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1990 Geological and Geochemical Report

on the

**NIE GROUP**

(Nie #3 to Nie #7 Claims)

20,655

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

Atlin Mining Division  
 N.T.S.: 104K/8W  
 Lat.: 58° 20' North  
 Long.: 132° 18' West

OWNERS: Chevron Minerals Limited  
 400-815 West Hastings Street  
 Vancouver, B.C.  
 V6C 3G9

and

North American Metals Corporation  
 1000-700 West Pender Street  
 Vancouver, B.C.  
 V6C 1G8

STAMP: SEARCHED  
 SERIALIZED  
 DEC 13 1990  
 M.R. # \_\_\_\_\_ S. \_\_\_\_\_  
 VANCOUVER, B.C.

AUTHOR: D.A. McBean  
 Dec. 6, 1990

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## 1.0 INTRODUCTION

The Nie #3 to Nie #7 claims, Nie Group, were staked in September 1981 by Chevron Canada Limited and totals 85 units (2125 hectares). The claims are now subject to an option agreement between Chevron Minerals Limited and NAM (North American Metals Corporation) whereby NAM can earn a 50% interest in the claims through work requirements.

### 1.1 Claim Status

All claims are located within the Atlin Mining Division; status of the claims is noted in Table 1. The Nie Group is 100 percent owned by Chevron Minerals Limited; Homestake Mineral Development Company has been contracted by NAM as operator.

CLAIM	REC. NO	UNITS	RECORDED	EXPIRY*
Nie #3	1541	20	Sept. 17, 1981	Sept. 17, 1991
Nie #4	1542	20	Sept. 17, 1981	Sept. 17, 1991
Nie #5	1543	15	Sept. 17, 1981	Sept. 17, 1991
Nie #6	1544	10	Sept. 17, 1981	Sept. 17, 1991
Nie #7	1545	20	Sept. 17, 1981	Sept. 17, 1991

\*Assuming acceptance of this report

**Table 1** Claim Status

### 1.2 Location, Access and Physiography

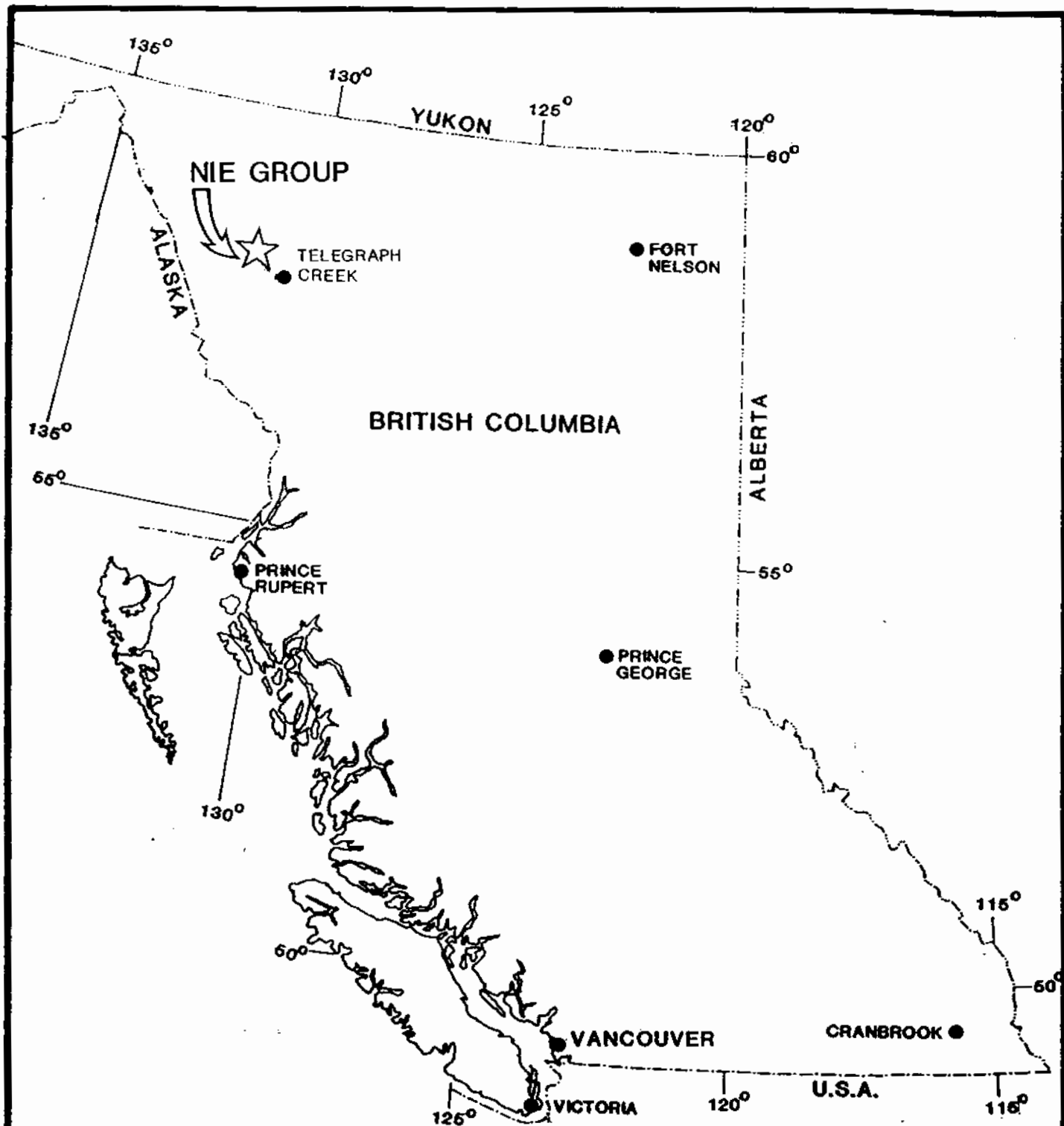
The Nie Group is located on N.T.S. Map 104K/8W centered at 132° 18' West longitude and 58° 20' North latitude. The claims border the eastern shoreline of Tatsamenie Lake which is 84 Kilometres northwest of Telegraph Creek, B.C.. Helicopter or float plane access is available to the Nie Group from a year round base at Dease Lake or a summer base at Telegraph Creek. The property is on a relatively flat, high plateau at an elevation of approximately 2,000 meters; Tatsamenie Lake is at 775 meters.


### 1.3 Exploration History

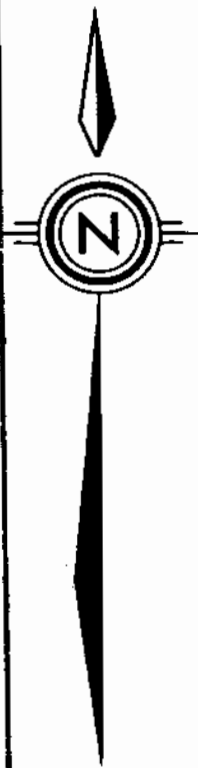
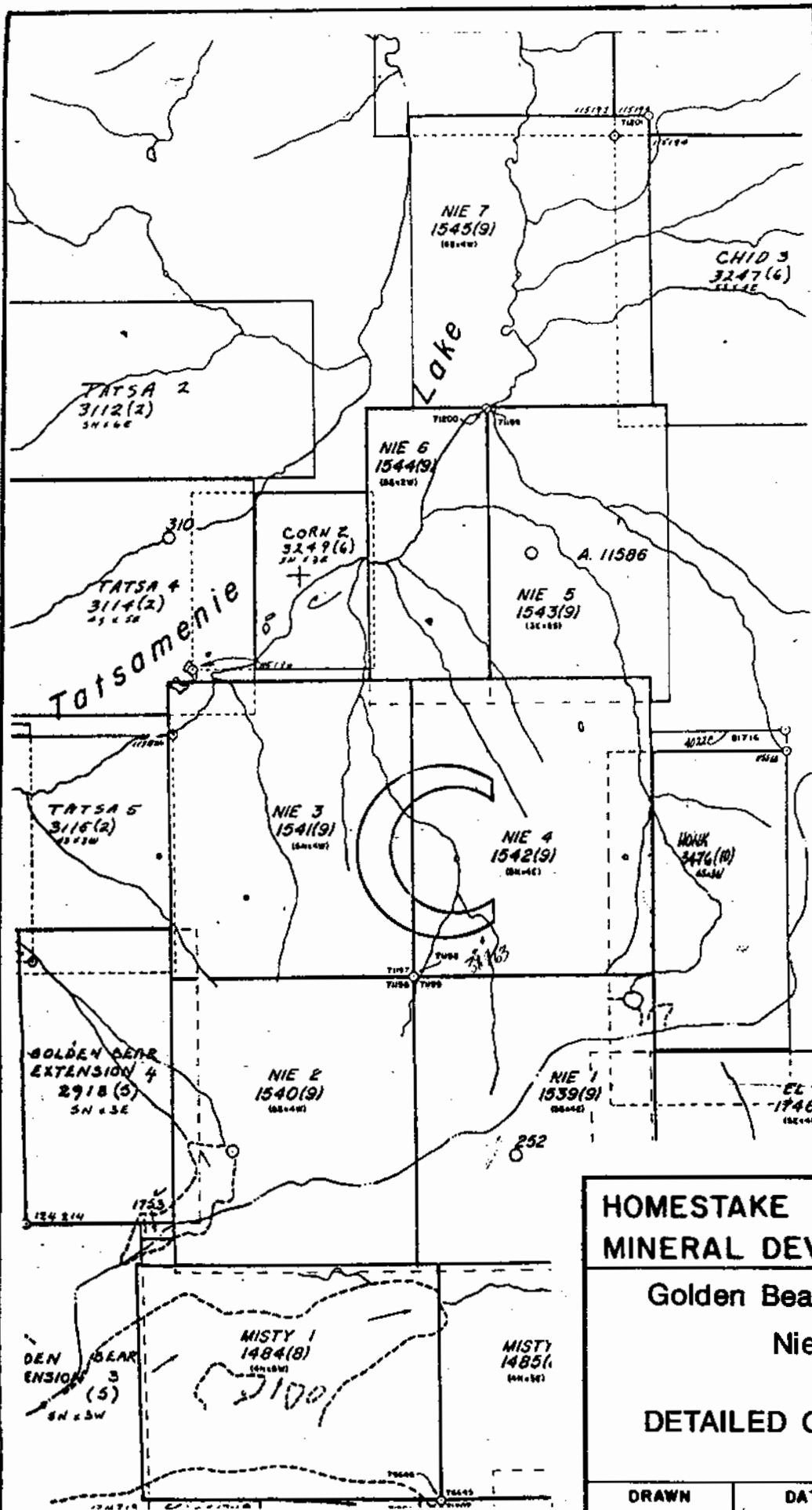
Chevron Canada Limited staked Nie #3 to Nie #7 in 1981 and intermittently completed work until 1987 (Table 2).

YEAR	WORK DONE
1982	Geology, rock and soil sampling
1983	Geology grid line, rock and soil sampling
1984	Ground electromagnetic survey, geology, grid line, rock and soil sampling and trenching
1987	Diamond drilling and sampling

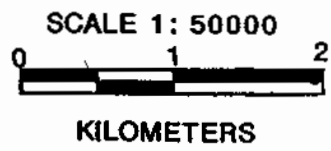
**Table 2** Previous Work Completed



<b>HOMESTAKE</b> <b>MINERAL DEVELOPMENT COMPANY</b> 			
<b>Golden Bear Road J.V. Project</b> <b>Nie Group</b>			
<b>DRAWN</b> DAM	<b>DATE</b> Nov.30,1990	<b>FILE CODE</b> 104K	Fig. 1
Revised _____			



note: modified from Mineral  
Titles Reference Map  
104K/8W May, 1990.  
Department of Mines and  
Petroleum Resources



**HOMESTAKE**  
**MINERAL DEVELOPMENT COMPANY**



**Golden Bear Road J.V. Project**  
**Nie Group**

**DETAILED CLAIM LOCATION**

DRAWN DAM	DATE Nov.30,1990	FILE CODE 104K	Fig. 2
Revised _____			

Drilling, geophysics and a grid line geochemical survey has been completed on the Nie #3 claim. Previous work was completed on the inferred extension of the West Wall fault zone; this fault forms part of the Ophir break, which hosts the Golden Bear Mine to the south.

#### **1.4 1990 Work Completed**

Twenty-five man days were spent mapping and sampling on the Nie Group in 1990. The work was completed on the Shoulder Vein, Eastern Ultramafic and PJ Creeks areas (Figures 4.1 and 4.2). Detailed mapping and sampling were carried out on the Spire Grid (Figure 5) at 1:1,000 scale. Due to limited outcrop exposure in the northern part of the Nie Group stream sediment sampling was completed on three drainages flowing through the Nie #5 and Nie #7 claims. A total of twenty-two rock samples and twenty-seven stream sediment samples were collected.

### **2.0 REGIONAL GEOLOGY AND STRUCTURE**

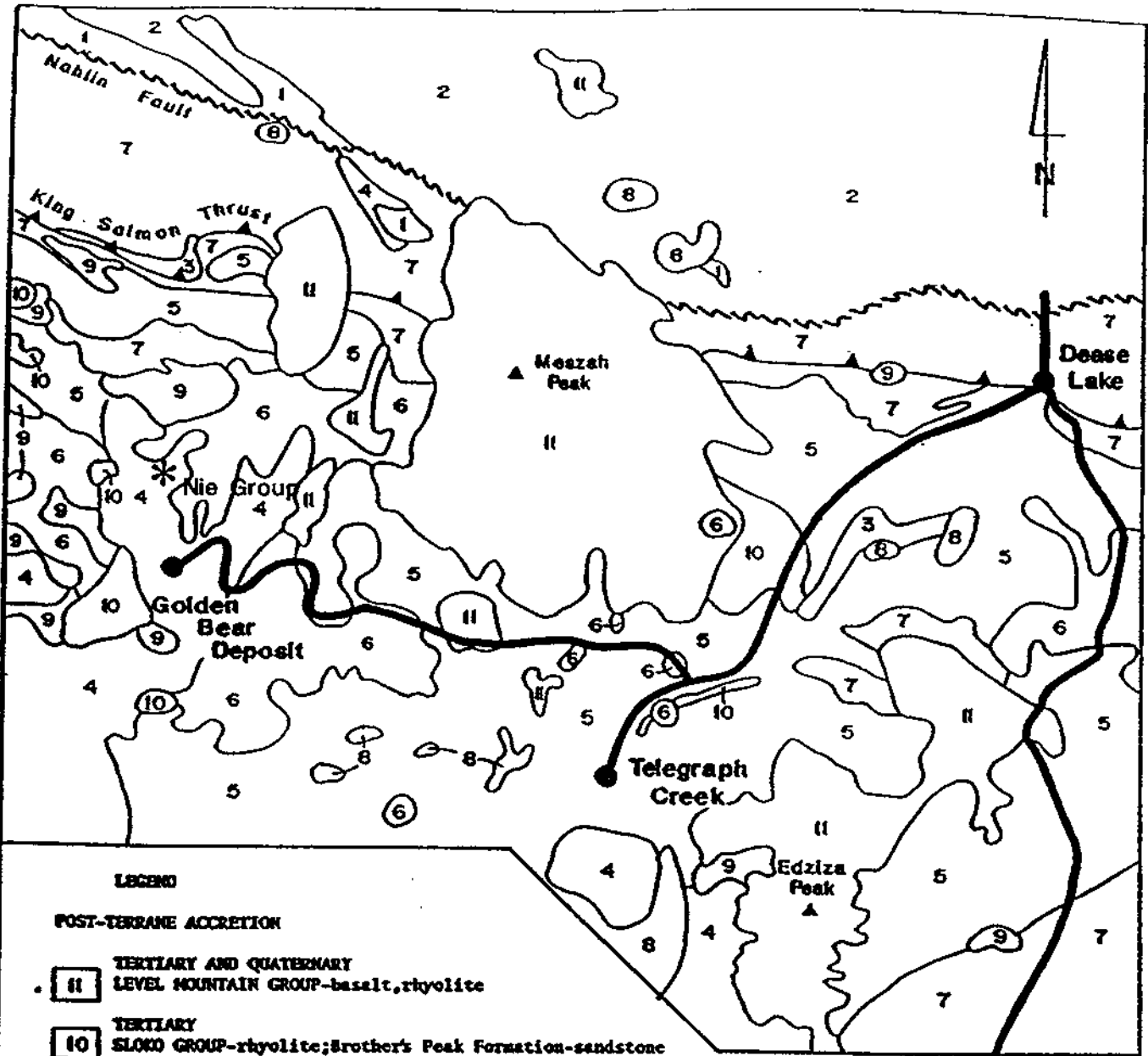
The Nie Group lies on the eastern margin of the Coast Plutonic Complex and the western margin of the Intermontane Belt within rocks of the Stikine Terrane. The Terrane consists of island arc rocks of Paleozoic, Triassic and Jurassic age; not all of these are exposed in the property area. Stikine Assemblage rocks are basal to the Terrane and are composed of Devonian to Permian limestones, argillites, cherts and epiclastic volcanic rocks. These lithologies are distinct from similar lithologies of the younger Cache Creek Group exposed north of the Nahlin Fault, a northwest trending, steeply dipping fault located north of the property. The Stikine Assemblage is overlain by oceanic arc rocks of the Upper Triassic Stuhini Group and further to the south, the Jurassic Hazelton Group. All lithologies are crosscut by Triassic and/or Jurassic intrusions of intermediate to felsic composition.

Cretaceous and Tertiary units include felsic volcanic rocks, volcanoclastic rocks and their intrusive equivalents and dikes of the (Tertiary) Sloko Group (Souther, 1971). Basalt to rhyolite flows make up the youngest rocks in the area (Level Mountain Basalt flows and Hearts Peak Felsic flows). Three major deformation phases are present, they include Eocene extensional faults, a mid-Jurassic accretionary event (the King Solomon southwest verging thrust fault) and a pre-Middle Triassic accretionary event.

Both the Cache Creek Group and the Stikine Terrane have been subjected to low grade greenschist metamorphism in the western portion of the map area (Souther, 1971). This area has also been subjected to a regional hydrothermal alteration which has produced bright orange, red and brown carbonate zones that are found along major structural breaks (Walton, 1990)

### **3.0 PROPERTY GEOLOGY**

Fieldwork completed in the 1990 season has been divided into five main areas within the Nie group. Sample locations and geology for each area are illustrated on Figure 4.1 and 4.2 except for the detailed Spire Grid area located on Figure 5.



**LEGEND**

**POST-TERRANE ACCRETION**

- 11 TERTIARY AND QUATERNARY LEVEL MOUNTAIN GROUP-basalt, rhyolite
- 10 TERTIARY SLOKO GROUP-rhyolite; Brother's Peak Formation-sandstone
- 9 CRETACEOUS AND TERTIARY quartz monzonite, quartz diorite
- 8 JURASSIC AND CRETACEOUS diorite, granodiorite, quartz diorite
- 7 Laberge and Bowser Groups-conglomerate, sandstone

**STIKINIA TERRANE**

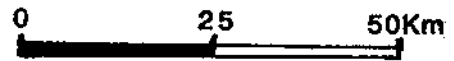
- 6 TRIASSIC diorite, granodiorite, quartz monzonite
- 5 STIKINI GROUP-mafic volcanic and sedimentary rocks
- 4 CARBONIFEROUS AND PERMIAN greenstone, limestone, schist, gneiss

**CACHE CREEK TERRANE**

- 3 TRIASSIC SINNA FORMATION-limestone
- 2 CARBONIFEROUS AND PERMIAN CACHE CREEK GROUP-limestone, basalt
- 1 serpentinite, peridotite, gabbro, diorite

Modified from G.S.C. map 1418A-Souther, Brew and Okulitch (1978)

Scale 1:1,000,000



<b>HOMESTAKE</b>			
<b>MINERAL DEVELOPMENT COMPANY</b>			
<b>ROAD PROJECT, B.C.</b>			
<b>REGIONAL GEOLOGY</b>			
<b>DRAWN</b> DAM	<b>DATE</b> Nov. 30, 1990	<b>FILE CODE</b> 104J/4 104K/1	<b>FIGURE 3</b>



### 3.1 Spire Grid Geology

The Spire Grid geology consists of pre-Upper Triassic mafic volcanics and siliceous to calcareous sediments with minor carbonaceous units. These interlayered rock units are cut by numerous plagioclase porphyritic diorite dykes or sills.

The volcanic rocks on the Spire Grid consist of intensely porphyroblastic mafic volcanics to the northeast and dark green massive flows to the southwest. The mafic flows are locally chloritized and/or serpentinized and grade into unaltered mafic flows. The porphyroblastic mafic volcanic rocks are characteristically bluish-green, exhibit a phyllitic sheen, are strongly foliated and contain fine grained pyroxene porphyroblasts. The sedimentary rocks consist of interbedded calcareous and siliceous siltstones and dark grey to dark brown limestone. Chert nodules are common within the black siltstones especially near sample 35071 located at 3+00 south and 1+33 west. (Figure 5). The plagioclase porphyritic dykes are parallel to subparallel to stratigraphy and contain euhedral plagioclase crystals up to 0.7 millimetres in size. The groundmass varies from fine to medium grained hornblende, feldspar and minor biotite. The margins of these dykes are chilled.

#### 3.1.1 Structure and Mineralization

The dominant structural feature on the Spire Grid is a discontinuity located along the main stream and grid base line. The geology, regional deformation and alteration package are discordant with the western boundary of the porphyroblastic mafic flow. This boundary is possibly a west verging thrust fault and a possible extension of the West Wall Fault located farther south in the Golden Bear Mine area (Oliver and Hodgson, 1990). Intense foliation (strong  $160^{\circ}/75^{\circ}$  West dip and weak  $100^{\circ}/45^{\circ}$  North dip) and mullion structures do not occur west of the porphyroblastic mafic volcanic rocks. The plagioclase porphyritic dykes and stratigraphy do not extend across the fault. The massive mafic volcanic flows west of the West Wall Fault are chloritized and/or serpentinized near the fault and gradually become unaltered over a distance of approximately one hundred meters. The porphyroblastic mafic volcanic appears more chloritic adjacent to the fault. Mineral assemblages at the Spire Grid and other areas indicate a low grade, sub-greenschist contact metamorphism.

More than ten fault related quartz-carbonate breccia zones crosscut the stratigraphy west of the West Wall Fault and in a few zones on the east side of the Fault. All of these breccia zones appear to merge with the West Wall Fault, although only four are noted on Figure 5 because of map scale constraints. Marginal to these breccia zones, diorite dykes are offset an average of one meter and sedimentary beds exhibit sinistral drag folding. The quartz-carbonate breccia zones are three to seventy-five centimetres thick and average fifty percent quartz, forty percent breccia fragments of the host unit and up to eight percent sphalerite. Other mineralization within these zones range from trace to one percent pyrite, chalcopyrite, galena and possibly stibnite. The numerous quartz-carbonate breccia zones are subparallel, generally trend  $130^{\circ}$  and dip from forty to eighty degrees west. Where quartz-carbonate breccia zones crosscut diorite dykes iron carbonate alteration extends one to two meters into the dykes on either side of the faults significantly expanding the iron stained zone. This feature is most prominent at the largest, ten to twelve meters wide, dyke located at 2+80 south and 0+70 west on the grid.

### 3.1.2 Results

Quartz-carbonate breccia zones locally host two to eight percent sphalerite and trace to two percent galena mineralization. Some of the best results returned include:

Sample	Au - ppb	Ag - ppm	Cu - ppm	Pb - ppm	Zn - ppm
35067	6	0.47(oz/ton)	113	1.71 (%)	6.64 (%)
35072	1	0.18(oz/ton)	97	0.25 (%)	13.77(%)
35073	7	1.0	126	111	1943

**Table 3.** Spire Grid Results

Some of the samples also returned elevated values in silver, antimony, barium and cadmium. Cadmium is most likely tied up in sphalerite.

Sample 35069, taken from a breccia zone in the porphyroblastic mafic volcanics, does not carry anomalous values of gold, silver, lead or zinc probably because it is hosted in a different lithology.

Sample 35071, a quartz vein within silic sediments close to the West Wall Fault, contained abundant sulphides (one to five percent pyrite, chalcopyrite and magnetite) but returned poor precious and base metal values. Elevated chromium and titanium values from this sample reflect the proximity of the fault to the porphyroblastic mafic volcanic flows. Sample 35070 yielded the most promising gold value at 0.079 oz per ton Au in a fracture filled massive sulphide lense located eight meters west of the West Wall Fault. It appears to have a hydrothermal origin proximal to a diorite dyke. Elevated bismuth and tungsten values are also present. See Appendix I and II for sample descriptions and results.

### 3.2 Eastern Ultramafic Zone Geology and Structure

A fault bounded ultramafic unit outcrops at the eastern boundary of the Nie #4 claim. The ultramafic occurs as a linear, north-trending body along a topographic ridge and is black, aphanitic, locally serpentinized and weakly to moderately magnetic; it is an olivine clinopyroxenite of an Alaskan type ultramafic affinity (Oliver, 1990). Several pink plagioclase-rich dykes up to one meter wide randomly cut the ultramafic body.

Dark green aphanitic mafic volcanics containing five to ten percent white to pink feldspars outcrop to the south and east of the ultramafic. This unit is cut by several grey, strongly foliated, medium grained diorite, dykes up to thirty centimetres wide and containing up to ten percent medium to coarse grained anhedral to subhedral pink feldspars and weak epidote alteration. Level Mountain basalts outcropping to the southwest are dark green, aphanitic, non-foliated and vesicular.

### 3.2.1 Results

Five rock and one clay gouge sample were collected from this area. Samples of ultramafic rocks (35327, 35328, 35329 and 35481) are all anomalous in gold (Table 4). Samples 35328 and 35481 are from a strongly iron-carbonate altered shear zone which contains quartz veins and chalcopyrite; sample 35329 is clay gouge from the same shear zone. These three samples returned the most significant gold results as well as anomalous silver, copper and elevated chromium values. Sample 35327 is from a smaller and less altered shear zone which contains less quartz and sulphides, low gold but elevated copper and nickel.

Sample	Au - ppb	Ag - ppm	Cu - ppm	Cr - ppm	Ni - ppm
35328	0.296 (oz/ton)	2.70 (oz/ton)	0.30 (%)	313	121
(gouge) 35329	0.527 (oz/ton)	1.89 (oz/ton)	663	397	141
35481	0.164 (oz/ton)	1.55 (oz/ton)	0.87 (%)	217	88
35327	16	0.8	3362	8	259

**Table 4.** Eastern Ultramafic Zone Sample Results

Samples 35480 and 35326 are diorite dyke samples containing fracture controlled pyrite and chalcopyrite which returned low precious and base metals values (See Appendix I).

### 3.3 Shoulder Vein Geology and Structure

This area consists of two parallel quartz veins located approximately two meters apart, trending northeast and dipping 55° to 60° to the southeast, hosted within chloritized mafic volcanics (unit 4c). The smaller, five centimeter wide, quartz vein contains up to fifty percent sulphides; mainly pyrite (up to 15%), galena, stibnite and a trace of sphalerite. The second vein is a thirty centimeter wide, massive white quartz vein containing approximately four percent coarse euhedral pyrite and a trace of chalcopyrite. Iron carbonate alteration is prevalent in both veins. The exposure is up to three and a half meters long at the bottom of a steep west-facing slope just above talus. One quartz vein is at the margin of a feldspar porphyry dyke orientated at 036°/65° southeast.

#### 3.3.1 Results

The quartz veins contain significant to ore-grade gold as well as silver, arsenic, lead and zinc (Table 5). Cadmium in sample 31963 indicates the possible presence of greenockite (a cadmium sulphide).

Sample	Au (opt)	Ag (opt)	As - ppm	Pb (%)	Zn - ppm
31963	0.445	3.74	882	5.53	0.24(%)
31964	0.061	4.62	1505	4.76	83

**Table 5** Shoulder Vein Results

### **3.4 PJ Creeks Geology and Structure**

PJ Creeks, located in the north end of the Nie #4 claim (Figure 4.1), consists of massive mafic volcanic flow sequences that are intruded by Jurassic to Cretaceous diorites and minor ultramafics. Locally, the mafic volcanics are quartz-chlorite-sericite altered, shistose and iron stained. The ultramafic unit appears to be small in size and not directly related to the Eastern Ultramafic Zone on the west side of Nie #4 claim where it outcrops as a north-trending structure located to the east of PJ Creeks. (Oliver, 1990). North to northeast trending, steeply west and east dipping shears occur at the head waters of the western creek.

#### **3.4.1 Results**

Four rock samples (numbers 35482, 35330, 35475 and 35476) and two silt samples (numbers MN-06-3 J-1 and MN-04-3 P-1) were taken in this area. Low precious or base metal values were returned. Zinc, cadmium, vanadium and tungsten are, locally, weakly anomalous. The two silt samples only returned chromium and nickel which indicate a highly mafic to ultramafic source.

### **3.5 Stream Sediment Sampling (Nie #5 and Nie #7 Claims)**

Stream sediment sample numbers 35118 to 35123 and 31959 to 31961 were collected on the north end of the Nie #5 claim (Figures 4.1 and 4.2) and returned no significant values. The headwaters of the creek are dominated by iron-carbonate quartz mariposite altered rocks that grade into a diorite and eventually a chloritized mafic volcanic. No significant precious or base metal values were returned from two rock samples (31958 and 31962).

Two streams were sediment sampled on the Nie #7 claim (Figure 4.2). Of stream samples MN-07-03 J-1 to J-8 only J-6 reported an elevated gold value of 66 ppb Au. Outcrop from stations J-3 to J-4 is mainly an orange-coloured, iron-carbonate altered medium grained, massive granodiorite and to lesser extent massive mafic volcanic. No rock samples were collected from these outcrops.

Stream sediment samples MN-07-03 D-1 to D-8 were collected at the north end of the Nie #7 claim. Only sample D-6 yielded an elevated gold value of 107 ppb Au. Outcrop scattered from stations D-6 to D-8 is dominated by a strongly chlorite-carbonate-sericite altered mafic volcanic sequence and one minor outcrop of diorite. In unaltered rocks a feldspar phyric flow is indicated. Shear zones are prevalent around sample number D-7. Rock sample number 35068 is taken from a one and a half meter wide, 110° striking, 90° dipping shear zone. The rock sample was stained by malachite and yielded 1748 ppm copper but insignificant gold values.

It would appear that the intrusive to the east side of the Nie Group continues up through the first two creeks in Nie #5 and Nie #7 claims (Brown and Walton, 1984). However, the volcanic rocks exposed in the most northerly creek, on the Nie #7 claim, show that this area is not entirely underlain by intrusive lithologies.

#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The 1990 program discovered two zones of significance - the Shoulder Vein and the eastern Ultramafic Zone. The Shoulder Vein consists of two parallel stibnite - galena - sphalerite - pyrite rich quartz veins that returned up to 0.445 oz/ton gold, 4.62 oz/ton silver and anomalous arsenic, lead and zinc. The Eastern Ultramafic Zone is a north-trending fault-bounded ultramafic unit that returned up to 0.527 oz/ton gold and 2.70 oz/ton silver. Shear zone and fault gouge samples exhibit high iron carbonate alteration similar to that in the Golden Bear Fault Zone. Both zones warrant additional grid-controlled soil sampling, mapping and geophysical work in 1991.

A possible extension to the West Wall Fault was mapped on the Spire Grid. Except for ultramafic rocks, this fault is bounded by lithologies similar to those to the south on the Nie #2 claim. Geological and structural data indicates a fault zone trending northeast down the main creek (Figure 5), however fault gouge and alteration mineralogy similar to that seen in the same fault at the Golden Bear Mine are not exposed. One anomalous gold value of 0.079 oz/ton gold was returned from a massive sulphide lense near a diorite dyke. Anomalous lead, zinc and silver values were also noted. Based on these results no further detailed work is recommended.

Mapping and sampling in PJ creeks and the northern stream sediment creeks located pre-Upper Triassic mafic volcanic units intruded by late Triassic to early Jurassic diorite. An ultramafic unit outcrops at the top of the eastern creek of the two PJ creeks. Extensive shearing and quartz - carbonate - sericite alteration were common in the creeks. No significant precious metal values were returned; although sample 35068 yielded 1748 ppm copper. A quartz - carbonate - malachite alteration zone was located on the east shoreline of Tatsamenie Lake on the Nie #7 claim. This occurrence and ultramafics at the head of PJ creeks should be further investigated as a likely northern extension of the eastern ultramafic zone.

## 5.0 BIBLIOGRAPHY

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## 6.0 STATEMENT OF COSTS

Labour		
Project Geologist	5 x 1 days @ 250/day	1250.00
Geologist	10 x 1 days @ 180/day	1800.00
Geologist	8 x 1 days @ 180/day	1440.00
Geologist	2 x 1 days @ 180/day	360.00
Food & Accommodation		
	25 mandays @ 50/day	1250.00
Geochemical Analysis & Freight		
Rock samples	22 @ 13.00/sample	286.00
Silt samples	27 @ 13.00/sample	351.00
Helicopter Support (including fuel)		
	16.5 hrs @ 631.78	10,424.45
Report Preparation		
	15 days @ 180/day	<u>2700.00</u>
Total		<u>19,510.45</u>

**APPENDIX I**



GEOCHEMICAL ANALYSIS CERTIFICATE

Homestake Mining (Canada) Limited PROJECT 3130 <sup>3128</sup> File # 90-4486

1000 - 700 W. Pender St., Vancouver BC V6C 1G8

✓ Misty Mic

SAMPLE#	No	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Tl	B	Al	Na	K	W	Tl	Au**
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	%	%	%	%	ppm	ppm	ppb
MN-04-1 35069	1	135	2	8	.5	250	37	1308	4.55	610	5	ND	1	153	.2	24	2	54	10.89	.070	3	204	2.67	14	.01	6	.56	.01	.15		2	13
MN-01-1 35070	7	853	13	10	2.1	88	154	498	21.01	21	7	3	1	27	.2	8	247	40	2.04	.016	3	45	.60	7	.01	5	.82	.01	.01	52	2	2335
MN-04-1 35071	19	381	5	19	1.7	90	22	235	3.91	25	6	ND	1	19	.5	2	175	56	1.05	.083	8	112	.69	53	.06	2	.54	.06	.10	21	2	62
MN-04-1 35072	1	97	1730	99999	4.0	5	11	1661	7.26	482	5	ND	1	100	1211.8	15	2	5	8.47	.026	6	10	3.03	31	.01	3	.09	.01	.04		2	1
MN-01-1 35073	1	126	111	1943	1.0	3	4	2443	4.87	104	5	ND	1	209	18.5	5	2	3	18.18	.016	12	13	2.23	419	.01	3	.25	.01	.07		2	7
MN-03-1 35067	3	113	12329	42875	14.1	5	9	2329	6.63	1317	6	ND	1	113	533.6	31	2	7	11.90	.025	3	1	3.39	53	.01	2	.11	.01	.05	2	2	6

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Tl %	B ppm	Al %	Na %	K %	W ppm	TL ppm	Au** ppb
MN-03-1 35066	113	358	2	127	1.5	48	28	350	16.46	658	41	ND	4	136	2.2	3	6	37	4.55	4.112	18	8	.03	151	.01	3	1.63	.04	.15	3	3	14
MN-03-1 35326	1	344	10	92	.6	25	35	377	4.87	41	9	ND	1	15	1.0	2	2	43	1.54	230	4	18	1.05	25	.18	2	1.33	.07	.10	3	2	78
MN-03-1 35327	2	3362	8	54	.8	259	86	240	4.58	19	16	ND	1	20	.9	3	4	44	1.18	.178	6	8	1.02	46	.18	3	1.18	.07	.09	1	2	16
MN-03-1 35328	2	3192	118	259	93.9	121	33	743	11.20	554	18	7	1	21	4.0	2	439	48	3.23	.027	2	313	1.93	9	.01	2	1.34	.01	.02	1	2	7368
MN-04-1 31963	15	618	18643	2450	127.8	12	9	66	9.68	882	5	9	1	26	29.2	21	160	23	.18	.026	2	31	.13	27	.01	2	.19	.02	.10	6	4	10075
MN-04-1 31964	4	442	27773	83	137.6	10	3	38	2.39	1505	5	2	1	39	4.6	19	246	4	.06	.020	2	16	.04	31	.01	2	.15	.01	.05	1	2	1785
MN-04-1 35480	3	742	89	69	2.4	82	54	269	5.86	70	5	ND	1	18	1.0	2	74	80	1.74	.100	3	165	1.89	21	.09	2	1.97	.04	.06	1	2	84
MN-04-1 35481	2	9951	70	241	56.9	88	41	178	13.45	461	12	6	1	1	4.5	2	165	35	.07	.004	2	217	1.33	2	.01	2	.91	.01	.01	1	2	4629
MN-04-2 35329	10	663	426	174	62.9	141	23	487	9.31	182	8	19	2	16	2.7	2	31	68	.48	.035	4	397	2.64	68	.04	2	2.43	.02	.47	1	2	17535
MN-05-1 31958	1	29	52	131	.6	26	30	1161	7.45	12	5	ND	1	53	1.2	2	2	132	5.70	.093	2	37	2.67	23	.02	2	.38	.02	.04	1	2	22
MN-07-1 31962	1	465	8	46	.3	124	37	897	4.11	10	5	ND	1	94	.4	11	4	66	5.56	.054	4	103	2.97	105	.01	2	.45	.02	.07	1	2	5
MN-07-1 35068	1	1748	2	74	1.3	4	14	1023	3.58	10	5	ND	1	101	.7	4	6	45	5.53	.110	11	2	1.16	655	.01	4	1.73	.02	.07	1	2	25
STANDARD C/AU-R	19	58	42	132	6.9	70	32	1053	3.97	41	20	6	38	52	19.4	16	21	55	.52	.096	38	55	.90	181	.07	38	1.89	.06	.14	11	2	455

MN-04-1 35330	1	70	2	67	.5	48	17	904	4.02	63	5	ND	1	104	.2	2	6	56	8.65	.020	2	64	3.97	25	.01	2	.26	.01	.03	3	2	57
MN-04-1 35375	1	484	5	28	.6	23	25	523	6.05	11	5	ND	3	32	.2	2	7	71	1.29	.081	36	13	.78	19	.03	2	1.06	.09	.06	4	2	7
MN-04-1 35376	1	68	37	1171	.6	6	6	98	3.24	33	5	ND	2	29	13.3	2	10	45	.20	.052	10	7	.22	73	.01	2	.32	.11	.13	2	2	31
MN-04-1 35482	1	129	9	133	.6	7	22	925	6.36	4	5	ND	1	16	.6	4	3	107	.57	.043	2	9	3.92	67	.08	2	3.56	.09	.09	2	2	3
STANDARD C/AU-R	18	57	39	132	7.1	70	31	1052	3.97	38	15	7	39	53	18.5	15	21	56	.51	.092	38	59	.90	181	.07	38	1.89	.06	.14	12	2	493

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Tl %	B ppm	Al %	Na %	K %	W ppm	TL ppm	Au** ppb
MN-5-3 31959	1	95	3	81	.1	36	19	828	5.09	8	5	ND	1	108	.4	2	2	112	1.16	.140	12	62	1.66	179	.08	3	1.86	.01	.06	1	2	6
MN-5-3 31960	1	96	8	80	.2	40	18	760	5.48	9	5	ND	3	106	.2	2	2	131	1.14	.141	11	74	1.55	168	.09	3	1.69	.01	.05	1	2	5
MN-5-3 31961	1	49	4	59	.1	38	15	635	3.99	5	5	ND	1	91	.2	2	2	79	1.06	.110	7	84	1.45	246	.05	3	1.44	.01	.06	1	2	7
MN-5-3 35118	1	51	5	78	.1	42	17	667	4.36	6	5	ND	1	108	.2	2	2	93	.92	.110	7	88	1.57	219	.07	5	1.67	.02	.05	1	2	5
MN-5-3 35119	1	75	5	78	.3	39	18	722	5.69	12	5	ND	4	101	.3	2	2	139	1.07	.142	11	83	1.53	198	.08	4	1.64	.01	.05	1	2	7
MN-5-3 35120	1	82	2	94	.1	42	18	758	4.56	10	5	ND	1	104	.4	2	2	98	1.24	.122	9	64	1.62	180	.08	3	1.72	.01	.05	1	2	5
MN-5-3 35121	1	81	4	77	.2	39	18	593	5.44	9	5	ND	1	128	.2	2	2	132	1.14	.158	12	83	1.66	187	.10	2	1.89	.02	.05	1	2	8
MN-5-3 35122	1	78	7	75	.1	36	17	709	4.87	7	5	ND	1	104	.2	2	7	113	1.15	.116	9	68	1.51	189	.08	2	1.66	.01	.05	1	2	25
MN-5-3 35123	1	85	6	79	.1	37	19	705	5.68	10	7	ND	2	111	.6	2	3	138	1.11	.172	12	76	1.56	186	.08	2	1.76	.02	.05	1	2	4
MN-07-3 D-1	1	74	7	77	.1	21	19	1017	4.54	16	5	ND	1	70	.2	2	2	84	1.70	.148	10	19	1.14	309	.05	2	1.37	.02	.09	1	2	5
MN-07-3 D-2	1	81	14	77	.2	19	19	886	5.68	21	5	ND	1	69	.3	5	2	132	1.51	.155	11	33	.99	374	.07	3	1.17	.01	.06	1	2	21
MN-07-3 D-3	1	75	4	78	.2	20	17	905	5.22	18	5	ND	1	73	.2	3	2	118	1.59	.145	10	27	.98	370	.06	2	1.11	.01	.06	1	2	18
MN-07-3 D-4	1	74	10	77	.3	24	17	810	5.21	17	5	ND	1	76	.6	3	2	123	1.51	.137	10	39	1.08	304	.07	2	1.24	.01	.06	1	2	42
MN-07-3 D-5	1	80	9	74	.1	18	17	870	4.95	19	5	ND	1	71	.5	4	4	107	1.68	.144	10	26	.96	317	.06	2	1.10	.01	.06	1	3	14
MN-07-3 D-6	1	73	8	75	.2	18	19	816	5.33	22	5	ND	1	72	.2	2	2	121	1.53	.161	11	30	.97	368	.06	2	1.13	.01	.06	1	2	107
MN-07-3 D-7	1	75	10	72	.2	18	18	892	5.10	23	5	ND	1	78	.2	3	2	114	1.83	.149	10	26	.95	330	.06	2	1.08	.01	.06	1	2	13
MN-07-3 D-8	1	81	8	79	.4	19	19	810	6.06	22	5	ND	1	63	.4	5	2	149	1.04	.174	12	33	.93	453	.07	2	1.19	.01	.07	1	2	35
MN-06-3 J-1	1	181	2	75	.4	142	25	610	3.70	17	5	ND	1	65	.9	2	3	64	1.39	.122	7	199	2.67	161	.07	5	1.98	.02	.16	1	2	8
MN-07-3 J-1	1	87	3	51	.1	29	13	596	3.58	7	5	ND	1	44	.2	2	2	74	.73	.122	11	46	.72	262	.03	2	.97	.01	.06	1	2	7
MN-07-3 J-2	1	80	3	49	.1	21	12	588	4.12	9	5	ND	2	57	.2	2	2	86	.97	.154	13	35	.57	378	.02	5	.82	.01	.06	1	2	17
MN-07-3 J-3	1	86	4	51	.1	14	13	686	4.13	6	5	ND	1	89	.2	2	2	85	1.48	.151	13	30	.58	369	.02	2	.72	.01	.08	1	2	9
MN-07-3 J-4	1	86	2	42	.1	16	12	704	3.61	6	5	ND	1	102	.2	3	2	67	1.68	.160	14	21	.55	359	.01	2	.65	.01	.08	1	2	1
MN-07-3 J-5	1	94	3	47	.4	14	13	718	3.53	6	6	ND	5	85	.2	4	2	64	1.72	.154	14	20	.57	336	.01	2	.66	.01	.08	1	2	5
MN-07-3 J-6	1	102	2	54	.3	16	1																									

NOV 23 '90 15:53  
ACME ANALYTICAL LABORATORIES LTD.  
852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6  
PHONE(604)253-3158 FAX(604)253-1716

651 P02  
DATE RECEIVED

DATE REPORT MAILED:

NOV 23/90

### ASSAY CERTIFICATE

Homestake Mining (Canada) Limited PROJECT 3128 FILE # 90-4493R

SAMPLE#	Cu %	Pb %	Zn %	Ag** oz/t	Au** oz/t
MN-03-1 35067	-	1.71	6.64	.47	-
MN-03-1 35328	.30	-	-	2.70	.296
MN-04-1 31963	.08	5.53	.24	3.74	.445
MN-04-1 31964	.04	4.76	-	4.62	.061
MN-04-1 35481	.87	-	-	1.55	.164
MN-04-2 35329	-	-	-	1.89	.527

AG\*\* AND AU\*\* BY FIRE ASSAY FROM 1 A.T.  
- SAMPLE TYPE: ROCK PULP

SIGNED BY *C. Leong* D. TOYE, C. LEONG, J. WANG; CERTIFIED B.C. ASSAYERS

NOV 23 '90 15:54

ACME ANALYTICAL LABORATORIES LTD.  
852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6  
PHONE(604)253-3158 FAX(604)253-1716

651 P03  
DATE RECEIVED:

DATE REPORT MAILED:

NOV 23 / 90

### ASSAY CERTIFICATE

Homestake Mining (Canada) Limited PROJECT 3130 FILE # 90-4486R

SAMPLE#	Pb %	Zn %	Ag** oz/t	Au** oz/t
MN-01-1 35070	-	-	-	.079
MN-04-1 35072	.25	13.77	.18	-

AG\*\* AND AU\*\* BY FIRE ASSAY FROM 1 A.T.  
- SAMPLE TYPE: ROCK PULP

SIGNED BY *C. Leong* D. TOYE, C. LEONG, J. WANG; CERTIFIED B.C. ASSAYERS

**APPENDIX II**

**Spire Grid Samples****Description**

35067	rock. qtz-carb. breccia,tr-3% sph.,tr. galena
35069	rock. qtz-carb. breccia,tr.cpy. malachite
35070	rock. fracture in mafic volcanic proximal to dior. dyke.70% py.tr.cpy.
35071	rock.qtz.stringer 40cmX10cmX1cm on West Wall fault.5% py.blebs,tr.-1% diss.cpy. 1% diss. mt.
35072	rock.qtz-carb. breccia,5cm wide 10% sph. zone 6cm to 40cm wide,tr. diss. gal.
35073	rock.qtz-carb.breccia,host dior.dyke tr. diss. sph.,tr. diss. po.

**Eastern Ultramafic Zone**

35326	rock. fracture in mafic volcanic proximal to dior. dyke,tr.diss. py.
35327	rock. ultramafic hanging wall of shear zone, 2-3%cpy. stringers,tr.py.blebs
35328	rock.?ultramafics,sample white to clear qtz vein,5-10% euhedral py.
35329	clay gouge shear zone in ultramafics, pyritic?
35480	rock.dior.dyke,1-2%py.in fractures tr. cpy.,possible po.
35481	rock.qtz.vein in ultramafics near 35328,10-15% diss.py.,tr.diss.cpy, 1% diss. galena

**Shoulder Vein**

31963	rock.qtz vein(banded and vuggy) in chl. mafic volcanics at margin of fsp.porph. dyke,2-3%diss.py and gal.,tr.diss.cpy. vein 10 to 15cm wide
31964	rock.subparallel qtz vein(vuggy),40cm wide,5% coarse(3mm) euhedral py.,2% diss. gal.

**PJ Creeks Samples**

**Description**

35330 rock.carbonitized(protolith unknown)  
clear,white carbonate veins up to 0.5cm  
thick

35375 rock. potassium altered silicified dior.?,  
3-5% fine to med. diss. py and thin str.

35376 rock. same o/c as 35375,strong gossan,  
3-5% med. py with patches of euhedral py

35482 rock.several shear zones over 15m  
within mafic volcanic protolith,  
chl+ank+/-se+qtz schist(no qtz vein)  
1-2% fine diss. mt.,tr.medium diss.cpy  
and py.

J-1 stream.coarse sand(schist fragments),  
fast flowing,little moss

P-1 stream.brown with grey micaceous flakes,  
silty to fine sand

**Nie #5 and #7 Creeks**

31958 rock.fe-cbt.altered with 1-2% 1-4mm  
wide calcite str. stockwork,no min.

31962 fe-cbt,mariposite+/-qtz rock with  
tr-2% 1-2mm calcite stockwork,no min.

35068 rock. 1.5m wide shear zone within  
fsp.lithic? mafic volcanic,  
se-chl-cbt-sil alteration,  
tr.diss.cpy and malachite staining

MN-07-3 D-1 dry creek bed, sand,0%org.,large spruce  
and pine

D-2 moderate flow,sand,0%org,large round  
boulders,spruce/pine

D-3 moderate flow,silty-sand,0%org.

D-4 moderate flow,sand-gravel,0%org.

D-5 moderate flow,dark brown sand,<5%org

D-6 mod-fast flow,med.brown silty-sand,  
some moss matt for silt 25%org,balsam

D-7 mod-fast flow,orange brown sand,0%org

D-8 moderate flow,silt-sand,moss matt  
40% org.

**Nie #5 and Nie #7 Continued****Description**

MN-07-3 J-1	silt
J-2	swamp/lake silt, no flow
J-3	moderate flow, sand, K-altered qtz-dior. and mafic volcanic boulders
J-4	moderate flow, sand-silt
J-5	moderate flow, coarse red sand
J-6	moderate flow, red sand, syenite to granite boulders still abundant
J-7	moderate flow, red sand, diorite o/c nearby
J-8	moderate flow, some glacial till and outwash, o/c still diorite
MN-05-3	
35118	stream, moderate flow,
35119	stream, moderate flow, gravel
35120	stream, moderate flow, gravel and sand
35121	stream, moderate flow, gravel and sand
35122	stream, fast flow, large boulder, gravel and sand
35123	stream, fast flow, boulders, gravel sample is moss matt
31959	stream, fast flow, sand and gravel
31960	stream, fast flow, boulders, gravel and sand
31961	stream, slow flow, boulders, gravel and sand

**Near Spire Grid Detailed Area****Sample****Description**

MN-03-1	
35066	extremely limonitic and hematitic rock, vuggy with fragments of black carbonaceous argillite



**APPENDIX III**

ACME ANALYTICAL LABORATORIES LTD.

ICP - .500 gram sample is digested with 3 ml 3-1-2 HCl-HNO<sub>3</sub>-H<sub>2</sub>O at 95 degrees Celcius for one hour and is diluted to 10 ml with water. This leach is partial for Mn, Fe, Sr, Ca, P, La, Cr, Mg, Ba, Ti, B, W and limited for Na, K and Al. Au detection limit by ICP is 3 ppm. Au\*\* analysis by FA/ICP from 10 gram sample. Au\* by wet acid leach (10gm)

Au\*\* and Ag\*\* by fire assay from 1 assay ton sample type is rock pulp

For %Cu, %Pb and %Zn a one gram sample was digested in 50ml of aqua regia for one hour to 100mL and run by ICP.

**APPENDIX IV**

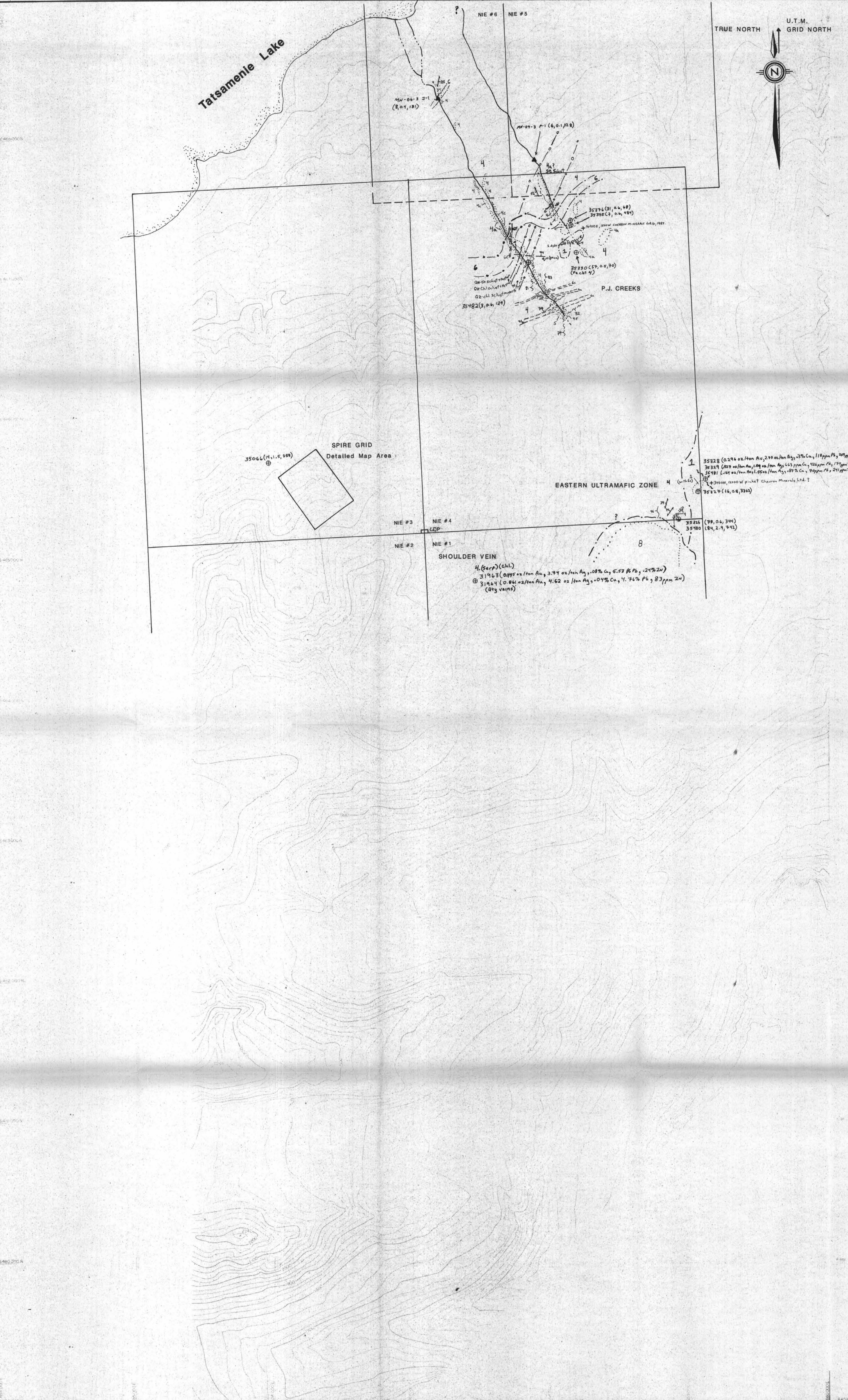
## STATEMENT OF QUALIFICATIONS

I, Duncan Archie McBean, of 2205 Graveley Street, Vancouver, British Columbia, Canada, here by certify that:

1. I am a graduate of the University of Saskatchewan, having been granted the degree of Bachelor of Sciences - Geology in 1989
2. I have practiced my profession as a geologist in mineral exploration since 1989
3. I am author/co-author of the above report
4. I am presently employed as a geologist with Homestake Mineral Development Company of #1000-700 West Pender Street, Vancouver, British Columbia, Canada
5. I have no direct or indirect financial interest in any companies known to me to have an interest in the mineral properties described by this report nor do I expect to receive any such interest.

Dated at Vancouver, B.C. this 12<sup>TH</sup> day of DECEMBER 1990

  
\_\_\_\_\_  
Duncan A. McBean



**LEGEND**

- MIOCENE**
- 8 Level Mountain - plateau basalts
- TERTIARY - CRETACEOUS**
- 7 Sikko Group
    - a - felspar porphyry
    - b - rhyolite dykes, stocks
    - c - basalt dykes
- JURASSIC - CRETACEOUS**
- 6 Non-foliated Diorite
    - a - diorite non-foliated dyke
    - b - siltstone sill
    - c - porphyritic diorite (feldspar porphyry)
- TRIASSIC**
- 5 Foliated Diorite
- PRE - UPPER TRIASSIC**
- 4 Intermediate to Mafic Volcanics: tuffs, flows and sediments derived from volcanics occasional calcareous siltstone beds
    - a - augite porphyry
    - b - tuff, thinly bedded
    - c - massive flows
    - d - lapilli tuff
    - e - chlorite schist
    - f - porphyroblastic mafic volcanic \*\*
- PERMIAN**
- 2 Limestone
    - a - carbonaceous
    - b - white
  - 1 Ultramafic

**GEOLOGICAL BRANCH ASSESSMENT REPORT**  
**20,655**

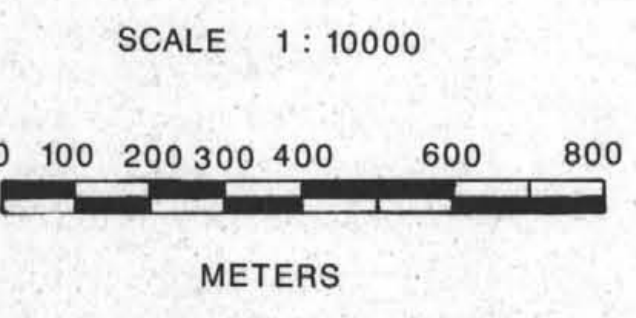
**SYMBOLS**

- 31118 (4,04,150) ⊕ Rock Sample (sample no. Au ppb, Ag ppm, Cu ppm)
- 31118 (4,04,150) ▲ Silt Sample (sample no. Au ppb, Ag ppm, Cu ppm)
- 31118 (4,04,150) ■ Soil Sample (sample no. Au ppb, Ag ppm, Cu ppm)
- 31119 (200,1,2000) ● Heavy Mineral Sample (sample no. Au ppb, Ag ppm, Cu ppm 100 mesh) (sample no. Au ppb, Ag ppm, Cu ppm 60+100 mesh)
- Mapping Station
- Claim Post (LCP: Legal Corner Post) (CP: Corner Post) (ID: Identification Post)
- Geologic Contact (defined, approximate, assumed)
- ~ Fault (with dip direction) (defined, assumed, possible)
- ~ Shear (with dip direction)
- Outcrop
- X Outcrop (too small at scale)
- ~ Bedding (with dip)
- ~ Foliation (with dip)
- ~ Dyke or Sill (with dip)
- ~ Joints (with dip)
- ~ Zone of alteration Crenulation (with dip direction)

**ABBREVIATIONS**

- Bi: Biotite
- Ch: Carbonate
- Chl: Chlorite
- Cp: Chalcopyrite
- c.g.: Coarse-grained
- Ep: Epidote
- Fract: Fracture
- f.g.: Fine-grained
- Ga: Galena
- m.g.: Medium-grained
- Mag: Magnetic
- Mt: Magnetite
- Musc: Muscovite
- Po: Pyrrhotite
- Py: Pyrite
- q.v.: Quartz Vein
- RCC: Rubble Crop
- Serp.: Serpentine
- Sil: Silicified
- Sph: Sphalerite
- St: Stellite

\* Based on Chevron Minerals Ltd. 1987 Legend  
 \*\* Porphyroblastic Mafic Volcanic added to Chevron Minerals Limited 1987 Legend



**HOMESTAKE** MINERAL DEVELOPMENT COMPANY

**Golden Bear Road J.V. Project**  
**NIE GROUP PROPERTY**  
 (Nie #3 Nie #4 Nie #5 Nie #6)

**GEOLOGY AND GEOCHEMISTRY**

DRAWN DAM	DATE NOV. 30, 1990	FILE CODE 104K/8W	Fig. 4.1
REVISED			

TRUE NORTH  
U.T.M. GRID NORTH



**LEGEND\***

- MIOCENE**
- 8 Level Mountain - plateau basalts
- TERTIARY - CRETACEOUS**
- 7 Sloko Group  
a - feldspar porphyry  
b - rhyolite dykes, stocks  
c - basalt dykes
- JURASSIC - CRETACEOUS**
- 6 Non-foliated Diorite  
a - diorite non-foliated dyke  
b - albite sill  
c - porphyritic diorite (feldspar porphyry)
- TRIASSIC**
- 5 Foliated Diorite
- PRE - UPPER TRIASSIC**
- 4 Intermediate to Mafic Volcanics:  
tuffs, flows and sediments derived from volcanics  
occasional calcareous siltstone beds
- a - augite porphyry  
b - tuff, thinly bedded  
c - massive flows  
d - lapilli tuff  
e - chlorite schist  
f - porphyroblastic mafic volcanic \*\*
- 3 Siltstone to Limestone:  
siltstone, calcareous siltstone and limestone
- a - siliceous siltstone  
b - calcareous to carbonaceous siltstone  
c - limestone  
d - white to light grey limestone  
e - black highly carbonaceous  
f - intraformational breccia
- PERMIAN**
- 2 Limestone  
a - carbonaceous  
b - white
- 1 Ultramafic

20,655

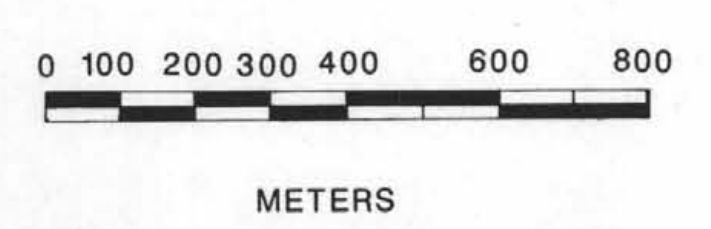
**SYMBOLS**

- 31118 (40.5,150) Rock Sample  
(sample no. Au ppb, Ag ppm, Cu ppm)
- 31118 (40.5,150) Silt Sample  
(sample no. Au ppb, Ag ppm, Cu ppm)
- 31118 (40.5,150) Soil Sample  
(sample no. Au ppb, Ag ppm, Cu ppm)
- 31119 (200.1,1,2000) (500.2,2,4000) Heavy Mineral Sample  
(sample no. Au ppb, Ag ppm, Cu ppm 150 mesh)  
(sample no. Au ppb, Ag ppm, Cu ppm 60-150 mesh)
- Mapping Station
- Claim Post (LCP: Legal Corner Post)  
(CP: Corner Post)  
(ID: Identification Post)
- Geologic Contact**  
(defined, approximate, assumed)
- Fault** (with dip direction)  
(defined, assumed, possible)
- Shear** (with dip direction)
- Outcrop**
- Outcrop** (too small at scale)
- Bedding (with dip)
- Foliation (with dip)
- Dyke or Sill (with dip)
- Joints (with dip)

**ABBREVIATIONS**

- Bl: Biotite  
Cbt: Carbonate  
Chl: Chlorite  
Cp: Chalcocopyrite  
c.g.: Coarse-grained  
Ep: Epidote  
Fract: Fracture  
f.g.: Fine-grained  
Ga: Galena  
m.g.: Medium-grained  
Mag: Magnetite  
Mt: Muscovite  
Musc: Muscovite  
Pp: Pyrrhotite  
Py: Pyrite  
q.v.: Quartz Vein  
R/C: Rubble Crop  
Sll: Silicified  
Sph: Sphalerite  
St: Sericite

SCALE 1: 10000



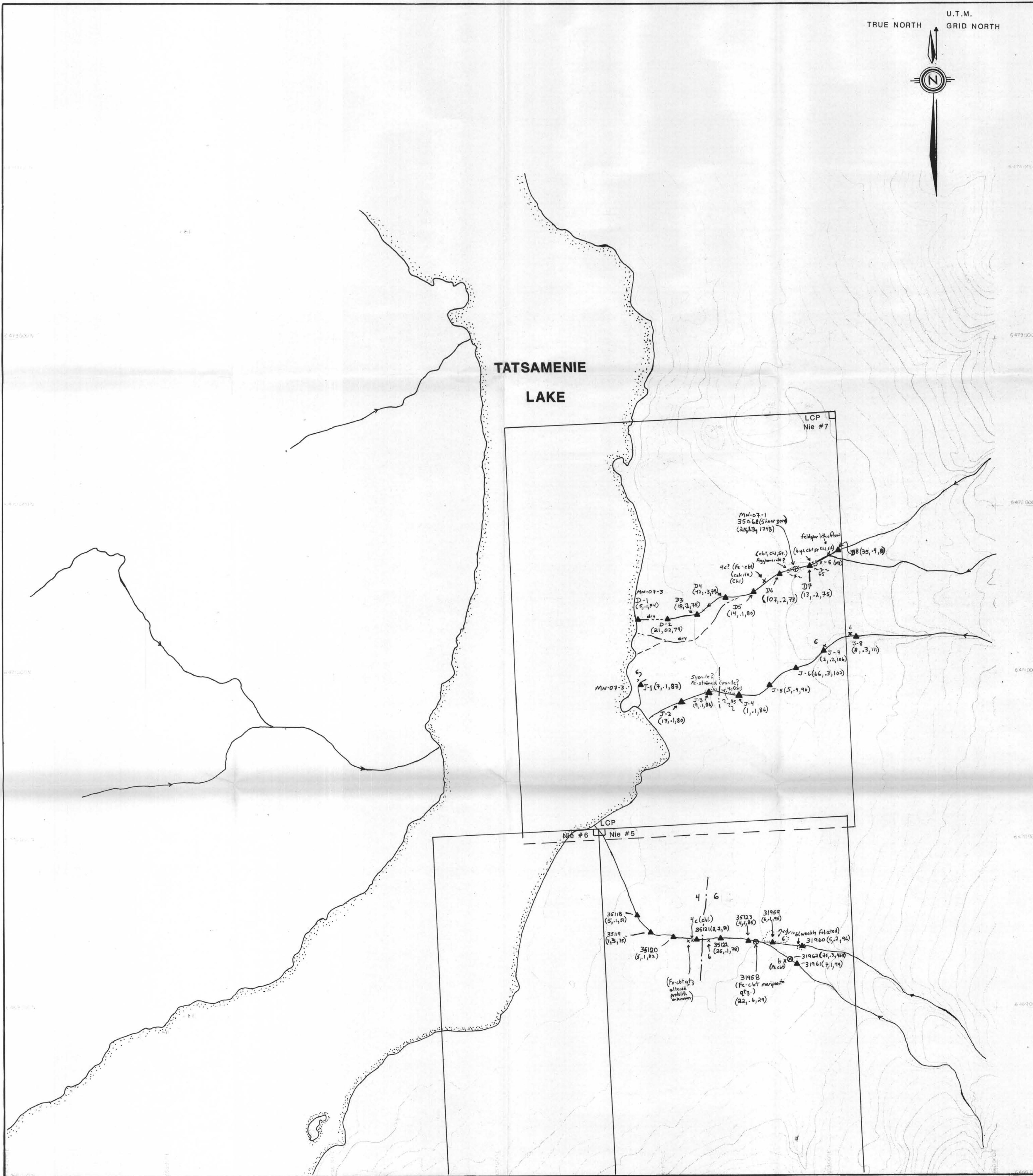
HOMESTAKE MINERAL DEVELOPMENT COMPANY

**Golden Bear Road J.V. Project**  
**NIE GROUP PROPERTY**  
(Nie #5 Nie #6 Nie #7)

**GEOLOGY AND GEOCHEMISTRY**

DRAWN DAM	DATE NOV. 30, 1990	FILE CODE 104K/8W	Fig. 4.2
REVISED			

**TATSAMENIE LAKE**



Nie 3 Claim

SPIRE GRID NORTH

TRUE NORTH

LEGEND\*

GEOLOGICAL BRANCH ASSESSMENT REPORT

20,655

MIOCENE

8 Level Mountain - plateau basalts

TERTIARY - CRETACEOUS

7 Sloko Group  
a - feldspar porphyry  
b - rhyolite dykes, stocks  
c - basalt dykes

JURASSIC - CRETACEOUS

6 Non-foliated Diorite  
a - diorite non-foliated dyke  
b - albite sill  
c - porphyritic diorite (feldspar porphyry)

TRIASSIC

5 Foliated Diorite

PRE - UPPER TRIASSIC

4 Intermediate to Mafic Volcanics:  
tuffs, flows and sediments derived from volcanics  
occasional calcareous siltstone beds

a - augite porphyry  
b - tuff, thinly bedded  
c - massive flows  
d - lapilli tuff  
e - chlorite schist  
f - porphyroblastic mafic volcanic \*\*

3 Siltstone to Limestone:  
siltstone, calcareous siltstone and limestone

a - siliceous siltstone  
b - calcareous to carbonaceous siltstone  
c - limestone  
d - white to light grey limestone  
e - black highly carbonaceous  
f - Intraformational breccia

PERMIAN

2 Limestone  
a - carbonaceous  
b - white

1 Ultramafic

ABBREVIATIONS

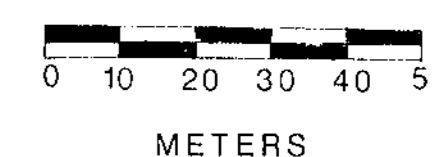
Bl: Biotite  
Cbt: Carbonate  
Chl: Chlorite  
Cp: Chalcopyrite  
c.g.: Coarse-grained  
Ep: Epidote  
Frac: Fracture  
f.g.: Fine-grained  
Ga: Galena  
m.g.: Medium-grained  
Mag: Magnetic  
Mt: Magnetite  
Mus: Muscovite  
Po: Pyrrhotite  
Py: Pyrite  
Qz: Quartz Vein  
R/C: Rubble Crop  
Sill: Sillified  
Sph: Sphalerite  
St: Sericite

SYMBOLS

3119 Rock Sample (sample no. Au pph, Ag ppm, Cu ppm, Pb ppm, Zn ppm)  
62,17,853,1730,2769  
JW35472 Rock Sample Chevron Minerals Ltd.  
Geologic Contact (dotted, approximate, assumed)  
Fault (with dip direction) (dotted, assumed, possible)  
Quartz Carbonate Breccia Fault Zone  
Outcrop  
Bedding (with dip)  
Foliation (with dip)  
Dyke or Sill (with dip)  
Joints (with dip)  
Creek (wet, dry)  
+ Chevron Minerals Ltd. grid location

\* Based on Chevron Minerals Ltd. 1987 Legend  
\*\* Porphyroblastic Mafic Volcanic added to Chevron Minerals limited 1987 Legend

SCALE 1: 1000



HOMESTAKE MINERAL DEVELOPMENT COMPANY

Golden Bear Road J.V. Project  
MISTY NIE PROPERTY  
(Nie 3 Claim)

SPIRE GRID GEOLOGY

Table with columns: DRAWN (DAM), DATE (Nov. 28, 1990), FILE CODE (104K/8W), and Fig. 5

