'79-#48-# 7160

REPORT ON THE
STREAM SEDIMENT AND SOIL FOLLOW-UP SURVE
ANOMALY 1A (SOUTH) AND 7C
KETTLE VALLEY AREA, B.C.
FOR KELVIN ENERGY LTD.
CALGARY, ALBERTA

BARRINGER MAGENTA

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REPORT ON THE STREAM SEDIMENT AND SOIL FOLLOW-UP SURVEY ANOMALY 1A (SOUTH) AND 7C KETTLE VALLEY AREA, B.C. FOR KELVIN ENERGY LTD. CALGARY, ALBERTA

CLAIMS: Jim 1, Jim 2, CH 8, CH 9, Leo 9
Vic 2, REN and VAL

LOCATION: Located on Maps 82E/15E, 82E/10 and bounded by longitudes 118° 45', 118° 42' and latitudes 49° 43' 00", 49° 45' 30" in the Greenwood Mining District

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DECEMBER, 1978

TABLE OF CONTENTS

LISTING OF FIGURES, TABLES AND DRAWINGS

ANOMALY 1A - SOUTH

FIGURES

TABLES

DRAWINGS

SUMMARY

A detailed follow-up stream sediment, soil and rock chip sample survey was completed in August, 1978 by a Barringer Magenta field crew at Anomalies 1A (South) and 7C located on the Jim 1, 2, CH 8, 9, Leo 9, Vic 2, Ren and Val claims staked or optioned by Kelvin Energy Limited. These claims are located in the Greenwood Mining Division along the Kettle River and Rendall Creek and are accessible by foot in August.

The object of the follow-up survey was to delimit the uranium and copper discovered during an earlier reconnaissance stream sediment survey (Lahti, 1978). A total of 64, 288, and 13 stream sediment, soil and rock chip samples, respectively, were collected and analysed for uranium (fluorimetric), copper, lead, zinc, silver and nickel (atomic absorption). Gamma radiation was monitored during the collection of samples by the use of two Exploranium Model GR-101A scintillometers.

Interpretation of the data was based on raw data maps of individual elements, thresholds, and anomalous levels, the latter two which were determined empirically from frequency histograms of individual elements. The uranium and copper target areas were outlined on their respective raw data maps. The uranium anomalies were also classified according to amplitude, size, continuity, geological setting and environmental factors.

The detailed stream sediment survey verified the presence of anomalous uranium with coincident lead and to a lesser degree zinc and silver in the northern streams located within Anomaly 1A (South). These anomalies are consistent with a seepage type anomaly related to uranium mineralization hidden under the basaltic cap.

The soil sample results are distorted by high organic soils which tend to absorb hydromorphically transported uranium. The soil sampling identified two lenticular uranium anomalies that are thought to be derived from hydromorphically transported uranium from a source up-slope.

Although it is conceivable the soil and stream anomalies are derived from a hidden "paleo-channel" source, mineralized shears, faults, pegmatites or uranium rich phases of the bedrock could give rise to the observed soil and stream sediment anomalies.

Soil sampling also identified anomalous copper concentrations in the same area where an earlier reconnaissance stream sediment survey detected anomalous copper values. Other multi-element anomalies were identified but are not considered as important as the two uranium and single copper anomaly.

It is recommended that a comprehensive follow-up trenching, pitting soil and rock chip sampling survey should be initiated to separate the suspected hydromorphically transported anomalies from those considered to be "in situ". Particular importance should be placed on identifying the sources for the two lenticular uranium anomalies and exploring the periphery of the basaltic cap for uranium seeps that might indicate a hidden uranium source.

If the recommended follow-up work is positive then drilling through basaltic cap would have to be considered.

1. INTRODUCTION

1.1 GENERAL STATEMENT

The mineral claims referred to in this report (Dwg. 208-42-501) were staked or optioned by Kelvin Energy Limited during 1978. The claim statistics for Jim 1, Jim 2, CH 8, CH 9, Leo 9, Vic 2, Ren and Val are listed in Table 1 below.

TABLE 1

Claim Statistics For
Jim 1, 2, CH 8, 9, Leo 9, Vic 2, Ren and Val

Claim Name	Units	Tag No	Date of Record	Record Number	Mining Division
Jim 1	1	31830	June 9/78	1123	Greenwood
Jim 2	1	31831	June 9/78	1124	Greenwood
CH 8	15	31850	Feb. 13/78	996	Greenwood
CH 9	20	31853	Feb. 13/78	967	Greenwood
Leo 9	10	31849	Feb. 13/78	971	Greenwood
Vic 2	9	31829	June 9/78	1014	Greenwood
Ren	9	--	July 19/78		Greenwood
Val	20	--	Oct. 24/77		Greenwood

A detailed stream sediment and soil survey was completed in August 1978 by a Barringer Magenta field crew. The object was to delimit the uranium and copper anomalies outlined during the semi-detailed reconnaissance survey (Lahti, 1978A) and to find their sources. A total of 64, 288 and 13 stream sediment, soil and rock chip samples, respectively, were collected. Due to time constraints and priorities, no stream sediment follow-up sampling was done in streams with anomalous copper values. All samples were analysed for uranium, copper, lead, zinc, silver and nickel. Gamma radiation was monitored during the collection of samples by the use of two Exploranium Model GR-101A scintillometers.

Two assessment reports (see Appendix II) have been prepared; one outlining the cost of work performed at anomaly 1A (South) and the other for work performed at anomaly 7C.

1.2 LOCATION AND ACCESS

The survey area lies on the east side of the Kettle River, north and south of the point where the road to Nevertouch Lake meets the Christian Valley road (Fig. 1) about 80 kilometres from Rock Creek. It is bounded by longitudes 118° 42', 118° 45' and latitudes 49° 43' 00", 49° 45' 30". Access to the area is difficult for two reasons; first, the Kettle River for most of the year is too deep and swift to cross by foot and too wide to make a tree bridge and secondly, there are very few places that a helicopter can land in the survey area. The work was done in August, by foot, about the only time the river can be forded.

Location Map for
Anomaly 1A (South) and 7C

N.T.S. REF. 82 E

Fig. 1

2. GEOLOGY

The geology consists of the Proterozoic Monashee and Grand Forks Groups (paragneiss with minor pegmatites and crystalline limestone), Mesozoic Valhalla Intrusions (granite, porphyritic granite), Paleocene or Eocene, Phoenix, Volcanic Group (andesite, trachyte, minor basalt; locally interbedded tuff shale and/or siltstone) and Tertiary Miocene basalt and olivine basalt (Little, 1957). The above rock units have been outlined on all maps in the back of the report. The northeast-southwest striking Tertiary Miocene basalt forms a cap over the Monashee Grand Forks Groups and Valhalla instrusive rocks.

All rocks except the Miocene basalt are cut by strong north-south trending faults and shear zones. The foliation of the rocks older than the plateau basalt is parallel to the regional strike of faults and shear zones.

Rock chip samples from Unit 1 (Proterozoic-paragneiss) and Unit 11 (Tertiary basalt) have a marked difference in trace element content (Table 2). The basalt has a higher concentration of copper, nickel and silver, about the same amount of lead and zinc and less than half the concentration of uranium.

TABLE 2

Rock Chip Data for Anomaly 1A-S and 7C

Sample Number (NLFR)	Location	U	Cu	Pb	Zn	Ag	Ni	Rock Description
104	NLFS 1025 Line 6	1.1	94	98	850	.8	37	Metasediment
105	NLFS 1027 Line 6	.4	46	73	250	1.0	70	Metasediment
106	NLFS 1037 Line 6	.2	36	24	150	1.1	65	Metamorphic (bottom of basaltic cap) basalt
107	NLFS 1039 Line 6	.2	35	25	135	1.4	37	Basalt
108	NLFS 1041 Line 6	3.2	32	19	95	.4	44	Pagmatite with potassic feldspar and quartz
109	NLFS 1047 Line 6	.2	14	14	71	.5	27	Weathered basalt
125	NLFS 1402 Line 5	3.0	3	26	68	.4	6	Sheared granite gneiss
126	NLFS 1431 Line 5	.4	32	11	88	.8	31	Basalt (Tertiary)
127	NLFS 1464 Line 5	.6	27	14	81	1.0	39	Basalt (Tertiary)
131	NLFS 1519 Line 4	6.2	8	11	125	.2	52	Mixture of pegmatite plus foliated fine grained potassic rich granite

TABLE 2

Rock Chip Data for Anomaly 1A-S and 7C

Sample Number (NLFR)	Location	U	Cu	Pb	Zn	Ag	Ni	Rock Description
132	NLFS 1546 Line 4	6.0	7	8	56	.4	20	Granite gneiss with potassic feldspar
133	NLFS 1562 Line 4	3.6	27	15	105	1.4	27	Basalt (Tertiary)
134	NLFS 1577 Line 4	3.8	28	14	71	1.2	93	Tertiary Miocene basalt

3. TOPOGRAPHY, CLIMATE, DRAINAGE, VEGETATION, SOIL

3.1 TOPOGRAPHY

The survey area lies on the top and side of a 1432.6 metre northeast trending mountain. The mountain is capped with an almost horizonal basalt flow and as a result the land on top of the basalt has a very gentle gradient. The edges of the basalt form a 5 to 15 metre scarp. The flanks of the mountain are very steep with deeply incised stream channels which extend down to the Kettle River Valley and go underground into the alluvial plain.

In the northern part of the soil grid the microtopography is controlled by large north-south striking faults and shear zones that form narrow steep walled valleys.

3.2 CLIMATE

The climate is, for the most part, wet and cool although not as severe as the coastal region of British Columbia. Summers are cool, 10-20°C, with frost occurring in June and August. Snow remains on the ground until June. During short periods in July and August, temperatures can exceed 30°C.

3.3 DRAINAGE

In general, the streams are short with a very steep gradient. The streams usually commence at the base of the plateau basalt and disappear into the ground at the edge of the Kettle River alluvial plain. The streams are mostly seasonal having variable water flow during July and August. The streams have very few tributaries but occasionally ramify at the base of the basaltic cap.

3.4 VEGETATION

Since most of the survey area was almost totally burnt over there is much new growth, which consists of a dense stand of pines on the well drained flanks of the mountain and mainly spruce and fir on the flat mountain top. Alder thickets grow on the mountain top where the drainage is impeded. Occasional patches of the original forest have escaped destruction by the forest fire. Devils club and other shrubs and plants grow beside the stream channels and in some swamps.

3.5 SOIL

The soils in this area are very similar to that found at anomaly 1A north (Lahti, 1978B) except there are fewer organic rich soils. Well drained soils have well developed L, H, A, B and C horizons. In shallow soils adjacent to bedrock, some of the soil horizons may be absent or very thin with poorly developed horizons. Adjacent to streams and in some dry valleys, soils tend to have a thick organic and clay rich A horizon with a poorly developed B horizon.

4. GEOCHEMISTRY

4.1 GENERAL STATEMENT

The semi-detailed reconnaissance stream sediment survey completed in July (Lahti, 1978A) detected a strong uranium anomaly east of the Kettle River and a strong copper anomaly about two kilometres further to the south. The purpose of the follow-up survey was to delimit the anomalous areas and to identify the source(s) of the uranium and copper. To facilitate the discussion, streams have been numbered on the accompanying maps.

Sixty-four (64) stream sediment and 288 soil samples were collected and are discussed in this section. Thirteen (13) rock chip samples were collected and the data are discussed in Section 2. All samples were analysed for uranium (fluorimetric), copper, lead, zinc, silver and nickel (atomic absorption). Details on field methods and analytical techniques are located in Appendix III.

4.2 RESULTS

The results for uranium, copper, lead, zinc, silver and nickel are listed in Appendix IV. The sample locations and numbers along with claim boundaries for stream sediment and soil samples were plotted on Dwg. 208-42-501. The results have been plotted on maps (scale 1:10,000) that were prepared from enlargements of a part of NTS map 82E/15E and 82E/10 (scale 1:50,000). The stream sediment and soil uranium results and their interpretation are plotted on one map (Dwg. 208-42-502). Copper, lead, zinc, silver and nickel stream sediment data are plotted on Dwg. 208-42-503. The soil results for copper, lead and zinc are plotted on Dwg. 208-42-504, the silver-nickel results are plotted on Dwg. 208-42-505, and Dwg. 208-42-506 is a copper interpretation map.

Rock chip data are tabulated in Table 2.
The rock chip data are plotted on the soil maps that are found in the back of the report.

4.3 INTERPRETATION

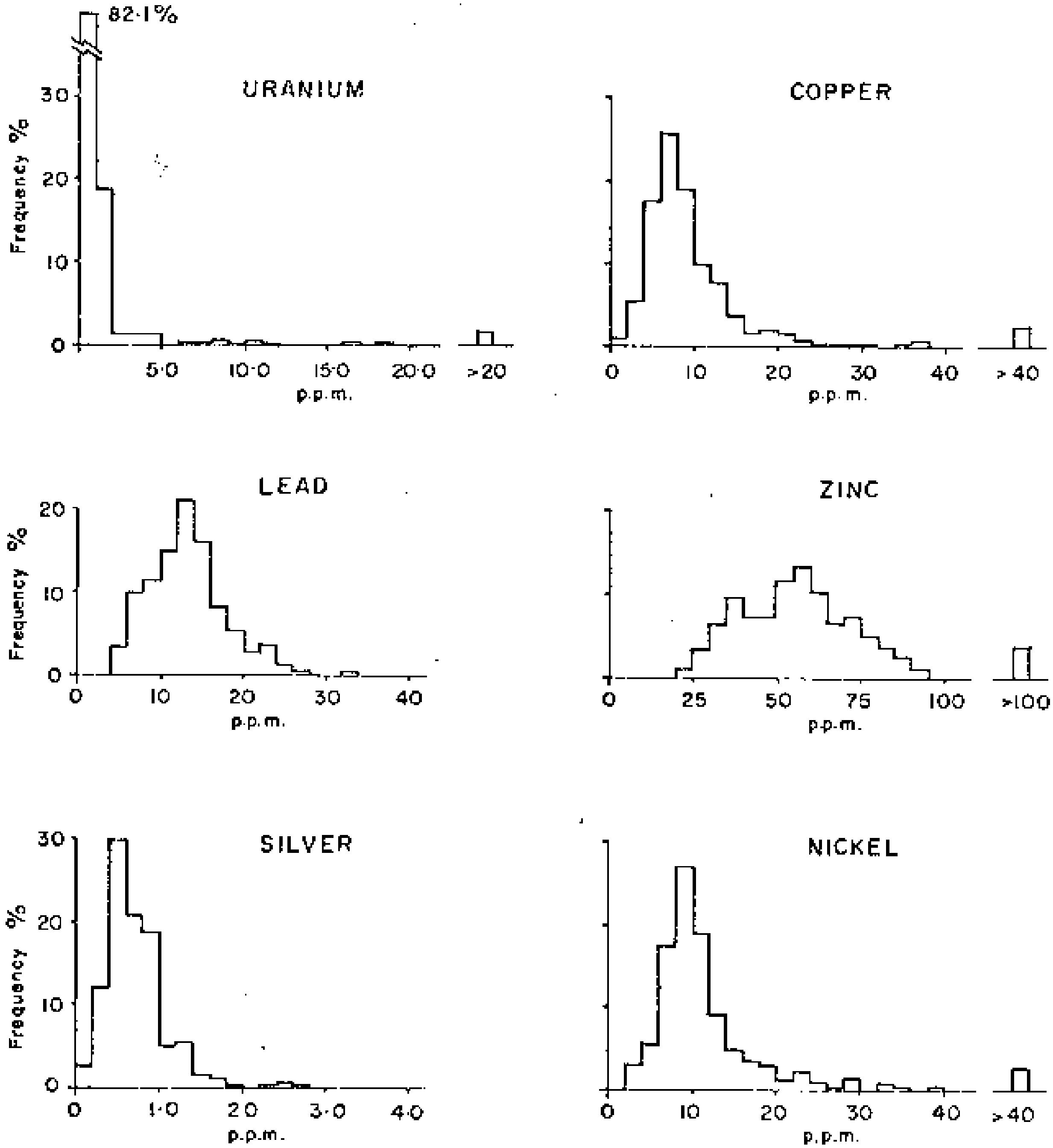
4.3.1 General Statement

To assist in the interpretation, frequency histograms (Figs. 2 and 3) for each element were prepared from the soil and stream sediment results, respectively. Thresholds and different anomalous levels were determined empirically for all elements and are summarized in Table 3 and 4. The raw data maps were then examined and the distribution of the anomalous levels noted. After evaluation of all data, uranium anomalies were outlined on the stream sediment and soil uranium raw data map Dwg. 208-42-502. The aforementioned map includes the area encompassing Anomalies 1A (south) and 7C, originally discovered during the reconnaissance stream sediment survey (Lahti, 1978).

4.3.2 Uranium

The stream sediment results from streams 1 and 2 in the northwest side of the central mountain contain some very high (first order anomalous) values. Stream 3 further to the south has several erratically distributed first and second order anomalous values. Stream 8 on the east side of the mountain across from streams 1 and 2 has an almost uniform concentration of third order uranium values from the headwater to about 300 metres above Rendell Creek.

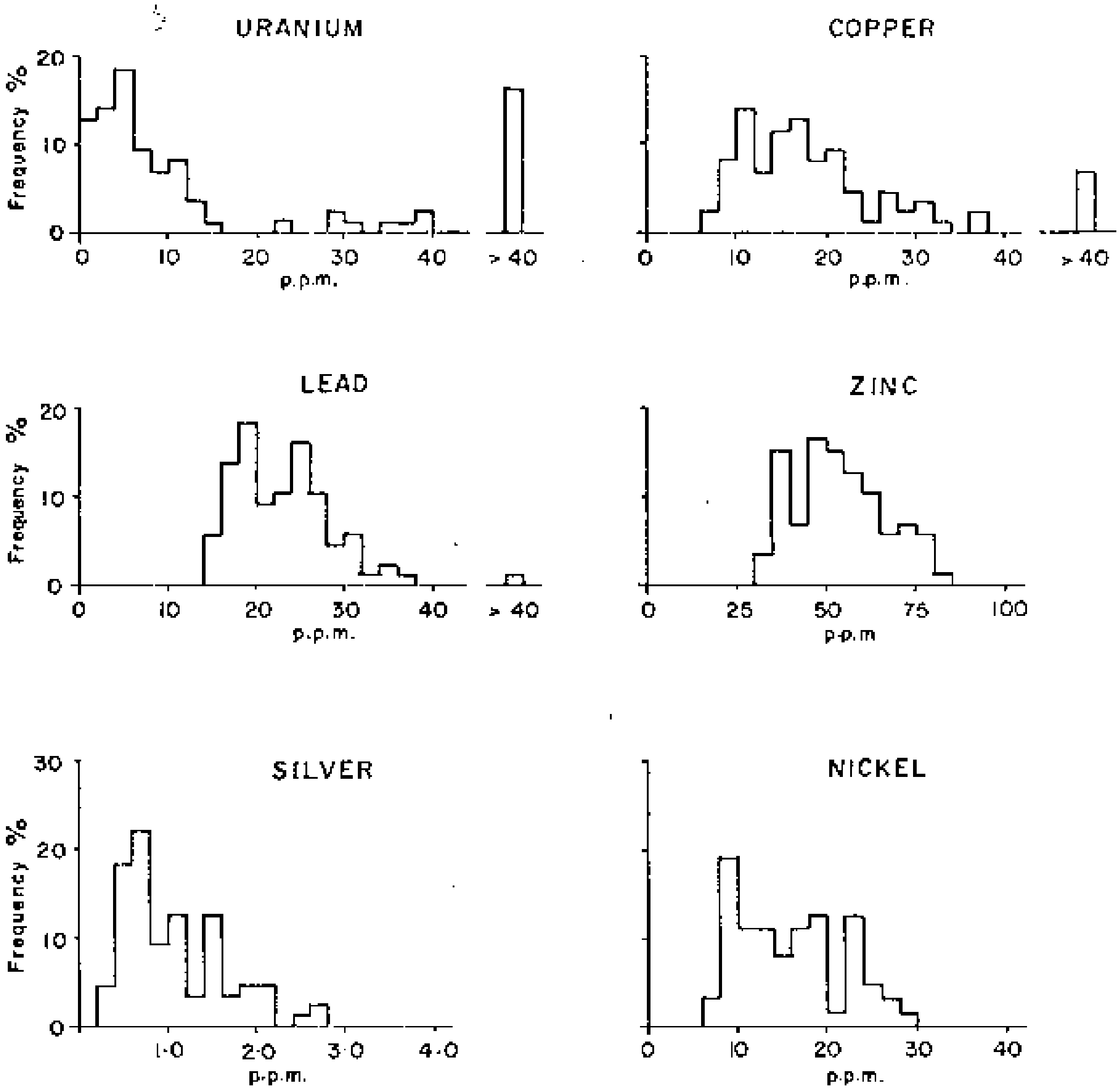
It appears the principal uranium source is located north of Stream 2 and on the west side of the central mountain ridge. Stream 1 has a third order anomalous cut-off value at NLF-26; the last sample collected near its headwaters. No cut-off value was found on Stream 2.



FREQUENCY DISTRIBUTION OF URANIUM, COPPER, LEAD, ZINC, SILVER AND NICKEL IN SOILS

ANOMALY 1A - SOUTH

FIG. 2



FREQUENCY DISTRIBUTION OF URANIUM, COPPER, LEAD, ZINC, SILVER AND NICKEL IN STREAM SEDIMENTS

ANOMALY 1A - SOUTH

FIG. 3

TABLE 3

THRESHOLDS AND ANOMALOUS LEVELS FOR SOIL DATA

Element	Threshold ppm	Fourth Order Anomalous ppm	Third Order Anomalous ppm	Second Order Anomalous ppm	First Order Anomalous ppm
U	3.0	3.1 - 6.0	6.1 - 12.0	12.1 - 18.0	> 18
Cu	16	---	17 - 24	25 - 36	> 36
Pb	20	---	21 - 30	31 - 40	> 40
Zn	65	---	---	66 -100	> 100
Ag	1.0	---	1.1 - 2.0	2.1 - 3.0	> 3.0
Ni	20	---	21 - 30	31 - 40	> 40

TABLE 4

THRESHOLDS AND ANOMALOUS LEVELS FOR STREAM SEDIMENT DATA

Element	Threshold ppm	Fourth Order Anomalous ppm	Third Order Anomalous ppm	Second Order Anomalous ppm	First Order Anomalous pp:
U	8	---	8.1 - 16.0	16.1 - 24	> 24
Cu	14	15 - 20	21 - 24	25 - 40	> 40
Pb	22	---	23 - 28	29 - 40	> 40
Zn	65	---	66 - 85	86 - 100	> 100
Ag	1.2	---	1.3 - 2.2	2.3 - 3.0	> 3.0
Ni	12	---	13 - 22	23 - 32	> 32

The uranium is associated with anomalous lead values and to a lesser degree with copper and silver. The only first order anomalous lead value is located near the central region of stream 2 coincident with the highest uranium values. This relationship is similar to that found at Mount Arthurs (Lahti, 1978B). Also, third order uranium values correlate with third order lead values in stream 8. The significance of this relationship is yet to be resolved.

The soil survey identified two elongated northeast-southwest striking first order uranium anomalies in the area of streams 1 and 2. Anomaly 1A extends for about two kilometres across Lines 8, 9, 12 and 3 and is 100 to 300 metres wide. Anomaly 2A, further up the slope, is much smaller (100 x 500 metres) and is made up of only two anomalous values on Lines 8 and 9, respectively (Dwg. 208-42-505). Both anomalies are open to the north.

Four hundred metres to the south and on strike with 2A is anomaly 5C consisting of fourth and third order anomalous uranium values. The discontinuous uranium trend, which is composed of anomalies 2A and 5C, is not detected on Line 1.

No obvious uranium sources for anomalies 1A and 2A-5C were observed during the collection of the stream sediment and soil samples. However, several possible explanations can be offered. Anomaly 1A appears to be in a classical location for a seepage anomaly derived from a hidden source up-slope. The uranium values in streams 1 and 2 rise in value to a peak at approximately halfway down both streams then gradually decrease in value until near the base of the mountain where the values increase in stream 2. The uranium soil sample results do not give an indication of the origin of the uranium. The two point anomaly (2A) is at the same elevation as the largest value found in the streams and is consistant with the seepage model.

Soil anomaly 1A, located at the base-of-slope and on the alluvial plain, is likely to be due to the downward migration of uranium in solution which precipitates at the break in slope where the physio-chemical parameters of the soil change. Although most of the soil samples with anomalous uranium concentrations, that form the above soil anomalies, have a high organic content, it does not alter the above model. The side of the mountain has natural uranium accumulation points at which the downward migration of uranium will concentrate once reaching the surface environment. The values observed on Stream 1 and 2 and in the soil strongly suggest a hidden uranium source which could well be concealed uranium mineralization under the basaltic cap. The uranium under the basaltic cap is oxidized by downward perculating oxygenated surface waters with resultant uranium transported in solution in the groundwater. Whenever this water table comes to surface (even intermittent throughout the year) anomalies will be developed. This applies to both sediments and soils.

It is also possible to account for the stream sediment and soil uranium geochemical features by re-mobilization of uranium from mineralized north-south shears and fault zones. These faults also create low points in the local topography where organic carbon, a primary scavening agent for uranium, accumulates. Thus, the downward migration of uranium could still form a secondary accumulation anomaly at the base-of-slope (anomaly 1A).

Another source that might account for anomalies 1A and 2B is slightly enriched pegmatites and county rock which is presently being leached, releasing uranium into solution. The uranium migrates downslope with the groundwater and accumulates in organic rich depressions or at base-of-slope accumulation points. The large enrichment factor detracts from this model but nevertheless it must be considered a possibility until there is evidence to the contrary.

There are two single point anomalies, 3B and 4B with uranium values of 32 and 46 ppm, respectively, that were downgraded to "B" class anomalies. The main reasons to downgrade anomaly 3B are that there are no supporting anomalous values and the anomaly is located in organic rich soils. Normally it would be down-graded to a "C" class anomaly but because it is located at an elevation of 1310.6 metres near the western edge of the basaltic cap, a similar environment to where uranium deposits are found elsewhere in the region, it is given the higher rating.

Anomaly 4B is near the eastern edge of the basaltic cap, in a similar geologic environment as anomaly 3B. This anomaly is not associated with organic rich soils nor is it at any other type of natural uranium accumulation point. The possible scavenging effects of iron and manganese cannot be determined because the soil samples were not analysed for these elements. This anomaly would be further up-graded if it could be shown the sample site was located near fissures and fractures which penetrate the basaltic cap or if the sample was located at or on a window exposing the underlying sedimentary deposits or basement rock.

The other uranium feature worth mentioning is Anomaly 5C, on strike and south of 2A. Line 1 did not pick up anomalous uranium concentrations at the projected strike continuation of 5C and 2A, however, due to the wide spacing of sampling along Line 1, it is still conceivable that the two anomalies are contiguous. Anomaly 5C is composed of fourth and third order anomalous values and is not considered important at this time. However, if follow-up work at 2A is positive then 5C should be re-examined in detail.

4.3.3 Copper

Stream sediment samples from streams 4, 5, 6 and 7 form copper anomaly 5C that was discovered during a previous semi-detailed reconnaissance stream sediment survey (Lahti, 1978A). There is a 1 kilometre dispersion train (using a 500 metre sample spacing) in stream 7, where copper declines from 135 ppm in the headwaters to 52 ppm one kilometre downstream (Dwg. 208-42-503). A detailed follow-up program with samples collected every 100 metres would have to be undertaken to more accurately define the extent of the dispersion train.

The overall distribution pattern shows higher copper values on the west side of the mountain. There are numerous fourth order to second order anomalous values in streams 1 to 6 with only one first order anomalous value in each of streams 3 and 5. These two first order anomalous values are not considered important at this time but if follow-up investigation at stream 7 proves positive then these one point anomalies should be re-evaluated.

No important copper anomalies are found in streams 8 and 9 on the east side of the mountain.

A soil survey (Dwg. 208-42-504) indicates a two kilometre long copper anomaly (A) that extends from Line 4 to Line 7 where the anomaly remains open to the south. This anomaly occurs in Unit 1 (Little, 1957) but the specific rock type associated with this anomaly has not been identified.

The anomalous samples occur on a steep slope with no obvious accumulation points. The source is thought to be in Unit 1 rather than the basaltic cap because most soil samples over the basalt have normal background values. There are exceptions, for example, there is a first order anomalous value on Line 6 at the west edge of the basalt and on Line 5 near the east edge. These isolated high copper values are not considered important at this time.

A strong copper anomaly at the extreme eastern end of Line 4 occurs at the same elevation as the large elongated anomaly on the west side. With the limited information available it is not known whether the anomalies occur in the same lithologic unit. More work is warranted to determine the source and nature of both anomalies.

Since anomaly "A" is primarily a copper anomaly with no associated lead or zinc it is possible the copper is related to weak porphyry type mineralization rather than volcanogenic massive sulphides. In contrast, geochemical feature B, which is on the east side of the mountain, has an excellent multi-element signature. This anomaly has first order nickel, zinc and second order silver values. The high nickel values suggests the metal values are associated with mafic to ultramafic rocks with normal high levels of copper, zinc and nickel. Because the detailed geology is not known it is impossible to verify any such association of anomalous values with the bedrock.

The erratic anomalous copper values found on Line 8, 9, 1 and 2 are proximal or coincident with some anomalous uranium values. Also some of the high values occur at natural accumulation points such as swampy valleys. The copper anomalies are not considered very important in themselves and further follow-up work is not warranted, but if the same or a proximal area is examined for uranium then concurrently the copper should be analysed and the data evaluated.

4.3.4 Lead, Zinc, Silver and Nickel

The follow-up stream sediment samples show streams 1 and 2 to have second order anomalous lead values coincident with the anomalous uranium values. Similarly, stream 8 on the east side of the mountain has numerous contiguous third order values which cease about 400 metres from the Rendell Creek. The close association between lead and uranium in the stream sediment was also detected at Mount Arthurs (Lahti, 1978B) about 10 kilometres to the east. There is a good possibility that there is a common source for the anomalous uranium and lead values therefore lead may become important when identifying potential drill targets.

The few third order lead soil anomalies do not appear to be related to any significant base metal mineralization.

No significant stream sediment zinc anomalies were found but there is a weak correlation of the third order zinc values with uranium and lead in the sediments of streams 1, 2 and 8. It is thought that none of the weak zinc anomalies are related to any significant base metal mineralization.

There are a large number of second order zinc soil anomalies that represent the upper end of the background range of values and are of no particular significance at this time.

There are, however, two good zinc soil anomalies; one at the extreme western end of Line 2 and the other at the eastern end of Line 4. The anomaly at the western end of Line 2 occurs at the base of the slope and extends out 200 metres out onto the Kettle River alluvial plain. This anomaly occurs at a natural accumulation point and probably indicates remobilized zinc from a normal background source. The values are first order but are not exceptionally high and if need be, could be examined simultaneously with the uranium investigations at anomalies 1A and 2A. The other zinc anomaly, which is on Line 4, is associated with copper, nickel and silver, and is considered important enough to warrant further evaluation.

The silver in stream sediments has a weak association with uranium, lead and zinc in stream 1, 2 and 8 suggesting a common source. There is also a weak correlation between silver and copper in streams 4, 5, 6 and 7 but the data are too few to determine the significance of this association of elements.

There is one possible significant silver anomaly located at the eastern end of Line 4. It is associated with anomalous copper, nickel and zinc and although there is limited data available it is believed that there is a bedrock anomaly indicating mafic to ultramafic rocks. If verification is required, it could be accomplished by rock chip sampling, detailed mapping and soil sampling.

Detailed stream sediment sampling reveals higher nickel levels in streams 8 and 9 on the east side of the mountain (Dwg. 208-42-504). However, there is no data available for stream 4, 5, 6 and 7 so it is unreasonable to speculate on the nickel concentration in these streams. The other streams draining to the west into the Kettle River have several second and third order anomalies that are not thought to be related to significant mineralization.

The soil samples verify the high nickel concentration on the east side of the mountain. Although, again, there is limited information available, it is suggested that the first order anomalous nickel along the eastern edge of the basaltic cap is due to high nickel content in a mafic to ultramafic rock. It is possible that limited copper-nickel mineralization contributes to the anomaly but this would have to be verified by additional soil and rock examinations.

There are other first order nickel values on Line 1, 2 and 3. These single point anomalies are not thought significant but if additional geochemical, geological or geophysical information becomes available then these anomalies should be reassessed.

5. CONCLUSIONS

1. Detailed stream sediment samples from streams 1 and 2 verified highly anomalous concentration of uranium in the stream sediments with coincident lead and to a lesser degree zinc and silver. The anomalies originate from an area overlaid by a basalt cap, a prime geological target for "paleo-channel" type uranium mineralization.
2. There appears to be a cut-off for uranium near the headwaters of stream 1 but none in stream 2.
3. Soil sampling identified two lenticular uranium anomalies on the west side of the basaltic capped mountain. The location of the highest uranium values in the soils are thought to be strongly modified by environmental factors such as seepage zones, breaks in the slope, etc. An interpretation of hydromorphic movement of uranium away from mineralization under the basalt cap is quite consistant with the available data.
4. Although the basaltic cap area is the prime target, mineralization in north-south shear zones, faults and pegmatites combined with downslope migration of uranium and the occurrance of natural accumulation points could give rise to the observed stream sediment and soil anomalies.
5. The soil and stream sediment uranium anomalies could also be derived from remobilized uranium from the basement rocks, however, the large enrichment factor is more indicative of uranium of a higher concentration than that found in the gneissic rocks.
6. Soil sampling also identified anomalous copper concentrations along Line 7, the site of first order copper values discovered during an earlier reconnaissance stream sediment survey.

7. There is a strong copper, nickel, zinc and silver anomaly located just off the eastern edge of the basaltic cap that is thought to be related to mafic or ultramafic rocks and not to any significant mineralization.
8. Many of the anomalous uranium, copper, lead, zinc and silver values are located at natural accumulation points such as in organic rich depressions, stream valleys, base-of-slope, etc. However, the anomalies cannot be completely downgraded due to environmental factors alone for in many instances the large enrichment factor; e.g., bedrock concentration versus the secondary accumulation anomalies, is high enough to suggest a richer primary uranium source.

6. RECOMMENDATIONS

1. Anomalies 1A and 2A should be followed up by detailed sampling, including soil profile sampling, pitting, mapping of surficial deposits, geology and measurement of the direction of groundwater movements. The prime purpose of this work would be to determine if the source or sources of the anomalies are sub-outcropping or are under the basalt cap. If the former is the case, then trenching and sampling of the sources is possible. In the latter case, drilling is required. A grid should be established with lines at 50 metre spacing, extending to the north and south, to delimit the anomalies. Soil samples should be taken from a depth of ± 20 cm. every 20 metres. Rock chip samples should be collected every 100 metres along the lines depending on bedrock exposure. All samples should be analysed for uranium, copper, lead and zinc and the organic matter should be visually estimated in the field and recorded.
2. A detailed examination should be made of the peripheral region of the plateau basalt by sampling all springs, seepages, and streams for any indication of uranium leaking out from under this cap. Gamma radiation should be monitored during all geochemical investigations.
3. The base metal anomaly at the end of Line 4 should be examined further by detailed soil sampling, rock chip sampling and geological mapping.
4. If priorities change then the copper anomaly in stream 7 should be evaluated by detailed stream sediment, soil, rock chip sampling and geological mapping.

5. If the results of the suggested follow-up work in 2 above proves positive, or if no other significant source of uranium can be located, then drilling through the basaltic cap will have to be considered and in addition, the minor geochemical features should be re-evaluated. All drill cores should be analysed for indications of an alteration halo. Detection of such a halo can significantly enlarge the drilling target.

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3. Little, H.W. (1957): Geology of Kettle River (East Half), Geological Survey of 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.

Howard Lahti

H.R. Lahti, Ph.D.
Geologist-Geochemist
Barringer Magenta Limited

APPENDIX II

ASSESSMENT REPORT - ANOMALY 1A (SOUTH)

Statement of Cost:

a) Days Worked at Anomaly 1A (South Part)

Supervisor, H. Lahti, August	7 days
Geochemical Technician, G. White, August	6 days
Senior Sampling Assistant, C. Shearer, August	6 days
Junior Sampling Assistant, R. Balford, August	7 days
Junior Sampling Assistant, K. Wisser, August	6 days
Junior Sampling Assistant, D. Pyke, August	1 day
Camp Guard, D. Moroko, August	2 days
Consultants, I. Thomson	3 days
P. Bradshaw	2 day

b) Cost of Wages

Supervisor, 7 days @ $220/day =	$ 1,540.00
Geochemical Technician, 6 days @ $119/day =	$ 714.00
Senior Sampling Assistant, 6 days @ $108/day =	$ 648.00
Junior Assistant (3), 14 days @ $96/day =	$ 1,344.00
Camp Guard, 2 days @ $25/day =	$ 50.00
Consultants (2) 5 days @ $300/day =	$ 1,500.00
	$ 5,996.00

c) Food and Accommodation

i) Field Camp: Charges:

$ 7.00 per day per person for food
$13.00 per day per person for rental of tents, etc.
$20.00

	35 crew days @ $20/day =	$ 700.00
ii)	Accommodation and Food, Vernon Lodge	
	3 days @ $43/day =	$ 129.00
		$ 829.00

d) Instrument Rental

i)	2 Exploranium Model GR-101A =	$ 101.61
ii)	GAD-6 Spectrometer =	$ 394.70
iii)	Radio Telephone =	$ 142.25
		$ 638.56

e) Geochemical Analyses

i)	Rock chip samples @ $8.90/sample for U, Cu, Pb, Zn, Ag, Mo or Ni	
	7 x $8.90 =	$ 62.30
ii)	Stream sediment sampling @ $7.30/sample for U, Cu, Pb, Zn, Ag, Ni or Mo	
	288 x $7.30 =	$ 2,102.40
iii)	Soil Sampling @ $7.30/sample for Cu, Pb, Zn, U, Ag, Mo or Ni	
	64 x $7.30 =	$ 467.20
		$ 2,631.90

f) Transportation

i)	Truck Rental, 7 days @ $51/day =	$ 357.00
ii)	3/4 ton Truck =	$ 44.71
iii)	Helicopter Support 3.8 hours @ $399.30/hour =	$ 1,517.34
		$ 1,919.05

g) Cost of Report Preparation

i)	Drafting and Compilation	
	Compilation, P. Lawrence =	$ 338.48
	Drafting, R. Marcroft =	$ 338.48
	Data Graphics, M. Herz =	$ 600.00
ii)	Materials	$ 42.31
iii)	Report Writing, H. Lahti	$ 2,068.94
		$ 3,388.21

h) Miscellaneous Costs

telephone, telex, shipment charges, miscellaneous materials, etc. =	$ 1,212.77
TOTAL COST FOR WORK ON ANOMALY 1A (SOUTH PART)	$16,415.49

ASSESSMENT REPORT - ANOMALY 7C

Statement of Costs:

a) Days Worked

Supervisor, H. Lahti, August	3 days
Geochemical Technician, G. White, August	2 days
Senior Sampling Assistant, C. Shearer, August	1 day
Junior Sampling Assistant, K. Wisser, August	2 days
Junior Sampling Assistant, R. Balford, August	2 days
Junior Sampling Assistant, D. Pyke, August	2 days
Camp Guard, D. Moroko	1 day
Consultant, I. Thomson, August	2 day

b) Cost of Wages

Supervisor, 3 days @ $220/day =	$ 660.00
Geochemical Technician, 2 days @ $119/day =	$ 238.00
Senior Sampling Assistant, 1 day @ $108/day =	$ 108.00
Junior Sampling Assistants, 6 days @ $96/day =	$ 576.00
Camp Guard, 1 day @ $25 =	$ 25.00
Consultant, 2 day @ $300/day =	$ 600.00
	$ 2,207.00

c) Food and Accommodation

i) Field Camp: Charges:

$ 7.00 per day per person for food

$13.00 per day per person for rental of tents, etc.

$20.00

13 crew days @ $20 =	$	260.00

d) Instrument Rental

i) 2 Exploranium Model GR-101A =	$	43.56
ii) GAD-6 Spectrometer =	$	169.21
iii) Radio Telephone =	$	60.98
	$	273.75

e) Geochemical Analyses

i) Rock chip samples @ $8.90/sample for U, Cu, Pb, Zn, Ag, Mo or Ni 6 x $8.90 =	$	53.40
ii) Soil Samples @ $7.30/sample for U, Cu, Pb, Zn, Ag, Mo or Ni 62 x $7.30 =	$	452.60
	$	506.00

f) Transportation

i) Truck Rental =	$	153.00
ii) 3/4 ton Truck =	$	19.17
	$	172.17

g) Cost of Report Preparation

i) Drafting and Compilation		
Compilation, P. Lawrence	$	64.16
Drafting, R. Marcroft	$	64.16
Data Graphics, M. Herz	$	300.00
ii) Materials	$	8.02
iii) Report Writing, H. Lahti	$	880.00
	$	1,316.34

h) Miscellaneous Costs

Telephone, telex, materials, photos, shipping charges, etc.	$	519.91
TOTAL COSTS INCURRED	$	5,255.17

APPENDIX III

1.1 Stream Sediment Sampling

All follow-up stream sediment samples were collected by hand from several locations (within 20 metres) to make a composite sample.

About 500 grams of material per sample was placed in high wet-strength Kraft sample packets (6 cm. x 9 cm.). To mark the location of the sample site, a water proof pen was used to print the sample number on a one metre length of fluorescent orange flagging tape. Samples were collected every 100 metres with the distance estimated by pacing. Airphotos and topographic maps at a scale of 1:50,000 were used to assist in locating sample sites.

1.2 Soil Sampling

The soil sample was collected by using a grub-hoe. The soil sample was collected from the "B" horizon generally from a depth of $\pm$ 20 cm. Approximately 250-500 grams were placed in high wet-strength Kraft paper bags (6 cm. x 9 cm.). The sample traverses were placed 500 metres apart approximately perpendicular to the drainage and samples were taken every 40 metres. The traverses were surveyed by pace and compass using airphotos or topography maps at a scale of 1:50,000. The sample site was marked by a metre length of fluorescent orange flagging tape with the distance and/or sample number marked on with waterproof marking pen. The whole length of the traverse was blazed using orange flagging tape.

1.3 Rock Chip Sampling

In conjunction with the soil sampling, rock chip samples were occasionally taken along the soil traverses. The rock chip sample consists of 3 to 5 rock chips collected from an area of approximately 50 to 100 m^2. Approximately 250 grams of material was placed in high wet-strength Kraft paper packets (6 cm. x 9 cm.).

2. LABORATORY TECHNIQUES

Stream sediment analyses were done at the Barringer Magenta Limited laboratory, Rexdale, Ontario. The samples were first oven dried at a temperature of 45°C. The samples were then sieved through a 80 mesh nylon screen. A .500 gram portion of this was placed in a glass test tube and perchloric 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 the concentrations of copper, lead, zinc, silver and molybdenum were read directly in ppm.

The uranium was determined fluorimetrically by using the following procedure. A .250 gram 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 fused with the sample. After cooling, the disc was then compared with fresh standards using a Jarrell-Ash Fluorometer.

The limit of detection for copper, lead, zinc, silver, molybdenum and uranium are 1, 1, 1, .2, 1 and .2, respectively.

Rock chip samples were first put through a jaw crusher, pulverizer, and a -200 mesh nylon sieve. A .500 gram portion of the sample was then subjected to the same procedure used to analyse the stream sediment samples.

APPENDIX IV

ANALYTICAL DATA

Geochemical Laboratory Report

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLE- 21	100.0	32	31	77	19	1.6				
22	76.0	22	31	65	16	1.3				
23	66.0	18	27	60	14	.9				
24	56.0	19	29	59	14	1.1				
25	32.0	17	29	62	13	1.0				
26	8.8	11	26	74	8	.6				
27	38.0	13	23	47	12	.7				
28	30.0	12	19	47	11	.6				
29	68.0	22	26	47	14	.7				
30	40.0	21	29	65	19	1.1				
31	80.0	27	36	68	20	1.6				
32	72.0	32	44	78	24	1.6				
33	48.0	22	36	64	18	1.5				
34	40.0	21	31	66	18	1.5				
35	36.0	21	28	58	16	1.3				
36	46.0	25	32	71	19	1.6				
37	3.4	12	20	44	23	.4				
38	3.0	10	18	38	18	.5				
39	3.6	11	21	41	20	.4				
40	1.0	12	25	56	27	.7				
41	2.6	12	18	43	19	.7				
42	2.8	12	15	38	17	.5				
43	1.8	9	16	38	17	.4				
44	1.7	11	18	39	19	.5				
45	2.0	13	20	54	24	.6				
46	1.9	15	19	49	23	.6				
47	4.4	18	22	54	29	.7				

Geochemical Laboratory Report

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm
NLF ~~NFL-~~ 1001	2.8	7	18	35	8	.4
1002	.6	18	20	44	9	.6
1003	1.3	28	20	49	10	.7
1004	1.2	50	28	71	11	1.1
1005	2.0	17	19	47	9	.5
1006	2.0	12	18	36	8	.6
1007	30.0	37	23	50	13	1.2
1008	7.6	12	19	38	9	.7
1009	1.3	16	20	52	9	.7
1010	12.0	27	24	56	13	.9
1011	24.0	34	26	56	15	1.2
1012	5.4	27	23	47	13	1.0
1013	3.8	15	18	36	9	.6
1014	5.8	19	18	40	11	.7
1015	4.2	16	17	34	10	.6
1016	6.4	16	17	37	9	.6
1017	3.8	15	19	41	10	.7
1018	6.2	15	18	37	9	.6
1019	6.0	18	20	43	11	.8
1020	6.6	17	19	39	10	.7
1021	4.0	17	21	46	11	.8
1022	10.8	24	22	44	11	.8
1023	8.0	22	22	46	10	.8

Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm
NLF- 1057	7.4	14	25	63	53	.9
1058	2.0	10	21	62	11	.7
1059	.4	8	19	59	9	.8
1060	.8	5	15	51	7	.4
1061	.4	3	12	22	5	.3
1062	1.5	9	24	71	11	.9
1063	.4	6	19	56	9	.5
1064	.9	6	19	32	9	.6
1065	1.5	8	22	76	15	.8
1066	4.2	10	27	74	12	.9
1067	6.6	10	24	57	12	.8
1068	.6	7	19	71	11	.6
1069	.2	7	20	72	10	.6
1070	1.0	12	23	64	12	.9
1071	1.1	11	24	51	14	.9
1072	.5	12	23	67	15	1.1
1073	.5	5	16	33	7	.5
1074	.2	8	18	43	9	.6
1075	.6	10	20	46	10	.6
1076	.4	9	21	83	11	.6
1077	.2	8	19	53	9	.7
1078	.4	13	19	92	24	1.1
1079	.5	14	24	68	19	.7
1080	.5	13	21	62	20	.8
NLF- 1081	.2	7	19	29	11	.4
1082	.4	9	20	58	12	.6
1083	.4	16	23	76	24	1.0

Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm
NLF- 1096	13.2	19	29	76	24	1.5
1097	11.6	20	28	73	26	1.7
1098	12.4	20	26	67	25	1.5
1099	13.0	21	27	71	28	1.6
1100	5.8	18	26	69	25	1.1
1101	9.4	17	25	62	24	1.1
1102	10.6	14	25	54	21	1.0
1103	10.0	17	25	60	23	1.1
1104	6.6	13	25	62	23	1.0
1105	10.0	12	23	57	20	1.0
1106	5.6	9	20	50	18	.7
1107	10.8	10	20	47	15	.7
1108	4.4	8	22	49	16	.7
1109	5.2	9	21	52	17	.8

Geochemical Laboratory Report

SAMPLE NUMBER	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLFS- 1	.6	14	17	70	13	.8				
2	.9	19	15	64	11	.5				
3	.7	14	19	67	11	.4				
4	18.4	13	20	81	14	.7				
5	10.6	19	20	45	15	.8				
6	3.2	10	16	84	12	.6				
7	.3	6	14	58	8	.4				
8	.2	3	12	36	7	.2				
9	.7	8	17	79	11	.5				
10	.3	9	15	74	11	.7				
11	.4	7	14	60	10	.5				
12	.2	6	14	67	9	.4				
13	.2	7	15	86	10	.5				
14	.4	7	17	71	10	.6				
15	.4	9	14	51	10	.4				
16	.4	6	17	34	7	.2				
17	.3	7	14	49	9	.2				
18	.7	6	16	63	9	.5				
19	.2	6	18	93	10	.5				

Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLFS- 20	1.2	11	14	130	13	.7				
21	.2	12	16	74	18	.6				
22	.4	20	25	150	69	.9				
23	.2	8	16	73	9	.5				
24	11.2	24	24	59	15	1.5				
25	.5	10	15	47	11	.6				
26	.2	6	14	47	8	.4				
27	.3	9	17	86	15	.8				
28	.2	7	12	77	12	.5				
29	.2	8	16	79	18	.6				
30	.2	11	13	74	41	.5				
31	1.6	9	18	47	9	.5				
32	.3	11	17	86	11	.8				
33	13.6	13	19	64	12	.4				
34	1.0	9	15	66	8	.5				
35	.2	7	14	62	11	.5				
36	1.7	13	20	89	12	.6				
37	.7	9	13	84	9	.5				
38	.6	8	21	65	8	.4				

Geochemical Laboratory Report

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLFS- 39	28.0	18	26	52	17	.7				
40	1.2	10	18	63	7	.6				
41	.2	5	16	35	4	.4				
42	.3	7	14	57	9	.7				
43	.2	7	16	51	8	.6				
44	.4	7	15	40	8	.5				
45	16.8	21	25	190	18	1.3				
46	.3	7	14	76	9	.5				
47	2.4	9	20	63	9	.7				
48	.4	6	13	61	8	.6				
49	.3	8	18	54	8	.6				
50	.8	9	26	59	10	.5				
51	.7	8	15	66	10	.5				
52	.6	9	22	81	13	.7				
53	.4	9	17	59	13	.4				
54	.6	10	18	75	11	.6				
55	22.0	49	33	140	26	1.8				
56	1.0	7	15	57	10	.5				
57	1.1	9	24	130	10	.7				
NLFS- 58	9.8	9	16	61	10	.6				
59	34.0	21	23	66	17	.8				
60	.6	6	14	51	8	.6				
61	.2	5	15	42	9	.6				
62	.2	5	13	30	10	.5				
63	1.2	4	12	35	12	.6				
64	1.0	7	15	36	10	.5				
65	.3	6	13	26	8	.7				

Geochemical Laboratory Report /

SAMPLE NUMBER	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLFS 66	.2	7	14	37	9	.6				
67	.2	3	11	28	6	.3				
68	.3	7	15	57	10	.7				
69	.6	7	14	38	10	.6				
70	.5	8	14	29	9	.7				
71	.8	9	16	40	.9	.7				
72	.5	9	13	35	7	.4				
73	.3	14	14	62	8	.7				
74	.3	18	12	40	9	.6				
75	.5	17	12	39	8	.4				
76	.2	135	13	42	11	.9				
77	.2	35	14	48	9	.5				
78	.2	8	15	56	11	.6				
79	.2	7	13	36	11	.4				
80	.2	15	13	52	34	.9				
81	.2	11	12	69	21	1.0				
82	.2	14	13	68	19	.9				
83	.5	9	13	51	15	.7				
84	.2	12	14	54	16	.9				
85	.2	12	14	37	12	.6				
86	.2	9	13	39	11	.8				
87	.2	9	14	40	10	.6				
88	.2	8	14	31	10	.5				
89	.4	8	13	45	10	.5				

Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm
NLFS 90	.5	11	15	32	11	.9
91	.4	7	15	36	11	.7
92	.4	10	18	71	12	1.0
93	.6	12	17	180	12	1.2
94	.8	10	16	170	9	1.1
95	.2	12	16	110	12	1.0
96	.4	13	15	135	12	.9
97	84.2	16	22	52	9	1.1
98	3.2	7	19	90	8	.7
99	1.4	7	13	60	8	.7
100	.9	7	15	45	8	.6
101	1.7	8	20	43	9	.9
102	1.3	9	17	70	10	.7
NLFRS (ROCKS) 103	1.3	14	14	38	53	.4
NLFRS 104	.2	37	16	53	64	.5
NLFRS 105	.2	6	17	44	10	.4
106	.4	7	16	78	10	.6

Geochemical Laboratory Report /

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLFS- 107	1.7	11	21	78	13	.8				
108	.4	5	13	38	6	.5				
109	.2	6	15	56	7	.5				
110	1.9	7	14	36	9	.3				
111	3.0	5	11	21	7	.2				
112	4.8	7	15	36	10	.6				
113	1.4	6	14	32	10	.6				
114	.6	8	16	56	11	.6				
115	8.4	7	14	37	7	.4				
116	.5	5	14	51	6	.4				
117	.2	5	14	61	9	.5				
118	.3	7	15	79	9	.9				
119	.2	5	13	58	7	.5				
120	.3	5	14	48	8	.6				
121	.5	5	12	50	7	.4				
122	1.3	7	14	59	10	.8				
123	1.1	10	18	69	11	.9				
124	1.0	8	16	56	11	.9				
125	2.0	9	15	67	12	.9				
126	.4	6	12	39	9	.6				
127	.2	7	14	51	8	.5				
128	.3	6	13	52	8	.6				
129	.6	7	13	35	8	.4				
130	.9	5	15	25	6	.3				
131	1.4	6	14	40	8	.8				
132	.2	6	14	39	7	.7				
133	.2	7	15	32	8	.6				

Geochemical Laboratory Report

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm
NLFS 134	.2	5	13	47	7	.4
135	.2	6	22	155	7	.7
136	32.0	25	27	60	19	2.0
137	.3	3	11	32	6	.4
138	.2	3	10	28	5	.2
139	.3	4	12	33	6	.3
140	4.6	9	17	51	8	.6
141	.5	10	17	53	7	.7
142	.2	7	14	52	8	.6
143	.8	6	14	59	10	.7
144	.2	6	15	70	8	.5
145	.4	8	16	82	10	.7
146	.2	8	15	51	12	.6
147	.5	8	17	70	9	.8
ROCK NLFR 148	.7	44	20	28	150	.5
149	.2	7	12	65	8	.4
150	.2	7	14	75	8	.7
151	.2	8	23	46	6	.6

Geochemical Laboratory Report /

Sample Number		U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLFS	1022	.2	6	15	49	12	.6				
	1023	1.0	12	16	34	13	.7				
	1024	.7	10	17	93	13	.9				
	1025	.4	8	17	74	11	.9				
	1026	.2	3	12	33	7	.4				
	1027	.2	3	15	31	6	.5				
	1028	.2	8	14	45	9	.8				
	1029	.2	7	16	73	9	.6				
	1030	.4	9	17	57	10	1.1				
	1031	.3	7	16	76	9	1.0				
	1032	.2	10	24	87	10	.9				
	1033	.2	21	18	45	8	1.0				
	1034	.2	12	14	58	10	.9				
	1035	.4	6	12	26	7	.4				
	1036	.3	3	11	34	7	.3				
	1037	.8	54	15	61	35	1.2				
	1038	.7	15	15	57	20	.9				
	1039	.2	10	15	58	15	1.0				
	1040	.2	12	14	41	18	1.2				
	1041	.2	8	15	57	10	.5				
	1042	.2	10	13	47	14	.7				
	1043	.2	10	13	38	10	.5				
	1044	.4	11	14	40	10	.9				
	1045	.2	7	14	54	11	.9				
	1046	.2	9	14	85	14	1.0				
	1047	.3	13	14	76	20	1.1				
	1048	.2	10	15	61	13	.7				
	1049	.7	21	14	65	30	1.3				

Geochemical Laboratory Report

Sample Number	U ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Ag ppm				
NLFS 1050	.2	11	13	74	16	.9				
1051	,2	13	14	72	25	1.1				
1052	.3	19	15	62	39	1.4				
1053	5	12	55	0.8	10	0.6				
1054	7	11	54	0.6	10	0.4				
1055	6	15	58	1.0	11	0.4				
1056	6	13	62	0.4	10	0.4				
1057	5	12	55	0.4	11	0.2				
1058	4	14	75	0.2	11	<.2				
1059	2	9	50	<.2	7	0.4				
1060	2	8	40	<.2	7	0.2				
1061	3	10	53	<.2	12	0.6				

Geochemical Laboratory Report

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm
NLFS-1399	7	10	80	1.0	9	0.8
1400	4	8	55	.8	16	0.4
1401	3	8	50	.6	5	1.0
1402	4	22	75	1.0	7	0.4
1403	9	14	73	1.0	8	0.8
1404	5	7	45	.8	6	0.6
1405	5	9	60	.8	8	0.8
1406	5	8	51	1.2	13	0.6
1407	5	8	44	0.6	10	1.0
1408	7	8	57	0.8	9	0.2
1409	4	7	38	0.4	7	0.6
1410	10	10	47	1.0	11	0.8
1411	5	6	28	0.4	6	1.2
1412	8	7	39	1.0	10	0.2
1413	8	9	42	1.0	9	0.4
1414	10	9	33	1.2	11	0.4
1415	10	8	34	1.4	11	0.8
1416	8	4	31	0.6	6	1.4
1417	5	5	29	0.6	5	0.8
1418	42	10	55	1.4	21	10.8
1419	7	7	120	1.0	11	0.6
1420	7	7	80	0.6	9	0.2
1421	7	5	78	0.8	8	0.4
1422	15	9	58	1.4	13	1.8
1423	7	8	42	0.8	9	0.8

Geochemical Laboratory Report

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm
NLFS-1424	5	7	50	0.6	8	0.4
1425	3	6	39	0.6	7	0.6
1426	3	5	44	0.4	7	0.6
1427	5	7	70	0.6	9	0.6
1428	3	7	35	0.4	5	0.4
1429	8	10	60	0.8	10	0.4
1430	5	8	64	0.6	8	0.4
1431	11	7	73	1.0	22	0.8
1432	14	9	65	1.4	33	0.2
1433	13	7	63	1.8	33	<.2
1434	10	5	40	0.4	8	0.4
1435	9	5	45	0.8	10	0.4
1436	11	7	42	0.8	12	0.8
1437	10	6	40	0.8	10	0.6
1438	9	8	50	0.8	11	0.4
1439	11	10	45	1.4	17	0.6
1440	5	6	36	0.8	9	0.6
1441	7	7	60	1.0	10	0.2
1442	12	10	46	1.6	13	1.4
1443	10	8	40	1.0	12	0.2
1444	6	9	45	0.8	10	0.6
1445	14	12	57	1.6	17	1.0
1446	12	12	85	0.8	20	0.6
1447	10	10	78	1.2	17	0.8
1448	12	9	83	1.4	17	1.2
1449	9	9	57	1.0	13	0.8
1450	8	7	72	0.5	14	0.4

Geochemical Laboratory Report

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm				
NLFS- 1451	10	8	80	1.0	24	0.4				
1452	8	9	55	0.6	15	0.2				
1453	55	16	82	2.6	43	8.4				
1454	12	5	55	0.8	18	0.2				
1455	8	5	66	0.6	16	46.0				
1456	9	6	70	0.6	14	0.8				
1457	16	7	55	1.0	23	0.4				
1458	14	7	55	1.0	20	0.4				
1459	16	8	58	0.8	23	0.4				
1460	14	9	52	1.2	24	0.6				
1461	15	11	65	1.4	25	<.2				
1462	15	9	65	1.2	29	0.2				
1463	15	10	66	1.4	29	0.2				
1464	16	9	57	1.6	28	0.6				
1465	7	8	62	1.0	13	0.4				

Geochemical Laboratory Report

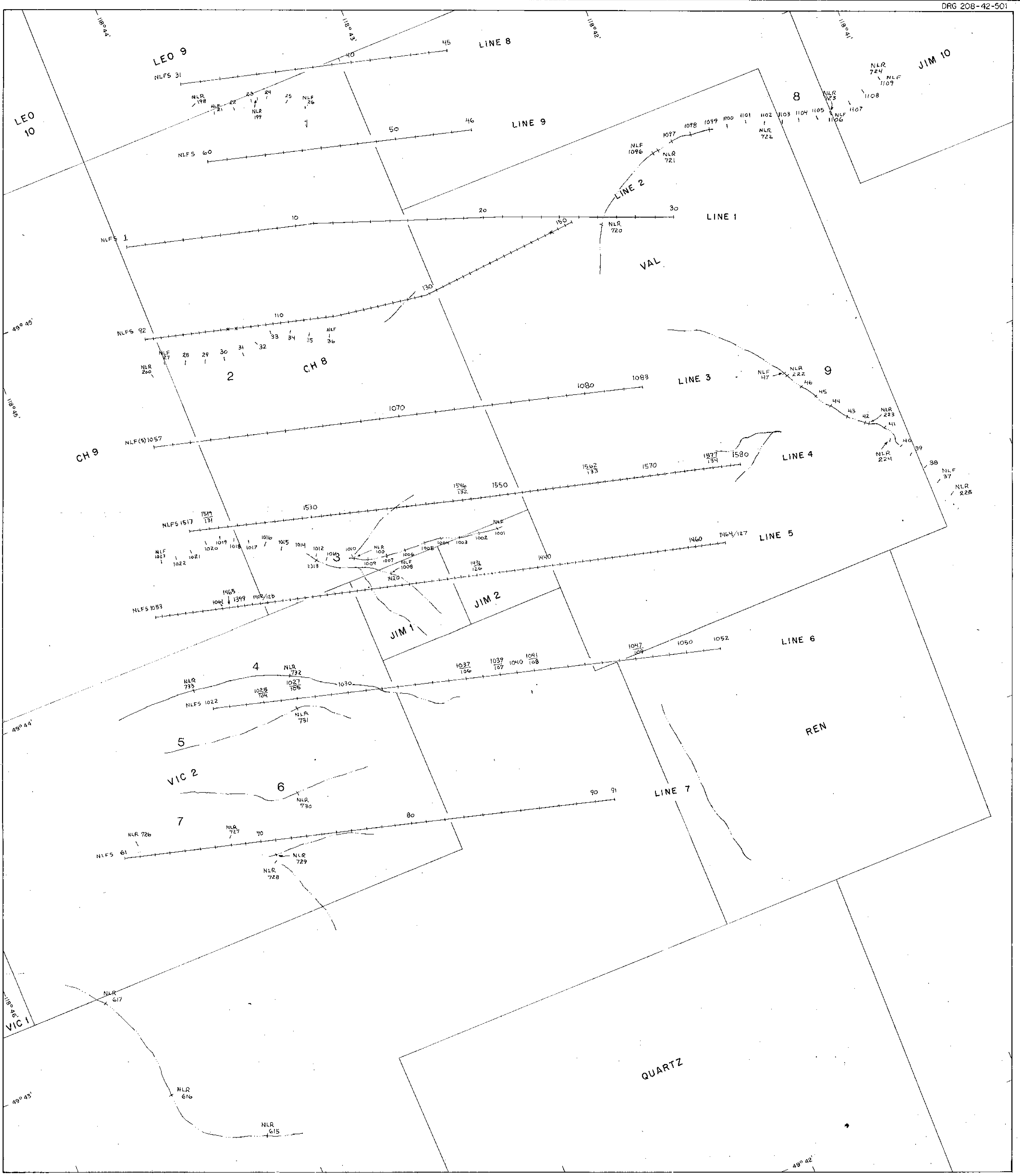
Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm
NLFS-1517	10	11	80	0.8	10	1.4
1518	5	11	59	1.0	10	0.6
1519	5	11	47	1.0	12	0.4
1520	7	11	55	1.0	9	0.2
1521	9	12	48	1.0	11	0.8
1522	8	12	62	1.2	11	0.6
1523	5	10	44	0.6	8	0.4
1524	7	13	65	1.0	10	0.6
1525	12	16	62	1.4	11	1.2
1526	7	12	70	1.0	11	0.4
1527	5	11	59	0.6	9	0.4
1528	7	10	55	0.8	14	0.8
1529	8	12	55	1.0	11	0.4
1530	6	10	59	0.6	9	0.8
1531	5	11	90	0.8	10	0.6

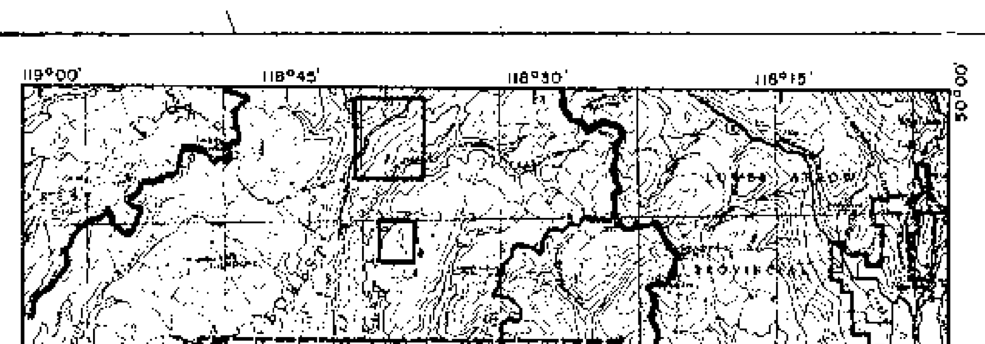
Geochemical Laboratory Report /

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm				
NLFS-1532	8	12	85	0.8	11	1.0				
1533	8	12	83	0.8	13	0.8				
1534	7	11	55	0.6	10	0.8				
1535	5	8	50	0.4	8	0.8				
1536	14	13	91	0.8	14	1.2				
1537	19	14	60	1.2	13	1.2				
1538	19	18	89	1.0	15	1.0				
1539	30	9	43	0.6	14	0.8				
1540	38	12	61	1.0	16	1.0				
1541	20	12	61	1.0	11	1.0				
1542	24	12	55	1.0	12	4.0				
1543	9	11	83	0.8	9	0.6				
1544	18	12	52	1.0	13	0.6				
1545	21	10	42	1.0	12	0.6				
1546	13	11	55	0.6	11	0.4				
1547	7	10	49	0.6	10	0.6				
1548	11	10	46	0.6	9	3.0				
1549	12	11	62	0.8	12	0.6				
1550	13	17	75	1.4	13	0.8				
1552	28	12	43	1.4	16	4.2				
1553	9	7	30	0.6	7	0.6				
1554	8	7	33	0.4	6	<.2				
1555	15	9	37	0.8	9	0.4				
1556	10	9	57	1.0	10	1.0				
1557	17	14	65	1.6	16	4.2				
1558	6	8	51	0.6	8	1.4				
1559	4	7	40	0.4	6	0.2				

Geochemical Laboratory Report

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	U ppm				
NLFS- 1560	5	7	25	0.4	5	0.8				
1561	10	9	68	1.0	8	1.2				
1562	8	9	46	0.8	11	0.4				
1563	15	10	60	1.4	13	0.6				
1564	12	11	65	1.0	13	0.4				
1565	14	11	57	1.4	15	1.0				
1566	13	12	75	1.4	19	<.2				
1567	11	13	72	1.6	20	1.0				
1568	14	11	62	1.4	30	<.2				
1569	10	10	58	1.0	14	1.4				
1570	12	10	57	1.2	24	0.6				
1571	10	11	46	1.0	13	0.6				
1572	10	10	43	1.0	13	0.2				
1573	14	11	67	1.4	21	3.0				
1574	23	12	40	1.8	23	3.4				
1575	11	9	48	0.8	12	2.4				
1576	11	12	89	1.4	18	0.2				
1577	19	14	67	1.8	20	1.8				
1578	32	16	72	2.4	29	4.0				
1579	51	19	135	2.6	150	0.2				
1580	45	18	125	2.8	150	0.2				





LEGEND

SOIL-18/ROCK-12 — Line or sampled stream with Sample number

SOIL-17/ROCK-25 — element value in p.p.m.

* Soil sample is a rock chip

JIM 8 — Claim boundary with name and number

5 — Stream number

PART 3 OF 9

7160

KELVIN ENERGY LIMITED

KETTLE RIVER AREA, B.C.

GEOCHEMICAL SURVEY

ANOMALY 1A SOUTH

SOIL TRAVERSE FOLLOW-UP

SAMPLE LOCATION AND NUMBER

(STREAM AND SOIL)

SCALE 1:10,000

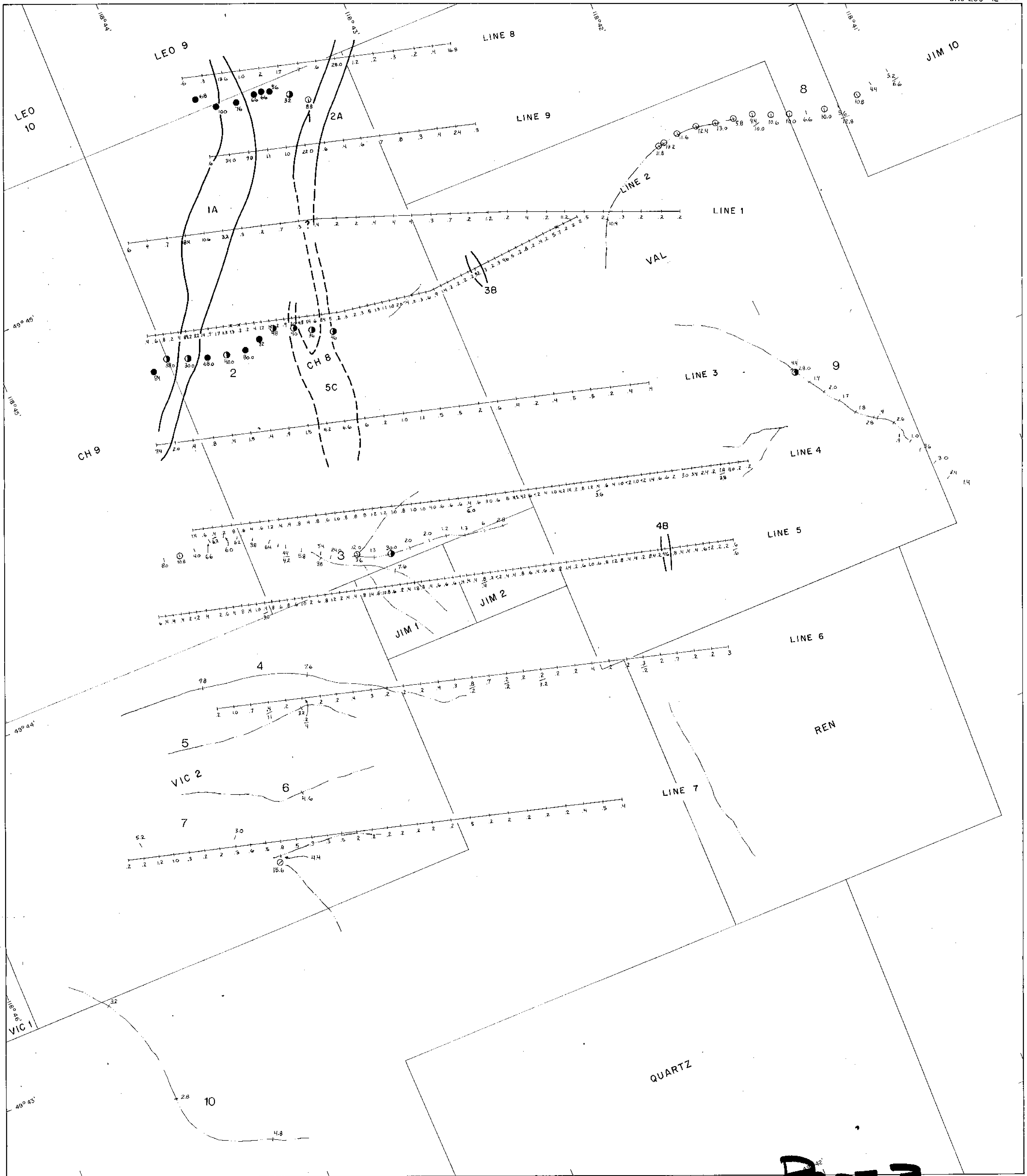
FEET 0 1000 2000 3000

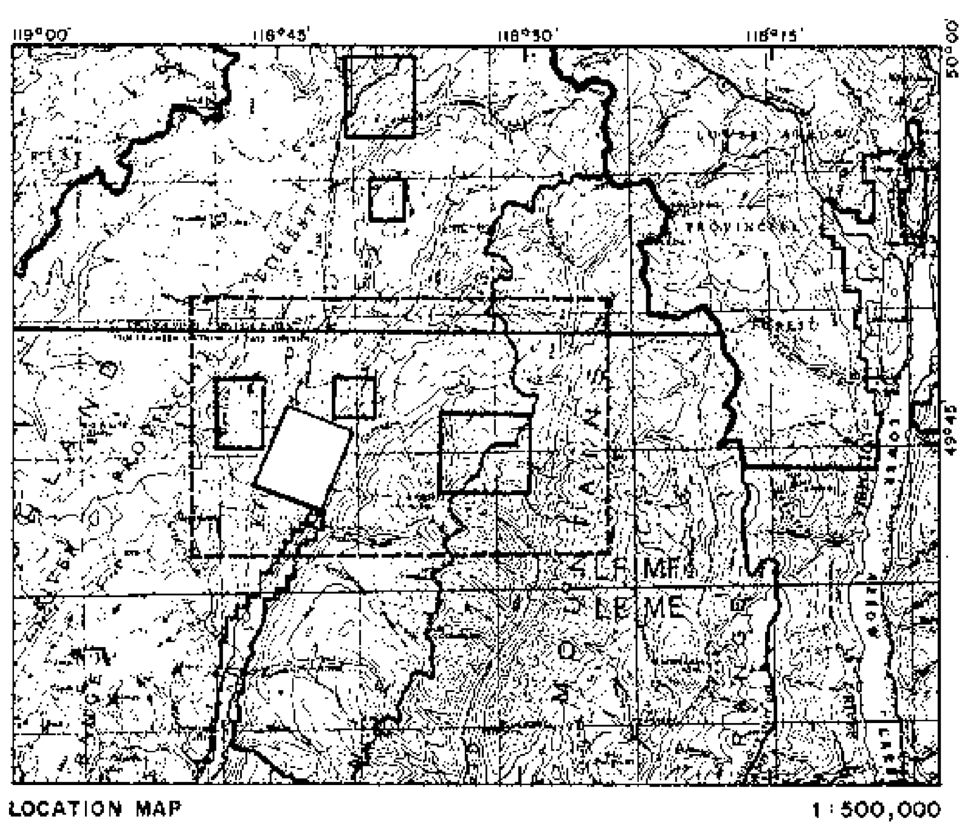
METRES 0 250 500 750 1000

Surveyed and compiled by BARRINGER MAGENTA LTD. Toronto, Canada

AUGUST-SEPTEMBER 1978

N.T.S. REF. 82-E 10,15





PART 3 OF 9

KELVIN ENERGY LIMITED
KETTLE RIVER AREA, B.C.

GEOCHEMICAL SURVEY
ANOMALY 1A SOUTH
SOIL TRAVERSE FOLLOW-UP

7160

URANIUM DATA & INTERPRETATION
(STREAM AND SOIL)

SCALE 1:10,000

FEET: 0, 1000, 2000, 3000
METRES: 0, 250, 500, 750, 1000

LEGEND

- Line or sampled stream with sample number
- element value in p.p.m.
- * Soil sample is a rock chip
- JIM 8: Claim boundary with name and number
- 5: Stream number
- Stream sediment threshold 8.0 p.p.m.
- 3rd order anomalous 8.1 - 16.0 p.p.m. ○
- 2nd order anomalous 16.0 - 24.0 p.p.m. ⊕
- * 1st order anomalous 24 - 48 p.p.m. ◑
- > 48 p.p.m. ●
- * Note: The additional division of the 1st order values is for presentation purposes
- 3C: Strong / Weak anomaly with designation

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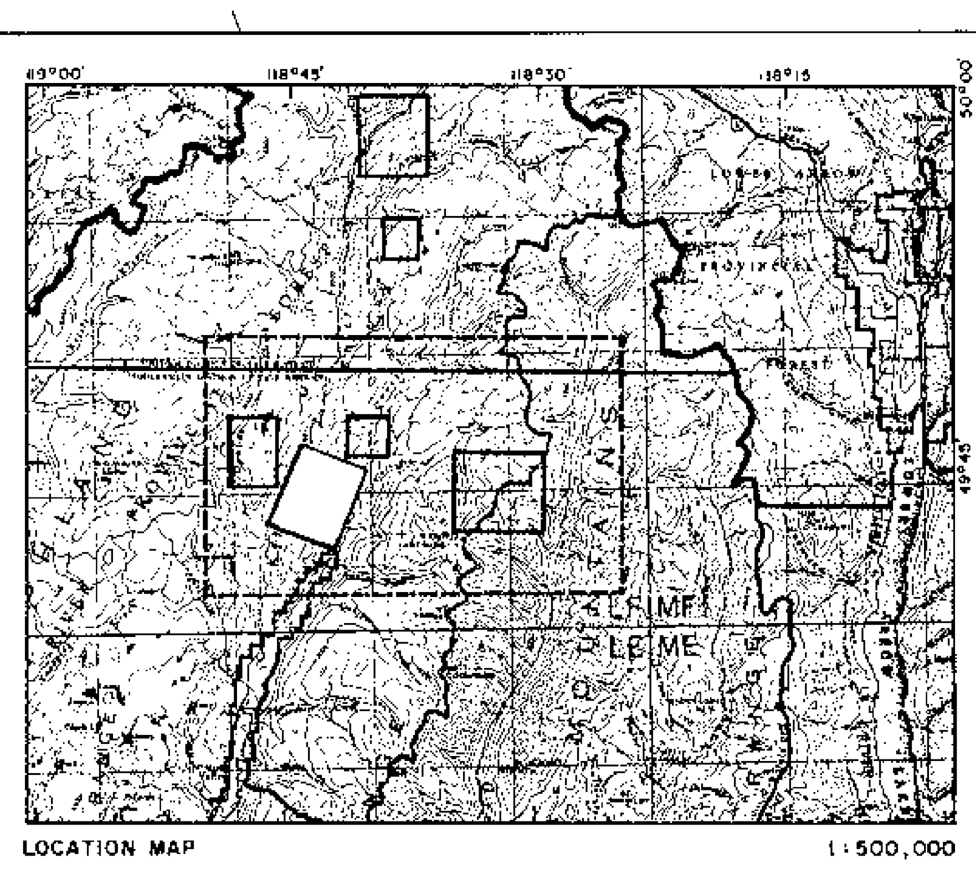
AUGUST-SEPTEMBER 1978

N.T.S. REF. 82-E 10,15

DRG 208-42-503



KELVIN ENERGY LIMITED

KETTLE RIVER AREA, B.C.

GEOCHEMICAL SURVEY

ANOMALY 1A SOUTH

STREAM SEDIMENT FOLLOW-UP

COPPER/LEAD/ZINC/SILVER/NICKEL

LEGEND

Line or sampled stream with
12 — Sample number
25 — element value in p.p.m. (Cu / Pb / Zn / Ag / Ni)

JIM 8 — Claim boundary with and number

5 — Stream number

PART 3 OF 9

SCALE 1:10,000

FEET 0 1000 2000 3000

METRES 0 250 500 750 1000

MINERAL RESOURCES BRANCH
NO. 7160

N

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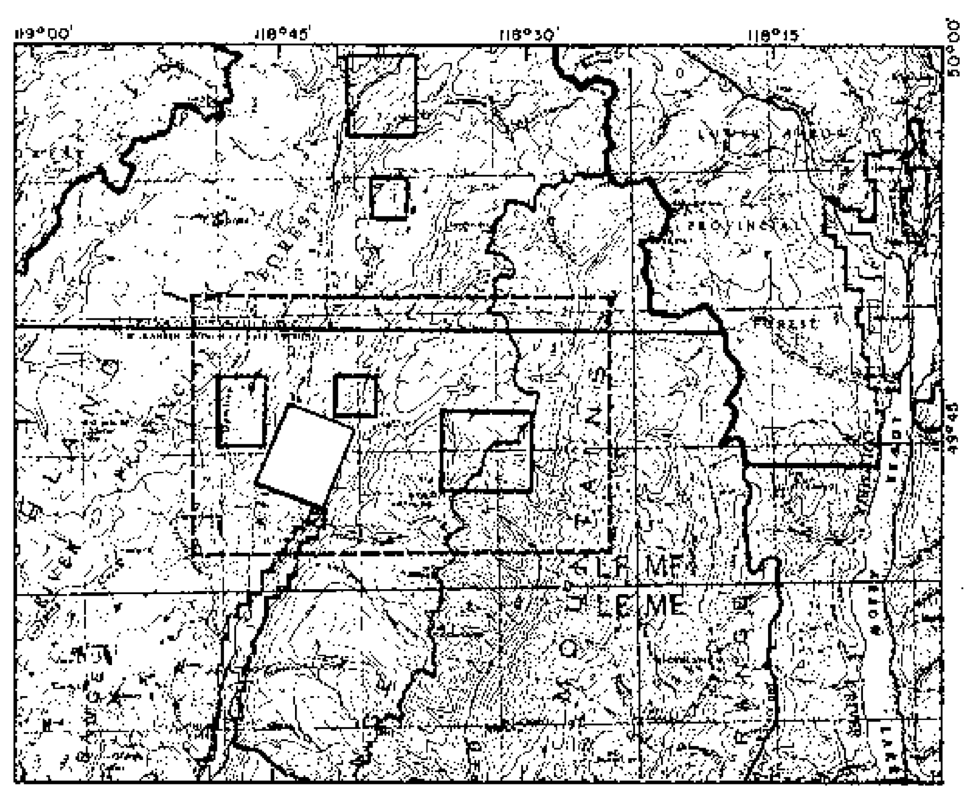
AUGUST-SEPTEMBER 1978

N.T.S. REF. 82-E 10,15

DRG 208-42503

DRG 208-42-504



LEGEND

SOIL-18/112, ROCK — Line or sampled stream with Sample number

SOIL-17/25, ROCK — element value in p.p.m. (Cu / Pb / Zn)

* Soil sample is a rock chip

JIM 8 — Claim boundary and number

5 — Stream number

KELVIN ENERGY LIMITED

KETTLE RIVER AREA, B.C.

GEOCHEMICAL SURVEY

ANOMALY 1A SOUTH

SOIL TRAVERSE FOLLOW-UP

COPPER/LEAD/ZINC IN SOILS

PART 3 OF 9

7160

SCALE 1:10,000

FEET 0 1000 2000 3000

METRES 0 250 500 750 1000

N

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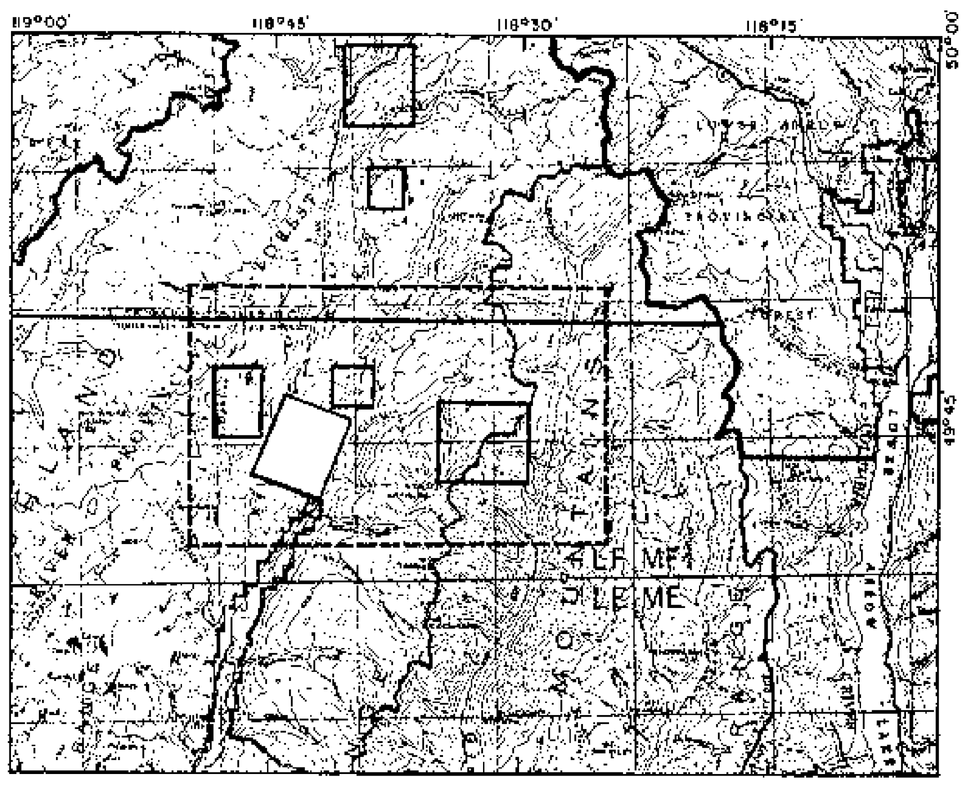
AUGUST-SEPTEMBER 1978

N.T.S. REF. 82-E 10,15

DRG 208-42-504

DRG 208-42-505



LEGEND

SOIL-10 / ROCK-1/2 — Line or sampled stream with Sample number

SOIL-11/25 / ROCK-* — element value in p.p.m. (Ag / Ni); Soil sample is a rock chip

JIM 8 — Claim boundary with name and number

5 — Stream number

KELVIN ENERGY LIMITED
KETTLE RIVER AREA, B.C.

PART 3 OF 9

GEOCHEMICAL SURVEY
ANOMALY 1A SOUTH
SOIL TRAVERSE FOLLOW-UP

7160

SILVER / NICKEL IN SOILS

SCALE 1:10,000

FEET 0 1000 2000 3000

METRES 0 250 500 750 1000

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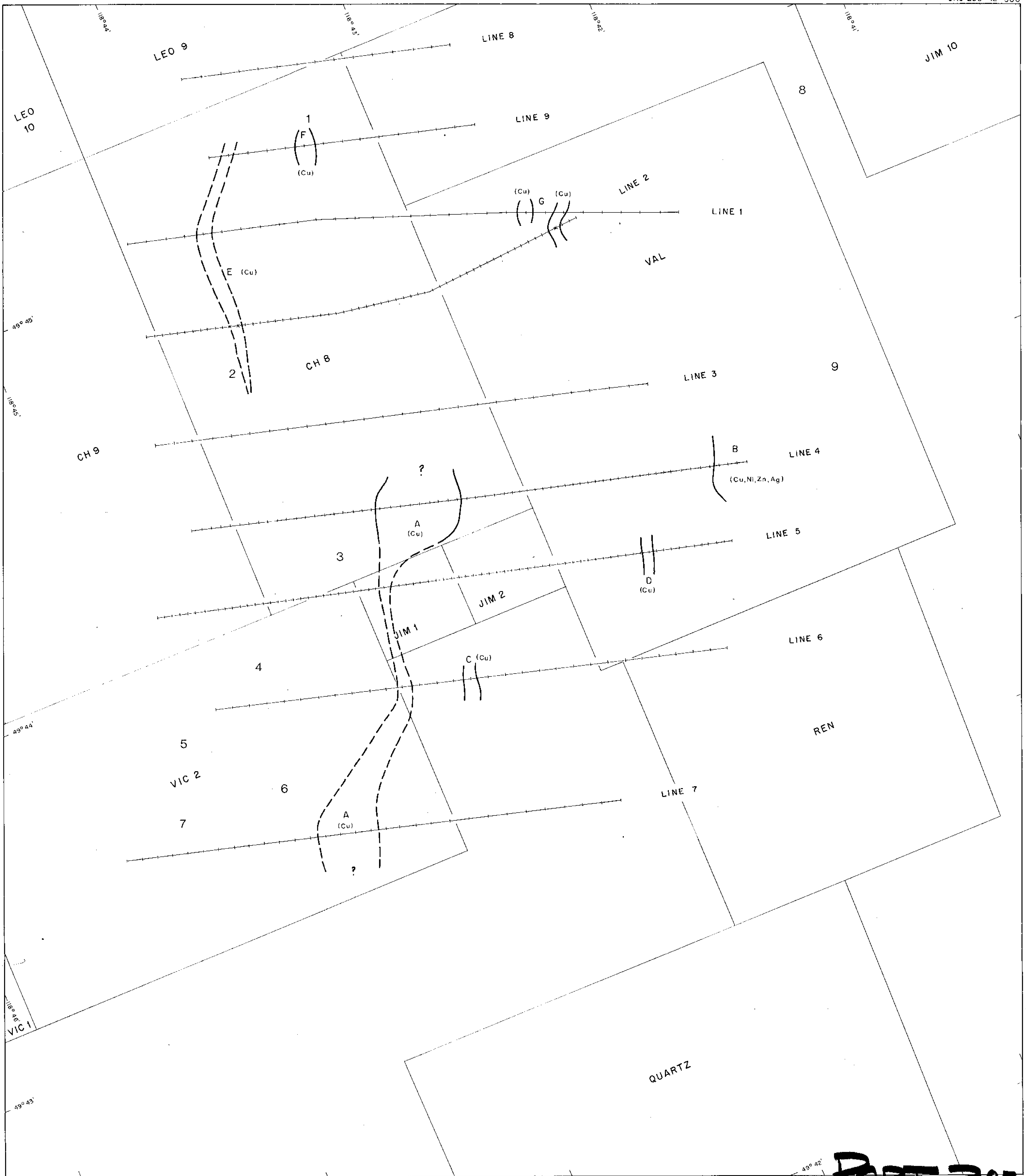
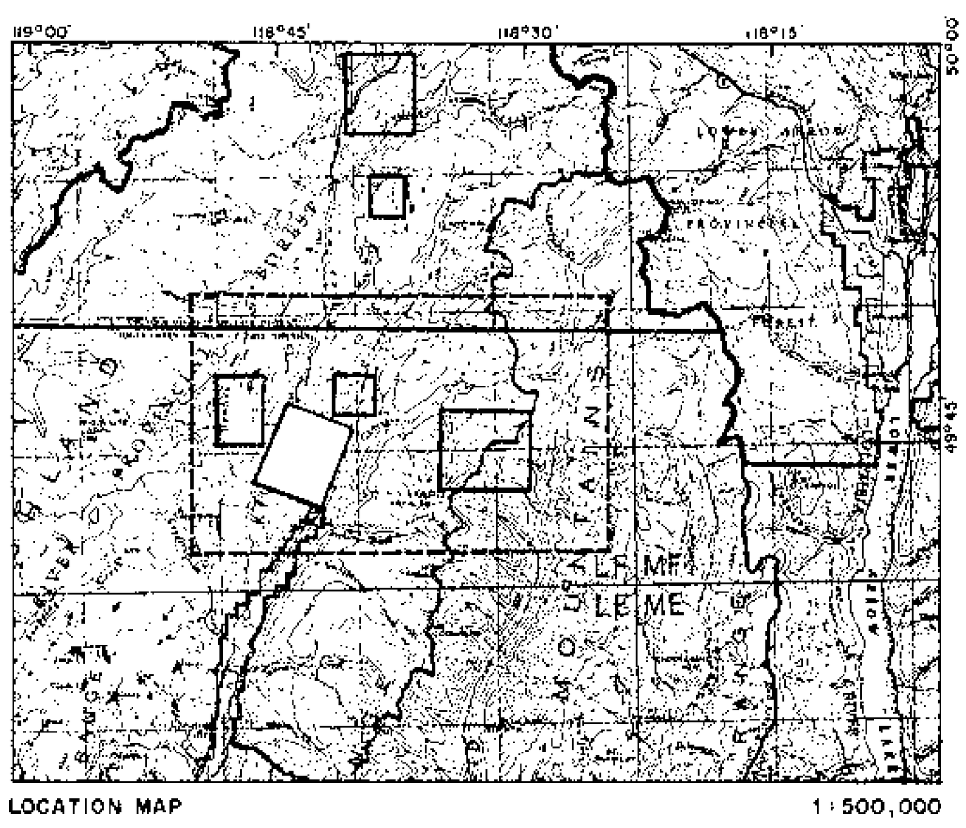
AUGUST-SEPTEMBER 1978

N.T.S. REF. 82-E 10,15

DRG 208-42-505




LOCATION MAP 1:500,000

LEGEND

- SOIL-18 / ROCK-12 — Line or sampled stream with Sample number
- SOIL-17/25 / ROCK-X — element value in p.p.m. Soil sample is a rock chip
- JIM 8 — Claim boundary with name and number
- 5 — Stream number
- A — Strong anomaly with designation
- A (dashed) — Weak anomaly with designation

KELVIN ENERGY LIMITED
KETTLE RIVER AREA, B.C.
GEOCHEMICAL SURVEY
ANOMALY 1A SOUTH
SOIL TRAVERSE FOLLOW-UP

COPPER INTERPRETATION

SCALE 1:10,000

FEET 0 1000 2000 3000
METRES 0 250 500 750 1000

Surveyed and compiled by
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Toronto, Canada

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