



Occurrence Details

Occurrence Number: 095D 006
Occurrence Name: McMillan Main Zone
Occurrence Type: Hard-rock
Status: Deposit
Date printed: 8/5/2025 9:03:34 AM

General Information

Primary Commodities: lead, silver, zinc
Aliases: Quartz Lake
Deposit Type(s): Manto Polymetallic Ag-Pb-Zn
Location(s): 60°29'26" N - -127°56'34" W
NTS Mapsheet(s): 95D05
Location Comments: Location digitized from map in AR091083
Hand Samples Available: No
Last Reviewed:

Capsule

Exploration History

Apparently first discovered in 1892 by prospectors from the Cassiar Gold Fields and rediscovered by K. McMillan, who staked it as the Dorothy cl (15509) in Aug/30 and restaked as South Nahanni cl 1-50 (57465) and Dorothy cl (57470) in Oct/48. Noranda Exploration Company Ltd purchased the property in late 1948 and optioned it in 1949-50 to New Jersey Zinc Exploration Company Ltd, which hand trenched and drilled 4 holes (200 m).
The earliest fringe staking was Kic & Ski cl (60073) in July/50 on the north side of Noranda Lake by F.J. Shtlick & J. Urbanowski, who hand trenched in 1951. Prospectors Airways Company Ltd tied on the HR cl (68620) to the south in May/54 on behalf of a syndicate including Noranda and Kerr Addison Mines Ltd. The property was extensively fringe staked in Dec/65 as Red, Fort, etc cl (89489) by Redfort Prospecting Syndicate (Redstone Mines Ltd, Rayrock Mines Ltd, Elgin Petroleum Corporation Ltd and Fort Reliance Minerals Ltd), which conducted an airborne mag and EM survey in 1966 and 1967. During 1968, Fort Reliance Minerals Ltd acquired the interests of its partners and drilled 6 holes (583 m) on geophysical anomalies.
In 1951 Asarco Exploration Company of Canada Ltd joined the Noranda-New Jersey Zinc joint venture and a new company was formed, Liard River Mining Company Ltd. Both Asarco and Noranda later acted as operator at different times. Exploration consisted of 93 holes (7058 m) between 1951 and 1973, an IP survey in 1967, a geochem survey in 1970-72, a legal survey in 1972 which led to several claims being leased in 1973, the addition of QTZ and Strat cl (Y84112), a gravity survey and 27 holes (about 2530 m) in 1975, linecutting, soil sampling and CEM, VLF and gravity surveys on the new claims, plus 27 holes (2530 m) on the old claim block in 1976, 2 holes (265 m) on the east side of the main zone in 1977, 25 holes (1981 m) in 1980 and 6 holes (640 m), geological mapping, gravity and EM surveys in 1981 on the southeast side.
In 1990, Noranda conducted a two-phase program of soil sampling, followed by bulldozer trenching of anomalous areas (7 trenches - 810 m).
American Smelting and Refining Company and Liard River Mining Co Ltd conducted a reclamation program on the M 19 and South Nahanni 1 and 11 claims in Sept/93. In the succeeding years Liard River has allowed most of their claims to lapse. As of May/2002 the property consists of 18 claims which cover the actual deposit.

Capsule Geology

The McMillan zinc-lead-silver deposit contains 1.1 million tonnes grading 8.3% zinc, 4.1% lead and 62 g/t silver in a tabular, manto-like body near the top of the Neoproterozoic-lower Cambrian undivided Vampire and Narchilla formations. The Main Zone is 600 x 150 m in plan, 2 to 30 m thick, and dips gently east. A second deposit (the South Zone) occurring 300 m to the south contains reserves of 0.4 million tonnes grading 9.3% lead, 1.7% zinc and 214 g/t silver. These figures are not National Instrument 43-101 compliant thus they must be considered historical mineral resource estimates. The property is covered by extensive glacial drift up to 50 m thick, and only the edge of the deposit is exposed along Mine Creek.
Both concordant and discordant styles of mineralization are known. Massive sulphide mineralization at the discovery outcrop is clearly discordant and occurs along the sole of a low-angle fault which separates an upper package of quartzite and massive grey limestone from bleached, silicified and clay-altered phyllite. This fault, termed the 'Black Fault' by Noranda geologists, forms the base of the mineralized horizon in most of the drillholes. Discordant mineralization consists of galena, sphalerite and pyrite which fill tension fractures, form envelopes around small duplexes of sheared, silicified phyllite and occur in the matrix of a large pod of manganese-stained quartz-sulphide breccia.
Concordant, finely banded sphalerite, galena, siderite and minor sulphosalts reach an aggregate thickness of up to 15 m. Lateral continuity is limited and mineralization often terminates abruptly against barren or weakly mineralized limestone. However, sedimentary structures which resemble graded bedding and scouring appear to be preserved in the layered sulphides.
An epigenetic replacement origin is clearly indicated for at least the discordant mineralization on the McMillan property. J. Morin (Department of Indian And Northern Development) suggested that the McMillan deposit is similar to known replacement-type deposits of the Park City district, Utah. This is consistent with a lead isotopic age of 100 million years obtained for galena samples taken by P. Vaillancourt in 1981 and analysed under C.I. Godwin at University of British Columbia (Godwin et al, 1988). Fine banding and other structures in the layered sulphides have been variously interpreted as evidence of a syngenetic origin, or faithful selective replacement of clastic carbonate horizons.
The 1990 program tested the property for bulk tonnage gold potential, based on its proximity to the Hyland Gold deposit (Minfile Occurrence 095D 011). Soil sampling on the east side of the claim block outlined an 1100 x 700 m arsenic anomaly open to the east and south. Bulldozer trenching uncovered brecciated limonitic and pyritic quartzite and sheared graphitic quartzite which returned anomalous arsenic values (82 to 3298 ppm). However, no significant gold values were reported.

Work History		
Date	Work Type	Comment
12/31/1990	Drilling	Eleven holes, 1,552 m.
12/31/1990	Trenching	
12/31/1967	Geochemistry	
12/13/2017	Drilling	Nine holes, 2,114 m.
12/13/2017	Lab Work/Physical Studies	On ore.
12/13/2017	Geochemistry	
12/13/2017	Trenching	

12/13/2017	Geology	
12/13/2015	Remote Sensing	Entire property .
12/13/2015	Studies	
12/13/2014	Studies	Cover whole property .
12/13/2012	Pre-existing Data	Digitized all drill data.
12/13/1997	Drilling	Two holes, 361 m.
12/13/1997	Geochemistry	
12/13/1997	Ground Geophysics	Also magnetics, and gravity surveys.
12/13/1996	Drilling	One hole, 336.5 m.
12/13/1996	Geochemistry	
12/13/1995	Drilling	Two holes, 337.5 m.
12/13/1995	Ground Geophysics	
12/13/1994	Drilling	Six holes, 3,123 m.
12/13/1994	Geology	
12/13/1994	Geochemistry	
12/13/1994	Ground Geophysics	Also VLF and IP surveys.
12/13/1989	Drilling	Four holes, 638 m.
12/13/1987	Drilling	Seven holes, 2,012 m.
12/13/1985	Development, Surface	
12/13/1979	Drilling	Nineteen holes, 4,054 m. Drilling 1978-79.
12/13/1979	Ground Geophysics	
12/13/1977	Geology	
12/13/1977	Geochemistry	Also silt sampling .
12/13/1977	Ground Geophysics	Also gravity survey .
12/13/1975	Drilling	Ten holes, 1,404 m.
12/13/1974	Drilling	Eight holes, 548 m.
12/13/1973	Geology	
12/13/1973	Geochemistry	
12/13/1969	Airborne Geophysics	
12/13/1967	Trenching	
12/1/1968	Drilling	8 holes, 802.84 m
12/1/1956	Drilling	1 hole, 74.37 m
12/1/1955	Drilling	1 hole, 91.44 m
12/1/1954	Drilling	14 holes, 1371.30 m
12/1/1953	Drilling	18 holes, 932.63 m
12/1/1952	Drilling	13 holes, 733.99 m
12/1/1951	Drilling	7 holes, 346.56 m
12/1/1949	Drilling	7 holes, 198.64 m

Assessment Reports that overlap occurrence					
Report Number	Year	Title	Worktypes	Holes Drilled	Meters Drilled
093039	1984	[Drill Logs Prospectors Airways Liard R. Mining]	Data Compilation - Pre-existing Data		
090954	1981	Quartz Lake Project (McMillan Option) Summary Report	Orthophoto - Airphotography, Diamond - Drilling, Bedrock Mapping - Geology, EM - Ground Geophysics, Gravity Survey - Ground Geophysics, Line Cutting - Other	6	640
090710	1980	Assessment Report on Diamond Drilling on the M 18, 20, 25 Mineral Claims	Diamond - Drilling	5	523.95
090126	1976	Combined Geochemical/Geophysical Report	Soil - Geochemistry, EM - Ground Geophysics, Gravity Survey -		

090160	1970	Combined Geochemical/Geophysical Report	Ground Geophysics		
061600	1976	Preliminary Report on Gravity Survey Hulse Lake Yukon Project Yukon Territory	EM - Ground Geophysics, Gravity Survey - Ground Geophysics		
090055	1975	Evaluation of Gravity Data Hulse Lake Area, Yukon Territory for Noranda Exploration Limited	Gravity Survey - Ground Geophysics		
092015	1975	Summary Report Quartz Lake Project	Electromagnetic - Airborne Geophysics, Magnetic - Airborne Geophysics, Diamond - Drilling, Soil - Geochemistry, Bedrock Mapping - Geology, EM - Ground Geophysics, Gravity Survey - Ground Geophysics	27	2529.50
092014	1975	Geological/Geochemical Reconnaissance	Diamond - Drilling, Rock - Geochemistry, Silt - Geochemistry, Soil - Geochemistry, EM - Ground Geophysics, Magnetics - Ground Geophysics	17	1277.80
061188	1973	Report on Porker 1-54 Claims	Soil - Geochemistry, Detailed Bedrock Mapping - Geology, Line Cutting - Other, Prospecting - Other		
091083	1973	Report on McMillan Property Watson Lake Area Yukon Territory	Diamond - Drilling	4	1037.54
060920	1973	Report on Porker 1-54 Claims	Soil - Geochemistry, Detailed Bedrock Mapping - Geology, Line Cutting - Other, Prospecting - Other		
092568	1969	Report on McMillan Property Watson Lake Area Yukon Territory	Pre-feasibility - Studies		
092566	1968	Report on 1968 Diamond Drilling Program on ""Redfort Claims"" of Fort Reliance Minerals Limited	Diamond - Drilling, Soil - Geochemistry, Regional Bedrock Mapping - Geology, EM - Ground Geophysics, Gravity Survey - Ground Geophysics, Magnetics - Ground Geophysics, Prospecting - Other	6	584.30
060678	1967	Report on a Combined Helicopter-Borne Electromagnetic and Megnetometer Survey of Quartz Lake, Yukon Territory for Redfort Syndicate	Electromagnetic - Airborne Geophysics, Magnetic - Airborne Geophysics		
060677	1966	Geological Reports on the Redfort Group Comprising the Red, Fort, and Plus Claims (192 Claims)	Interpretation - Airphotography, Detailed Bedrock Mapping - Geology, Petrographic - Lab Work/Physical Studies		
092911	1951	[American Smelting And Refining Company, Quartz Lake Area, Yukon]	Cursory Property Visit - Other		

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC0085 18	Summary of properties - MacMillan		Property File Collection	News Release
ARMC0081 38	Recce geochem map - Cu, Pb, Zn - Acland Creek		Property File Collection	Geochemical Map
ARMC0081 39	Heavy mineral sampling map - Acland Creek - Anmac Project		Property File Collection	Geochemical Map
ARMC0081 41	Heavy mineral sampling map - Irons Creek - Anmac project		Property File Collection	Geochemical Map
2011-1	Bedrock geology of Coal River map area (NTS 95D), Yukon		Yukon Geological Survey	Open File (Geological - Bedrock)
YEG1981	Yukon Exploration and Geology 1981	85	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Annual Report
MIR1975	Mineral Industry Report 1975	154-155	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Annual Report
MIR1976	Mineral Industry Report 1976	188	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Geology	Annual Report
MIR1977	Mineral Industry Report 1977	75	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Geology	Annual Report
YEG1979 8 0-pg105	The McMillan Deposit - a stratabound lead-zinc-silver deposit in sedimentary rocks of Upper Proterozoic age, Yukon		Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Annual Report Paper
YEG1982-p g73	Geology of pyrite-sphalerite-galenite concentrations in Proterozoic quartzite at Quartz Lake, southeastern Yukon		Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Annual Report Paper
YEG1990-p g44	McMillan property, southeastern Yukon		Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Annual Report Paper
ARMC0132 54	Report on helicopter reconnaissance - Francis River Syndicate - August to Septemeber 1962 - Quartz Lake 95-D-12		Property File Collection	Report
ARMC0132 60	Prospecting map with field markings - Quartz Creek		Property File Collection	Geoscience Map (General)
ARMC0132 57	Air photo overlays of Quartz Lake area		Property File Collection	Geoscience Map (General)
ARMC0132 58	Mineral claims map - SN and M claims - Quartz Lake area		Property File Collection	Geoscience Map (General)
ARMC0132 59	Notes and sketch maps on the Quartz Lake area		Property File Collection	Miscellaneous Company Documents
ARMC0132 56	Quartz Lake - Photo interpretation legend and preliminary air photo interpretation		Property File Collection	Report

ARMC018634	Field map - Coal River area		Property File Collection	Geoscience Map (General)
ARMC013255	Field notes - Quartz Lake Camp		Property File Collection	Miscellaneous Company Documents

Resource/Reserve									
Year	Zone	Type	Commodity	Grade	Tonnage	Amount	Reported Amount	43-101 Compliant	Cut-off
1991	MCMILLIAN - SOUTH ZONE (UNDERGROUND)	Historical Estimate	zinc	1.7 %	400,000		No	No	Unknown
Figures based on internal reports produced by Noranda Exploration Company Ltd. Resource Type Not Defined. Not National Instrument 43-101 compliant.; Yukon Exploration 1990, p. 44. See also Assessment report #092920.									
1991	MCMILLIAN - MAIN ZONE (UNDERGROUND)	Historical Estimate	zinc	8.3 %	1,100,000		No	No	Unknown
Figures based on internal reports produced by Noranda Exploration Company Ltd. Resource Type Not Defined. Not National Instrument 43-101 compliant.; Yukon Exploration 1990, p. 44. See also Assessment report #092920.									
1991	MCMILLIAN - SOUTH ZONE (UNDERGROUND)	Historical Estimate	silver	214 g/t	400,000		No	No	Unknown
Figures based on internal reports produced by Noranda Exploration Company Ltd. Resource Type Not Defined. Not National Instrument 43-101 compliant.; Yukon Exploration 1990, p. 44. See also Assessment report #092920.									
1991	MCMILLIAN - MAIN ZONE (UNDERGROUND)	Historical Estimate	silver	62 g/t	1,100,000		No	No	Unknown
Figures based on internal reports produced by Noranda Exploration Company Ltd. Resource Type Not Defined. Not National Instrument 43-101 compliant.; Yukon Exploration 1990, p. 44. See also Assessment report #092920.									
1991	MCMILLIAN - SOUTH ZONE (UNDERGROUND)	Historical Estimate	lead	9.3 %	400,000		No	No	Unknown
Figures based on internal reports produced by Noranda Exploration Company Ltd. Resource Type Not Defined. Not National Instrument 43-101 compliant.; Yukon Exploration 1990, p. 44. See also Assessment report #092920.									
1991	MCMILLIAN - MAIN ZONE (UNDERGROUND)	Historical Estimate	lead	4.1 %	1,100,000		No	No	Unknown
Figures based on internal reports produced by Noranda Exploration Company Ltd. Resource Type Not Defined. Not National Instrument 43-101 compliant.; Yukon Exploration 1990, p. 44. See also Assessment report #092920.									

Drill core at YGS core library					
Number	Property	Year Drilled	Core Size	Photos	Data
DDH-115	McMillan	1975	BQ	0	2
DDH-94	McMillan	1975	BQ	0	2