



Occurrence Details

Occurrence Number: 105B 039

Occurrence Name: Logtung

Occurrence Type: Hard-rock

Status: Deposit

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General Information

Primary Commodities: molybdenum, tungsten, tungsten trioxide

Secondary Commodities: beryl

Aliases: Northern Dancer

Deposit Type(s): Porphyry W

Location(s): 60°0'19" N - -131°35'52" W

NTS Mapsheet(s): 105B04

Location Comments: .5 Kilometres

Hand Samples Available: Yes

Last Reviewed:

Capsule

Work History

Mineralization was first noted by the Geological Survey of Canada in the early 1950s but the first claims were staked in Sep/76 as Log cl 1-138 (YA11210) by Bath 1976 Uranium Partnership (W.M. Bath Investments Ltd, Scintine Mines Ltd and several individuals), which performed limited mapping and sampling in 1976 and formed a new company, Logtung Resources Ltd, to develop the property.

Amax Potash Ltd tied on Top cl 1-54 (YA11472) to the northwest in Oct/76, optioned the Logtung property, built a road, and explored with mapping, geochem and IP surveys, 51 holes (11 628 m), 496 m of decline and drifts, a 15 000 tonne bulk sample and preliminary engineering, metallurgical and environmental studies between 1977 and 1981. Logtung changed its name to Regional Resources Ltd and W.M. Bath Investments changed to Petromin Resources Corporation in 1982 and Amax's interest was transferred to Canamax Resources Inc in 1983.

Canamax dropped its interest in 1986 and the Log claims were transferred back to Logtung Resources in Sep/86. In Dec/92 the Barb and Log claims were transferred to 7188 Yukon Ltd.

In Jun/93, NDU Resources Ltd entered into an option agreement with Regional to obtain a 50% interest in the Yukon portion of the property. The agreement required NDU to evaluate the gold potential of the deposit and surrounding area over a 3 year period. In July and Aug/93, NDU conducted an exploration program which included prospecting, soil geochemical surveys and two diamond drill holes totaling 234 m. NDU dropped its option at the end of 1993.

The Barb and Log claims covering the deposit began to lapse in early 1998. Nordac Resources Ltd staked Dansar cl 1-6 (YB91322) in Jun/98. These claims covered the portion of the deposit located in the Yukon Territory. The company also staked claims in British Columbia to cover the portion of the deposit located in that province. During the summer of 1998 Nordac carried out a few prospecting traverses on the claims and began removing old drums which had been abandoned on the claims. In 2000 the company examined the beryl potential of the property and removed the remaining barrels.

In Mar/2001 Nordac staked Dansar cl 7-14 (YB93166). The company re-organized and changed its name to Strategic Metals Ltd in Jun/2001. Upon acquiring the Logtung property Strategic Metals began digitizing all previous exploration data. In Sep/2001 the company carried out a brief prospecting program to verify previous results. The company also staked Dansar cl 15-23 (YB93172). The digitizing program continued through 2002. In Aug 2003 the company carried out a small prospecting and hand trenching program.

Largo Resources optioned the property in 2006 and performed 3945 m of diamond drilling in 17 holes. A total of 26 holes (8494 m) were completed in 2007 and a total of 38 holes (11 500 m) in 2008. Drilling in 2008 tested the deposit downdip and added infill drilling in order to support an upgrade of the resource calculation for a prefeasibility study.

work history between 2008 and 2011 has not yet been updated.

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In march 2011, the company released a Preliminary Economic Assessment.

Capsule Geology

The property is located in south-central Yukon near the border with British Columbia. Recent geological mapping completed by geologists employed by the Ancient Pacific Margin NATMAP project; a projected jointly funded by the Geological Survey of Canada, the British Columbia Geological Survey and the Yukon Geology Program shows the area is underlain by mafic to intermediate volcanic and epiclastic rocks assigned to the Klinkit Succession. Recent age dating by Mortensen and Gabites (2002) has resulted in a Pennsylvanian age for the Klinkit Succession. Roots and et al., have recently assigned the Klinkit Succession to the Yukon-Tanana terrane.

The Klinkit Succession is intruded by a Triassic diorite stock flanked by numerous satellite dikes and a mid-Cretaceous monzonite stock accompanied by pegmatitic dike swarms and a slightly younger but apparently comagmatic felsic dike complex. Both ages of intrusions produced extensive hornfels halos and localized skarn horizons. Mineralization is hosted by an extensive, multi-episode vein system that is enriched in several metals, most notably tungsten and molybdenum. The vein system is centred on the felsic dike complex, and approximately 95% of the mineralization occurs within veins and fractures with the remainder found as disseminations within the felsic dike complex and skarn horizons. The veins crosscut all units and are believed to be genetically related to emplacement of the felsic dike complex.

The original mineralized showing found by the GSC consisted of blades of wolframite with purple fluorite, tourmaline, cosalite and beryl in a quartz vein cutting quartz monzonite. The main zone found nearby in 1976 consists of scheelite and molybdenite in a multi-stage stockwork vein system developed in a quartz porphyry plug, and disseminated in a vein stockwork which cuts garnet-diopside skarn and hornfels peripheral to a fluorite-rich quartz monzonite stock which intrudes cherty banded argillite and quartzite of Pennsylvanian age.

Mineralization is controlled by four overprinting stages of veining: (Type 1) quartz-molybdo-scheelite veins occurring up to 1.5 km away from the western edge of the monzogranite, but most well developed in calc-silicate rocks near the felsic dike complex at the north flank of the main stock; (Type 2) quartz-pyrite-scheelite proximal to felsic dikes; (3) quartz-moly in and near the felsic dikes; and (4) polymetallic sheeted veins.

Studies by Noble, Spooner & Harris suggest that this deposit has many similarities to classic porphyry Mo deposits and that the skarn minerals are incidental to the W-Mo mineralization, which is almost totally confined to porphyry-style crackle breccia.

The 1993 exploration program evaluated the deposit as a bulk tonnage gold target. The results of the soil geochemical survey were generally low, although four strongly anomalous values ranged up to 273 ppb Au. The chip and rock samples returned low values of gold. The two diamond drill holes were cored in diorite which contained minor pyrrhotite, pyrite, chalcopyrite, scheelite and molybdenite, primarily along fractures. Assay values of the drill core were low for all metals.

The 1998 prospecting program identified beryl in crushed material on the dumps from the underground development and in several narrow quartz veins on the periphery of the deposit. Specimens assayed up to 5.36% BeO, 4.60% WO₃ and 0.91% MoS₂. In 2000 the company collected a 20 kg composite sample of dump material to determine whether or not the dump contained economic amounts of beryl. Although the dump material was enriched in tungsten and molybdenum, the beryl content was low.

The 2001-2002 digitizing exercise allowed the company to plot all known geochemical results on a common 1:50 000 scale map. The results revealed that an area of strongly anomalous tungsten in soil values lies southwest of the defined deposit. Samples collected within the anomaly but outside of the deposit average 1577 ppm WO₃ compared to 240 ppm WO₃ from samples collected directly over the deposit. Further analysis of the data identified 5 areas (A-E) hosting sheeted veins and related pegmatite dikes which may host economic quantities of tungsten and/or molybdenum. The bulk of the prospecting and hand trenching was carried out in the vicinity of area C. The best chip sample returned 10.33% WO₃, 0.13% MoS₂, 1.88% bismuth and 8 ppm beryllium across 65 cm.

The work history between 2008 and 2011 has not yet been updated.

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A Preliminary Economic Assessment, dated march 2011, was prepared by AMC Mining Consultants for Largo Resources Ltd. The report states that a lower cut-off grade of 0.04% WO₃ was more appropriate than the 0.06% WO₃ cut-off grade used in the 2009 estimate, considering current metal prices and economic paramaters. The 2011 mineral inventory estimate, reported at a 0.04% WO₃ cut-off grade, contains Measured mineral resources of 37.2 million tonnes grading 0.10% WO₃ and 0.030% Mo, and Indicated mineral resources of 266.1 million tonnes grading 0.09% WO₃ and 0.03% Mo. Inferred mineral resources were estimated to be 241.9 million tonnes grading 0.06% WO₃ and 0.02% Mo. The financial projections associated with this preliminary economic assessment employ a mining rate for ore and waste of approximately 30M tpa for 23 years, for a total production of 545.2 Mt. During this time there will be sufficient ore stock piled to run the process plant for another 26 years once mining has stopped.

Work History

Date	Work Type	Comment
3/31/2011	Studies	Largo Resources PEA, 2011.
12/31/2008	Drilling	Thirty-eight holes, 11,500 m.
12/31/2007	Drilling	Twenty-six holes, 8,494 m.
12/31/2006	Drilling	Seventeen holes, 3,945 m.
12/31/2003	Trenching	
12/31/2003	Other	
12/31/2002	Pre-existing Data	
12/31/2001	Pre-existing Data	
12/31/2001	Other	
12/31/2000	Geochemistry	Collected 20 kg composite sample from dump piles.
12/31/1998	Other	Nordac carried out prospecting in conjunction with drum removal trips.
12/31/1993	Drilling	Two holes, 234 m.
12/31/1993	Geochemistry	
12/31/1993	Other	
12/31/1988	Lab Work/Physical Studies	
12/31/1981	Studies	
12/31/1981	Development, Surface	
12/31/1980	Geochemistry	Approximate 15,000 t bulk sample.
12/31/1980	Drilling	Eleven holes, 3,135 m.
12/31/1980	Development, Underground	Approximately 496 m of drifting and declines.
12/31/1977	Drilling	Fifty-one holes, 11,628 m.
12/31/1977	Geology	
12/31/1977	Geochemistry	
12/31/1977	Ground Geophysics	
12/31/1976	Geochemistry	
12/31/1976	Geology	
12/13/1977	Development, Surface	

Assessment Reports that overlap occurrence

Report Number	Year	Title	Worktypes	Holes Drilled	Meters Drilled
095322	2008	Exploration on the Northern Dancer Property	Diamond - Drilling, Drill Core - Geochemistry, Water - Geochemistry, Metallurgical Tests - Lab Work/Physical Studies, Environmental Assessment/Impact - Studies, Preliminary Economic Assessment - Studies	38	11509.78
095012	2007	Assessment Report on Year-2007 Surface Exploration and Diamond Drilling on the Northern Dancer Property	Diamond - Drilling, Diamond - Drilling, Detailed Bedrock Mapping - Geology, Environmental Assessment/Impact - Studies	52	16988
094774	2006	Assessment Report Describing Diamond Drilling at the Northern Dancer Property	Diamond - Drilling	17	3943.80
094521	2004	Assessment Report Describing Road Construction and excavator Trenching at the Logtung Property	All Weather Road - Development, Surface, Rock - Geochemistry, Backhoe - Trenching		
094303	2002	Assessment Report Describing Prospecting and Digital Data Compilation at the Northern Dancer Property	Prospecting - Other, Data Compilation - Pre-existing Data		
094158	1999	Sampling and Reclamation at the Northern Dancer Property	Environmental Clean-up - Development, Surface, Rock - Geochemistry, Rock - Geochemistry, Soil - Geochemistry		
093994	1998	Prospecting and Reclamation at the Northern Dancer Property	Environmental Clean-up - Development, Surface, Prospecting - Other		
093178	1994	Prospecting, Geochemical and Diamond Drilling Report NDU Resources Ltd. Logtung Property	Diamond - Drilling, Diamond - Drilling, Drill Core - Geochemistry, Historical Drill Core - Geochemistry, Rock - Geochemistry, Silt - Geochemistry, Soil - Geochemistry, Soil - Geochemistry, Prospecting - Other	4	468.20
090661	1980	[Diamond Drill Report on the Logjam Property]	Diamond - Drilling	3	813.20
091102	1979	[Drill Logs]	Diamond - Drilling	2	561.40
091101	1978	[Diamond Drilling Report Logtung Property]	Diamond - Drilling	4	903.50
092843	1977	[Diamond Drilling Report Logtung Property by Amax Minerals Exploration]	Diamond - Drilling, Diamond - Drilling	10	1573.40
091100	1977	[Drill Logs]	Diamond - Drilling	5	1241.10

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC007618	News release - Notes and and drill plan - Logtung project and Logjam Creek		Property File Collection	News Release
YEG197980	Yukon Geology and Exploration 1979-80	148-149	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Annual Report
YEG1981	Yukon Exploration and Geology 1981	98	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Exploration & Geological Services Division	Annual Report
MIR1977	Mineral Industry Report 1977	78	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Geology	Annual Report
MIR1978	Mineral Industry Report 1978	56-57	Indian & Northern Affairs Canada/Department of Indian & Northern Development: Geology	Annual Report

Resource/Reserve

Year	Zone	Type	Commodity	Grade	Tonnage	Amount	Reported Amount	43-101 Compliant	Cut-off
2011	Logtung (Open Pit)	Inferred	tungsten trioxide	.06 %	241,900,000		No	Yes	0.04% WO3
AMC Mining Consultants, PEA for Largo Resources , 2011.									
2011	Logtung (Open Pit)	Indicated	tungsten trioxide	.09 %	266,100,000		No	Yes	0.04% WO3
AMC Mining Consultants, PEA for Largo Resources , 2011.									
2011	Logtung (Open Pit)	Measured	tungsten trioxide	.1 %	37,200,000		No	Yes	0.04% WO3
AMC Mining Consultants, PEA for Largo Resources , 2011.									
2011	Logtung (Open Pit)	Inferred	molybdenum	.02 %	241,900,000		No	Yes	0.04% WO3
AMC Mining Consultants, PEA for Largo Resources , 2011.									
2011	Logtung (Open Pit)	Indicated	molybdenum	.03 %	266,100,000		No	Yes	0.04% WO3
AMC Mining Consultants, PEA for Largo Resources , 2011.									
2011	Logtung (Open Pit)	Measured	molybdenum	.03 %	37,200,000		No	Yes	0.04% WO3
AMC Mining Consultants, PEA for Largo Resources , 2011.									
			tungsten						

2009	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Inferred	tungsten trioxide	.089 %	201,200,000	178300	Yes	Yes	0.06% WO3
Snowden Mining Industry Consultants Inc.									
2009	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Indicated	tungsten trioxide	.1 %	192,600,000	191800	Yes	Yes	0.06% WO3
Snowden Mining Industry Consultants Inc.									
2009	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Measured	tungsten trioxide	.114 %	30,800,000	35100	Yes	Yes	0.06% WO3
Snowden Mining Industry Consultants Inc.									
2009	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Inferred	molybdenum	.024 %	201,200,000	48900	Yes	Yes	0.06% WO3
Snowden Mining Industry Consultants Inc.									
2009	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Indicated	molybdenum	.029 %	192,600,000	56100	Yes	Yes	0.06% WO3
Snowden Mining Industry Consultants Inc.									
2009	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Measured	molybdenum	.03 %	30,800,000	9100	Yes	Yes	0.06% WO3
Snowden Mining Industry Consultants Inc.									
2008	LOGTUNG - HIGH GRADE CORE (OPEN PIT)	Inferred	molybdenum	.023 %	18,700,000		No	Unknown	Unknown
This figure represents high grade WO3 zone. Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.14% WO3 cut-off grade.									
2008	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Inferred	molybdenum	.022 %	253,200,000		No	Unknown	Unknown
Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.06% WO3 cut-off grade.									
2008	LOGTUNG - HIGH GRADE CORE (OPEN PIT)	Indicated	molybdenum	.029 %	17,100,000		No	Unknown	Unknown
This figure represents high grade WO3 zone. Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.14% WO3 cut-off grade.									
2008	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Indicated	molybdenum	.026 %	140,800,000		No	Unknown	Unknown
Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.06% WO3 cut-off grade.									
2008	LOGTUNG - HIGH GRADE CORE (OPEN PIT)	Inferred	tungsten	.16 %	18,700,000		No	Unknown	Unknown
This figure represents high grade WO3 zone. Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.14% WO3 cut-off grade.									
2008	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Inferred	tungsten	.1 %	253,200,000		No	Unknown	Unknown
Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.06% WO3 cut-off grade.									
2008	LOGTUNG - HIGH GRADE CORE (OPEN PIT)	Indicated	tungsten	.17 %	17,100,000		No	Unknown	Unknown
This figure represents high grade WO3 zone. Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.14% WO3 cut-off grade.									
2008	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Indicated	tungsten	.1 %	140,800,000		No	Unknown	Unknown
Report available on SEDAR.; Largo Resources Limited: Northern Dancer Project Mineral Resource Estimate Update by Snowden Mining Industry Consultants Incorporated, p. 62-63. Using 0.06% WO3 cut-off grade.									
2007	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Inferred	molybdenum	.047 %	242,000		No	Yes	Unknown
Cut-off grade of 0.05% WO3; Snowdon Mining Industry Consultants Inc.									
2007	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Inferred	tungsten	.1 %	242,000		No	Yes	Unknown
Cut-off grade of 0.05% WO3; Snowdon Mining Industry Consultants Inc.									
1984	LOGTUNG - HIGH GRADE CORE (OPEN PIT)	Historical Estimate	molybdenum	.062 %	55,000,000		No	No	Unknown
Could not determine exact source. Tungsten = WO3, Molybdenum = MoS2; Source is uncertain but likely based on Canamax mining studies that were not filed with government. Data resided in Northern Cordilleran Mineral Inventory, predecessor to Minfile database.									
1984	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Historical Estimate	molybdenum	.052 %	162,000,000		No	No	Unknown
Reserve figure based on cut-off grade of 0.09% WO3, 0.04% MoS2. Higher tonnage figures have been published but don't give cut-off grade. Based on Canamax mining studies that were not filed with government.; Economic Geology. August 1984 p. 848-868. Also Canadian Mines Handbook 1983-1984.									
1984	LOGTUNG - HIGH GRADE CORE (OPEN PIT)	Historical Estimate	tungsten	.16 %	55,000,000		No	No	Unknown
Could not determine exact source. Tungsten = WO3, Molybdenum = MoS2; Source is uncertain but likely based on Canamax mining studies that were not filed with government. Data resided in Northern Cordilleran Mineral Inventory, predecessor to Minfile database.									
1984	LOGTUNG - TOTAL RESERVE (OPEN PIT)	Historical Estimate	tungsten	.13 %	162,000,000		No	No	Unknown
Reserve figure based on cut-off grade of 0.09% WO3, 0.04% MoS2. Higher tonnage figures have been published but don't give cut-off grade. Based on Canamax mining studies that were not filed with government.; Economic Geology. August 1984 p. 848-868. Also Canadian Mines Handbook 1983-1984.									