



Occurrence Details

Occurrence Number: 105I 032

Occurrence Name: HP Deposit

Occurrence Type: Hard-rock

Status: Deposit

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General Information

Primary Commodities: lead, zinc

Secondary Commodities: cadmium, copper, nickel, silver, vanadium

Aliases: Howards Pass, Selwyn Project, Shield

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

Location(s): 62°29'4" N - -129°12'59" W

NTS Mapsheet(s): 105I06

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Capsule

Work History

Staked in Oct/72 by Dynasty Explorations Ltd as Pas cl 1-32 (Y70563), and transferred early in 1973 to the Selwyn Project (Dynasty Explorations Ltd, Atlas Explorations Ltd, Shield Resources Ltd and Numac Oil & Gas Ltd) which conducted mapping and soil sampling later in the year and carried out trenching and 506.3 m drilling (4 holes) in 1974.

In Nov/72, A. Harman staked Envi cl 1-40 (Y70962) immediately to the northwest of the Pas claims, partially oversteaking them in the process. The Envi claims were subsequently acquired by Acheron Mines Ltd, which carried out geochemical soil sampling and geological mapping the following year.

In 1974 Shield Resources Ltd changed its name to Precambrian Shield Resources Ltd and Atlas changed to Cima Resources Ltd. Dynasty changed its name to Cyprus Anvil Mining Corp in 1975.

Restaked by W4 Joint Venture as the HP cl 1-31 (YB46381) in Feb/94. W4 carried out a cursory examination of the claims in Aug/94. In Dec/95, the W4 Joint Venture sold the HP claims to NDU Resources Ltd which merged with United Keno Hill Mines Ltd in Mar/98. Expatriate Resources Ltd purchased the claims from United Keno in the fall of 1998.

In 1999 Expatriate carried out claim surveys, geological mapping, grid soil sampling and hand trenching followed by reconnaissance prospecting and soil sampling programs in 2004. In Nov/2004 Expatriate Resources re-organized, with the company's Finlayson Lake properties being spun off to a new company; Yukon Zinc Corporation and the HP claims and all other non-Finlayson Lake claims being transferred to a new company called Pacifica Resources Ltd.

In May/2005 Pacifica Resources Ltd entered into a Letter of Intent to purchase a 100% interest in the surrounding Howard's Pass property. 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. The HP claims (this occurrence) were added to the project.

In 2005 Pacifica carried out an extensive regional exploration program on the Howard's Pass project which included geological mapping, geochemical sampling, camp construction and metallurgical testing. The company also collared 53 diamond drill holes (8,286.9 m). Three holes (724.68 m) were collared in the vicinity of the HP occurrence.

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 continued regional geological mapping and geochemical surveys, base line environmental studies and metallurgical testing. The company drilled 191 diamond drill holes (131,550.2 m) across the property. One hole was collared to test for mineralization on the HP claims but was lost due to poor ground conditions.

In Jan/2007 Pacifica released a preliminary assessment report for the development of the Howard's Pass project. The assessment indicates 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.

Selwyn Resources collared 106 diamond drill holes (37,208.6 m) in 2007. None of the holes targeted the HP claims. The company continued environmental and engineering studies, opened a new camp in the Don Valley and closed the XY camp located approximately 2 km to the southeast.

In Jan/2008 Selwyn announced a National Instrument 43-101 compliant mineral resource estimate for the newly designated HP deposit (Pearson and O'Donnell, March 2008), which remains current as of March 2014 (this update). During 2008 Selwyn drilled 13 diamond drill holes (3,856.9 m) on the Selwyn project. None of the holes targeted the HP deposit. The company continued comprehensive baseline environmental studies and a technical program focused on metallurgy, mining techniques and project infrastructure.

Selwyn Resources drilled 10 diamond drill holes (4,214m) in 2009, none of which targeted the HP deposit. The company continued engineering and geotechnical work in support of a pre-feasibility study and held discussions with various companies regarding the formation of a possible strategic partnership. In Dec/2009 Selwyn Resources announced 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. The company hopes to complete the study by the end of 2010.

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 from both surface and underground.

A September 2012 report by Kirkham Geosystems lists a global resource for the Selwyn Project, which includes the 2008 estimate for the HP deposit. 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 and completed 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 interlaminations 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 Dou 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 1051 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.

The HP deposit is located approximately 1.5 km northeast of the XP Central deposit (Minfile Occurrence 105I 012) and covers the northeast limb of the XY Central syncline that hosts the XY deposits. The original Selwyn Project joint venture group (mid-1970s) found a number of small sphalerite showings containing lesser amounts of galena along a west trending, steeply dipping horizon within the Active Member of the Ordovician to Middle Silurian Road River Formation. Assays from a 4 to 15 cm thick band of well mineralized black shale averaged 14.5% zinc, 4.0% lead and 4.1 g/t silver. Follow-up diamond drilling in 1974, intersected 6.1 m of 2.7 % zinc and 1.0 % lead in hole 74P-1 and 6.1m of 2.9 % zinc and 0.8 % lead in hole 74P-2.

The W4 Joint Venture staked their claims on the premise that part of the stratigraphy that hosts the XY deposits, including part of a higher grade core, may underlie the southern part of the HP property. Two silt samples collected from shallow streams underlain by black shales returned anomalous values for zinc and background values for lead and copper. The low values for lead and copper compared to those of zinc were thought to reflect the lower mobility of these elements in the local environment.

Expatriate’s soil sampling traced coincident and highly anomalous zinc and lead values along the trace of the Active Member, across the entire length of the claim block. The anomalous zone measures approximately 100 m wide and 3.5 km long, with the maximum recorded values of 17,600 ppm lead and 7,040 ppm zinc. Samples along this trend were also anomalous for cadmium (76.5 ppm), copper (487 ppm), nickel (504 ppm) and silver (7.6 ppm).

A second less distinct band of anomalous values was outlined approximately 500 m south and uphill from the Active Member trend. This trend lies on and immediately below Portrait Lake stratigraphy in an area not previously covered by detailed soil sampling. This area returned the highest zinc value (11 100 ppm) and anomalous values for vanadium (1 575 ppm), nickel (504 ppm) and cadmium (76.5 ppm). Expatriate also dug out several of Dynasty’s old trenches. A 3 m chip sample taken from calcareous silty mudstone, from trench TR-99 returned 1.29 % zinc and 3,680 ppm lead.

Diamond drilling carried out by Pacifica Resources in 2005 intersected the newly designated HP deposit with three drill holes (HP-001, 002 and 003).The holes were drilled on 500 m centres and all intersected Howard’s Pass (Duo Lake Formation) stratigraphy and the mineralized Active Member which supports Pacifica/Selwyn Resources Synclinal model. The best results were returned from hole HP-003 which returned 9.40 m grading 5.35% zinc and 1.44% lead (Pacifica Resources News Release - Oct 25, 2005). Based on the 3 successful drill holes collared in 2005 and the 4 holes drilled in 1974, Selwyn Resources reported in Jan/2008 a National Instrument 43-101compliant inferred mineral resource for the HP deposit of 6 180 000 tonnes grading 4.55% zinc and 1.23% lead (employing a 2% zinc cut-off)(report by Pearson and O'Donnell, March 2008).

The 2012 report by Kirkham Geosystems lists a global resource for the Selwyn Project, using a 2% Zn cut-off grade, of 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 7.3Blbs (3.3B kg) Pb in the INDICATED category and an INFERRED resource of 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 7.22Blbs (3.27B kg) Pb.

Work History		
Date	Work Type	Comment
9/27/2012	Studies	Kirkham Geosystems, Sept 27 2012.
3/14/2008	Studies	Pearson and O'Donnell, March 2008. Current as of March 2014
12/31/2010	Studies	Began feasibility study for entire Howard's Pass property.
12/31/2010	Pre-existing Data	Formed joint venture with Chinese company.
12/31/2007	Pre-existing Data	Prepared preliminary economic assessment for entire Howard's Pass project.
12/31/2006	Drilling	One hole collared on HP claims but lost due to poor ground conditions. Part of larger program.

12/31/2005	Drilling	3 holes, 724.68 m
12/31/2004	Other	Recooaisance scale.
12/31/1999	Geology	
12/31/1999	Geochemistry	Grid based soil sampling.
12/31/1999	Trenching	
12/31/1994	Geochemistry	
12/31/1994	Other	
12/31/1974	Drilling	4 holes, 506.3 m
12/31/1974	Trenching	
12/31/1973	Geology	
12/31/1973	Geochemistry	
12/1/2005	Geochemistry	
12/1/2005	Geology	
12/1/2005	Geochemistry	
12/1/2005	Geochemistry	
12/1/2005	Geology	
12/1/2004	Geochemistry	Reconnaissance scale.
12/1/1994	Geochemistry	
12/1/1973	Geochemistry	
12/1/1973	Geochemistry	
12/1/1973	Pre-existing Data	

Assessment Reports that overlap occurrence

Report Number	Year	Title	Worktypes	Holes Drilled	Meters Drilled
094657	2005	Assessment Report Describing Prospecting, Geochemical Sampling and Diamond Drilling on the Selwyn Project Property	Diamond - Drilling, Rock - Geochemistry, Silt - Geochemistry, Soil - Geochemistry, Bedrock Mapping - Geology, Regional Surficial Mapping - Geology	53	8285.72
094091	1999	Assessment Report Describing Geological Mapping, Geochemical Survey and Hand Trenching on the HP Claims	Soil - Geochemistry, Detailed Bedrock Mapping - Geology, Hand - Trenching		
093276	1994	Assessment Report Describing Prospecting and Geochemical Surveys on the HP 1-31 Claims	Silt - Geochemistry, Soil - Geochemistry		
091184	1974	Diamond Drilling 1974 Pas Claim Group	Diamond - Drilling	4	506.27
019820	1973	Application for Northern Mineral Assistance Grant Proposed Exploration Gull, Pas and Prevo Mineral Claims	Research/Summarize - Pre-existing Data		
061275	1973	Report on the Geology and Mineralization Summit Lake Area, Y.T. - N.W.T.	Silt - Geochemistry, Soil - Geochemistry, Regional Bedrock Mapping - Geology		
060115	1973	Geological and Geochemical Report Pas Claim Group	Rock - Geochemistry, Silt - Geochemistry, Soil - Geochemistry, Bedrock Mapping - Geology		

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC010549	Profile and assay results map - DDH 74-P2 & 3 - Selwyn project 1974 - Pas mineral claim group - NTS 105-I-6 - Figure 16		Property File Collection	Geoscience Map (General)
ARMC010086	Soil geochemical values map - Pas group		Property File Collection	Geochemical Map
ARMC010087	Pas group geochem values map - Zinc contours - Outside of Pas grid area - Selwyn project - Figure 5		Property File Collection	Geochemical Map
ARMC010089	Grid geology map - Selwyn project - Pas group - Fig. 6		Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC010090	Soil geochemical values and zinc contours grid map - Selwyn project - Pas group - Figure 3		Property File Collection	Geochemical Map
ARMC010091	Soil geochemical values and lead contours grid map - Selwyn project - Pas group - Figure 2		Property File Collection	Geochemical Map
ARMC010092	Geochem values map - Lead contours outside of Pas grid area - Pas group - Figure 4		Property File Collection	Geochemical Map

ARMC010537	Bulldozer trench P-3 - Selwyn project - Pas mineral claim group - Figure 8	Property File Collection	Geoscience Map (General)
ARMC010538	Bulldozer trench P-7 - Selwyn project - Pas mineral claim group - Figure 11	Property File Collection	Geoscience Map (General)
ARMC010539	Bulldozer trench P-2, 3, 5 - Selwyn project - Pas mineral claim group - Figure 7	Property File Collection	Geoscience Map (General)
ARMC010540	Bulldozer trench P-6, 7, 8 - Selwyn project - Pas mineral claim group - Figure 10	Property File Collection	Geoscience Map (General)
ARMC010541	Bulldozer trench P-12 - Selwyn project - Pas mineral claim group - Figure 14	Property File Collection	Geoscience Map (General)
ARMC010542	Geology and geochemical map of area surrounding Tap group - 105I-5	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC010543	Bulldozer trench P-9 - Selwyn project - Pas mineral claim group - Figure 13	Property File Collection	Geoscience Map (General)
ARMC010544	Bulldozer trench P-8 - Selwyn project - Pas mineral claim group - Figure 12	Property File Collection	Geoscience Map (General)
ARMC010545	Bulldozer trench P-5 - Selwyn project - Pas mineral claim group - Figure 9	Property File Collection	Geoscience Map (General)
ARMC010546	Profile and assay results map - DDH 74-P-4 - Selwyn project 1974 - Pas mineral claim group - Figure 17	Property File Collection	Geoscience Map (General)
ARMC010547	Detailed rock geochemical survey map - 105I-6 - Pas group soil grid	Property File Collection	Geochemical Map
ARMC010548	Profile and assay results map - DDH 74-P-1 - Selwyn project 1974 - Pas mineral claim group - NTS 105-I-6 - Figure 15	Property File Collection	Geoscience Map (General)
ARMC007987	Geochemistry map - Pas group	Property File Collection	Geochemical Map
ARMC007988	Map 6 - Soil grid value contours - Pas group	Property File Collection	Geochemical Map
ARMC008071	Compilation map outlining geology and mineral deposits in Selwyn Basin - Selwyn project	Property File Collection	Geochemical Map
ARMC016505	Geochem samples overlay maps - 105I/6 - With Selwyn project notes	Property File Collection	Geochemical Map
BROCK000105	Report on 1974 field work (geological, geochemical, bulldozer trenching, diamond drilling) - PAS mineral claim group	Property File Collection	Report

Resource/Reserve

[illegible]