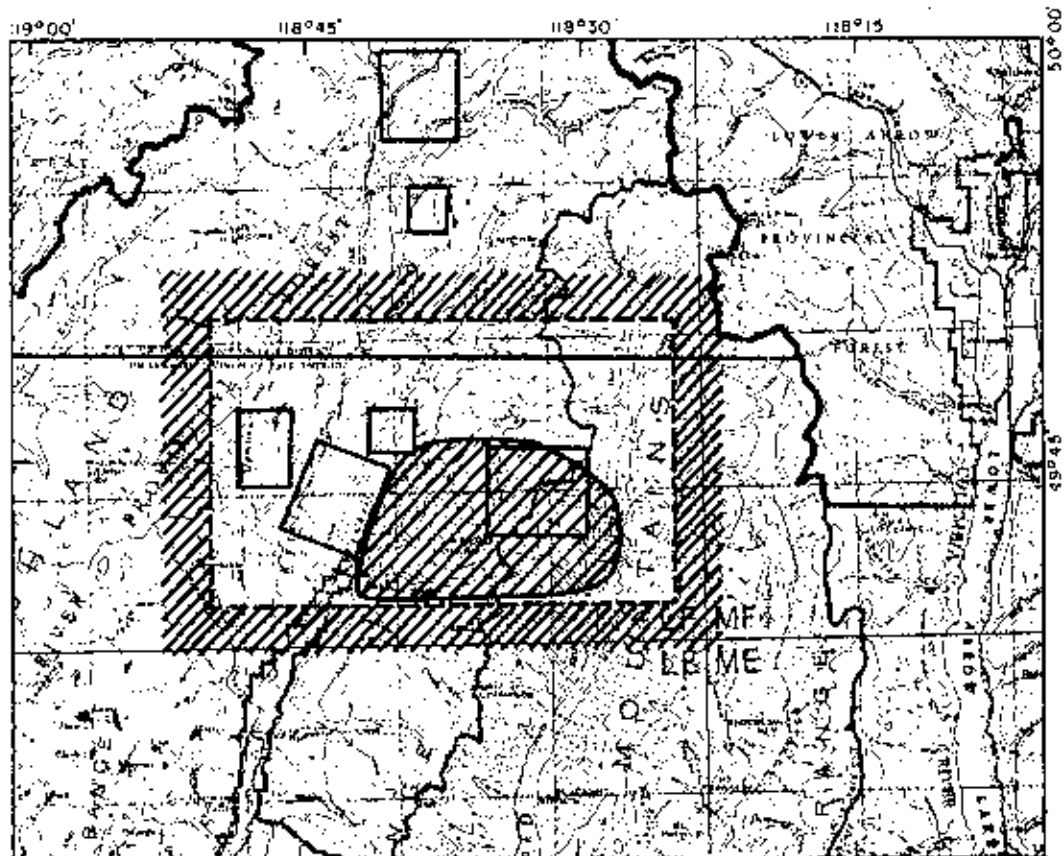
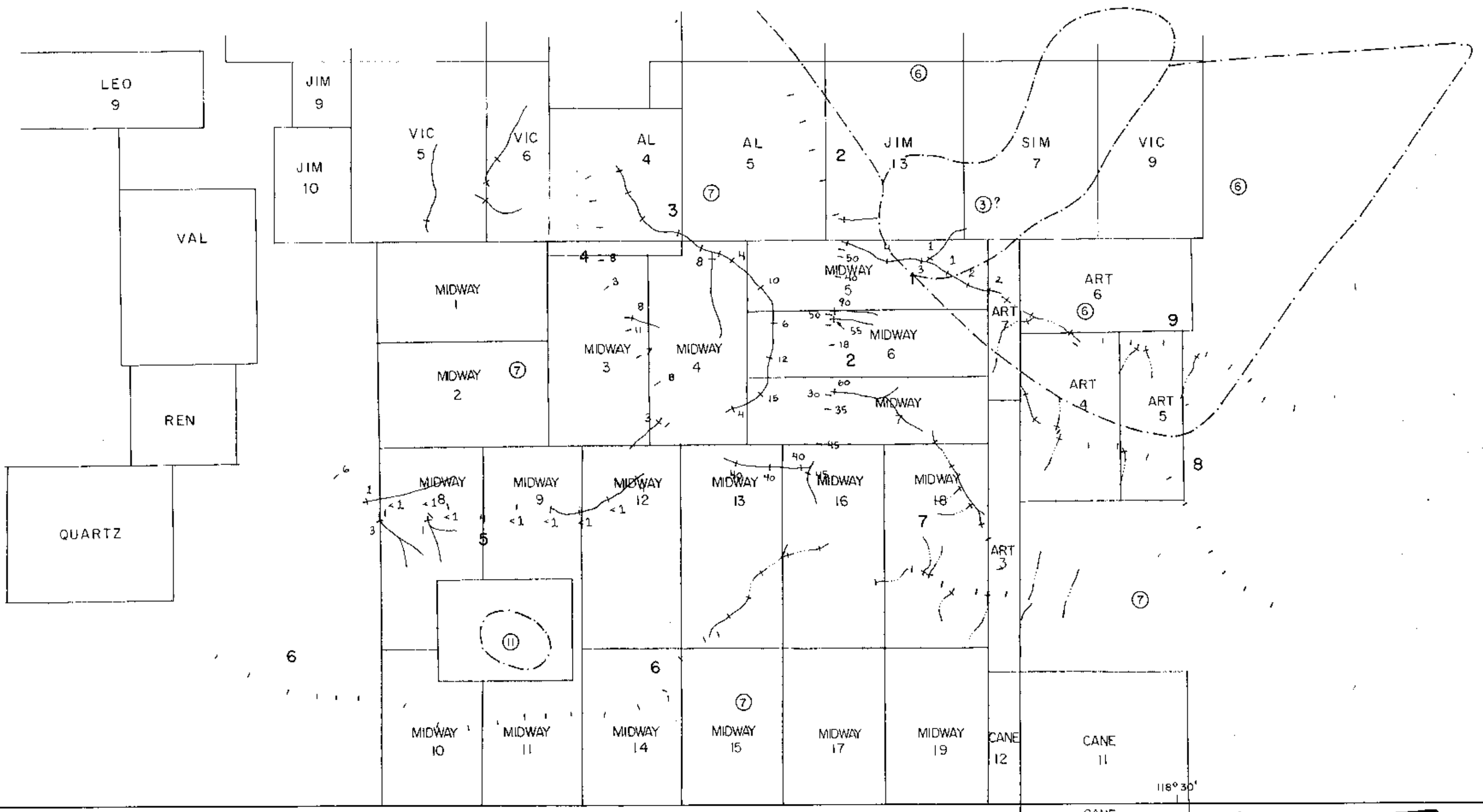
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49° 45'

118° 45'

118° 30'



LOCATION MAP

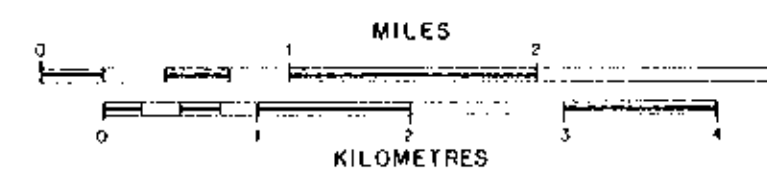
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LEGEND

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- Sample number
- element value in p.p.m.
- JIM 8 Claim boundary with name and number
- ⑦ Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

KELVIN ENERGY LIMITED  
 MOUNT ARTHURS AREA, B.C.  
 CANE  
 GEOCHEMICAL SURVEY  
 DRAINAGE RECONNAISSANCE  
 URANIUM (FIELD ANALYSIS)

SCALE 1:50,000



PART 7 OF 9

MINERAL REVENUE DISTRICT  
 7160



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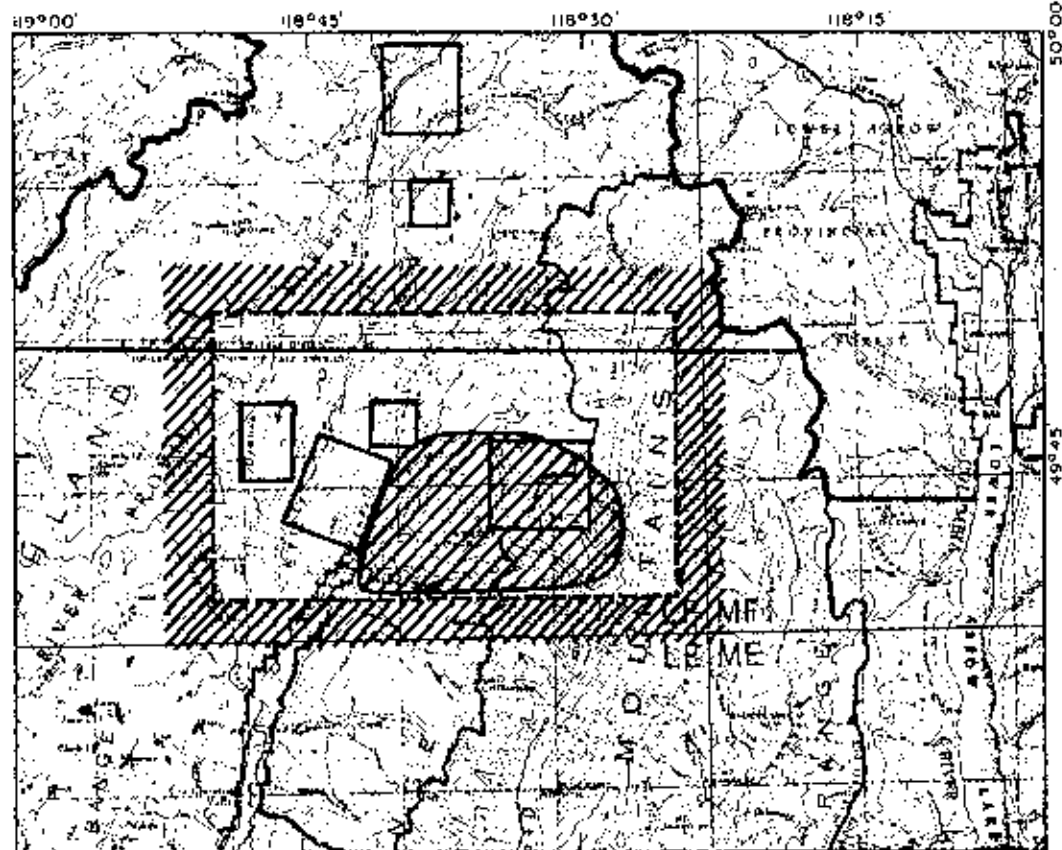
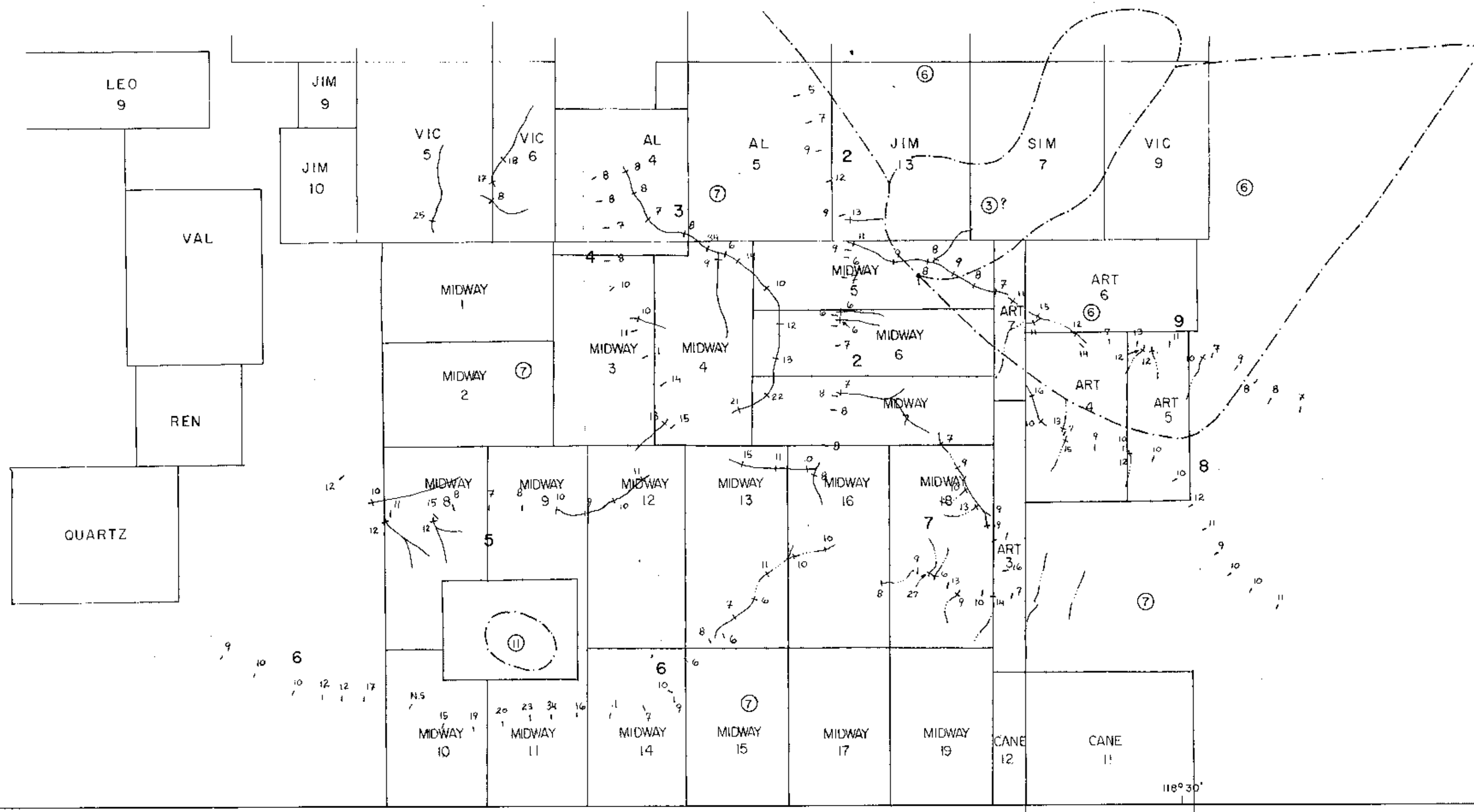
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49° 45'

118° 45'

118° 30'

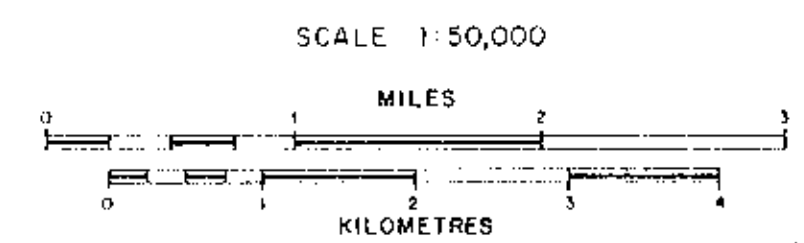


LOCATION MAP 1:500,000

- LEGEND**
- Line or sampled stream with  
Sample number  
element value in p.p.m.
  - JIM 8 Claim boundary with name and number
  - ⑦ Inferred geological boundary and unit number (Little, H.W., 1957)
  - 5 Stream number

KELVIN ENERGY LIMITED  
MOUNT ARTHURS AREA, B.C.  
GEOCHEMICAL SURVEY  
DRAINAGE RECONNAISSANCE

COPPER



**PART 7 OF 9**

**7160**

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Toronto, Canada

AUGUST-SEPTEMBER 1978  
N.T.S. REF. 82-E9, 10, 15, 16

118° 45'

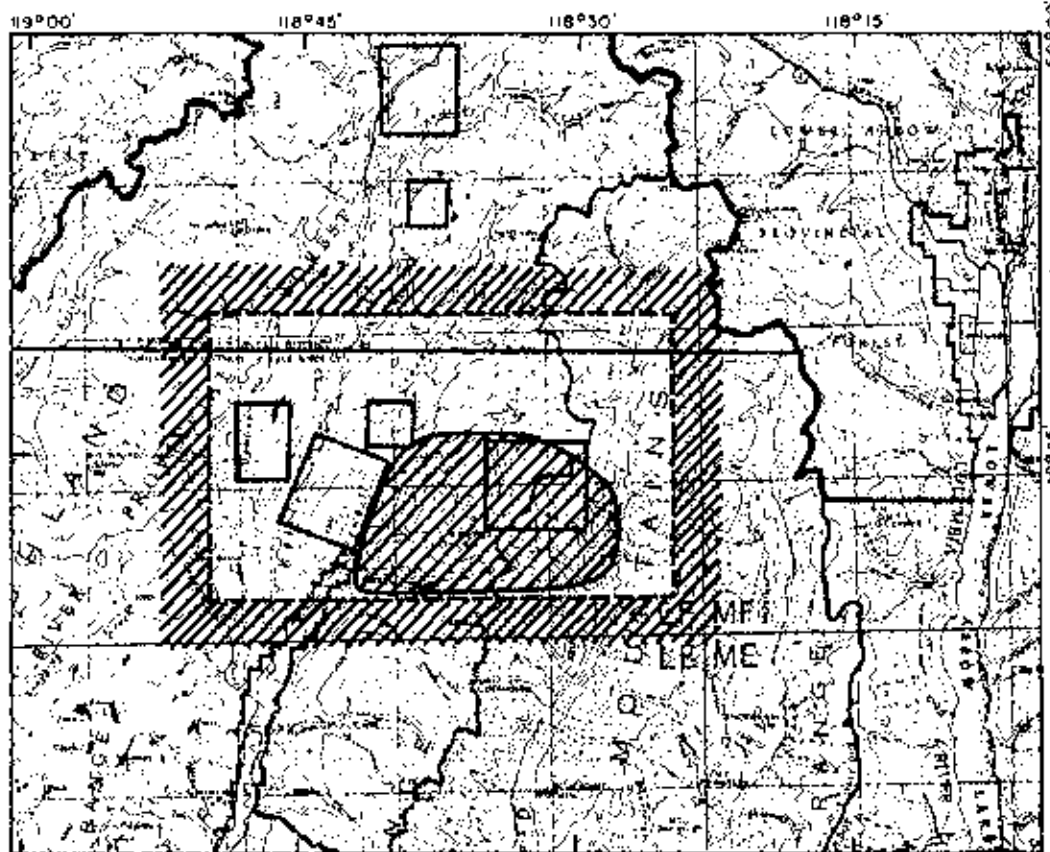
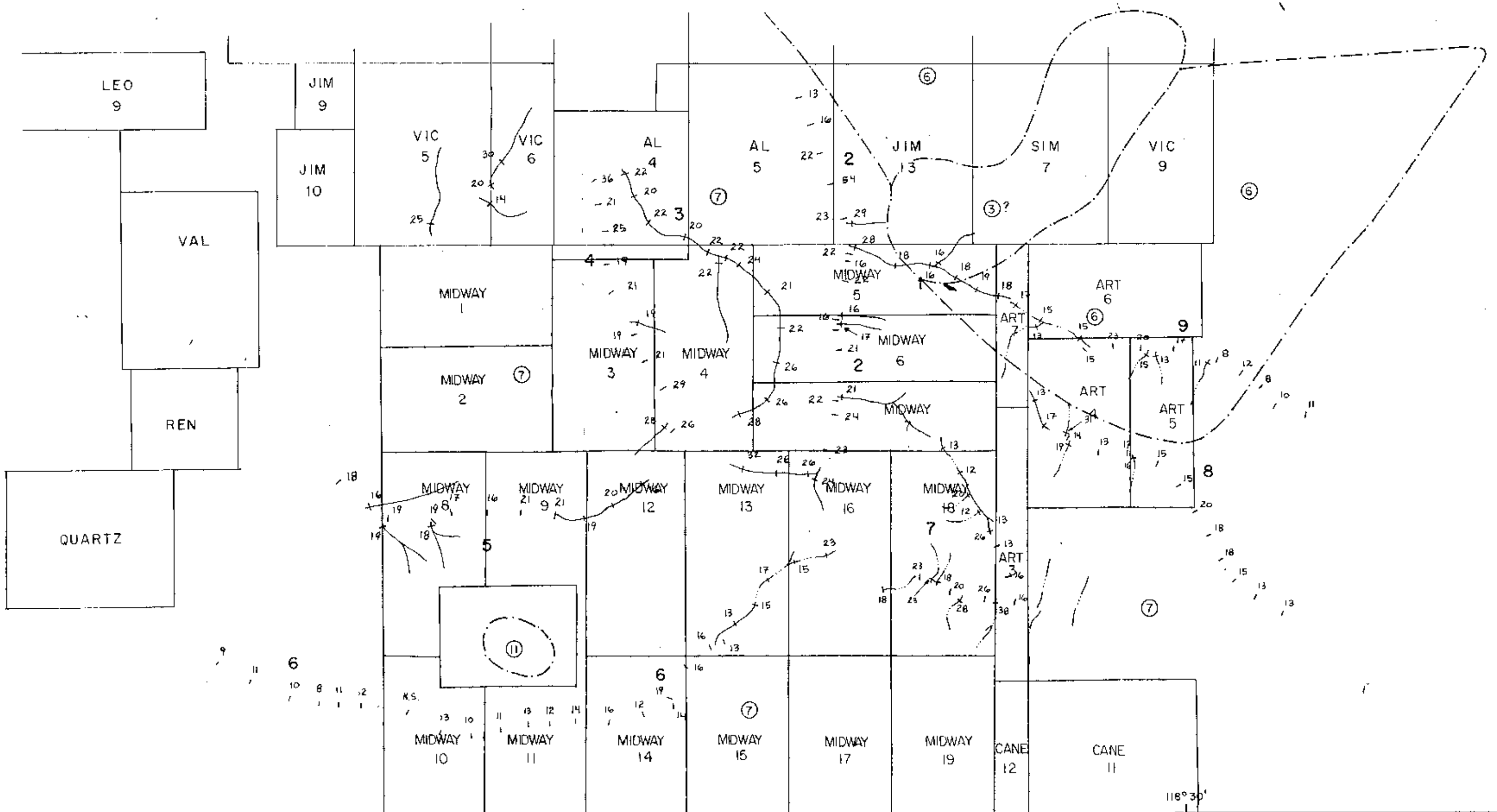
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49° 45'

118° 45'

118° 30'



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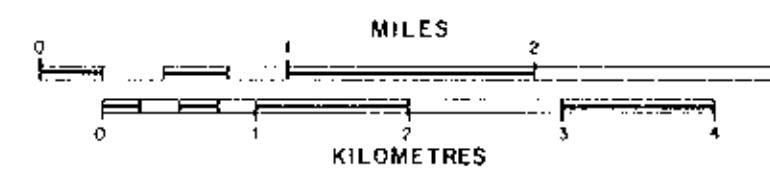
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- Sample number
- element value in p.p.m.
- JIM 8 Claim boundary with name and number
- ⑦ Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

KELVIN ENERGY LIMITED  
 MOUNT ARTHURS AREA, B.C.  
 GEOCHEMICAL SURVEY  
 DRAINAGE RECONNAISSANCE

LEAD

SCALE 1:50,000



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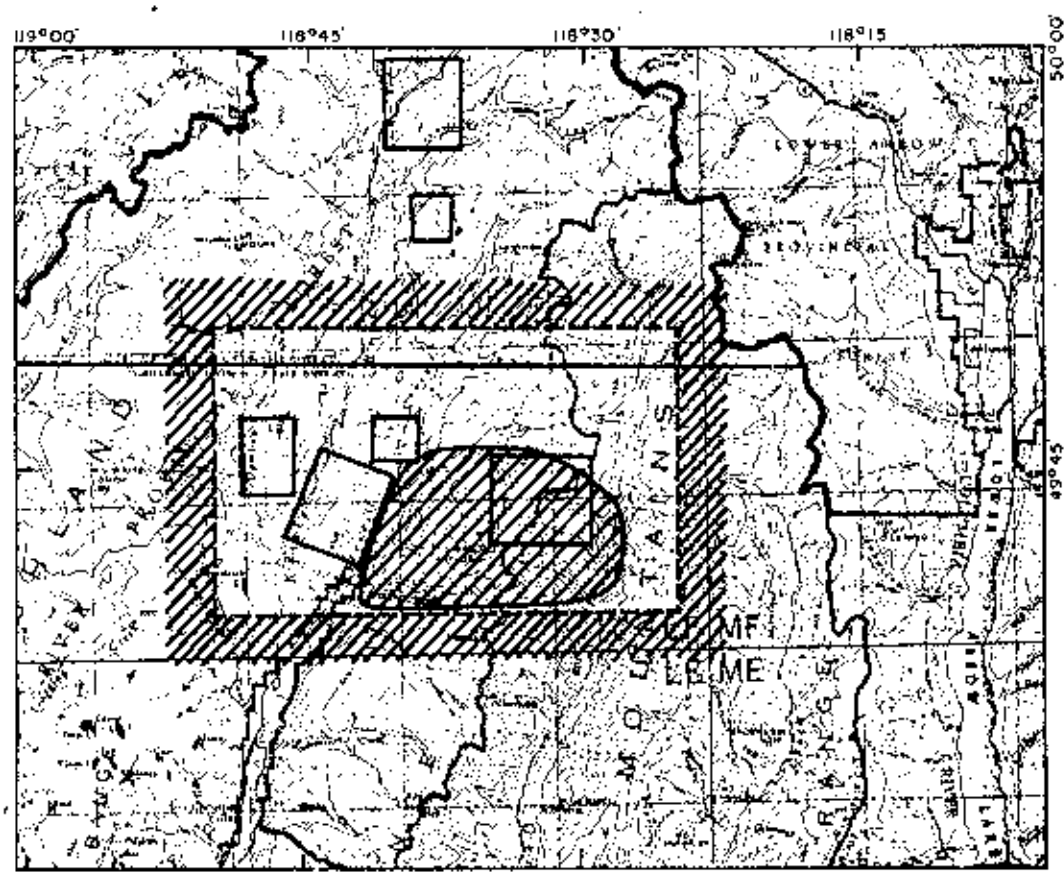
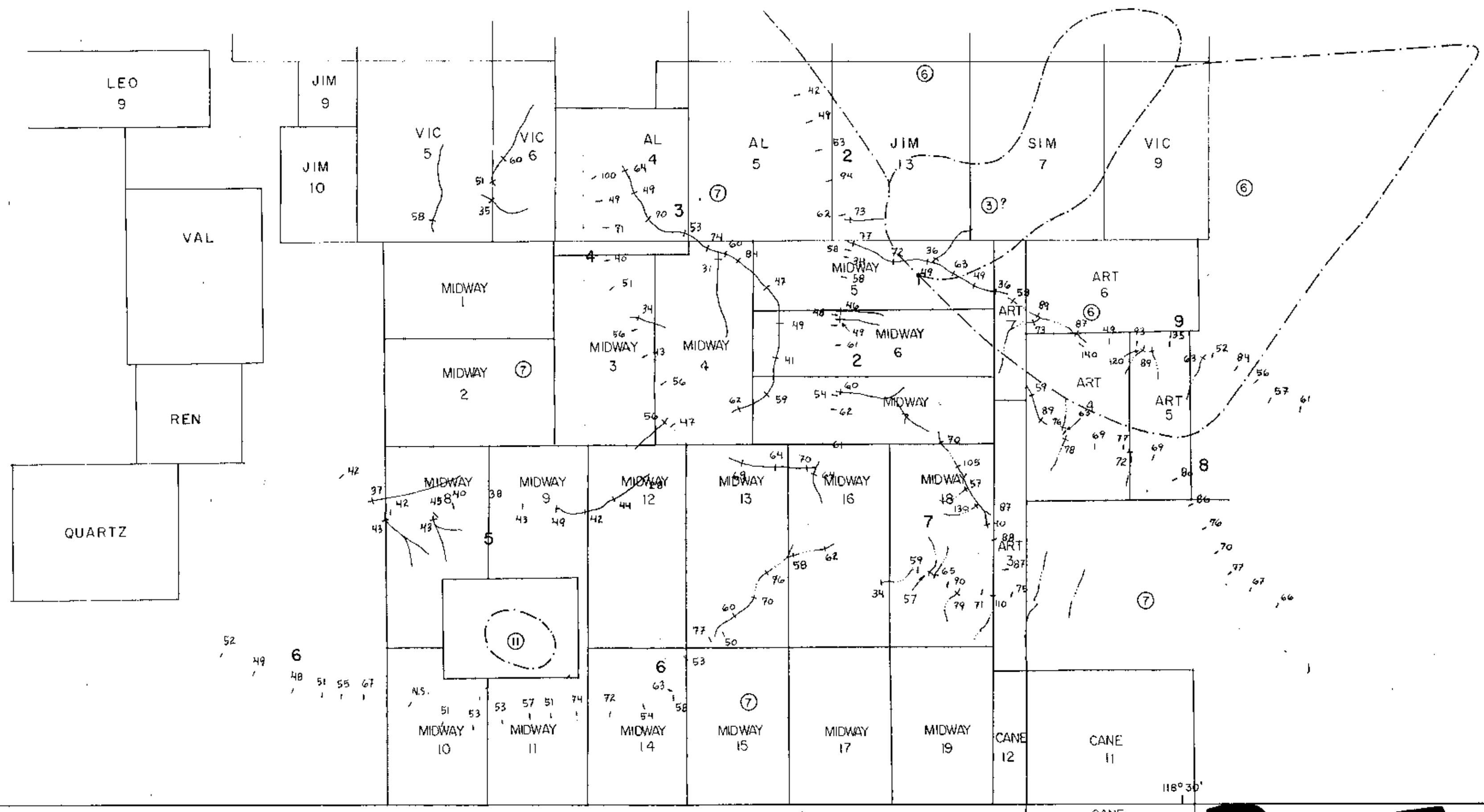
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49°45'

118°45'

118°30'



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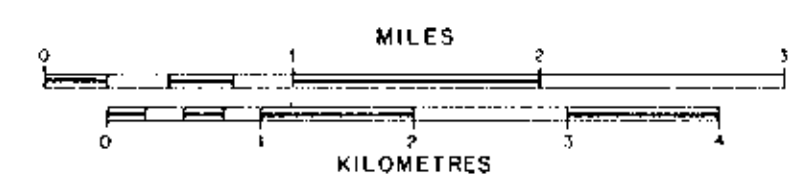
LEGEND

- Line or sampled stream with  
Sample number  
element value in p.p.m.
- JIM 8 Claim boundary with name and number
- (7) Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

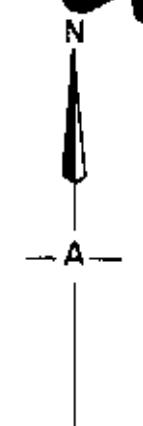
KELVIN ENERGY LIMITED  
MOUNT ARTHURS AREA, B.C.  
GEOCHEMICAL SURVEY  
DRAINAGE RECONNAISSANCE

ZINC

SCALE 1:50,000



**PART 7 OF 9**  
**7160**

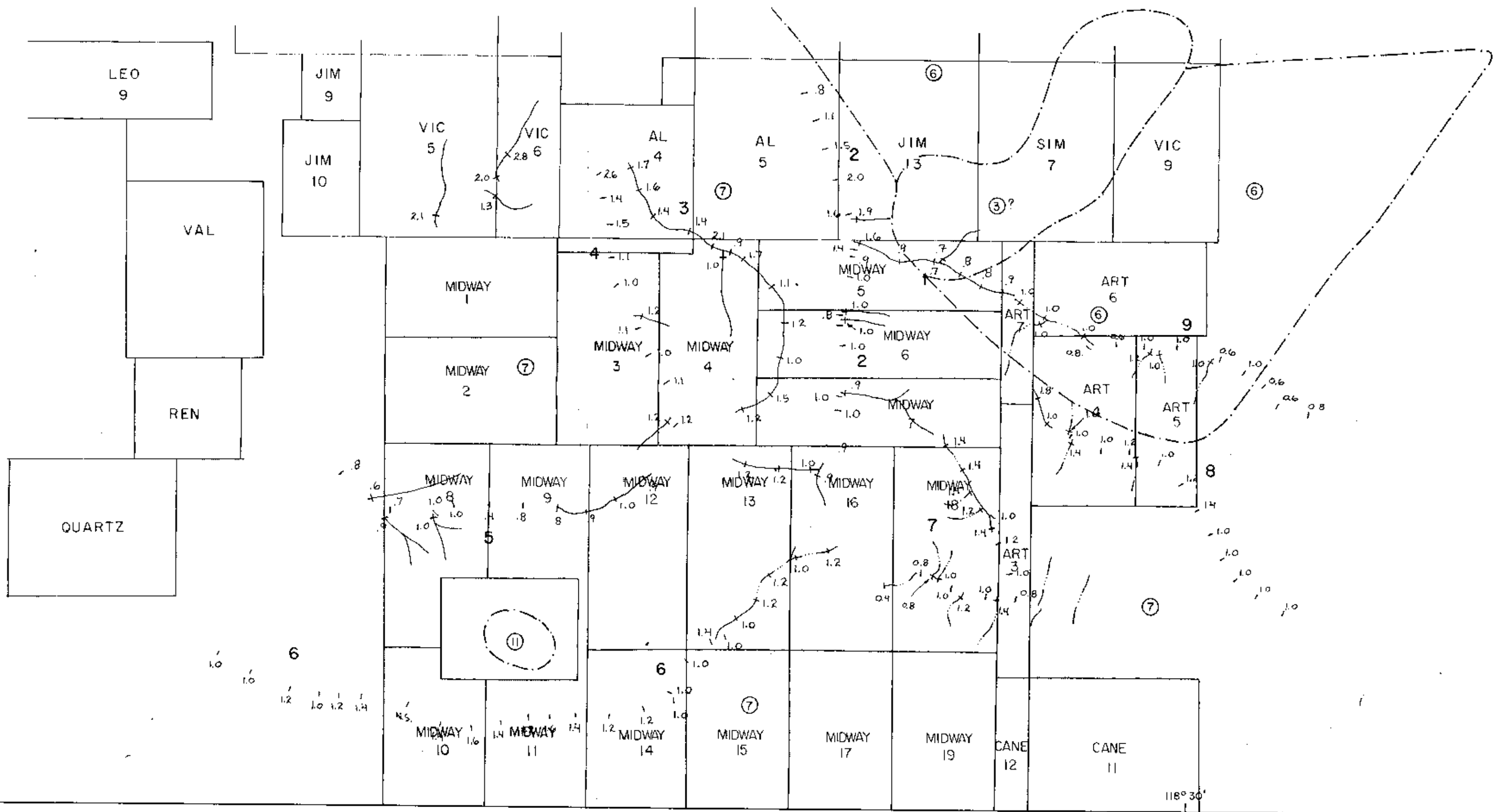


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**BARRINGER MAGENTA LTD.**  
Toronto, Canada

AUGUST-SEPTEMBER 1978  
N.T.S. REF. 82-E9, 10, 15, 16

118° 45'

118° 30'

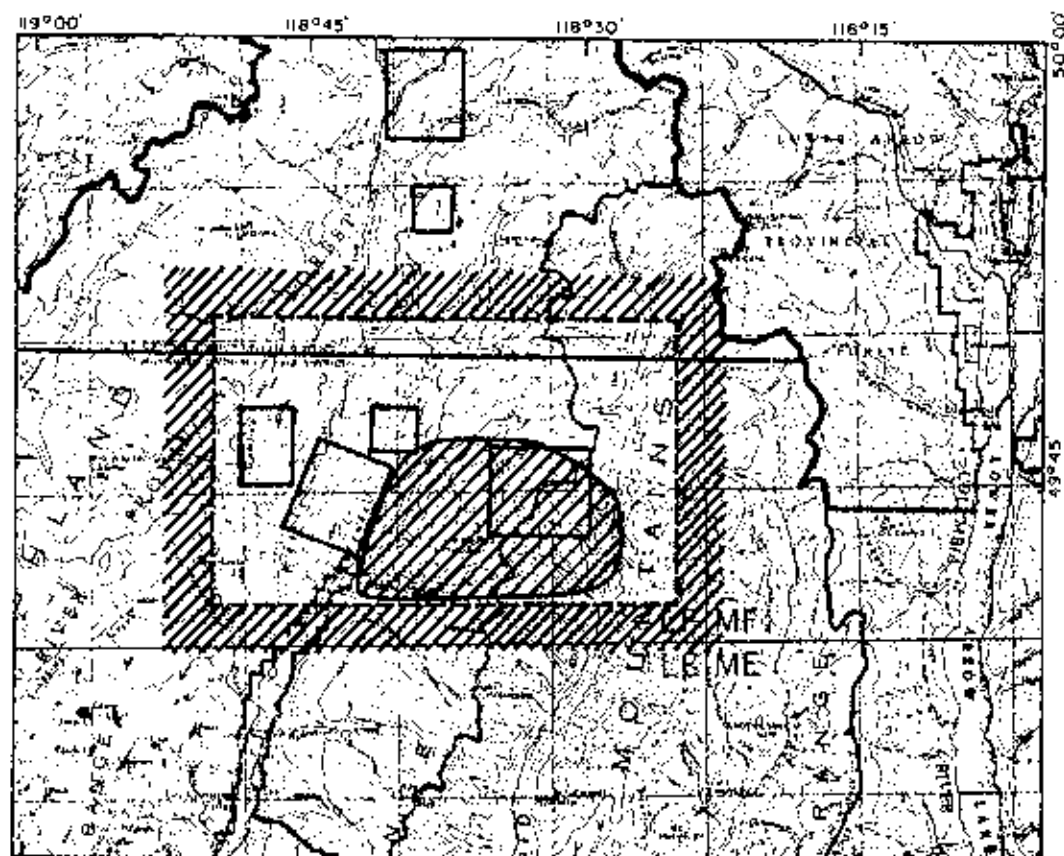


49° 45'

49° 45'

118° 45'

118° 30'



LOCATION MAP

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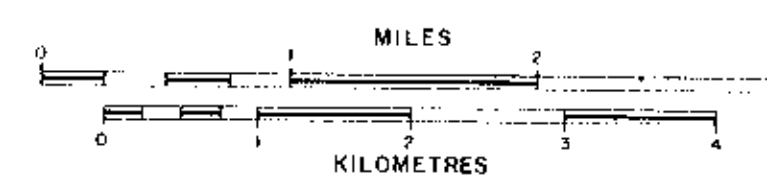
LEGEND

- Line or sampled stream with
  - Sample number
  - element value in p.p.m.
- JIM 8 Claim boundary with name and number
- ⑦ Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

KELVIN ENERGY LIMITED  
 MOUNT ARTHURS AREA, B.C.  
 GEOCHEMICAL SURVEY  
 DRAINAGE RECONNAISSANCE

SILVER

SCALE 1:50,000



**PART 7 OF 9**  
**7160**

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 Toronto, Canada

AUGUST-SEPTEMBER 1978  
 N.T.S. REF. 82-E9, 10, 15, 16



118° 45'

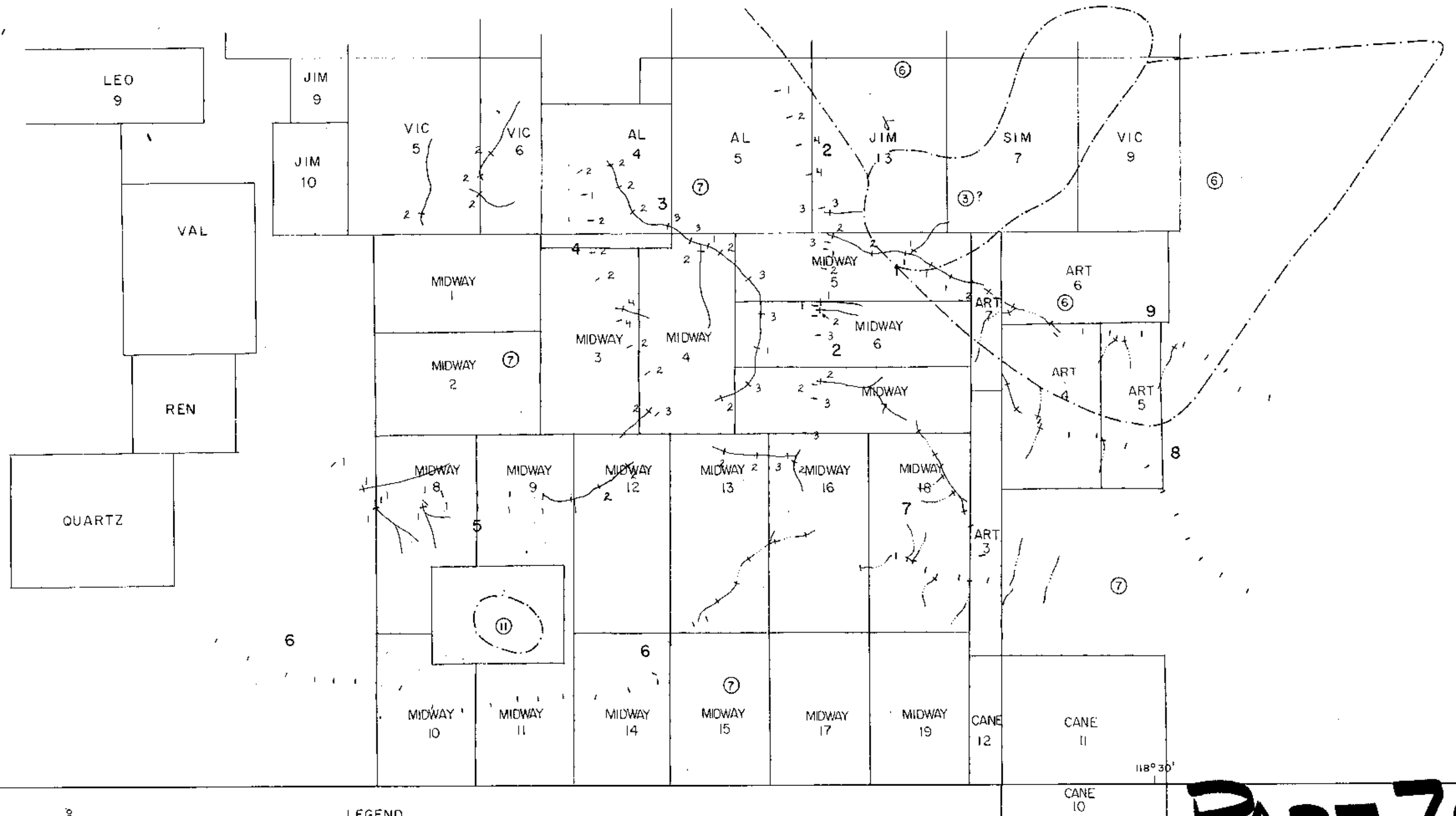
118° 30'

49° 45'

49° 45'

118° 45'

118° 30'

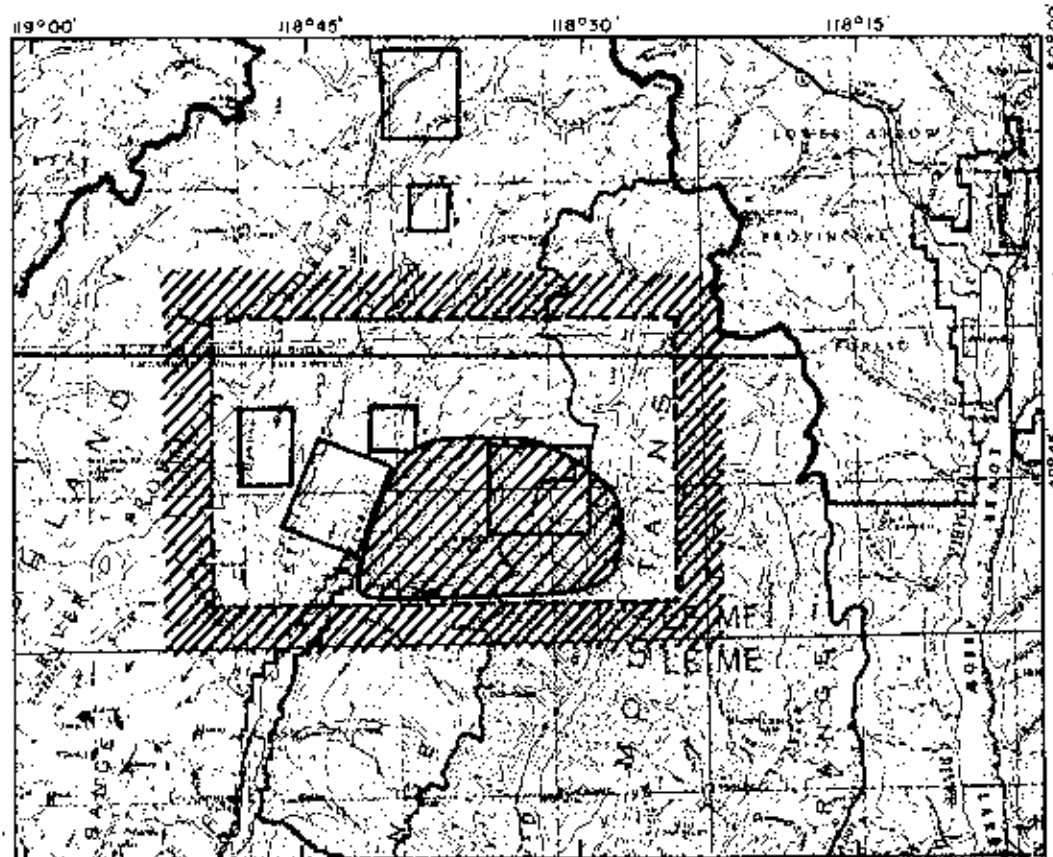


LEGEND

- Line or sampled stream with sample number element value in p.p.m.
- JIM 8 Claim boundary with name and number
- (7) Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

KELVIN ENERGY LIMITED  
 MOUNT ARTHURS AREA, B.C.  
 GEOCHEMICAL SURVEY  
 DRAINAGE RECONNAISSANCE  
 MOLYBDENUM

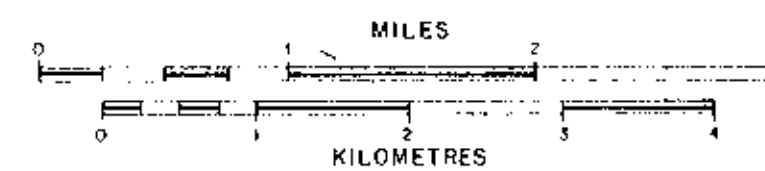
**PART 7 OF 9**  
 MINERAL RESOURCES ACT  
**7160**



LOCATION MAP

1:500,000

SCALE 1:50,000



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118° 45'

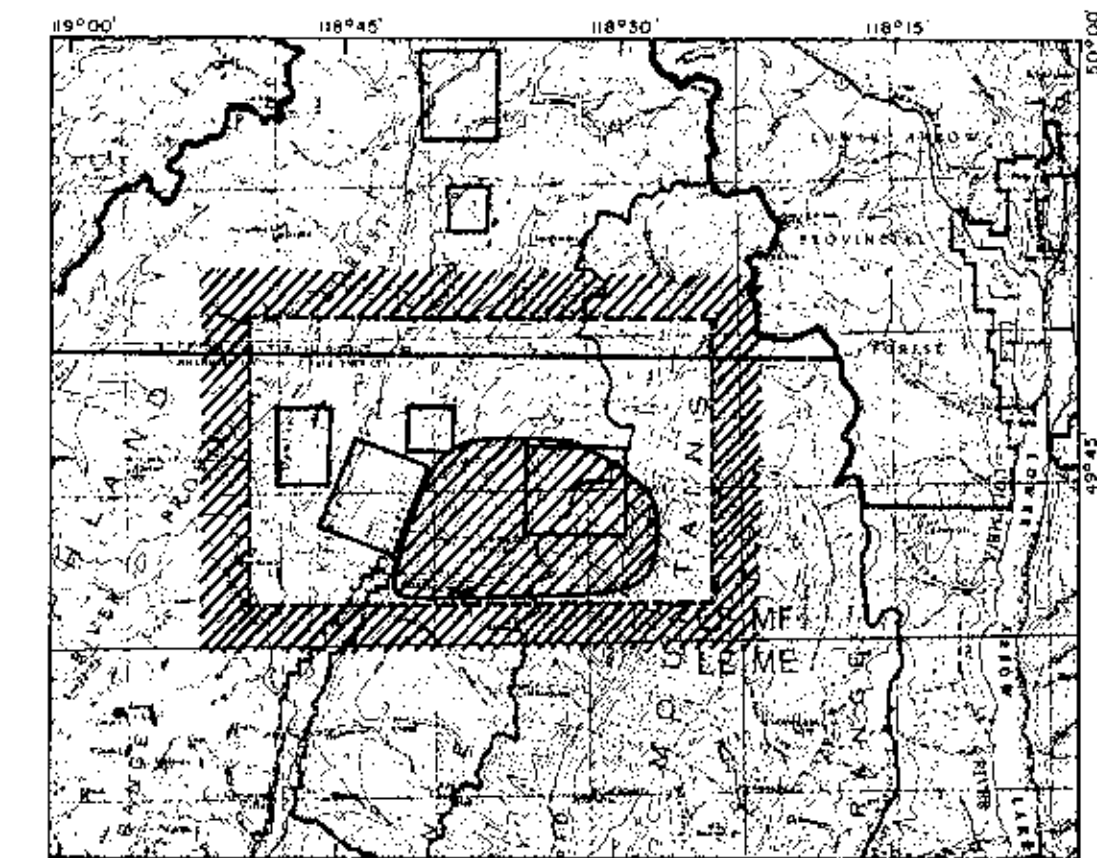
118° 30'

49° 45'

49° 45'

118° 45'

118° 30'



LOCATION MAP

1:500,000

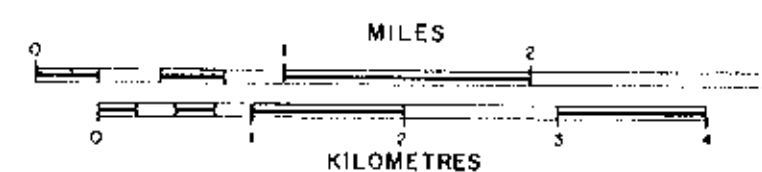
LEGEND

- Line or sampled stream with  
Sample number  
element value in p.p.m.
- JIM 8 Claim boundary with name and number
- (7) Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number

KELVIN ENERGY LIMITED  
MOUNT ARTHURS AREA, B.C.  
GEOCHEMICAL SURVEY  
DRAINAGE RECONNAISSANCE

NICKEL

SCALE 1:50,000



**PART 7 OF 9**

MINERAL RECORDS TO FILE  
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118°45'

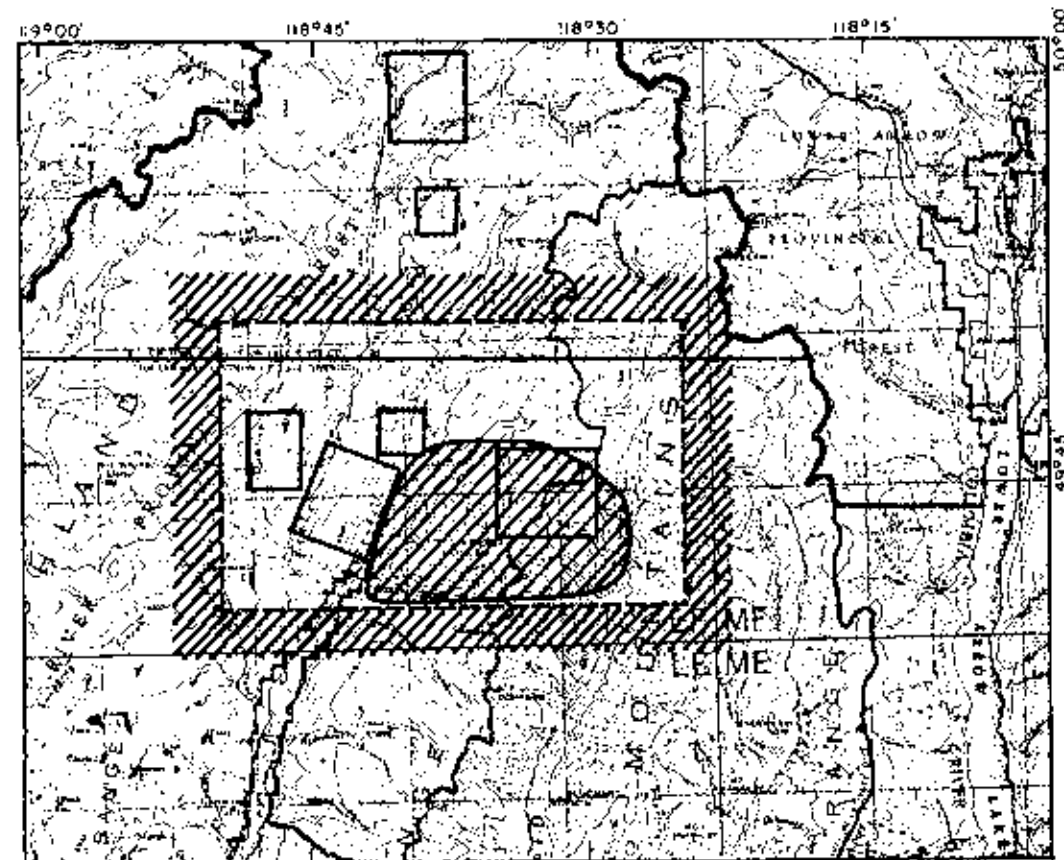
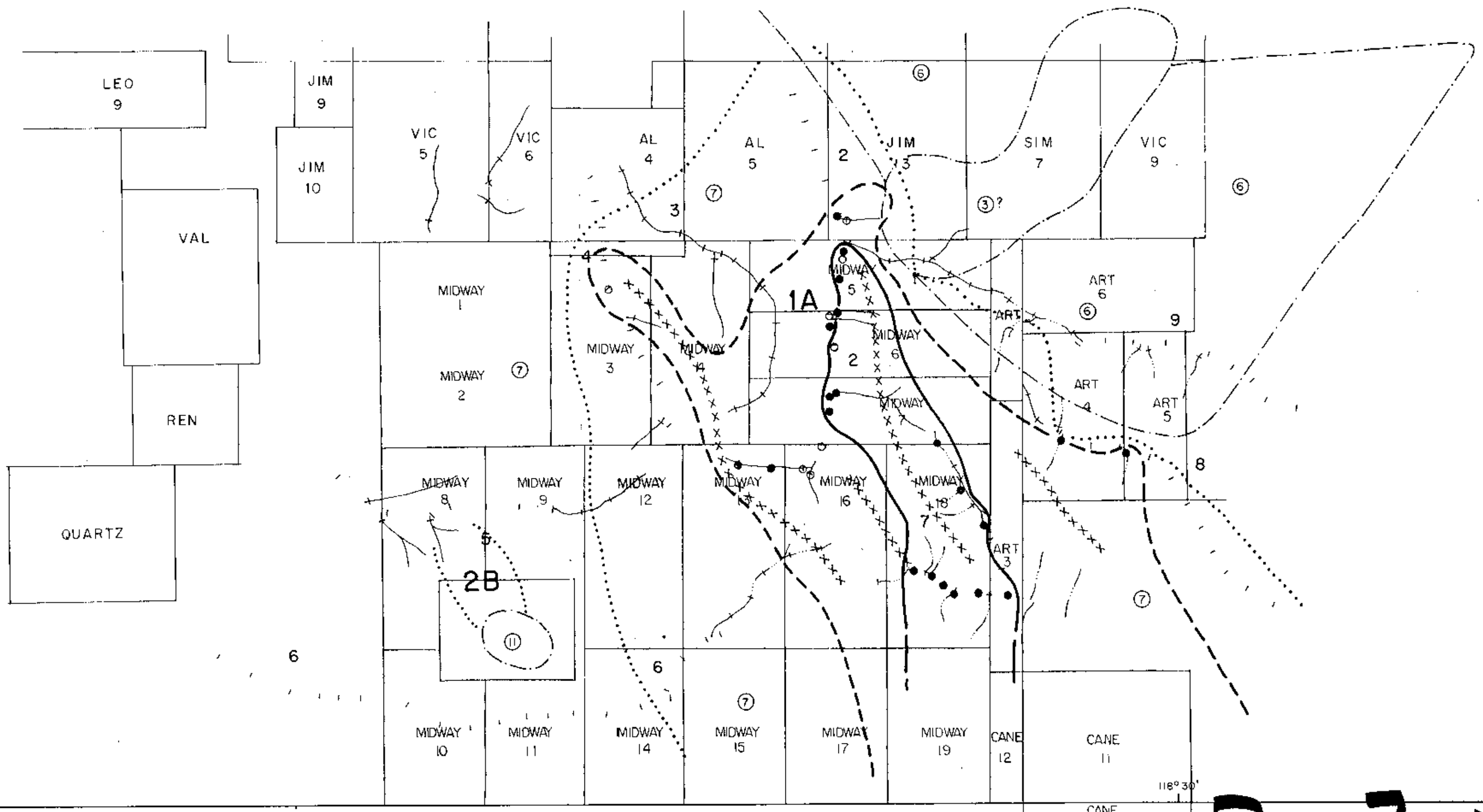
118°30'

49°45'

49°45'

118°45'

118°30'



LOCATION MAP 1:500,000

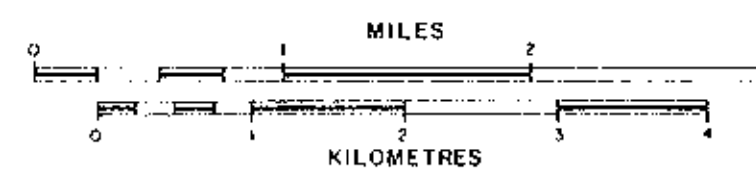
LEGEND

- Line or sampled stream with sample number element value in ppm.
- JIM 8 Claim boundary with name and number
- (7) Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number
- Focus of anomaly: ≥ 60ppm
- Strong anomaly: > 20 - < 60ppm
- Weak anomaly: > 8 - < 20ppm
- Axis of possible Uranium source
- ≥ 60 ppm Uranium
- ≥ 40 - < 60 ppm Uranium

KELVIN ENERGY LIMITED  
 MOUNT ARTHURS AREA, B.C.  
 GEOCHEMICAL SURVEY  
 DRAINAGE RECONNAISSANCE

URANIUM INTERPRETATION MAP

SCALE 1:50,000



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118° 45'

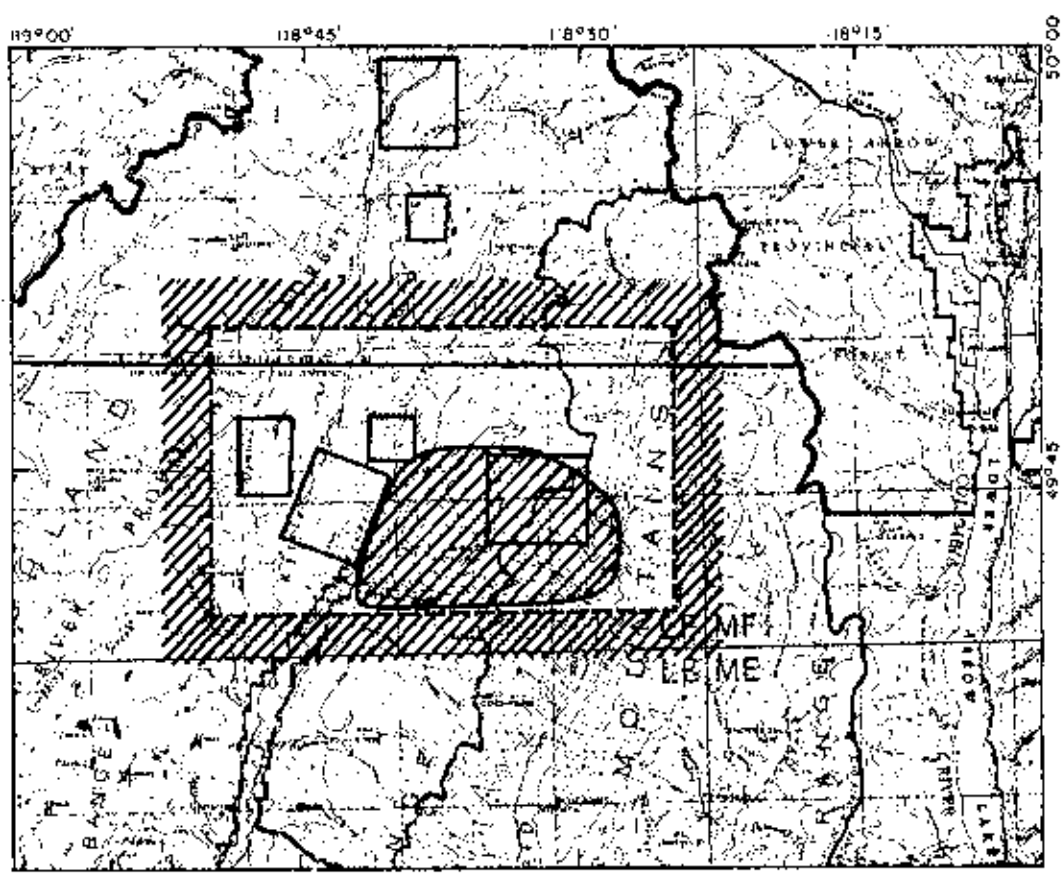
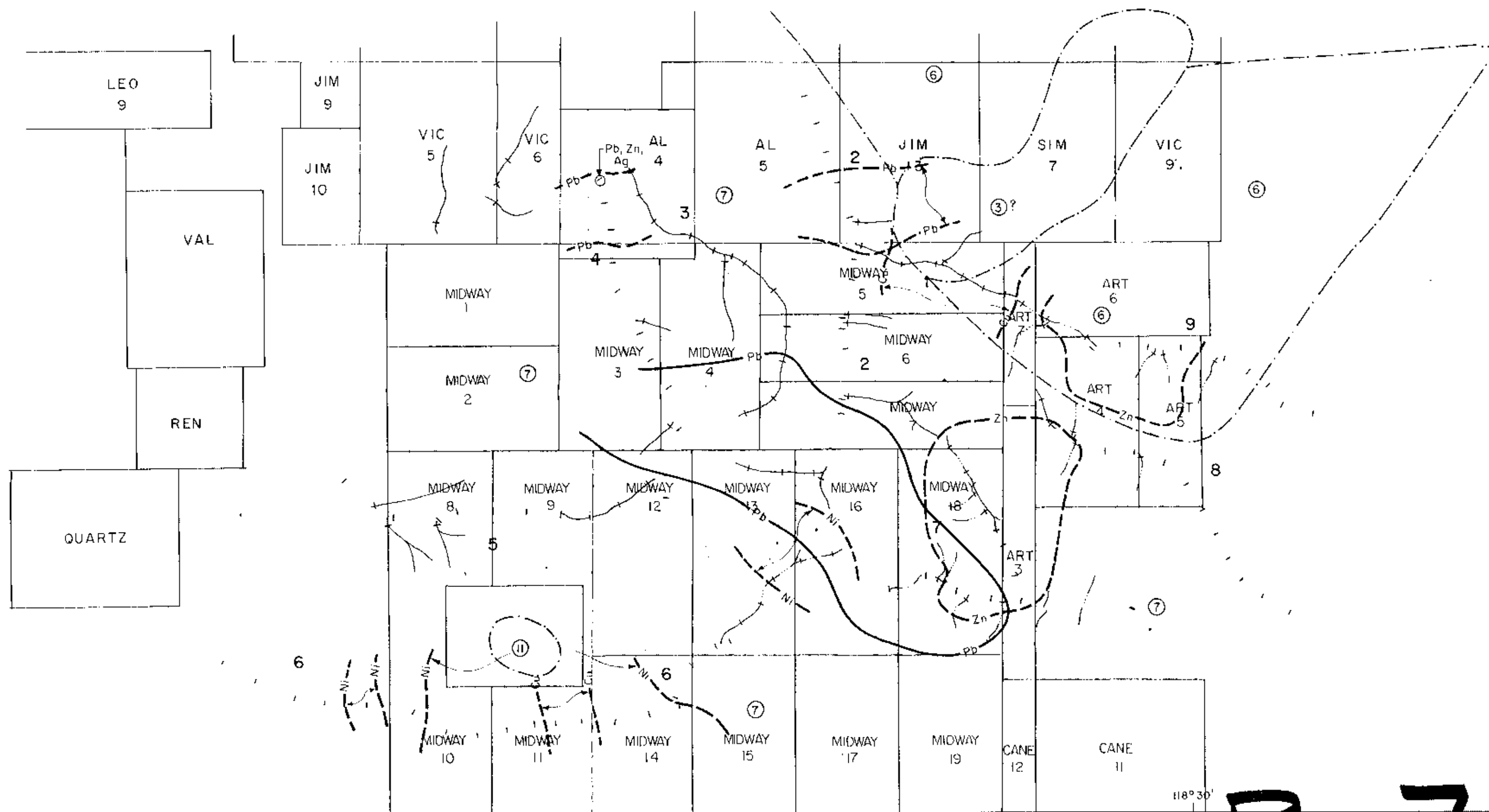
118° 30'

49° 45'

49° 45'

118° 45'

118° 30'



LOCATION MAP 1:500,000

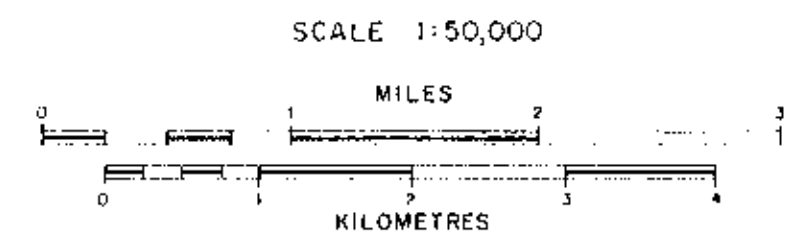
LEGEND

- Line or sampled stream with  
Sample number  
element value in p.p.m.
- JIM 8 Claim boundary with name and number
- (7) Inferred geological boundary and unit number (Little, H.W., 1957)
- 5 Stream number
- Strong anomaly
- Weak anomaly

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MOUNT ARTHURS AREA, B.C.  
GEOCHEMICAL SURVEY  
DRAINAGE RECONNAISSANCE

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BASE METAL INTERPRETATION MAP



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