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# TECHNICAL REPORT on the SNOWFIELD PROPERTY Skeena Mining Division British Columbia, Canada

Latitude 56° 29' North by Longitude 130° 12' West

- Report Prepared For -

## SILVER STANDARD RESOURCES INC.

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## **EXECUTIVE SUMMARY**

The Snowfield property is situated within the Sulphurets district in the Iskut River region, approximately 20 kilometres northwest of Bowser Lake or 65 kilometres north-northwest of the town of Stewart, British Columbia. The geographic centre of the property is at 56°29' North latitude by 130°12' West longitude or U.T.M. Zone 09 (NAD 83) at 6264193 m North by 434777 m East; within N.T.S. map sheet 104B/9 East.

The author was retained by Silver Standard Resources Inc. ('Silver Standard') in August 2007 to conduct a mineral resource estimate of the Snowfield zone, situated in the northern portion of the Silver Standard claim holdings, following the guidelines of the Canadian Securities Association National Instrument 43-101. This work involved: a property visit during August 2007, examination of the Snowfield occurrence, verification sampling, data validation, construction of a geological resource model, and estimation and classification of NI 43-101-compliant mineral resources according to the guidelines set out by the Canadian Institute of Mining, Metallurgy and Petroleum Resources (CIM).

The Snowfield property is comprised of seven mineral claims, totalling 4,466.7 hectares, and covers an area measuring 10 km north+south by 4 km east-west. In 1999 Silver Standard purchased the entire mineral claim interests of Newhawk Gold Mines. In December 2006 Silver Standard re-organized the claim ownership and sold all the Snowfield mineral claims to 777666B.C. Ltd., a wholly-owned subsidiary of Silver Standard. Silver Standard Resources Inc. remains the operator of the property.

The property is accessible via a 30-minute flight in a chartered helicopter from the town of Stewart, British Columbia. It is located in the Boundary Ranges of the Coast with elevations ranging from 1,000 to 1,960 m A.M.S.L. There are no local resources other than abundant water for any drilling work.

Historic exploration of the Sulphurets-Mitchell Creek area dates back to 1933 when placer gold miners worked on Sulphurets Creek. This early work led to the later discovery of many copper-gold and gold-silver occurrences in the area, including the Sulphurets, Kerr and Mitchell copper-gold porphyry-related deposits and the Brucejack, West Zone and other epithermal gold-silver vein deposits. Various operators, including Granduc Mines, ESSO Minerals, Newhawk Gold Mines and International Corona Corporation, have explored the Snowfield area prior to its acquisition and exploration by Silver Standard.

The Snowfield property is situated along the western margin of the Intermontene tectonic belt, underlain by Lower Jurassic andesitic volcanic rocks that correlate with the 'Upper Andesite' unit of the Unuk River Formation from the lower portion of the Hazelton Group. These rocks are interpreted as being a marine volcanic back-arc sequence forming a moderately northwesterly-dipping sequence of predominantly andesitic autochthonous breccia flows, and lithic, crystal and lapilli tuffs that have been regionally altered to a lower greenschist facies prior to local hydrothermal-related alteration and mineralization. Both the pervasive quartz-sericite-pyrite (+ chlorite, calcite, garnet) alteration and precious metal-bearing sulphide mineralization of the Snowfield zone are inferred to be spatially and genetically associated with ascending hydrothermal fluids from one or more buried alkalic intrusions in the immediate vicinity.

The 2006 and 2007 drilling programs within the Snowfield zone have now traced the gold-bearing mineralization, grading in excess of 0.5 gpT gold, over an area measuring 615 by 460 metres and to a vertical depth of more than 300 metres. Gold grades in excess of 2 gpT occur from surface to a depth of 75 to 125 metres, baneath which there is mineralization of 1 to 2 gpT gold extending for another 15 to 185 metres forming an elongate east-west 'bowl' or 'keel' shape that plunges northwesterly. Beneath the 1.0 gpT gold

Technical Report on the Snowfield Property, Skeena Mining Division, British Columbia, Canada Minorex Consulting Ltd. April 21, 2008

grade shell, there is a 25- to 125-metre transitional zone of 0.5 to 1.0 gpT gold mineralization that appears to dissipate with depth.

Gold mineralization occurs as microscopic electrum grains encased within fine-grained, disseminated and fracture filling pyrite with trace amounts of galena and sphalerite. Tetrahedrite-tennantite, barite, acanthite, minor manganese-rich calcite and rare chalcopyrite also occur spatially associated with the gold mineralization. Weakly disseminated and minor fracture filling molybdenite mineralization, commonly associated with tourmaline, is widespread and common throughout the Snowfield zone, and appears to have been emplaced during an earlier hydrothermal event. Chalcopyrite mineralization with minor sphalerite and galena increases with cepth coincident with a stratigraphic facies change from medium-grained andesitic volcaniclastics and breccias to fine-grained ash-crystal-lithic tuffs.

The Snowfield zone has now been tested with 51 diamond drill holes, totalling 13,117 m, for which there are survey, lithology and/or assay data. In addition, Silver Standard has tested the adjacent Coffgepot zone with six drill holes and the nearby Mitchell East zone with one drill hole. The results of this work indicate that the Snowfield zone continues to be open for expansion laterally and vertically; although it appears to have been down-dropped to the east and west by strike-slip movements on the Brucejack and Snowfield faults respectively. Considerably more drilling will be required to define the lateral and vertical limits of the Snowfield gold mineralization and complete in-fill testing for revised mineral resource estimation.

The 2007 dalling on the adjoining Coffeepot zone did not intersect significant gold or copper mineralization to confirm the western extension of the Snowfield zone. Future testing of this zane may require closer spaced drilling than that undertaken to date. The one drill hole on the Mitchell East zone returned a 258.77-metre intercept grading 0.713 gpT gold and 0.14% copper, including a 31.14 m section grading 1.377 gpT gold and 0.31% copper. This intercept indicates that the porphyry-related copper-gold mineralization of the adjoining Mitchell East zone has excellent exploration potential for discovering significant porphyry-related copper-gold mineralization.

### Mineral Resource Estimates

Details of the estimation procedure are summarized below:

- The mineral resources were estimated using a geological model constructed from 51 drillholes that penetrated the Snowfield zone and 15 surface trenches that were re-sampled in 2006.
- A database was constructed in Gemcom from the channel sampling and drilling results that were provided by Silver Standard Resources Inc. Multi-element analytical results for 9,544 samples accompanied the data; however, only gold resources were addressed in the resource study. The database has been subjected to quality assurance checks and is suitable for resource estimation.
- Gold values were composited into 1.5-metre intervals. The compositing process yielded 8,610 1.5metre composites which were utilized for the mineral resource estimation. The remaining composites occur beyond a 0.5 gram per tonne gold grade shell used for the study.
- The geological model was constructed by plotting a 0.5 gpT gold grade shell around mineralized intercepts on vertical drill sections spaced 25 metres apart and oriented north-south across the mineralized zone, and then joining the two-dimensional plots to form three-dimensional solids. The

Technical Report on the Snowfield Property, Skeena Mining Division, British Columbia, Canada

results of this work were four solids, one large main body and three smaller, down-dropped solids as eastern extensions.

- Statistical analyses of the gold assays indicated grading capping at the 99.4 percentile resulting in a grade cap of 6.8 gpT gold.
- Density data from the 2006-07 drill core and laboratory specific gravity determinations were utilized to assign an average specific gravity of 2.82 g/cc for the Snowfield gold-bearing mineralization.
- Block models were created for: Rock Type, Density, Percent and Gold, plus additional models for Distance (i.e. distance to the closest composite, true distance model) and Classification (i.e. flag model for resource classification) using a 10- by 10- by 5-metre block size.
- The block models were interpolated using an 'Inverse Distance Squared' methodology. Interpolation
  of gold grades into a block required a minimum of 3 composites with a maximum of 12 composites.
  The models were interpolated in a single pass.
- Resource classification was based upon true distance from a block to the nearest composite. Interpolated blocks within 15 metres of composite samples from re-sampled surface trenches with near-surface drill hole composite samples were given the highest confidence level and considered 'measured'. Elsewhere, interpolated blocks with only drill hole intercepts and within true distances of 0.0 to 50.0 metres were classified as 'indicated' resources and interpolated blocks within true distances of 50.0 to 75.0 metres were classified as 'inferred' resources. Blocks beyond the 75.0metre maximum distance for inferred resources were not classified or reported in the resource estimates.

The following mineral resources for the Snowfield zone are estimated at a cut-off grade of 0.5 grams per tonne gold.

Category	Tonnes (in thousands)	Gold Grade (g/t)	Gold Grade (oz/ton)	Contained Gold (troy ounces)
Measured	1,450	2.177	0.063	101,500
Indicated	77,122	1.200	0.034	2,975,600
Measured and Indicated	78,572	1.218	0.035	3,077,100

Category	Tonnes	Gold Grade	Gold Grade	Contained Gold
	(thousands)	(g/t)	(oz/ton)	(troy ounces)
Inferred	14,350	1.010	0.029	466,200



#### Figure 4: Mineral Deposits and Occurrences of the Sulphurets District

(After Burk, 2007)

The exploration work by Silver Standard on the Snowfield zone in 2006 included: diamond drilling 27 NQ-2size holes (6,141 m), drill core logging and sampling (3,948 samples were shipped to ALS-Chemex for geochemical analysis), re-sampling two of the 1991 drill holes (115 samples) and fifteen of the previously excavated shallow trenches (126 m, 64 rock samples).

The 2006 drilling and rock sampling results indicated that the gold values are associated with pyrite and molybdenite in quartz veinlets hosted by quartz-sericite altered intermediate volcanic rocks. Drilling over an area of 450 by 300 metres delineated a flat-lying gold-bearing zone averaging 150 m thick. The gold intercepts demonstrate a high level of consistency between holes, all but three returned from 1.0 to 2.0 gpT gold over lengths of 100 to 250 m (Wojdak, 2007).

According to a 43-101 compliant mineral resource study carried out by McCrea (2007), the measured and indicated resources of the Snowfield zone were estimated at 49.4 million tonnes grading 1.48 gpT gold and 0.021% MoS<sub>2</sub> (0.012% Mo) at a cut-off grade of 0.5 gpT gold. At the same cut-off grade, inferred resources were estimated at 14.7 million tonnes grading 1.41 gpT gold and 0.020% MoS<sub>2</sub> (0.012% Mo). McCrea (2007) recommended continued exploration to test the open lateral and vertical extensions of Snowfield zone mineralization with surface trenching, rock sampling and 13,750 metres of diamond drilling.



## 8 MINERALIZATION

The gold mineralization of the Snowfield zone is hosted by schistose, pervasively altered (quartz-sericitechlorite) volcanic and volcaniclastics that contain 1 to 5 percent disseminated pyrite, minor disseminations / and veinlets of tourmaline and molybdenite, and abundant younger calcite veinlets.

Gold mineralization occurs as microscopic grains ( $\leq$ 30 microns) of electrum that are encased within finegrained, pervasively disseminated pyrite in close association with trace amounts of galena and sphalerite (Margolis, 1993). Other associated minerals within the gold-mineralized zone include: tetrahedrite-tennantite, barite, acanthite, minor Mn-rich calcite and rare chalcopyrite. Minute clusters, approximately 75 microns, of pyrite and rutile (<u>+</u> barite) are also observed within the gold-bearing mineralization (Margolis, 1993).

Molybdenite mineralization appears to have been emplaced during an earlier hydrothermal event. Pyritetetrahedrite veinlets from the gold-bearing mineral assemblage are observed cutting molybdenite veinlets. Weakly disseminated and minor fracture filling molybdenite mineralization is widespread and common throughout the Snowfield zone and nearby area. Fine-grained tourmaline crystals are often associated with molybdenite in quartz veinlets (Margolis, 1993).





**Note:** QSP = quartz-sericite-pyrite alteration facie; QSCP = quartz-sericite-calcite-pyrite alteration facie.

Hydrothermal alteration within the Snowfield zone includes quartz-sericite-pyrite with varying amounts of chlorite, calcite and garnet. The dark reddish-brown, rounded garnets are < 7 mm and appear to have been crystallized during the gold mineralizing event(s). They are probably of hydrothermal in origin as they are well fractured and exhibit deformational features consistent with the tectonic event that caused the deformation, alteration and schistocity of the host rocks (Margolis, 1993).



Photograph 7: Mineralized drill core from DDH SF-23; marked intercept from 4.57 to 15.24 m. (Modified after Burk, 2007)

Greater than 1.0 gpT gold mineralization has been traced on surface for 450 metres northeasterly by 350 metres northwesterly, and drilling has shown the zone is up to 225 metres thick (see Figure 7). The highest gold grades (> 2.0 gpT gold) are at surface, yielding is excess of 2.0 to 3.2 gpT gold. This layer is 75 to 125 metres thick. The 1.0 to 2.0 gpT gold grade shell is at least 15 to 185 metres thick and appears to have an elongate east-west 'bowl' or 'keel' shape that plunges northwesterly. Beneath the 1.0 gpT gold grade shell, a 25- to 125-metre transitional zone of 0.5 to <1.0 gpT gold grade shell is well developed in the eastern portion of the zone but quite spotty or absent in the extreme western limits of the known mineralization. Beneath the < 0.5 gpT gold cut-off shell, the predominately aphanitic tuffs average 0.32 gpT gold over 78.22 metres. The deepest intersection from hole SF-23 averaged 0.35 gpT gold over 224 metres, however, some individual gold assays were as high as 1.14 gpT towards the bottom of the hole (Burk, 2007).

Page | 26



Page | 37

above the north side of Mitchell Glacier, north of the Snowfield zone (see Figure 4). According to B.C. Geological Survey (Minfile No. 104B 173, 2008), "The 500 by 1500-metre Iron Cap zone is a large area of well-exposed, intensely and pervasively quartz-sericite-pyrite altered intrusive and volcanic rock located in the northeast corner of the claim block. Alteration is controlled by northeast-trending, near-vertical structures with associated stockwork fractures and veins. Pyrite content varies from 10 per cent to 70 per cent and averages about 25 per cent. To the west, the intense quartz-sericite-pyrite alteration of the Iron Cap zone gradually weakens and primary intrusive textures can be observed. Mapping by Noranda has delineated a northeast trending intrusion intermittently exposed over 200 by 800 metres now referred to as the Iron Cap West zone. This zone is a strongly altered granodiorite, laced with a fine- to medium-grained quartz stockwork of varying intensity. Fracture coating and disseminated chalcopyrite and malachite, with minor pyrite, occurs throughout the intrusion. Forty partially leached rock chip samples collected by Noranda over an area of 1200 by 300 metres from the Iron Cap West and adjacent Iron Cap zone averaged 1.0 gram per tonne gold and 0.32 per cent copper (Press Release, Seabridge Gold Inc., July 25, 2005)."



(Modified after Seabridge, 2008)

Photograph 9: View of the Mitchell East and Snowfield Zones looking eastward.

According to Seabridge (Press release, March 25, 2008), deep exploration drilling has been proposed during the 2008 field season to test for gold-copper mineralization between the Mitchell and Iron Cap prospects.

Sample	Au	ST	Cu	Мо
ID	gpT	%	%	%
SF-03-A	3.66	4.27	0.040	0.02
SF-03-B	1.45	2.94	0.030	0.01
SF-03-C	1.02	3.56	0.030	0.01
SF-11-A	3.24	3.26	0.040	0.02
SF-11-B	1.37	3.10	0.030	0.02
SF-11-C	0.96	2.50	0.030	0.01
SF-12A	3.04	3.26	0.020	< 0.01
SF-12-B	1.19	2.21	0.010	<0.01
SF-12-C	0.93	2.46	0.010	< 0.01
SF-17-A	3.68	4.59	0.030	0.01
SF-17-B	1.49	3.89	0.020	0.01
SF-17-C	0.99	3.02	0.020	< 0.01
Comp A	2.33	4.91	0.029	0.01
Comp B	1.46	4.79	0.029	0.01
Comp C	0.99	4.54	0.025	0.01
CompA+B+C	1.57	4.75	0.028	0.01

On the twelve original composites using a moderate grind, the whole ore cyanide leach recoveries varied from 71% to 88% Au, with one lower exception at 64%. Additional work on the blended composites showed similar gold recoveries averaging ~75%. Further studies on various flotation products and using carbon in leach ('CIL') cyanidation procedures did not offer any significant improvement to the overall recovery. Incorporation of pre-treatment methods and establishing the response at finer grinds is recommended in order to evaluate if further improvements using cyanidation can be accomplished.

Bulk rougher flotation provided gold recoveries in a range of 73% to 88%, which is similar to the whole ore cyanidation. There is a relatively low gold grade in the cleaned bulk concentrate due to a low mass concentration ratio that relates to the relatively high sulfide (pyrite) content of the feed. The cleaned bulk float concentrate from Comp SF-12-B produced the highest gold content at 115 g/t, due to having the lowest sulfide content of the samples, and having a relatively high gold to sulfur ratio. The remaining cleaned bulk concentrates ranged from 70 g/t or less for higher head grade composites, to less than 40 g/t for most of the lower head grade composites tested.

On the master composite (Comp. A+B+C) differential flotation procedures were performed to first produce a copper concentrate (with molybdenum). This provided a moderately higher gold content of 67 g/t, into a copper concentrate but at a lower gold recovery. Gold not recovered to the copper concentrate can report to a scavenger (pyrite) concentrate, but with grades of less than 10 g/t Au after cleaning. The low head grade of the copper and molybdenum in the samples tested would likely not permit production of a suitable base metal concentrate grade typically needed for by-product credit. Flotation as a stand-alone process will be challenging for optimizing the grade recovery relationships, but warrants further investigation."

According to Silver Standard (2008), there has been no further metallurgical work since the above mentioned study.

Technical Report on the Snowfield Property, Skeena Mining Division, British Columbia, Canada Minorex Consulting Ltd.

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April 21, 2008





#### **Descriptive Statistics**

	A22		
Mean	.8113		
25th %-ile	0.25		
Median	0.5		
75th %−ile	1.06		
Minimum	0		
Maximum	14.55		
count	9544		
St Dev	0.85		
Coef of Var	1.05		





Page | 47





Technical Report on the Snowfield Property, Skeena Mining Division, British Columbia, Canada Minorex Consulting Ltd.

April 21, 2008







## 3.0 2006 QA/QC BLANKS

Silver Standard used well fractured argillite as blank material for this part of the QA/QC program. The argillite was collected in the field from a barren outcrop. The blanks were inserted on a 1 in 20 basis. The assays of the blank material show that there is some very minor gold contamination of the blank material and one or two sample mix-ups. The blanks overall show no anomalous values for gold or molybdenum. The results of the analyses for the blanks are in Figures 5 and 6.



Figure 8: Duplicate Samples – Mo ppm Scatter Plot

Figures 9 and 10 are plots of the mean of the duplicate pair plotted against the relative percent difference. The molybdenum chart shows a lot of scatter as is seen in the scatter plot and this scatter the author believes is related to the style of mineralization. The gold distribution is tighter than the molybdenum but both show no apparent bias.