## ARIS SUMMARY SHEET

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District Geologist, Victoria
ASSESSMENT REPORT 18023
    PROPERTY: 
    UTM 09 5616755 572976
    NTS 092L12W
CLAIM(S): Red Dog 5,Red Dog 7,Red Dog Fr.
OPERATOR(S): TP Res.
AUTHOR(S): Richards, J.B.
REPORT YEAR: 1988, }88\mathrm{ Pages
COMMODITIES
SEARCHED FOR: Copper,Gold,Molybdenum/Molybdenite
GEOLOGICAL
SUMMARY:
intruded and mineralized by feldspar porphyry dykes. Strong
hydrothermal alteration and sulphide mineralization are related to
fracturing adjacent to the intrusives. Economic sulphides are
chalcopyrite and molybdenite. Gold is also very important.
WORK
DONE: Drilling
DIAD 1041.8 m 4 hole(s);NQ
SAMP 287 sample(s) ;CU,MO,AU,AG
00684,01621,03400,03958,04754,05262,05345,11048,12027
092L 200
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FILE NO:

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DRILLING REPORT
on the
RED DOG PROJECT
Located on Vancouver Island B.C. \(50^{\circ} 40^{\prime} \mathrm{N}, 127\) 50'W
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Owned by CREW CAPITAL CORPORATION Vancouver Canada


## GEOLOGICALBRANCH

 JB Engineering


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## INTRODUCTION

The Red Dog property is a copper-gold porphyry type deposit, located on northern Vancouver Island, British Columbia Canada. Crew Capital Corp. holds the claims under option from Mr Heinz Veerman of West Vancouver, B.C.

## LOCATION AND ACCESS

The Red Dog property is located on northern Vancouver Island, in British Columbia Canada. Geographic coordinates are $50^{\circ} 40^{\prime}$ north latitude and $127^{\circ} 50^{\circ}$ west longitude.

The claims lie completely within Western Forest Products tree farm license \#6, and are surrounded by BHP-Utah Mines Ltd "Expo" claim block. See Figure 1, LOCATION MAP and Figure 2 , CLAIM MAP. The coordinate grid marked on the claim map is a local true north grid defined by Rayonier Canada Ltd., the predecessor of Western Forest Products Ltd. It is employed to maintain consistency with previous work. It is in feet.

Access to the claim block is by way of 45 km of good gravel road to the Island Highway at Port Hardy. Tide water is 15 km away by road at Holberg. Western Forest Products logging access road NE6 6 provides access from the Port Hardy - Holberg road. Branches 62 B and 62 H cross all areas of interest.

## TOPOGRAPHY AND CLIMATE

The area is one of moderate relief, the hills rising to 360 metres above the valley bottom at 600 feet above MSL. Slopes rarely exceed $40^{\circ}$.

The mineralized zone occupies a local prominence called Red Dog Hill, which rises to 470 metres on the flank of a long 550 metre elevation ridge.

The entire area of interest has been cleari-cut logged, and replanted in the years since the Red Dog claims were staked. Secondary growth is very dense, and movement through the bush away from cut lines or creek beds is difficult.


Figure 1

## CLAIM STATUS

The Red Dog property consists of 28 full size and fractional two post claims. See Figure 2., Claim Map. Relevant data is tabulated below.

| Claim Name | Record No. | Record date | Expiry Date |
| :---: | :---: | :---: | :---: |
| Red Dog 1-8 | 19134-19141 | Dec. 13,1966 | Dec.13,1993 |
| Red Dog 9-10 | 19142 - 19143 | Dec. 13,1966 | Dec. 13, 1992 |
| Red Dog 11 - 12 | 19144-19145 | Dec. 13,1966 | Dec.13,1994 |
| Red Dog 13 fr . | 25147 | June 17,1968 | June17,1993 |
| Red Dog 14 | 19409 | May 23,1967 | May 23,1993 |
| Red Dog 15-26 | 21521-21532 | Dec. 1,1967 | Dec. 1,1993 |
| Red Dog 29 fr . | 21535 | Dec. 1,1967 | Dec. 1,1993 |
| Red Dog fr. | 19410 | May 23,1967 | May 23,1994 |

With the filing of this assessment work the claims expiry will be 1998 and 1999.

## HISTORY

The Red Dog property is a geochemical find, having been first detected by a regional program in 1962. Follow-up on a 1962 anomaly during the 1966 field season led to the discovery of the mineralization in the bed of a creek and the subsequent staking of the Red Dog claims. Three holes were drilled with a winkie drill in 1967 but core recovery was very poor.

In 1968 a two stage drilling program was carried out; 1,722 metres in 20 holes, with a soil geochemistry survey run in between stages.

In 1970 very-low frequency electromagnetic (VLF-EM) and ground magnetic surveys were completed. Four anomalies located in by the geophysical surveys were tested by 4 diamond drill holes totalling 453 metres The roads and creeks were geologically mapped.

In 1972 the claims were optioned to Cities Services who remapped the property, relogged the previous drilling and drilled three holes totalling 903 metres.

In 1973 Cities Services was joined by Westminex Development. A program of rock geochemistry and 7.7 km . of road I.P. survey were done. Three deep core drill holes were recommended, but were not drilled.

In 1974 Westminex Development drilled the three core holes


Figure 2
recommended in 1973, totalling 613 metres as well as 2 winkie holes.

The property was not worked again until 1982 when Utah Mines optioned it and completed the line I.P. work over the Red Dog hill as recommended in 1973, and 664 meters of core drilling in 6 holes,in the first stage and 1059 metres in 6 more holes plus one earlier one deepened.

The final work program on the property was a program of five core holes drilled by Utah in the fall of 1983, totalling 779 metres, to test various I.P. anomalies on the south slope of Red Dog hill, and all results were negative.

## GEOLOGY

A) Regional

The property is underlain by volcanic and sedimentary rocks of the Vancouver Group; the Bonanza Formation volcanics and related tuffs and tufaceous sediments of lower Jurassic age for the largest part. The volcanics have been intruded by Jurassic and later porphyry stocks and dikes. The regional trend of the volcanics is NW with moderate SW dips in the order of 20 to 35 degrees. The regional dip is related to a set of strong NW block faults which also cause the section to be repeated. The NW tending block faults appear to be part of a deep seated zone of structural weakness along which intrusive centers have been located. The Red Dog. intrusive and related dikes are one of seven volcanic centers regularly spaced at 7 to 10 km intervals in a more or less straight line along the north side of Holberg and Rupert inlets starting with Island Copper on the south east, Apple Bay, Pemberton Hills, Hushamu, Red Dog, and finally Knob Hill to the north west. Block faulting has lifted the various volcanic centers so that different levels within the original systems are exposed at each location. Island Copper, Hushamu, and Red Dog are the only ones having sufficiently deep erosion to expose the copper porphyry zones.
B) Property

- Andesitic flows; tuffs and tufaceous sediments of the Bonanza volcanics have been intruded, altered and mineralized by a sequence of feldspar porphyry dikes.

Faulting is very extensive. Fracturing is every where at least moderate and very often strong to extreme in its intensity.

Alteration in the Red Dog Hill zone ranges from propyliftic to advanced argillic, with sericite-chlorite-magnetite quite common. Alteration varies considerably over quite short distances. The quartz magnetite breccia with chlorite-sericite alteration is suggestive of the chlorite-sericite zone of the Lowell \& Gilbert model for porphyry copper deposits, that $1 s$ very low in the system.

There can be little certainty attached to any geologic interpretation until more drill data is available, at which time it may be possible to say with more certainty which dike or dikes were the key to ore formation, and how much movement there has been on any one fault.

## DRILL PROGRAM

The objective of the drill program was to test the depth extent of a mineralized zone located on the top of Red Dog Hill by previous operators.

The drilling was executed by Tonto Drilling Ltd. of Burnaby B.C., using a Longyear Super-38 drill rig equipped for helicopter moves. NQ tools were used for all coring, recovering a 48 mm. diameter core.

Drill moves were made with a Bell 206B helicopter on charter from Vancouver Island Helicopters of Port Hardy B.C.

The field work commenced with the mobilization of the engineer and assistant on the 25 th of July. The drill and crew arrived on the $3 r d$ of August and drilling continued until the 19th of September: The last core was logged and sampled and the engineer left the site on the $26 t h$ of September.

Considerable difficulty was experienced by the drill crew in gaining good core recovery due to the highly fractured nature of some rock units. The drilling fluid often did not return to the stand-pipe, and in the case of holes $1 A$ and 4 , appeared at ground surface hundreds of feet away. Holes 1 and 4 were both lost due to the drill strings breaking in faults. Hole 4 was abandoned as it had achieved most of its' planned depth, hole 1 was redrilled as 1 A about 30 cm . from its original position.

On completion of each hole, as the drill was being moved to the next location, the core was flown to the road and transported by truck to the logging facility at the Trails End Motel at Holberg. The core was logged in detail by J.B.Richards, P.Eng.

on GEOFORM computer forms. The GEOFORMs were used to enable the data to be readily digitized at a later date should this be necessary. The logs contain a prefix that explains the codes and scales used, and at the end of each geologic log there is a plain english summary of the geology on a unit by unit basis.

As there are numerous drill holes in the existing database going back 20 years, English measure was used to maintain consistency.

The core was marked out 1 n intervals of 10 feet and split lengthways, with half being returned to the core-box and half sent for assay. Assaying was done by Acme Analytical Laboratories Ltd. of Vancouver. The assay results are tabulated on Assay Logs at the end of each geologlc log. The core recovery was estimated by measuring the core over each sample length, and is reported as a percent on the assay logs. Also the Rock Quality Designator or RQD was estimated by measuring the amount of core in each sample interval that is in pieces longer than twice the core diameter. This figure is also tabulated with the assay data.

The geologic and assay logs are appended.
The core is stored at the Trails End Motel in Holberg.
The collars of the holes were surveyed by closed tape and compass traverses using previously established control. The coordinates are in feet on the Western Forest Products Ltd. grid.

See Plate 1 for drill hole locations.

## RESULTS and DISCUSSION

The results of the program are ambiguous, and do not provide clear answers to the questions it was hoped that they would solve. While holes $1 A$ and 2 did contain good grade mineralization in their upper portions, both holes encountered barren intrusives well before their planned depths. In both cases it is probable that the intrusives are dikes that are in the order of 30 metres thick or less at shallow angles to the drill holes. In the case of hole $1 A$, approximately 12 metres of good grade is encountered at depth ( 275 metres) between dikes. This intersection proves that ore grade does persist to depth. The question of the orientation of the barren dikes will require east-west oriented drill holes, or perhaps trenches.

Hole 3 encountered a zone of strong hydrothermal alteration and sulphide mineralization, up to $10 \%$ pyrite, and averaging $5 \%$ or more, but only spotty copper mineralization of generally below ore grades. This zone appears to represent a fault block of the strongly pyritized and altered rock found in holes drilled earlier lower down hill to the south. (That is in EC 144 drilled by Utah Mines)

Hole 4 was expected to pass from barren altered rock through a fault and into copper mineralization and then back into barren rock through another fault. The faulting proved to be more complex than anticipated, and while the mid-section of the hole did indeed contain interesting values, it seems probable that it delineates the eastern end of the zone of interest.

With the present data it seems that there is a reasonable possiblilty of developing a small open-pitable deposit on the Red Dog claims.

## STATEMENT OF COSTS

Diamond Drilling
1041.8 m @ $\$ 110.95 / \mathrm{m} \$ 115.587 .71$

## Assaying

166 samples @ 19.00/sample (Cu, Mo, Au,\& Ag) 3154.00
121 samples @ $16.00 /$ sample (Cu, Mo, \& Au) 1936.00
Field Supplies 1099.72
Telephone
324.82

Helicopter Charter
23.0 hrs @ $\$ 548.00 / \mathrm{hr}$. $12,604.00$

Vehicle Rental
July 25-29,31 6 days
Aug. 2-31 30 days
Sept.1-26
Room \& Board
Room rental,
July 26-Sept. 26 , 2 mo. @ $\$ 810 . / \mathrm{mo} 1620.00$
Board
July 25,262 days, 2 men 4 man-days
July 27,28,31 1 man 3
Aug.1,3-14,16-31 " 29
Sept.1,5-26 " 23
59 man-days @ $\$ 20 . /$ man-day
Labour
Engineer, supervision and core logging.
J.B.Richards, July 25-29,31
Aug. 1,3-14,16-31
Sept. 1,5-26
6 days
27 days
$\frac{23}{} \frac{\text { days }}{\text { days } @ \$ 375 . / \text { day } 21,000.00}$

Assistant, survey help \& sampler.
K.O.Richards, labourer.

July 25,26 2 days @ $\$ 100 . /$ day 200.00
M.D.Russell, Geological Technician.

Aug. 2-6, 8-10, 12-15, 17, 20-24, 27-31
Sept.1,2,5-11,13-26. 331 hours worked @ $\$ 20 . / \mathrm{hr}$
6620.00

Report writing and drafting. Total Costs
1000.00
$\$ 170740.65$

JB Engineering

I , John Byron Richards certify that:

1) I reside at 2879 West 38 th Avenue in Vancouver, Canada,
2) I am a graduate of the University of British. Columbia in Geological Engineering,
3) I have practiced my profession more or less continuously since graduation in 1970,
4) I have been a member of the Association of professional Engineers of the Province of British Columbia since 1973,
5) I have no interest in the Red Dog mineral claims or in Crew Capital Corporation, nor do $I$ expect to receive any such interest.

The signature below endorses all the drill logs as well as the text of this report.
J.B.Richards, P.Eng.


JB Engineering
P. 8

Red Dog Assessment, Nov. 1988
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