



Occurrence Details

Occurrence Number: 105I 053

Occurrence Name: OP

Occurrence Type: Hard-rock

Status: Deposit

Date printed: 12/16/2025 3:19:38 PM

General Information

Primary Commodities: lead, zinc

Aliases: Howards Pass, Selwyn Project, Op West

Deposit Type(s): Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)

Location(s): 62°35'52" N - -129°39'8" W

NTS Mapsheet(s): 105I12

Location Comments: Location from map in 2012 NI43-101 technical report

Hand Samples Available: No

Last Reviewed:

Capsule

Work History

Staked within a large block of OP claims (Y64837) beginning in Sep/72 by Canex Placer Ltd, a wholly owned subsidiary of Placer Development Ltd, following a 1971 regional geochemical program that led to the discovery of the Howard's Pass deposit (Minfile Occurrence 105I 012). The property was explored in a joint venture with Essex Minerals Company (U.S. Steel and Western Hemisphere Inc) with grid geochemical sampling and mapping in 1973 and 1974. The companies' staked additional OP claims in Oct/75, and April and May/76 and drilled 2 diamond drill holes (249.9 m) in the summer of 1976 and 7 diamond drill holes (583.7 m) in 1978. Essex's interest was transferred to Cygnus Mines Ltd in Apr/82.

An economic analysis completed at the end of 1982 by Placer and Cygnus concluded that mining the various Howard's Pass deposits was not economically viable at that time. Placer Development Ltd was amalgamated into Placer Dome Inc in Aug/87. Placer Dome performed cleanup work on the property in 1991.

In Jul/2000 Copper Ridge Explorations Inc acquired an option to purchase a 100% interest in the Howard's Pass property, including this occurrence. The agreement called for a 150 day due diligence followed by a pre-feasibility study. In Sep/2000 Copper Ridge signed a letter of agreement with Billiton Metals Canada Inc for a joint evaluation and possible development of the property. Billiton provided Copper Ridge with \$200,000.00 through a private placement, which Copper Ridge used to fund a diamond drill program. Copper Ridge collared 8 diamond drill holes (717 m) on the Anniv Central and Don (Minfile Occurrences 105I 037 and 068) showings as part of their due diligence. In Nov/2000 Billiton informed Copper Ridge that they would not proceed with the proposed joint venture. In Dec/2000 Copper Ridge failed to make a payment as required by the option agreement and the agreement was cancelled.

In May/2005 Pacifica Resources Ltd entered into a Letter of Intent to purchase a 100% interest in the Howard's Pass property for the sum of \$10 000 00 spread over 7 years and a commitment to spend a minimum of \$3,500,000.00 in exploration expenditures. The agreement was signed between Pacifica and Placer Dome (CLA) a wholly owned subsidiary of Placer Dome Inc (51% owner) and Cygnus Mines Ltd (49% owner). The agreement was formally approved in Aug/2005.

Pacifica Resources drilled 53 diamond drill holes (8,286.9 m) on the Howard's Pass property in 2005. Four holes (668.4 m) were collared on the OP zone to test historical soil sample anomalies and targets unveiled by new geological mapping. The company also carried out Dense Media Separation test work on grab samples collected during previous underground mining programs and from diamond drill core samples. Elsewhere on the property the company carried out regional mapping and soil sampling programs.

In Mar/2006 Barrick Gold Corporation acquired Placer Dome Inc. In May 2006, Barrick sold Placer Dome's 51% interest and other mines and exploration properties to Goldcorp Inc. In Jul/2006 Goldcorp sold Placer Dome's 51% interest in the Howard's Pass property to Terrane Metals Corp. During 2006, Pacifica completed 191 diamond drill holes (40,096.5 m). Six holes (919.4 m) targeted the OP showing. The company also continued Dense Media Separation test work, geochemical sampling, commenced baseline environmental and engineering studies and surveyed all previous drill hole locations, roads and grids in order to digitize and compile all historical geological data.

In Jan/2007 Pacifica released a preliminary economic assessment report for the development of the Howard's Pass project. The assessment indicated excellent potential for a long life mine, having large-scale, low cost zinc and lead production. The company used the results to help plan future exploration and engineering work.

On January 29, 2007 Pacifica Resources announced a plan of re-organization in which the Howard's Pass project would be spun off to a new company, Selwyn Resources Ltd and the company's remaining properties would be transferred to a new company Savant Exploration Ltd. Pacifica shareholders received shares in Savant Exploration as compensation for the transfer of assets from Pacifica to Savant. The agreement was approved on May 31, 2007 and completed on June 6, 2007 at which time control of the Howard's Pass property, commonly referred to as the Selwyn Project was transferred to Selwyn Resources and the charter of Pacifica Resources was cancelled.

In 2007, Selwyn collared 106 diamond drill holes (37,208.6 m) on the Selwyn Project. Five holes (767 m) targeted the OP showing and one hole (152.4 m) targeted the OP West showing. The company continued environmental and engineering studies, opened a new camp in the Don Valley and closed the camp located near the XY central zone.

On Jan 29, 2008 Selwyn Resources announced an initial mineral resource estimate for the newly designated OP and OP West zones (Pearson and O'Donnell, March 2008), which are still current as of March 2014 (this update). Selwyn collared 13 diamond drill holes (3,856.9 m) on the Howard's Pass property in 2008 and 10 diamond drill holes (4,214 m) in 2009. None of the holes targeted the OP and OP West zones.

In mid-2009 Selwyn opened discussions with various companies regarding the formation of a possible strategic partnership. The company announced in Dec/2009 that they had signed a binding Framework Agreement with Yunnan Chihong Zinc & Germanium Company Ltd (China), whereby both companies would form a joint venture company to hold all assets associated with the Selwyn project. In return for a 50% interest in the joint venture Yunnan Chihong deposited 100 million dollars in cash irrevocably to a bank account for the joint venture to use to fund development of the Selwyn project. As part of the agreement Yunnan Chihong agreed to fund all of Selwyn Resources direct costs incurred from July 1, 2009 on the Selwyn project.

On January 5, 2010 Selwyn Resources announced that they had engaged Wardrop Engineering Inc to start a Phase 1 work program leading to the completion of a National Instrument 43-101 compliant feasibility study on the Selwyn project.

On August 18, 2010 Selwyn announced the completion of the joint venture with Yunnan Chihong and the formation of a new company Selwyn Chihong Mining Ltd. Selwyn Resources transferred all Selwyn Project claims, equipment, permits and licenses to the new company. At the same time the joint management committee approved in principal a predevelopment budget of 89 million dollars for 2010 and 2011. The money will be directed to the advancement of permitting, completion of the feasibility study and related engineering and resource definition drilling various surface and underground deposits.

A September 2012 report by Kirkham Geosystems lists a global resource for the Selwyn Project, which includes the 2008 estimate for the OP deposits.

In 2014, Selwyn Chihong completed 55,000 m of drilling on a number of the deposits making up the project, upgraded the Howard's Pass access Road (HPAR), conducted baseline environmental studies and completed an updated Preliminary Economic Assessment (PEA).

In 2015, the company completed a Prefeasibility Study (PFS), secured a permit to widen the HPAR, continued the environmental baseline studies, drilled 10,000 m and completed a Socio-economic Participation Agreement (SEPA) with the Kaska First Nation.

From 2016 to 2022, the company conducted reclamation on many of the exploration and camp sites road and camp upgrades.

Capsule Geology

The project is located in Selwyn Basin, a region of deep-water offshore sedimentation that persisted from Late Precambrian to Middle Devonian time. Its basal deposits consist of late Precambrian rift-related clastic sediments. These are overlain by rift clastics of late Devonian age. On the north-eastern side of the project are time-equivalent shallow shelf strata of Mackenzie Platform. Along its southwestern margin is a Silurian to Devonian carbonate-clastic shelf of the Cassiar Platform. Its southwestern limit is essentially the limit of the miogeocline as presently preserved in the Yukon.

Regionally, Selwyn Basin stratigraphy overlies a basement of Upper Proterozoic to Lower Cambrian maroon to dark blue-grey weathering shale assigned to the Narchilla Formation of the Hyland Group. This unit is conformably overlain by the Upper Cambrian to Lower Ordovician Rabbitkettle Formation. The Rabbitkettle Formation is comprised of an Upper member consisting of grey weathering fine crystalline nodular limestone and a Lower member consisting of grey orange weathering, argillaceous to silty limestones usually limited to beds of less than 10 cm. Pacifica/Selwyn Resources report the presence of a Transition Formation between the Rabbitkettle Formation and the overlying Duo Formation. This unit, identified in drill core, consists of thin interaminations of grey limestone and buff coloured shale and is generally well cleaved.

The Transition Formation is overlain by the Ordovician to Middle Silurian Road River Group which is divided into the Duo Lake and Steel Formations. Various operators working in the area have locally renamed the Duo Formation the Howard’s Pass Formation and have subdivided it into various units. The local operators have divided the Duo Formation into five member units measuring 300 m thick. The lowest member is a pyritic siliceous shale member, which is overlain by a calcareous mudstone member and a lower cherty mudstone member. These members are overlain by the Active member, a heterogeneous mudstone, limestone, chert that hosts the region’s abundant sulphide mineralization in lamella within a poorly preserved graptolite horizon. An upper siliceous mudstone member tops the formation. The Steel Formation which measures approximately 140 m thick and consisting of a flaggy mudstone containing orange weathered siliceous argillite in beds 10-80 cm thick overlies the Howard’s Pass Formation.

The Road River Group is overlain by the Lower to Upper Devonian Portrait Lake Formation of the Lower Earn Group. The Portrait Lake Formation is comprised of a Lower, Middle and Upper member. The Lower Member consists of a dark brown weathering, silty shale and shale in beds up to 420 m thick. The Middle member consists of a black weathering, massive pebble conglomerate up to 195 m thick and the Upper Member consists of a gun-blue weathering black platy siltstone up to 260 m thick. The Portrait Lake Formation is overlain by the Upper Devonian to Middle Mississippian Prevost Formation of the Upper Earn Group. It also divided into Lower, Middle and Upper members. The Lower member consists of a grey weathering, dark grey, medium to coarse-grained chert-quartz sandstone up to 160 m thick. The Middle member consists of brown weathering, dark grey, thin bedded shale and siltstone measuring up to 90 m thick and an Upper member consisting of coarse-grained, poorly sorted, chert-quartz sandstone and conglomerate in beds up to 300 m thick. The entire sequence is intruded by various Middle to Late Cretaceous stocks and batholiths ranging in composition from intermediate to granitic assigned to the Selwyn plutonic suite.

Historical drilling and geological mapping carried out by Placer Development suggested that the Anniv and the XY (Minfile Occurrences 105I 037 and 012) sedimentary-exhalative deposits occurred in separate sub-basins along the base of a paleo-slope of the eastern Selwyn Basin. Later geological mapping and diamond drilling carried by Pacifica/Selwyn Resources indicated the lead-zinc mineralization hosted by the Selwyn project was part of a long-lived, single mineralizing event. As proof of this theory the companies reported that the sulphide textures, mineralogy and thickness are similar in each of the 15 deposits identified to date. The hydrothermal fluids that formed the different deposits are also isotopically identical throughout the property. The companies believe the strataform and tabular Active Member was affected by post-depositional structural deformation which likely accounts for the thickening and thinning of the Active Member across the property. Understanding the timing of the faults with respect to each other will aid future exploration programs in locating extensions of the known deposits and locating new resources.

Zinc and lead mineralization at the Selwyn project is hosted in the Active Member and consists of alternating layers of carbonaceous mudstone, limestone and chert, interlayered with stratabound laminated sulphide rich bands. The sulphides are fine grained and dominantly sphalerite and galena with minor pyrite. The mineralized horizon is generally 20 to 30 m thick and is texturally and mineralogically consistent throughout the property.

Metallurgical test work has confirmed that high-grade zinc and lead concentrate can be achieved. These concentrates have low levels of deleterious elements. Floatation test work indicates that a zinc concentrate grading 55 to 57% can be produced with an overall recovery of about 80% and a lead concentrate grading 65 to 70% lead with a recovery of approximately 70%. The ore will require fine grinding and floatation processing which will include the removal of carbon prior to producing high grade concentrates. Test work completed to date on the application of dense media separation indicates that simple gravity processing could provide an effective means of upgrading run-of-mine ores.

This occurrence consists of the OP zone (occurrence A) and the OP West zone (occurrence B). Both occurrences are located on the western end of the property approximately 30 km west of the Yukon-Northwest Territories border. Canex/Placer Development discovered zinc-lead mineralization similar to the XY deposit (Minfile Occurrence 105I 012) by prospecting in 1975. Follow-up diamond drilling targeted a series of surface showings located at the OP zone. The 1976 drill holes failed to reach their target depths. The 1978 drill holes were more successful with drill hole OP-8 intersecting 4.08% zinc and 1.04% lead over 4.6 m.

Pacifica/Selwyn Resources targeted their diamond drill program to test historical soil geochemical anomalies overlying favourable stratigraphy at the OP zone. Hole OP- 11 intersected 8.3 m grading 2.84% zinc and 1.50% lead. Later holes were completed away from known mineralization and either intersected the hanging wall or low level mineralization within the Active Member. Examination of drill core suggests that the Active Member could be intersected with deeper drilling. Drilling to date has shown that the OP zone dips moderately southwest and is cut by numerous imbricate southwest dipping faults that break up the zone. The OP zone is open in all directions. The OP West zone is located 3.5 km northwest of the OP zone and has been defined by a single drill hole (OP-017) drilled in 2006, which intersected 8.9 m grading 2.64% zinc and 0.85% lead. Although the grades of the OP and OP West zones are considered lower than other areas of the property, test work demonstrates that dense media separation provides an effective way to increase the over grade.

As of Jan/2008 Selwyn Resources calculated that the OP zone hosts an inferred mineral resource of 1,770,000 tonnes grading 4.18% zinc and 1.29% lead (report by Pearson and O'Donnell, March 2008). The OP West zone hosts an inferred mineral resource of 1 380 000 tonnes grading 2.67% zinc and 0.86% lead. Both calculations employ a 2% zinc grade cut-off.

As of Sep/2010 the entire Howard’s Pass property (consisting of 15 individual deposits) hosts an indicated resource (using a 2% zinc cut-off) of 154,350,000 tonnes grading 5.35% zinc and 1.86% lead and an inferred resource of 234,150,000 tonnes grading 4.54% zinc and 1.41% lead.

A September 2012 report by Kirkham Geosystems lists a global resource for the Selwyn Project, which includes the 2008 estimate for the OP deposits. Calculated at a 2% Zn cut-off grade, the Global INDICATED Mineral Resource for the Selwyn Project is calculated at 185,570,000 tonnes grading 5.2% Zn and 1.79% Pb for a contained total of 21.26B lbs (9.64B kg) Zn and 7.3B lbs (3.3B kg) Pb. The Global INFERRED resource is listed at 237,860,000 tonnes grading 4.47% Zn and 1.38% Pb for a contained total of 23.45B lbs (10.63B kg) Zn and 7.22B lbs (3.27B kg) Pb.

Work History

Date	Work Type	Comment
9/27/2012	Studies	Kirkham Geosystems, Sept 27 2012. Includes global resource for Selwyn Project.
3/14/2008	Studies	Pearson and O'Donnell, March 2008. Resource still current as of March 2014.
12/31/2010	Studies	
12/31/2007	Drilling	6 holes, 919.4 m. Five holes collared on OP zone, one hole collared on OP West zone.
12/31/2006	Drilling	6 holes, 919.4 m
12/31/2006	Lab Work/Physical Studies	Dense Media Separation testing of samples from OP zone.
12/31/2005	Drilling	4 holes, 668.4 m
12/31/2005	Geology	Property wide.
12/31/2005	Geochemistrv	Properly wide.

2008	OP WEST ZONE (OPEN PIT)	Inferred	zinc	2.67 %	1,380,000	36287389	Yes	Yes	2% Zn
Update Resource Estimate Report for the Selwyn Project Yukon-NWT, Canada (NTS- 105 I/6, 11, 12). Prepared for Selwyn Resources by C. Pearson and J. O'Donnell. Submitted March 14, 2008, p. 61.									
2008	OP WEST ZONE (OPEN PIT)	Inferred	lead	.86 %	1,380,000	13607771	Yes	Yes	2% Zn
Update Resource Estimate Report for the Selwyn Project Yukon-NWT, Canada (NTS- 105 I/6, 11, 12). Prepared for Selwyn Resources by C. Pearson and J. O'Donnell. Submitted March 14, 2008, p. 61.									
2008	OP ZONE (OPEN PIT)	Inferred	zinc	4.18 %	1,770,000	72574779	No	Unknown	2% Zn
Update Resource Estimate Report for the Selwyn Project Yukon-NWT, Canada (NTS- 105 I/6, 11, 12). Prepared for Selwyn Resources by C. Pearson and J. O'Donnell. Submitted March 14, 2008, p. 61.									
2008	OP ZONE (OPEN PIT)	Inferred	lead	1.29 %	1,770,000	22679618	Yes	Yes	2% Zn
Update Resource Estimate Report for the Selwyn Project Yukon-NWT, Canada (NTS- 105 I/6, 11, 12). Prepared for Selwyn Resources by C. Pearson and J. O'Donnell. Submitted March 14, 2008, p. 61.									