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**GEOCHEMICAL, GEOPHYSICAL AND PROSPECTING**

**ASSESSMENT REPORT**

ON THE

HOLBERG INLET PROPERTY

NANAIMO MINING DIVISION

BRITISH COLUMBIA

**GEOLOGICAL BRANCH**

**N.T.S.: 92LM12 ASSESSMENT REPORT**

Latitude: 50° 42' N  
Longitude: 127° 47' W

For

**CAMECO CORPORATION**

**22,283**

2121 - 11th Street West  
Saskatoon, Saskatchewan  
Canada, S7M 1J3

By

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MAY 1 1992

September 30, 1991

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## SUMMARY

The Holberg Inlet property is located on northern Vancouver Island, British Columbia. A number of zinc, lead, gold, silver and copper showings occur on the claims. Between August 27 and September 15, 1991, Daiwan Engineering Ltd. conducted an exploration program on the Holberg Inlet property on behalf of Cameco Corporation. The object of the program was to determine the source of, and to better define, geochemical and geophysical anomalies outlined during the spring (1991) exploration work on the property. Work included prospecting, soil sampling, IP and magnetometer surveys, rock sampling and geological mapping. This program was designed to test three areas which contain most of the showings on the property, and to attempt to discover new metal occurrences within these areas.

The property is underlain by a conformable sequence of generally east-west striking, moderately south-dipping basalt flows of the Karmutsen Formation, limestone of the Quatsino Formation, siliceous siltstone of the Parson Bay Formation (collectively the Triassic Vancouver Group) and mafic to intermediate volcanoclastics of the Jurassic Bonanza Group. This sequence has been intruded by several phases of dykes, sills and stocks, and later cut by a complex series of faults.

The most significant mineralization on the property occurs within the 150 to 300 metres thick Quatsino Formation limestone and the 100 to 300 metres thick Parson Bay Formation.

A total of 254 soil samples was collected on 6.625 km of hip-chain-and-compass surveyed flagged lines. The survey better defined previously known anomalies near the old showings and identified a few small zones with anomalous amounts of gold which may warrant follow-up.

Magnetometer and IP surveys were conducted over 8.94 km of cut crossline. The IP survey outlined several apparent zones of sulphide mineralization and numerous geological contacts. The magnetic survey was conducted by the geophysical crew to aid in the interpretation of the IP data. A few small magnetic highs probably due to the presence of magnetite-bearing skarns were profiled.

The prospecting has resulted in the discovery of several new mineral occurrences on the Holberg Inlet property in the Contact Creek, HPH and Dorlon areas. The Contact Creek and HPH areas warrant additional work to evaluate the mineralization in each area.

Expenditures on the property between August 27 and September 30, 1991 totalled \$64,725.52

## INTRODUCTION

At the request of Mr. Robert Chapman, Regional Geologist of Cameco Corporation, Daiwan Engineering Ltd. conducted an exploration program on the Dorlon Claim Group located near Port Hardy, British Columbia. This program consisted of IP and magnetometer surveying, prospecting, geological mapping and geochemical rock and soil sampling. The purpose of this exploration program was to explore in more detail three areas of interest identified during the previous episode of exploration on the property.

During the program, 254 soil and 99 rock samples were collected; IP and magnetometer surveys were performed over 8.94 line-kilometres; three areas within the property were prospected and a limited amount of geological mapping was done. The cut crosslines totalled 8.94 km, and 6.625 km of flagged only crosslines were completed.

This report is a description of work completed on the property between August 27 and September 15, 1991.

## LOCATION AND ACCESS

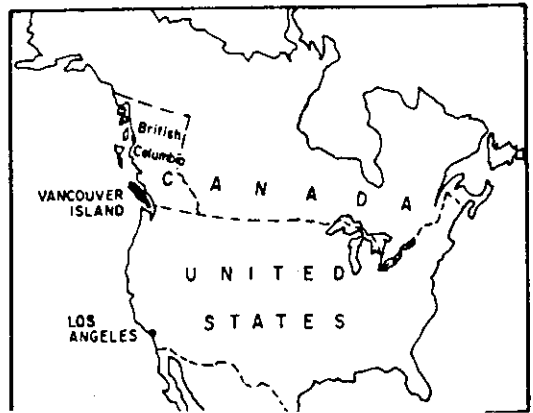
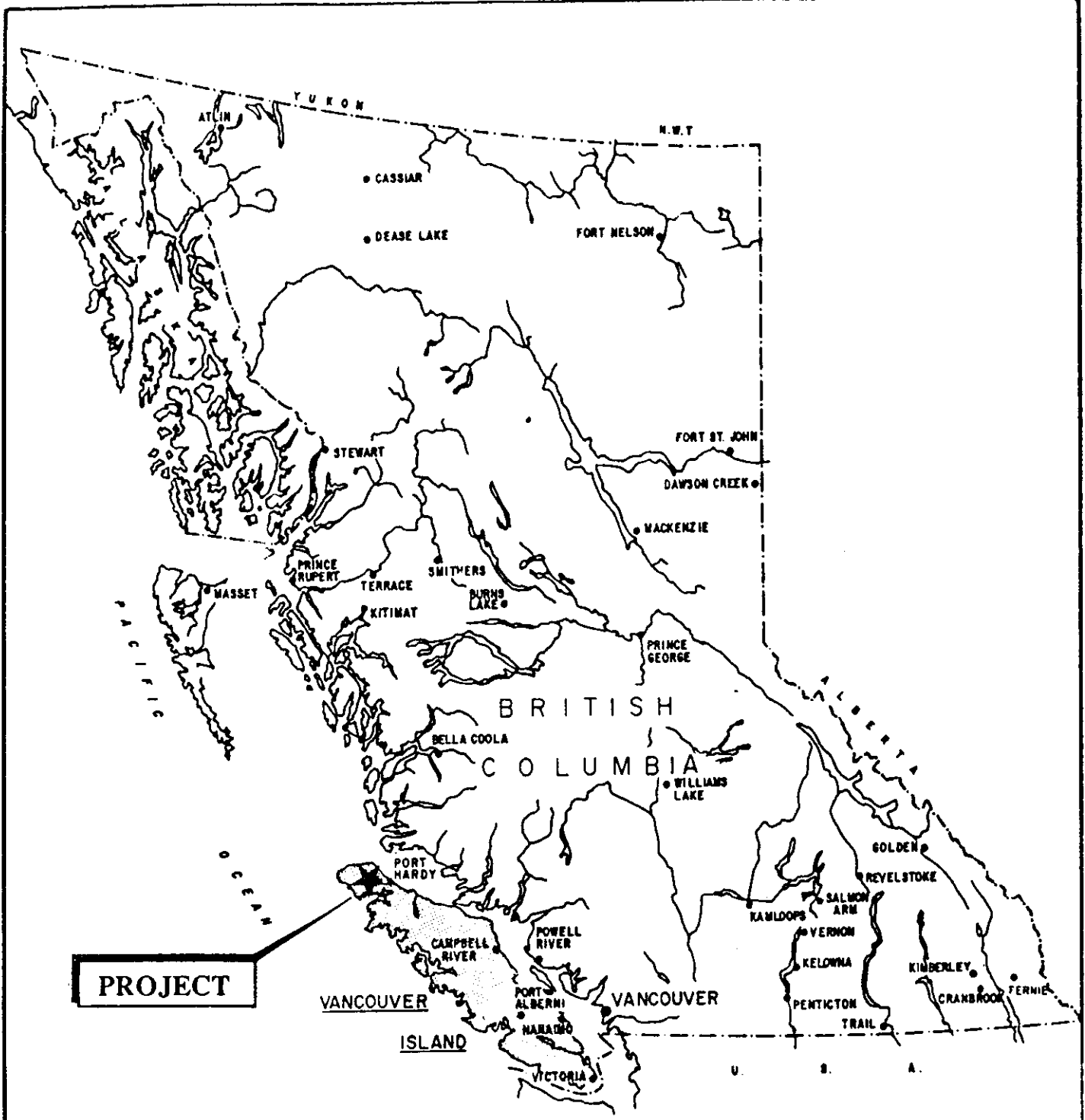
The Dorlon property is centred approximately 21 km west of Port Hardy on northern Vancouver Island, British Columbia (Figure 1).

The gravel road between Port Hardy and Holberg passes through the central part of the property. Logging roads branching out from this main road provide good access to most parts of the property.

## TOPOGRAPHY AND VEGETATION

The westerly trending Nahwitti River valley occupies the eastern portion of the property area. This valley is bounded by westerly trending ridges which are cut by narrow creek gullies. Elevations range from approximately 300 to 550 metres a.s.l. The western portion of the property rises steeply from Nahwitti Lake to elevations of 730 metres a.s.l.

The property is within an active logging area with forest cover ranging from mature fir, hemlock, spruce and cedar stands to dense second growth to open clear-cut areas. The lower parts of the Nahwitti River and Kains Creek valleys are covered by thick brush and berry bushes. In areas of previous logging



<b>Cameco</b> CORPORATION		
<b>HOLBERG INLET PROJECT</b> Northern Vancouver Island		
<b>LOCATION MAP</b>		
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Scale: As Shown	Date: Sept. '91	Fig.: 1

activity, traverses are difficult because of the dense secondary growth. Recent tree thinning across the property has obliterated much of the earlier grid, and made access difficult.

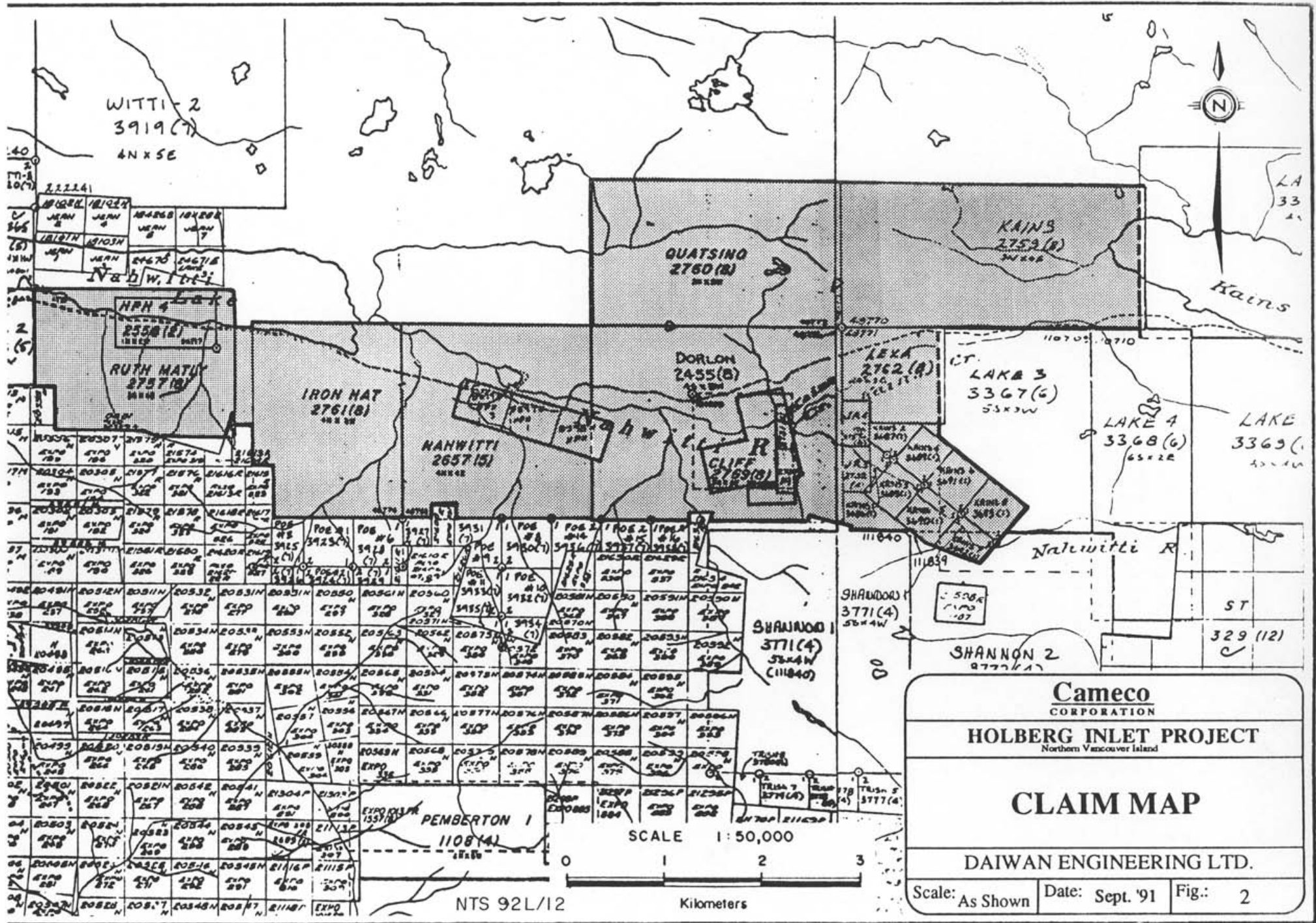
Rock outcrops are exposed within creek gullies, in logging road cuts and on the steeper hillsides. Thick accumulations of sand and gravel are present on valley floors.

The property is precipitous south of Nahwitti Lake, especially in the vicinity of limestone outcrops.

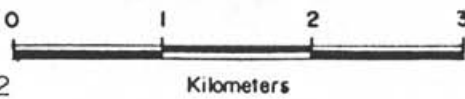
### PROPERTY

This property consists of 25 contiguous claims totalling 120 claim units within N.T.S. map-sheet 92L/12. The property consists of the following contiguous mineral claims located in the Nanaimo Mining Division. The claims are depicted on Figure 2 and listed below:

<u>Name</u>	<u>Record No.</u>	<u>Units</u>	<u>Expiry</u>	<u>Recorded Owner</u>
Dorlon	2455	20	August 13, 1993	Lexa Scott
Iron Hat	2761	12	August 17, 1993	James Scott
Kains	2759	18	August 17, 1993	Lexa Scott
Lexa	2762	4	August 17, 1993	" "
Quatsino	2760	15	August 17, 1993	" "
HPH 1	8597	1	July 4, 2000	Hisway Resources Corp.
HPH 2	8598	1	July 4, 2000	" "
HPH 3	8599	1	July 4, 2000	" "
HPH 4	2558	2	February 19, 1994	" "
Nahwitti	2657	16	May 6, 1994	Lexa Scott
Cliff	2769	4	August 19, 1994	Hisway Resources Corp.
JLJ 1	2730	1	April 29, 1994	" "
JLJ 2	2731	1	April 29, 1994	" "
JLJ 3	2732	1	April 29, 1994	" "
JLJ 4	2733	1	April 29, 1994	" "
Iron Fraction #1	4158	1	April 13, 1994	L. Allen
Iron Fraction #2	4159	1	April 13, 1994	" "
Ruth Mary	2757	12	August 17, 1993	Hisway Resources Corp.



SCALE 1:50,000



<b>Comeco</b> CORPORATION		
<b>HOLBERG INLET PROJECT</b> Northern Vancouver Island		
<b>CLAIM MAP</b>		
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Scale: As Shown	Date: Sept. '91	Fig.: 2



claims list cont:

<u>Name</u>	<u>Record No.</u>	<u>Units</u>	<u>Expiry</u>	<u>Recorded Owner</u>
Kains 1	3686	1	January 20, 1994	C. Von Einsiedel
Kains 2	3687	1	"	" "
Kains 3	3688	1	"	" "
Kains 4	3689	1	"	" "
Kains 5	3690	1	January 22, 1994	" "
Kains 6	3691	1	"	" "
Kains 7	3692	1	"	" "
Kains 8	3693	<u>1</u>	"	" "
	Total	120		

The above claims are optioned by Hisway Resources Corporation to Cameco Corporation. The expiry dates shown are the current date, and do not show credit for this assessment report.

### HISTORY

A HPH lead-zinc occurrence was discovered about three km east of Nahwitti Lake by M. Hepler, F.K. Hicklenton and S.S. Pugh during 1930. Two shafts, an adit and trenches were excavated on this occurrence during 1930 (Christopher, 1988).

Intermittent mineral exploration since 1930 has included prospecting, geological mapping, geochemical soil sampling, magnetometer surveys, induced polarization surveys, an airborne electromagnetic survey and also the completion of more than 40 diamond drill holes. Numerous showings and 15 named *mineral occurrences* have been located as a result of this work.

Christopher (1988), Greene and Einsiedel (1990) and Oakley (1990) have outlined the exploration history of the Dorlon (Holberg Inlet) property in some detail.

Hisway Resources Ltd. optioned the property and completed preliminary exploration in 1988 and 1989. Further claims were staked in this period to protect the land holdings and to cover additional showings. Cameco Corporation optioned the property from Hisway Resources Ltd. in April 1991.

Cameco Corporation performed a program of geological mapping, soil sampling, stream sediment (dredge) sampling, rock sampling and magnetic/VLF-EM surveys between April and June, 1991 (Allen and Dasler, 1991).

## **REGIONAL GEOLOGY**

Vancouver Island north of Holberg and Rupert inlets is underlain by rocks of the Vancouver Group. These rocks range in age from Upper Triassic to Lower Jurassic. They are intruded by rocks of Jurassic and Tertiary age and disconformably overlain by Cretaceous sedimentary rocks. Figure 3 shows the regional geological mapping of the northern part of the island.

Faulting is prevalent in the area. Large-scale faults with hundreds to thousands of metres of displacement are offset by younger, strike-slip faults with displacements up to 750 metres (2,500 ft.).

### **Vancouver Group**

The Vancouver Group rocks consist of the Harbledown Formation sills and argillites, the Karmutsen Formation basalts, the Quatsino Formation limestone, the Parson Bay Formation argillites and cherty tuffs and the Bonanza Formation volcanic breccias and flows.

### **Intrusive Rocks**

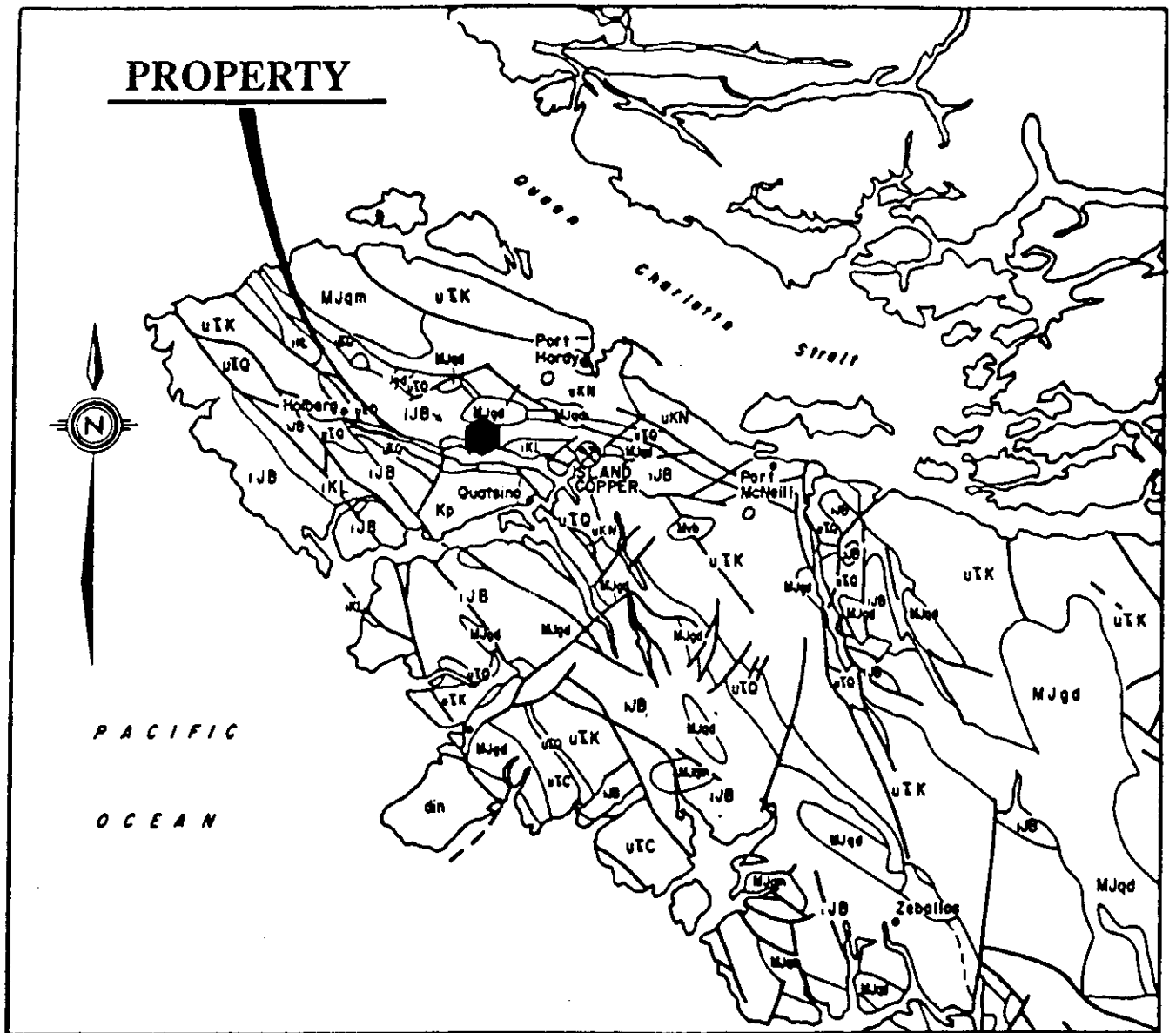
The Vancouver Group rocks are intruded by a number of Jurassic-aged stocks and batholiths. In the Holberg Inlet area a belt of northwest-trending stocks extends from the east end of Rupert Inlet to the mouth of Stranby River on the northern coast of Vancouver Island.

Quartz-feldspar porphyry dykes and irregular bodies occur along the southern edge of the belt of stocks. The quartz-feldspar porphyries are thought to be differentiates of middle Jurassic felsic intrusive rocks.

## **REGIONAL MINERALIZATION**

A number of types of mineral occurrences are known on northern Vancouver Island (Figure 4). These include:

1. Skarn deposits: copper-iron and lead-zinc skarns,
2. Copper in basic volcanic rocks (Karmutsen): in amygdules, fractures, small shears and quartz-carbonate veins, with no apparent relationship to intrusive rocks,



**PROPERTY**

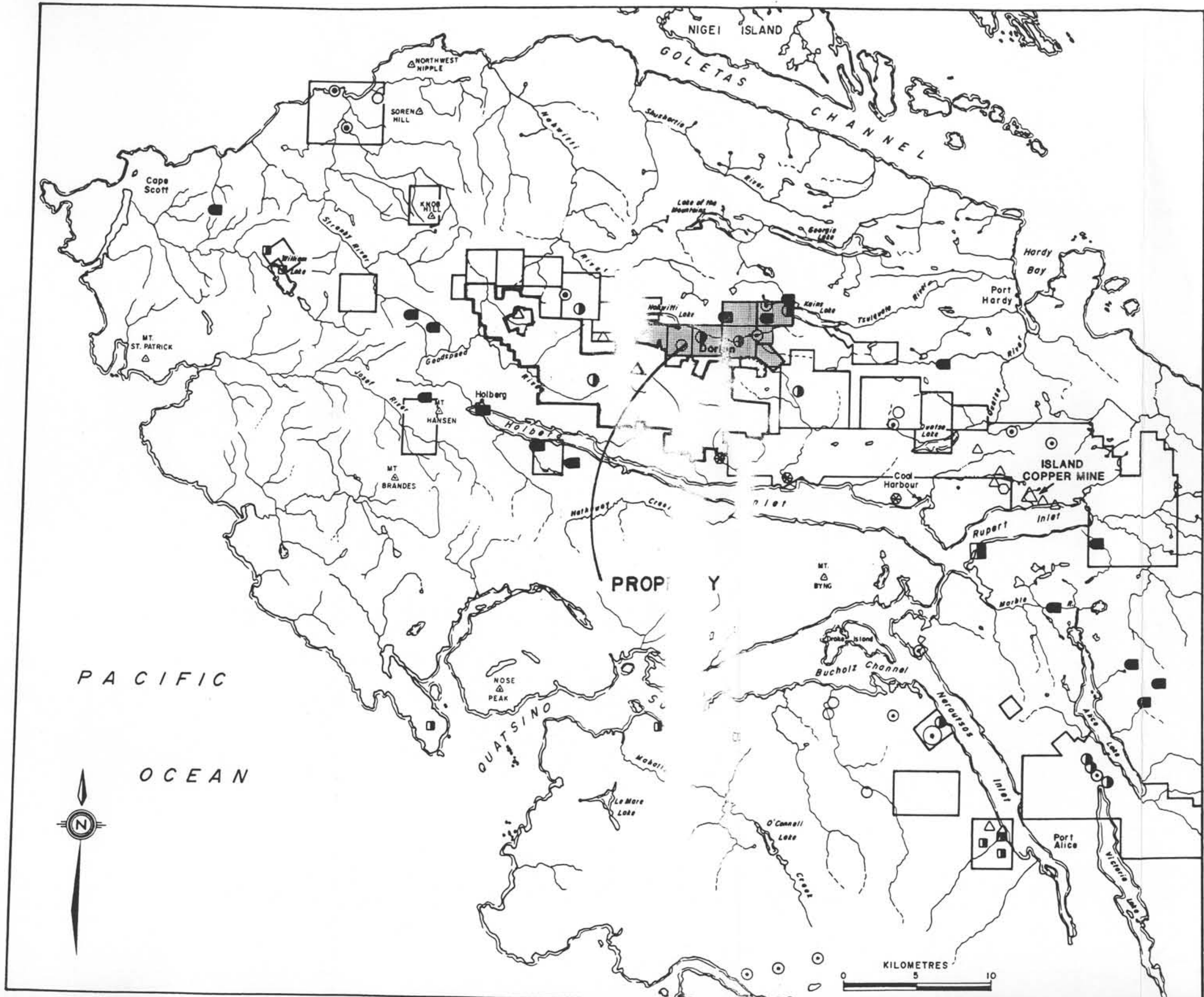
**LEGEND**

- MIOCENE**
  - Mvb basalt flows, sills and dykes
- UPPER CRETACEOUS, PALEOCENE, EOCENE**
  - Kp QUEEN CHARLOTTE GROUP: siltstone, shale, greywacke
- UPPER CRETACEOUS**
  - uKN NANAIMO GROUP: sandstone, shale, conglomerate
- LOWER CRETACEOUS**
  - iKL LONGARM: greywacke, conglomerate
- JURASSIC**
  - Jgd granodiorite, quartz diorite
- MIDDLE JURASSIC**
  - MJqm quartz monzonite, granite, monzonite
  - MJgd granodiorite
  - MJqd quartz diorite
- LOWER JURASSIC**
  - UB BONANZA: andesite, dacite, rhyolite
- UPPER TRIASSIC**
  - uTQ QUATSINO and PARSON BAY: limestone, argillite
  - uTK KARMUTSEN: basalt, pillow lava

**SCALE**



<b>Cameco</b> CORPORATION		
<b>HOLBERG INLET PROJECT</b> <small>Northern Vancouver Island</small>		
<b>REGIONAL GEOLOGY</b>		
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Scale: As Shown	Date: Sept. '91	Fig.: 3



**LEGEND**

- ⊗ Bog Iron
- Potassium-alumina
- △ Porphyry copper
- Gold quartz veins
- Copper-bearing veins
- Lead-zinc skarn or replacement in limestone
- ⊙ Copper skarn
- Iron skarn
- Copper in volcanics
- △○ Mineral occurrence
- △○ Properties recording production

(Data from British Columbia Department of Mines and Petroleum Resources, mineral inventory maps and cards; by E.V. Jackson and G.P. Eastwood)

□ - Current Mineral Titles

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**HOLBERG INLET PROJECT**  
Northern Vancouver Island

**REGIONAL MINERALIZATION**  
**OF**  
**NORTHERN VANCOUVER ISLAND**

**DAIWAN ENGINEERING LTD.**

Scale: As Shown | Date: Sept. '91 | Fig.: 4

3. Veins: with gold and/or base metal sulphides, reacted to intrusive rocks,
4. Porphyry copper deposits: largely in the country rock surrounding or enveloping granitic rocks and their porphyritic phases.

### **PROPERTY GEOLOGY**

The Holberg Inlet property is underlain by a conformable sequence of generally east-west striking, moderately south-dipping basalt flows of the Karmutsen Formation, limestone of the Quatsino Formation, fine-grained clastic sediments of the Parson Bay Formation (collectively the Triassic Vancouver Group) and intermediate volcanoclastics of the Jurassic Bonanza Group.

**Table 1 - Stratigraphy of the Holberg Inlet Property**

EARLY JURASSIC BONANZA GROUP

LATE TRIASSIC VANCOUVER GROUP

Parson Bay Formation

Quatsino Formation

Karmutsen Formation

This sequence has been intruded by several phases of dykes, sills and stocks, and later cut by a complex series of faults (Figures 6a and 6b).

The report by G. Allen and P.G. Dasler (1991) outlines the geology of the property in detail. One aspect of the mineralizing events on the property, which has not been determined, is the relationship between the various types of intrusive rocks present and the known mineral occurrences. There are numerous siliceous or felsic rocks on the property that may be either intrusive dykes or else interbeds of felsic tuff. These rocks are very fine grained, with sometimes ghosts of relic feldspars. Occasionally they are speckled with sulphides; often they are barren. Whole rock analyses of these "dykes" indicate that they have widely varying compositions. At least five types of intrusive rock occur on the property (Allen and Dasler, 1991).

### **MINERALIZATION**

The main exploration targets are the Quatsino Formation limestone and Parson Bay Formation sediments and tuffs which extend over the entire length of the property. Significant mineralization is hosted in these rock units in sporadically distributed showings along a discontinuous strike length of 7.7 km.

The mode of occurrence and precious metal content of the various showings is not consistent, suggesting that these rocks have been affected by several mineralizing events, possibly related to the various intrusive units.

### Structure

The property appears to be underlain by a simple, conformable, upright stratigraphic sequence striking roughly easterly and dipping moderately to the south. Minor folding has occurred but this does not seem to have complicated the stratigraphic sequence. The rocks are, however, cut by a complex set of faults which have apparent offsets of up to 800 m.

### PROSPECTING

Twenty man-days were spent prospecting and detail mapping on the Holberg Inlet property during September, 1991. This work was done to investigate three areas of interest outlined during the April-June 1991 exploration: HPH, Dorion and Contact Creek.

The prospecting was hampered in portions of all three areas by the presence of thick forest and/or recent tree spacing which results in a tangle of fallen trees covering the ground. However, new sulphide mineral occurrences were discovered in all three of the areas. Most of these occurrences were found during follow-up of anomalies from May-June 1991 geochemical soil sampling; this exploration technique works well in the property area.

### HPH Area

Numerous new sulphide mineral occurrences were discovered in the HPH area within Quatsino Formation limestone and Parson Bay Formation cherts and ash tuffs (Figure 12).

The most important of these new occurrences is the lead-zinc-silver occurrence in limestone exposed along the south side of the creek at 48+10W/3+60S (Figure 12). Here finely brecciated limestone contains lenses up to 0.6 or 0.7 metre wide mineralized with sphalerite, galena and pyrite occurring within small veinlets, disseminated or as irregular masses. The mineralized zone is exposed for 12 to 15 metres easterly along strike; it is cut off by a subvertical fracture or fault at its western end. This mineralization was thought to form part of a bedded sulphide deposit, however later inspection shows that the mineralization is more likely to represent replacement along the fault system in the creek.

There is evidence of shearing in the outcrop exposures in the vicinity of the showing. A northwesterly trending fault at 51+00W/2+40S likely extends southeastward through the showing area. An anticlinal fold hinge is exposed west of the showing in the creek gully at 48+75W/3+75S.

Two samples of the mineralized material, numbered 76217 and 76218, were collected from the showing. Sample 76217 contains 2.23% lead, 26.20% zinc and 232.7 ppm (6.79 opt) silver. Sample 76218 contains 3.07% lead, 18.05% zinc and 321.2 ppm (9.37 opt) silver. These two rocks also contain up to 451 ppm copper, 2964.7 ppm cadmium and up to 103 ppb gold (Appendices A and B).

To the north of this occurrence, on the south-facing slope of the HPH ridge, are several new (small) sulphide occurrences within interbedded chert and felsic ash tuff of the Parson Bay Formation (Figure 12). These contain up to 5619 ppm zinc, 46 ppm lead, 377 ppm copper and up to 2.4 ppm silver (Appendix A). Most of the occurrences within the Parson Bay Formation rocks appear stratabound with sulphides concentrated within cherty interbeds.

Disseminated honey-coloured sphalerite was found within limestone near the top of the north facing slope of the HPH ridge (Figure 12, Appendix B). Samples 76208 and 76209 were collected from one of these occurrences in metamorphosed limestone containing sphalerite, hydrozincite and galena at 49+00W\1+75S. These contain up to 46,633 ppm (4.66 %) zinc, 30749 ppm (3.07 %) lead and up to 315.3 ppm (9.20 opt) silver. All of the occurrences in this area are within a thickly forested area with limited rock exposure and so are difficult to evaluate. (The area would be accessible to a small excavator).

Siliceous-looking "dyke" material mineralized with pyrite and local pyrrhotite, sphalerite and graphite was sampled at three locales on the north-facing slope of the HPH ridge. These rocks, numbered 76201, 76203 and 76210, contain up to 2440 ppm zinc, 1405 ppm lead, 58 ppm copper, 21.7 ppm silver and up to 23 ppb gold. These three showings are the only new occurrences within the HPH area which appear to be related to igneous intrusions (felsic dykes).

### Contact Creek Area

The results of prospecting and geochemical soil sampling in the Contract Creek area are shown on figure 13.

Bands or tongues of garnet skarn occur within limestone at western Contact Creek area at 93+70-W/2+45S. These bands vary from 10 metres down to 1-2cm. This skarn appears to be altered Parson Bay Formation sediments in a couple of places; in other places the protolith may be limestone.

The skarn is most abundant within 25 metres of the contact between the sediments and an intrusive hornblende granite and is likely related to this contact. The skarn bands pinch out and disappear with increasing distance from the contact (Figure 13). Discontinuous chip sample 99388, from one of these bands, contains 63,489 ppm zinc, 2,575 ppm copper, 198 ppm lead, 12.8 ppm silver, 547.9 ppm cadmium and 25 ppb gold across 4.6 metres. This occurrence is likely the "Monzonite Showing" drilled by American Smelting and Refining Co. in 1966. Log cribbing from an old X-Ray(?) drillsite is east and upslope of the occurrence. One of their drill holes reportedly intersected 27.4 m (90 ft) of mineralized skarn (Clarke, 1968); no assays of this drill core are available.

Skarn within limestone at 89+80W\2+10S contains sphalerite, galena, greenockite(?), pyrite (Figure 13). Samples 76223, 76224 and 76225 of this rock contain from 7,141 to 38,344 ppm zinc, 922 to 4,757 ppm lead, 142 to 1188 ppm copper, 2.7 to 4.7 ppm silver, 58.6 to 316.7 ppm cadmium and from 3 to 13 ppb gold (Appendices A and B). This site is near an area of high chargeability detected during the IP survey (Appendix D). The high chargeability may be due to the presence of sulphide minerals.

Pale green to brown, garnet skarn-altered Parson Bay Formation float is mineralized with galena, sphalerite, chalcopyrite, pyrite and pyrrhotite between 2+35S and 6+18S along line 85+00W (Figure 13). Grab samples 99376 through 99385 were collected from this area. These rocks contain up to 55,724 ppm zinc, 5,063 ppm lead, 2,103 ppm copper, 12.6 ppm silver and up to 38 ppb gold. The source area of these rocks was not determined due to a lack of outcrop exposure, but is probably near by.

The source of the high gold concentrations within soil at the northern end of line 96+00W could not be determined due to a lack of outcrop exposure and no boulder float in the area. This area is wooded by mature cedar trees.

### Dorlon Area

The results of prospecting in the Dorlon area are shown on figure 11. Several new, small sulphide occurrences were located in this area, mainly within interbedded Parson Bay Formation chert and



limestone.

Rock samples numbered 76247, 99405 and 99406 are from occurrences exposed in the creek gully about 175 m southwest of the Dorlon Shaft occurrence at 18+50W/1+55S; these showings may be part of the original "Dorlon" occurrence. The three rocks contain up to 14,025 ppm zinc, 1,155 ppm lead, 508 ppm copper, 4.4 ppm silver and up to 391 ppb gold (Appendix A). Samples 99405 and 99406 are from interbedded Parson Bay Formation felsic tuff, chert and limestone horizons up to 30 cm thick which contain local pyrite, sphalerite, galena, pyrrhotite, chalcopyrite and magnetite near a felsic dyke. This appears to be replacement-style mineralization within 20 m along strike of the contact with the pale greenish grey felsic dyke. Small scale open folds are present within the sediments. Sample 76247 is of disseminated pyrite and sphalerite within limestone near the intrusive contact with a siliceous-looking dyke.

Grab sample 99400 is of a cherty Parson Bay Formation band 6 to 8 cm wide mineralized with sphalerite, pyrite and greenockite at 24+00W/2+37S. This mineralized band is exposed for 1 metre along strike. The sample contains 29,339 ppm zinc, 321 ppm copper, 12 ppm lead, 4.9 ppm silver and 44 ppb gold (Appendix A).

Grab samples 99392, 99393 and 99394 are of Parson Bay Formation marble or chert mineralized with pyrite, pyrrhotite, chalcopyrite, sphalerite and galena at the intrusive contact with quartz diorite at about 21+90W/1+34S. These rocks contain up to 18,384 ppm zinc, 246 ppm copper, 104 ppm lead, 3.4 ppm silver and 169 ppb gold. These are replacement-style mineral occurrences.

Grab samples 99396 and 99397 are from limestone and Parson Bay Formation cherty tuff at 18+00-W/2+12S mineralized with locally up to 0.5% disseminated chalcopyrite and pyrite. Chalcopyrite and malachite also occur spotted along fracture surfaces. The two rocks contain 1,220 and 1,221 ppm copper.

Grab samples 76237 and 76238 are of meta-sediment(?) at 20+01W/0+30N with disseminated pyrite, pyrrhotite, sphalerite, chalcopyrite and galena. They contain 2,270 and 3,190 ppm zinc, 380 and 6,059 ppm lead, 102 and 114 ppm copper, 2.5 and 29.1 ppm silver and 48 and 235 ppb gold respectively.

## CONCLUSIONS

- 1) The Holberg Inlet (Dorlon) property is underlain by a conformable sequence of basalt, limestone, siltstone and volcanoclastic rocks which have been intruded by several phases of dykes, sills and stocks and disrupted by a complex set of block faults.
- 2) Geological data collected to date indicate that lead-zinc-silver occurrences within the Quatsino Formation limestone, and polymetallic stratabound occurrences within the Parson Bay Formation are the most promising exploration targets on the property.
- 3) Numerous new showings were discovered during prospecting follow-up of the May, 1991 geochemical soil anomalies in all three areas of detailed work. The soil geochemistry survey also outlined previously known showings and a few small gold anomalies without any known associated bedrock mineralization. This exploration technique works well in the Holberg Inlet property area.
- 4) The southern portion of the HPH ridge area is interesting because the numerous stratabound sulphide occurrences present in Parson Bay Formation rocks do not appear to be related to any intrusive event; no igneous dykes were recognized within this area. These occurrences may thus be due to volcanogenic massive sulphide-style mineralization.
- 5) The new zinc-lead-silver occurrence along the south side of the creek between 48W and 49W at HPH area is hosted by finely brecciated limestone which occurs as lenses which parallel the presumed trace of a northwesterly trending fault of considerable displacement. This showing is probably related to the existence of the fault.
- 6) The new occurrences discovered at the Dorlon area are mostly due to replacement-style mineralization, and are within a few metres of the contact with a younger, intrusive rock unit.
- 7) The soil overlying the Quatsino Formation limestone west of the Dorlon Shaft contains anomalous amounts of zinc. This may be due to the presence of additional sphalerite mineralization within this limestone.

- 8) The IP survey results show that there are a number of zones of high chargeability and low resistivity. These are possibly due to the presence of stratabound sulphide mineral occurrences. Many have a strike length of greater than 200 metres. Almost all of these anomalies correlate with known sulphide occurrences and/or soil geochemistry anomalies. This strongly suggests that the causative source of the IP anomalies is sulphide mineralization (Appendix C).
- 9) The magnetometer survey results show that magnetite-bearing skarns likely exist within the sedimentary rocks on the Holberg Inlet property.
- 10) The source of the high gold concentrations within soil at the northern end of line 96W in Contact Creek area could not be determined due to a lack of outcrop exposure and no boulder float. This area is wooded with mature cedar trees.

### **RECOMMENDATIONS**

- 1) The area with coincident IP and soil geochemistry anomalies at lines 90W and 92W in the Contact Creek area should be further explored by backhoe trenching along the old logging road upslope of these anomalies. Metallic occurrences uncovered during the trenching may warrant testing with diamond drill holes.
- 2) The southern portion of the HPH ridge area should be further investigated. The numerous stratabound sulphide occurrences present in Parson Bay Formation rocks do not appear to be related to any intrusive event. These occurrences may be due to volcanogenic massive sulphide mineralization. Backhoe trenching in overburden-covered parts of this area is needed to determine the extent and grade of these occurrences. Some of them may warrant testing by diamond drill holes.
- 3) The soil overlying the Quatsino Formation limestone west of the Dorlon Shaft contains anomalous amounts of zinc. This may be due to the presence of further sphalerite mineralization within this limestone. Backhoe trenching and rock sampling possibly to be followed by diamond drilling will be needed to investigate these anomalies.

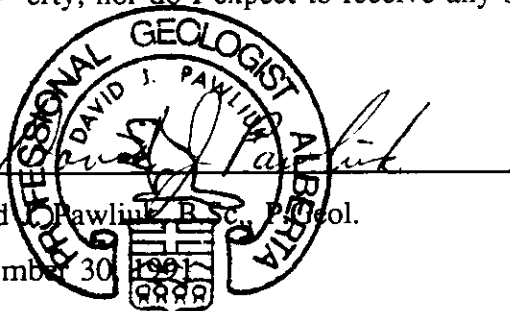
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- Allen, G. and Dasler P.G. (1991) Geochemical, Geophysical and Geological assessment report on the Holberg Inlet property, Nanaimo Mining Division, British Columbia; private unpublished report prepared for Cameco Corporation by Daiwan Engineering Ltd.
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- Greene, A.S. and von Einsiedel, C. (1990) Report on Phase 1 Exploration, Geological, Geochemical, Geophysical and Diamond Drilling, Dorlon Claim Group, Nanaimo Mining Division, Northern Vancouver Island; private unpublished report prepared for Hisway Resources Ltd. by Silver Drake Resources Ltd.
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- Clarke, W.E. (1968) Report of Property Holdings and Exploration Activities of Giant Explorations Limited (N.P.L.); private, unpublished report by Walter E. Clarke, Professional Engineer.

**CERTIFICATE OF QUALIFICATIONS**

I, David J. Pawliuk, do hereby certify that:

- 1.0 I am a geologist for Daiwan Engineering Ltd. with offices at 1030 - 609 Granville Street, Vancouver, British Columbia.
- 2.0 I am a graduate of the University of Alberta, Edmonton, Canada, with a degree of B.Sc., Geology.
- 3.0 I am a member, in good standing, of the Association of Professional Engineers, Geologists and Geophysicists of Alberta.
- 4.0 I have practised my profession since 1975.
- 5.0 This report is based upon my personal fieldwork including supervision of the geochemical and geophysical surveys, and on reports of others working in the area.
- 6.0 I have no direct or indirect interest in the property or securities of Cameco Corporation or Hisway Resources Corporation, or in companies with claims contiguous to the Holberg Inlet property, nor do I expect to receive any such interest.


  
 David J. Pawliuk, B.Sc., P. Geol.

September 30

**STATEMENT OF COSTS**

The following expenditures were incurred for exploration on the Holberg Inlet Project between August 27 and September 30 1991.

**Personnel**

P. Dasler, Geologist 2.05 days @ \$380/day	\$ 779.00
D. Pawliuk, Geologist 16 days @ \$340/day	5,440.00
L. Allen, Field Technician 18 days @ \$260/day	4,680.00
S. Oakley, Field Technician 18.5 days @ \$250/day	4,625.00
R. Bilquist, Field Technician 19 days @ \$260/day	4,940.00
T. Sheridan, Office 2.15 days @ \$220/day	<u>473.00</u>

**Total Personnel****\$ 20,937.00****Disbursements**

Transportation 4 x 4's - 39 days	2,223.81
Fuel, etc.	568.76
Airline	641.61
Equipment Rental Chainsaws - 34 days @ \$28/day	952.00
Food & Accommodation 66 days @ \$26.69/day	1,761.65
Supplies Flagging/thread/bags	288.82
Assays 255 soil samples, 30 el ICP and Au geochem @ 11.16 100 rock samples, 30 el ICP and Au FA @ \$10.16 Misc assays and freight \$8.65	3870.45
Office & Miscellaneous	175.96
Geotronics Survey - IP Survey and mag 8.94 km	<u>25,696.00</u>

**Total Disbursements****36,174.53**

Disbursement Fees

3,379.71

SUBTOTAL

60,491.24

Plus GST

4,234.28

**TOTAL****\$ 64,725.52**

**APPENDIX A**  
**GEOCHEMICAL ANALYSIS CERTIFICATES**

**APPENDIX A**

**GEOCHEMICAL ANALYSIS CERTIFICATES**





GEOCHEMICAL ANALYSIS CERTIFICATE

Daiwan Engineering Ltd. PROJECT HOLBERG INLET File # 91-4522 Page 1

1030 - 609 Granville St., Vancouver BC V7Y 1G5 Submitted by: D.J. PAWLIUK

Table with columns for SAMPLE#, Mo, Cu, Pb, Zn, Ag, Ni, Co, Mn, Fe, As, U, Au, Th, Sr, Cd, Sb, Bi, V, Ca, P, La, Cr, Mg, Ba, Ti, B, Al, Na, K, W, Au\*\*, and units (ppm, ppb). Rows include samples C 76201 through STANDARD C/AU-R.

ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C 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. ASSAY RECOMMENDED FOR ROCK AND CORE SAMPLES IF CU PB ZN AS > 1%, AG > 30 PPM & AU > 1000 PPB. - SAMPLE TYPE: P1 TO P3 ROCK P4 TO P6 SOIL AU\*\* ANALYSIS BY FA/ICP FROM 30 GM SAMPLE. Samples beginning 'RE' are duplicate samples.

DATE RECEIVED: SEP 17 1991 DATE REPORT MAILED: Sept 23/91 SIGNED BY: ... D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS





AA ANALYTICAL



AA ANALYTICAL

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	Ti %	B ppm	Al %	Na %	K %	W ppm	Au** ppb
D 99379	1	17	5063	12231	12.6	91	27	6627	3.66	35	5	ND	1	11	91.2	2	17	71	5.82	.182	9	10	.49	7	.05	3	.83	.01	.01	1	6
D 99380	333	75	344	10361	.9	146	96	13741	4.18	31	5	ND	1	16	83.5	2	2	1087	4.19	.066	5	68	.83	170	.06	2	1.30	.01	.01	1	6
D 99381	17	99	54	810	.6	49	11	1489	1.64	35	5	ND	1	78	8.9	2	2	157	13.14	.126	4	38	.06	79	.08	3	1.85	.85	.05	5	3
D 99382	4	78	188	2825	.7	38	11	939	.90	31	5	ND	1	85	30.6	2	2	72	4.77	.561	9	10	.07	154	.08	4	1.70	.10	.04	17	3
D 99383	65	2103	195	55724	5.9	47	177	5338	2.22	19	5	ND	2	61	489.9	7	18	210	1.89	.040	5	29	.70	49	.03	15	.72	.01	.01	2	9
RE D 99387	9	32	52	2146	.5	7	6	1192	1.86	3	5	ND	3	33	17.2	2	2	39	3.45	.031	5	8	.31	24	.08	6	2.29	.04	.05	10	4
D 99384	7	91	27	53692	2.4	42	76	2368	1.95	12	5	ND	3	81	451.6	8	5	99	4.36	.067	3	20	1.25	9	.05	14	.94	.01	.01	1	6
D 99385	1	26	4495	8979	8.2	88	18	8380	3.96	25	5	ND	1	6	57.0	2	11	61	4.34	.081	4	12	.67	9	.05	5	.75	.01	.01	20	38
D 99386	3	1563	27	38099	6.2	3	19	17433	31.74	43	9	ND	1	2	318.8	19	15	9	5.90	.006	2	1	.06	2	.01	21	.16	.01	.01	1	19
D 99387	8	30	50	2013	.2	7	6	1088	1.70	3	5	ND	2	30	15.9	2	2	35	3.06	.027	5	7	.29	22	.07	2	2.07	.04	.04	10	4
D 99388	2	2575	198	63489	12.8	6	34	22863	31.26	79	8	ND	.2	3	547.9	25	46	8	5.43	.015	3	1	.12	3	.01	27	.29	.01	.01	1	25
D 99389	1	1002	19	29562	5.5	2	20	18160	32.20	78	10	ND	1	3	273.4	17	16	5	5.56	.014	2	1	.08	3	.01	20	.18	.01	.01	1	14
D 99390	1	1699	13	27792	5.8	3	32	15478	23.62	84	5	ND	1	37	242.0	14	16	8	4.66	.017	3	1	.30	5	.02	15	.47	.01	.01	1	17
D 99391	2	195	32	10657	1.6	19	10	2599	3.14	16	5	ND	1	203	82.1	2	2	11	22.23	.021	2	11	.18	13	.03	3	.80	.04	.14	1	93
D 99392	136	246	87	2797	3.4	142	19	898	6.15	12	5	ND	1	250	25.8	5	3	67	5.81	.087	6	39	.04	15	.20	9	3.55	.13	.06	16	115
D 99393	5	245	47	4129	2.5	24	5	1942	2.66	16	5	ND	1	263	32.6	2	2	5	28.14	.019	4	2	.03	15	.03	7	1.70	.04	.02	26	129
D 99394	11	141	104	18384	3.3	14	5	1883	1.88	7	5	ND	1	317	149.7	5	2	11	31.34	.024	3	1	.01	16	.03	8	2.45	.11	.04	1	169
D 99395	14	65	13	430	.5	33	14	353	2.90	9	5	ND	1	326	3.9	2	3	60	3.31	.041	2	25	.50	28	.19	7	4.51	.81	.09	1	10
D 99396	1	1220	8	143	1.1	1	1	1234	.35	4	5	ND	1	198	1.2	2	7	2	40.55	.001	2	1	.04	3	.01	2	.14	.02	.01	2	8
D 99397	1	1221	5	392	.6	8	3	1319	.47	9	5	ND	1	194	2.9	2	6	7	37.92	.005	2	22	.16	7	.02	2	.43	.01	.02	3	10
D 99398	7	471	18	695	1.3	147	38	252	4.41	201	5	ND	1	473	7.5	2	2	45	4.70	.144	5	108	.59	79	.11	6	4.44	.24	.31	3	12
D 99399	1	77	28	156	.6	193	38	250	4.56	12	5	ND	1	378	.6	3	2	35	3.88	.064	4	99	1.21	72	.07	4	5.64	.46	.16	1	12
D 99400	1	321	12	29339	4.9	7	21	865	6.03	184	5	ND	2	16	313.4	16	8	63	2.52	.039	2	7	.53	9	.20	14	2.19	.03	.02	1	44
D 99401	1	1136	12	300	1.5	396	113	771	8.18	395	5	ND	1	3	2.9	4	8	17	.73	.017	2	13	.07	10	.01	4	.17	.01	.01	2	12
D 99402	2	1760	4	154	1.1	278	77	2302	7.11	238	5	ND	1	19	1.3	2	10	103	3.56	.296	9	47	.03	15	.03	3	.59	.01	.01	3	4
D 99403	1	80	6	4403	1.0	6	5	294	1.12	38	5	ND	1	362	41.2	2	2	10	37.73	.016	2	2	.10	4	.02	3	.32	.01	.01	26	8
D 99404	11	174	8	339	1.5	74	21	277	6.20	50	5	ND	1	61	3.0	14	4	162	1.37	.064	5	79	.90	69	.17	6	1.83	.06	.10	1	48
D 99405	1	54	1155	4986	2.4	19	14	1781	5.01	67	5	ND	1	39	54.0	6	2	47	9.20	.056	7	11	.59	4	.17	3	2.39	.01	.01	27	13
D 99406	2	508	16	140	2.0	109	71	819	27.28	147	5	ND	1	5	1.0	2	3	35	3.31	.025	3	18	.07	10	.01	7	.28	.01	.01	4	391
STANDARD C/AU-R	17	58	36	132	7.1	70	31	1039	3.93	40	15	6	37	54	18.6	16	18	56	.48	.090	38	58	.88	177	.09	34	1.89	.06	.15	11	467

Samples beginning 'RE' are duplicate samples.







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	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb	(10 gm)
19W 0+00	1	30	211	1351	1.4	48	14	9904	3.89	39	5	ND	1	79	8.3	2	3	75	1.97	.229	6	23	.49	40	.13	14	5.08	.02	.07	6	7.9	
19W 0+25S	1	71	1087	4125	7.3	51	9	12195	3.17	86	12	ND	1	160	28.1	2	2	45	6.70	.610	16	10	.90	64	.05	20	3.75	.01	.09	30	19.6	
19W 0+50S	1	106	2497	6957	5.3	48	12	38397	3.99	72	7	ND	1	76	105.9	2	2	37	1.75	.591	5	6	.33	59	.04	6	2.88	.01	.06	33	210.0	
RE 19W 1+50S	2	31	321	814	1.3	45	24	3853	3.67	108	5	ND	1	43	4.1	3	4	99	.42	.100	7	57	.18	43	.21	2	6.68	.01	.02	5	9.0	
19W 0+75S	1	40	213	3860	1.7	46	13	28017	3.66	56	6	ND	1	79	31.1	2	2	85	1.70	.556	6	23	.45	204	.11	2	4.35	.02	.03	25	13.1	
19W 1+00S	1	91	54	525	.8	17	13	3179	4.21	58	5	ND	1	17	3.7	2	5	109	.37	.041	5	43	.37	23	.32	2	4.41	.02	.02	2	18.7	
19W 1+25S	1	10	74	188	3.2	17	7	1740	1.46	28	5	ND	1	52	2.0	2	2	63	1.54	.113	2	8	.14	20	.11	4	1.07	.02	.02	1	3.7	
19W 1+50S	2	31	318	740	1.4	46	25	3794	3.86	111	5	ND	1	46	3.1	2	4	104	.42	.102	8	60	.18	45	.21	3	6.99	.01	.02	3	10.5	
19W 1+75S	25	26	53	367	.4	29	16	1791	6.60	57	7	ND	1	8	2.1	2	3	708	2.54	.022	7	55	.13	14	.38	3	2.38	.01	.01	1	9.6	
19W 2+00S	9	10	13	139	.3	7	2	708	8.81	41	5	ND	1	6	.7	2	3	425	4.03	.023	4	84	.18	5	.38	2	1.38	.01	.01	1	31.2	
STANDARD C/AU-S	18	59	42	129	6.9	70	32	1037	3.93	38	16	7	36	51	17.2	15	19	56	.48	.091	36	59	.88	171	.09	34	1.88	.06	.15	13	45.2	

Samples beginning 'RE' are duplicate samples.













## ASSAY CERTIFICATE

Daiwan Engineering Ltd. PROJECT HOLBERG INLET FILE # 91-4522R

SAMPLE#	Pb %	Zn %
C 76217	2.23	26.20
C 76218	3.07	18.05

- 1 GM SAMPLE LEACHED IN 50 ML AQUA - REGIA, ANALYSIS BY ICP.  
- SAMPLE TYPE: ROCK PULP

DATE RECEIVED: SEP 24 1991

DATE REPORT MAILED: *Sept 26 / 91.*SIGNED BY *C. King* ..... D. TOYE, C. LEONG, J. WANG; CERTIFIED B.C. ASSAYERS

**APPENDIX B**  
**ROCK SAMPLE DESCRIPTIONS**

**GEOCHEMICAL ROCK SAMPLE DESCRIPTIONS**

Samples collected by Ron Bilquist:

- 76201 4796W/152S. Siliceous looking "dyke" with disseminated pyrite, occ. spot of sphalerite and some graphite in small masses and on fractures.
- 76202 49W/175S. Local float; orange weathered meta-limestone (?) with occ. 1 to 2 mm quartz veinlet and semi-massive black\brown sphalerite,
- 76203 4990W/160S. Siliceous looking "dyke" with diss. pyrite, pyrrhotite and traces of sphalerite (?). The "dyke" cuts cooked-up sediments.
- 76204 4810W/173S. Local float; thinly bedded cherty sediments with the occ. 1 to 2 mm quartz\calcite stringer; traces of pyrite, pyrrhotite and possible chalcopryrite.
- 76205 4830W/185S. Thinly banded cherty sediments with traces of sphalerite, pyrite and possible chalcopryrite.
- 76206 4890W/200S. Dark grey limestone with traces of diss. pyrite and sphalerite.
- 76207 49W/203S. Interbedded calcareous and non-calcareous sediments with diss. pyrite and chalcopryite (?).
- 76208 49W/175S. Subcrop of cooked limestone (?) with hydrozincite, honey coloured sphalerite and galena.
- 76209 Same as above.
- 76210 4930W/190S. Siliceous looking "dyke" with diss. pyrite and pyrrhotite.
- 76211 5205W/190S. Massive garnet with traces of chalcopryite and "smears" of magnetite.
- 76212 51W/220S. Subangular float; massive pyrite and chalcopryite with magnetite and/or pyrrhotite.
- 76213 5235W/165S. Subrounded float; grey limestone with small band of sphalerite and diss. pyrite and sphalerite.
- 76214 4950W\370S. Thinly bedded P. Bay ash tuff with dark chert interbed with diss. sphalerite, chalcopryite and pyrite.
- 76215 Intensely "cooked-up" P. Bay sediments with 5 to 10 per cent diss. and veinlet pyrite, possible chalcopryite; traces of sphalerite, galena and pyrrhotite across approx. 10 m thickness on south side of creek.
- 76216 Local float with massive sphalerite and traces of galena and chalcopryite (?).
- 76217 4810W\360S. Dark grey, fine grained, finely brecciated band 0.6 to 0.7 m wide and 12 to 15 m along strike within limestone contains 50 to 60 % sphalerite, galena, pyrite and local chalcopryite? Generally abundant hydrozincite coating fracture surfaces; little or no limonite on weathered outcrop surface. Mineralized band dips at about 15 ° to the south, and has an easterly strike. Mineralized band finely brecciated with interlocking veinlets spaced 2 to 5 mm apart in some sections. Sample from outcrop on southern bank of creek.
- 76218 As above; grab from at least 10 sites along strike within the mineralized band.
- 76219 6050W\750S. Fine grained, light grey-green, siliceous looking "dyke" with 1 to 2 % pyrite diss. and lining fractures. Some magnetite as small, irregular lenses. P. Bay or ?Bonanza Fm.
- 76220 Meta-limestone with pyrite and traces of sphalerite and chalcopryite.
- 76221 Same as above.
- 76222 Grey\white recrystallized limestone; occ. streaks of graphite and diss. pyrite. One mm wide chalcedony veinlets present.
- 76223 8990W/212S. Skarn with massive pyrite, galena (?) and greenockite coating fracture surfaces.
- 76224 Same as above.

- 76225 8980W/210S. Skarn with diss. galena, sphalerite and intense manganese weathering.
- 76226 8915W/135S. "Cooked-up" limestone with diss. sphalerite, galena and occ. pyrite, chalcopyrite and greenockite.
- 76227 92W/0+64S. Angular float with occ. 1 mm wide quartz veinlets. Very rare pyrite diss. and along the quartz veinlets.
- 76228 92W/0+67S. Grey limestone with brown "patches"; traces of pyrite, sphalerite (?) and greenockite (?).
- 76229 92W/0+84S. Angular float; brecciated limestone with occ. diss. pyrite.
- 76230 9195W/297S. "Cooked" limestone (?) with manganese oxides and diss. sphalerite, galena and traces of greenockite.
- 76231 9198W/307S. Cherty sediments with diss. galena and sphalerite.
- 76232 85W\250S. Rock appears to be replaced limestone overlying intensely fractured intrusive units. The outcrop area is 2 by 6 m and is massive to semi-massive sphalerite and galena; occ. greenockite.
- 76233 8505W\250S Same as above. These two samples combined are a discontinuous chip sample of the entire exposed outcrop area.
- 76234 1985W\125N. Metasediment (?) with diss. pyrrhotite and occ. arsenopyrite and traces of chalcopyrite.
- 76235 1980W\125N. Chip sample across 40 cm of black, massive sphalerite in dark grey recrystallized limestone with occ. greenockite.
- 76236 20W\125N. Subcrop of siliceous looking "dyke" rock with diss. pyrite and pyrrhotite.
- 76237 2001W\0+30N Meta-sediment (?) with diss. pyrite, pyrrhotite and sphalerite; traces of chalcopyrite.
- 76238 Same as above but with diss. galena.
- 76239 20W\120N at approx. same location as 97140. Siliceous-looking dyke with diss. pyrite and a trace of sphalerite and chalcopyrite.
- 76240 1997W\125S. Siliceous looking dyke cutting limestone with diss. pyrite, galena and sphalerite.
- 76241 20W\151S. Subcrop of cherty meta-sediment; diss. pyrite, pyrrhotite, sphalerite and possible traces of chalcopyrite and magnetite.
- 76242 1998W\150S. Subcrop; cherty meta-sediment with "bands" of sphalerite and diss. sphalerite, pyrite and traces of galena.
- 76243 1340W/125N. Approx. 75 m upstream from the point where line 14W crosses the Nahwitti River. Intensely fractured sediments with quartz and zeolite veinlets and diss. pyrite.
- 76244-76246 inclusive intentionally omitted; collected on another property.
- 76247 1850W/155S. 175 m southwest of the Dorlon Shaft at the base of a waterfall. Diss. sphalerite and pyrite near the contact of a siliceous-looking dyke intruding limestone.
- Samples collected by D. Pawliuk:
- 99351 48W\300S. Pale brownish cream Parson Bay clay-rich rock with pale grey to brownish grey chert laminae to 3 mm wide and up to 10 mm long. Probable felsic tuff; no sulphides seen. Collected at site of 1418 ppm zinc in soil.
- 99352 48W\330S Off-white P. Bay felsic tuff (?) with rare trace pyrite.
- 99353 48W\345S. Grab sample from 3 locales across 1.5 m in brecciated P. Bay cherts with weak skarn alteration. Specks pyrite, chalcopyrite(?) and bornite(?) seen.
- 99354 4745W\360S. Grab from 4 locales over 1 m<sup>2</sup> in green, brecciated P. Bay; angular limestone clast 10 by 25 mm seen. Pyrite to 5 %, local specks chalcopyrite(?). Abundant hematite both along fractures and pervasive.

- 99355 4708W\305S. Grab from 0.5 m<sup>2</sup> area of chalky white weathered, pale grey to maroon grey P. Bay cherty felsic tuff with av. say 1 % pyrite, 0.5 % pyrrhotite (locally 5 % over 2 cm<sup>2</sup>) and occ. specks chalcopyrite.
- 99356 4725W\300S. Float prob. near source; abundant orange limonite in soil. Pale greenish grey P. Bay felsic tuff ribboned with dark green-maroon chert interbeds 1 to 2 cm thick. Pyrrhotite, pyrite and chalcopyrite(?) av. 1-2 % finely diss. mainly within the chert. Similar float found 20 m upslope of here.
- 99357 4690W\285S. Interbedded, banded (on cm and mm scale) P. Bay felsic tuff and chert with diss. pyrite, pyrrhotite, chalcopyrite and arsenopyrite?
- 99358 4655W\235S. Chalky white weathering P. Bay felsic tuff spotted by dark brown limonite after pyrite; 0.5 % diss. pyrite. Grab.
- 99359 46W\225S. Grab of brown to orange weathering P. Bay felsic tuff at bottom of pit dug to investigate soil geochemistry anomaly. No sulphides seen.
- 99360 4940W\2+15S. Grab of dark to light grey, thinly bedded limestone with finely diss. pyrite, chalcopyrite and arsenopyrite? (unsure of grey ?sulphide mineral). Outcrop 10 m west of edge of clearcut.
- 99361 4795W\245S. Cream to pale P. Bay ash tuff with dark maroon chert interbed 10 mm thick containing hematite, pyrite and sphalerite? P. Bay here contains limestone interbeds.
- 99362 4940W\340S. Grab of 60 % black to dark grey recrystallized limestone, 40 % P. Bay felsic tuff. Possible sphalerite band about 20 cm wide within the black limestone.
- 99363 4940W\320S. Grab sample of black, fine grained limestone with very fine diss. specks of reddish brown mineral (sphalerite?).
- 99364 4950W\295S. Grab sample of fine grained, felsic P. Bay ash tuff with occ. chalcopyrite specks.
- 99365 4980W\285S. Grab of P. Bay ash tuff with cherty laminae and crosscutting quartz veinlets contains pyrite and sphalerite(?) locally to 10 %.
- 99366 4980W\220S. Grab of limestone 75 %, cherty ash tuff 25 % containing about 0.5 % pyrrhotite, pyrite and ?chalcopyrite.
- 99367 50W\273S. Angular float of P. Bay ash tuff with sphalerite, trace chalcopyrite.
- 99368 50W\300S. Few pieces angular float; pale brownish grey rock with occ. black cherty interbeds. P. Bay ash tuff with specks pyrrhotite, pyrite, chalcopyrite and ?sphalerite.
- 99369 4590W\215S. Grab of P. Bay ash tuff with black chert interbeds to 2 cm thick contains very fine diss. pyrite, pyrrhotite both diss. and as hairline veinlets subparallel bedding within chert beds, chalcopyrite as hairline veinlet approx. perpendicular to bedding within cherty bed. Beds strike 116 dip 43 S.
- 99370 Grab of maroon-green fine grained andesite on north side of creek at entrance to canyon. 1 % diss. pyrite (occ. veinlet and bleb) and locally up to 1 % chalcopyrite. Weakly magnetic rock. Occ. pyrrhotite esp. near patches bright green garnet? Sample site 5 m below limestone contact.
- 99371 Float from creek bed. Subangular boulder 0.5 m in diameter. P. Bay with galena, pyrite, ?sphalerite and chalcopyrite(?).
- 99372 4935W\395S 20 m upstream of 76214. Subangular float approx. 30 cm diameter; P. Bay ash tuff (?) with diss. and veinlet pyrite, pyrrhotite, chalcopyrite, sphalerite and galena(?).
- 99373 6095W\975S. Subround float boulder approx. 20 cm diameter from Meade Creek with garnet, pyrite, chalcopyrite, sphalerite and galena. This boulder also contains about 80 % black metallic mineral that looks like magnetite but is not magnetic. Tough rock



- probably some distance from source.
- 99374 6140W\1010S Faintly banded (probably relict bedding), pale green-brown, skarn-altered P. Bay (?) contains garnet with local blackjack sphalerite and pyrite. Grab.
- 99375 54W\275S. Grab samples from at least 10 float boulders contain traces diss. pyrite and rare traces of sphalerite within coarsely crystalline limestone. Flagging labelled 99374 at this site.
- 99376 8600W\235S P. Bay (?) float containing 30 to 50 % brown sphalerite; all of subangular rock 15 cm long taken.
- 99377 8600W\237S. Subangular to subround boulder 20 cm diameter pale greyish green P. Bay with say 5 % galena as diss. blebs and irregular masses, traces pyrite, trace sphalerite.
- 99378 8588W\285S. Angular float boulder 0.6 m diam. light green to pale green P. Bay with 1 to 2 % finely diss. galena blebs av. 0.75 mm across. Red sphalerite also present locally up to say 25 or 30 % of rock volume; some of this material may be fine grained garnet. Local trace to 2 % pyrite as subround masses up to 3 mm across. Boulder surface weathered dark brown-black.
- 99379 8581W\284S. Angular 0.4 m diam. pale green to light green P. Bay with diss. galena as blebs to 1 mm across, local reddish sphalerite traces, pyrite traces.
- 99380 8570W\285S. Light brownish green, fine grained P. Bay with some galena speckles less than 0.5 %. Float; small, subangular boulder 0.2 m diameter.
- 99381 86W\605S. Grab from P. Bay float along road. Banded ash tuff with cherty interbeds on cm and mm scale contains chalcopyrite, pyrrhotite, sphalerite trace.
- 99382 86W\607S. Larger piece P. Bay float; light brownish grey tuff with chert interbed contains galena, sphalerite, pyrite and ?chalcopyrite.
- 99383 8590W\603S. Pale green P. Bay float contains galena and sphalerite. Soft rock similar to that seen at 86W\285S.
- 99384 8628W\618S. Float as above with galena diss. as small blebs; softer and more friable than P. Bay ash tuffs at 99381,99382.
- 99385 86W\351S. Angular float; boulder 0.3 by 0.3 by 0.15 m of pale green, fine grained, granular P. Bay speckled by diss. galena and sphalerite.
- 99386 9397W\224S. Angular float approx. 0.35 m diam. of dark brown rock that appears to be mainly sphalerite; lighting not good here. Galena to 5 %, pyrite to 1 %.
- 99387 9373W\245S. Grab sample from several locales over 30 m<sup>2</sup> outcrop area of hornblende granite adjacent to mineralized skarn.
- 99388 9370W\242S. Discontinuous chip across 4.6 m of dark brown skarn that appears to be altered P. Bay breccia. Unmineralized skarn pale greyish green, mostly fine grained; mineralized rock mainly dark brown garnet and blackjack sphalerite. Local galena up to 80 % over 5 cm, occ. greenockite traces.
- 99389 9370W\239S. Continuous chip across 3 m of skarn 90 % as for 99388, 10 % light brownish green with diss. galena. Into overburden at north end of sample interval.
- 99390 9375W\255S. Discontinuous chip across 4 m of skarn with bright green to pale brown garnet, sphalerite, galena, pyrite, calcite; local greenockite and malachite.
- 99391 22W\0+93S. Subangular float 0.6 m diameter maroon-grey P. Bay chert with galena, sphalerite, pyrite, chalcopyrite. Tough, indurated rock.
- 99392 2193W\135S. Grab of P. Bay brown-grey chert outcrop with 0.5-1 % diss. pyrrhotite, to 0.5 % pyrite, local traces chalcopyrite, ?sphalerite diss. Sample taken immediately adjacent to contact with intrusive quartz diorite.
- 99393 2190W\133S. Pale grey P. Bay marble or limestone with 1 to 3 cm wide chert interbeds contains

- diss. pyrite, pyrrhotite, sphalerite, galena, trace chalcopyrite at base cliff exposure.
- 99394 2184W\134S. Grab from 10 sites over 2 m<sup>2</sup> P. Bay marble with chert interbeds within 1 m of discrete intrusive contact with quartz diorite to east. Little red-brown limonite on weathered surface. Diss. blackjack sphalerite, galena, pyrrhotite, chalcopyrite trace, pyrite.
- 99395 22W\175S. Grab from 4 pieces angular P. Bay chert float in vicinity of high Zn in soil sample point. Rocks contain diss. pyrrhotite, pyrite, local chalcopyrite and sphalerite (?). No outcrop near here.
- 99396 18W\210N. Grab of cherty tuff, P. Bay outcrop. Trace amounts pyrite, chalcopyrite and malachite diss. and spotted along fracture surfaces. Upslope of high Cu in soil at 225N/18W.
- 99397 18W\215N. Grab from 1 m<sup>2</sup> area of light grey, fine grained limestone with up to 0.5 % diss. chalcopyrite; malachite spotted along fracture surfaces to 0.5 %. Upslope of high Cu in soil at 225N/18W.
- 99398 24W\125S. Grab of angular to subangular float P. Bay cherty tuff from road ditch with 1 to 3 % combined diss. pyrite, pyrrhotite, chalcopyrite and ?sphalerite.
- 99399 2396W\190S. Grab of P. Bay float with 1 % diss. pyrite, pyrrhotite and sphalerite(?).
- 99400 24W\237S. Grab from 6 to 8 cm wide band of cherty P. Bay mineralized with pyrite, sphalerite and greenockite exposed for 1 m along strike.
- 99401 2510W\235S. Grab of float from road ditch. Light grey-green to green P. Bay with 5 % pyrite, possible chalcopyrite and translucent quartz veinlets. Sample collected ~25 m on bearing 060° from one of Mayer's survey points.
- 99402 2418W\128S. Grab of float; subangular boulder 0.2 m diam., P. Bay with pyrite, chalcopyrite, calcite and sphalerite.
- 99403 4W\130S. Grab of light grey, medium to fine grained, partly recrystallized limestone with traces diss. pyrite, pyrrhotite(?) and sphalerite(?).
- 99404 550W\0+50N. Discontinuous chip across 2 m in soft, friable, slaty, black P. Bay argillite that is thinly bedded.
- 99405 1860W/155S. 175 m southwest of the Dorlon Shaft occurrence. Grab of P. Bay felsic tuff? underlying limestone bed exposed at top of waterfall on west side of canyon. Pyrite and galena across approx. 40 cm width in slightly skarn-altered P. Bay.
- 99406 1860W/190S. 40 m above waterfall southwest of Dorlon Shaft. Grab of interbedded P. Bay felsic tuff, limestone and chert beds to 30 cm thick mineralized with magnetite, pyrite, sphalerite, pyrrhotite and chalcopyrite. Certain beds within P. Bay mineralized for up to 20 m along strike in what appears to be replacement-style mineralization adjacent to the margin of a pale greenish grey felsite dyke which crosscuts the P. Bay sediments. Small-scale open folds present within the sediments.

**APPENDIX C**  
**GEOPHYSICAL SURVEY REPORT**

**GEOPHYSICAL REPORT**

**ON**

**INDUCED POLARIZATION, RESISTIVITY AND MAGNETOMETER SURVEYS**

**OVER A PORTION OF THE**

**HOLBERG INLET PROJECT**

**NORTHERN VANCOUVER ISLAND AREA**

**NANAIMO MINING DISTRICT, BRITISH COLUMBIA**

---

**PROPERTY** : 21 km west of town of Port Hardy  
: 50° 42' North Latitude  
: 127° 47' West Longitude  
: N.T.S. 92L/12

**WRITTEN FOR** : CAMECO CORPORATION  
: 2121 - 11th Street West  
: Saskatoon, Saskatchewan  
: S7M 1J3

**WRITTEN BY** : David G. Mark, Geophysicist  
: GEOTRONICS SURVEYS LTD.  
: #405 - 535 Howe Street  
: Vancouver, B.C., V6C 2Z5

**DATED** : October 4, 1991



**GEOTRONICS SURVEYS LTD.**  
Engineering & Mining Geophysicists  
VANCOUVER, CANADA

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IP/Resistivity Survey Pseudosections  
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Line 20+00W	1: 2,500	7(b)
Line 22+00W	1: 2,500	7(c)
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Line 48+00W	1: 2,500	7(e)
Line 50+00W	1: 2,500	7(f)
Line 54+00W	1: 2,500	7(g)
Line 56+00W	1: 2,500	7(h)
Line 82+00W	1: 2,500	7(i)
Line 86+00W	1: 2,500	7(j)
Line 90+00W	1: 2,500	7(k)
Line 92+00W	1: 2,500	7(l)

## SUMMARY

Induced polarization, resistivity and magnetometer surveys were carried out during August and September, 1991 over a portion of the Holberg Inlet Project located on Nahwitti River, 21 km west of the town of Port Hardy, British Columbia. The purpose of the work was to locate base metal sulphides hopefully containing associated gold mineralization.

The IP and resistivity surveys were carried out using a Hunttec receiver operating in the time-domain mode with the dipole-dipole array at 6 separations. The dipole length and reading interval were 30 m. Twelve lines were done totalling 8.94 km. The data for IP (chargeability) and the data for resistivity were each plotted in pseudosection form and contoured.

The magnetometer survey was completed along the same lines as the IP survey. Two Scintrex MP-2 proton precession magnetometers were used, measuring the total field at 30-metre station intervals. A total of 8.94 km were done. The data were diurnally corrected, plotted and profiled with the IP and resistivity pseudosections at a scale of 1:2500.



## CONCLUSIONS

Strong IP anomalies with good strike lengths occur throughout the Holberg Inlet Project on all three grids. Almost all of the anomalies correlate with known sulphide showings and/or with gold, zinc, and/or copper soil geochemistry anomalies. This strongly suggests the causative source of the IP anomalies is sulphide mineralization.

The strike of the main anomalies, that is, those of greatest exploration interest, is east-west, the strike length is a minimum of 800 or 1,000 m being open on one or both ends, and the dip is southerly, which is the same as that of the rock-types on the property.

The anomalies of greatest exploration interest are as follows:

- (1) Dorlon Grid - anomalies A and B;
- (2) H.P.H. Grid - anomalies B and C as well as possibly A;
- (3) Contact Grid - anomaly A.

### RECOMMENDATIONS

Considering the wide spacing of 200 or 400 meters between the IP survey lines, fill-in IP/resistivity surveying should be done between the lines. Also since each of the IP anomalies are open in at least one direction, IP/resistivity surveying should be carried out to extend the strike length of the anomalies.

However, there is no doubt that numerous drill targets of IP anomalies occur throughout the property and that these drill targets can be drilled now before any further IP/resistivity surveying is carried out. Prioritizing the drill targets and choosing the location of the drill collars as well as the dip of the holes should be done in collaboration between the geologist and the geophysicist. A southerly dip of the causative source for each anomaly should always be assumed.

Prospecting and/or geological mapping for the causative source of each IP anomaly on each line should be carried out. It is understood, however, that much of this was done while the IP/resistivity survey was in progress as the results became available.

A horizontal loop EM survey may prove useful in helping to more accurately determine the dips of the various causative sources. But this assumes that they would be conductive enough to give a strong enough response. Also, the terrain would increase the cost significantly over most other areas. Therefore, a horizontal loop EM survey is not recommended.

**GEOPHYSICAL REPORT**  
**ON**  
**INDUCED POLARIZATION, RESISTIVITY AND MAGNETOMETER SURVEYS**  
**OVER A PORTION OF THE**  
**HOLBERG INLET PROJECT**  
**NORTHERN VANCOUVER ISLAND AREA**  
**NANAIMO MINING DISTRICT, BRITISH COLUMBIA**

---

**INTRODUCTION AND GENERAL REMARKS**

This report discusses the instrumentation, theory, field procedure and results of induced polarization (IP), resistivity and magnetometer surveys carried out over a portion of the claims belonging to the Holberg Inlet Project of Cameco Corporation located 21 km west of the town of Port Hardy on Nahwitti River within Northern Vancouver Island.

The field work was completed between August 29 and September 14, 1991 under the supervision of David G. Mark and under the field supervision of Marc Beaupre, senior geophysical technician, who also formed part of the field crew. A second geophysical technician as well as two helpers completed the crew of four.

The purpose of the IP survey was to locate base metal sulphides with which, hopefully, gold is associated.

The main purpose of the resistivity survey was to assist in mapping lithology and structure, especially as to how they relate to the IP anomalies.

The purpose of the magnetic survey was to assist in the IP-resistivity interpretation in addition to mapping lithology and geological structure.

The exploration on the property was under the supervision of Peter Dasler and Dave Pawliuk, both consulting geologists with Daiwan Engineering Ltd., who was carrying out the work on behalf of Cameco Corporation.

This report will appear as an appendix to a report authored by Pawliuk. Therefore, it will not contain a description of the property such as claims, ownership, location, access, physiography, history and geology, which appear in Pawliuk's report.

### INDUCED POLARIZATION-RESISTIVITY SURVEY

#### a) Instrumentation

The transmitter used for the induced polarization-resistivity survey was either a Model IPT-1 powered by a 2.5 Kw motor generator, (both manufactured by Phoenix Geophysics Ltd. of Markham, Ontario) or a Hunttec MK IV transmitter powered by a 7.5 Kw MK IV motor-generator, both manufactured by Hunttec ('70) Limited of Scarborough, Ontario.

The receiver used was a model Mark IV manufactured by Hunttec ('70) Limited of Scarborough, Ontario. This is state-of-the-art equipment, with software-controlled functions, programmable through the front panel.

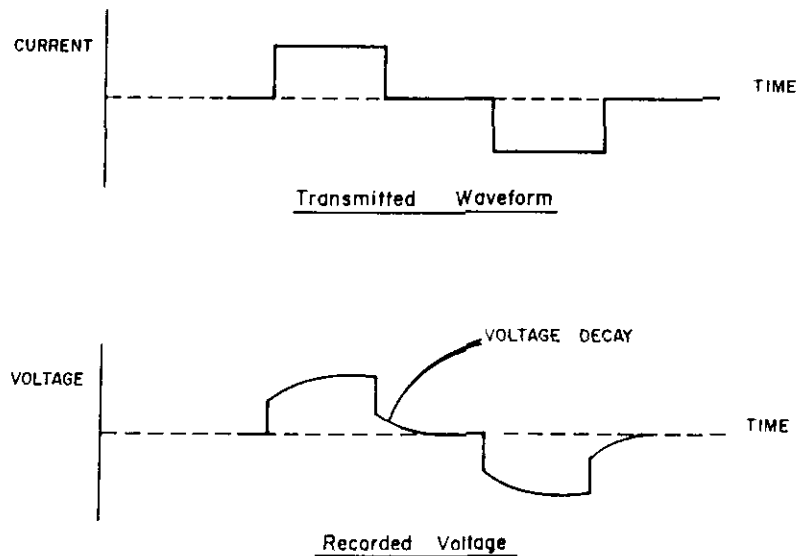
The Mark IV system is capable of time domain, frequency domain, and complex resistivity measurements.

b) Theory

When a voltage is applied to the ground, electrical current flows, mainly in the electrolyte-filled capillaries within the rock. If the capillaries also contain certain mineral particles that transport current by electrons (most sulphides, some oxides and graphite), then the ionic charges build up at the particle-electrolyte interface, positive ones where the current enters the particle and negative ones where it leaves. This accumulation of charge creates a voltage that tends to oppose the current flow across the interface. When the current is switched off, the created voltage slowly decreases as the accumulated ions diffuse back into the electrolyte. This type of induced polarization phenomena is known as electrode polarization.

A similar effect occurs if clay particles are present in the conducting medium. Charged clay particles attract oppositely-charged ions from the surrounding electrolyte; when the current stops, the ions slowly diffuse back to their equilibrium state. This process is known as membrane polarization and gives rise to induced polarization effects even in the absence of metallic-type conductors.

Most IP surveys are carried out by taking measurements in the "time-domain" or the "frequency-domain".



Time-domain measurements involve sampling the waveform at intervals after the current is switched off, to derive a dimensionless parameter, the chargeability, "M" which is a measure of the strength of the induced polarization effect. Measurements in the frequency-domain are based on the fact that the resistance produced at the electrolyte-charged particle interface decreases with increasing frequency. The difference between apparent resistivity readings at a high and low frequency is expressed as the percentage frequency effect, "PFE".

The quantity, apparent resistivity,  $\rho_a$ , computed from electrical survey results is only the true earth resistivity in a homogeneous sub-surface. When vertical (and lateral) variations in electrical properties occur, as they always will in the real world, the apparent resistivity will be influenced by the various layers, depending on their depth relative to the

electrode spacing. A single reading cannot therefore be attributed to a particular depth.

The ability of the ground to transmit electricity is, in the absence of metallic-type conductors, almost completely depending on the volume, nature and content of the pore space. Empirical relationships can be derived linking the formation resistivity to the pore water resistivity, as a function of porosity. Such a formula is Archie's Law, which states (assuming complete saturation) in clean formations:

$$\frac{R_o}{R_w} = 0^{-2}$$

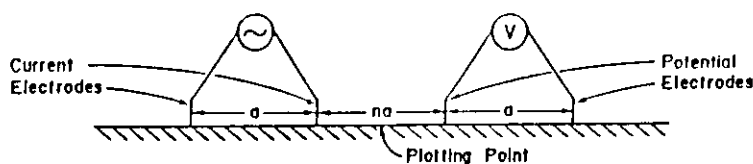
Where:  $R_o$  is formation resistivity  
 $R_w$  is pore water resistivity  
 $0$  is porosity

### c) Survey Procedure

The IP and resistivity measurements were taken in the time-domain mode using an 8-second square wave charge cycle (2-seconds positive charge, 2-seconds off, 2-seconds negative charge, 2-seconds off). The delay time used after the charge shuts off was 200 milliseconds and the integration time used was 1,500 milli-seconds divided into 10 windows.

The array chosen was the dipole-dipole shown as follows:

DIPOLE-DIPOLE ARRAY



The dipole length ('a') was chosen to be 30 m for all lines. The 30-m (100-ft) dipoles were read from one to six levels ('n'), to give a separation of 180 m and a maximum theoretical depth penetration of 100 m.

The dipole-dipole array was chosen because of its symmetry resulting in a greater reliability in interpretation. Also smaller mineral zones, such as occur on this property, can be missed entirely using non-symmetrical arrays such as pole-dipole.

Stainless steel stakes were used for current electrodes. For the potential electrodes, metallic copper in copper sulphate solution, in non-polarizing, unglazed, porcelain pots was used.

Readings were taken over 12 different lines to give a total survey length of 8.94 km.

#### d) Compilation of Data

The chargeability (IP) values are read directly from the instrument and no data processing is therefore required prior to plotting. The resistivity values are derived from current and voltage readings taken in the field. These values are combined with the geometrical factor appropriate for the dipole-dipole array, to compute the apparent resistivities.

The chargeability and resistivity data were each plotted in pseudosection form on maps 7(a) through to 7(1) for lines 18+00W to 92+00W, respectively, at a scale of 1:2,500 (see List of Illustrations at front of report). The chargeability data were then contoured at an interval of 5 msec, and the resistivity data at a logarithmic interval to the base 10 in ohm-m.

The soil geochemistry anomalies were placed on the same maps in order to show their correlation with the IP and resistivity results. What is considered anomalous for gold is above 10 ppb; for zinc, above 500 ppm; and for copper, above 100 ppm.



## MAGNETOMETER SURVEY

### a) Instrumentation and Theory

The magnetic survey was carried out with two Scintrex MP-2 proton precession magnetometers, manufactured by Scintrex Limited of Concord, Ontario. This instrument reads directly in gammas to an accuracy of  $\pm 1$  gamma, over a range of 20,000 - 100,000 gammas. Operating temperature range is  $-35^{\circ}$  to  $+50^{\circ}$  C, and gradient tolerance is up to 5,000 gammas per meter.

Only two commonly occurring minerals are strongly magnetic, magnetite and pyrrhotite; magnetic surveys are therefore used to detect the presence of these minerals in varying concentrations. Magnetics is also useful as a reconnaissance tool for mapping geologic lithology and structure since different rock types have different background amounts of magnetite and/or pyrrhotite.

### b) Field Procedure

Readings of the earth's total magnetic field were taken every 30 metres along all 12 survey lines on the three grids, by one of the magnetometers. The work consisted of 8.94 km of survey.

The diurnal variation was monitored in the field by using the second magnetometer as a base station. This enabled the diurnal variation to be removed from the raw data prior to plotting.

### c) Compilation of Data

The total magnetic field values were profiled above the IP and resistivity pseudosections on each map for each line at a scale of 1:2500.

## DISCUSSION OF RESULTS

The survey has revealed numerous strong IP (chargeability) anomalies across all three grids. This should not be surprising considering the IP survey lines were placed across target areas, that is, locations containing sulphide mineralization, soil geochemistry anomalies, and/or favourable geology.

It is considered that the most important survey of the three surveys carried out by Geotronics is IP chargeability, since IP anomalies are in all likelihood reflecting sulphides, and it is sulphides that are being sought after on this property. Therefore, the discussion will center around the IP anomalies and the resistivity and magnetic survey results will be discussed, for the most part, in how they relate to the IP anomalies.

The results are discussed on a grid-by-grid basis. The writer has labelled IP anomalies of interest by capital letters and has attempted to connect anomalies from one line to the next using geophysics, geology, and geochemistry. This, for the most part, should work since the lithology is mainly striking perpendicular to the lines, that is, westerly. However, the distance between the lines is 200 or 400 meters, which is fairly large. As a result, it should be kept in mind that an IP anomaly labelled by the same letter on two adjacent lines may in fact be two different anomalies that are caused by two different sources.

In trying to determine the dip of the causative source of the IP anomalies, the writer takes into account geology and the resistivity results over the IP results. For example, the weaker of the two legs of a pant-leg type IP anomaly often correlates with the dip of the causative source, and not the stronger of the two legs.

A. DORLON (Lines 18+00W to 22+00W)

The writer has labelled six IP anomalies considered to be worthy of further discussion. Some of these are minor in size, but, because they correlate with known sulphide showings, have been labelled. The anomalies are labelled from south to north.

Anomaly A occurs on all three lines and therefore has a minimum east-west strike length of 400 m, being open to both the east and to the west. The resistivity as well as the geology suggest a southerly-dip. It occurs on the south side of a sharp, strong magnetic high that correlates with a resistivity high that is probably caused by a basalt dyke. It is therefore quite possible that this "basalt dyke" is related to the sulphide mineralization that is the causative source of IP anomaly A. Of even stronger exploration interest is the correlation of a gold soil anomaly with A on lines 18+00W and 20+00W.

Anomaly A occurs within the Parsons Bay sediments and/or close to its contact with the Bonanza volcanics breccias and flows. However, on line 22+00W, A correlates directly with a north-west-striking intrusive dyke. It is here where anomaly A is the strongest.

Anomaly B is considered to be the anomaly of greatest exploration interest on the Dorlon Grid. It is also seen on all three lines, which therefore indicates a minimum westerly-strike length of 400 m, being open to both the east and to the west. A southerly dip is also suggested for the causative source of this anomaly.

On each line anomaly B correlates with known sulphide mineralization described as follows:

Line 18+00W - 50 m west of the line at 1+50S occurs disseminated chalcopyrite, pyrite, sphalerite, pyrrhotite, and some galena within a felsic tuff and limestone.

Line 20+00W - At 1+50S occur bands and disseminations of sphalerite with pyrite and galena occurring within a cherty siltstone.

- At 1+25S occur pyrite, galena, and sphalerite within limestone intruded by a felsic dyke.

Line 22+00W - At 1+60S occurs float, and downhill at 1+45S occurs in place disseminated pyrite, sphalerite, galena, chalcopyrite and pyrrhotite within interbedded cherts and limestone.

There is a similarity in the geology and mineralogy of the sulphide occurrences on all three lines, strongly suggesting continuity for the causative source.

There is a strong correlation with soil geochemistry results, especially on line 22+00W where it correlates with the uphill part of a wide gold/zinc soil anomaly. There is also a correlation on line 20+00W with a gold/zinc soil anomaly, but on 18+00W, IP anomaly B occurs just downhill of a gold/zinc anomaly and just uphill of a zinc anomaly.

Anomaly B occurs on the north side of a strong magnetic high suggesting a correlation with a basalt dyke. Also, B correlates with a resistivity low which may be caused by alteration and/or fracturing associated with the sulphide mineralization.

Anomaly C is an east-striking anomaly occurring on lines 20+00W and 18+00W and therefore is open only to the east. On both lines it correlates with a zinc soil anomaly and on line 18+00W,

it correlates with two 30-m separated showings that consist of massive sphalerite with some galena, pyrite, and chalcopyrite occurring at a limestone/felsic dyke contact. The resistivity correlation seems to be a high dipping to the south.

Anomaly D also occurs only on lines 18+00W and 20+00W, therefore being open only to the east. On line 20+00W, the anomaly is relatively weak, but on line 18+00W it is quite strong. The suggested dip of the causative source is southerly.

The only soil geochemistry correlation is on line 20+00W where it correlates with a gold/zinc anomaly. The resistivity correlation is with a high possibly caused by Quatsino limestone or an intrusive. The geological mapping indicates the causative source, that is, the sulphide mineralization, occurs within Quatsino limestone very close to its contact with an intrusive dyke.

Anomaly E is also an IP anomaly considered to be of strong exploration interest that occurs on all three lines. Since it seems to be striking in a southwesterly direction, it would be open to both the southwest and to the northeast and have a minimum strike length of 450 m.

The causative source also appears to be plunging to the southeast. On line 22+00W it sub-crops at about 0+45N; on line 20+00W, it may sub-crop at 2+10N, though the main causative source seems to be 50 m to 100 m below surface; and on line 18+00W it may sub-crop at 2+10N although the main causative source may be at least 150 m below surface.

On line 18+00W, the possible IP sub-crop correlates with a showing of disseminated chalcopyrite and pyrite within limestone and cherty tuff. Also at this location is a correlation with a

copper/zinc soil anomaly. On line 22+00W there is a possible correlation with a gold soil anomaly centered at 1+30N.

The resistivity correlation is with a low on both lines 18+00W and 22+00W. However, on line 20+00W, it occurs on the edge of a south-dipping resistivity high that appears to be caused by Quatsino limestone. Also, on line 20+00W, anomaly E occurs between two strong magnetic highs probably caused by basalt dykes.

Anomaly F occurs at the northern edge of the survey on all three lines. The IP survey should be extended northerly in order to properly ascertain the location of the causative source. However, the anomaly appears to strike northerly, have a minimum strike length of 400 m, and therefore is open to both the north and to the south.

Anomaly F correlates with a resistivity low that the writer thinks is probably caused by the Nahwitti River fault. The sulphide mineralization (or graphite?) is therefore probably related to the fault.

There are no other correlations with anomaly F.

#### B. H.P.H. GRID (lines 46+00W to 56+00W)

For this grid, four IP anomalies thought to be caused by four separate causative sources have been labelled by the capital letters A to D, inclusive.

Anomalies A and B are closely sub-parallel to each other and occur on the eastern four lines. This suggests a minimum strike length of 800 m being open to the east. On line 56+00W, anomaly

A does not occur and anomaly B possibly may occur which would extend B's minimum strike length to 1000 m, being open to the west as well.

On line 48+00W, anomaly A correlates with a showing of disseminated sphalerite, pyrite and chalcopyrite within an ash tuff. Another possible causative source of A is the occurrence of pyrite and sphalerite within graphite limestone 30 m north of the first showing.

Anomaly B correlates directly with a sulphide showing on line 48+00W which consists of disseminated hematite, pyrite, and sphalerite occurring within an ash tuff, and with a sulphide showing on line 50+00W which consists of disseminated pyrite and pyrrhotite within an ash tuff. On line 54+00W, float was found at anomaly B that consisted of sphalerite and chalcopyrite within limey sediments.

On all five lines anomalies A and B correlate with zinc soil anomalies that in places correlate with gold and copper soil anomalies as well.

The resistivity correlation with IP anomaly B is clearly a low which could be caused by alteration or possibly faulting associated with the sulphide mineralization. The resistivity correlation with anomaly A is much less clear with both lows and highs correlating with it.

IP anomaly A occurs closely with a magnetic high suggesting a close association with basalt dyking (if this is the causative source of the magnetic high).

Anomaly C can be seen on the western four lines and probably on line 56+00W as well, though at depth. This suggests a minimum

strike length of 1000 m. The dip of the causative source appears to be southerly.

On line 48+00W, anomaly C correlates with a showing of veinlets and disseminations of sphalerite, galena, pyrite, and chalcopyrite occurring within a brecciated limestone. In addition, anomaly C correlates with a gold/zinc anomaly on lines 50+00W and 56+00W.

The causative source appears to occur within Quatsino limestone on lines 50+00W, 54+00W, and 56+00W, though very close to a contact with an intrusive.

The correlation of C with the resistivity results is mixed, sometimes correlating with a high, sometimes with a low, and sometimes with the edge of a high (or low).

Anomaly D is shown to occur only on line 56+00W. It is possible that D is in fact an extension, or arm, of anomaly C, but the host rock of D is an intrusive whereas that of C is Quatsino limestone adjacent to the same intrusive.

There is no other correlation other than that it occurs on the northern edge of a resistivity low. Both the IP and resistivity suggest a near vertical dip.

#### C. CONTACT GRID (Lines 82+00W to 92+00W)

IP anomaly A is of strong exploration interest. It occurs on all four lines indicating a minimum strike length of 1000 m and open to both the east and the west. The dip of the causative source is southerly.



The anomaly occurs within the Quatsino limestone near its contact with the Parson Bay sediments. This feature therefore has been used to connect the anomaly from one line to the next.

The anomaly is quite strong except on line 86+00W where it is significantly weaker.

On line 92+00W, anomaly A correlates directly with a showing of disseminated sphalerite and galena within an altered limestone. Also occurring nearby is float containing sphalerite and galena within cherty sediments. On line 86+00W, float has been found at the location of anomaly A that contained disseminated (?) pyrite, galena, sphalerite, and chalcopyrite within boulders of siltstones and tuffs. The boulders were angular, indicating the source was very close.

Anomalous soil values in gold, zinc, and/or copper correlate with anomaly A except on line 90+00W.

The resistivity correlation is with a low, indicating alteration or fracturing occurring with the sulphide mineralization.

Anomaly B occurs within the Parson Bay sediments on line 82+00W. It has a nearby correlation with a zinc soil anomaly.

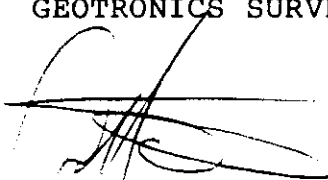
Anomaly C is a strong IP anomaly occurring on line 86+00W. The host rock appears to be an intrusive occurring within Quatsino limestone. It correlates with a zinc/copper soil anomaly.

On this property, the resistivity results are not clearly indicative of the various lithological units. At different locations, highs can be seen to correlate with intrusive dykes, and at other locations there is no correlation. Also, the Quatsino limestone is reflected by both highs and lows. Perhaps the lows

indicate limestone that contains water-filled fractures and/or is a "dirty" limestone. The highs would therefore indicate limestone that is relatively clean and non-fractured.

Respectfully submitted,

GEOTRONICS SURVEYS LTD.



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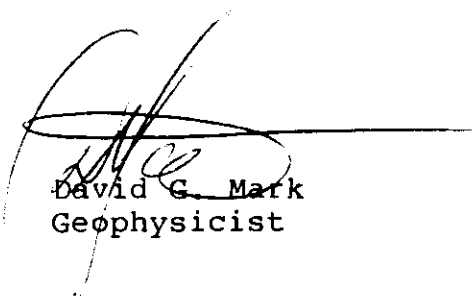
GEOPHYSICIST'S CERTIFICATE

I, DAVID G. MARK, of the City of Vancouver, in the Province of British Columbia, do hereby certify:

That I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices located at #405-535 Howe Street, Vancouver, British Columbia.

I further certify:

1. I am a graduate of the University of British Columbia (1968) and hold a B.Sc. degree in Geophysics.
2. I have been practising my profession for the past 23 years and have been active in the mining industry for the past 26 years.
3. This report is compiled from data obtained from induced polarization, resistivity and magnetometer surveys carried out by a crew of Geotronics Surveys Ltd., under my supervision, and under the field supervision of Marc Beaupre, geophysical technician, from August 29 to September 14, 1991.
4. I do not hold any interest in Cameco Corporation, nor in any of the properties discussed in this report, nor will I receive any interest as a result of writing this report.



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