Occurrence Details

Occurrence Number: 115I 130
Occurrence Name: Carmacks Copper Zone 13
Occurrence Type: Hard-rock
Status: Deposit
Date printed: 12/16/2025 9:48:31 PM

General Information

Primary Commodities: copper, gold, silver
Aliases: Carmacks Cu Zone 13
Deposit Type(s): Porphyry Alkalic Cu-Au
Location(s): 62°20'2.4" N - 136°41'6" W
NTS Mapsheet(s): 115I07
Location Comments:
Hand Samples Available: No
Last Reviewed:

Capsule

Work History

The original Carmacks Copper property (aka, Williams Creek property) was staked as Boy cl 1-150 (Y51099) in Mar/70 by A. Arsenault & G. Wing and optioned in July by Dawson Range Joint Venture (Straus Exploration Inc, Great Plains Development Corporation, Marietta Resources International Ltd, Molybdenum Corporation of America and Trojan Consolidated Mines Ltd).

The main showing (No. 1 zone) was found by prospecting in Aug/70 and explored with bulldozer trenching and 2 x-ray holes (31.4 m) in 1970; soil sampling, I.P., EM and magnetometer surveying, bulldozer trenching, road construction and drilling of 25 holes (5 583 m) in 1971; bulldozer trenching and drilling of 8 holes (1 531 m) in 1972; and a legal survey in 1974. Great Plains dropped its interest in 1971. The Trojan interest was transferred to BX Development Ltd in late 1972.

In 1982, the property was purchased by Archer, Cathro and Associates (1981) Ltd which conducted bulldozer trenching in 1987 and optioned the property to Western Copper Holdings Ltd in Aug/89. Western Copper began baseline environmental studies and farmed out a 50% interest to Thermal Exploration Ltd. The joint venture added W cl 1-49 (YB26708) in Sep/89, and shipped 2 composite bulk samples totaling 2 700 kg for metallurgical testing, and drilled 3 holes (321.6 m) in 1990. A major exploration program in 1991 included drilling 34 holes (3 463 m); excavating twenty-two trenches (1 856 m); one hectare of stripping at the south end of the No. 1 Zone; 83.7 km of VLF-EM and magnetometer surveying; and baseline environmental studies commenced.

The first trenching and drill holes in Zone 13 were in 1992. That year the company staked the WC cl 1-76 (YB36689) and War cl 38-50 (YB36765) to the northwest and the W cl 87-99 (YB36925) were added to the south side of the property. The 1992 exploration program included 6.5 km of trenching, diamond drilling of 11 holes (3 781 m), percussion drilling of 11 holes (2 805 m), baseline environmental studies and numerous engineering, geotechnical and metallurgical studies. A 300 tonne test heap leach (grading 1.36% copper) and pilot plant was operated from September to Dec/93. Numerous surviving Dun, AC , W, X, and War claims were transferred to Western Copper Holdings Ltd in Apr/93.

In Sep/93 Western Copper Holdings contracted Kilborn Engineering Pacific Ltd to carry out a mining feasibility study of the Williams Creek property. In 1994 Western Copper began the permitting process and held preliminary economic development discussions with both the Yukon Territorial Government and the Little Salmon Carmacks First Nations. In Sep/94 Kilborn Engineering returned a positive feasibility study and Western Copper announced their intentions to place the property into production.

In Apr/95 Western Copper Holdings and Thermal Exploration announced their intention to amalgamate with Western Copper as the continuing entity. In Sep/95 Prime Equities International reached an agreement with Teck to acquire a controlling interest in Western Copper and the Williams Creek property. Prime announced that once the transaction closed it would take an active role in the management of Western Copper and assist it in raising capital to bring the Williams Creek property into production.

Western Copper Holdings continued geotechnical and engineering studies under the review process of the Canadian Environmental Assessment Act from 1996-1998. During 1997 the company also cleared the access road, leach pad and plant site and contracted Kilborn Engineering Pacific Ltd to carry out run-of-mine bulk sampling of the No. 1 zone 1 deposit. Leaching and decommissioning test work was then carried out by Beattie Consulting Ltd to provide a basis for predicting copper recovery and neutralization requirements.

Western Copper Holdings changed its name to Western Silver Corporation in March 2003. In May/2006, Glamis Gold Ltd bought out Western Silver and spun off the property to a new company, Western Copper Corporation. In 2006 Western Copper drilled 34 diamond drill holes (7 100 m), 10 of the holes (1 711.76 m) were in Zone 13. The company also completed 61 rotary air blast holes (1 200 m - none in Zone 13) and re-initiated environmental baseline studies. The diamond drilling targeted infill and deepening of Zone no.1 and exploration of Zone no.13.

Western Copper released an independent feasibility study in Apr/2007 which proposed an open-pit mine with acid heap leach and solvent extraction and electrowinning. Production was projected at 1.73 million tonnes of ore per year over a six-year mine life. The company's 2007 exploration program consisted of 17 000 m of diamond drilling in 123 holes (11 holes for 1 535.59 m in Zone 13), 845 m of geotechnical drilling in 34 holes (none in Zone 13), 31.7 line kilometres of induced polarization surveys and surveying of all drill hole locations including all the historical drill holes, geotechnical holes and rotary air blast holes.

In Nov/2007 Western Copper released an updated resource estimate for zones 1, 4 and 7 of the Carmacks Copper Project. Using a 0.25% total copper cut-off grade Wardrop Engineering Inc calculated that the project hosts an Oxide Resource Estimate of 11 980 00 tonnes in the Measured and Indicated categories containing 1.06 % total copper, 0.86 % oxide copper, 0.46 g/t gold and 4.6 g/t silver. The Sulphide Resource Estimate equals 4 340 000 tonne in the measured and indicated categories containing 0.75% total copper, 0.03 % oxide copper, 0.21 g/t gold and 2.3 g/t silver.

The Carmacks Copper Project received its Yukon Environmental and Socio-economic Assessment Board (YESAB) final Screening Report in Jul/2008 which recommended approval of the project subject to terms and conditions of the mitigative factors outlined in the report. In Sep/2008 the Yukon Government issued a Decision Document agreeing with the recommendations of the Yukon Environmental and Socio-economic Assessment Board that the Carmacks Copper Project proceed, signalling the completion of assessment process under the Yukon Environmental and Socio-economic Assessment Act. Geotechnical drilling, engineering studies and water sampling were conducted in 2008 in preparation for mine development. In Dec/2008 the company submitted an updated Water Use License application to the Yukon Water Board. In addition the company filed updated Quartz Mining License application with the Yukon Government's Department of Energy, Mines and Resources.

In Apr/2009 Western Copper received a Quartz Mining License from the Yukon Government for the Carmacks Copper Project. This license permits the company to build the Carmacks

Copper Mine and establishes many of the terms and conditions under which the mine will operate.

In May, 2010, the company was notified by the Yukon Water Board that the Water Use Licence application had been denied.

In Oct/2011 Western Copper Corp changed name to Western Copper and Gold Corporation and spun out Copper North Mining Corp, which retained the Carmacks Copper property.

In 2015, the company completed ground magnetic surveying, trenching in Zone 13. In 2016, they conducted trenching in Zone 13, but results were hampered by frozen overburden.

Capsule Geology

The Carmacks Copper property hosts 15 similar occurrences and the large Carmacks-Minto belt hosts others which resemble Carmacks Copper including Stu (Minfile Occurrence #115I 011), Minto (or Def, Minfile Occurrence #115I 021) and Minto North (Minfile Occurrence #115I 022).

The Carmacks Copper deposits are hosted in a series of elongate, N-NW-trending inliers of amphibolite facies mafic to intermediate meta-igneous rocks and migmatitic derivatives within generally massive granitoids of the Granite Mountain batholith (Kovacs et. al., 2020). Mafic rocks include foliated, equigranular amphibolite that locally is texturally transitional with less foliated, hornblende-porphyroblastic amphibolite. Rare augite gabbro is also locally present. Mafic rocks are interlayered with quartz-plagioclase-biotite schist. These metamorphic rocks are texturally transitional with migmatitic rocks, which host the bulk of hypogene copper mineralization. Migmatitic rocks occur preferentially along the eastern flank of the largest, 3-km-long by 20- to 100-m-wide inlier, where they represent a transitional intrusive contact between metamorphic rocks and the Granite Mountain batholith.

The Granite Mountain batholith includes K-feldspar megacrystic granodiorite and quartz diorite phases. These Granite Mountain batholith phases are typically undeformed, although a weak magmatic foliation is locally defined by the alignment of phenocrysts. Dikes of quartz monzonite, quartz monzodiorite, granite pegmatite, and aplite crosscut the metamorphic host rocks and other massive intrusive phases and are variably overprinted in the metamorphic rocks by folding and boudinage.

Hypogene copper mineralization is restricted to metamorphic host rocks, and occurs both as foliation-parallel chalcopyrite-dominant stringers in schistose rocks, and as net-textured bornite-chalcopyrite-dominant sulphides in the migmatitic rocks prevalent along the eastern margin of the metamorphic inlier. The latter style of mineralization is interpreted to form from a sulphide melt phase generated during partial melting of a previously mineralized protolith, during emplacement of the Granite Mountain batholith.

The Carmacks Copper No. 1 zone deposit extends over a 700 m strike length and at least 450 m down dip. At its south end the No. 1 zone appears to splay into the No. 7 and 7A zones and is pulled apart, or fault offset into No. 4 zone. The deposit is open at depth and is oxidized to approximately 230 m in depth. The copper mineralization in the oxidized portion of the deposit is predominantly malachite, tennorite and azurite.

The combined strike length from the northern end of Zone 1 to the southern tip of zone 12 is just over 2 km. The character of the Zone 1 deposit changes along strike leading to a division into northern and southern halves. The northern half is more regular in thickness, dip angle, width and down dip characteristics. The southern half splays into irregular intercalations, in zones 7 and 7A, terminating against sub-parallel faults down dip.

Zones 12 and 13 are similar in character and are located 1.2 km south of Zone 1. They occur over a strike length of 1.2 km and up to 100 m in width. The mineralization in Zones 12 and 13 is hosted by less mafic amphibolite and gneisses than those found in Zone 1. The gneisses are highly silicified and K-feldspar altered; the gneissic texture may be the result of alteration along closely spaced parallel planes, rather than the product of high strain. At present, it is unclear if there is a gap between Zone 12 and 13; further drilling should clarify this. In Zone 12, the mineral zones bifurcate and split into several parallel zones that are affected by post mineralization faulting, whereas Zone 13 is less disrupted.

Late Cretaceous andesitic to basaltic volcanic rocks, conglomerate and sandstone of the Carmacks Group is present in across the property in several areas, but most prominently affects mineralization in Zones 12, 13 and 14 where it forms a fault-bounded cover rocks. Thin mafic dykes that were feeders for Carmacks Group volcanic are uncommon.

Work History

Date	Work Type	Comment
12/13/2016	Trenching	
12/13/2015	Trenching	
12/13/2015	Ground Geophysics	
12/13/2008	Airphotography	
12/13/2007	Drilling	
12/13/2007	Other	
12/13/2007	Ground Geophysics	
12/13/2007	Other	
12/13/2007	Development, Surface	
12/13/1994	Geochemistry	
12/13/1994	Ground Geophysics	
12/13/1994	Ground Geophysics	
12/13/1992	Trenching	
12/13/1992	Drilling	
12/13/1992	Studies	
12/13/1992	Geochemistry	
12/13/1992	Geochemistry	
12/13/1992	Studies	
12/13/1992	Studies	

12/13/1991	Other	
12/13/1991	Ground Geophysics	
12/13/1991	Ground Geophysics	
12/13/1991	Development, Surface	
12/13/1972	Airphotography	
12/13/1972	Geology	
12/13/1972	Geochemistry	

Assessment Reports that overlap occurrence

Report Number	Year	Title	Worktypes	Holes Drilled	Meters Drilled
096851	2015	2015 Technical Assessment Report on the Geology and Geophysics of the Carmacks Copper Project, Yukon	Diamond - Drilling, Magnetics - Ground Geophysics, Backhoe - Trenching	35	3271
096688	2014	2014 Assessment Report for the Carmacks Copper Project	Diamond - Drilling, Soil - Geochemistry, IP - Ground Geophysics, Line Cutting - Other, Prospecting - Other, Mechanical - Trenching	15	1082.09
095081	2008	Air Photo Study of Surficial Geology of the Southern Access Route for the CARMACKS COPPER Project	Interpretation - Airphotography		
094984	2007	Assessment Report on the WS TOTAL Claims Target Evaluation Program	Gamma-Ray Spectrometry - Airborne Geophysics, Magnetic - Airborne Geophysics, Rock - Geochemistry, Soil - Geochemistry, Bedrock Mapping - Geology, Prospecting - Other		
094996	2007	2007 Assessment Report for the CARMACKS COPPER Project	All Weather Road - Development, Surface, Diamond - Drilling, IP - Ground Geophysics, Line Cutting - Other, Prospecting - Other	122	17830
094003	1998	[CARMACKS COPPER Report-Bulk Sampling, Geotechnical and Environmental Studies Compilation]	Rock - Geochemistry, Bulk Sample - Lab Work/Physical Studies, Column Leach Test - Lab Work/Physical Studies, Metallurgical Tests - Lab Work/Physical Studies, Data Compilation - Pre-existing Data, Research/Summarize - Pre-existing Data, Environmental Assessment/Impact - Studies, Geotechnical - Studies, Pre-feasibility - Studies, Handblast - Trenching, Mechanical - Trenching		
093083	1992	Biophysical Assessment Report of Williams Creek	Silt - Geochemistry, Water - Geochemistry, Data Compilation - Pre-existing Data, Biophysical Mapping - Studies, Environmental Assessment/Impact - Studies, Heritage/Archeological - Studies		
093100	1992	Assessment Report WILLIAMS CREEK Property	Diamond - Drilling, Reverse Circulation - Drilling	22	2017
093023	1991	Assessment Report WILLIAMS CREEK Property	All Weather Road - Development, Surface, Diamond - Drilling, EM - Ground Geophysics, Magnetics - Ground Geophysics, Metallurgical Tests - Lab Work/Physical Studies, Petrographic - Lab Work/Physical Studies, Line Cutting - Other, Environmental Assessment/Impact - Studies, Mechanical - Trenching	36	3463.75
093040	1991	WILLIAMS CREEK Copper Oxide Project	Metallurgical Tests - Lab Work/Physical Studies, Research/Summarize - Pre-existing Data, Environmental Assessment/Impact - Studies, Pre-feasibility - Studies, Resource Estimate - Studies		
060114	1972	Report on 1972 Geochemical Diamond Drilling and Trenching Program-WILLIAMS CREEK Property	Interpretation - Airphotography, Diamond - Drilling, Drill Core - Geochemistry, Soil - Geochemistry, Detailed Bedrock Mapping - Geology, Line Cutting - Other, Mechanical - Trenching	8	1530.71

Related References

Number	Title	Page(s)	Reference Type	Document Type
94-029	Carmacks Copper Project, 1994 Exploration Program		Yukon Government: Energy, Mines and Resources	YMEP Report
2016-097	2016 TECHNICAL ASSESSMENT REPORT ON THE GEOLOGY AND GEOPHYSICS OF THE CARMACKS COPPER PROJECT, YUKON		Yukon Government: Energy, Mines and Resources	YMEP Report

Resource/Reserve

Year	Zone	Type	Commodity	Grade	Tonnage	Amount	Reported Amount	43-101 Compliant	Cut-off
2016	Zone 13 Oxide (Undetermined)	Measured	copper	.35 %	1,501,000		Yes	Yes	.15% CuOx
NI43-101 report by JDS Energy and Mining, dated October, 2016									
2016	Zone 13 Oxide (Undetermined)	Measured	gold	.12 g/t	1,501,000	180120	Yes	Yes	0.15% CuOx
NI43-101 report by JDS Energy and Mining, dated October, 2016									
2016	Zone 13 Oxide (Undetermined)	Measured	silver	1.5 g/t	1,501,000	2551700	Yes	Yes	0.15% CuOx
NI43-101 report by JDS Energy and Mining, dated October, 2016									
2016	Zone 13 Transition (Undetermined)	Measured	copper	.23 %	286,000		Yes	Yes	0.15% CuOx

2016	Zone 13 Transition (Undetermined)	Measured	gold	.13 g/t	286,000	65780	Yes	Yes	0.15% CuOx
2016	Zone 13 Transition (Undetermined)	Measured	silver	1.7 g/t	286,000	486200	Yes	Yes	0.15% CuOx
2016	Zone 13 Oxide (Undetermined)	Indicated	copper	.3 %	315,000		Yes	Yes	0.15% CuOx
2016	Zone 13 Oxide (Undetermined)	Indicated	gold	.12 g/t	315,000	37800	Yes	Yes	0.15% CuOx
2016	Zone 13 Oxide (Undetermined)	Indicated	silver	1.3 g/t	315,000	409500	Yes	Yes	0.15% CuOx
2016	Zone 13 Transition (Undetermined)	Indicated	copper	.3 %	359,000		Yes	Yes	0.15% CuOx
2016	Zone 13 Transition (Undetermined)	Indicated	gold	.16 g/t	359,000	57440	Yes	Yes	0.15% CuOx
2016	Zone 13 Transition (Undetermined)	Indicated	silver	2.3 g/t	359,000	825700	Yes	Yes	0.15% CuOx
2016	Zone 13 Oxide (Undetermined)	Inferred	copper	.23 %	413,000		Yes	Yes	0.15% CuOx
2016	Zone 13 Oxide (Undetermined)	Inferred	gold	.11 g/t	413,000	45430	Yes	Yes	0.15% CuOx
2016	Zone 13 Oxide (Undetermined)	Inferred	silver	1.3 g/t	413,000	536900	Yes	Yes	0.15% CuOx
2016	Zone 13 Transition (Undetermined)	Inferred	copper	.34 %	106,000		Yes	Yes	0.15% CuOx
2016	Zone 13 Transition (Undetermined)	Inferred	gold	.12 g/t	106,000	12720	Yes	Yes	0.15% CuOx
2016	Zone 13 Transition (Undetermined)	Inferred	silver	1.8 g/t	106,000	190800	Yes	Yes	0.15% CuOx