Occurrence Details

Occurrence Number: 105O 063
Occurrence Name: Tom Southeast
Occurrence Type: Hard-rock
Status: Deposit
Date printed: 8/5/2025 6:35:07 PM

General Information

Primary Commodities: lead, silver, zinc
Secondary Commodities: antimony, barite, copper
Aliases: Tom
Deposit Type(s): Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)
Location(s): N - W
NTS Mapsheet(s): 105O01
Location Comments: based on drill collar of DDH TS078 in 2007 Roscoe-Postle Technical Report
Hand Samples Available: No
Last Reviewed:

Capsule

Work History
Staked as Tom cl 1-146 in Sep/51 by L. Seville and A. Lindsay for Hudson Bay Exploration and Development Company Ltd, which carried out geological mapping and hand trenching in 1951; drilled 37 holes (5435 m) from 1951-53; carried out geological mapping, geochemical sampling and magnetometer surveying in 1966; geochemical sampling and drilled 16 holes (3 233 m) in 1968; carried out 1809 m of drifting on the 1447.8 m (4 750 foot) level, drilled 75 underground holes (3 617 m), bulk sampling and metallurgical testing in 1970-71; geological mapping, geochemical sampling, EM and gravity surveying and bulldozer trenching from 1976-78; drilled 5 holes (587 m) in 1978 and drilled 15 holes (2295 m) in 1979. The claims were surveyed in 1953, leased in 1955 and renewed for a further 21 years in 1976.
Hudson Bay staked Tom cl 147-183 contiguously to the south in Aug/79 and carried out geological mapping, geochemical surveying in 1980 and 1981; magnetometer surveying and bulldozer trenching in 198l and 1983. The 1983 trenches, which failed to reach bedrock, were deepened in 1985. Hudson Bay also staked TS cl to the north in 1981 and explored with test pitting later in the year. Between 1980 and 1982, Hudson Bay completed part of a major feasibility study which included 120 m of drifting to rehabilitate the adit portal, drilling of 12 surface holes (1 457 m) and 18 underground holes (1 174 m), 923 m of decline, bulk sampling, engineering and environmental studies. Hudson Bay carried out minor trenching and a joint feasibility study with Aberford Resources Ltd in 1985.
Cominco optioned the property in Jul/88 and staked Tome cl 1-192 to the east in Aug/88, Jerry cl 1-26 in Oct/88 to the south, Mac cl 1-12 in Oct/88 to the north and carried out contour geochemical sampling of the Tome claims that year. Cominco remapped the property and began a program of surface drilling to test for extensions of the West and Southeast zones at depth. This program included 4 holes (2 226 m) in 1988, 4 holes (2 175 m) in 1989, 7 holes (3 578 m) in 1990 and 8 holes (2 882.7 m) in 1991. The 1991 holes tested peripheral geochemical and geological targets. More Jerry claims were added in Jul/90 and explored with contour soil sampling in 1991. Cominco dropped its option in Aug/92.
In 2002, HudBay Minerals resampled historic drillcore and performed talus sampling, but no assessment work was filed. HudBay Minerals Inc. purchased the property outright in 2006. In 2007, HudBay released an NI 43-101 Technical Report with a new mineral resource estimate for the Tom deposit.
In 2011, HudBay diamond drilled and ran one soil line across the Tom West deposit. Fireweed Zinc entered into an option agreement with HudBay in 2017 for the Jason and Tom deposits, which was fulfilled in 2018.
Work after 2016 is summarized in the work history tables.
Regional Geology
The property lies along the eastern margin of the Selwyn basin, a continental margin basin characterized by the deposition of thick shale sequences along with coarser grained, clastic sedimentary rocks and lesser carbonate rocks. This passive margin sedimentary sequence ranges in age from latest Proterozoic to Middle Devonian. The Selwyn basin sedimentary rocks are, in turn, overlain by a sequence of Late Devonian turbidites of the Earn Group. During the Cretaceous, several pulses of magmatism caused the emplacement of calcalkaline, intermediate to felsic plutons, stocks, and dikes.
The Tom stratibound lead-zinc deposits are hosted by the Portrait Lake Formation of the Devonian Earn Group, within an informal unit called the Tom Sequence (Goodfellow, 1991). The Tom Sequence comprises well banded carbonaceous and radiolarian chert, with some sandier intervals, barite nodules and pyrite laminae. It overlies sandy to silty laminated shales and siltstones of the MacMillan Pass Member, which are interpreted to have been deposited by deep water turbidites (Goodfellow, 1991). These MacMillan Pass shales and siltstones are interbedded with chert pebble conglomerates and diamictite, indicative of submarine slumping near syn-sedimentary faulting.
Mineralization at Tom occurs in three zones: Tom East (this MINFILE), Tom West and Tom Southeast. The mineralization varies from well laminated and stratiform settings to brecciated stockwork adjacent to the Tom normal fault. The Tom West and Tom East zones likely formed one continuous strata-bound controlled lens prior to folding and faulting of the Tom Sequence; the Southeast Zone is interpreted to have formed in a separate sub-basin from the Tom West and Tom East zones (Goodfellow, 1991).
The host rocks are believed to have been deposited in narrow grabens during Devonian rifting of the Cordilleran passive margin. The Tom deposits are confined to a small basin with a thickened isopach of the Tom Sequence rocks. The West zone and Southeast zone deposits appear to occupy two separate troughs flanking a narrow horst block formed of chert pebble conglomerate. Flanking sediments wedge out against the horst block and substantial differences in stratigraphy exist between the two troughs. The horst block separating the Tom West and Southeast zones coincides with a tightly folded north-south doubly-plunging anticline ('Tom anticline'). Detailed structural analysis by McClay (1983) revealed three phases of folding and faulting. The Tom anticline is a first phase structure which has been refolded by open second phase structures with east-west axes. Second phase folds are associated with low-angle thrust faults and have a well developed axial planar slaty cleavage. Third phase structures are open north-south folds which fold the second phase slaty cleavage. The deformation is related to folding and thrust faulting during the Late Jurassic and Early Cretaceous.
Four distinct ore facies are recognized in sequence away from the vent:
(1) The Vent facies consists of network pyrite-pyrrhotite-galena-sphalerite-ankerite-siderite-quartz veins with variable chalcopyrite, arsenopyrite and tetrahedrite. Brecciated sulphide textures and replacement of sedimentary barite, sphalerite and galena by pyrrhotite, pyrite and iron carbonate are characteristic, and grades of 15-30% Pb+Zn and 150-200 g/t Ag are common in the upper part. The lower parts are high in iron sulphides and siderite with 2-5% combined Pb-Zn.
(2) The Pink facies consists of interbedded barite, chert, cream coloured sphalerite, fine grained pyrite and black barium carbonate, silicified and overprinted by recrystallized multi-coloured sphalerite and coarse-grained galena and iron carbonate. Grades of 10-30% Pb+Zn are common in this facies.
(3) The Grey facies forms the largest part of the Tom West zone and consists of interbedded sphalerite, fine grained galena, pyrite, light grey chert, and abundant barite, barium carbonate and barium feldspar. The high barium content has diluted the lead and zinc grades, which typically run 0-2% lead, 4-5% zinc and negligible silver. The light grey colour reflects bleaching of organic matter from the chert.
(4) The Black facies consists of black chert and mudstone with fine laminae of sphalerite, galena, pyrite and barite-witherite. Grades are as low as 4-10% Zn+Pb in this zone, except for the upper few metres which grade low in silver and lead but contain 7- 12% Zn and were included in Hudson Bay's ore calculations. The contact between the black facies rocks and the enclosing sediments is gradational, and pyrite and minor sphalerite and barite laminae extend hundreds of metres into the overlying chert and mudstone.
The Tom East zone consists of a series of contorted fault-bounded pods of high grade laminated barite, chert, sphalerite and galena, near the hinge of the Tom anticline. Grades are approximately 22% Zn+Pb, and 165 g/t Ag.
ISOTOPIC WORK
Lead and strontium isotope ratios indicate that the metals are derived from a radiogenic crustal source, probably the Canadian Shield to the east. Fluid inclusions in quartz and siderite yield homogenization temperatures in the range 157 to 335°C, and an average salinity of 9.1 wt% NaCl-equivalent. Primary depositional and early diagenetic textures are well preserved.
J. Magnall researched the role of barite in sedex deposits, or as he terms them, clastic-dominated type mineralization. He concluded that sulfide mineralization at the MacMillan Pass deposits occurs entirely in the subsurface (Magnall, 2020). Diagenetic barite formed during burial of seafloor sediments and was overprinted by hydrothermal activity beneath the paleoseafloor.

Work History

Date	Work Type	Comment
12/1/2021	Geochemistry	
12/1/2021	Lab Work/Physical Studies	
12/1/2019	Ground Geophysics	
12/1/2019	Geochemistry	
12/1/2019	Drilling	1 hole, 330 m
12/1/2019	Geology	
12/1/2019	Geochemistry	
12/1/2018	Ground Geophysics	
12/1/2018	Geochemistry	
12/1/2018	Drilling	20 holes, 5497 m
12/1/2018	Geochemistry	
12/1/2018	Geology	
12/1/2018	Geology	
12/1/2018	Studies	
12/1/2017	Airborne Geophysics	
12/1/2017	Drilling	14 holes, 2202 m
12/1/2017	Airborne Geophysics	
12/1/2017	Geochemistry	resampled historic drillcore
12/1/2017	Remote Sensing	
12/1/2011	Drilling	11 holes, 1823 m
12/1/2011	Geochemistry	
12/1/2007	Studies	
12/1/1991	Drilling	Eight holes, 2,883 m. Drilled peripheral to geochemical and geological targets.
12/1/1990	Drilling	Seven holes, 3,578 m.
12/1/1989	Drilling	Four holes, 2,175 m.
12/1/1988	Geology	
12/1/1985	Trenching	
12/1/1982	Trenching	
12/1/1981	Geochemistry	
12/1/1981	Drilling	Thirty holes, 2,621 m. Twelve surface holes, 18 underground holes. Work started in 1980.
12/1/1980	Geochemistry	
12/1/1980	Geochemistry	
12/1/1980	Trenching	
12/1/1979	Geology	
12/1/1979	Ground Geophysics	
12/1/1979	Drilling	Fifteen holes, 2295 m
12/1/1978	Drilling	Five holes, 587 m.
12/1/1976	Geology	
12/1/1976	Geochemistry	
12/1/1976	Ground Geophysics	
12/1/1976	Trenching	
12/1/1970	Drilling	Seventy-five holes, 3617 m. Underground drilling
12/1/1970	Lab Work/Physical Studies	

12/1/1970	Development, Underground	Approximately 1809 m
12/1/1968	Drilling	Sixteen holes, 3233 m.
12/1/1966	Geology	
12/1/1966	Geochemistry	also rock sampling
12/1/1966	Ground Geophysics	
12/1/1951	Drilling	Thirty-seven holes 5,435 m. Drilled between 1951 and 1953.
12/1/1951	Geology	
12/1/1951	Trenching	

Related References

Number	Title	Page(s)	Reference Type	Document Type
1979-4	Geological Setting and Stratiform Lead-Zinc-Barite Mineralization of Tom Claims, MacMillan pass, Yukon Territory		Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Open File (Geological - Bedrock)
MIR1969_70	Mineral Industry Report 1969 - 70	p.129-130	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Geology	Annual Report
MIR1977	Mineral Industry Report 1977	p.33, 95	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Geology	Annual Report
MIR1978	Mineral Industry Report 1978	p. 9, 72	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Geology	Annual Report