TECNICAL REPORT ON THE BERENGUELA PROPERTY

SOUTH-CENTRAL PERU

Mineral Concessions: Berenguela and Berenguela 97

Geographic Coordinates
Centred at Approximately:
15° 40' S
70° 34' W

Peruvian (NTS) Map Area Lagunillas 32-U
2005-10-04

Prepared for
Silver Standard Resources Inc.

By
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SUMMARY

The Berenguela Property consists of two mineral concessions totalling 141.33 hectares. Berenguela is located in southern Peru, in the department of Puno, approximately 50 kilometres west of the city of Juliaca and six kilometres northeast of the town of Santa Lucia. The property is vehicle accessible year round. The concessions are held by Sociedad Minera de Berenguela S.A. (SOMINBESA), a private company registered in Peru which is held 100% by Fossores Ltd., a holding company registered in the Cayman Islands. Silver Standard Resources Inc. (Silver Standard) has an option agreement with SOMINBESA and Fossores Ltd. to purchase a 100% interest in the silver resources contained on the Berenguela Property.

The Berenguela Deposit has seen exploration and production since colonial times with the most period from 1906 to 1965 when it was the property of the Lampa Mining Company. Production from underground workings and small surface pits totalled approximately 500,000 tonnes. After Lampa Mining the property was the subject of various agreements with ASARCO and Charter Mining that were not completed or dropped. In January of 1972, the property was awarded to Minero Peru as special rights. The Ministry responsible for Minero Peru sold the rights to the property to Kappes, Cassiday & Associates of Reno Nevada who subsequently formed the SOMINBESA to manage the project.

The Berenguela deposit, as it is presently known, consists of several lenses and pods of potentially economic Ag-Cu (-Mn) mineralization that occur within a WNW-trending block of metasomatically altered carbonate rocks which has dimensions roughly estimated at 1,400 m long by 400 m wide by 100 m thick. Individual, well-mineralized pods or lenses are anticipated to have maximum dimensions of less than 100 meters.

Silver Standard completed an RC drilling program on the Berenguela Property in 2004 and 2005. The program entailed 222 RC drill holes with the objective of delineating the mineralization of the Berenguela Deposit and completing a resource estimate for the property.
The Berenguela Property is a property of merit. It is host to a potentially bulk mineable silver, copper and manganese deposit. The author completed a 3D block model resource estimate for the Berenguela Deposit. Resources for the Berenguela using a 50 gram per tonne silver cut-off, are 15.6 million tonnes at 132.0 grams per tonne silver, 0.92 % copper and 8.8 % manganese in the indicated category and 6.0 million tonnes at 111.7 grams per tonne silver, 0.74 % copper and 6.5 % manganese in the inferred category. Total resources in all categories at a 50 gram per tonne silver cut-off are 21.6 million tonnes at 126.3 grams per tonne silver, 0.87 % copper and 8.2 % manganese.

Recommendations for the Berenguela Project to include 2000 metres of RC drilling to further define the edges of the known mineralization, petrographic studies of the mineralization and improvements to the QA/QC program.

INTRODUCTION AND TERMS OF REFERENCE

The Berenguela Property, located in southern Peru, is held by Sociedad Minera de Berenguela S.A. (SOMINBESA), a wholly owned subsidiary of Kappes, Cassiday & Associates (KCA) of Reno Nevada. Silver Standard Resources Inc. (Silver Standard) of Vancouver, Canada has entered into an agreement with KCA to purchase the currently defined silver resource found on the Berenguela property. This Technical Report on the Berenguela Property has been prepared to comply with the standards outlined in National Instrument 43-101 and completes a portion of the agreement between KCA and Silver Standard.

Terms of Reference

Silver Standard retained Mr. James A. McCrea, P. Geo. during November 2004 to complete an independent review and resource estimate for the Berenguela Property. Mr. McCrea, a qualified person under NI 43-101, visited the property and surrounding area on December 7th and 8th of 2004.

Sources of Information

This evaluation was partly based on published and unpublished material and data submitted to the author by Silver Standard and on data obtained from INGEMMET, the Peruvian geological survey and agency responsible for Peru’s mineral resources. The
author also relied on over 17 years of field experience in base and precious metal deposits and in resource estimations of numerous base metal prospects with characteristics similar to those found on the Berenguela Property.

DISCLAIMER

This technical report is based upon published and unpublished data, primarily from geological reports as described in the sections herein entitled History and References. These reports were written prior to the implementation of the standards relating to National Instrument 43-101. However, as persons experienced in geology or related fields prepared the reports, the reports and relevant data are considered to be of high quality. Additional information was obtained during a visit to the property, by the author.

Silver Standard’s employees and consultants provided additional information used in database compilation and resource modelling. This information is also considered by the author to be of high quality.

PROPERTY DESCRIPTION AND LOCATION

The Berenguela Property encompasses approximately 141.33 hectares situated in the eastern part of the Western Cordilleran of south-central Peru (Figure 1) and consists of two mineral concessions (Figure 2; Table 1). The Berenguela concessions are located within the Department of Puno and lie within Peruvian National Topographic System (NTS) map area Lagunillas, No. 32-U. The centre of the Berenguela concessions is at 15° 40’ South Latitude and 70° 34’ West Longitude. The concessions, their sizes and entry codes are summarized in Table 1.

<table>
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The two Berenguela concessions are held by Sociedad Minera de Berenguela S.A. (SOMINBESA), a private company registered in Peru which is held 100% by Fossores Ltd., a holding company registered in the Cayman Islands. Silver Standard has an option agreement with SOMINBESA and Fossores Ltd. to purchase a 100% interest in the silver resources contained on the Berenguela Property. Under the terms of the
Mineral rights in Peru are awarded by the national government. The current system of acquiring mineral rights is by applying for concessions at the Ministry of Mines. Concession boundaries are specified on the application by indicating the locations of the corners of the concessions. Coordinates must be specified to the nearest 1,000-meter UTM coordinate and boundaries must be orientated north south and east west. Concessions awarded before 1992 can have irregular coordinates. These concessions have specific corners that were legally surveyed in the field and must be registered at the Ministry of Mines.

The two Berenguela concessions held by SOMINBESA are in good standing. The Berenguela concession was created on January 19, 1972 and awarded special state rights by Supreme Decree. The concession covers the following lapsed mining concessions: Burton, Corocora, Hadden, Nueva Virginia, Santa Margarita, Santiago Esmeralda, Delta, Hadden No. 1 and San Vecente. In 1991 the Special Rights were converted to the mining concessions regime and later awarded to Minero Peru. On April 11, 1997 Minero Peru staked the mining pediment Berenguela 97 and on March 9, 1999 the final resolution approved the Berenguela 97 mining concession for the benefit of Minero Peru with an area of 100 hectares. The Berenguela 97 concession partly overlaps the Berenguela priority mining concession so the priority concession was reduced to 41.33 hectares. According to the mining registry these mining rights are not subject to any mortgage, pledge or other charges presently in force. (Fontana, 2004)
Grey concession names are superseded by Berenguela Concession.
All concessions held by SOMINBESA are in good standing until June 30th 2006. Annual concession payment requirements are US$3 per hectare to maintain the concessions in good standing; annual tax payments must be received by June 30th. In order to conduct detailed-exploration work, such as roadwork and drilling, permits must be obtained from the Peruvian Ministry of Mines. It is not necessary to obtain permits for basic exploration, such as mapping and sampling. Companies are also required to submit a summary of annual exploration expenditures to the Peruvian Ministry of Mines.

ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Accessibility, Local Resources and Infrastructure

The Berenguela Property is accessible in under an hour by paved and gravel roads from the city of Juliaca, located in southern Peru. Juliaca is a small city (100,000 people) with an Airport and daily flights to Lima, the capital of Peru. The property is located about 50 kilometres west of Juliaca. Arequipa is the major city in southern Peru and it is about 2.5 hours by road from the property. The property is 6 kilometres northeast of the town of Santa Lucia and Santa Lucia is on the main, paved highway to Arequipa. Santa Lucia has groceries and fuel available on a limited basis; however, major purchases would be made in Arequipa or Juliaca. Infrastructure and access is considered excellent.

Topography, Elevation and Vegetation

The Berenguela Property lies between 4150 and 4280 metres above sea level in the Western Cordillera of southern Peru. The terrain of the property is one of moderate relief, with relatively poorly drained pampas occurring in the valleys that lie north and south of a central WNW-trending ridge where the Berenguela deposit is found. The slopes are typically covered with sparse grasses and few small low bushes. The steeper slopes generally have very little vegetation and are mostly covered by talus.

Climate

Within the region of the Berenguela Property, annual temperatures range from greater than 25°C to less than -20°C, with periods of extreme precipitation. The rainy season in
this part of the Andes is from December to April. Snow covers many of the peaks, which are in excess of 5100 metres. Dense fog is common during the rainy season.

HISTORY

Berenguela has a long history of exploration and production dating back to Colonial times. This summary of the mining history of Berenguela is not believed to be all-inclusive since not all exploration and development activities have been documented.

The early history of the Berenguela Deposit is summarized in the volume Perú: A Mining Country (1986):

“The Berenguela Deposit has been continually exploited since Colonial times; the most active period of exploitation dates back to 1906 when it became the property of the Lama Mining Company, who built a small smelter at Santa Lucia to treat silver and copper ores.

The Berenguela mineral consists principally of manganese oxide containing copper and silver. The complex nature of the Berenguela mineral has been one of the causes preventing its exploitation on a large scale, since the beneficiation of silver from the manganese oxides has always presented metallurgical problems. In 1958 the plant was reconditioned in order to obtain a concentrate by floatation with a higher grade. This process was new and complicated, no new tests of this kind have been made in other plants; the initial results were discouraging, but later improved and the engineers were optimistic as to the final result of the procedure.

During the period June 1957 to June 1958, production at the Berenguela mine was as follows:

21,153 tonnes with Ag grades of 22.07 oz/t (686.44 grams) and 1.91 % Cu
It is stated that the mineral also has 30% manganese.

In the 1940 to 1950 decade efforts were made to obtain a by-product from manganese. However the cost of this product was very high and the market was unstable, as this operation was laid aside.

The American Smelting & Refining Co. (ASARCO) took a purchase option on these properties for a year, between August 1965 to September 1966, in which period the first important studies of these deposits were made.

These studies consisted of 3,241.6 m. of diamond drilling distributed in 52 drill holes; the corresponding geological mapping was also made and metallurgical tests in the laboratory of the U.S. Bureau of Mines, F.C. Torkelson Company and Silver Bell.

Later the Cerro de Pasco Corporation took out a purchase option on the same deposit between November 4, 1966 to November 4, 1968, limiting its activities to estimating reserves and carrying out metallurgical research at the La Oroya laboratory.

Finally Charter Consolidated took out a purchase option in December 1968, to December 1970; in this period it carried out 56 complementing diamond drill holes over a total length of 3,386 m.; metallurgical research and a feasibility study were also carried out.
Total production from Berenguela by the Lampa Mining Company (Lampa) is reported at approximately 500,000 tonnes during the period 1906 to 1965. Production was largely from underground workings but numerous small open pits can be seen on surface. Underground production created 17,700 metres of underground workings (Figure 3). Lampa was mainly concerned with silver extraction and the recovery of by-product copper. (Kappes, Cassiday & Associates: Berenguela.com)

Both ASARCO and Charter Consolidated Mining (Charter) took bulk samples for metallurgical testing. ASARCO took a 268 tonne bulk sample of the different ore types from 18 different underground locations. In addition Charter sampled 5108 metres of the underground workings with chip samples that were collected on 1.5 metre intervals. The chip samples were used to verify the drill hole results.

Charter had a reserve estimate completed for Berenguela. In November of 1969, J.M Strathern released a sectional-polygonal reserve estimate for Berenguela. This sectional reserve used underground sampling and drill hole data on vertical cross-sections spaced 50 metres apart. The reported historic reserve was 14,329,514 tonnes at a grade of 124.8 grams per ton silver and 1.32 percent copper per tonne. The reserve did not report manganese grade because the drill hole samples were not assayed for manganese. Strathern called the reserve a "proved reserve". (Strathern, 1969)

The Strathern reserve was reviewed in 1998 by Ross Glanville & Assoc. who concluded that based on the extensive drill and underground sampling it would be reasonable to classify the Strathern "reserve" in the "probable" category. (Glanville, 1998) The Strathern estimate and the review by Ross Glanville were completed prior to the implementation of National Instrument 43-101 and the author believes that it would be appropriate to re-classify the historic “reserve” estimate as an indicated resource based on the quantity of data used in the original estimate. The historic resource estimate is superseded by the current expanded resource.

In 1995, a policy of privatization was adopted by the Peruvian ministry responsible for Minero Peru, with the result that the Berenguela Property was offered for sale by the
state company. Kappes, Cassiday & Associates (KCA) purchased Berenguela in 1995 by competitive bid and formed a private Peruvian company, Sociedad Minera de Berenguela S.A. (SOMINBESA) to manage the project. Dan Kappes and Mike Cassiday are the majority shareholders in SOMINBESA (Kappes, Cassiday & Associates: Berenguela.com).

Following acquisition of the property, KCA conducted a surface bulk-sampling program and collected two bulk samples. The first sample was a composite sample that was formed from mineralization collected at about 20 sites, with each site providing approximately 20 kilograms of rock for a total of approximately 300 kilograms. The second bulk sample was obtained from more extensive sampling, being produced from material gathered from 48 separate locations. The objective of this sampling was to obtain a good representation of remaining mineralization. The second bulk sample weighted approximately 3000 kilograms, with individual samples being taken from existing open cuts and pits, various tunnel sections as well as from surface stockpiles and dumps. The samples were processed at the KCA laboratories in Reno, Nevada, USA and later utilized for process development and testing purposes. (Kappes, Cassiday & Associates: Berenguela.com)

In March of 2004, Silver Standard entered into an option agreement with SOMINBESA (KCA) to purchase 100% of the silver resources contained in the Berenguela Project. The option agreement required payments of cash and shares, the completion of an exploration program and the completion of a 43-101 compliant resource estimate. (Silver Standard Press Release, March 2004). Silver Standard completed the exploration drill program in July of 2005 after completing 222 reverse circulation drill holes.
GEOLOGICAL SETTING

Regional Geology

The Berenguela Property is situated within the Western Cordillera of the Andean mountain range, which since the Late Cretaceous has been formed by collisional plate tectonics where Pacific oceanic crust is being subducted beneath the South American plate. The regional geology of the Western Cordillera in south eastern Peru is dominated by volcanic and sedimentary rocks of Cenozoic to Quaternary age (Figure 4). In the region west of Lake Titicaca where the Berenguela deposit is found, referred to here as the Santa Lucia district, there are several large erosional or structural windows in the volcano sedimentary terrane where structurally deformed Paleozoic and Mesozoic sedimentary strata are exposed. The Berenguela Ag-Cu-Mn deposit lies within one of these areas of Mesozoic sedimentary rocks.

According to researchers of Andean geology in Peru (Clark et al., 1990; Medina, 1993), a major tectonic event known as the Andino Orogeny that started in the Late Cretaceous and continued into Early Tertiary time uplifted and folded pre-Tertiary sedimentary sequences in southern Peru. Medina (1993) was able to recognize in this part of the country five distinct episodes of deformation that occurred during this orogeny, although he suggests that two main deformation events, referred as the Quechua D1 and D2 events, established the main litho-tectonic relationships seen in the region and could also be linked to the main mineral deposits of the Santa Lucia district, including Berenguela. Subsequent to the main compressional tectonism of the Andino Orogeny, the region west of Lake Titicaca experienced a prolonged period of continental sedimentation, with highlands of folded Paleozoic and Mesozoic rocks being eroded to form thick and extensive deposits of conglomerates and arenites belonging to the Puno Group. Regionally extensive, northwest-trending fault zones, including the Lagunillas Fault Zone that passes a few kilometres south of Santa Lucia town, partly controlled the deposition of these coarse clastic lithologies.

Subaerial volcanism in the Santa Lucia district began in the Oligocene with the deposition of relatively potassic, trachyandesitic flows and agglomerates of the Yapoco and Piruani Formations. Clark et al. (1990) suggests that this volcanism began at
approximately 31 Ma and ceased around 26 Ma. Numerous sub-volcanic stocks of calc-alkaline diorite along with dikes and sills of high-K andesite were also emplaced during this period. These Middle Tertiary volcanics and sub-volcanic intrusives are considered by Clark et al. (1990) to belong to the Tacaza Group.

During Late Oligocene to Early Miocene time, the Puno region was affected by Quechua D2 deformation, which involved major uplift and erosion. As well, this period saw the eruption of rhyolite ignimbrites of the Churuma and Santa Lucia Formations and subsequently ash flow tuffs belonging to the Sillapalca Group. The peak of this deformation event occurred at approximately 23 Ma and resulted in the moderate folding of Tacaza Group volcanics and Puno Group sediments along a northwest and southeast trend (Medina, 1993). Further short-lived uplift and erosion was then followed by additional volcanism, with predominantly dacite lavas of the Sillapaca Formation being extruded. In the Santa Lucia district, this volcanic event was brief, extending from approximately 16.2 Ma until 14.7 Ma.

Clark et al. (1990) observed that the majority of the metallic deposits of the Santa Lucia district are hosted by Tacaza Group volcanic rocks or underlying Mesozoic sedimentary strata. They also concluded that most of the base and precious metal epithermal mineralization in the region accompanied the eruption of these volcanics and that the deposits show a close association with Late Oligocene, calc-alkaline sub-volcanic intrusions. The Berenguela Ag-Cu-Mn deposit is considered by the researchers to represent the strongest expression of metal-rich hydrothermal activity in the district.
Lake Titicaca

Tertiary Rocks
- Sillapaca and Palca Groups
- Tacaza Group
- Puno Group Sediments

Mesozoic and Paleozoic Rocks
- Cuena Putina, Caliza Ayacas Fm, Murco Fm, Caliza Arcurquina Fm, Caliza Spin Fm, Yura Group, Lagunillas Group
- Paleozoic Rocks

Major Fault

BERENGUELA PROJECT
Silver Standard RESOURCES INC.
Puno, Peru
Regional Geology of the Puno Area

DATE: Oct. 2005 SCALE: AS SHOWN Figure: 4
Property Geology

The Berenguela Ag-Cu-Mn deposit trends in a WNW direction for more than 1,400 meters along a *whale-back* ridge that separates two valleys, the broader one being to the south. The eastern and western limits of the deposit roughly correspond to where steep slopes truncate the ridge and descend to the pampa valleys some 200 metres below the ridge-crest. Moderately to isoclinally folded limestones and dolomites of the Cretaceous-age *Ayavacas Formation* are the dominant lithologies exposed along the ridge and host the deposit mineralization. (Figure 5) Commonly the limestones are difficult to recognize due to the extensive and complete replacement of Ca-Mg carbonates by manganese and iron oxides. In the western sector of the deposit, detailed mapping has identified three areas where the carbonate rocks are intruded by small rhyodacitic bodies. As well, a number of sub-vertical, dike-like bodies of polymictic, coarsely fragmental rock have been recognized in the central part of the deposit, with probably the best exposure being in the San Jose open-cut. These clastic units are characterized by their dike- or pipe-like form with sharply defined margins and a coarse fragmental component that includes subangular to subrounded *cobbles* and *boulders* of fine-grained diorite, hornblende-plagioclase-porphyritic dacite and minor sandstone and carbonate clasts. These enigmatic fragmental rocks have been interpreted as isolated or remnant deposits of fluvial-glacial sediments (Candiotti and Castilla, 1983; Klink *et al*., 1986), possibly being fluvial conglomerates preserved in karst cavities within the *Ayavacas Formation* limestone. Alternatively, Clark *et al*. (1990) consider these coarsely fragmental rocks to be phreatic breccia dikes and sills related to hydrothermal activity.

Both hypogene and supergene silver and copper minerals are invariably associated with high concentrations of manganese +/- iron oxide concentrations representing metasomatic replacement zones that apparently were localized along faults or intensely fractured zones which formed axial planar to the relatively tight, WNW-trending folds found along the ridge at Berenguela. Fault structures that cut more or less orthogonally across the fold axes likely also channelled the hydrothermal fluids, with the intersection of these structures and the dominant WNW-ESE structures being logical loci of high fluid flow and metasomatism. In addition, dolomitic horizons in steeply inclined limbs of the folds appear to have been preferentially replaced by the Mn-rich hydrothermal fluids.
The manganiferous replacement zones are generally earthy in texture and range in colour from blackish brown where the MnO content is up to 30%, through a ‘leopard skin’ texture of dark brown and yellowish brown to an ochre colour where the altered rock is richer in potassium and iron and the manganese contents are less than 5%. Locally, the Mn-oxide metasomite rock hosts irregular veins and veinlets of orange-red jasper. Other evidence of hydrothermal activity that postdates manganese metasomatism is seen in patches of brecciated, Mn oxide-replaced limestone where crustiform and chalcedonic quartz is coating breccia clasts. (Burk, 2005)

Apart from the restricted surface exposures of sub-volcanic rhyodacite rock in the western part of the deposit there do not appear to be any sizeable bodies of intrusive rock at Berenguela that could be genetically linked to the Mn-rich metasomatism. Evidently no drill holes intersected exo- or endoskarn rocks that would indicate the presence of an intrusion at depth. (Burk, 2005) Instead, many of the longer drill holes cored through thick sections of gypsum. In the case of one Asarco drill hole, some 172 meters of gypsum was drilled, with the hole actually ending in the sulphate. (Strathern, 1969)

In summary, the Berenguela deposit, as it is presently known, consists of several lenses and pods of potentially economic Ag-Cu (-Mn) mineralization that occur within a WNW-trending block of metasomatically altered carbonate rocks which has dimensions roughly estimated at 1,400 m long by 400 m wide by 100 m thick. Individual, well-mineralized pods or lenses are anticipated to have maximum dimensions of less than 100 meters.
DEPOSIT TYPES

Based on the distribution and form of the potentially economic bodies of Mn-Cu-Ag mineralization within the structurally deformed limestone formation there is little doubt that Berenguela represents a type of epigenetic, replacement-type ore deposit (Clark et al., 1990). Silver- and copper-mineralized veins of quartz and/or carbonate appear to be a very minor component of the deposit. What is debateable at Berenguela is whether or not, or to what extent supergene processes played a role in the formation of the deposit. More specifically, is the extensive development of manganese oxides the result of the surface oxidation of hypogene manganiferous carbonates (manganocalcite and/or rhodochrosite) which had replaced calcite and dolomite adjacent to fractures in the precursor limestone and where silver, copper and zinc were deposited as sulphides synchronous with or subsequent to the Mn-carbonate replacement event? Or are the Mn- and Fe-oxides the direct metasomatic products of a hydrothermal system marked by strongly oxidized fluids enriched in Ag, Cu and to lesser degrees Ba and zinc? (Burk, 2005)

In Peru, silver-enriched base metal deposits (Cu, Pb-Zn, Cu-Pb-Zn) of the metasomatic or replacement type have been exploited by some of the country’s most important mines, including those at Hualgayoc, Antamina, Huanzala, Raura, Cerro de Pasco, Morococha, Casapalca, and Yauricocha, with all of these mines being located in the northern half of the country. In southern Peru, porphyry copper and epithermal precious metal lode deposits are the dominant deposit types. Based on what is presently known at Berenguela, the deposit is more comparable with the metasomatic base metal deposits of northern Peru than the precious metal deposits in the south. (Burk, 2005)

Perhaps the closest deposit analogy to Berenguela is found in some of the silver-rich supergene ore bodies of the Uchucchacua Ag-Mn-Pb-Zn mining camp located in the Western Cordillera of Central Peru. Hosted by folded and faulted Cretaceous limestones of the Jumasha Formation, these particular ore bodies represent the oxidized equivalents of structurally controlled, replacement ore bodies in which the hypogene mineralization consisted of a complex assemblage of anhydrous Mn-Fe-Ca silicates (Mn olivine, rhodonite, bustamite) partially replaced by Zn-Mn-Fe, Cu-Fe and Pb sulphides (wurzite, alabandite, galena, pyrite) and carbonates (manganocalcite, rhodochrosite) that
together were overprinted by late stage Ag-Mn sulfosalts and sulphides (pyargyrite, uchucchacuaite). Supergene oxidation of the manganiferous replacement mineralization produced ore bodies' rich in goethite, various Mn oxides and minor amounts of Pb carbonates. These ore bodies extended 30 to 150 meters from surface and were mined early on by indigenous people and colonial miners. (Bussel et al., 1990) The abundant Mn oxides and goethite at Berenguela appear to be comparable to the supergene assemblage at Uchucchacua, while the secondary copper minerals at Berenguela (malachite, azurite, chrysocolla) could be exchanged for the Pb carbonates at Uchucchacua. (Burk, 2005)

Since few drill holes completed at Berenguela are longer than 150 m, there are few accounts of hypogene, sulphide-rich mineralization. However, this is not to say that such mineralization does not exist in altered limestones at greater depths. (Burk, 2005) Considering that the replacement-type ore bodies at Uchucchacua have vertical extents of up to 300 meters, one could presume that good exploration potential still exists at Berenguela for the discovery of hypogene Ag-Cu-Mn mineralization at depths of 150 meters or greater. A possible indication of additional and extensive metasomatic alteration at depth is represented by the thick gypsum zone that has been intersected by several of the deeper holes in the deposit. (Strathern, 1969) While this gypsum may be of sedimentary origin, it could also be explained as forming a well-developed zone of sulphate alteration (perhaps originally occurring as anhydrite) that is related to a high-level intrusion which exsolved a large volume of sulphur-rich fluids and/or vapour. (Burk, 2005)
MINERALIZATION AND ALTERATION

Limited mineralogical data for the manganiferous Ag-Cu mineralization at Berenguela was available to the author. Based on the drilling and ore mineralogy studies done by Asarco in the 1960’s, four main types of mineralization were identified (Strathern, 1969):

1. Yellow, orange and red altered limestone comprising 50% Mn oxides by volume along with hydrated Fe oxides.
2. Brown, hard manganiferous rock with high dolomite content but of comparatively low Ag and Cu contents.
3. Yellow, friable, clay-rich altered carbonate with less than 50% Mn oxides by volume and having relatively high Ag contents. Referred to as panizo by early miners.
4. Yellow, friable material with minor manganese and less than 1% combined metals; this represents the low grade mineralized material throughout the mine.”

According to Fletcher et al. (1989), the main manganese minerals in the metasomatised limestones include the oxides cryptomelane, todorokite, psilomelane, pyrolusite, and chalcophanite, together with a variety of hydrated iron oxides. In addition to the manganiferous replacement-style mineralization, Fletcher et al. (1989) also describe a paragenetically late, vein-style mineralization that consists of vuggy calcite-jasper veins hosting minor amounts of malachite, azurite, covellite, chrysocolla, chalcopyrite, pyrite and native silver.

To help understand the nature of the mineralization at Berenguela, a statistical analysis was done of 13,318 rock samples collected by Silver Standard from the reverse circulation drill holes that the company completed in 2004 and 2005. This analysis shows that in addition to silver and copper, the manganiferous replacement mineralization is also enriched in zinc and barium. The mean values for these elements were calculated to be 2,811 ppm Zn and 2,549 ppm Ba. In addition, when correlation coefficients were calculated for the elements Mn, Ag, Cu, Zn and Ba, it was found that the closest element association exists between Mn, Cu and Ba (correlation coefficients of 0.556 for Mn:Cu and 0.511 for Mn:Ba). While the close spatial relationship between Mn, Cu and Ba may be interpreted as clear evidence that these three elements were introduced into the limestone host rocks from the same hydrothermal fluids, an alternative explanation lies in the fact that manganese oxides have a strong capacity to absorb Cu and Ba ions from simple meteoric fluids, which if this is the case implies that copper and possibly even barium may have been introduced into the carbonate rocks.
that already were replaced to varying degrees by Mn- and Fe-oxides. Another interesting finding from the statistical analysis is the close association shown by copper and zinc, as indicated by the correlation coefficient of 0.326, a value that is very similar to the coefficient for the Ag:Cu element pair. This data, when considered together with the data set's average values for Pb, Sb and As, suggests that the hypogene silver mineralization at Berenguela was likely associated with the base metal sulphides chalcopyrite and sphalerite, as opposed to silver sulfosalt minerals with high Pb, Sb and/or As contents. (Burk, 2005)

EXPLORATION

The Berenguela Property has been explored since Colonial times with the most active period from 1906 to 1970 by the Lampa Mining Company, and then ASARCO, Cerro de Pasco and Charter Consolidated Mining conducted exploration. KCA conducted a bulk-sampling program after the purchase of the property in 1995. The historic exploration is summarized in the history section of this report.

Silver Standard conducted a 2-phase exploration program at Berenguela starting in October of 2004; the exploration consisted mainly of drilling with the drilling completed in July of 2005. The exploration program entailed mainly reverse circulation drilling with some surface mapping and limited surface sampling. Silver Standard completed 222 reverse circulation drill holes for 18,972 metres. Using this drill data Silver Standard contracted the author to complete a resource estimate and this 43-101.

DRILLING

The first reported drilling was completed in 1965 to 1966 by ASARCO. The ASARCO drill program consisted of 52 diamond drill holes for 3,241.6 metres. Drill logs and data is available from this program.

Charter Consolidated Mining conducted a drill program in 1969. Charter completed 56 diamond drill holes for 3,386 metres. Assays and drill program summaries are available for this work but no drill logs. (Kappes, Cassiday & Associates: Berenguela.com)

Silver Standard completed the largest and most comprehensive drill program to date on the Berenguela Property. Silver Standard delineated the Berenguela Deposit with 222
drill holes containing 18,972 metres of reverse circulation drilling; drill hole locations are shown on Figure 6. The objective of the drill program was to delineate the deposit for resource estimation. The deposit was drilled off on a regular grid pattern. The drill program expanded the areas of known mineralization to the east and subsequently the resource of the deposit. True thickness of the mineralization is not known because of the folded and faulted nature of the ore body.

**SAMPLING METHOD AND APPROACH**

Silver Standard, during the 2004 and 2005 RC drill programs sampled the drill holes on one-metre intervals. RC drill samples were collected at the drill site by the drill crews. The RC drill holes were sampled from collar to total depth. Sampling intervals were dependent on the drilling equipment selected, the density of samples required and not based on geological controls or other features of the zone of interest.

The RC drill crews collected 18,476 samples and 1,035 sample duplicates for a total of 19,511 samples. The drill holes were laid out on a 50-metre pattern to cover the known areas of mineralization and test the limits of mineralization. As is normal with RC drilling there were occasional samples that were not recovered, however, sample recoveries are 98.6 percent for the whole drill program.

**SAMPLE PREPARATION, ANALYSIS AND SECURITY**

Surface samples collected by the author were personally delivered to Chemex labs in Lima, Peru. The samples were at all times in the presence of the author. Samples submitted by the author were prepared by standard procedures (PREP-31). The samples were analyzed for silver, copper and manganese by Atomic Absorption (AA62b) using a 30-gram split.

Samples from the drill program were prepared using the following procedure: The RC Drill crews collected the samples and the samples were split 3 times, using a Jones Splitter, down to 1/8th size. The sample size ranges from approximately 2 to 10 kilograms. Approximately every 40th sample had a second, field duplicate sample collected. The samples were tagged with the hole number and depth and then sent to the warehouse for further preparation were Silver Standard Peru personnel prepared the
samples for shipment to the assay lab. All samples were stored in the company warehouse in Santa Lucia and samples were dried in the warehouse as required. The samples were prepared and tagged for shipment to the assay lab and blanks and standards were inserted into the sample stream at a rate of approximately one sample in 40 for blanks and two in 40 for standards. Three different standards were utilized in the program. Periodically Silver Standard Peru staff would deliver the samples to the ALS Chemex Labs depot in Arequipa and the samples were shipped to Lima, Peru for preparation. The assay pulps were shipped to ALS Chemex Labs in North Vancouver for analysis.

The Samples were prepared using a standard sample preparation (PREP-31) to produce a 250-gram pulp. The analyses performed were four acid “near total” digestion with a 27 element ICP analysis (ME-ICP61). Samples over the maximum for silver, copper or manganese were reanalyzed using Atomic Absorption (AA62b) and very high silver samples were analyzed using a fire assay procedure with a gravimetric finish (Ag-GRA21).


Silver Standard employed a comprehensive Quality Control/Quality Assurance (QA/QC) program during the drill program on Berenguela. The program included: standards, blanks, field duplicates and outside lab check assays as described above with the sampling procedures. Following the drill program, the author compiled the QA/QC data for the 2004 and 2005 drill programs and completed a summary of the QA/QC program results. The QA/QC summary contains recommendations for the improvement of QA/QC results, which included checking for Standard Reference Material (SRM) failures and contaminated blanks and follow up with corrective action. Other recommendations were to improve sample handling so as to reduce labelling errors.
The author is of the opinion that the sampling, sample preparations, security and analytical procedures are all consistent with industry standard practice. During the site visit, the first phase of the drill program was under way. The author examined the full sample handling process and preparation and felt there were no obvious problems.

DATA VERIFICATION

Data verification included surface samples to confirm the mineralization at Berenguela. The author collected four randomly located surface grab samples (BER-01 to BER-04) from the property. Each sample location was surveyed with a GPS. Samples were taken over an area of approximately 1 square meter. Approximately 2 kilograms of material was taken from each sample site. The four samples were taken to represent different areas of the Berenguela Deposit. The results of these samples are listed in Table 3 and the locations of the author’s surface samples are show on Figure 6.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Ag (ppm)</th>
<th>Cu (%)</th>
<th>Mn (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BER-01</td>
<td>50</td>
<td>0.52</td>
<td>38.93</td>
</tr>
<tr>
<td>BER-02</td>
<td>42</td>
<td>0.94</td>
<td>20.11</td>
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<tr>
<td>BER-03</td>
<td>445</td>
<td>1.78</td>
<td>17.19</td>
</tr>
<tr>
<td>BER-04</td>
<td>91</td>
<td>0.18</td>
<td>21.78</td>
</tr>
</tbody>
</table>
MINERAL PROCESSING AND METALLURGICAL TESTING

Kappes, Cassiday & Associates, after purchasing Berenguela collected bulk samples and carried out metallurgical testing at their Reno facilities. KCA describe the test work as follows:

“Historically (from 1905 to 1965) the ore was processed by direct smelting to produce a copper-silver matte, which was then sold to Southern Peru Copper Corporation. This process would be marginally economic in today’s market. In the 1960’s, Asarco and Charter considered a roast/ segregation process (the “Torco” process), but this process also has inherent high capital and operating costs, and also recovers only silver and copper.

Since the 1960’s, markets for specialty manganese products have developed that make a recovery of this metal economically important. KCA has directed its work towards developing a wet chemical leach process for recovery of manganese along with the copper and silver. Once manganese recovery is included, costs and revenues both increase to the point where manganese becomes the most important economic constituent.

The proposed flow sheet is presented below. The ore will be ground, pumped into agitated tanks in slurry form, and leached with sulfuric acid and sulfur dioxide. The pregnant solution will be separated from the solids and clarified. From this solution, copper will be recovered by the standard solvent extraction electrowinning (SX-EW) process, or alternatively by simple crystallization to produce copper sulfate. The copper-free solution will be purified and sent to a manganese electrowinning section where manganese dioxide will be produced. A portion of the depleted solution will be sent to evaporation ponds, and then to a crystallizer, to produce manganese sulfate (which is extensively used as a fertilizer). Solids from the initial acid leach will be subject to a normal cyanide leach process where silver will be dissolved, precipitated on zinc dust, and refined to bullion.

All of the process steps, are currently in commercial use in EMD production plants elsewhere in the world. The individual steps of the process have been tested on the bulk ore sample at KCA’s Reno facility. Recovery routinely exceeds 90% for all three metals. For economic evaluation purposes, recovery is targeted at 80% for manganese, and 85% for silver and copper.

Final process development work is planned as part of the design/cost study, including the establishment of a demonstration/pilot plant. Consulting manganese production specialists have been retained to advise on the project concepts, and they will continue to be involved throughout the process development stages.”

The KCA flow sheet is Figure 7. (Kappes, Cassiday & Associates: Berenguela.com)
MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

The Berenguela deposit has seen exploited since Colonial times with active mining from 1905 to 1965. The property has a historic reserve estimate as described in the history section of this report. Limited geologic data from the drill programs was available to the author for the completion of the resource estimate, but sectional interpretations of the mineralized zone were completed and used to constrain the block model for the Berenguela Project.

Database

The author received a drill hole database from Silver Standard in Gemcom. The database contained all the available data for the 222 RC drill holes completed on the property. The author checked the validity of the database and made corrections as required from the original compiled data. The database contains the surveyed drill collars for the 222 RC drill holes completed by Silver Standard in 2004 to 2005.

The database contains 18,476 assays for silver, copper and manganese (below detection limit samples were entered as half detection limit). The RC drill holes were all sampled on 1-metre intervals from collar to total depth. The 1-meter samples were displayed on drill hole sections and the sections were used to domain the mineralization on the Berenguela Property.

Solid Modeling

The mineralized zone on the property is bowl shaped and elongated in an east west direction. North south sections for the entire property were created to domain the mineralization. The sectional interpretations were entered into Gemcom as 3D polylines. The polylines were stitched together to produce 3D solid body models, or grade shells for the mineralized zones. The solid model was used to code the rock type model in the block model, control the interpolation and to filter the composites for statistics and geostatistics.
Compositing, Statistics and Geostatistics

The 1-metre samples were composited into 2-metre composites for resource modeling and grade interpolation. Compositing produced 9400 2-metre composites. The solid model was used to code the composites as being from within the ore zone or the background domain. Filtering left 6233 composites in the domain for interpolation and variogram modeling.

The composites for silver produced a lognormal histogram with a near normal distribution, a mean of 103 ppm Ag, a standard deviation of 179.2 and a coefficient of variation of 1.79. The composited population has no noticeable skew. The log probability plot is near linear and all composites appear to be in a single population.

The composites for copper also produced a lognormal histogram with a negatively skewed distribution. The population has a low-grade tail. The mean is 0.82 Cu%, the standard deviation is 0.76 and the coefficient of variation is 0.92. The log probability plot is curved reflecting the low-grade tail.

The composites for manganese produced a lognormal histogram with a strong positive skew to the distribution. The population has a high grade skew similar to iron deposits. The mean is 7.68 Mn%, the standard deviation is 8.04 and the coefficient of variation is 1.05. The log probability plot is very linear reflecting a consistent population.

The 2-metre composites for silver, copper and manganese were imported into Isaaks’ Sage software for Variogram analysis. The variograms were modelled with exponential structures. All metals exhibited low nuggets in the 5 to 10% range and reasonable search ranges. The results of the variogram analysis are in Appendix 2.

Block Model

A 3D whole block model was laid out to cover the mineralization on the Berenguela Property and to allow room for pit optimizations during later analyses of the project. Block model parameters are summarized in Table 4.
Table 4: Block Model Parameters

<table>
<thead>
<tr>
<th>Co-ordinates</th>
<th>Origin Co-ordinates</th>
<th>Block Size</th>
<th>Number of Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axis Direction</td>
<td>Axis</td>
<td>Orientation</td>
<td>X</td>
</tr>
<tr>
<td>90°</td>
<td>0°</td>
<td>Vertical</td>
<td>331350</td>
</tr>
</tbody>
</table>

The solid models were used to code the rock type model and control the interpolation. The block model was coded for air (above topography), background and for the mineralized zone by coding blocks using a 50% threshold. Blocks with more than 50% of the block inside the solid were given the code of the solid. During the interpolation of the model, the background zone was not interpolated and the ore zone was not allowed to use data points from the background zone.

The block model was interpolated using inverse distance squared where a minimum of four composites was required to interpolate a block with a maximum of 16 composites. The interpolation was required to use data from two drill holes to interpolate grade into a block.

**Grade Capping**

Grades were capped for the Berenguela resource. Capping was based on histograms, probability plots and the coefficient of variation. Silver grades were capped at 2000 ppm Ag, copper grades were capped at 4.5 Cu% and manganese grades were capped at 35 Mn%. The assays were capped and then the composites were created.

Capping of silver at 2000 ppm Ag is equivalent to the 99.6 percentile; capping of copper at 4.5 Cu% is equivalent to the 99.4 percentile and capping the manganese at 35 Mn% is equivalent to the 99.4 percentile. These capping levels are consistent with industry standard practice.

**Classification**

The model was classified as indicated and inferred based on distance. No measured category was defined because of no geologic model and a lack of surface trenches. Only blocks inside the grade shell were classified. All other blocks were not interpolated.
or classified. The table below contains a summary of the resource model. Blocks were classified as follows: an indicated range of 0 to 25 metres and inferred range of 25 to 60 metres. Blocks outside these ranges are not reported. Resources are reported in Table 5. Detailed resource tables are included in Appendix 1.

Table 5: Berenguela Resource Summary, Using a Cut 50 Gram per Tonne Silver Cut-off

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (Millions)</th>
<th>Silver Grade (g/t)</th>
<th>Copper Grade (%)</th>
<th>Manganese Grade (%)</th>
<th>Silver (millions of ounces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicated</td>
<td>15.6</td>
<td>132.0</td>
<td>0.92</td>
<td>8.8</td>
<td>66.1</td>
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<tr>
<td>Inferred</td>
<td>6.0</td>
<td>111.7</td>
<td>0.74</td>
<td>6.5</td>
<td>21.6</td>
</tr>
</tbody>
</table>

The stated resources are not materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues, unless stated in this report, to the best knowledge of the author.

There are no known mining, metallurgical, infrastructure, or other factors that materially affect this resource.

**INTERPRETATION AND CONCLUSIONS**

The Berenguela Property contains a large potentially exploitable resource of silver and copper. The objective of the exploration program was to delineate and possibly expand the resource at Berenguela. The property is now ready for advancement towards production.

**RECOMMENDATIONS**

Although the property has seen extensive drilling, a smaller follow up exploration program is recommended. The program will include further drilling and petrographic studies. The program is estimated at $300,000 US for the Berenguela Property. It should include:

1. A further 2000 metres of RC drilling to define edges of the deposit and one surface target;
2. Petrographic studies of the ore zone at Berenguela to better understand the mineralization and genesis of the deposit;

3. Improvements to the QA/QC program which include: checking for Standard Reference Material (SRM) failures and contaminated blanks and follow up with corrective action;

Budget

<table>
<thead>
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<th>Description</th>
<th>Cost</th>
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<tr>
<td>2000 metre drill program</td>
<td>$250,000</td>
</tr>
<tr>
<td>Petrographic study</td>
<td>$10,000</td>
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<tr>
<td>Assays</td>
<td>$40,000</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$300,000</strong></td>
</tr>
</tbody>
</table>

The Berenguela Property is a property of merit and the above listed exploration expenditures are warranted. The exploration program will potentially expand the known resources on the property and further the development of this property.
REFERENCES

Boggio, M. S., 1986, Peru: a Mining Country, Volume 4, Section Ore Deposits, Laboratorios Sevilla, Lima Peru, p. 1 - 1547

Burk, Ron, 2005, Personal communication, Silver Standard Resources Inc.


STATEMENT OF QUALIFICATIONS

I, James A. McCrea, am a Professional Geoscientist residing at 306 - 10743 139th Street, Surrey, British Columbia do state that:

• I have a B.Sc. in Geology from the University of Alberta, 1988.
• I have been working as a geologist continuously since graduation, for the past 17 years.
• I am a Registered Professional Geoscientist (P.Geo.), Practising, with the Association of Professional Engineers and Geoscientists of British Columbia. (Licence # 21450)
• I am a “qualified person” for the purposes of NI 43-101.
• I have visited the Berenguela Property on December 7th & 8th, 2004.
• I am responsible for all sections of the report titled Technical Report on The Berenguela Property.
• I am not aware of any material fact or material change related to this report that is not reflected in the technical report.
• I am an independent consultant with no promised or implied affiliation with Silver Standard Resources Inc. subject to the tests set out in section 1.5 of NI 43-101.
• I have had no prior involvement with the Berenguela Property before I visited it in December of 2004.
• I have read National Instrument 43-101 and Form 43-101F1 and the technical report has been prepared in compliance with this Instrument and Form 43-101F1.

October 26, 2005

James A. McCrea, B.Sc., P.Geo.
APEGBC Licence # 21450
Appendix 1

Resources Tables
### Berenguela Resource, August 2005

<table>
<thead>
<tr>
<th>Cut-off</th>
<th>Tonnage (000)</th>
<th>Ag PPM</th>
<th>Cu %</th>
<th>Mn %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicated Resources - All Zones</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>9227.902</td>
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<tr>
<td>70</td>
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<td>15570.555</td>
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<td>0.924</td>
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<td>18515.842</td>
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<td>0.883</td>
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<table>
<thead>
<tr>
<th>Cut-off</th>
<th>Tonnage (000)</th>
<th>Ag PPM</th>
<th>Cu %</th>
<th>Mn %</th>
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<td><strong>Indicated Resources - West Zone</strong></td>
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Appendix 2

Variograms
Silver Composites, 2 metre, Down Hole

\[ \text{Gamma}(h) = 0.1 + 0.743 \exp_{14.3}(h) + 0.157 \exp_{88}(h) \]
Silver Composites, 2 metre, in solid

User Defined Rotation Conventions

Nugget ==> 0.100
C1 ==> 0.694
C2 ==> 0.206

First Structure -- Exponential with Practical Range
RH Rotation about the Z axis ==> -10
RH Rotation about the Y’ axis ==> 62
RH Rotation about the Z’ axis ==> 50
Range along the Z’ axis ==> 81.2  Azimuth ==> 100  Dip ==> 28
Range along the Y’ axis ==> 14.4  Azimuth ==> 341  Dip ==> 42
Range along the X’ axis ==> 7.3   Azimuth ==> 32   Dip ==> -35

Second Structure -- Exponential with Practical Range
RH Rotation about the Z axis ==> -22
RH Rotation about the Y’ axis ==> -108
RH Rotation about the Z’ axis ==> 30
Range along the Z’ axis ==> 897.1  Azimuth ==> 292  Dip ==> -18
Range along the Y’ axis ==> 75.6   Azimuth ==> 32   Dip ==> -29
Range along the X’ axis ==> 49.4   Azimuth ==> 355  Dip ==> 56

Modeling Criteria
Minimum number pairs req’d ==> 350
Sample variogram points weighted by # pairs
Silver Composites, 2 metre, in solid

Structure Number 1

Rose Diagram of Ranges Dipping 0 Degrees

Scale:

80 Units
Silver Composites, 2 metre, in solid

Structure Number 1
Rose Diagram of Ranges Dipping 30 Degrees
Scale:

80 Units
Silver Composites, 2 metre, in solid

Structure Number 1
Rose Diagram of Ranges Dipping 60 Degrees
Scale:

80 Units

Isaaks & Co.
Consultants in Spatial Statistics
Silver Composites, 2 metre, in solid

Structure Number 2

Rose Diagram of Ranges Dipping 0 Degrees

Scale:

300 Units
Silver Composites, 2 metre, in solid

Structure Number 2
Rose Diagram of Ranges Dipping 30 Degrees
Scale:

300 Units
Silver Composites, 2 metre, in solid

Structure Number 2
Rose Diagram of Ranges Dipping 60 Degrees
Scale:

300 Units
Horizontal Slices Through the Ellipsoids

Reference Cube

X-Y Planes Looking Down

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Cross Section Views Through the Ellipsoids

Reference Cube

X-Z Planes Looking North

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Long Section Views Through the Ellipsoids

Reference Cube

Y-Z Planes Looking West

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Silver Composites, 2 metre, in solid

AZIMUTH = 0   DIP = 0
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.4}(h) + 0.206 \exp_{66.4}(h) \]

AZIMUTH = 30   DIP = 0
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.5}(h) + 0.206 \exp_{67.1}(h) \]

AZIMUTH = 60   DIP = 0
\[ \gamma(h) = 0.100 + 0.694 \exp_{10.0}(h) + 0.206 \exp_{88.1}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 90  DIP = 0
\[ \gamma(h) = 0.100 + 0.694 \exp^{-16.0(h)} + 0.206 \exp^{-157.6(h)} \]

AZIMUTH = 120  DIP = 0
\[ \gamma(h) = 0.100 + 0.694 \exp^{-24.9(h)} + 0.206 \exp^{-149.3(h)} \]

AZIMUTH = 150  DIP = 0
\[ \gamma(h) = 0.100 + 0.694 \exp^{-13.7(h)} + 0.206 \exp^{-85.1(h)} \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Silver Composites, 2 metre, in solid

AZIMUTH = 180  DIP = 0
γ(h) = 0.100 + 0.694 Exp_9.4(h) + 0.206 Exp_66.4(h)

AZIMUTH = 210  DIP = 0
γ(h) = 0.100 + 0.694 Exp_8.5(h) + 0.206 Exp_67.1(h)

AZIMUTH = 240  DIP = 0
γ(h) = 0.100 + 0.694 Exp_10.0(h) + 0.206 Exp_88.1(h)

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 270  DIP = 0

\[ \gamma(h) = 0.100 + 0.694 \exp(16.0h) + 0.206 \exp(157.6h) \]

*Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 300  DIP = 0

\[ \gamma(h) = 0.100 + 0.694 \exp(24.9h) + 0.206 \exp(149.3h) \]

*Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 330  DIP = 0

\[ \gamma(h) = 0.100 + 0.694 \exp(13.7h) + 0.206 \exp(85.1h) \]

*Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 0   DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.5}(h) + 0.206 \exp_{76.9}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 30   DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp_{7.7}(h) + 0.206 \exp_{73.1}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 60   DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.6}(h) + 0.206 \exp_{86.4}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 90  DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp(12.1h) + 0.206 \exp(107.3h) \]

AZIMUTH = 120  DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp(18.0h) + 0.206 \exp(91.5h) \]

AZIMUTH = 150  DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp(14.6h) + 0.206 \exp(67.5h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Silver Composites, 2 metre, in solid

AZIMUTH = 180   DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp^{10.6}(h) + 0.206 \exp^{58.0}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 210   DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp^{10.1}(h) + 0.206 \exp^{60.9}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 240   DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp^{12.6}(h) + 0.206 \exp^{81.9}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 270  DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp^{25.4}(h) + 0.206 \exp^{180.1}(h) \]

AZIMUTH = 300  DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp^{31.1}(h) + 0.206 \exp^{379.7}(h) \]

AZIMUTH = 330  DIP = -15
\[ \gamma(h) = 0.100 + 0.694 \exp^{12.5}(h) + 0.206 \exp^{111.2}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Silver Composites, 2 metre, in solid

**AZIMUTH = 0  DIP = -30**
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.2}(h) + 0.206 \exp_{84.8}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 30  DIP = -30**
\[ \gamma(h) = 0.100 + 0.694 \exp_{7.4}(h) + 0.206 \exp_{75.7}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 60  DIP = -30**
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.0}(h) + 0.206 \exp_{78.3}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 90  DIP = -30
\[ \gamma(h) = 0.100 + 0.694 \exp_{10.2}(h) + 0.206 \exp_{79.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 120  DIP = -30
\[ \gamma(h) = 0.100 + 0.694 \exp_{14.1}(h) + 0.206 \exp_{68.9}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 150  DIP = -30
\[ \gamma(h) = 0.100 + 0.694 \exp_{14.8}(h) + 0.206 \exp_{57.4}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 180  DIP = -30
\[ \gamma(h) = 0.100 + 0.694 \times \text{Exp}_{12.7}(h) + 0.206 \times \text{Exp}_{52.7}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 210  DIP = -30
\[ \gamma(h) = 0.100 + 0.694 \times \text{Exp}_{12.7}(h) + 0.206 \times \text{Exp}_{56.1}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 240  DIP = -30
\[ \gamma(h) = 0.100 + 0.694 \times \text{Exp}_{17.3}(h) + 0.206 \times \text{Exp}_{72.6}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

\[ \gamma(h) = 0.100 + 0.694 \exp^{25.9}(h) + 0.206 \exp^{121.0}(h) \]

AZIMUTH = 270  DIP = -30

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 300  DIP = -30

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 330  DIP = -30

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -45
$\gamma(h) = 0.100 + 0.694 \exp(8.2h) + 0.206 \exp(83.1h)$

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 30  DIP = -45
$\gamma(h) = 0.100 + 0.694 \exp(7.4h) + 0.206 \exp(73.0h)$

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 60  DIP = -45
$\gamma(h) = 0.100 + 0.694 \exp(7.8h) + 0.206 \exp(69.3h)$

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 90   DIP = -45
$\gamma(h) = 0.100 + 0.694 \exp_{9.4}(h) + 0.206 \exp_{65.2}(h)$

AZIMUTH = 120   DIP = -45
$\gamma(h) = 0.100 + 0.694 \exp_{12.0}(h) + 0.206 \exp_{58.3}(h)$

AZIMUTH = 150   DIP = -45
$\gamma(h) = 0.100 + 0.694 \exp_{14.1}(h) + 0.206 \exp_{52.2}(h)$
Silver Composites, 2 metre, in solid

AZIMUTH = 180  DIP = -45
\[ \gamma(h) = 0.100 + 0.694 \exp(14.6 \cdot h) + 0.206 \exp(50.0 \cdot h) \]

AZIMUTH = 210  DIP = -45
\[ \gamma(h) = 0.100 + 0.694 \exp(16.0 \cdot h) + 0.206 \exp(53.2 \cdot h) \]

AZIMUTH = 240  DIP = -45
\[ \gamma(h) = 0.100 + 0.694 \exp(22.7 \cdot h) + 0.206 \exp(64.7 \cdot h) \]

* Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

**AZIMUTH = 270  DIP = -45**

\[ \gamma(h) = 0.100 + 0.694 \exp_{36.3}(h) + 0.206 \exp_{90.1}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 300  DIP = -45**

\[ \gamma(h) = 0.100 + 0.694 \exp_{18.7}(h) + 0.206 \exp_{120.3}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 330  DIP = -45**

\[ \gamma(h) = 0.100 + 0.694 \exp_{10.8}(h) + 0.206 \exp_{105.7}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Silver Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -60
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.6}(h) + 0.206 \exp_{73.6}(h) \]

AZIMUTH = 30  DIP = -60
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.0}(h) + 0.206 \exp_{67.0}(h) \]

AZIMUTH = 60  DIP = -60
\[ \gamma(h) = 0.100 + 0.694 \exp_{8.2}(h) + 0.206 \exp_{62.3}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 90  DIP = -60
\[ \gamma(h) = 0.100 + 0.694 \exp_{9.2}(h) + 0.206 \exp_{58.0}(h) \]

AZIMUTH = 120  DIP = -60
\[ \gamma(h) = 0.100 + 0.694 \exp_{10.9}(h) + 0.206 \exp_{53.7}(h) \]

AZIMUTH = 150  DIP = -60
\[ \gamma(h) = 0.100 + 0.694 \exp_{12.9}(h) + 0.206 \exp_{50.4}(h) \]

* Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

**AZIMUTH = 180  DIP = -60**

\[ \gamma(h) = 0.100 + 0.694 \exp_{14.7}(h) + 0.206 \exp_{49.6}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 210  DIP = -60**

\[ \gamma(h) = 0.100 + 0.694 \exp_{17.0}(h) + 0.206 \exp_{52.3}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 240  DIP = -60**

\[ \gamma(h) = 0.100 + 0.694 \exp_{20.1}(h) + 0.206 \exp_{59.3}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

\[
\gamma(h) = 0.100 + 0.694 \exp_{19.8}(h) + 0.206 \exp_{70.7}(h)
\]

Sample variogram points with less than 350 pairs have not been plotted.

\[
\gamma(h) = 0.100 + 0.694 \exp_{14.4}(h) + 0.206 \exp_{81.0}(h)
\]

Sample variogram points with less than 350 pairs have not been plotted.

\[
\gamma(h) = 0.100 + 0.694 \exp_{10.5}(h) + 0.206 \exp_{80.6}(h)
\]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

**AZIMUTH = 0  DIP = -75**

\[ \gamma(h) = 0.100 + 0.694 \exp_{9.5}(h) + 0.206 \exp_{7.5}(h) \]

\*Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 30  DIP = -75**

\[ \gamma(h) = 0.100 + 0.694 \exp_{9.1}(h) + 0.206 \exp_{60.8}(h) \]

\*Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 60  DIP = -75**

\[ \gamma(h) = 0.100 + 0.694 \exp_{9.1}(h) + 0.206 \exp_{57.9}(h) \]

\*Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 90  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp_{10.7}(h) + 0.206 \exp_{55.2}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 120  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp_{10.6}(h) + 0.206 \exp_{53.0}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 150  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp_{11.8}(h) + 0.206 \exp_{51.6}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 180  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp_{13.0}(h) + 0.206 \exp_{51.6}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 210  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp_{14.0}(h) + 0.206 \exp_{53.2}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 240  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp_{14.5}(h) + 0.206 \exp_{56.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 270  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp(13.7h) + 0.206 \exp(60.7h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 300  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp(12.1h) + 0.206 \exp(64.1h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 330  DIP = -75
\[ \gamma(h) = 0.100 + 0.694 \exp(10.6h) + 0.206 \exp(65.0h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Silver Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -90
\[ \gamma(h) = 0.100 + 0.694 \exp_{11.0}(h) + 0.206 \exp_{56.1}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid, Down Hole

\[
\text{Gamma}(h) = 0.1 + 0.411 \exp^{10.7}(h) + 0.489 \exp^{76}(h)
\]
Copper Composites, 2 metre, in solid

User Defined Rotation Conventions

Nugget ==> 0.100
C1 ==> 0.247
C2 ==> 0.653

First Structure -- Exponential with Practical Range
RH Rotation about the Z axis ==> 6
RH Rotation about the Y’ axis ==> -18
RH Rotation about the Z’ axis ==> -71
Range along the Z’ axis ==> 4.8 Azimuth ==> 264 Dip ==> 72
Range along the Y’ axis ==> 23.8 Azimuth ==> 64 Dip ==> 17
Range along the X’ axis ==> 18.4 Azimuth ==> 156 Dip ==> 6

Second Structure -- Exponential with Practical Range
RH Rotation about the Z axis ==> 63
RH Rotation about the Y’ axis ==> -16
RH Rotation about the Z’ axis ==> -76
Range along the Z’ axis ==> 65.3 Azimuth ==> 207 Dip ==> 74
Range along the Y’ axis ==> 50.0 Azimuth ==> 13 Dip ==> 15
Range along the X’ axis ==> 148.4 Azimuth ==> 104 Dip ==> 4

Modeling Criteria
Minimum number pairs req’d ==> 350
Sample variogram points weighted by # pairs
Copper Composites, 2 metre, in solid

Structure Number 1
Rose Diagram of Ranges Dipping 0 Degrees
Scale:

20 Units
Copper Composites, 2 metre, in solid

Structure Number 1
Rose Diagram of Ranges Dipping 30 Degrees
Scale:

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Copper Composites, 2 metre, in solid

Structure Number 1

Rose Diagram of Ranges Dipping 60 Degrees

Scale:

20 Units
Copper Composites, 2 metre, in solid

Structure Number 2

Rose Diagram of Ranges Dipping 0 Degrees

Scale:

100 Units
Copper Composites, 2 metre, in solid

Structure Number 2
Rose Diagram of Ranges Dipping 30 Degrees
Scale:

100 Units
Copper Composites, 2 metre, in solid

Structure Number 2

Rose Diagram of Ranges Dipping 60 Degrees

Scale:

100 Units

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Consultants in Spatial Statistics
Horizontal Slices Through the Ellipsoids

Reference Cube

X-Y Planes Looking Down

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Cross Section Views Through the Ellipsoids

Reference Cube

X-Z Planes Looking North

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Long Section Views Through the Ellipsoids

Reference Cube

Y-Z Planes Looking West

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Copper Composites, 2 metre, in solid

AZIMUTH = 0 DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp(18.9h) + 0.653 \exp(52.0h) \]

AZIMUTH = 30 DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp(16.6h) + 0.653 \exp(52.7h) \]

AZIMUTH = 60 DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp(13.8h) + 0.653 \exp(69.6h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Copper Composites, 2 metre, in solid

AZIMUTH = 90  DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp(12.8h) + 0.653 \exp(125.1h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 120  DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp(13.7h) + 0.653 \exp(115.5h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 150  DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp(16.6h) + 0.653 \exp(66.2h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 180  DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp^{18.9}(h) + 0.653 \exp^{52.0}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 210  DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp^{16.6}(h) + 0.653 \exp^{52.7}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 240  DIP = 0
\[ \gamma(h) = 0.100 + 0.247 \exp^{13.8}(h) + 0.653 \exp^{69.6}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

**AZIMUTH = 270   DIP = 0**

\[ \gamma(h) = 0.100 + 0.247 \exp^{12.8}(h) + 0.653 \exp^{125.1}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 300   DIP = 0**

\[ \gamma(h) = 0.100 + 0.247 \exp^{13.7}(h) + 0.653 \exp^{115.5}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 330   DIP = 0**

\[ \gamma(h) = 0.100 + 0.247 \exp^{16.6}(h) + 0.653 \exp^{66.2}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Copper Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -15
\[ \gamma(h) = 0.100 + 0.247 \exp_{12.9}(h) + 0.653 \exp_{54.2}(h) \]

AZIMUTH = 30  DIP = -15
\[ \gamma(h) = 0.100 + 0.247 \exp_{10.1}(h) + 0.653 \exp_{54.7}(h) \]

AZIMUTH = 60  DIP = -15
\[ \gamma(h) = 0.100 + 0.247 \exp_{8.7}(h) + 0.653 \exp_{70.9}(h) \]
Copper Composites, 2 metre, in solid

\[ \gamma(h) = 0.100 + 0.247 \exp(8.3h) + 0.653 \exp(113.7h) \]

AZIMUTH = 90  DIP = -15

Sample variogram points with less than 350 pairs have not been plotted.

\[ \gamma(h) = 0.100 + 0.247 \exp(8.9h) + 0.653 \exp(100.8h) \]

AZIMUTH = 120  DIP = -15

Sample variogram points with less than 350 pairs have not been plotted.

\[ \gamma(h) = 0.100 + 0.247 \exp(10.8h) + 0.653 \exp(63.4h) \]

AZIMUTH = 150  DIP = -15

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 180  DIP = -15
\[ \gamma(h) = 0.100 + 0.247 \exp(14.8h) + 0.653 \exp(51.1h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 210  DIP = -15
\[ \gamma(h) = 0.100 + 0.247 \exp(20.8h) + 0.653 \exp(52.0h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 240  DIP = -15
\[ \gamma(h) = 0.100 + 0.247 \exp(23.4h) + 0.653 \exp(67.7h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 270  DIP = -15

γ(h) = 0.100 + 0.247 \text{Exp}\,_{21.7}(h) + 0.653 \text{Exp}\,_{115.7}(h)

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 300  DIP = -15

γ(h) = 0.100 + 0.247 \text{Exp}\,_{19.8}(h) + 0.653 \text{Exp}\,_{116.0}(h)

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 330  DIP = -15

γ(h) = 0.100 + 0.247 \text{Exp}\,_{16.8}(h) + 0.653 \text{Exp}\,_{69.0}(h)

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp^{8.7}(h) + 0.653 \exp^{57.6}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 30  DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp^{7.2}(h) + 0.653 \exp^{57.8}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 60  DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp^{6.5}(h) + 0.653 \exp^{70.9}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 90   DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp(0.63h) + 0.653 \exp(94.7h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 120   DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp(6.6h) + 0.653 \exp(85.1h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 150   DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp(7.7h) + 0.653 \exp(61.3h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 180  DIP = -30

\[ \gamma(h) = 0.100 + 0.247 \exp(9.6h) + 0.653 \exp(51.5h) \]

AZIMUTH = 210  DIP = -30

\[ \gamma(h) = 0.100 + 0.247 \exp(12.7h) + 0.653 \exp(52.5h) \]

AZIMUTH = 240  DIP = -30

\[ \gamma(h) = 0.100 + 0.247 \exp(16.0h) + 0.653 \exp(65.6h) \]
Copper Composites, 2 metre, in solid

AZIMUTH = 270  DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp^{16.4(h)} + 0.653 \exp^{96.7(h)} \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 300  DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp^{13.9(h)} + 0.653 \exp^{101.7(h)} \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 330  DIP = -30
\[ \gamma(h) = 0.100 + 0.247 \exp^{11.0(h)} + 0.653 \exp^{71.0(h)} \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -45
\[ \gamma(h) = 0.100 + 0.247 \exp(6.6h) + 0.653 \exp(61.5h) \]

AZIMUTH = 30  DIP = -45
\[ \gamma(h) = 0.100 + 0.247 \exp(5.9h) + 0.653 \exp(61.3h) \]

AZIMUTH = 60  DIP = -45
\[ \gamma(h) = 0.100 + 0.247 \exp(5.4h) + 0.653 \exp(69.6h) \]

* Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 90  DIP = -45
\[ \gamma(h) = 0.100 + 0.247 \exp(5.3h) + 0.653 \exp(79.8h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 120  DIP = -45
\[ \gamma(h) = 0.100 + 0.247 \exp(5.5h) + 0.653 \exp(73.7h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 150  DIP = -45
\[ \gamma(h) = 0.100 + 0.247 \exp(6.1h) + 0.653 \exp(60.3h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

**AZIMUTH = 180  DIP = -45**

\[ \gamma(h) = 0.100 + 0.247 \exp^{7.1}(h) + 0.653 \exp^{53.4}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 210  DIP = -45**

\[ \gamma(h) = 0.100 + 0.247 \exp^{8.4}(h) + 0.653 \exp^{54.4}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 240  DIP = -45**

\[ \gamma(h) = 0.100 + 0.247 \exp^{9.5}(h) + 0.653 \exp^{63.9}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

**AZIMUTH = 270  DIP = -45**

\[ \gamma(h) = 0.100 + 0.247 \exp_{9.8}(h) + 0.653 \exp_{81.2}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 300  DIP = -45**

\[ \gamma(h) = 0.100 + 0.247 \exp_{9.0}(h) + 0.653 \exp_{85.8}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 330  DIP = -45**

\[ \gamma(h) = 0.100 + 0.247 \exp_{7.7}(h) + 0.653 \exp_{71.1}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Copper Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp^{5.6}(h) + 0.653 \exp^{64.7}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 30  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp^{5.2}(h) + 0.653 \exp^{64.3}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 60  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp^{4.9}(h) + 0.653 \exp^{67.7}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 90  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp(4.9h) + 0.653 \exp(70.4h) \]

AZIMUTH = 120  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp(5.0h) + 0.653 \exp(66.9h) \]

AZIMUTH = 150  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp(5.3h) + 0.653 \exp(60.4h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 180  DIP = -60

$\gamma(h) = 0.100 + 0.247 \exp_{6.9}(h) + 0.653 \exp_{56.4}(h)$

AZIMUTH = 210  DIP = -60

$\gamma(h) = 0.100 + 0.247 \exp_{6.4}(h) + 0.653 \exp_{57.3}(h)$

AZIMUTH = 240  DIP = -60

$\gamma(h) = 0.100 + 0.247 \exp_{6.9}(h) + 0.653 \exp_{63.0}(h)$

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 270  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp(7.0h) + 0.653 \exp(71.2h) \]

AZIMUTH = 300  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp(6.7h) + 0.653 \exp(74.2h) \]

AZIMUTH = 330  DIP = -60
\[ \gamma(h) = 0.100 + 0.247 \exp(6.2h) + 0.653 \exp(69.5h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Copper Composites, 2 metre, in solid

**AZIMUTH = 0  DIP = -75**

\[ \gamma(h) = 0.100 + 0.247 \exp_{4.1}(h) + 0.653 \exp_{65.7}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 30  DIP = -75**

\[ \gamma(h) = 0.100 + 0.247 \exp_{4.9}(h) + 0.653 \exp_{65.3}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 60  DIP = -75**

\[ \gamma(h) = 0.100 + 0.247 \exp_{4.8}(h) + 0.653 \exp_{65.6}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
AZIMUTH = 90  DIP = -75

\[ \gamma(h) = 0.100 + 0.247 \exp(4.8h) + 0.653 \exp(65.4h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 120  DIP = -75

\[ \gamma(h) = 0.100 + 0.247 \exp(4.9h) + 0.653 \exp(63.8h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 150  DIP = -75

\[ \gamma(h) = 0.100 + 0.247 \exp(5.0h) + 0.653 \exp(61.6h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 180  DIP = -75
\[ \gamma(h) = 0.100 + 0.247 \exp_{5.2}(h) + 0.653 \exp_{60.3}(h) \]

AZIMUTH = 210  DIP = -75
\[ \gamma(h) = 0.100 + 0.247 \exp_{5.5}(h) + 0.653 \exp_{60.8}(h) \]

AZIMUTH = 240  DIP = -75
\[ \gamma(h) = 0.100 + 0.247 \exp_{5.6}(h) + 0.653 \exp_{63.0}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Copper Composites, 2 metre, in solid

AZIMUTH = 270  DIP = -75
\[ \gamma(h) = 0.100 + 0.247 \exp(5.7h) + 0.653 \exp(65.7h) \]

AZIMUTH = 300  DIP = -75
\[ \gamma(h) = 0.100 + 0.247 \exp(5.6h) + 0.653 \exp(67.2h) \]

AZIMUTH = 330  DIP = -75
\[ \gamma(h) = 0.100 + 0.247 \exp(5.4h) + 0.653 \exp(66.8h) \]

* Sample variogram points with less than 350 pairs have not been plotted.
Copper Composites, 2 metre, in solid

AZIMUTH = 0  DIP = -90

\[ \gamma(h) = 0.100 + 0.247 \exp(0.0h) + 0.653 \exp(0.9h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid, Down Hole

\[ \text{Gamma}(h) = 0.05 + 0.694 \exp(0.15h) + 0.256 \exp(2.5h) \]
Manganese Composites, 2 metres, in solid

User Defined Rotation Conventions

Nugget ==> 0.050
C1 ==> 0.707
C2 ==> 0.243

First Structure -- Exponential with Practical Range
RH Rotation about the Z' axis ==> -51
RH Rotation about the Y' axis ==> 77
RH Rotation about the Z'' axis ==> -38
Range along the Z' axis ==> 16.7 Azimuth ==> 141 Dip ==> 13
Range along the Y' axis ==> 11.4 Azimuth ==> 61 Dip ==> -37
Range along the X' axis ==> 38.6 Azimuth ==> 214 Dip ==> -50

Second Structure -- Exponential with Practical Range
RH Rotation about the Z' axis ==> 68
RH Rotation about the Y' axis ==> -29
RH Rotation about the Z'' axis ==> 20
Range along the Z' axis ==> 200.9 Azimuth ==> 202 Dip ==> 61
Range along the Y' axis ==> 372.9 Azimuth ==> 275 Dip ==> -9
Range along the X' axis ==> 111.9 Azimuth ==> 0 Dip ==> 27

Modeling Criteria
Minimum number pairs req’d ==> 350
Sample variogram points weighted by # pairs
Manganese Composites, 2 metres, in solid

Structure Number 1
Rose Diagram of Ranges Dipping 0 Degrees
Scale:

30 Units
Manganese Composites, 2 metres, in solid

Structure Number 1

Rose Diagram of Ranges Dipping 30 Degrees
Scale:

30 Units
Manganese Composites, 2 metres, in solid

Structure Number 1

Rose Diagram of Ranges Dipping 60 Degrees

Scale:

30 Units
Manganese Composites, 2 metres, in solid

Structure Number 2

Rose Diagram of Ranges Dipping 0 Degrees

Scale:

400 Units
Manganese Composites, 2 metres, in solid

Structure Number 2
Rose Diagram of Ranges Dipping 30 Degrees
Scale:

400 Units
Manganese Composites, 2 metres, in solid

Structure Number 2
Rose Diagram of Ranges Dipping 60 Degrees
Scale:

400 Units
Horizontal Slices Through the Ellipsoids

Reference Cube

X-Y Planes Looking Down

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Cross Section Views Through the Ellipsoids

Reference Cube

X-Z Planes Looking North

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Long Section Views Through the Ellipsoids

Reference Cube

Y-Z Planes Looking West

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".
Manganese Composites, 2 metres, in solid

AZIMUTH = 0  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{17.2}(h) + 0.243 \exp_{121.0}(h) \]

AZIMUTH = 30  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{15.2}(h) + 0.243 \exp_{135.5}(h) \]

AZIMUTH = 60  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{13.8}(h) + 0.243 \exp_{203.2}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Manganese Composites, 2 metres, in solid

AZIMUTH = 90  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{13.8}(h) + 0.243 \exp_{358.5}(h) \]

AZIMUTH = 120  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{15.3}(h) + 0.243 \exp_{215.2}(h) \]

AZIMUTH = 150  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{17.2}(h) + 0.243 \exp_{138.9}(h) \]
Manganese Composites, 2 metres, in solid

$\gamma(h) = 0.050 + 0.707 \exp_{17.2}(h) + 0.243 \exp_{121.0}(h)$

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 180   DIP = 0

$\gamma(h) = 0.050 + 0.707 \exp_{15.2}(h) + 0.243 \exp_{135.5}(h)$

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 240   DIP = 0

$\gamma(h) = 0.050 + 0.707 \exp_{13.8}(h) + 0.243 \exp_{203.2}(h)$

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

AZIMUTH = 270  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{13.8}(h) + 0.243 \exp_{358.5}(h) \]

AZIMUTH = 300  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{15.3}(h) + 0.243 \exp_{215.2}(h) \]

AZIMUTH = 330  DIP = 0
\[ \gamma(h) = 0.050 + 0.707 \exp_{17.2}(h) + 0.243 \exp_{138.9}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Manganese Composites, 2 metres, in solid

AZIMUTH = 0   DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp_{15.0}(h) + 0.243 \exp_{135.0}(h) \]

AZIMUTH = 30   DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp_{13.1}(h) + 0.243 \exp_{150.5}(h) \]

AZIMUTH = 60   DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp_{12.2}(h) + 0.243 \exp_{220.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
**Manganese Composites, 2 metres, in solid**

AZIMUTH = 90  DIP = -15

\[ \gamma(h) = 0.050 + 0.707 \exp(12.6h) + 0.243 \exp(300.9h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

AZIMUTH = 120  DIP = -15

\[ \gamma(h) = 0.050 + 0.707 \exp(14.5h) + 0.243 \exp(184.5h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

AZIMUTH = 150  DIP = -15

\[ \gamma(h) = 0.050 + 0.707 \exp(18.1h) + 0.243 \exp(127.8h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Manganese Composites, 2 metres, in solid

AZIMUTH = 180  DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp_{20.8}(h) + 0.243 \exp_{113.7}(h) \]

AZIMUTH = 210  DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp_{19.2}(h) + 0.243 \exp_{126.7}(h) \]

AZIMUTH = 240  DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp_{16.9}(h) + 0.243 \exp_{184.3}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Manganese Composites, 2 metres, in solid

AZIMUTH = 270  DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp(16.2h) + 0.243 \exp(347.9h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 300  DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp(16.5h) + 0.243 \exp(252.4h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 330  DIP = -15
\[ \gamma(h) = 0.050 + 0.707 \exp(16.5h) + 0.243 \exp(157.5h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

\[ \gamma(h) = 0.050 + 0.707 \exp^{13.8}(h) + 0.243 \exp^{156.9}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 0  DIP = -30

\[ \gamma(h) = 0.050 + 0.707 \exp^{12.3}(h) + 0.243 \exp^{171.3}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 60  DIP = -30

\[ \gamma(h) = 0.050 + 0.707 \exp^{11.5}(h) + 0.243 \exp^{226.9}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

AZIMUTH = 90  DIP = -30
\[ \gamma(h) = 0.050 + 0.707 \exp_{12.0}(h) + 0.243 \exp_{241.3}(h) \]

AZIMUTH = 120  DIP = -30
\[ \gamma(h) = 0.050 + 0.707 \exp_{14.1}(h) + 0.243 \exp_{164.5}(h) \]

AZIMUTH = 150  DIP = -30
\[ \gamma(h) = 0.050 + 0.707 \exp_{18.8}(h) + 0.243 \exp_{123.2}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

**AZIMUTH = 180  DIP = -30**

\[ \gamma(h) = 0.050 + 0.707 \exp^{25.6(h)} + 0.243 \exp^{112.0(h)} \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 210  DIP = -30**

\[ \gamma(h) = 0.050 + 0.707 \exp^{26.8(h)} + 0.243 \exp^{123.6(h)} \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 240  DIP = -30**

\[ \gamma(h) = 0.050 + 0.707 \exp^{22.6(h)} + 0.243 \exp^{169.6(h)} \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

**AZIMUTH = 270  DIP = -30**

\[ \gamma(h) = 0.050 + 0.707 \exp_{19.7}(h) + 0.243 \exp_{284.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 300  DIP = -30**

\[ \gamma(h) = 0.050 + 0.707 \exp_{18.0}(h) + 0.243 \exp_{274.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 330  DIP = -30**

\[ \gamma(h) = 0.050 + 0.707 \exp_{16.1}(h) + 0.243 \exp_{183.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Sample variogram points with less than 350 pairs have not been plotted.

\[
\gamma(h) = 0.050 + 0.707 \exp^{13.5}(h) + 0.243 \exp^{184.3}(h)
\]

\[
\gamma(h) = 0.050 + 0.707 \exp^{12.0}(h) + 0.243 \exp^{192.6}(h)
\]

\[
\gamma(h) = 0.050 + 0.707 \exp^{11.5}(h) + 0.243 \exp^{217.7}(h)
\]
Manganese Composites, 2 metres, in solid

AZIMUTH = 90  DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp_{12.1}(h) + 0.243 \exp_{201.9}(h) \]

AZIMUTH = 120  DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp_{14.3}(h) + 0.243 \exp_{153.7}(h) \]

AZIMUTH = 150  DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp_{19.1}(h) + 0.243 \exp_{124.3}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Manganese Composites, 2 metres, in solid

AZIMUTH = 180   DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp(28.6h) + 0.243 \exp(115.8h) \]

AZIMUTH = 210   DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp(37.2h) + 0.243 \exp(125.8h) \]

AZIMUTH = 240   DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp(31.0h) + 0.243 \exp(160.5h) \]

* Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

AZIMUTH = 270  DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp_{23.9}(h) + 0.243 \exp_{229.6}(h) \]

AZIMUTH = 300  DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp_{19.3}(h) + 0.243 \exp_{258.5}(h) \]

AZIMUTH = 330  DIP = -45
\[ \gamma(h) = 0.050 + 0.707 \exp_{15.9}(h) + 0.243 \exp_{209.1}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

$\gamma(h) = 0.050 + 0.707 \exp_{13.9}(h) + 0.243 \exp_{202.7}(h)$

Sample variogram points with less than 350 pairs have not been plotted.

Sample variogram points with less than 350 pairs have not been plotted.

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

**AZIMUTH = 90  DIP = -60**

\[ \gamma(h) = 0.050 + 0.707 \exp_{12.9}(h) + 0.243 \exp_{179.2}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 120  DIP = -60**

\[ \gamma(h) = 0.050 + 0.707 \exp_{14.9}(h) + 0.243 \exp_{150.7}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 150  DIP = -60**

\[ \gamma(h) = 0.050 + 0.707 \exp_{18.8}(h) + 0.243 \exp_{131.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

**AZIMUTH = 180  DIP = -60**

\[ \gamma(h) = 0.050 + 0.707 \exp_{25.9}(h) + 0.243 \exp_{125.6}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 210  DIP = -60**

\[ \gamma(h) = 0.050 + 0.707 \exp_{33.6}(h) + 0.243 \exp_{133.5}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 240  DIP = -60**

\[ \gamma(h) = 0.050 + 0.707 \exp_{31.8}(h) + 0.243 \exp_{157.1}(h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Manganese Composites, 2 metres, in solid

AZIMUTH = 270  DIP = -60
\[ \gamma(h) = 0.050 + 0.707 \exp^{-24.9(h)} + 0.243 \exp^{-194.9(h)} \]

AZIMUTH = 300  DIP = -60
\[ \gamma(h) = 0.050 + 0.707 \exp^{-19.6(h)} + 0.243 \exp^{-221.8(h)} \]

AZIMUTH = 330  DIP = -60
\[ \gamma(h) = 0.050 + 0.707 \exp^{-16.1(h)} + 0.243 \exp^{-215.0(h)} \]
Manganese Composites, 2 metres, in solid

AZIMUTH = 0   DIP = -75
\[ \gamma(h) = 0.050 + 0.707 \exp(15.1h) + 0.243 \exp(193.8h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 30   DIP = -75
\[ \gamma(h) = 0.050 + 0.707 \exp(14.2h) + 0.243 \exp(189.3h) \]

Sample variogram points with less than 350 pairs have not been plotted.

AZIMUTH = 60   DIP = -75
\[ \gamma(h) = 0.050 + 0.707 \exp(14.1h) + 0.243 \exp(181.1h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

**AZIMUTH = 90  DIP = -75**
\[ \gamma(h) = 0.050 + 0.707 \exp_{14.6}(h) + 0.243 \exp_{168.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 120  DIP = -75**
\[ \gamma(h) = 0.050 + 0.707 \exp_{15.9}(h) + 0.243 \exp_{155.0}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.

**AZIMUTH = 150  DIP = -75**
\[ \gamma(h) = 0.050 + 0.707 \exp_{18.2}(h) + 0.243 \exp_{145.5}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

**AZIMUTH = 180  DIP = -75**

\[ \gamma(h) = 0.050 + 0.707 \exp(-21.1h) + 0.243 \exp(-142.6h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 210  DIP = -75**

\[ \gamma(h) = 0.050 + 0.707 \exp(-23.4h) + 0.243 \exp(-147.4h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*

**AZIMUTH = 240  DIP = -75**

\[ \gamma(h) = 0.050 + 0.707 \exp(-23.4h) + 0.243 \exp(-159.4h) \]

*Sample variogram points with less than 350 pairs have not been plotted.*
Manganese Composites, 2 metres, in solid

AZIMUTH = 270  DIP = -75
\[ \gamma(h) = 0.050 + 0.707 \exp_{21.4}(h) + 0.243 \exp_{175.6}(h) \]

AZIMUTH = 300  DIP = -75
\[ \gamma(h) = 0.050 + 0.707 \exp_{18.8}(h) + 0.243 \exp_{189.2}(h) \]

AZIMUTH = 330  DIP = -75
\[ \gamma(h) = 0.050 + 0.707 \exp_{16.6}(h) + 0.243 \exp_{194.9}(h) \]

* Sample variogram points with less than 350 pairs have not been plotted.
Manganese Composites, 2 metres, in solid

AZIMUTH = 0  DIP = -90

\[ \gamma(h) = 0.050 + 0.707 \exp_{17.4}(h) + 0.243 \exp_{167.3}(h) \]

Sample variogram points with less than 350 pairs have not been plotted.
Appendix 3

Assay Laboratory Certification
ALS Chemex Accreditation

Peru – Bureau Veritas

North America – BSI

ALS Chemex in Peru and Canada are registered to ISO 9001:2000 (which replaces ISO 9002:1994). In addition, ALS Chemex is actively pursuing accreditation to ISO Guide 17025 (General requirements for the competence of testing and calibration laboratories).