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GEOLOGICAL REPORT ON THE DOO 1-4 MINERAL CLAIMS FOR

HALCYON RESOURCES LTD.

OWNER

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UNIVERSAL TRIDENT INDUSTRIES LTD 1930 609 GRANVILLE ST

VANCOUVER B.C.

Located in the Iskut River Area Liard Mining Division NTS 104B/11W 56°44' North Latitude 131°25' West Longitude

- Prepared by -

S. DUDKA, Geologist S.L. TODORUK, Geologist C.K. IKONA, P.Eng.

March, 1991

- Pamicon Developments Ltd. -

## 1.0 INTRODUCTION

Halycon Resources Ltd. has acquired an option to earn an interest in the Doo 1-4 mineral claims located in the Iskut River area of B.C.

The claims are located within a large metallogenic province in the northwest portion of B.C. The area has received extensive exploration in the past with most attention focussed on precious metals. Recent work has indicated the presence in the region of volcanogenic massive sulphide mineralization in rock units which have hitherto been relatively overlooked.

To date the most important of these deposits appears to be the Eskay Creek deposit of Prime Resources and Stikine Resources. A second discovery, the Black Dog of Thios and Eurus Resource Corp. is presently receiving extensive investigation.

The Doo mineral claims are located 5 km west of the Black Dog discovery and from available geological information are partially underlain by the same formations containing the Black Dog horizon.

Minimal work has been conducted to date on the Doo claims, however one of the writers of this report, Steve Dudka, examined the claims from February 19 to 21, 1991.

This report is intended to summarize all available information on the claims and recommends an exploration program based on the results of the writer's examination and on information available.

#### 2.0 LIST OF CLAIMS

Records of the British Columbia Ministry of Energy, Mines and Petroleum Resources indicate the claims are owned by Daiwan Engineering Ltd. Separate agreements indicate that Halcyon Resources Ltd. has the right to earn an interest in these claims subject to payments and expenditures.

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with heavy underbrush. The higher portions are of more extreme relief with the coniferous forests yielding to subalpine flora.

## 4.0 AREA HISTORY

Figure 3 of this report presents a regional scale map of northwestern B.C. from the town of Stewart in the south to near Telegraph Creek in the north, a distance of 225 kilometres. Within this area, a semi-arcuate band of Hazelton Group equivalent volcanic and sedimentary rocks (Unuk River Formation, Betty Creek Formation, Salmon River Formation) with their metamorphic equivalents trend northwest and contain most of the known mineral occurrences. This group is bounded by the Coast Range intrusive complex to the west and by the much younger sediments of the Bowser Basin to the east.

This area of approximately 10,000 square kilometres has historically been referred to as the Stikine Arch. Mining activity within it goes back to the turn of the century. Due to the large size of the region it has been referred to in more specific areas which range from the Stewart area to Sulphurets, Iskut and Galore Creek areas. Recent discoveries appear to be filling in areas between these known mineralized camps. It is probable that the entire area can be considered as one large mineralized province with attendant subareas.

The history of the area can be divided into two time periods: circa 1900 to the mid-1970s and the more recent activities of the late 1970s and 1980s.

### 1900 - 1975

The original discovery of mineralization in the area can be attributed to miners either en route to or returning from the Klondike gold fields at the turn of the century. Rivers flowing through the Alaska Panhandle served as access corridors and mineralization was noted along the Iskut and Unuk Rivers and at the head of the Portland Canal. Highlights of this period were:

- \* discovery of copper, gold, silver mineralization at Bronson Creek in the Iskut
- \* location of similar mineralization along the Unuk and at Sulphurets
  Creek
- \* discovery of the Silbak-Premier gold-silver mine near Stewart plus a number of other rich silver occurrences along the Portland Canal
- \* the location by Tom MacKay of the original mineralization at Eskay Creek near the headwater of the Unuk River

Development and production at this time was largely limited to the area around Stewart where a number of mines produced high grade silver. The most significant producer was the Silbak Premier some 12 km north of Stewart which from 1920 until 1936 produced some 2,550,000 tons grading 16.8 g/tonne gold and 409.5 g/tonne silver.

After World War II the area was explored for base metals, notably copper. This era led to the discovery of the Granduc, Galore Creek and Schaft Creek copper deposits and the E & L copper-nickel deposit. Published reserves of these are listed below and shown on Figure 3.

	Tons	<u>Cu</u> (%)	$\frac{\underline{Au}}{(g/t)}$	$\frac{\underline{Ag}}{(g/t)}$	<u>Mo</u> (7)	<u>Ni</u> (%)
Granduc	10,890,000	1.79				
Galore Creek	125,000,000	1.06	0.397	7.94		
Schaft Creek	910,000,000	0.30	0.113	0,992	0.02	
E&L	3,200,000	0.60				0.80

Of these Granduc was taken to production by Newmont Mining but a combination of low copper prices and high operating cost resulted in suspension of activity.

These successes have generated extensive exploration activity in the area which has led to the discovery of a large number of mineral occurrences which are in a preliminary stage of evaluation. The most notable of these to date is on Tom MacKay's old Eskay Creek showings. The 1988/89 work on this project of Calpine/Stikine Resources indicates a major gold-silver-base metal mineral deposit of possible volcanogenic massive sulphide and epithermal affinity with a minimum strike length of 1800 metres. Some notable recent results on the project are:

DDH #CA 89-93 91.8 feet 0.453 oz/ton Au and 16.9 oz/ton Ag DDH #CA 89-109 682.2 feet 0.875 oz/ton Au and 0.97 oz/ton Ag including 62.3 feet 7.765 oz/ton Au and 1.35 oz/ton Ag

These intersections are considered to be close to the true width of the mineralization. A great many other excellent intersections have been published by the companies and exploration is continuing with drilling and underground bulk sampling tests. Reserves based on this drilling indicate probable reserves of 4,364,000 tons grading 0.77 oz/ton Au and 29.12 oz/ton Ag (news release, September 14, 1990).

Drilling on Gulf International Minerals' Northwest Zone near Newmont Lake has been ongoing between 1987 and 1990. A few of their more significant intersections are provided below (annual reports and news releases).

Drill Hole	<u>Interval</u>	Length	<u>Copper</u>	<u>Silver</u>	Gold
	(reet)	(leet)	(%)	(02/10n)	(oz/ton)
87-25	343.0-373.0	30.0	0.23	0.11	0.404
	409.3-412.0	2.7	0.55	0.35	0.250
	470.2-473.8	3.6	0.42	0.19	1.520
87-29	167.0-170.0	3.0	0.001	0.01	0.140
	205.0-241.5	36.5	0.97	1.16	1.605
88-28	213.9-229.0	15.1	0.41	0.29	0.810
	260.5-276.6	16.1	0.24	0.29	0.645
	300.2-301.5	1.3	0.15	0.17	0.320
	330.1-338.9	8.9	1.99	0.31	0.340
	353.0-363.2	10.2	1.02	0.22	0.268



Stratigraphy of the Iskut River Area (after descriptions by R.G. Anderson and J.M. Logan)

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Stratigraphy	Lithology	Connents
BOWSER GROUP		
M. Jurassic	conglomerate, siltstone, sandstone, shale	Successor basin
SPATSIZI GRO	UP	au10
L. Jurassic	shale, tuff, limestone unconformable	
HAZELTON GRO	UP	
E. Jurassic	coeval alkalic/calc-alkalic	contractional event? Island Arc rocks
STININI CROU	gradational to unconform	able
L. Triassic	intrusions; mafic volcanic the east, bimodal in the we	rocks in extensional in western st area
	polymictic conglomerate bas andesitic volcanics (plagio and hornblende)	altic to no Triassic clasts; clase limestone clasts common <sup>-</sup>
M. Triassic	sedimentary rocks	contractional event
STIKINE ASSE	BLAGE	
Permian	thin bedded coralline to cr limestone (over 1000 m thic fossiliferous; intermediate and volcaniclastics	ystalline volcanic units resemble k), Hazelton Group rocks flows
E. Permian	rusty argillite	
:	'siliceous' turbidite, fels lapilli tuff	ic extensional event
Missis- sippian	mafic meta-   upper coral volcanics and   limestone as	line thick bedded nd
	metasediments conglomerate lower limes with tuff 1:	e limestone commonly tone bioclastic, coarse ayers crinoids, corals
E. Devonian	limestone; intermediate to : volcanics	elsic contractional events; rocks highly deformed

## Plutonic Rocks - Coast Plutonic Complex

L. Tertiary	granodiorite, diorite, basalt
E. Tertiary	quartz diorite, granodiorite, quartz monzonite, feldspar porphyry, granite
M. Jurassic	quartz monzonite, feldspar porphyry, syenite
L. Jurassic	diorite, syenodiorite, granite
L. Triassic	diorite, quartz diorite, granodiorite
? Not determined	quartz diorite, ?

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### Spatsizi Group Sedimentary Rocks

Spatsizi Group shales, tuffs and limestone of upper Lower and lower Middle Jurassic age overlie Hazelton Group rocks in the eastern part of the map area. Buff, sandy bivalve and belemnite fossil bearing limestone units decrease in abundance in the north parts of the area at the expense of shale. Here, black radiolarian-bearing siliceous shale alternately interbeds with white tuffs giving the units an informal name of 'pyjama beds'. This pyjama bed sequence serves as an important marker for identifying the favourable underlying Hazelton Group.

## Bowser Group Sedimentary Rocks

Bowser Lake Group Middle and Upper Jurassic clastic sediments cover most of the northeast quadrant of the map area. Interbedded shale and greywacke units predominate in the south while thick-bedded shales dominate toward the north. Near the highlands toward the northern reaches of the Bowser Basin, basal chert-rich conglomerates identify the Bowser Group as an overlap assemblage.

#### CENOZOIC VOLCANIC ROCKS

Recent mafic flows and ash of the Hoodoo Formation, Iskut Formation and Lava Fork Formation cap specific areas within the region.

### PLUTONIC ROCKS

The Coast Plutonic Complex, forming the western boundary of the Stewart Complex, is generally characterized by felsic Tertiary plutons. Late Triassic Stuhini Group and Early Jurassic Hazelton Group plutonic styles suggest coeval and cospatial relationships with surrounding volcanics via distinctive porphy-

On the basis of metal content these deposits have been classified into two distinct groups, a Cu-Zn group as typified by those of the Canadian Shield and on the Island of Cyprus and a Zn-Pb-Cu group such as the Green Tuff belt of Japan (Kuroko type), Tasmania and Bathurst, New Brunswick. Results from work to data at Eskay Creek and the Rock & Roll project appear to indicate Zn-Pb-Cu or Kuroko types, consequently these are described in more detail.

Deposits of the Kuroko type are in stratigraphic settings dominated either by felsic volcanic rocks or by subequal amounts of felsic volcanic and sedimentary strata. Because of their method of formation volcanogenic massive sulphide deposits tend to form in clusters. Examples of this are the Bathurst area of New Brunswick which contains approximately 30 massive sulphide deposits (Davis and McAllister, 1980) and Japan where a number of districts contain multiple deposits (Tatsumi, 1970 plus a myriad of references).

Sizes of these deposits vary greatly. In the Bathurst area the median deposit is 1.1 million metric tons while the Brunswick No. 12 contains 109.2 million metric tons (Sangster, 1980). A number of other deposits in the area contain in excess of 10 million metric tons with similar variations seen in the Japanese deposits.

## 6.2 VOLCANOGENIC MASSIVE SULPHIDE DEPOSITS IN THE AREA

A number of deposits of the Cypress or Kuroko type have been documented in the Canadian Cordillera. These range from Brittania, some 50 km north of Vancouver to Kutcho Creek east of Dease Lake to the Tulsequah Chief in the northwest corner of B.C. In the Iskut River area two recent discoveries, Eskay Creek and Black Dog, appear to be of the Kuroko type. A brief discussion of each is provided below as these may relate to the underlying geology on the Doo 1-4 claims.



Geological reserves total 5,023,000 tonnes grading 15.6 gm/tonne Au and 441 gm/tonne Ag with a higher grade core of 1,223,000 tonnes averaging 49.4 gm/tonne Au, 1,392 gm/tonne Ag, 5.5% Zn and 2.2% Pb.

### 6.2.2 Black Dog (Thios Resources Ltd./Eurus Resource Corp.)

This newly discovered occurrence was located in mid-1990 and is situated within the Iskut River Gold Camp 50 kilometres west of the polymetallic Eskay Creek deposit.

The Black Dog mineralization consists of massive pyrrhotite, pyrite, sphalerite and galena with minor chalcopyrite and lesser arsenopyrite and tetrahedrite within a sequence of probable Mesozoic age strata belonging to Stuhini Group.

In the area of known mineralization the Stuhini Group consists of a thick sequence of northwest trending moderately deformed sedimentary and volcanic rocks containing andesite tuffs and flows conformably interbedded with siltstones, argillites and graphitic argillites. Massive sulphide mineralization in the Black Dog horizon is hosted within graphitic horizons at or near pheric/apheric andesite flow contacts. Quartz and calcite exist as stringers as probable greenschist facies products.

To date the results of 27 drill holes have been released on the Black Dog horizon. Results of these vary from 1% to 8% combined Zn-Pb-Cu, .001 to .459 oz/ton gold and between 1 and 38 oz/ton silver over widths ranging between 6 and 30 feet. No grade and tonnage ealculations are available.

## 6.2.3 <u>Other</u>

A number of other mineral occurrences have been noted to date in the Iskut River area which may be of similar genetic origin although no documentation on

### STUHINI GROUP

## Volcanic and Sedimentary Rocks

As observed on the property, the unit is generally medium to dark grey in colour. It consists of fine to medium grained andesite to porphyritic andesite flows, andesitic ash to lithic lapilli tuffs, minor mafic (basalt ?) flows, and grey to maroon coloured siltstones to mudstones. These can be locally very siliceous.

Local outcrops contain up to 1% sulphides, mainly pyrite.

### Limestone

Thick sequences of limestone beds exist mainly on the Doo 2 mineral claim and appear to trend in a northwest-southeast direction. The limestone is generally white in colour but is also found yellow, grey and reddish. Large blocks of limestone measuring  $2 \times 3$  metres in size were observed along traverse lines.

Numerous beds within the limestone are very hard and siliceous but still react strongly to cold dilute HCl. In outcrop these beds are usually more prominent due to their resistance to weathering.

At one location the limestone was found interbedded with thin (up to 5 cm) layers of andesite.

### DIORITE-GRANDIORITE INTRUSIVES

This unit is locally variable but generally equigranular, fine to medium grained, hornblende to quartz diorite or granodiorite. The unit locally displays 5 to 10 cm thick, parallel, fine grained epidote-rich bands.

- 2. Geologically map the claims on a reconnaissance basis to identify the contact between the Stuhini rocks and overlying volcanics or intrusives.
- 3. Based on results of the work described above determine the best orientation and coverage for emplacing grids.
- 4. These grids would be used for the following work:
  - geophysical' surveys (VLF, horizontal loop, EM and IP)
  - geochemical sampling
  - detailed geological mapping and prospecting.

Contingent upon the success of this first phase, a modest diamond drilling program could be undertaken to test any favourable targets.

A recommended budget for this work is contained in the next section of this report.

### 9.0 RECOMMENDED BUDGET

WAGES		
Geologist (Senior) - 30 days @ \$400	\$ 12,000	
Geologist (Field) - 10 days @ \$325	3,250	
Prospector - 20 days @ \$300	6,000	
Samplers - 2 x 15 days @ \$225	6,750	
Line Cutters - 4 x 20 days @ \$300	24,000	
Geophysical		
- IP Survey (5 men) - 7 days @ \$1,800	12,600	
- Horizontal Loop (2 men) - 7 days @ \$1,800	12,600	
- VLF-EM (2 men) - 7 days @ \$1,000	7,000	
Total Wages		\$ 84,200

#### PROJECT SUPERVISION AND COORDINATION

7,500

# APPENDIX I

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#### STATEMENT OF QUALIFICATIONS

I. STEVE L. TODORUK, of 5700 Surf Circle, Sechelt, in the Province of British Columbia, DO HEREBY CERTIFY:

- THAT I am a Geologist in the employment of Pamicon Developments Limited, with offices at Suite 711, 675 West Hastings Street, Vancouver, British Columbia.
- 2. THAT I am a graduate of the University of British Columbia with a Bachelor of Science Degree in Geology.
- 3. THAT my primary employment since 1979 has been in the field of mineral exploration.
- 4. THAT my experience has encompassed a wide range of geologic environments and has allowed considerable familiarization with prospecting, geophysical, geochemical and exploration drilling techniques.
- 5. THAT this report is based on data generated by myself, under the direction of Charles K. Ikona, Professional Engineer.
- 6. THAT I have no interest in the property described herein, nor in securities of any company associated with the property, nor do I expect to receive any such interest.
- 7. THAT I hereby grant permission to Halcyon Resources Ltd. for the use of this report in a Prospectus or Statement of Material Facts or any other such document as may be required by the Vancouver Stock Exchange or the Office of the Superintendent of Brokers.

DATED at Vancouver, B.C., this 1st day of March, 1991.

Steve L. Todoruk, Geologist

Pamicon Developments Ltd.

## APPENDIX III

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## ENGINEER'S CERTIFICATE

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## CERTIFICATE OF THE ISSUER

The foregoing constitutes full, true and plain disclosure of all material facts relating to the securities offered by this Statement of Material Facts of Halcyon Resources Ltd. as required by the <u>Securities Act</u> and its regulations.

DATED: APRIL 11, 1991

ISSUER

LESLIE MACCONNELL

President and Chief Executive Officer

BY HEATTOBNEY IN FACT NELL M. DRAGO

ON BEHALF OF THE BOARD OF DIRECTORS

Director

NAREN MAJITHIA Director