Shorty Creek Project

Avalon Development Corporation
Summary Report 2012

The Shorty Creek property is located in the Livengood - Tolovana Mining District about 125 road-kilometers northwest of Fairbanks Alaska. The property lies about 4 kilometers south of the now-abandoned gold-mining town site of Livengood and the all-weather paved Elliott Highway. The Trans-Alaska Pipeline and the associated surface access corridor cross the Shorty Creek property. The Shorty Creek property is controlled by Tri-Valley Corporation through its subsidiary, Select Resources. The property consists of 335 State of Alaska mining claims covering 30,880 acres in two groups separated by the Trans-Alaska Pipeline. Approximately 4,480 acres of this land is leased from a private Fairbanks-based corporation while the remaining acres are owned 100% by Select Resources.

The Shorty Creek area is largely covered by sub-Arctic taiga forest consisting of black spruce, white spruce, birch and aspen. Elevations range from 150 meters along the Tolovana River, to 660 meters on the hilltops. This part of Alaska was not glaciated during the Pleistocene however, the project area was near the southwestern terminus of continental ice and winds from this cold ice mass deposited a variably thick layer of aeolian silt over much of Interior Alaska, including the Shorty Creek project area.

Placer gold was discovered on Livengood Creek in 1914 and placer mining has been conducted in the district on a nearly continuous basis since that time. Total recorded production from the district through 2007 is approximately 530,121 ounce of gold, all from placer operations. The Shorty Creek project is located on the south side of the Tolovana River. With the exception of Wilber Creek, also located on the south side of the Tolovana River, the most productive creeks in the district are located on the north side of the Tolovana River valley. Total placer production from the Wilber Creek valley is unknown but likely less than 50,000 ounces.

The Shorty Creek prospect was originally located as an antimony prospect in 1972. It was re-evaluated as a copper-molybdenum prospect by Earth Resources in 1972 and was reportedly drilled in several locations prior to 1974. No technical data remains from this work. Public sector mineral evaluations between 1979 and 1984 indicated that copper, gold and arsenic mineralization was exposed in road cuts on the Alyeska Pipeline access road on what is now the southwestern extension of the Hill 1835 prospect. The Shorty Creek prospect was staked in 1984

and leased to Fairbanks-based Fairbanks Exploration Inc. who conducted exploration on the project in 1985 through 1990, the latter three years under a joint venture with Asarco Inc. These efforts included soil and rock sampling and a total of 6,843.5 feet of reverse circulation drilling in 20 holes. Total cost of these programs was approximately $400,000. Fairbanks Exploration terminated their interest in the project which was subsequently acquired by Fairbanks-based Gold Range Ltd. Little substantive exploration was conducted until 2005 when California-based Select Resources acquired a lease on the project. During 2005 Select conducted a top of bedrock soil sampling program over the Hill 1835 prospect. A total of 566 soil samples were collected along with 21 grab rock samples collected while soil sampling was under way. Additional non-field related work included digital compilation and evaluation of geological, geophysical, geochemical, GIS and remote sensing data. This work was conducted before, during and after the field program. No drilling has been conducted on the project since 1990.

The Shorty Creek project is located within the Livengood Terrane, a belt of Paleozoic through Cretaceous sedimentary, metamorphic and intrusive rocks which is bounded on the north by the northeast trending right lateral Kaltag fault and the northwest trending right lateral Tintina fault. On the south the Livengood terrane is bounded by the regionally extensive Yukon Tanana Terrane. Rocks of the Shorty Creek project are hosted within the Wilber Creek unit, a folded sequence of Early Cretaceous flysch sediments which form the youngest bedded rocks in the project area. The principal Wilber Creek flysch lithologies exposed on the Shorty Creek project include black carbonaceous siltstone, gray feldspathic sandstone and silty sandstone, black shale and polymict conglomerate. The Wilber Creek flysch disconformably overlies a thrust package of south dipping Lower Paleozoic carbonates, volcanics and pelitic rocks which host the +20 Moz Livengood gold project located about 5 miles north of the Shorty Creek project. A variety of small intermediate igneous bodies occur within and peripheral to the Shorty Creek project. Biotite granodiorite is the most abundant intrusive rock type seen on the property. An Ar^{40}/Ar^{39} age date of 62.8 ± 0.4 Ma was reported from white mica in mineralized intrusive rocks exposed on Hill 1835 prospect. Limited fluid inclusion data from a granitic pluton on the south side of Wilber Creek indicated the presence of high $C0_2$, high salinity fluids.

The dominant structural elements of the Shorty Creek property are compression-related, generally northwest directed, northeast-trending thrust faults and northeast striking folds. Folds with axes parallel to the northeast-trending Wilber Creek valley are examples of this style of deformation. Rocks of the Wilber Creek flysch are folded into open to recumbent isoclinal folds and subsequently cut by northeast and north-south structures, the largest of which are the Minto and Ranney Hollow faults, two north-south striking left lateral faults with significant vertical offset. The Minto fault bounds a broad topographic lowland immediately west of the project area, and remains active to the present.

Previous work has indicated that biotite hornfels and lesser diopsidic hornfels are widespread in the area. Limited petrographic work has been conducted to confirm that the term "hornfels" is properly applied to the altered rocks on the Shorty Creek project however, the term is used in this report for historical continuity. Limited XRD and XRF analytical results from the State Div. of Geological and Geophysics Surveys from the “hornfels” at Hill 1835 prospect indicate no evidence of contact metamorphism. Results indicate that altered rocks on Hill 1835 have been hydrothermally altered with significant introduction of quartz, arsenic, bismuth, tin

and tungsten. Field evidence suggests that hornfelsing/hydrothermal alteration precedes brecciation and mineralization. Previous mapping indicates that hornfels/hydrothermal alteration occurs at the Shorty Creek Cu-Mo prospect, on 1835 prospect, on the flanks of Hill 1870 and in the Hill 2161 area on the southern end of the Shorty Creek project. Although very little intrusive rock is exposed on the Shorty Creek project the widespread and often intense hornfelsing/hydrothermal alteration of the sediments, particularly in the Hill 1835 area, suggest a significant size intrusive nearby.

Outcrop exposures containing anomalous gold mineralization were discovered at the Hill 1835 prospect in 1985. Subsequent field activities revealed anomalous gold, silver, mercury, zinc, copper, molybdenum and arsenic in RC drill chips, grab rock and trench rock samples collected in 1985, 1986 and 1988 through 1990. Highly anomalous Au, As, Bi, Te, S, Sn and W were detected in top of bedrock soil samples collected on Hill 1835 in 2005. Other areas with anomalous Au, Cu, As, Sb or Mo include the old Shorty Creek Cu-Mo prospect, Hill 1890 east of Ranney Hollow, Hill 1870 on the south side of the pipeline corridor, Hill 2161 at the head of Eagle and Wilber Creeks and the lower eastern flank of Wilber Creek valley.

The most intense hydrothermal alteration and anomalous metal geochemistry at Shorty Creek is concentrated at the Hill 1835 prospect. The protolith host rocks at Hill 1835 were shale and siltstone of the Wilber Creek flysch which subsequently were contact-metamorphosed(?) to a dense light to dark brown biotite-diopside rock. Later vein and flood silicification is accompanied by variable crackle to matrix-supported brecciation. Rubble and outcrop of this hornfels/hydrothermal alteration unit contain large (1 cm) cubic molds after pyrite, often partially filled with limonite. In drill chips, disseminated and fracture-controlled pyrite, pyrrhotite, chalcopyrite, arsenopyrite and bornite have been identified (along with numerous secondary oxide minerals). In total, the area of hornfels/hydrothermal alteration, silicification, brecciation and geochemical enrichment covers a northeast-trending area measuring 1700 meters by 600 meters. Mineralization remains open under Quaternary cover on both ends.

Mineralization at Hill 1835 prospect is often accompanied by arsenopyrite-quartz veinlets and disseminated pyrite and arsenopyrite. Significant drill intercepts at Hill 1835 prospect include 220 feet grading 1.216 gpt gold in hole RH8908, including 25 feet grading 4.577 gpt gold, 60 feet grading 0.800 gpt gold in hole RH9016, 25 feet grading 1.707 gpt gold in hole RH9017 and 55 feet grading 1.035 gpt gold in hole RH9019. Drill results indicate that deeper portions of the system contain arsenopyrite-pyrite-chalcopyrite stockwork veinlets along with local disseminated pyrite, chalcopyrite and rare bornite. Gold values tend to be higher near the tops of the drill holes. Widespread pervasive sericite(?) or clay(?) alteration appears to overprint all other alteration and mineralization styles, resulting in a pale yellow to tan “bleached” appearance in altered host lithologies. Outcrops of matrix supported breccia often are restricted to one or more mappable lithologic horizon, indicating possible stratigraphic control of at least a portion of the gold mineralization present. Chemically favorable stratigraphic units are well documented in skarn and replacement deposits around the world however, recent research has demonstrated the importance of host rock porosity and permeability in relation to gold mineralization in the Great Basin of the western United States. Drilling results indicate that the hornfels alteration on Hill 1835 is “dipping” shallowly to the southeast and overlies less altered or unaltered sediments of the Wilber Creek flysch. Given the lack of evidence for low angle

faulting and recent XRF analyses, this geometric arrangement suggests that the Hill 1835 mineralization represents sulfide-bearing mineralization in stratabound or bedding plane replacement zones along permeable horizons in a high-sulfidation epithermal(?) gold-copper±silver system.

A comparison of salient features of intrusive-related gold (IRG) and porphyry Cu-Au-Mo deposits demonstrates that many of the important alteration and mineralization features of a typical IRG deposit are shared by porphyry Cu-Mo-Au deposits. However, in every characteristic that is not common to both deposit types, the data suggest that the operant model at Shorty Creek is a porphyry Cu-Au-Mo system instead of an IRG.

Post-mineral faulting on the north-south trending Minto and Ranney Hollow faults and on the Steel Creek lineament and the other northeast trending structures has offset alteration and mineralization in a consistent sense across all three alteration/mineralization zones. Three-dimensional modeling of magnetic data indicates a strong central magnetic low with highly magnetic bodies surrounding it on the north. The buried magnetic highs may be related to Cu-Fe skarn mineralization developed in Lower Paleozoic carbonates which regional and district-scale mapping indicate dip south under the Wilber Creek flysch sequence.

If this over-all deposit model is correct, and if post-mineral structural deformation has not significantly deformed the actual footprint of the alteration/mineralization, the Shorty Creek project porphyry system covers an area approximately 8 miles in diameter. Zoning of this scale is not uncommon in large porphyry systems such as Bingham District, Utah (5-6 miles), Central Mining District, New Mexico (+10 miles), Los Bronces, Chile (5 miles), Chuquicamata (+10 miles). While the interpretations of this report represent a departure from previous thinking about the Shorty Creek project area, this is the first time a single study has been able to incorporate all of the available data. Previous investigators focused on individual parts of the larger system, but did not recognize these parts as being integral pieces of a larger porphyry copper-gold-molybdenum system.

Potential exists at Shorty Creek for significant grade-tonnage accumulations of Cu-Mo-Au porphyry mineralization. Tri-Valley Corp. is seeking to option the property to a financially and technically capable party interested in conducting future exploration and development on the project.

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