Occurrence Details

Occurrence Number: 116A 009
Occurrence Name: Hart River
Occurrence Type: Hard-rock
Status: Deposit
Date printed: 12/15/2025 1:06:43 PM

General Information

Primary Commodities: copper, gold, lead, silver, zinc
Secondary Commodities: bismuth
Aliases: Mark
Deposit Type(s): Volcanogenic Massive Sulphide (VMS) Besshi Cu-Zn
Location(s): 64°38'5" N - -136°49'30" W
NTS Mapsheet(s): 116A10
Location Comments: .5 Kilometres
Hand Samples Available: Yes
Last Reviewed:

Capsule

Work History

Copper mineralization was first found in this area in the 1930's by trapper Frank Rae but the earliest staking records are for the Rae cl (57973) in Apr/55 and Hoffman cl (80000) in Jun/56 by F. Hoffman and Copper cl (80026) in Jun/56 by R. McKamey. Asbestos Corp optioned the property in 1956 and explored with mapping, hand trenching and sampling.
Restaked by the Callison Syndicate as Mark cl (Y6283) in May/66 and optioned in 1967 to Ventures ML and Anglo Western Mls L, which explored with soil sampling, EM surveys and two packsack holes (21.9 m) before forming a new company, Hart River ML in Dec/67 to finance further work. Hart River drilled 31 holes (2214.4 m) and enlarged the property in 1968, then constructed a winter road and explored the main zone with 530.4 m of underground development plus 1645.9 m of underground drilling (32 holes) and 1028.1 m of surface drilling (9 holes) in 1969. A lower adit was also driven 67 m before operations terminated.
A feasibility study was conducted in 1969 by Kaiser Engineering. Subsequent exploration consisted of detailed soil sampling, an EM survey and 823.0 m of underground drilling (2 holes) in 1970, and 277.7 m (4 holes) in 1971, and the restaking of a few lapsed claims in Jun/75. In 1976, the company changed its name to North Hart Res L. Welcome North ML tied on 111 Luke cl (YA37588) in Aug/78 and H. Wall tied on Ark cl (YA62799) in Jun/81.
North Hart restaked the southwest side as GEN cl (YA76492) in Feb/82 and Core cl (YA77560) in Jul/84. In Aug/84, North Hart Res L changed its name to Calypso Developments Ltd.
In Nov/92, Inco Limited optioned the 11 remaining Mark claims from Calypso and added 40 Arm claims (YB29409). In June and Jul/93, Inco explored the Arm claims with 42.4 line-km of EM37 and magnetic surveys, a geochemical survey, geological mapping and 5 diamond drill holes totalling 1556 m.
In 1994, Inco carried out a geophysical survey and drilled 5 holes totalling 1652 m. The geophysical survey included 76.6 line km of magnetics and 38.8 line km of HLEM. Inco staked additional Arm cl 45-85 (YB43065) in Jul/94. In Jan/95 Inco Limited terminated the option and returned the Mark and Core claims to Calypso Developments Ltd. In Feb/2003 Calypso Developments changed its name to Calypso Aquisition Corporation.

Capsule Geology

The Hart River massive sulphide deposit occurs within the Lower Proterozoic Gillespie Lake Group where orange dolomite exhibits a facies change to calcareous argillite and black argillite. The sedimentary rocks are cut by numerous diabase sills and dikes. Contact metamorphism of the dolomite has formed serpentine and talc, and the argillite is hornfelsed. The Gillespie Lake Group is overlain unconformably by Middle Proterozoic Pinguicula Group basalt and argillite.
The deposit consists of two en echelon, steeply south dipping, west plunging lens-shaped bodies. In 1969, Hart River Mines Ltd. reported total proven reserves of 523,849 tonnes with an average grade of 3.65% Zn, 1.45% Cu, 0.87% Pb, 49.7 g/t Ag, and 1.41 g/t Au. The No. 1 Zone is up to 119 m in strike length, between 4.6 and 15 m wide and has a plunge length of at least 183 m. Proven reserves in the No. 1 Zone are 462,728 tonnes grading 3.6% Zn, 1.45% Cu, 0.9% Pb, 49.7 g/t Ag and 1.41 g/t Au. In the No. 2 Zone, proven reserves are 61,122 tonnes grading 3.65% Zn, 0.96% Cu, 0.7% Pb, 40.8 g/t Ag and 1.03 g/t Au. Both zones are open to depth, and probable tonnage was estimated at about 544,000 tonnes of a grade similar to that of the proven reserves. The one surface exposure of the deposit is near the crest of a north-trending ridge and consists of a narrow, bright orange gossan in which all the sulphides are oxidized.
Most of the information regarding the deposit is derived from diamond drill core, which is now lost, and from underground working on the 3880 level. A second adit at the 3680 level failed to reach the deposit.
The deposit is located in a west-plunging anticline, primarily beneath the Hart River basalts in shales assigned to Unit G1 of the Gillespie Lake Group. The two zones are oriented roughly parallel to the axial plane and cleavage of the fold, and rake down the fold axis. The No. 2 Zone is about 15-30 m above the No. 1 Zone, but is not exposed at surface. Guardia reported four sets of faults, all of which cut the deposit. West-trending high angle reverse faults are associated with the anticline and three sets of younger faults have the following orientations: northwest-trending and moderately southwest-dipping, west trending and moderately to shallowly north dipping and north-trending and moderately west dipping. Replacement of shear zones by sulphides attests to poorly understood pre or syn-mineralization faulting.
Three types of mineralization are reported: banded ore, massive, and mineralized andesite. Banded ore is described by Guardia as having preserved bedding in which sulphides have selectively replaced certain layers, and which grades from unmineralized argillite to totally replaced argillite over several feet. The banded mineralization appears to mantle the massive sulphide core of the No. 1 Zone, and make up most of the No. 2 Zone. Massive ore consists of at least 90% sulphide with quartz and dolomite gangue as cavities and irregular vein and patches. In the No. 1 Zone andesite is mineralized locally where sulphides preferentially replace shear zones and margins of fractures and fill cavities in intense breccias. Geological relationships shown in cross-section (Olsson, 1973) also suggest that massive sulphides replace both argillite and andesite.
The sulphide minerals are mainly pyrite and pyrrhotite, with lesser amounts of sphalerite, galena, chalcopyrite and traces of tetrahedrite, tennantite and the argyrodite-canfieldite sulphosalt series (Olsson). Morin described a crude metal zonation in the No. 1 Zone in which copper and gold are concentrated in the eastern portion and lead and zinc in the west. Petrologic studies and observed megascopic textures indicate that primary textures have been largely destroyed by later deformation and annealing. Foliation and cataclastic textures are locally prominent in the deposit.
Various authors have suggested both an epigenetic and a syngenetic origin for the deposit (see Abbott, 1997). Abbott argues that the deposit is most likely epigenetic, given its position beneath the Hart River basalts, its overall orientation across general trend of bedding and the evidence for replacement cited by early workers.
Lead isotope ratios from galena indicate a Middle Proterozoic age for the Hart River deposit, roughly the same as that of the Hart River sills, and the two are almost certainly related. Replacement of andesite indicates that mineralization postdates volcanism. Abbott (1997) suggests that perhaps the thick, course-grained sill beneath the deposit was emplaced shortly after volcanism, and is related to mineralization.
The Hart River deposit, although probably epigenetic, formed close to surface and should be classified as a volcanogenic massive sulphide deposit. It may represent a feeder to a syngenetic deposit which was deposited above the volcanic rocks and has since been eroded away (Abbott, 1997).
Inco filed drill records for two of five drill holes. All holes were drilled in a fence across strike in the valley west of the deposit. The holes tested the possible continuation of the deposit to the west and east-west trending conductors outlined by the geophysical program. Hole 87024 returned weakly anomalous Cu, Pb and Zn values associated with thin pyrrhotite-rich veinlets in argillite. Hole 87026 returned weakly anomalous Zn values associated with thin pyrite-rich veinlets in very carbonaceous argillite.

Work History

Date	Work Type	Comment
12/31/1994	Drilling	Five holes, 1,652 m.
12/31/1994	Ground Geophysics	Also magnetic survey.
12/31/1994	Geochemistry	
12/31/1993	Drilling	5 holes, 1556 m
12/31/1993	Geology	
12/31/1993	Geochemistry	
12/31/1993	Ground Geophysics	Also magnetic survey.
12/31/1971	Drilling	Four holes, 277.67 m. Underground drilling.
12/31/1970	Drilling	Two holes, 8,22.96 m. Underground drilling.
12/31/1970	Geochemistry	
12/31/1970	Ground Geophysics	
12/31/1969	Drilling	Forty-one holes, 2,674.01 m
12/31/1969	Development, Underground	597.41 m
12/31/1968	Drilling	Thirty-one holes, 2,214.37 m
12/31/1967	Drilling	Two holes, 21.95 m. Packsack drill holes.
12/31/1967	Geochemistry	
12/31/1967	Ground Geophysics	
12/31/1956	Geology	
12/31/1956	Trenching	
12/31/1956	Geochemistry	

Assessment Reports that overlap occurrence

Report Number	Year	Title	Worktypes	Holes Drilled	Meters Drilled
093230	1994	Geophysical Report on the Hart River Project	EM - Ground Geophysics, Magnetics - Ground Geophysics, Line Cutting - Other		
093192	1993	Geophysical Assessment Report, Hart River Project	EM - Ground Geophysics, Magnetics - Ground Geophysics, Line Cutting - Other		
019104	1966	Geological and Engineering Evaluation Report on the Mark 1 to 25 Mineral Claims of H. A. Briden	Rock - Geochemistry, Bedrock Mapping - Geology, Property Evaluation - Other, Hand - Trenching		

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC012679	Report - Mark group		Property File Collection	Report
ARMC012677	Report on Mark group claims - Hart River, Yukon Territory		Property File Collection	Report
ARMC012678	Report on the Mark group of claims of Hart River Mines Ltd.		Property File Collection	Report
ARMC012668	Report on the property of Hart River Mines Ltd. - Hart River area		Property File Collection	Report
ARMC012666	Geology - Mark and Zebra areas - Drawing no. 701-43		Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC012680	Field sheet 116A-10 - Hart River showing Zebra, Linda B, Trade & Mark claims and hand drawn markings		Property File Collection	Geoscience Map (General)
9	Geology of the Upper Hart River Area, Eastern Ogilvie Mountains, Yukon Territory (116A/10, 116A/11)		Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Bulletin
1993-7(G)	Surficial Geological Map of Stewart River Valley, parts of 115O/8, 115P/5 and 115P/12		Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Open File (Geological - Bedrock)
YEG1992	Revised stratigraphy and new exploration targets in the Hart River region		Indian & Northern Affairs Canada/Department of Indian & Northern	Annual Report Paper

-pg13	(NTS116A/10, 116A/11), southeastern Ogilvie Mountains		Development: Exploration & Geological Services Division	Annual Report Paper

Resource/Reserve

Year	Zone	Type	Commodity	Grade	Tonnage	Amount	Reported Amount	43-101 Compliant	Cut-off
1969	HART RIVER - No.2 ZONE RESERVES (UNDERGROUND)	Historical Estimate	copper	.96 %	61,122		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.1 ZONE RESERVES (UNDERGROUND)	Historical Estimate	copper	1.45 %	462,728		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - TOTAL RESERVES (UNDERGROUND)	Historical Estimate	copper	1.45 %	523,849		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves also reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.2 ZONE RESERVES (UNDERGROUND)	Historical Estimate	gold	1.03 g/t	61,122	62955.66	No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - TOTAL RESERVES (UNDERGROUND)	Historical Estimate	gold	1.41 g/t	523,849		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves also reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.2 ZONE RESERVES (UNDERGROUND)	Historical Estimate	lead	.7 %	61,122		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGs Bulletin 9 by Grant Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.1 ZONE RESERVES (UNDERGROUND)	Historical Estimate	lead	.9 %	462,728		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - TOTAL RESERVES (UNDERGROUND)	Historical Estimate	lead	.87 %	523,849		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves also reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.2 ZONE RESERVES (UNDERGROUND)	Historical Estimate	silver	40.8 g/t	61,122		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.1 ZONE RESERVES (UNDERGROUND)	Historical Estimate	silver	49.7 g/t	462,728		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - TOTAL RESERVES (UNDERGROUND)	Historical Estimate	silver	49.7 g/t	523,849		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves also reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.2 ZONE RESERVES (UNDERGROUND)	Historical Estimate	zinc	3.65 %	61,122		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.1 ZONE RESERVES (UNDERGROUND)	Historical Estimate	zinc	3.6 %	462,728		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - TOTAL RESERVES (UNDERGROUND)	Historical Estimate	zinc	3.65 %	523,849		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves also reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									
1969	HART RIVER - No.1 ZONE RESERVES (UNDERGROUND)	Historical Estimate	gold	1.41 g/t	462,728		No	No	Unknown
Reported as Proven Reserves. Figure reported in YGS Bulletin 9 by G. Abbott. Figure is reported to have been taken from Hart River Mines Ltd, 1969 Annual Report. Total reserves reported in Mineral Industry Report 1977, p. 22, and in Canadian Mines Handbook 1970-71 p.168.									