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GEOLOGICAL & GEOCHEMICAL REPORT ON PART OF BURN CLAIM GROUP

NTS 93N/6E, 11E, 11W
55°31'N Lat., 125°13'W Long.

R.A. Boyce
December 28th, 1980

#4524

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PLACER DEVELOPMENT LIMITED

GEOLOGICAL AND GEOCHEMICAL REPORT
ON PART OF BURN CLAIM GROUP

OMINECA MINING DIVISION

NTS 93N/6E, 11E, 11W

$55^{o}31$'N Lat., $125^{o}13$'W Long.

Owner: Luc Syndicate

Operator: PLACER DEVELOPMENT LIMITED

BY: R.A. Boyce

December 28th, 1980

Work Performed During Period 23 June to 7 July, 1980
on Burn 2-6, 9, 11-14, 24, 31, 51, 54, 56, 58, Snag, Siberia.

700 Burrard Building / 1030 West Georgia Street / Vancouver, B. C., Canada / V6E 3A8 (604) 682-7082 / Telex 04-55181

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1. Introduction

1.1 Location and Access

The Burn claim group is located in the northern Kwanika Range of the Omineca Mountains, in north-central British Columbia. The property is comprised of 61 full-size two-post claims and two modified-grid system claims of sixteen units each. They are located in the headwaters area of Burn Creek, a northerly-flowing tributary of Kwanika Creek (Figure 1).

Access is provided by a good gravel road north from Fort St. James and west from Manson Creek to the outlet of Burn Creek, a distance of 260 kilometers. Nine kilometres of dirt road up the valley of Burn Creek is passable by four-wheel-drive vehicles.

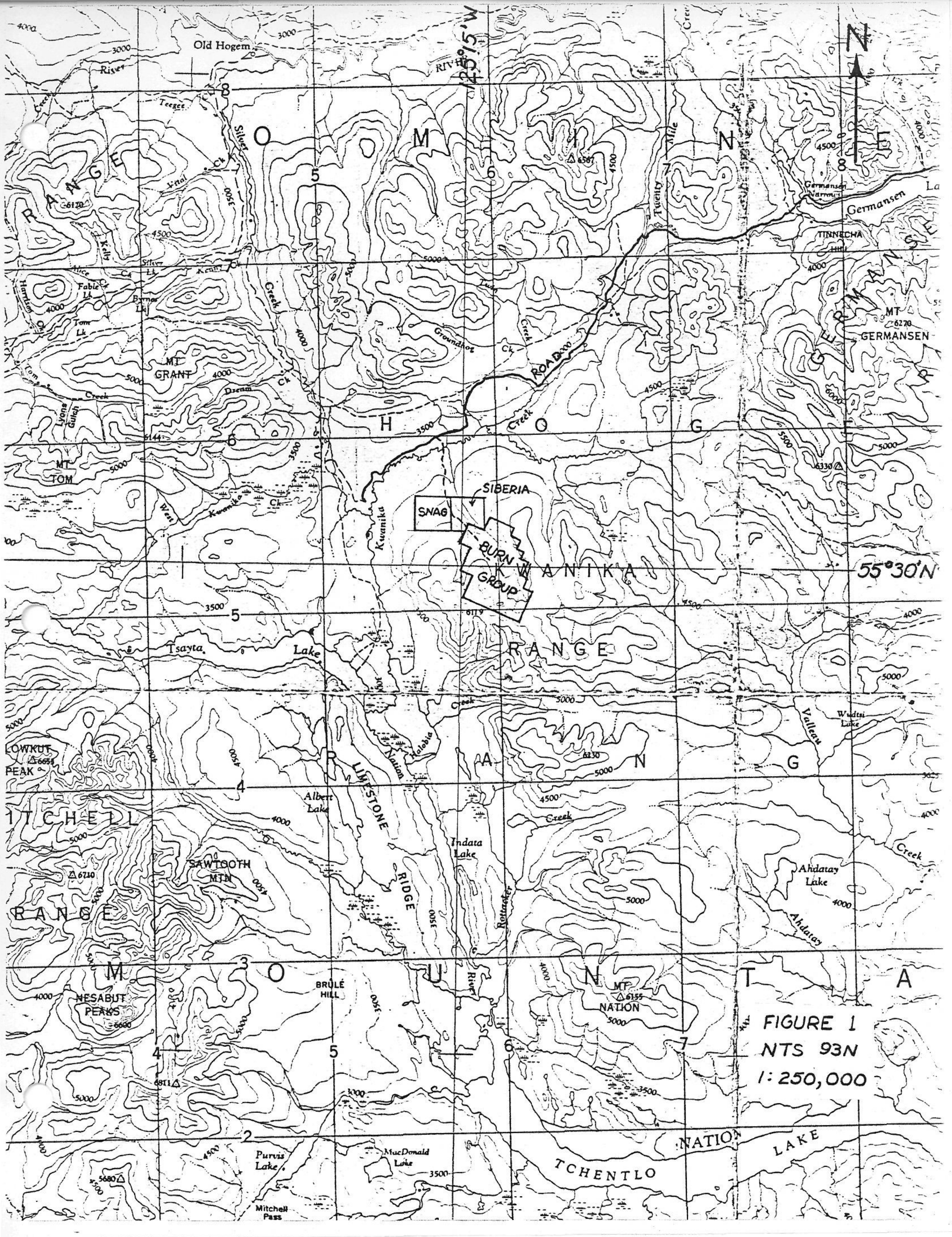
1.2 History and Ownership

Initial work in the area involved a stream-sediment sampling program by Luc Syndicate, which produced anomalous values. Followup soil sampling defined a large, high-value molybdenum-copper anomaly. Further work included magnetometer and I.P. surveys, trenching, and diamond drilling by the Syndicate and by Dome Exploration. All efforts failed to find a mineral source for the anomaly.

Placer Development Limited optioned the Burn claims in 1978. Subsequent work included sampling of soil, sediment, overburden profiles, bedrock and drill core; magnetometer survey; and percussion drilling. In fall 1979, the Snag and Siberia claims were added to the property.

2. Field Work

Work was performed on the Burn property between 23 June and 7 July, 1980. The principal purpose was to demonstrate extent of mineralized zones and their relationship to lithology. Also, field investigation was needed to verify



Old Hogem
River
Teegee
Silver
Vital Ck
Twenty Mile
Germansen Narrows
Germansen
TINNECHA HILL
MT GERMANSEN
MT GRANT
MT TOM
Groundhog Ck
ROAD
Kwanika
SIBERIA
SNAG
BURN GROUP
K W A N I K A
R A N G E
55°30'N
125°15'W
Tsayta Lake
LOWKUT PEAK
Albert Lake
LIMESTONE RIDGE
Nation
Indata Lake
Valleau
Wudtsi Lake
Ahdatay Lake
SAWTOOTH MTN
NESABUT PEAKS
BRULÉ HILL
MT NATION
Purvis Lake
MacDonald Lake
Mitchell Pass
TCHENTLO
NATION LAKE
H O G E M
R A N G E
M O U N T A
FIGURE 1
NTS 93N
1:250,000

a surficial geology report prepared for the operator by L. Bayrock and Associates. Work included geochemical sampling, overburden inspection, and lithologic pebble counts.

2.1 Geochemical Survey

2.1.1 Soil Sampling

Three lines of soil samples were collected in the lower valley of Gully Creek (Map 1). These correspond to grid line 96N, 80N, and 64N. Line 96N coincides with the southern boundary of the Snag and Siberia claims. The two southern lines extend westward outside of the claims. Forty-three samples were taken within claim boundaries. The purpose was to identify in till an expression of any mineral source in upper Gully Creek.

The area sampled was mostly till. Swampy areas were encountered, some of which could not be sampled. Whenever an apparent outwash pocket was encountered, the sample was relocated on till. Holes were commonly dug 10 to 20 centimeters deep with a mattock. B horizon was sampled whenever possible, otherwise C horizon. Soil was collected with a nylon spoon and stored in kraft paper bags. All samples were analyzed for Mo, Cu, Zn, Pb, Ag and F content.

2.1.2 Soil Profile Sampling

Two profile sections of 12 samples each were collected from till in the 20 metre high cutbanks of lower Gully Creek (Map 1 and Figure 2). The purpose was to demonstrate any change in metal values with depth attributable to more than one overlain till sheet. It should be noted that Mo/Cu anomalies occur in soil immediately southeast of the cutbanks, but not at the edge.

The banks showed considerable sloughing, so that trenches had to be dug to reach undisturbed soil. Below eleven metres depth, no undisturbed soil was available. Each sample was a composite of one metre vertical depth. In several cases, a new trench was dug for lower samples. One sample from the top of B horizon was included. Samples were collected in the same manner as soil samples. All samples were analyzed for content of Mo, Cu, Zn, Pb, Ag and F.

2.1.3 Sediment Samples

Nine sediment samples were collected in the southeastern corner of the property in order to complete sediment sample coverage. All sample material was taken from the centre channel of flowing streams with a nylon spoon, stored in kraft bags, and dried on site. Sediment was analyzed for Mo, Cu, Zn, Pb, Ni, Ag, F, Sn and W.

2.1.4 Analyses

All samples collected were treated at the Placer Development Limited Research Centre. Samples were sieved and the -80 mesh fraction was analyzed. Analytical methods are listed in the Appendix.

2.2 Surficial Geology

Surface investigation was made on postulated geology, glacial and recent overburden movements, and distribution of metals in till. This work was largely to follow up a contracted report by L. Bayrock on airphoto investigation of surfical geology.

A landslide was interpreted by Bayrock to exist in the north-central part of the property, west of Burn Creek. On-site investigation attempted to trace its boundaries.

Visual inspection was made of high value anomalous areas to determine quantity of till and outwash. Till in Gully Creek cutbanks was inspected for positioning of profiles. Anomalous areas were searched for felsenmeer, to indicate close bedrock. Till was also inspected to determine probable distance of transport.

2.2.1 Pebble Counts

Lithologic pebble counts were conducted at 36 stations on the property (see Map 1). Purpose was to determine lithologies in till material and compare to known geology. Station lines were laid out across anomalies and crossed stratigraphy at a high angle.

Procedure was to dig a hole with a shovel into the C horizon, approximately 40 cm. deep. The first 100 pebbles and cobbles encountered were collected. Each pebble or cobble was then broken, and its lithology noted, as well as any alteration, oxidation, or mineralization. Notes were also taken on pebble roundness, soil composition, and local bedrock exposure .

Rock types listed were diorite, monzonite, quartz monzonite, alaskite, granodiorite, granite, aplite, fine-grained dyke, volcanic and sediment, quartz vein, epidote, unknown and other.

3. <u>Geochemical Survey Results</u>

3.1 Soil Samples

All analyses are plotted on Map 1. No anomalous values were reported in the northern sample line. Two high Mo values were noted on line 80N. This was attributed to hydromorphic concentration in prevailing swampy conditions. Line 64N has two adjacent samples anomalous in Mo which are continuous with the main Burn anomaly. Two isolated Cu highs are also evident. Throughout the line, F values are higher than the previous lines, and generally higher than the rest of the property.

The general interpretation of results is that there is no source of anomalous material higher in Gully Creek. Similarily, there is no extension of Burn Creek anomalies across Gully Creek. From this, arises conclusion that the linear anomalies southeast of, and parallel to Gully Creek are related to Burn Creek anomalies, and have a glacial source from the southeast. It is also possible that the anomalies are a result of northeastern movement of ice down Gully Creek over a small, close mineralization source. However, the depth of till in the area makes this unlikely. These results agree with sediment sampling on Snag and Siberia claims, with the exception of Cu and Ag values being lower in soil.

3.2 Soil Profile Samples

Soil profiles (Figure 2, Map 1) indicate the character of the top half of the till in the area. Note that the till on the property is variable in depth. The steeper slopes west of Burn Creek are thought to be thicker, and may be represented by the cutbanks in Gully Creek.

The two profiles show similar metal values. No anomalous values were reported. In both profiles, there is no appreciable change in values of Mo, Zn, Pb and Ag with depth. Cu shows an increase with depth in Profile A and a slight increase in Profile B. There is a slight general increase in F values with depth.

The very slight changes indicates that there is compositionally one till within the depth sampled. This makes it unlikely that two overlapping till sheets exist in the area. In any case, the nearby soil anomalies cannot be related to till below the level sampled.

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3.3 Sediment Samples

Most of the sediment samples were taken from streams in poorly-drained areas, and could possibly reflect hydromorphic concentration. However, all values of Zn, Pb, Ni, Ag, F, Sn and W were low. The two samples from creeks draining northeastward from the cirques showed anomalous Mo values. The northern sample also contains high Cu. These two streams drain out of the southern part of the Burn Cu/Mo soil anomaly.

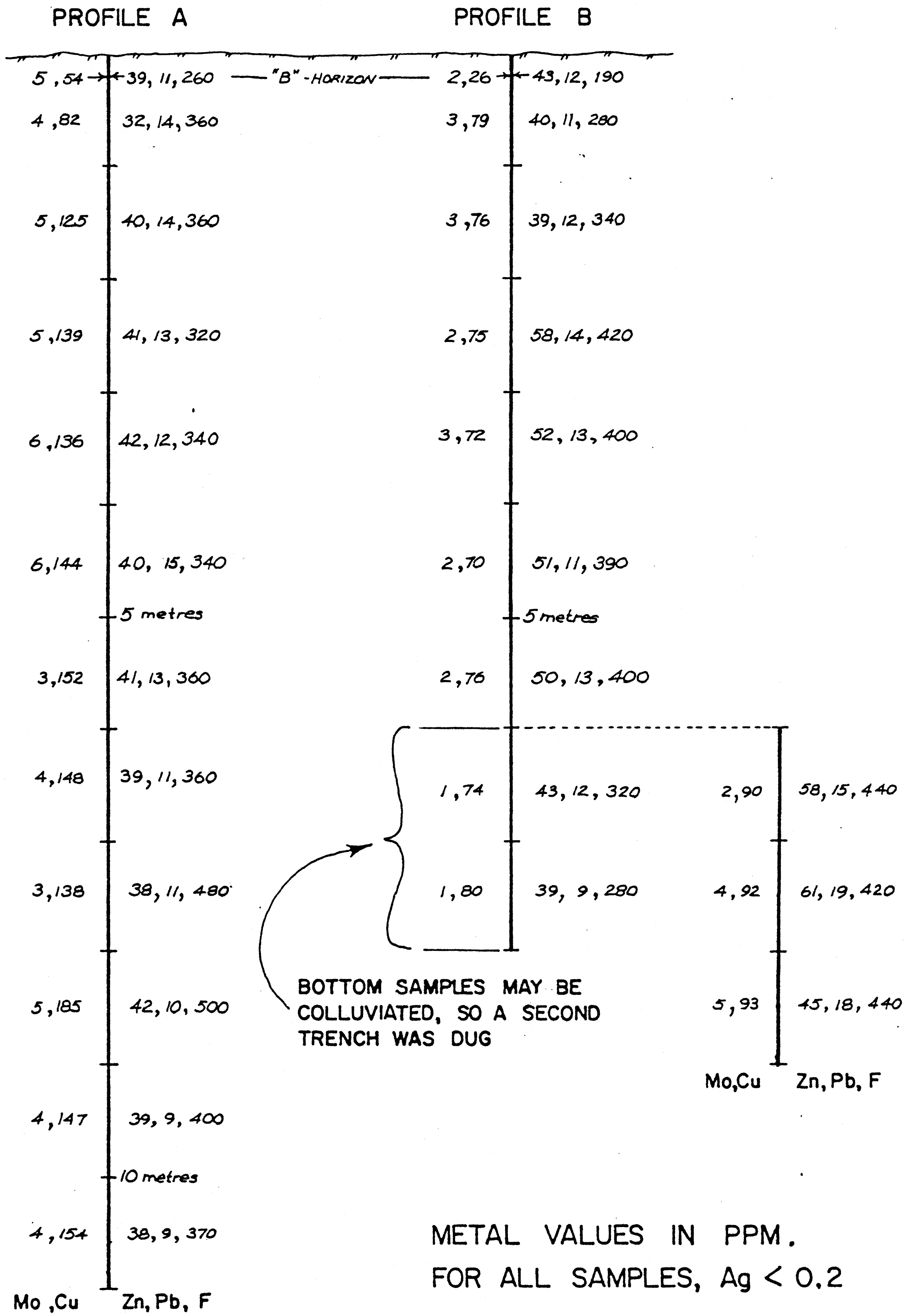
4. Geological Interpretation

Soil in anomalous areas was inspected to determine amount of outwash in till. Only small pockets of outwash were identified in the central valley of Gully Creek. The majority of the property is blanketed in till.

Continental glaciation proceeded eastward across the Burn property. However, subsequent alpine glaciation is thought to have erased all continental glaciation features. Alpine glaciation in the area included two major glaciers. One glacier had its source in the cirques at the head of Burn Creek, and flowed north, then northwestward . A second sheet flowed northeasterly from the headwaters of Gully Creek. The two glaciers coalesced and flow north-northwesterly in lower Burn Creek Valley.

The ice theoretically moves till approximately parallel to contours from their source. Coarse fraction will not travel as far as the fine fraction. When till is one to two metres thick, more than 50% of the coarse fraction will have its source 50 to 100 metres away, or closer. Ten metre thick till will have source less than 1000 metres distant, for more than 50% of coarse fraction.

Figure 2 - SOIL PROFILE ANALYSES GULLY CREEK



Till thickness on the property varied from very thin among copious outcrop on the south and west rims of the property, to approximately 20 metres in the cutbanks of Gully Creek. Trenches and drill holes provide depth information in several areas.

It appears that in the area of the trenches and southern end of the main road, overburden is only two to three metres thick. Outcrop and felsenmeer are noted near Burn Creek, above its junction with Gully Creek. This is interpreted as a bedrock bench marking the lip of a downvalley cirque. Many of the soil anomalies occur where bedrock is close to surface. In each of these areas, molybdenum mineralization has been noted, generally in outcrop. It occurs in quartz veins with K-feldspar envelopes in alaskite, quartz monzonite, and monzonite, and disseminated in monzonite and alaskite. Along trenches, large mineralized boulders were seen, which could have a geochemical expression in soil.

The deepest overburden occurs on the west slope of Burn Creek Valley, from Gully Creek cutbanks to the boulder field near the beaverponds. This is on the steeper slopes below the break in slope. Common thickness of till is 10 metres.

Field investigation was made of the area interpreted as landslide as noted in the report by Bayrock. The lineation which on airphotos appears to be a slip scarp is in fact a change in tree size and spacing on the slope. The interpreted area of debris accumulation is a broad topographic high which causes a marked eastward deflection in the course of Burn Creek. However this was found to be the bedrock bench noted above. There was no evidence found of sag ponds or interrupted drainage. It is therefore concluded that no landslide occurred. Hence, geochemical anomalies near the creek have a bedrock and local till source.

4.1 Pebble Counts

The results of pebble count analysis was expected to be a down-ice reflection of bedrock geology. At one station, a boulder count was also made, in which there was a noticeable difference from the pebble count, in rock type content.

Pie-diagram plots of lithology (Map 1) show all rock categories which comprise at least 4% of sample. Identifiable types that form less than 4% are classified with "other." Results and interpretation are detailed below.

1. Monzonite forms the major lithology in all but two stations (92% of samples). Monzonite is thought to underlie most of the survey area, and is a major lithology up-ice.

2. Diorite is indicated only in the westernmost stations, and one site near the centre of the survey. Diorite underlies the western part of the property, and crops out on the ridgetop. The central sample may indicate a small, masked diorite body, or a coincident concentration of pebbles.

3. Quartz monzonite is apparent in the northeastern corner, and is the dominant type at two locations. It is associated with alaskite and quartz vein material. Quartz monzonite crops out to the northeast and is the main lithology of boulders in the creek bed immediately upstream. Thus, the quartz monzonite is interpreted to underlie this part of Burn Creek.

   Quartz monzonite also occurs in the pebble count at the western end of line 68N, and crops out in the eastern end of Trench 50N. All quartz monzonite may be part of the same unit, or may be divided into an eastern and western band. The lack of quartz monzonite pebbles in between may be attributed to intervening monzonite. It is also possible that the much greater till depth causes more mixing and greater ice transport distance.

4. Alaskite occurs as 4% to 9% of the sample in six sites along trench 64N. These samples are approximately 200 metres down-ice from the inferred position of the alaskite dyke. The overburden is 2 metres thick at these locations along the trench, but is thought to be slightly thicker over the source area. Hence 200 metres is a reasonable transport distance.

   Alaskite is indicated at the east end of line 84N near Burn Creek. This is close to the bedrock bench mentioned previously. In felsenmeer 100 metres west of the creek, quartz-molybdenum vein-bearing alaskite was seen. Hence the pebbles and anomaly are of very local derivation

   There is no occurence of alaskite in line 68N. From this line northward, the magnetic low interpreted to signal the alaskite is much less distinct. Hence the dyke may narrow or branch or may be faulted laterally.

5. Volcanic and sedimentary rocks occur as a constituent in various places. The volcanics are generally fine-grained, chloritized flow rocks, and sediments are slate. These are probably members of Takla Group, and as such must have a distal source. It is possible that some of these rocks are fine-grained variants of dioritic rocks.

6. Granodiorite is noted in one station. The source is unknown. The only granodiorite occurring regionally is well to the south. It is more likely a compositional varient of other plutonic rocks.

No mineralization was seen in any of the pebble count stations. However, various types were limonitized. Propylitic alteration was common in diorite and monzonite. Pebbles were commonly both rounded and angular, with slight increase in roundness in thicker till.

5. Conclusions

The findings in the pebble-count analyses indicates that, with minor exception, the till contains only lithologies known to exist within the local area. Hence the coarse fraction of till is expected to have travelled less than one kilometre in the down-ice direction.

Coarse and fine fractions may not have exactly the same source, so this procedure cannot be used to defin tely determine lithologies containing mineralization. The results indicate mineralized soil in areas where monzonite, quartz monzonite, and alaskite are the principal coarse fraction types. This lends support to previous information on mineralization.

Surface exposures of mineralization are small in extent, and can be directly related to local anomalies. Areas with soil anomalies in shallow till have metal sources less than 100 metres distant.

Anomalous areas on thick till have been tested by 1979 percussion drilling on east and northeast margins. However, no Cu/Mo mineralization was encountered, up to 1500 metres up-ice from the surface anomaly. The southern part of the property, below the cirques, was tested with a pattern of Pionjar overburden drilling in 1978. The area is up-ice from the main anomalous area, but no mineralization was encountered at bedrock interface. It is suggested that drill holes were too widely-spaced to hit mineralization. Also, some holes may be too far up-ice.

An additional possible cause of anomaly in the lower west wall of the valley is down hill transport of metals and hydromorphic concentration in poorly-drained soil. Sediment samples in areas of deeper cover will reflect the nature of the upper part of the till.

1972 Diamond Drill information on the western part of the anomalies indicates some significant Mo values near bedrock surface. This can be correlated with local geochemical highs. Some drill holes show very low surface values, indicating the discontinuous nature of the mineralization. None of these drill holes encountered economic grades.

The general conclusion reached is that mineralized zones are common and widespread on the property, but very small in area, and not high grade.

6. Recommendations

The results of 1980 field work have clarified the concept of mineralization on the Burn property. The final conclusion states that no economic copper or molybdenum orebodies exist. Therefore, it is recommended that no further work be done on the property.

7. Summary of Expenditures

Labour Cost (for period 23 June to 7 July)		
R. Boyce (geologist) @$150/day x 15 days =	2,250	
M. Gareau (geologist) @$125/day x 15 days =	1,875	
M. Dore (field assistant) @$75/day x 15 days =	1,125	
	$5,250	$5,250.00
Camp Costs (accommodation and meals)		
$30/man/day x 3 men x 11 days =	990	990.00
Vehicle Expense		
1980 3/4 ton Chevrolet pickup @ $260/mo. x ½ mo.	130	130.00
Labratory Costs		
Soil geochemistry - 47 samples for Mo, Cu, Zn, Pb, Ag, F, @ $10.65/sample = $500.55		
Soil profile geochemistry - 24 samples for Mo, Cu, Zn, Pb, Ag, F @ $10.65/sample = $255.60		
Sediment geochemistry - 9 samples for Mo, Cu, Zn, Pb, Ni, Ag, F, Sn, W @$19.40/sample = $174.60		930.75
Transportation (meals & accommodation between site & Vanc.)		
$55/man/day x 3 men x 4 days -		660.00
Report Preparation		
R. Boyce @ $150/day x 11 days =		$1,650.00
	TOTAL EXPENDITURES:	$9,610.75

8. Statement of Qualifications

I, R.A. Boyce, with a business address at 700-1030 West Georgia Street, Vancouver, B.C. V6E 3A8, do hereby certify that I have supervised and carried out the field work and have assessed and interpreted the data from this geochemical sampling and surficial geology program on part of the Burn Claim Group.

I also certify that:

1. I am a graduate of the University of British Columbia, Vancouver (B. Sc. Geological Sciences, 1977).

2. I have engaged in the practice of mineral exploration since graduation, in the province of British Columbia.

Respectfully submitted.

PLACER DEVELOPMENT LIMITED

R. A. Boyce

R.A. Boyce

RAB/cs

CERTIFICATION

I, D.A. Howard, with a business address at 700-1030 West Georgia Street, Vancouver, British Columbia, do hereby certify that:

1. I am a professional engineer registered in the Province of British Columbia.

2. I have examined the report by R.A. Boyce, on work in 1980, on the Burn Claims, $55^{o}31$'N Lat., $125^{o}13$'W. Long., in the Omineca Mining District.

3. To the best of my knowledge the acquisition of the data and expenditure claimed for the performance of work is correct.

Respectfully submitted,

D.A. Howard

D.A. Howard, M.Sc., P. Eng.

Dated this 5th day of January, 1981,
Vancouver, British Columbia.

A P P E N D I X

STANDARD ANALYSIS METHODS USED BY PDL GEOCHEM LAB ARE LISTED BELOW:
ALL RESULTS EXPRESSED AS INDICATED IN UNITS COLUMN BELOW

	UNITS	WT.G	ATTACK USED	TIME	RANGE	METHOD
MO	PPM	0.5	C HCLO4/HNO3	4HRS	1-1000	ATOMIC ABSORPTION
CU	PPM	0.5	C HCLO4/HNO3	4HRS	2-4000	ATOMIC ABSORPTION
ZN	PPM	0.5	C HCLO4/HNO3	4HRS	2-3000	ATOMIC ABSORPTION
PB	PPM	0.5	C HCLO4/HNO3	4HRS	2-3000	A.A. BACKGROUND COR.
CD	PPM	0.5	C HCLO4/HNO3	4HRS	0.2-200	A.A. BACKGROUND COR.
NI	PPM	0.5	C HCLO4/HNO3	4HRS	2-2000	ATOMIC ABSORPTION
CO	PPM	0.5	C HCLO4/HNO3	4HRS	2-2000	ATOMIC ABSORPTION
AG1	PPM	0.5	C HCLO4/HNO3	4HRS	0.2-20	A.A. BACKGROUND COR
AG2	PPM	0.5	C HNO3	2HRS	0.02-4.00	A.A. SOLVENT EXTRACT
AU	PPM	3.0	C HBR/BR	12HRS	0.02-4.00	A.A. SOLVENT EXTRACT
U	PPM	0.25	DIL HNO3	2HRS	0.5-1000	FLUORIMETRY SOLV. EX.
V	PPM	0.5	C HF/HCLO4/HNO3/HCL	6HRS	5-1000	ATOMIC ABSORPTION
W	PPM	1.0	C HF/HNO3/HCL/H2SO4	4HRS	5-500	A.A. SOLVENT EXTRACT.
F	PPM	0.25	NA2CO3/KNO3 FUSION	30MIN	40-4000	SPECIFIC ION ELECTODE
AS	PPM	0.5	C HCLO4/HNO3	4HRS	2-1000	A.A. HYDRIDE GENERATOR
BI	PPM	0.5	C HCLO4/HNO3	4HRS	2-2000	ATOMIC ABSORPTION
MN	PPM	0.5	C HCLO4/HNO3	4HRS	2-3000	ATOMIC ABSORPTION
FE	%	0.5	C HF/HCLO4/HNO3/HCL	6HRS	0.02-20%	ATOMIC ABSORPTION
HG	PPB	0.5	DIL HNO3	2HRS	5-2000PPB	A.A. COLD VAPOR GEN.
BA	%	0.5	C HF/HI/OXALIC	4HRS	0.02-20%	ATOMIC ABSORPTION
NA	%	0.5	C HF/HCLO4/HNO3/HCL	6HRS	0.2 -20%	ATOMIC ABSORPTION
K	%	0.5	C HF/HCLO4/HNO3/HCL	6HRS	0.2 -20%	ATOMIC ABSORPTION
CA	%	0.5	C HF/HCLO4/HNO3/HCL	6HRS	0.02-20%	ATOMIC ABSORPTION
SR	PPM	0.5	C HF/HCLO4/HNO3/HCL	6HRS	10-2000	ATOMIC ABSORPTION
MG	%	0.5	C HF/HCLO4/HNO3/HCL	6HRS	0.2-20%	ATOMIC ABSORPTION
SN	PPM	1.0	NH4I FUSION	15MIN	2-500	A.A. SOLVENT EXTRACT.
LOI	%	1.0	ASH 600 DEG C	2HRS	0.02-99%	WEIGH RESDUE

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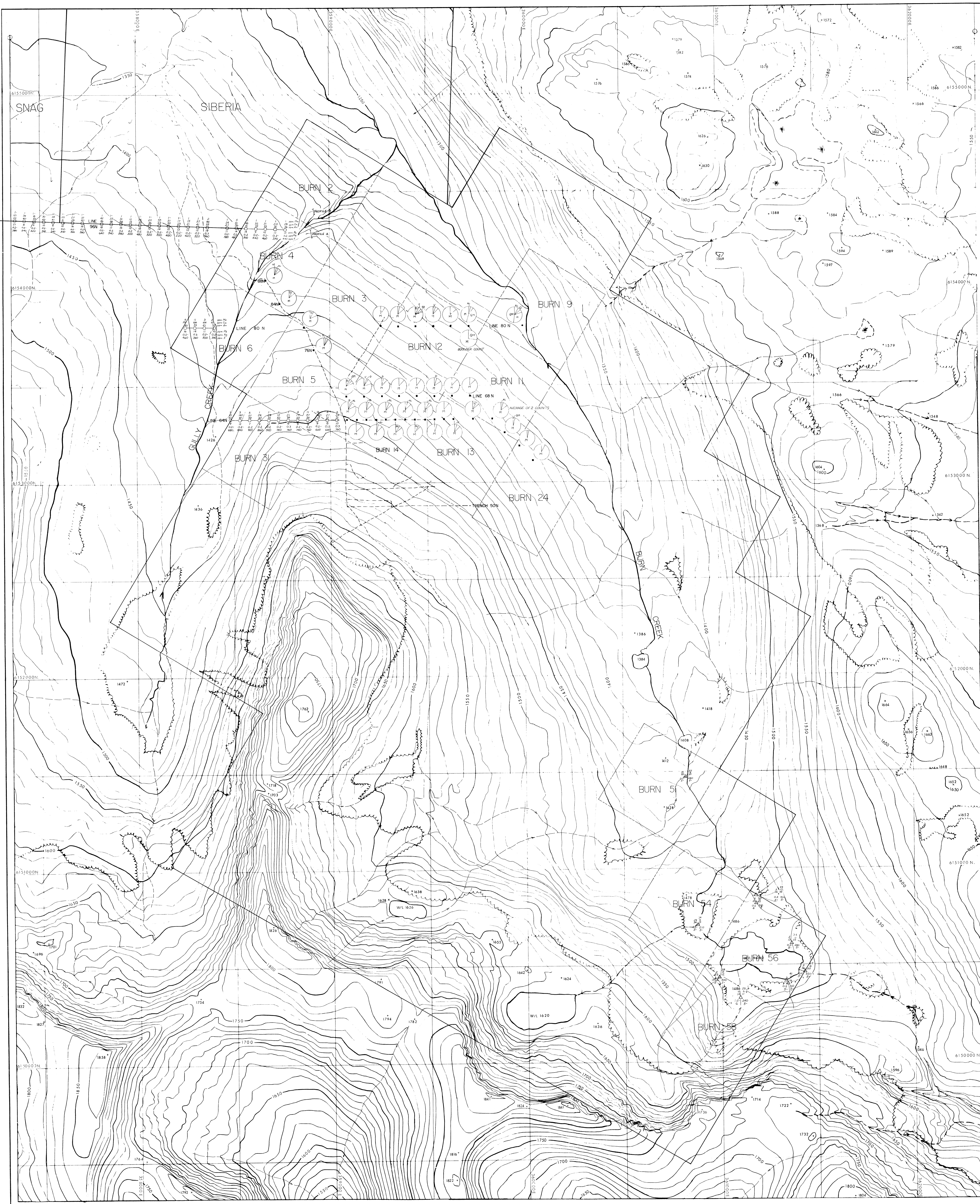

LEGEND

GEOCHEMISTRY

Mo Zn Cu Pb Ni △ Ag F W Sn — SEDIMENT SAMPLE LOCATION WITH ppm METALS AS SHOWN

Mo Cu Zn ○ Pb Ag F — SOIL SAMPLE LOCATION WITH ppm METALS AS SHOWN

PEBBLE COUNTS

PEBBLE COUNT LOCATION AND PERCENTAGE CONTENT

D DIORITE
M MONZONITE
QM QUARTZ MONZONITE
AL ALASKITE
V VOLCANIC & SEDIMENTARY
AP APLITE
GD GRANODIORITE
Q QUARTZ VEIN
OTHER

MAP I

NTS 93 N

OMINECA MINING DIVISION

inches 0 1 2
0 1 2 3 4 5 centimetres

BRITISH COLUMBIA GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy

Compiled from aerial photography at an approximate scale of 1 : 80,000 in the month of SEPT 1973

PLACER DEVELOPMENT LTD.

KWANIKA CREEK

PRELIMINARY RECONNAISSANCE TYPE MAPPING

McElhanney

McElhanney Surveying & Engineering Ltd
1200 West Pender Street, Vancouver B.C., Canada

Scale -	1 : 5,000
Contour Interval -	10 Metres
Date -	AUG. 1979
Job No. -	06630-0
Sheet No. -	1 of 1 #4524

80-11-V166 2/#B-0030