NI 43-101 Technical Report on Mineral Resources
Black Butte Copper Project
White Sulphur Springs, MT, USA

Effective Date: October 15, 2019
Report Date: December 6, 2019

Report Prepared for

Sandfire Resources America, Inc.

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Signed by Qualified Persons:

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DATE & SIGNATURE PAGE

Herewith, our report entitled "NI 43-101 Technical Report on Mineral Resources, Black Butte Copper Project, White Sulphur Springs, MT, USA" with an effective date of October 15, 2019

"Signed"

December 6, 2019

Erik Ronald, MEng, P.Geo, SME-RM
Principal Consultant (Resource Geology)
SRK Consulting (U.S.) Inc.

Dated

"Signed"

December 6, 2019

Deepak Malhotra, PhD, SME-RM
President
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Dated

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1 Summary

This report was prepared as a Canadian National Instrument 43-101 (NI 43-101) Technical Report on Mineral Resources for Sandfire Resources America Inc. (SRA) by SRK Consulting (U.S.) Inc. (SRK) on the Black Butte Copper Project (Black Butte, or the Project) located in south-central Montana, USA. The Project contains the Johnny Lee deposit along with various other regional prospects.

1.1 Property Description and Ownership

1.1.1 Property Description and Location

The Black Butte project consists of 3,223.03 hectares (ha) of fee simple lands under a mineral lease by SRA and 525 unpatented mining claims on United States Forest Service (USFS) land, leased by SRA, totaling 4,036.74 ha. The project is located in south-central Montana in Meagher County, 27 kilometers (km) north of White Sulphur Springs. The Johnny Lee copper deposit, which forms the focus of this technical report, was discovered in a joint venture between Broken Hill Propriety Ltd. (BHP) and Cominco American Inc. (CAI) in 1985. The Johnny Lee copper deposit is centered about geographical coordinates 46°46’90”N, 110°54’45”W.

1.1.2 Ownership

The Johnny Lee copper deposit is located on two tracts of fee simple lands referred to as the Bar Z tract and the Short tract.

SRA has one surface lease and three mineral leases that collectively cover 100% of the Bar Z tract in the Johnny Lee area. The leases were signed in May 2010 and are valid for a 30-year period, renewable for subsequent periods of 10 years each. Under the surface lease agreement, the landowner has the option to transfer the title to the lands necessary for construction and operating a mining and milling operation to SRA and be compensated for the land at the appraised value. Annual payments of $75,000 are to be made by SRA for the duration of the surface lease. Under the mineral lease agreements, a net smelter return royalty (NSR) of 5%, split equally between the three mineral lease holders, is payable on any mineral concentrates produced by SRA. Minimum advance annual royalty payments of $64,600 are payable to each of the three mineral lease holders by SRA. The NSR can be reduced to 2% by payment of $1,666,666 to each of the lease holders. Exercising the NSR reduction option eliminates further advance royalty payments.

The Short tract surface lease and two mineral leases cover 100% of the Short tract in the Johnny Lee area and are valid for a 30-year period, renewable for subsequent periods of 10 years each. The Short tract surface lease, signed in April 2010, requires annual payments of US$4,000 by SRA. All other terms of the surface lease are the same as those described above for the Bar Z tract. The original mineral lease for the Short tract was signed in May 2010 but has since been subdivided between the Short Family (15% share of mineral rights) and Holmstrom’s Sheep Creek Ranch LLC. (85% share of mineral rights). A revised mineral lease agreement signed with the Short family in December 2014 requires an advance royalty payment of US$24,120.30 per year plus an additional US$10,000 per year in rent. The mineral lease agreement signed with Holmstrom’s Sheep Creek Ranch LLC. requires an advance royalty payment of US$136,681.70 per year. The combined mineral interest has an NSR of 5%, with an option to reduce this to 2% by payment of US$5 million. Exercising the NSR reduction option eliminates further advance royalty payments.

1.2 Geology and Mineralization

The Johnny Lee copper deposit is hosted by Mesoproterozoic sedimentary rocks of the Newland Formation of the Belt Supergroup that were deposited in a portion of the Belt-Purcell basin referred to as the Helena Embayment. The Newland Formation comprises shale, carbonaceous shale, calcareous shale, dolomite, conglomerate, sedimentary breccia and, bedded-pyrite massive sulphide (massive sulphide) that was deposited along the fault controlled, northern margin of the Helena Embayment.

Copper mineralization at the Johnny Lee deposit is hosted by two massive sulphide units that occur at different stratigraphic levels within the sedimentary succession. These units are referred to as the Upper Sulphide Zone (USZ) and Lower Sulphide Zone (LSZ). Copper mineralization of economic significance in the USZ and LSZ is developed sub-parallel to bedding in the massive sulphide but is localized and mineralization is interpreted to have formed subsequent to the formation of the host units. In places, economically significant copper mineralization extends into the clastic sediment units above, below, and interbedded with the massive sulphide.

Subsequent to the hydrothermal event that produced the copper mineralization, the Belt Group and overlying Cambrian to Devonian rocks were deformed during the Laramide orogeny. Initial northeast vergent deformation in the Johnny Lee area resulted in the formation of gentle west-northwest (WNW) plunging, upright, open folds. Further progressive deformation led to the development of curvi-planar southward dipping, oblique reverse-sinistral faults such as the Volcano Valley Fault Zone (VVFZ). The north-northeast (NNE) striking, steeply west-dipping, oblique reverse-dextral Fault 1 formed as a second order structure conjugate to the VVFZ.

The zone of greater than 0.25% copper mineralization in the USZ is referred to as the Upper Copper Zone (UCZ). The UCZ is gently folded by a WNW plunging syncline-anticline pair such that its strike is variable and its dip ranges from 0° to 20°. The northeastern part of the UCZ outcrops and is oxidized to a depth of 13 meters (m) below surface (most of this oxidized mineralization is located on the McGuire parcel which is excluded from the Black Butte project). Within the SRA mineral tenure, the UCZ occurs at depths of 40 to 210 m below surface.

The UCZ is truncated in the north by the VVFZ and is transected and displaced by Fault 1 which divides the UCZ into Eastern and Western blocks. The UCZ Western block has plan dimensions of 1,000 m long by 440 m wide and a thickness that ranges from 4 to 45 m. The UCZ in the Eastern Block has plan dimensions of 950 m long by 140 to 185 m wide and a thickness that ranges from 5 to 37 m. Within the zone of more than 0.25% copper mineralization, the UCZ contains one to six, stacked bedding, sub-parallel zones of more than 1.2% copper mineralization that range in thickness from 1 m to 12 m.

Primary copper mineralization in the UCZ occurs as copper sulphides (chalcopyrite, tennantite, bornite and cuprian-siegenite) that texturally overprint early framboidal or melnikovite textured pyrite. Copper sulphide grain size and liberation characteristics in the UCZ are a function of both host lithofacies variation and the amount of progressive hydrothermal remobilization that has occurred. The northern part of the UCZ generally experienced stronger hydrothermal remobilization and exhibits coarse grained, well-liberated copper sulphides, and recrystallized euhedral pyrite. The southern part of the UCZ is generally characterized by fine grained copper sulphides that are interstitial to early pyrite. Heterogeneous hydrothermal activity, and preferential replacement of atoll-textured pyrite, in the southern part of the UCZ has created localized zones of coarse grained, well-liberated copper sulphide.

The intersection zone of Fault 1 and a bedding sub-parallel, brittle-ductile shear zone has resulted in enhanced fracturing and has allowed localized water ingress into the UCZ, below the local level of surficial oxidation. Primary copper sulphides in this zone have been supergene altered to chalcocite, covellite, and secondary bornite.

Arsenic in the UCZ occurs in tennantite, marcasite, and pyrite. The concentrations of these minerals in the UCZ is highly variable.

Within the LSZ, a deeper copper mineralization zone is termed the Lower Copper Zone (LCZ). The LCZ is situated below the UCZ, at depths of 340 to 520 m below surface. Mineralization occurs in three lenses representing copper grades greater than 2%, that occur at the same stratigraphic level, termed the West, Central, and East lenses. These lenses are truncated to the south by the VVFZ. The three LCZ lenses strike east-west and dip to the south at 15°to 30°, the variable dip resultant from gentle folding during Laramide orogenesis. The East lens has a strike length of 450 m, a down-dip extent that ranges from 45 to 250 m and a thickness that ranges from 1 to 15 m. The Central lens has a strike length of 360 m a down-dip extent that ranges from 35 to 270 m and a thickness that ranges from 1 to 8 m. The West lens has a strike length of 350 m, a down-dip extent that ranges from 45 to 200 m and a thickness that ranges from 1 to 6 m.

The LCZ has been subject to a significantly higher intensity of hydrothermal activity compared with the UCZ. Pyrite in the LCZ is predominantly crystalline, although minor relict, fine-grained partially recrystallized framboidal or melnikovite pyrite occurs. Copper mineralization in the LCZ is almost entirely hosted by chalcopyrite that is coarse-grained in comparison with the northern part of the UCZ. Trace amounts of tennantite are rarely observed, typically interstitial to early pyrite. Arsenic concentrations in the LCZ are considered minor.

The Johnny Lee deposit is considered a hybrid SEDEX (sedimentary exhalative sulphide) – SCC (sediment-hosted stratabound copper) deposit. It is likely that current fault architecture represents reactivated, basin rift and transform fault architecture, the intersections of which formed feeder structures for mineralizing hydrothermal fluids during basin evolution.

1.3 Status of Exploration, Development and Operations

From 1975 to 1984 several companies undertook exploration in the Black Butte project area, but no significant mineralization was discovered. A joint venture between BHP and CAI discovered the Johnny Lee deposit in 1985. BHP exited the joint venture in 1990, where after CAI continued to explore and discovered the Lowry zone, but abandoned the project in 1995.

In 2010 Tintina Resources Inc. (Tintina) acquired the mineral rights formerly owned by CAI and, between 2010 to 2012 and completed 168 diamond drillholes, primarily focused on Resource definition and preliminary economic assessment (PEA) work at the Johnny Lee and Lowry deposits. Sandfire Resources NL acquired an initial shareholding in Tintina in 2013 and the company name was subsequently changed to SRA.

Subsequent to acquisition by SRA, an additional 87 diamond drillholes have been completed to support Resource definition, metallurgical test work and geotechnical studies.

Much of the area overlying prospective stratigraphy in the Black Butte project area has been soil sampled at a line spacing that ranges from 200 to 800 m. Robust copper in soil anomalies have been identified at the Johnny Lee Deposit as well as other copper prospects in the vicinity.

1.4 Mineral Processing and Metallurgical Testing

Previous metallurgical test work programs undertaken by Tintina and SRA indicated that production of a copper concentrate from the LCZ by froth flotation recovered 93.3% to 96.6% of the copper resulting in a concentrate grading 27% to 30.8% copper. Tests on UCZ composites during the same test programs showed a wide range of copper recoveries (61.9% to 91.2%) at concentrate grades of 18.5% to 24.5% copper. Mineralogical investigation of UCZ metallurgical composites indicated that copper sulphide liberation was the primary metric that defined metallurgical performance.

Systematic mineralogical investigation of UCZ drill intercepts was undertaken to define the vertical and lateral variability in copper sulphide liberation throughout the entire UCZ. This study also allowed the geometry of the supergene alteration zone (at the intersection of Fault 1 and the brittle-ductile shear zone) to be resolved. The supergene altered zone comprises 2.2% of the total volume of the UCZ.

Based on the mineralogy derived geometallurgical model, 19 PQ diameter (85 millimeter [mm]) diamond drillholes were targeted to intersect the complete range of UCZ copper liberation types. From these drillholes, 21 metallurgical composites were developed, including two composites from the supergene alteration zone.

Comprehensive batch rougher and cleaner tests were completed on all 21 UCZ metallurgical composites to determine the optimum primary grind size, reagent suite, rougher regrind size and flow-sheet for UCZ ore. Tests undertaken with site water showed no significant differences to those completed with laboratory tap water. Two rounds of locked cycle tests were conducted, using a representative subset (seven to eight composites) of the UCZ composites using slightly different regrind sizes and different grinding media.

The locked cycle tests on non-supergene altered composites, using the optimized flow sheet, recovered 70.6% to 90.1% of the copper into a concentrate grading of 16.9% to 27.1% copper. Locked cycle testing of a supergene altered UCZ composite recovered 69.8% of the copper into a concentrate grading of 14.1% copper. A blend of the six non-supergene altered composites was used to create an UCZ Global Composite. Locked cycle testing of this composite recovered 81.6% copper into a concentrate grading 24.4% copper.

Given the amount of variability in non-supergene altered UCZ composites the relationship between copper recovery, categorized proportional geometallurgical core logging, comprehensive geochemistry and systematic mineralogy was evaluated in detail. Of these, mineragraphy-defined copper sulphide liberation metrics showed the best correlation with recovery. The regression-based formula below defines the relationship between variability batch test cleaner copper recovery (from the 19, non-supergene altered composites) with five mineralogy derived metrics:

$$\text{Variability Test Cu Cleaner Recovery} = 94.144 + (0.10615*(A+B)) + (-0.28667*(C+D)) + (-0.26708*E)$$

- *A* =% Chalcopyrite Interlocked with Marcasite/Siegenite;
- *B* =% Chalcopyrite Interlocked with Gangue;
- *C* =% Chalcopyrite in Ternary Grains;
- *D* =% Chalcopyrite in Quaternary Grains; and
- *E* =% Pyrite.

There is a robust linear correlation between the variability test cleaner copper recoveries and the cleaner recoveries from the six locked cycle tests on non-supergene altered UCZ composites, using the optimized UCZ flow sheet. This linear correlation is defined by:

*Locked Cycle Test Cu Cleaner Recovery = (0.6619 * Variability Test Cu Cleaner Recovery) + 31.231*

The formulae above were used to convert the mineragraphy metrics from 113 non-supergene altered UCZ mineralogy composites spaced throughout the UCZ (both laterally and vertically) into expected copper recoveries. Inverse distance weighted squared (IDW2) interpolation of these copper recovery metrics has been used to create a copper recovery model for the UCZ that has been integrated with the Mineral Resource model. Based on the process outlined above, estimated copper recoveries for the UCZ range from 68.2% to 87.9%.

The supergene altered zone has been assigned a copper recovery estimate of 69.8% based on the locked cycle test of the supergene altered composite.

A batch, single stage cleaner test on an LCZ composite, using the UCZ flow sheet, recovered 92.3% copper to a concentrate grading of 26.1% copper. Locked cycle testing was undertaken using a blend of the UCZ Global Composite (76%) and the LCZ composite (24%). Copper in the feed was 93.2% recovered into a concentrate grading 21.5% copper. The metallurgical balance indicated that there were no negative synergies between blending the two feed sources. Based on previous and recent test work, a global 94% copper recovery has been assigned to the LCZ.

1.5 Mineral Resource Estimate

The Johnny Lee deposit has been classified as per the Canadian Institute of Mining (CIM) definitions into Measured, Indicated, and Inferred Mineral Resources. The effective date of the Mineral Resource model is October 15, 2019. Mineral Resources are classified on the basis of geological continuity, quality of fundamental data including logging, physical, and analytical datasets, distance from informing sample data, and spatial continuity of quality variables as determined from variography studies. Quantity and quality estimated are classified in accordance with the Canadian Institute of Mining, Metallurgy, and Petroleum’s Definition Standard for Mineral Resources and Mineral Reserves (CIM, 2014).

The Mineral Resource statement for the Black Butte copper project is presented in Table 1-1. Mineral Resources are presented using a cut-off grade (CoG) that incorporates variable recovery assumptions for the UCZ with an assumed constant recovery of 94% Cu for the LCZ. The applied CoG for the Project is 1% copper.

The previous Mineral Resource statement for the Black Butte Copper project included the Johnny Lee and the Lowry deposit. This technical report has excluded the Lowry deposit from the Mineral Resource statement. Recent work on metallurgical recovery and current economic assumptions were not conducted on Lowry, and the 2013 Mineral Resource statement is considered not current. Additionally, the QPs of this technical report have not reviewed Lowry data.

There are no known factors related to environmental, permitting, legal, land or mineral title, taxation, socio-economic, marketing or political concerns that would materially affect the extraction or classification of Mineral Resources at the Johnny Lee deposit.

Table 1-1: Black Butte Copper Project Mineral Resource Estimate for the Johnny Lee Deposit as of October 15, 2019– SRK Consulting (U.S.), Inc.

Category	Quantity (Mt)	Cu (%)	Total Metal (kt)
UCZ			
Measured	1.4	2.6	36.2
Indicated	8.3	2.3	191.3
Measured and Indicated	9.7	2.4	227.5
Inferred	2.2	2.2	49.5
LCZ			
Measured	0.6	5.7	32.9
Indicated	0.6	7.9	50.5
Measured and Indicated	1.2	6.8	83.4
Inferred	0.5	6.3	30.3
Combined UCZ + LCZ			
Measured	2.0	3.5	69.1
Indicated	8.9	2.7	241.8
Measured and Indicated	10.9	2.9	310.9
Inferred	2.7	3.0	79.7

Source: SRK, 2019

- The effective date for this Mineral Resource is October 15, 2019. All significant figures are rounded to reflect the relative accuracy of the estimates. Copper assay values were capped where appropriate;
- Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. Inferred Mineral Resources have a high degree of uncertainty as to their economic and technical feasibility. It cannot be assumed that all or any part of an Inferred Mineral Resources can be upgraded to Measured or Indicated Mineral Resources;
- Metallurgical recovery of copper has been estimated on a block basis in the UCZ, averaging 77.4%, with a consistent 94.0% Cu recovery applied to the LCZ;
- To demonstrate reasonable prospects for eventual economic extraction of Mineral Resources, a cut-off grade of 1.00% copper based on metal recoverability assumptions, long-term copper price assumptions of $3.20/lb, mining costs, processing costs, G&A costs totaling $71/t;
- There are no known legal, political, environmental, or other risks that could materially affect the potential development of the Mineral Resources other than those outlined in the Management Discussion and Analyses of the June 2019 Company Quarterly Report. All Mineral Resources are located within land currently under control or lease to Sandfire Resources America Inc.

Geological modeling and Mineral Resource estimation were performed during 2019 based on a combination of historic drilling and recent SRA drilling campaigns completed in 2018 and 2019. A total of 188 drillholes have been used to inform the 2019 Mineral Resource estimate including historic drilling and recent drilling between 2010 and 2019. A structural and lithostratigraphic three-dimensional (3D) wireframe model was constructed using Seequent Leapfrog Geo ™ software which formed the foundation of the resource block model. The structural and lithostratigraphic models are based on a combination of diamond drill core logging and field mapping in the Black Butte copper project area.

A resource block model was constructed encompassing the UCZ and LCZ. For copper and specific gravity (SG), a parent block size of 25 m (X) by 25 m (Y) by 3 m (Z) with sub-block dimensions down to 5 m (X) by 5 m (Y) by 1 m (Z) in order to provide an appropriate representation of modeled volumes. For recovery and arsenic (As) in concentrate, a slightly larger parent block was utilized as data spacing was generally wider than Cu and SG. For Cu recovery and As, a parent block size of 30 m (X) by 30 m (Y) by 5 m (Z) was constructed with the same sub-block size as used for Cu and SG. These models were combined resulting in a single resource block model for the Johnny Lee deposit.

A combination of copper grade shells and lithostratigraphic modeling was used to generate estimation domains. The primary domains used to control and constrain copper grade estimation are the: 1) UCZ lower-grade mineralized halo (halo), 2) UCZ higher-grade mineralized core (vein), 3) LCZ lower-grade massive sulphide unit (LSZ), and 4) LCZ higher-grade mineralized cores (lenses). Each UCZ domain includes two separate domains representing the East and West blocks. Additionally, the LCZ lenses are modeled as three discreet lenses of high-grade mineralization (more than 2.0% Cu).

Estimation was performed using a combination of Ordinary Kriging (OK) and inverse distance weighting to the second power (IDW2). Estimated variables include copper, SG, copper recovery, and arsenic in concentrate. The resource block model was validated using visual and statistical techniques comparing block grade values against composited and raw drilling data.

1.6 Mineral Reserve Estimate

The technical and economic inputs to define a Mineral Reserve estimate are currently being developed for the Black Butte project. At this stage, there is insufficient data to define a Mineral Reserve estimate.

1.7 Interpretations and Conclusions

It is the opinion of the Qualified Persons of this technical report that the data collection, analyses, interpretation, and reporting of Mineral Resources adheres to CIM definitions and standards (CIM, 2014) and is suitable for disclosure as per NI 43-101.

1.7.1 Property Description and Ownership

The surface and mineral rights under lease to SRA are of sufficient size to allow development of a mining operation and exploitation of the Johnny Lee copper deposit. While SRK has not undertaken a review of the property ownership, an independent review of the surface and mineral leases was undertaken by Crowley Fleck Attorneys of Billings, MT, dated September 25, 2019. This review concluded that the mineral and surface leases for the area within the MOP boundary are in good standing.

1.7.2 Geology and Mineralization

The regional and local geology of the Black Butte project is well-understood, and a robust 3D structural and stratigraphic model of the Johnny Lee area has been constructed. Within the framework of that model, geological models of the UCZ and LCZ mineralization have been developed. SRK considers that the constraints used to create the geological models are appropriate and that the geologic models are suitable for Mineral Resource estimation and reporting.

Extensive systematic mineragraphy of drillhole composites from the Johnny Lee deposit has been undertaken to determine the composition, texture, grain size and associations of copper sulphide minerals that host the copper mineralization in the Johnny Lee deposit. This work has been utilized in metallurgical recovery studies.

1.7.3 Status of Exploration, Development and Operations

A significant amount of Mineral Resource definition diamond drilling has been completed at the Johnny Lee deposit resulting in drill spacing of nominal 50 m by 50 m across the deposit. The limits of the mineralization are well-defined and the drillhole spacing within those limits is sufficient to allow classification of the Mineral Resource estimate into Measured, Indicated, and Inferred categories. Additional drilling at tighter spacing of the LCZ and the northeastern portion of the UCZ could allow upgrading of mineralization in the Inferred category to Indicated and from Indicated to Measured.

A Mineral Resource was estimated at the Lowry zone by a previous operator and disclosed in 2013 as part of preliminary economic assessment (PEA) (Winckers et al., 2013). SRK has not reviewed the Lowry Mineral Resource, nor is it included as part of this technical report. The historic Mineral Resources reported at Lowry are considered not current at this time.

Several exploration targets have been identified within the current SRA tenement package that have potential to increase the Mineral Resource base.

1.7.4 Mineral Processing and Metallurgical Testing

Sufficient metallurgical test work has been completed to demonstrate that copper recovery of Johnny Lee mineralization into a copper concentrate by froth flotation is the preferred method for mineral processing. The LCZ mineralization is expected to deliver fairly homogenous copper recoveries averaging 94%. Due to significant variability in copper sulphide liberation characteristics, the UCZ mineralization is estimated to return variable copper recoveries ranging from 68.2% to 87.9%. Systematic mineragraphy, correlated with metallurgical test results, has been used to develop a copper recovery block model for the UCZ that has been integrated with the Mineral Resource estimate to create a recoverable copper grade field in the block model.

Mineralogical studies of tailings from metallurgical test work has shown fine grained, liberated copper sulphide is reporting to rougher and cleaner tailings. Limited test work to simulate the recovery impact of a Jameson cell was inconclusive. There is potential to increase copper recovery by capturing liberated fine copper sulphide.

Limited metallurgical test work on blended UCZ and LCZ mineralization indicated that there are potential positive recovery synergies to be realized from material blends that require further evaluation.

1.7.5 Mineral Resource Estimate

It is the opinion of SRK that the Mineral Resource estimate has been produced in accordance with CIM guidelines with classification appropriate for the level-of study completed.

1.7.6 Mineral Reserve Estimate

No Mineral Reserve estimate has been conducted for the project.

1.7.7 Mining Methods

Work completed for the 2013 Tintina PEA (Winckers et al., 2013) indicated that drift-and-fill underground mining may be the most appropriate mining method for the Johnny Lee deposit. Final mining method selection is dependent on engineering and geotechnical studies being undertaken.

1.7.8 Recovery Methods

The metallurgical test program has been used to develop a process flow-sheet. The flow-sheet records a recovery process that involves: crushing, grinding to 38 µm K_{80}, rougher flotation circuit, regrind of rougher concentrate to 10 µm K_{80}, three stage cleaner flotation circuit, and filtering of the cleaner concentrate to produce a saleable copper concentrate.

1.7.9 Project Infrastructure

The location and footprint of all surface infrastructure, including the mine portal, has been determined and included in the MOP application to the MT DEQ. Detailed design and costing of all surface and underground infrastructure will be completed in future studies.

1.7.10 Environmental Studies and Permitting

Extensive environmental monitoring and base-line studies were undertaken as part of the MOP application and continue to be updated on a systematic basis. The MT DEQ retained an independent environmental consulting company to complete a draft EIS. Public comment of the draft EIS has been completed and at the time of this report, the MT DEQ is in the process of evaluating these comments and will then issue a final EIS. The MT DEQ can then issue a Record of Decision that approves the MOP application as submitted, approves the application with modifications, or denies the application if it is considered that it does not meet the laws of the State of Montana. In addition to a positive Record of Decision there are additional permits required, or plans to be approved, prior to undertaking all proposed mining and development activity.

SRK has not reviewed the environmental studies and permitting applications for the project. Permitting for the project remains a project risk.

1.7.11 Capital and Operating Costs

No currently valid capital or operating cost estimates have been developed for the project.

1.7.12 Economic Analysis

No currently valid economic analysis of the project has been completed.

1.8 Recommendations

The QPs make the following recommendations:

- Continued work toward the obtainment of all required permits for mining on the property;

- Infill or operational drilling at tighter spacing will aid in increasing the confidence in Mineral Resources in the UCZ and LCZ with emphasis on increased data related to recovery in the UCZ;
- During mine infrastructure development, collect geological data through drive mapping, channel sampling in the mineralized zones, and analysis of underground drilling;
- During mining operations, a robust grade control program coupled with reconciliation of grade control drilling and short-term modeling with the resource block model will aid in improved confidence in areas of the Johnny Lee deposit that exhibit variability in grade, mineralized thickness, and recovery;
- Additional metallurgical testwork from portions of the UCZ will aid in improving recovery and concentrate grade.

2 Introduction

2.1 Terms of Reference and Purpose of the Report

This report was prepared as a NI 43-101 Technical Report on Mineral Resources for SRA by SRK on the Black Butte Copper Project (Black Butte, or the Project) located in south-central Montana.

The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in SRK's services, based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by SRA subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits SRA to file this report as a Technical Report with Canadian securities regulatory authorities pursuant to NI 43-101, Standards of Disclosure for Mineral Projects. Except for the purposes legislated under provincial securities law, any other uses of this report by any third party is at that party's sole risk. The responsibility for this disclosure remains with SRA. The user of this document should ensure that this is the most recent Technical Report for the property as it is not valid if a new Technical Report has been issued.

This report provides Mineral Resource estimates and a classification of Mineral Resources prepared in accordance with the CIM Standards on Mineral Resources and Reserves: Definitions and Guidelines, May 10, 2014 (CIM, 2014).

2.2 Qualifications of Consultants

The independent consultants preparing this technical report are specialists in the fields of geology, exploration, Mineral Resource estimation and classification, metallurgical testing, mineral processing, and processing design.

None of the consultants or any associates employed in the preparation of this report has any beneficial interest in SRA. The consultants are not insiders, associates, or affiliates of SRA. The results of this Technical Report are not dependent upon any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings between SRA and the consultants. The consultants are being paid a fee for their work in accordance with normal professional consulting practice.

The following individuals, by virtue of their education, experience and professional association, are considered Qualified Persons (QP) as defined in the NI 43-101 standard, for this report, and are members in good standing of appropriate professional institutions. QP certificates of authors are provided in Appendix A. The QP's are responsible for specific sections as follows:

- Erik Ronald, Principal Consultant, SRK Consulting (U.S.), Inc. is the QP responsible for Geology and Mineral Resources of the Johnny Lee deposit and sections 6 through 12 and 14 and portions of Sections 1, 25 and 26 summarized therefrom, of this Technical Report.
- Deepak Malhotra, Resource Development, Inc. is the QP responsible for Mineral Processing and Metallurgical Testing, Section 13, and portions of Sections 1, 25 and 26 summarized therefrom, of this Technical Report.

2.3 Details of Inspection

In compliance with the requirements for preparation of the NI 43-101 Technical Report, the QP's responsible for this report have visited the Project site. During the site visit, the QPs were provided unobstructed access to SRA personnel and facilities.

Table 2-1: Site Visit Participants

Personnel	Company	Expertise	Date(s) of Visit	Details of Inspection
Erik Ronald	SRK Consulting (U.S), Inc.	Geology & Mineral Resources	November 6, 2018	Site visit by multiple consultants reviewing the project.
Deepak Malhotra	Resource Development Inc.	Geology & Mineral Resources	November 6, 2018	Site visit by multiple consultants reviewing the project.

Source: SRK, 2019

2.4 Sources of Information

This report is based in part on internal SRA technical reports, previous studies, maps, and published reports, SRA reports and memoranda, and public information as cited throughout this report are listed in the References Section 27.

2.5 Effective Date

The effective date of this report is October 15, 2019.

2.6 Units of Measure

The metric system has been used throughout this report. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in U.S. dollars (US$) unless otherwise stated.

3 Reliance on Other Experts

The consultant’s opinion contained herein is based on information provided to the consultants by SRA throughout the course of the investigations. SRK has relied upon the work of other consultants in the project areas in support of this Technical Report.

These items have not been independently reviewed by SRK and SRK did not seek an independent legal opinion of these items. The consultants used their experience to determine if the information from previous reports was suitable for inclusion in this technical report and adjusted information that required amending. This report includes technical information, which required subsequent calculations to derive subtotals, totals, and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, the Consultants do not consider them to be material.

SRK has relied on the independent land attorneys Crowley Fleck, PLLP of Billings, MT for their opinion on the good standing of SRA’s necessary mineral interests, surface use agreements, and water rights for the Project.

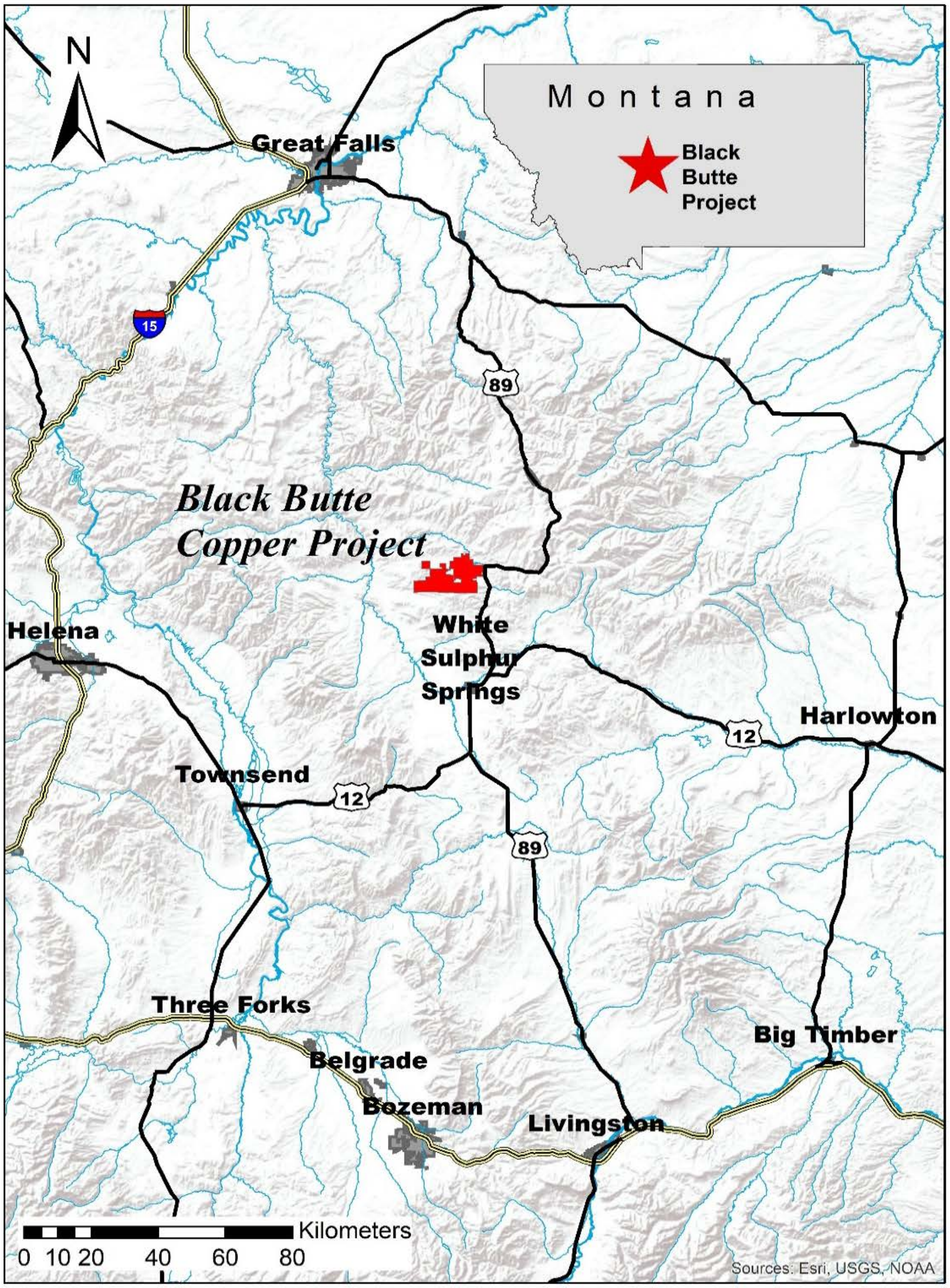
SRK has relied on SRA for environmental requirements, regulations, and permits necessary to obtain a Mine Operations Permit and provide the appropriate legal, environmental, and social license to declare a Mineral Resource with the aim of eventual economic extraction on the Project property. The portions of the technical report that SRK has relied on SRA for this instance are contained within section 4.

SRK has relied on SRA for the Project property accessibility, climate, local resources, infrastructure and physiography as described in section 5. SRA staff and consultants have collected and summarized the data reported in section 5.

4 Property Description and Location

4.1 Property Location

The Black Butte Project is located within Meagher County, Montana, USA approximately 27 km north of the town of White Sulphur Springs (Figure 4-1). The Johnny Lee deposit is located 3 km west of U.S. Highway 89.



Source: SRA, 2019

Figure 4-1: Regional Map Showing the Property Location in Relation to Nearby Settlements

4.2 Mineral Titles

The Black Butte property consists of approximately 3,223.03 ha (7,964.28 acres) of fee simple lands under mineral lease by Sandfire Resources America, through Tintina Montana Inc, (collectively referred to as SRA), and 525 unpatented mining claims on U.S. Forest Service (USFS) lands covering approximately 4,036.74 ha (9,975 acres) (Table 4-1; Figure 4-2). The project's land holdings are within Sections 19, 29, 30, 31, and 32 of Township 12 North, Range 7 East; Sections 23, 24, 25, 26, 27, 28, 30, 32, 33, 34, and 35 of Township 12 North Range 6 East; Sections 6,7 and 13 of Township 11 North and Range 7 East; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 of Township 11 North and Range 6 East, and sections 1 and 12 of Township 11 North and Range 5 East.

Table 4-1: Summary of Mineral Lands Held by the Black Butte Project

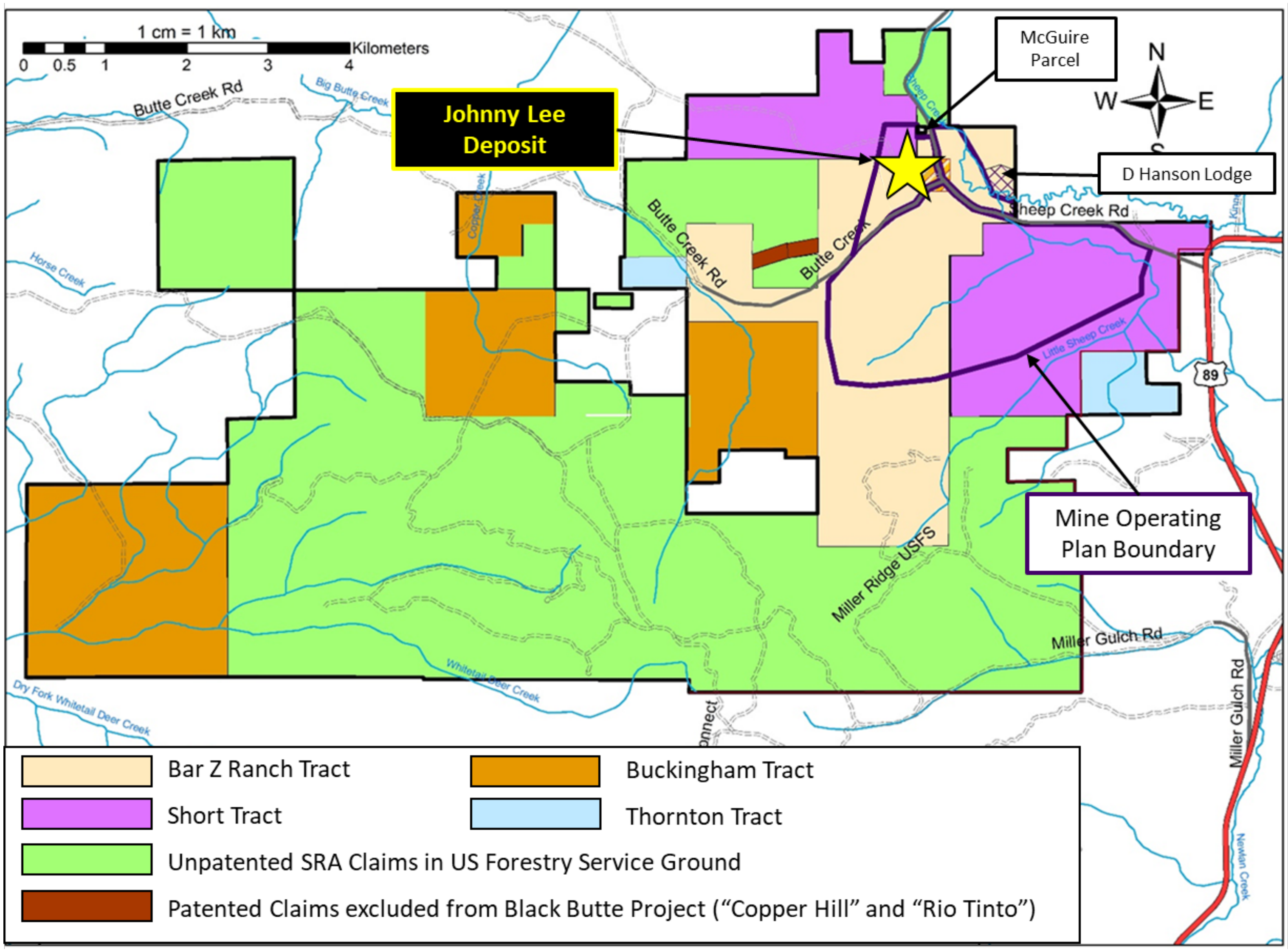
Tract	Surface Estate	Mineral Estate	Date of Agreement	Acres	Hectares
Bar Z Ranch	Hanson	Hanson, Hanson, Dupea	May 2010	2594.28	1049.87
Short, A & J	Short, A & J	Short, A & J (15%) Davis (85%)	November 2014	2120	857.9
Buckingham	Buckingham	Buckingham, Johnston, Bodell	June 2011	2970	1201.9
Thorson Ranch LLC (Black Butte Portion)	Thorson Ranch LLC	Thorson Ranch LLC	June 2017	280	113.3
US Forest Service Unpatented Mining Claims	US Forest Service	525 Unpatented Mining Claims	---	9,975	4036.7

Source: SRA, 2019

The MOP application for the Johnny Lee Deposit is located on two parcels of fee simple land under mineral lease: The Bar Z Tract and the Short Tract (Figure 4-2 and Figure 4-3). The Bar Z Ranch (Hanson Family) owns 100% of the surface rights and three members of the Hanson family own 100% of the mineral interest in the Bar Z Tract. Arthur and Joy Short, a local ranching family, control 100% of the surface rights and 15% of the mineral interests of the Short Tract. Holmstrom's Sheep Creek Ranch LLC (Davis family) controls the remaining 85% of the Short Tract mineral estate.

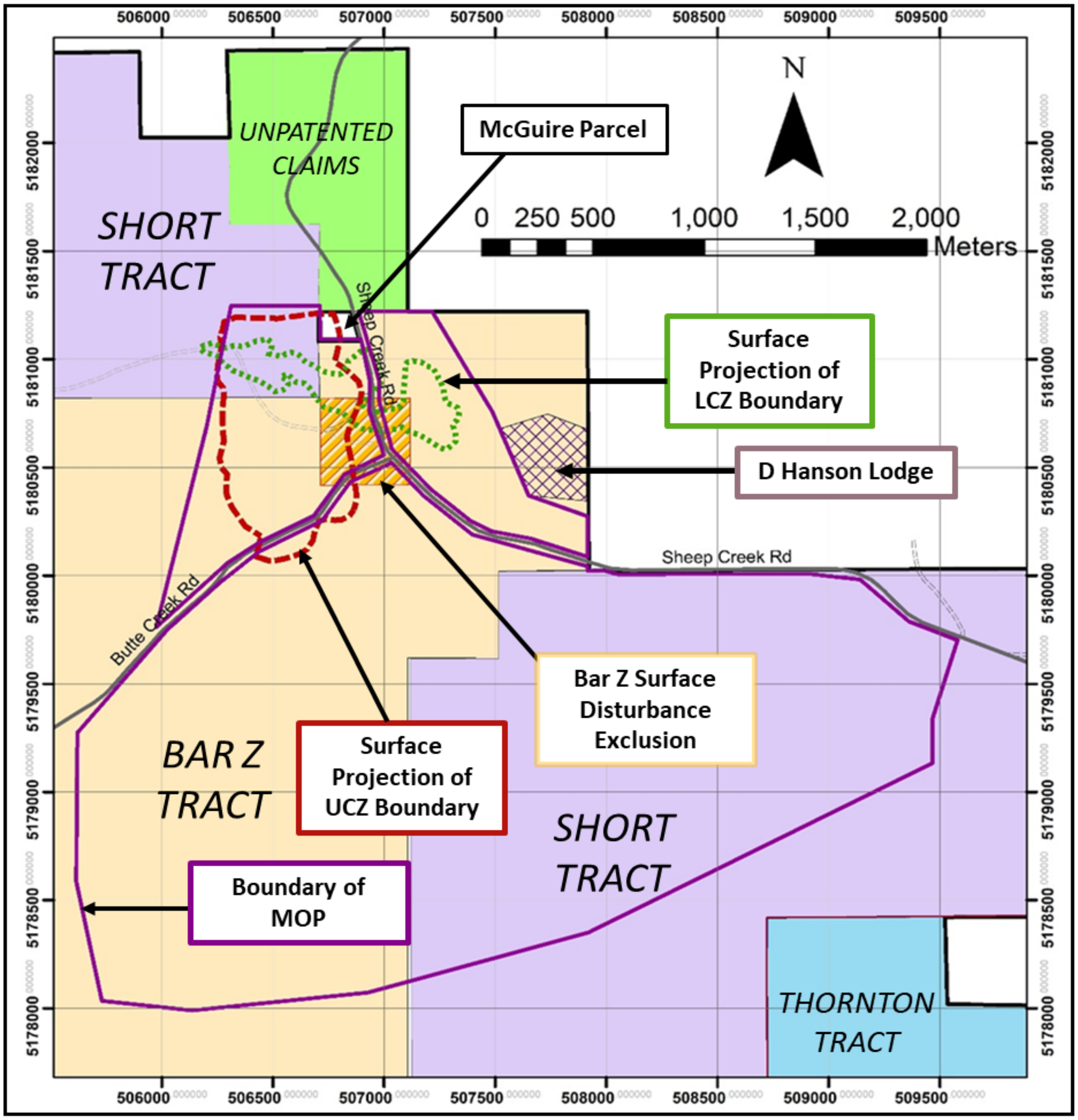
Steve Buckingham, a local rancher, controls 100% of the surface rights for the Buckingham Tract (Figure 4-2) and shares equal shares of the mineral rights with two siblings. Thorson Ranch LLC owns 100% of the surface estate and 100% of the mineral estate for the portion of the ranch included within the Black Butte Project.

The Federal mining claims are distributed over six claim blocks which cover isolated parcels and contiguous blocks of USFS lands in the vicinity of the Black Butte Project. The mining claims give SRA control of the mineral rights covered by those claims. Access for exploration drilling or mining is subject to the rules and processes of the USFS. Appendix B lists the unpatented claims included in the Black Butte Project.



Source: SRA, 2019

Figure 4-2: Current Land Tenure of the Black Butte Project Showing the Boundary of the Mine Operating Plan and the Location of the Johnny Lee Deposit



Source: SRA, 2019

Figure 4-3: Map of the Study Area Showing Landholdings, the Boundary of the MOP and the Boundaries of the Johnny Lee UCZ And LCZ Projected To Surface

4.2.1 Nature and Extent of Issuer's Interest

The MOP application delineates the outline of the mine facilities planned for the mine operation (Figure 4-3). The plan submitted to the MT DEQ envisions mine disturbances on only two of the leased fee tracts, the Bar Z Tract and the Short Tract.

For the Bar Z Ranch Tract, SRA has one surface lease and three mineral leases. The surface lease covers 100% of the approximately 1,049.9 ha (2,594.28 acres) owned by the Bar Z Ranch. SRA has three separate mineral lease agreements covering that tract with each of the members of the

Hanson family who each own portions of the mineral interest. The terms are for 30 years which is renewable for subsequent periods of 10 years each. Included in the surface lease are two patented mining claims (Figure 4-2) for the remaining 13.06 ha (32.28 acres), the Copper Hill (Mineral Survey #10311) and Rio Tinto (Mineral Survey #10304) patented claims. The mineral rights for these two claims are owned by another party. SRA has no agreement with this party, but the Copper Hill and Rio Tinto patented claims are not currently included in the project.

In June of 2012, the Bar Z Ranch transferred the surface rights of a 31-acre parcel near Sheep Creek to Mr. David Hanson for the purposes of a building a lodge (Figure 4-3). This parcel was under the Surface Use Agreement of the Bar Z Ranch at the time of the exchange and an addendum to the Surface Use Agreement was made verifying the Surface Use Agreement is in effect over this parcel.

Upon the death of Rose Holmstrom, the original owner of the Short tract, the surface rights of her leased tract were transferred to Arthur and Joy Short and the mineral rights were split. As to the mineral estate, Arthur and Joy Short were bequeathed a ‘life estate’ of 15%, and the remaining 85% going to Holmstrom’s Sheep Creek Ranch LLC. At the passing of Arthur and Joy Short, the mineral estate will revert to the complete ownership of Holmstrom’s Sheep Creek Ranch LLC, and the surface ownership will be retained by the successors of Arthur and Joy Short. This Tract consists of approximately 857.9 ha (2,120 acres) and is subject to a Surface Use Agreement (dated April 2013) with Arthur and Joy Short. The mineral estate for this tract is covered by the Short Mineral Lease Agreement dated December 2014, and The Holmstrom Sheep Creek Ranch Mineral Lease Agreement dated November 2017. Both Mineral Lease Agreements are valid for 30 years from the date of the original Rose Holmstrom Lease (May 2010) and are renewable for subsequent periods of 10 years each.

The McGuire parcel (Figure 4-3) is a 5-acre area, included within the Bar Z Tract, on which SRA has no mineral or surface use agreement. The northeast corner of the UCZ projects to surface and outcrops in this area. The portion of the UCZ that occurs within the McGuire parcel is excluded from the Mineral Resource estimate presented in this document.

The Buckingham Tract (Figure 4-2) consists of approximately 1,209.1 ha (2,970 acres) and is subject to a single Mining Lease Agreement (dated June 2011) with Mr. Steve Buckingham, 100% surface owner and one-third mineral owner, and his two siblings, Kathy Johnston and Marilyn Bodell, each one-third mineral owners. The agreement has a term of 30 years and is renewable in 10-year increments.

Within the Black Butte Project (Figure 4-2) there are two small parcels totaling 113.3 ha (280 acres) that are part of the Thorson Ranch Mineral Lease Agreement (dated June 2017). These parcels are part of a larger lease agreement that includes parcels not contiguous with the Black Butte tenement and that currently have no known mineral resources. The term of the lease is thirty years from the signing date but can be extended for additional periods of five years.

The unpatented lode mining claims (Figure 4-2) are kept active with annual maintenance fees paid to the Bureau of Land Management and Meagher County by September 1st of each year. There are no royalty or lease obligations on these claims.

4.3 Royalties, Agreements and Encumbrances

4.3.1 Bar Z Tract

The Surface Lease Agreement required lease payments of $50,000 on signing (May 2, 2010) and on each of the first four anniversary dates. Payments since the fifth anniversary date and each anniversary date since have been $75,000 and will continue for that amount until the end of the lease.

Within this Surface Use Agreement, the landowner has the option to transfer title to those lands “which are necessary for the construction and operation of a mining and milling operation” (Mine Property) to SRA. The Bar Z Ranch would be compensated for the land at the appraised value. At the end of mining and reclamation the Bar Z may, at their discretion, have the title of the Mine Property returned to them.

SRA has agreed that only underground mining operations will be conducted on the property. SRA also agreed to not disturb any of the pre-existing buildings in the Bar Z Surface Disturbance Exclusion Area (Figure 4-3). These buildings overlie the Johnny Lee Upper Copper zone, and so must be considered when designing mine workings.

Each of the three mining leases for the Bar Z Tract required advance minimum royalty payments of $16,150 on signing and on the first and second anniversaries, $32,300 on the third anniversary, $48,450 on the fourth anniversary, and $64,600 on each anniversary thereafter through the term of the lease. The combined mineral interest has a net smelter return royalty (NSR) of 5%, with an option to buy this down to a 2% NSR for $5,000,000, thereby reducing each mineral lessors’ royalty to 0.6666% NSR in return for a payment of $1,666,666. Exercising the buy down option eliminates further advance minimum royalty payments.

4.3.2 Short Tract

The Short Tract Surface Use Agreement requires a surface lease payment of $4,000 per year and contains the same Mine Property clause as the Bar Z Surface Use Agreement. The landowner may transfer title to those lands deemed Mine Property to SRA. The landowners would be compensated for the land at the appraised value. At the end of mining and reclamation, the owners may have the title of the mine property returned to them at their discretion.

SRA has agreed that only underground mining operations will be conducted on the property.

The Short Mineral Lease Agreement (dated December 2014) sets out an advance royalty payment of $24,120.30 per year plus an additional $10,000 per year in surface rent. The Holmstrom Sheep Creek Ranch Mineral Lease Agreement (dated November 2017) is compensated by an advanced royalty of $136,681.70 per year. The combined mineral interest has a net smelter return (NSR) of 5%, with an option to buy this down to a 2% NSR for $5,000,000 which terminates any additional advanced royalty payments.

4.3.3 Other Tracts

The following tracts are part of the Black Butte project property package but are lands for which there is no currently defined mineralization suitable for mining, nor have they been included in any mine plan or permit, but still may have mineral potential. This potential could be realized through future exploration and drilling.

The Buckingham Tract agreement required advance minimum royalty payments of $5,000 on signing, $15,000 on or before six months after signing, $20,000 on or before the first and second anniversaries, $25,000 on or before the third through fifth anniversaries, $30,000 on or before the sixth through eighth anniversaries, $35,000 on or before the ninth through eleventh anniversaries, $40,000 on or before the twelfth through fourteenth anniversaries, and $50,000 per annum through the remainder of the lease term or until commercial production. At Commercial Production, the advance royalty payments terminate and a 5% NSR royalty would come into effect, which could be bought down to 2% NSR for a payment of $5 million. The agreement specifies that only underground mining will be conducted.

Within SRA's land package, there are two small parcels totaling approximately 113.3 ha (280 acres) that are part of the Thorson Ranch Mineral Lease Agreement (dated June 2017). The Mining Lease Agreement prescribed an initial payment of $5,000 on signing, $5,000 on or before the first through the fifth anniversaries, $10,000 on or before the sixth through the tenth anniversaries, $15,000 on or before the eleventh through the fifteenth anniversaries, $20,000 on or before the fifteenth through the twentieth anniversaries, and $30,000 on or before the twentieth anniversary and each anniversary thereafter until the termination of the agreement or the commencement of mining. The agreement includes a 5% NSR, which can be bought down to 2% NSR for a payment of $5 million. Advance royalty payments will cease on the exercise of the royalty buyout. The company has agreed to pay an additional $5,000 per year and $1,000 per drill site for each year that drill exploration is conducted on the property. The agreement specifies that only underground mining will be conducted. The properties subjected to this lease are also covered under a Conservation Easement purchased by a third party. Any mining or exploration conducted on these lands would need to maintain the qualities of the lands under the terms of the Conservation Easement.

4.4 Environmental Liabilities and Permitting

4.4.1 Environmental Liabilities

SRA has conducted exploration under Exploration License #00710 issued by the MT DEQ. Regulations include the bonding of exploration disturbances to ensure reclamation is completed. SRA currently has an obligated bond of $137,365 for completion of the reclamation of the 2018/2019 Phase 2 and earlier drill programs. These obligations will be released when the reclamation is completed by SRA and inspected and approved by the MT DEQ.

4.4.2 Required Permits and Status

The MOP application for the Black Butte project was submitted to the MT DEQ in December 2015. The application was designed to meet the requirements of the Metal Mines Reclamation Act (Title 82, Chapter 4, Part 3, MCA) (MMRA) and the rules and regulations governing the act. Compliance with regulatory requirements is cross-referenced with components of the Operating Permit Application in Table 4-2. Following revisions, the MOP application was declared complete and compliant with the MMRA by the MT DEQ in September 2017. Following this determination, the MT DEQ retained an independent third-party environmental expert to complete a draft EIS for the Black Butte project. The draft EIS was released for Public Comment by the MT DEQ in March 2019. The public comment period ended in May 2019.

At the date of publication of this document, the MT DEQ is reviewing public comments. The next step in the MT DEQ's process is to respond to public comments and issue a final EIS. The MT DEQ can then issue a Record of Decision that approves the MOP application as submitted, approves the application with modifications, or denies the application if it deems that it does not meet the laws of the State of Montana.

Table 4-3 presents a list of other permits required, plans that must be submitted or acts requiring compliance or monitoring in order to comply with a Montana Mine Operating Permit. The current status of these requirements is summarized.

Table 4-2: Black Butte Mine Operating Permit Application Cross-Referenced with Regulatory Compliance

Section	Rules (ARM)/ACT (MCA) Citation
1.0 Introduction	
1.1 Project Location	ARM 17.24.115(k) MCA 82-4-337(1)(a) MCA 82-4-335(5)(f) through (h) ARM 17.24.116(3)(i)
1.2 Brief Project History	
1.3 Land Status	
1.4 Geology	
2.0 Existing Conditions/ Environmental Baseline Studies	
2.1 Climate, Metrological Data & Air Quality	ARM 17.24.116(3)(a) ARM 17.24.116(3)(a) MCA 82-4-335(5)(f) through(h)
2.2 Water Resources	
2.3 Wetlands Resources	
2.4 Environmental Geochemistry	
2.5 Soil Resources	
2.6 Terrestrial Wildlife Resources	
2.7 Aquatic Resources	
2.8 Vegetation Resources	
2.9 Cultural Resources	
2.10 Socio-economic Resources	
2.11 Noise	
2.12 Transportation Resources	
2.13 Land Use	
3.0 Operating Plan	
3.1 Introduction	ARM 17.24.116(3)
3.1.1 Mine Permit Boundary	ARM 17.24.116(3)(d) and (e)
3.1.2 List of Facilities with Surface Disturbance Acres	ARM 17.24.116(3)(d)
3.2 Underground Mine Operations and Mining Methods	ARM 17.24.116(3)(f)
3.2.2 Tintina's Underground Mine Plan	
3.2.2.6 Mining Equipment	ARM 17.24.116(3)(j)
3.3 Mineral Production	
3.3.1 Processing Method	ARM 17.24.116(3)(g): ARM 17.24.116(3)(p)
3.3.2 Mining Operations and Schedule	
3.3.3 Mill Support Facilities	
3.4 Mine Site – General Construction	
3.4.1 Overview and Disturbance Acres	
3.4.2 Construction of Facilities	
3.5 Engineering Evaluations	
3.51 Geotechnical Foundation Evaluations	MCA 82-4-301, 82-4-303, 82-4-305, 82-4-335, 82-4-336, 82-4-337, and 82-4-342

Section	Rules (ARM)/ACT (MCA) Citation
3.5.2 Design Standards	MCA 82-4-301, 82-4-303, 82-4-305, 82-4-335, 82-4-336, 82-4-337, 82-4-342 and 82-3-378
3.5.3 Hazard Potential Classifications	
3.5.4 Seismicity	MCA 82-4-301, 82-4-303, 82-4-305, 82-4-335, 82-4-336, 82-4-337, and 82-4-342
3.5.5 Stability Analysis	MCA 82-4-301, 82-4-303, 82-4-305, 82-4-335, 82-4-336, 82-4-337, 82-4-342 and 82-4-378
3.5.6 Longevity of HDPE Geomembranes	
3.5.7 Seepage Analysis	
3.5.8 Tailings Characteristics	ARM 17.24.116(3)(d), MCA 82-4-335(5)(n)
3.5.9 Binder Sources, Cemented Tailings Paste Suitability, and Laboratory Test Results	
3.6 Infrastructure Support and Waste and Water Management Facilities	
3.6.1 Roads	ARM 17.24.116(3)(h) & (r), MCA 82-4-335(5)(i)
3.6.2 Power and Powerlines	
3.6.3 Portal Pad	
3.6.4 Ventilation Raises	
3.6.5 Temporary Waste Rock (WRS) & Operational Storage	ARM 17.24.116(3)(d), MCA 82-4-335(5)(n)
3.6.6 Process Water Pond (PWP)	MCA 82-4-301, 82-4-303, 82-4-305, 82-4-335, 82-4-336, 82-4-337, and 82-4-342
3.6.7 Contact Water Pond (CWP)	
3.6.8 Cemented tailings Facility (CTF)	MCA 82-4-301, 82-4-303, 82-4-305, 82-4-335, 82-4-336, 82-4-337, 82-4-342 and 82-4-378; ARM 17.24 116(3)(g); SB-209: MCA 82-4 335(5)(l)
3.6.9 Non-Contact Water Reservoir (NCWR)	
3.6.10 Stockpiles	
3.6.11 Pipelines	
3.6.12 Equipment & Contract Manpower Required for Support Facility Construction	
3.6.13 Facility Siting Alternative Analysis	
3.7 Water Management	
3.7.1 Introduction	ARM 17.24.116(3)(k); MCA 82-4-336(5) ARM 17.24.116(3)(b); ARM 17.24.115 (a-d) and (k)(iv) MCA 82-4-336(2)
3.7.2 Water Supply	
3.7.3 Water Balance	
3.7.4 Water Treatment	
3.7.5 Treated Water Disposition	
3.7.6 Storm Water	
3.7.7 Erosion Control & Best Management Practices (BMP)	
3.8 Other Operational Management Components	
3.8.1 Total Project Employment with Subcontractors	ARM 17.24.116(3)(q)
3.8.2 Projected Construction & Operational Traffic	
3.8.3 Waters of the US (WOTUS)	
3.8.4 Air Quality & Dust Control	ARM 17.8.308; 17.24.115(1)(h)
3.8.5 Visual Resource Assessment	
3.8.6 Operational Noise	ARM 17.24.116(3)(a): ARM 17.24.116(3)(s)
3.8.7 Fire Protection	ARM 17.24.116(3)(m): 17.24.116(3)(g)
3.8.8 Solid Waste Disposal	ARM 17.24.115(i); ARM 17.24.116(3)(c)
3.8.9 Sewage Treatment	ARM 17.24.116(3)(o)
3.8.10 Hazardous Materials Disposal (Includes Emergency	ERP: ARM 17.24.116(3)(n)

Section	Rules (ARM)/ACT (MCA) Citation
Response Plan)	
3.8.11 Site Security	
3.8.12 Lighting	
3.8.13 Cultural Resource Protection	ARM 17.24.116(3)(t)
4.0 Modeling Studies	
4.1 Hydrologic Conceptual Model	
4.2 Predictive Water Quality Modeling	
4.3 Post Closure Non-degradation Evaluation	ARM17.30.715
4.4 Closure Compliance with Non-degradation Criteria	ARM17.30.715
5.0 Mitigations	
6.0 Monitoring	
6.2 Ongoing Baseline Monitoring	
6.3 Operational Monitoring	
6.3.1 Water Quality & Quantity Monitoring	ARM 17.24.116(3)(l), MCA 82-4-335(5)(m)
6.3.2 Facility Operational Monitoring	
6.3.3 Facility Geotechnical Monitoring	
6.3.4 Waste Rock Geochemistry Monitoring	
6.3.5 Air Quality Monitoring	ARM 17.8.308; 17.24.115(1)(h)
6.3.6 Wetlands Monitoring	
6.3.7 Aquatic Resource Monitoring	
6.3.8 Noise Monitoring	ARM 17.24.116(3)(s)
6.3.9 Reclamation Monitoring	
6.4 Post Operational Closure Monitoring	
6.4.1 Facility Closure Monitoring	ARM 17.24.115(1)(m)
6.4.2 Water Quality Monitoring	ARM 17.24.115(1)(d), (e),(f),(n);17.24.116(3)(l); ARM 17.24.106
6.4.3 Reporting	
7.0 Reclamation & Closure	Arm 17.24.116(5)
7.2 Disturbed Land Reclamation Compliance	MCA 82-4-336(2), (3), (4), (5), (6), (8), (9)(a), (10), (11)
7.3 Detailed Plan for Permanent Reclamation & Closure	ARM 17.24.150
7.3.1 Post Mining General Construction Measures	
7.3.2 Post Mining Building & Solid Waste Disposal	ARM 17.24.115(1)(i) & (m), MCA 82-4-303(15)(e); ARM 17.50.1405
7.3.3 Site-specific Facility Closure	ARM 17.24.115(1)(m); ARM 17.24.106
7.3.4 Soil Salvage Placement	
37.3.5 Revegetation	ARM 17.24.115(1)(c), (k)(iii) & (l) MCA 82-4-303(15)(c)
7.4 Reclamation Schedule	MCA 82-4-303(15)(i); 82-4-336(3)
7.5 Bond Release	MCA 82-4-338(1),
8.0 References	
9.0 Responses to Comments	

Source: SRA, 2019

Table 4-3: List of Permits Required, Plans Requiring Submission and Acts for Compliance

	Permit/Plan	Agency	Status
Mine Operating Permit	Exploration Licence	MT DEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	Approved
	Environmental Impact Statement - Record of Decision	MT DEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	Submitted
	Hard Rock Mining Operating Permit	MT DEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	Submitted
	Reclamation Bond	MT DEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	In Progress
Water Quality	Montana Pollution Discharge Elimination System Permit	MT DEQ: Water Quality Div., Water Protection Bureau	Submitted
	Montana Groundwater Pollution Control SystemPermit	MT DEQ: Water Quality Div., Water Protection Bureau	Submitted
	Storm Water Pollution Prevention Plan	MT DEQ: Water Quality Div., Water Protection Bureau	Approved
	Spill Prevention, Control and Countermeasures Plan	MT DEQ: Permitting and Compliance Div., Waste and Undeground Tank Management Bureau	In Progress
Water Rights	Certificate of Water Rights / Groundwater Appropriations	MT Department of Natural Resources and Conservation, Water Rights Bureau.	Submitted
Water - Other	Public Water Supply Permit	MT DEQ: Water Quality Div., Water Protection Bureau	Submitted
	Sewerage Disposal	Meagher County Health Department	In Progress
Wetlands Streambeds	Clean Water Act Section 401 Permit	US Army Corps of Engineers, MT DEQ: Water Quality Div., Water Protection Bureau	Approved
	Clean Water Act Section 404 Permit	US Army Corps of Engineers	Approved
	MT Streambed Preservation Act 310 Permit	Meagher County Conservation District, MT DEQ: Water Quality Div., Water Protection Bureau	Approved
	MT Streambed Preservation Act 318 Permit	Montana Fish, Wildlife and Parks, MT DEQ: Water Quality Div., Water Protection Bureau	Approved
Aquatics	Aquatics Monitoring Program	MT DEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau; Montana Fish, Wildlife and Parks	Submitted
Dam Safety	Dam Safety / Hazard Evaluation	MT Department of Natural Resources and Conservation, Water Resources Div., Dam Safety Bureau	Submitted
Tribal Communications		US Army Corps of Engineers	In Progress
Air/Noise	Air Quality Permit	MT DEQ: Air Quality Bureau	Submitted
Hard Rock Mining Impact	Hard Rock Mining Impact Plan	MT Department of Commerce, Community Development Div., Hard Rock Mining Impact Board	In Progress
Power Transmission Line	MT Major Facilities Siting Act	MT Public Service Commission	In Progress
Invasive Vegetation	Weed Plan	Meagher County Noxious Weed Management	In Progress
Cultural Resources	Historic Preservation Act	MT State Historical Preservation Office	In Progress
Emergency	Emergency Response Plan	MT DEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	In Progress
Mining Operations	Notification of Commencement of Operations	US Mine Safety and Health Administration	Not Initiated
	Hazardous Waste ID	US Environmental Protection Agency, US Department of Energy	Not Initiated
	FCC Radio Licences	Federal Communications Commission	Not Initiated
	Explosives Permit	Bureau of Alchohol, Tobacco, Firearms and Explosives	Not Initiated

Source: SRA, 2019
A status of "In Progress" refers to where application compilation or studies have been initiated but have not been submitted to the relevant authority.

4.5 Other Significant Factors and Risks

There are no known additional factors or risks that affect future development at the Project.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Topography, Elevation and Vegetation

The project area is situated on the south flank of the Little Belt Mountains (Figure 5-1) in an area of gently rolling topography. Elevations within the proposed area of operations range from 1,700 to 1,870 meters above sea level (masl). The highest point within the SRA tenement package is Black Butte at 2,071 masl.

Sheep Creek, a tributary of the Smith River, runs through the northeast corner of the property (Figure 5-1). The junction between Sheep Creek and the Smith River is approximately 30 km downstream from the Black Butte Project.

Within the project area, the Sheep Creek valley is a 200 to 800 m wide, flat-lying corridor that is partially utilized for agriculture (irrigated hay meadows). The portions of the valley not being cultivated form willow-covered wetlands. The surrounding hill-tops, and north facing slopes in particular, are tree-covered, primarily with Douglas fir. Open slopes between the high-lying ground and the valley are covered with a mixture of sage-brush and grass.

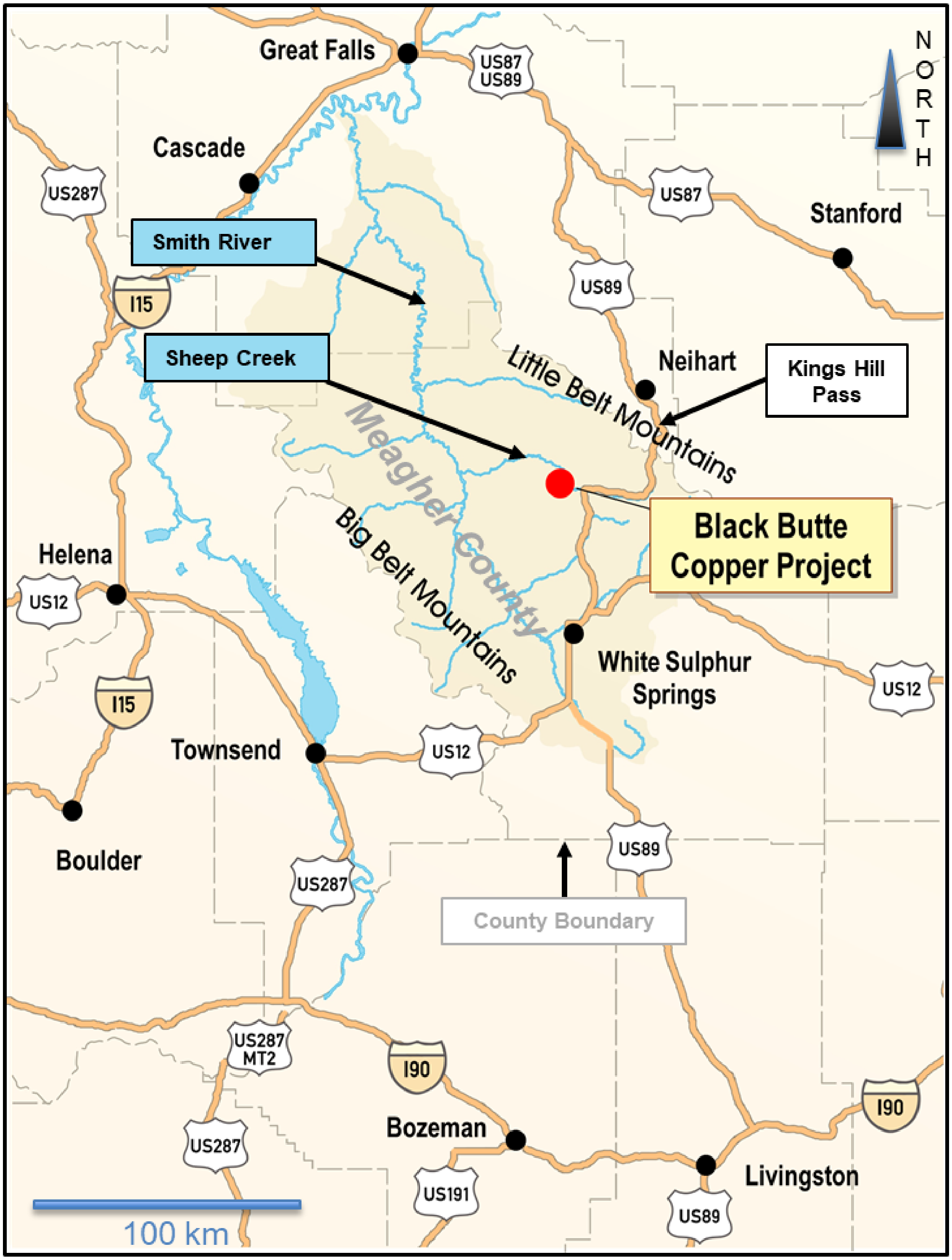
5.2 Accessibility and Transportation to the Property

The property is located in Meagher County, Montana, 27 km north of the town of White Sulphur Springs (Figure 5-1). Access is via the asphalt-surfaced, US Highway 89 and 4 km of the county maintained, gravel-surfaced, Sheep Creek road. US Highway 89 and the Sheep Creek road are snow-plowed during the winter, allowing year-round access to the project location.

5.3 Climate and Length of Operating Season

The project area occurs in an area with a climate characterized (Köppen-Gieger climate classification) as Cold, Semi-arid or Steppe type (Peel *et al*, 2007). These climate zones have hot summers and cold winters. Precipitation occurs as a mixture of rain and snowfall during the colder months and rain during the warmer months. Steppe climate zones are subject to significant diurnal temperature variations with the difference between day-time and night-time temperatures often exceeding 20°C.

Long-term weather records for White Sulphur Springs (1,609 masl) record average daily-low and daily–high temperatures of -11 to 0°C for January -2 to 12°C for April, 9 to 28°C for July and -1 to 14°C in October. Temperature extremes can reach -44°C in winter and 37°C in summer. Average annual precipitation in White Sulphur Springs is 32 2 mm of rain and 988 mm of snow for a total of 421 mm precipitation (Western Region Climate Centre, 2019).



Source: SRA, 2019

Figure 5-1: Location of The Black Butte Copper Project Showing Significant Cadastral Features

In 2012, a meteorological monitoring station was established at the proposed Black Butte mine site. Monitoring results from 2013 to 2017 are summarized in Table 5-1.

Table 5-1: Summary of Temperature and Precipitation Observations from the Black Butte Meteorological Station

	2013				2014				2015				2016				2017			
	Temperature (°C)			Precipitation	Temperature (°C)			Precipitation	Temperature (°C)			Precipitation	Temperature (°C)			Precipitation	Temperature (°C)			Precipitation
	Min.	Max.	Ave.	(mm)	Min.	Max.	Ave.	(mm)	Min.	Max.	Ave.	(mm)	Min.	Max.	Ave.	(mm)	Min.	Max.	Ave.	(mm)
Jan	-28.2	6.0	-1.6	16.8	-29.2	6.7	-7.0	40.9	-31.1	9.8	-7.5	35.8	-21.8	7.7	-6.3	33.8	-30.3	5.9	-11.9	9.1
Feb	-23.7	5.0	-6.4	33.8	-39.7	4.9	-12.6	3.6	-30.5	11.7	-3.9	19.8	-23.8	9.1	-3.1	6.4	-32.5	9.5	-5.4	23.4
Mar	-22.0	9.1	-3.4	184.2	-28.3	9.1	-3.3	78.2	-25.5	16.7	0.6	15.2	-16.8	12.4	-1.1	19.8	-11.4	15.9	0.8	19.6
Apr	-20.3	16.3	-0.3	23.1	-14.7	13.7	1.2	46.7	-14.2	19.3	2.0	35.1	-10.7	20.5	3.9	39.4	-13.6	17.0	2.1	45.0
May	-11.0	24.4	7.4	67.6	-7.0	23.0	6.9	21.1	-7.4	21.1	6.6	53.1	-6.5	21.1	6.6	67.6	-6.2	23.5	7.4	41.9
Jun	-3.0	26.5	11.5	F	-0.6	19.7	9.3	144.3	0.1	30.0	14.2	50.0	-2.2	27.0	13.2	33.8	-2.9	26.9	11.6	72.4
Jul	2.8	29.8	16.8	F	1.1	26.4	16.0	30.7	0.7	28.1	14.1	42.9	-1.9	28.5	14.8	44.2	2.2	29.7	18.0	7.6
Aug	F	F	F	F	1.1	28.8	13.9	82.0	-3.6	29.6	14.4	14.7	-2.4	30.1	13.9	29.2	0.1	28.7	14.7	4.3
Sep	-6.1	28.1	11.4	F	-7.8	27.1	9.0	36.6	-4.4	27.1	10.0	42.9	-3.7	26.8	8.3	67.1	-6.5	29.9	8.6	30.0
Oct	-10.9	13.9	0.0	10.2	-9.6	19.8	5.5	18.8	-10.1	23.8	5.4	6.1	-15.8	17.7	4.5	58.7	-11.7	18.9	1.6	6.9
Nov	-22.7	13.5	-2.9	18.5	-28.5	16.5	-5.6	13.5	-26.1	10.8	-5.5	17.8	-20.6	16.3	0.8	4.3	-24.0	13.2	-3.5	28.4
Dec	-35.1	8.5	-9.7	34.0	-36.1	11.6	-5.9	F	-26.0	8.6	-7.2	22.6	-37.4	2.5	-11.7	7.4	-31.3	6.0	-10.3	25.9

Source: SRA, 2019
F = indicates where observations were missing due to instrument malfunction

The area is generally snow-covered from November to March. Surface drilling is typically done between December and March, when the ground is frozen, so as to reduce disturbance in areas of soft ground and avoid surface-use conflicts with agricultural activities, it is envisaged that mine operations will be conducted year-round. Although, heating of both underground and surface operations shall be required during winter.

5.4 Sufficiency of Surface Rights

All infrastructure proposed in the MOP application for the Black Butte Project is wholly located on private ranch lands that are leased by SRA. Section 4 details the surface and mineral rights which are sufficient to conduct mining operations as currently planned. SRK has relied on the independent land attorneys Crowley Fleck, PLLP of Billings, MT for their opinion on the good standing of SRA's necessary mineral interests, surface use agreements, and water rights for the Project.

5.5 Infrastructure Availability and Sources

White Sulphur Springs (Figure 5-1) has a population of approximately 984 people (2010 U.S. Census) and is the county seat of Meagher County, population 1,908. White Sulphur Springs is 122 km from the state capital Helena (population 31,429), 127 km from Bozeman (population 46,596) and 158 km from Great Falls (population 58,876). All of these cities have international airports. The nearest railheads are Townsend (93 km from site), Belt (100 km from site) and Livingston (149 km from site).

There are currently no mining facilities at the Black Butte project site. Three core storage sheds and a lay-down yard have been constructed at the site by SRA.

5.5.1 Power

The power for the onsite core sheds, water well and meteorological station is currently supplied, from the local power grid, by Fergus Electric Cooperative Inc. It is envisaged that an existing 100 kilovolt (kV) power line, located at Kings Hill Pass, 25 km along US Highway 89 (Figure 5-1) shall be used to supply electricity for the Project.

5.5.2 Water

The site contains significant surface water resources. In addition to Sheep Creek there are two tributaries in the project area, Little Sheep Creek and Coon Creek.

Mine facilities and operations have been designed to avoid impacts to these surface waters and adjacent wetlands. SRA has conducted and will continue to conduct water and aquatic bio-system monitoring of these surface waters to ensure water quality is maintained.

Groundwater will be encountered during underground mining of the Johnny Lee Deposit. It is expected that the water-table shall be intersected by the decline at approximately 320 m from the portal, at a depth of approximately 70 m below surface.

When necessary, groundwater shall be pumped out of the mine to the Contact Water Pond (CWP), located near the portal. Run-off from mine surface facilities will also be collected in the CWP. Water required for processing use shall be pumped from the CWP.

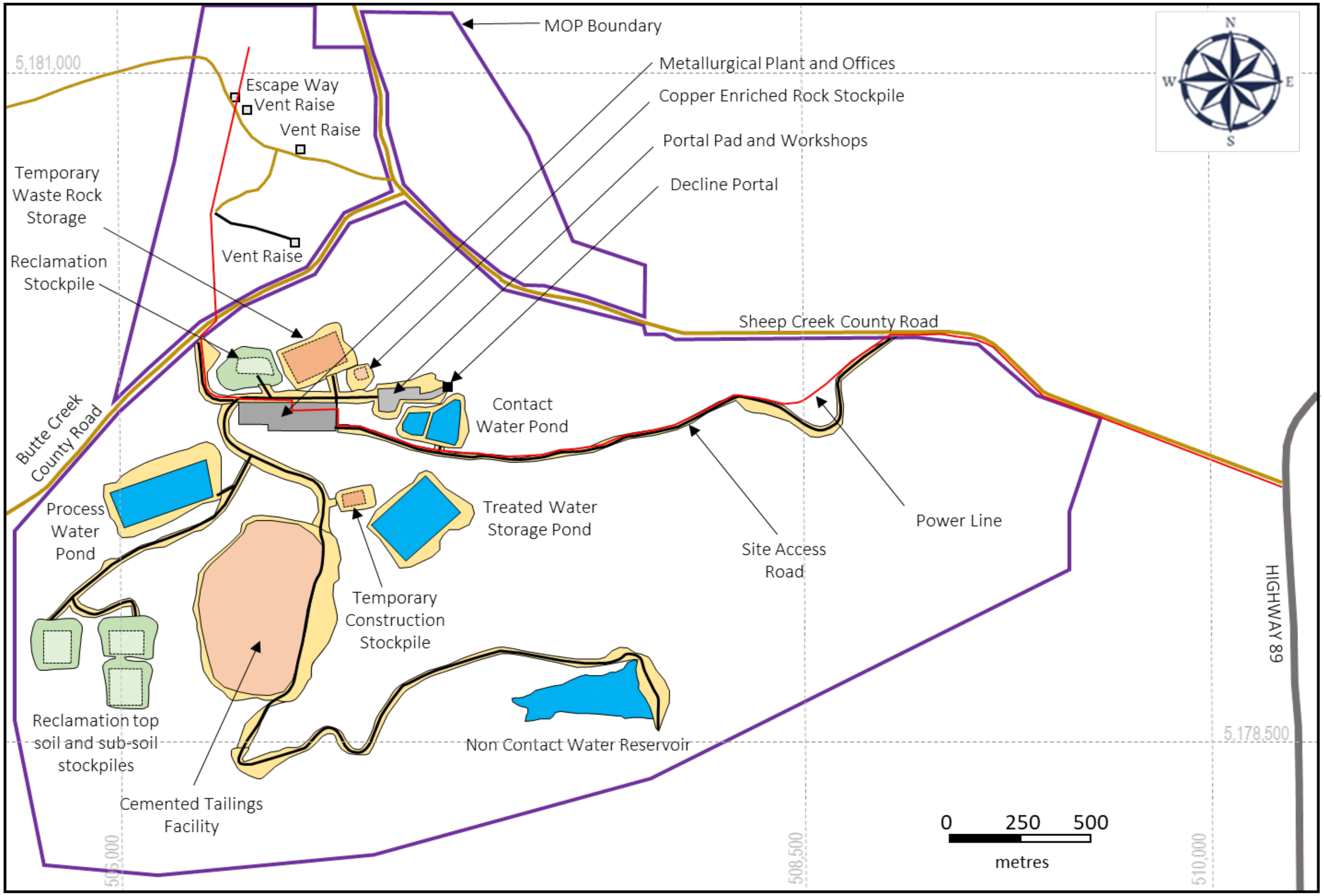
5.5.3 Mining Personnel

It is expected that about approximately 300 workers will be required during construction and 230 employees once mining activities reach steady state. Meagher County has a small population most of whom are employed in agricultural and service industries. During construction and ramp-up it is envisaged that the majority of skilled personnel will have to be recruited from outside of the County.

Both Montana, and the USA, have a well-developed mining industry from which skilled mining and construction workers can be recruited. Recruitment and training of Meagher County residents will form an important part of the operations strategy.

5.5.4 Potential Mine Facilities

A MOP application for the Black Butte Copper Mine has been submitted and declared “complete and compliant” by the MT DEQ. The MOP includes all mine facilities required to establish and operate the Black Butte Copper mine (Figure 5-2). Environmental Resources Management Inc. (ERM), an independent environmental consulting company was contracted by the DEQ to evaluate the MOP and develop a draft EIS. The draft EIS has been completed and distributed for public comment. Public comments are currently being assessed by the DEQ.



Source: SRA, 2019

Figure 5-2: Proposed Infrastructure Layout for the Black Butte Project

6 History

The first mineral development on the property was by Messrs. Weir and Tyler, local ranchers, who staked claims on copper-stained quartzite at the Virginia Mine prospect, situated approximately 500 m west of the Johnny Lee deposit. By 1894, they had sunk a 20 m shaft and completed a 9 m drift but only encountered minor copper oxide mineralization (Weed, 1899).

A homesteader, John Lee, settled in the area immediately above the current resource in 1906 and in 1910 sunk a 15 m deep shaft on the Volcano Valley fault zone (Pers. Comm., Hanson family). He continued to work the property intermittently until 1922. Based on observations in and around the shaft, SRA geologists interpret the workings to have encountered minor copper oxide that had been remobilized during movement along the Volcano Valley Fault. It is likely that the source for this remobilized copper was the Johnny Lee deposit. The mineralization that forms the Johnny Lee deposit has been named in recognition of Mr. Lee's efforts.

Until 1973, commercial interest was focused on iron contained by ferruginous gossans in the vicinity of the Black Butte property (Goodspeed, 1945; Roby, 1950). These efforts resulted in the staking and patenting of several claims both inside and adjacent to the current Bar Z Ranch lease (Figure 6-1). The small-scale development of the iron ore deposits was accompanied by copper prospecting but none of the test-pits nor exploration adits encountered copper mineralization of economic significance. No copper mining has been undertaken within the project area.

6.1 Prior Ownership and Ownership Changes

The leases that form part of the Black Butte property were originally homestead and railroad properties which have been consolidated, over time, into the fee simple tracts now under lease by SRA (Figure 6-1). The remainder of the project area comprises unpatented claims on USFS land.

Homestake Mining Company Inc. (Homestake) claimed ground within and adjacent to the current Black Butte Property in 1973, but by 1975 had abandoned the district.

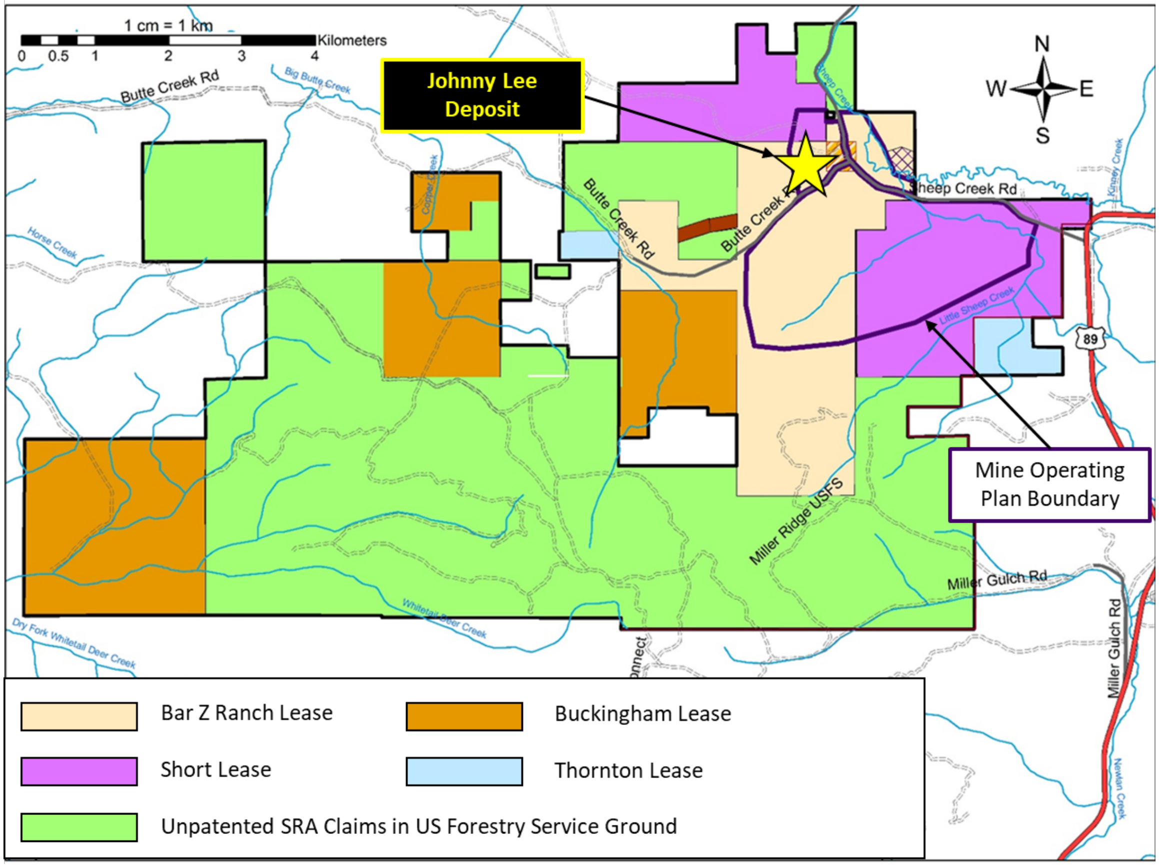
CAI acquired mining claims and leased a number of properties, including the current Bar Z tract, in 1976.

In 1977, Anaconda Mining Company (Anaconda) acquired land to the west of CAI in the Horse Prairie area. CAI formed a joint venture (JV) with Anaconda in the early 1980s then bought-out Anaconda's interest in 1984.

Exxon Minerals leased the tract owned by Rose Holmstrom (now the Short Lease) in 1981. CAI formed a JV with Exxon Minerals between 1984 and 1985 after which CAI purchased Exxon Minerals' interest. In 1985, CAI formed a JV with Utah International Inc. (UII). BHP acquired UII in 1985 and continued the JV with CAI. In 1990, CAI purchased BHP's interest, and assumed control of the entire property. Five years later, CAI dropped all the leases due to falling copper prices.

In 2010, Tintina acquired the mineral rights formerly owned by CAI.

Sandfire Resources NL acquired a controlling interest in Tintina in 2014. Tintina Resources was subsequently renamed SRA.



Source: SRA, 2019

Figure 6-1: Map of the Project Area Showing Mineral Rights Under Lease to SRA and Unpatented Claims on US Forestry Service Ground

6.2 Exploration and Development Results of Previous Owners

Homestake conducted geologic mapping, soil sampling, and trenching targeting lead-zinc (Pb-Zn) mineralization in ferruginous gossans. Homestake completed one drillhole, sited southwest of the Johnny Lee deposit, before abandoning the district in 1975.

Anaconda commenced exploration in 1977 and from 1978 to 1979 drilled 12 drillholes that encountered bedded pyritic sulfides but no economic mineralization.

CAI completed 13 drillholes in the Black Butte area from 1978 to 1981. These drillholes intersected bedded pyrite with narrow zones of elevated (less than 1%) zinc but no commercially significant copper mineralization.

In 1985, CAI created a JV of the property with UII, with UII as the operator. As part of the JV agreement, UII was required to complete a number of drillholes recommended by CAI geologists. In the second of these drillholes, SCC-17, UII intercepted both the Upper Zone and Lower Zone of the Johnny Lee deposit. The Upper Zone intersection was 6.09 m at 2.92% Cu from 131.4 m and the Lower Zone intersection was 2.44 m at 2.88% Cu from 355.7 m. This is considered the discovery hole for the project.

BHP/UII operated the JV until early 1988, drilling a total of 37 drillholes; at which point, they had fulfilled their earn-in agreement for a 50% interest. In 1990, CAI purchased BHP's 50% interest with no retained royalties or back-in rights and operational control reverted to CAI.

CAI continued to drill the Johnny Lee deposit, discovered the nearby Lowry zone, and drilled an additional 28 drillholes before abandoning the project in 1990.

From 2010 to 2014, Tintina completed an additional 163 drillholes for Mineral Resource definition, metallurgical test work, and geotechnical studies. This data was used for the PEA released in 2013 (Winckers *et al*, 2013).

From 2014 to present, SRA has focused on gathering environmental, geotechnical, hydrogeological, metallurgical, and geological data to finalize the MOP, provide data for a new Mineral Resource estimate, and complete a feasibility study (FS).

6.3 Historic Mineral Resource and Reserve Estimates

Prior to the establishment of NI 43-101, CAI declared Mineral Resource estimate of 4.5 million tonnes (Mt) at 2.5% Cu and 0.1% Co for the Johnny Lee UCZ and 1.8 Mt at 6.0% Cu for the LCZ (Cominco, 1989). No additional details for this estimate have been located by SRA personnel.

Tintina declared separate Mineral Resource estimates for the Black Butte deposit in 2011, 2012, and 2013, all of which were prepared in accordance with NI 43-101. These estimates are documented below.

6.3.1 2011 Resource Estimate

In 2010, Tintina conducted a six drillhole program to verify drilling, logging, and analyses by previous operators. Resource Modeling Inc. (RMI) used the verification and historic drill data to estimate an Inferred Mineral Resource (Table 6-1) for the Johnny Lee UCZ and Johnny Lee LCZ (Lechner, 2011).

Table 6-1: 2011 Mineral Resource Estimate for the Johnny Lee Deposit at a 1.5% Cu Cut-Off Grade

Area	Resource Classification	Tonnes (000s)	Cu Grade (%)	Co Grade (%)	Ag Grade (g/t)	Cu (Tonnes)	Co (Tonnes)	Ag (000s oz)
Johnny Lee UCZ	Inferred	7,037	2.36	0.12	12.3	166,018	8,618	2,800
Johnny Lee LCZ	Inferred	2,462	4.71	0.06	5.1	116,122	1,315	400

Source: After Lechner, 2011

6.3.2 2012 Preliminary Economic Assessment Resource Estimate

During 2011, Tintina completed an additional 92 drillholes in the Johnny Lee and Lowry Zones. The updated dataset was used, by Tetra Tech Inc., to complete a Mineral Resource estimate, for the Johnny Lee and Lowry zones that was used for a PEA (Winckers, et al, 2012). Table 6-2 summarizes the Mineral Resource Estimate.

Table 6-2: 2012 Mineral Resource Estimate for the Johnny Lee Deposit and Lowry Zone

Area	Resource Classification	Tonnes (000s)	Cu Grade (%)	Co Grade (%)	Ag Grade (g/t)	Cu (Tonnes)	Co (Tonnes)	Ag (000s oz)
Johnny Lee UCZ	Indicated	8,483	2.96	0.12	16.9	241,769	9,979	4,609
	Inferred	1,257	2.64	0.10	16.4	33,113	1,361	663
Johnny Lee LCZ	Inferred	2,462	4.71	0.06	5.1	116,112	1,315	404
Lowry	Inferred	5,139	2.60	0.12	14.6	133,358	6,350	2,412

Source: After Winckers *et al*, 2012
Cut-Off Grade for the Johnny Lee UCZ and Lowry is 1.6% Cu. Cut-Off Grade for the Johnny Lee LCZ Is 1.5% Cu

6.3.3 2013 Updated Preliminary Economic Assessment Resource Estimate

In 2013, Tetra Tech Inc. updated the PEA using a new Mineral Resource estimate that incorporated results from an additional 65 drillholes (Winckers et al, 2013). Table 6-3 summarizes this Mineral Resource Estimate.

Table 6-3: 2013 Mineral Resource Estimate for the Johnny Lee Deposit and Lowry Zone

Area	Resource Classification	Tonnes (000s)	Cu Grade (%)	Co Grade (%)	Ag Grade g/t	Au Grade (g/t)	Cu (Tonnes)	Co (Tonnes)	Au (000s oz)	Ag (000s oz)
Johnny Lee UCZ	Measured	2,659	2.99	0.12	16.3	0.007	79,380	3,130	0.6	1,393
	Indicated	6,520	2.77	0.13	15.5	0.009	180,533	8,165	1.9	3,249
	Inferred	1,255	2.52	0.10	15.2	0.008	31,752	1,270	0.3	613
Johnny Lee LCZ	Indicated	2,387	6.40	0.03	4.5	0.304	152,863	771	23.3	345
	Inferred	205	5.33	0.03	4.1	0.207	100,000	45	1.4	27
Lowry	Indicated	4,099	2.94	0.10	15.1	0.006	120,658	4,082	0.8	1,990
	Inferred	801	2.58	0.10	14.1	0.008	20,866	907	0.2	363

Source: After Winckers, et al (2013)
Cut-Off Grade for the Johnny Lee UCZ and Lowry is 1.6% Cu Cut-Off Grade for the Johnny Lee LCZ Is 1.5% Cu

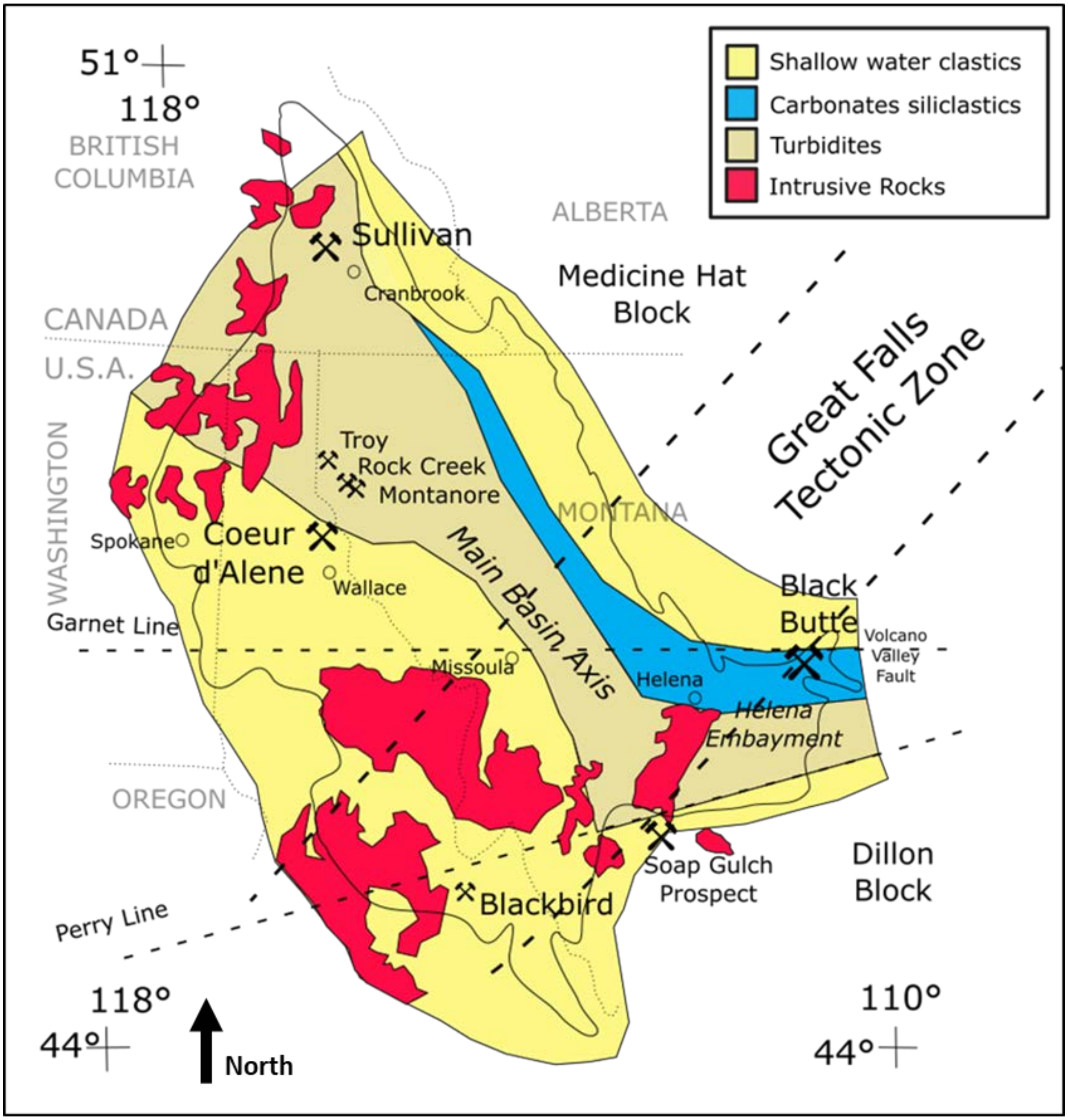
6.4 Historic Production

There has been no historical production from the Black Butte project.

7 Geological Setting and Mineralization

7.1 Regional Geology

The crystalline basement underlying the project area consists of Mesoproterozoic crust formed during a period of ocean basin closure, arc magmatism and high-grade metamorphism, termed the Big Sky Orogeny, which occurred during the final assembly of the supercontinent Nuna from 1.86 giga annum (Ga) to 1.71 Ga (Condit *et al*, 2015; Foster *et al*, 2006; Mueller *et al*, 2016). The Big Sky Orogeny created a zone of crustal weakness coincident with a trend of high-angle faults, and shear zones stretching northeastward from eastern Idaho to southwest Saskatchewan named the Great Falls Tectonic Zone (Figure 7-1).



Source: Modified after Lydon, 2007

Figure 7-1: The Preserved Portion of the Belt Basin Showing Major Facies Groups of the Belt Supergroup and the Location of Significant Mineral Deposits

Beginning at 1.5 Ga, the Nuna supercontinent began to break-up (Evans & Mitchell, 2011) and an intracontinental basin (the Belt Basin) formed in what is now British Columbia, Alberta, Washington, Idaho and western Montana. This basin rapidly filled with a 15 to 20 km thick sequence of sediments and minor volcanic rocks collectively termed the Belt Supergroup (Harrison, 1972). U-Pb Zircon dating of volcanic rocks in the Belt Supergroup returned ages ranging from 1,468±2 to 1,390±10 Ma (Evans *et al*, 2000).

Three main lithofacies are recognizable within the Belt Supergroup (Figure 7-1):

- shallow water clastic sediment;
- a contemporaneous carbonate platform and shelf lithofacies; and
- a deep water turbidite lithofacies.

The Belt Basin was partitioned into a number of sub-basins by differential movement on syn-sedimentary growth faults. One of these sub-basins is the Helena Embayment (Figure 7-1), an east-west trending graben bounded by major growth fault zones, principally the Garnet Line on the north, and the Perry Line on the south (Winston, 1986). The Helena Embayment sub-basin contains significantly more carbonate than the main part of the basin and was likely hydrologically restricted from the main basin (Godlewski and Zieg, 1984).

The Belt Basin became increasingly shallow over time and deposition ceased with the onset of the East Kootenay orogeny at approximately 1,350 mega annum (Ma) (Lydon, 2007). Neoproterozoic mafic dikes and sills cut the Belt Supergroup rocks in the Helena Embayment (Reynolds & Brandt, 2005). Cambrian to Devonian sedimentary and volcanic lithofacies unconformably overly the Belt Supergroup of the Helena Embayment.

The Belt Supergroup and overlying Cambrian to Devonian rocks were deformed in the late Cretaceous to early Tertiary by the Laramide Orogeny. This process involved west to east compression and reactivated and inverted many of the Proterozoic faults (Marshak *et al*, 2000).

7.2 Local and Property Geology

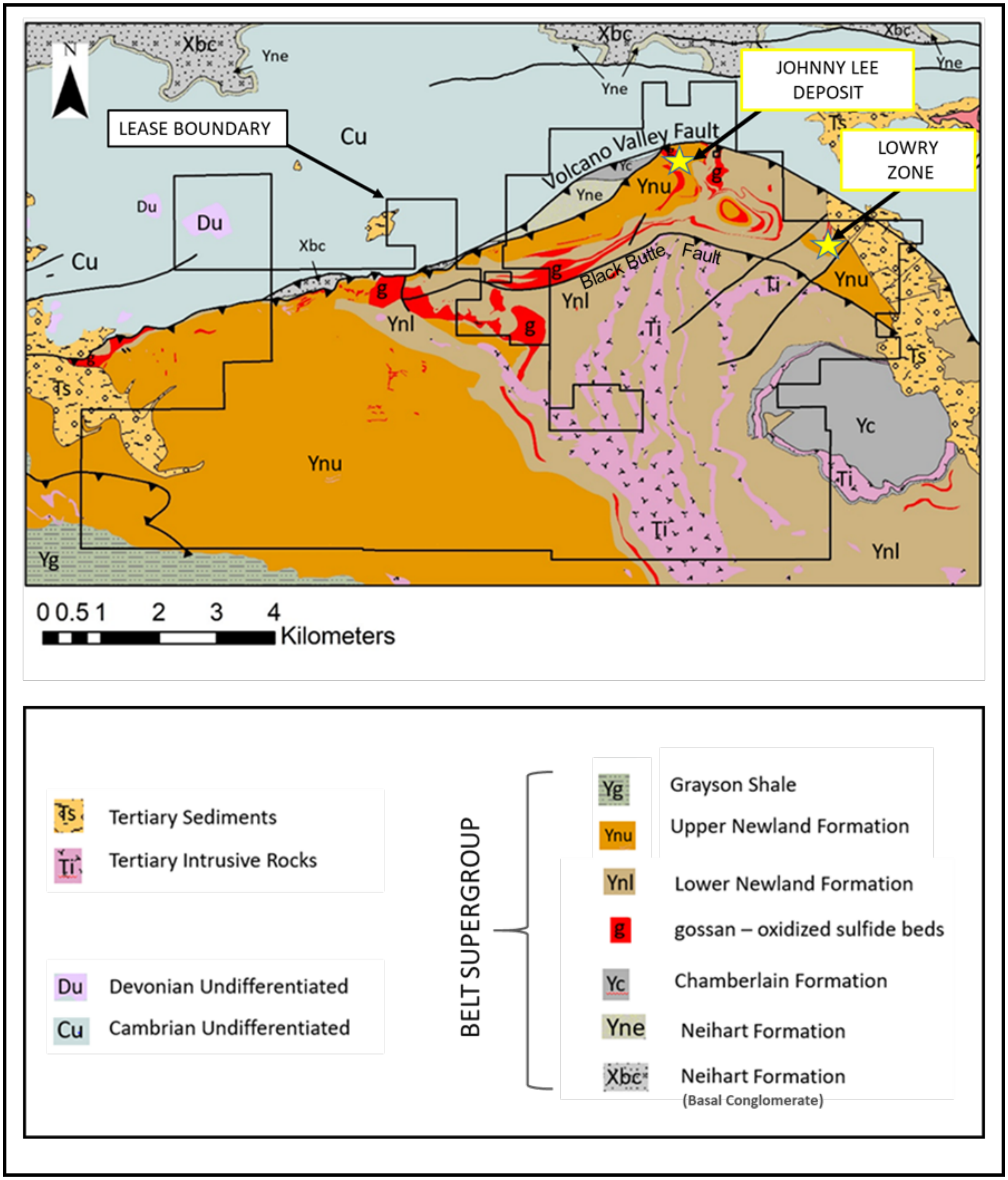
Figure 7-2 shows the geology of the Black Butte project area. The majority of the project area is underlain by gentle to moderately southward-dipping rocks of the Belt Supergroup. The Belt Supergroup lithofacies are juxtaposed against gently south-dipping Cambrian sedimentary rocks along the VVFZ. To the north of the project area, Belt Supergroup rocks are also exposed, below the basal Cambrian unconformity (Figure 7-2). Intermediate to mafic, Early Tertiary intrusive dykes and sills occur within the Belt Supergroup. Late Tertiary sedimentary lithofacies unconformably overlie all other units in the area.

7.2.1 Lithology and Stratigraphy

Figure 7-3 summarizes the lithostratigraphy within the project area.

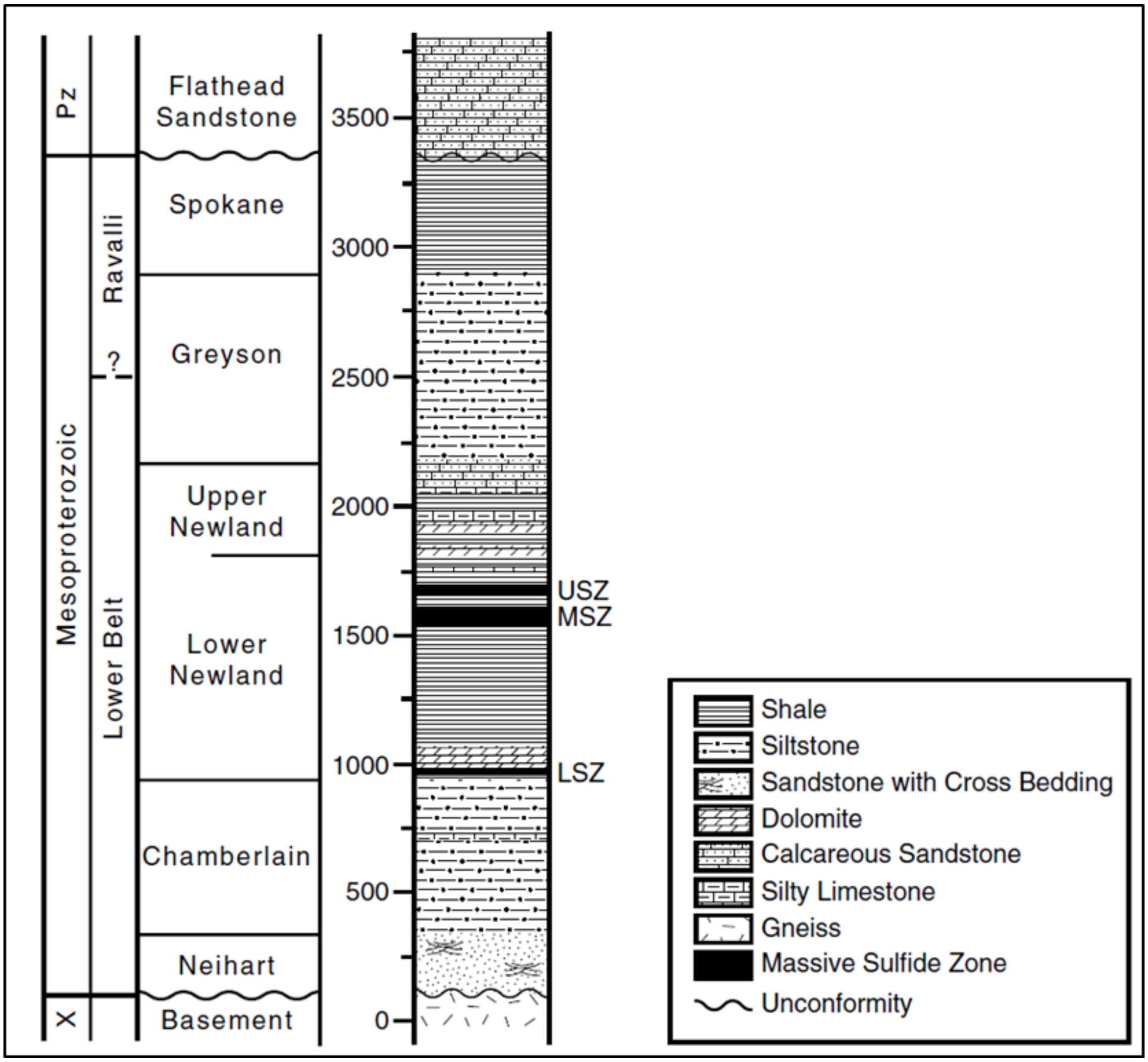
Mesoproterozoic Basement

Proterozoic basement rocks are not exposed within the project area but have been intersected in drillholes that penetrate the basal unconformity of the Belt Group. The basement in the project area consists of coarsely-crystalline amphibolite intruded by meta-granite (granitic gneiss) and meta-diorite (orthogneiss). Granitic gneiss samples collected 20 km north of the project area have been dated at 1.79 Ga to 1.89 Ga (Mueller *et al*, 2002).



Source: SRA, 2019

Figure 7-2: Geologic Map of the Black Butte Project Area Showing Project Boundary and Copper Deposits



Source: Present *et al*, 2017

Figure 7-3: Project Area Stratigraphy with Thickness Scale in Meters

Neihart Formation

The lowest Belt Supergroup unit in the area is the Neihart Formation which unconformably overlies basement rocks (Figure 7-2). Within the project lease boundaries, the Neihart Formation is exposed as fault bounded blocks within the VVFZ (2) and has been intersected in drillholes to the north of the VVFZ. The Neihart Formation comprises a locally developed basal conglomerate overlain by a well-sorted, fine-grained quartz-rich sandstone. Due to its well-cemented quartz-rich nature, this unit is informally referred to as the Neihart Quartzite.

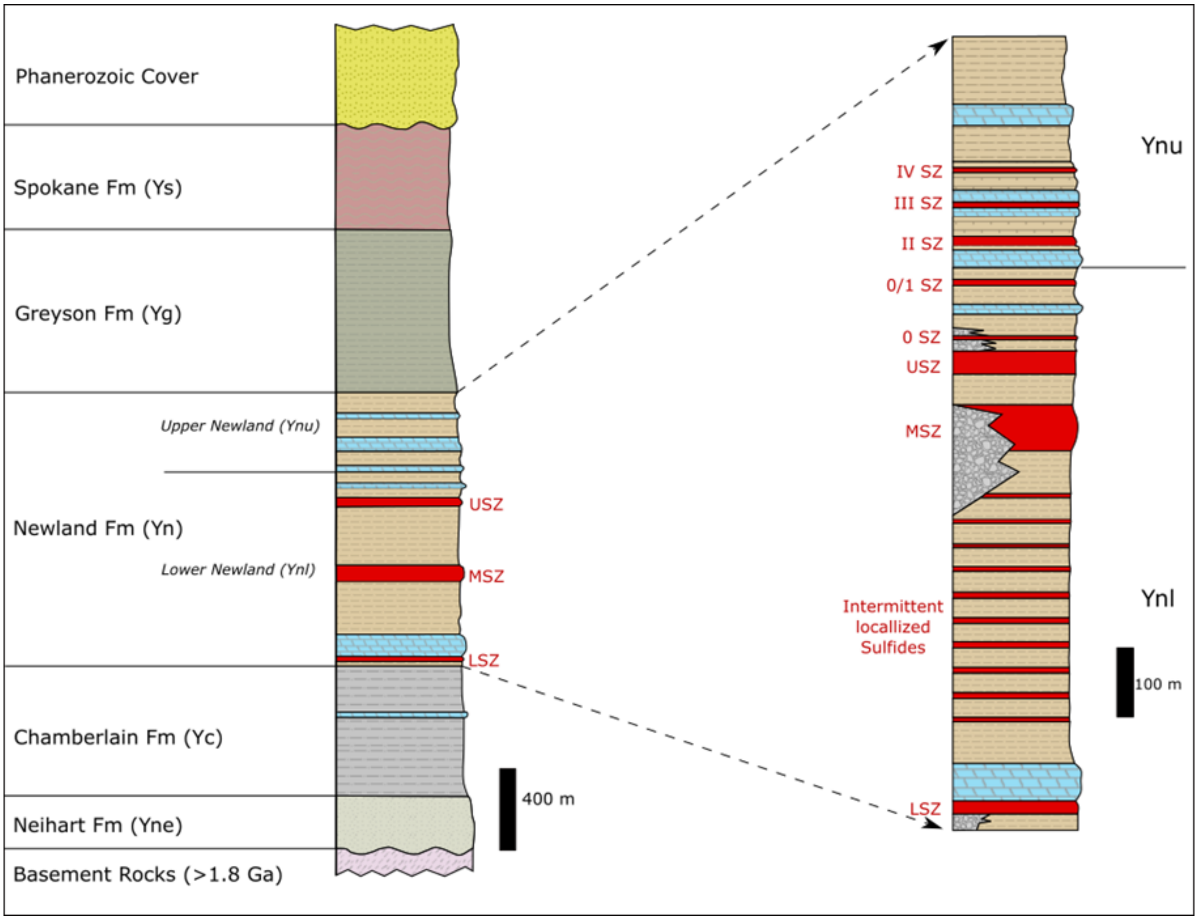
Chamberlain Formation

The Neihart Formation grades-up into the Chamberlain Formation comprising interlayered shale and sandstone with the first shale unit marking the base of the Chamberlain Formation. The Chamberlain Formation is exposed in a fault-bounded block within the VVFZ and in the axial region of a breached, periclinal anticline along the eastern margin of the project area (Figure 7-2).

The upper part of the Chamberlain Formation has been intersected in drillholes north of the VVFZ, where it comprises a carbonaceous shale with sandstone lenses and layers. The top of the Chamberlain Formation is defined by the last sandstone unit before Newland Formation shale lithofacies.

Newland Formation

The Chamberlain Formation grades upward into the Newland Formation (Figure 7-3) which consists of shale, carbonaceous shale, calcareous shale, dolomite, conglomerate and massive sulphides. The Newland Formation can be subdivided into two parts: a lower shale and conglomerate-dominated portion, and an upper carbonate-rich portion (Figure 7-3 and Figure 7-4).



Source: SRA, 2019

Figure 7-4: Detailed Stratigraphy of the Newland Formation within the Project Area

Lower Newland

The Lower Newland is approximately 800 m thick in the property area, though it thickens considerably to the south. This unit consists of dolomite, dolomitic shale, carbonaceous shale, shale, and conglomerate. Numerous layers of massive sulphide, comprising bedded pyrite accumulations, are found throughout the unit. These massive sulphide units range from centimeter scale layers to units that exceed 40 m in thickness. Shale and conglomerate lenses often occur within the massive sulphide units. All economically significant copper mineralization discovered in the project area to date occurs within massive sulphide units of the Lower Newland. The Johnny Lee Upper Zone deposit is hosted by the USZ, the Johnny Lee LCZ deposit is hosted by the LSZ. The nearby mineralization hosted at the Lowry zone is located within the MSZ as illustrated in Figure 7-4.

Upper Newland

The Upper Newland is approximately 350 m thick and comprises dolomite, dolomitic shale, carbonaceous shale, and shale. Significant conglomerate horizons are absent from the Upper Newland and the proportion of carbonate rocks (dolomite and dolomitic shale) is higher than that of the Lower Newland. The Upper Newland contains massive sulphide units, but no economically significant copper mineralization has been identified to date.

Greyson Formation

The Greyson Formation is exposed in the southwest corner of the project area. It comprises non-calcareous shale with occasional sandstone beds and minor local carbonate. There are no known bedded sulphides in this unit.

Flathead Formation

Much of the area north of the VVFZ is covered by an extensive sheet of Middle Cambrian Flathead Formation that rests unconformably on Belt Supergroup rocks. The Flathead Formation is a moderately to poorly sorted, fine to coarse-grained sandstone that contains abundant hematite. In the area north of the VVFZ, drillholes have intersected Flathead Formation unconformably overlying both Neihart and Chamberlain Formations.

Igneous Rocks

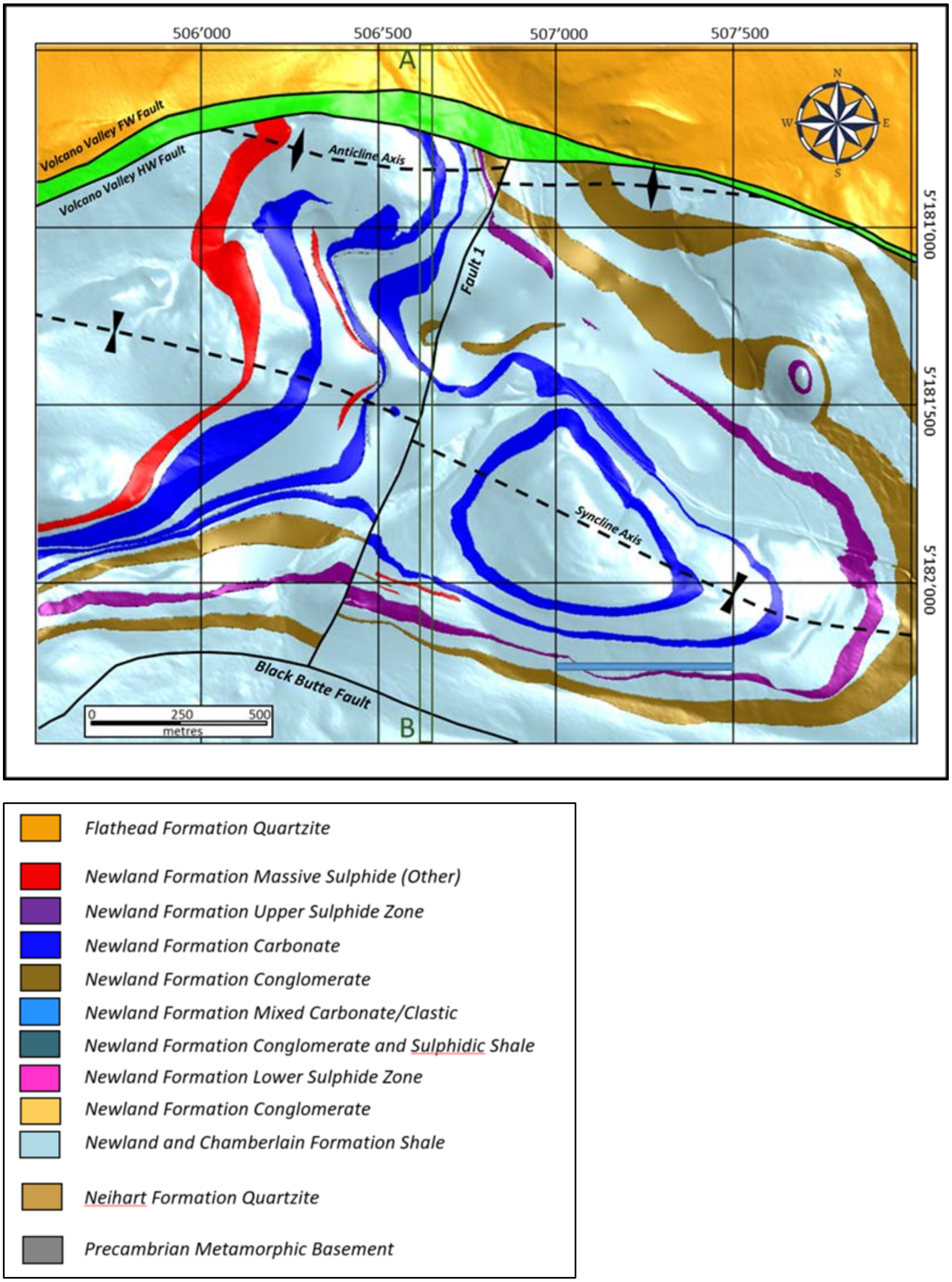
The project area contains numerous Tertiary, intermediate to mafic dykes and sills that have intruded the Belt Supergroup. The dykes exhibit a preferential north-northeast to south-southwest (N/NE-S/SW) strike.

7.2.2 Structure

A 3D lithostratigraphic model of the Johnny Lee area, constructed in 2019 by SRA using Seequent Leapfrog Geo™ software, allows significant geological units and geological structures to be visualized (Figure 7-5 and Figure 7-6). All proposed mine development and infrastructure occurs within the boundaries of the 3D lithostratigraphic model.

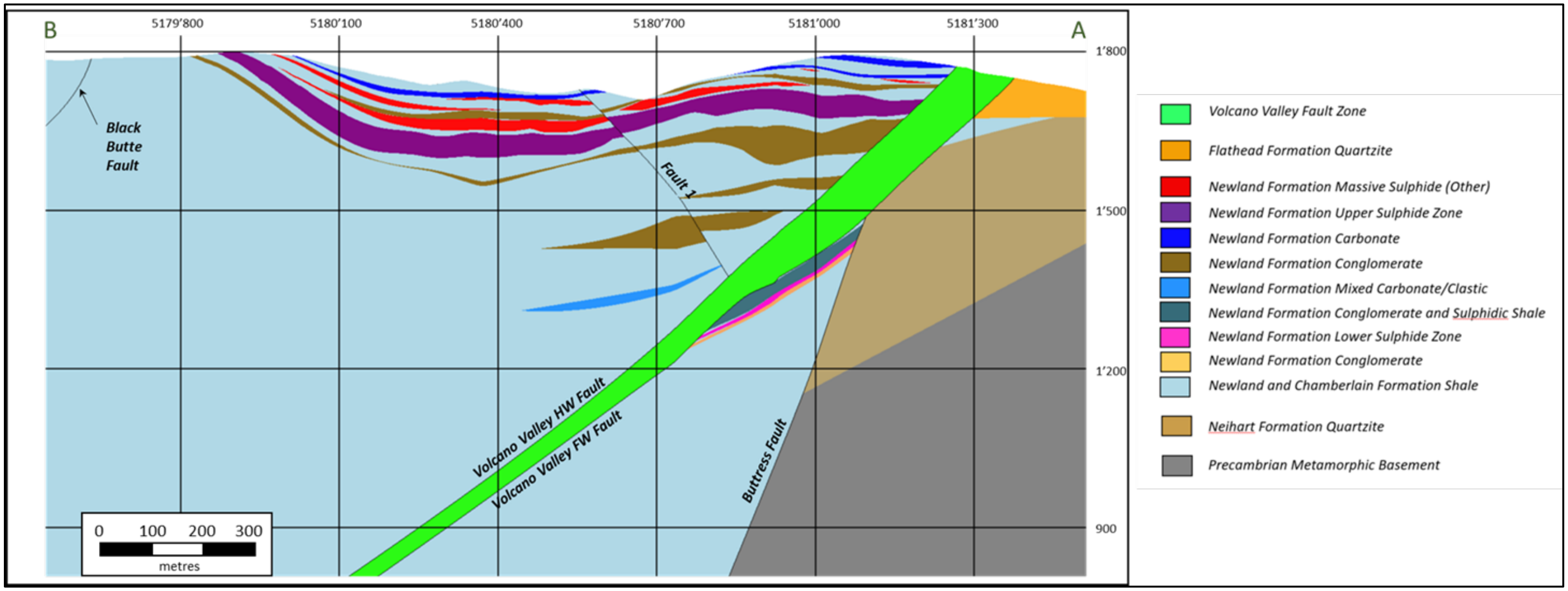
Buttress Fault

The oldest structural element that has been recognized in the Johnny Lee area is the Buttress Fault (Figure 7-6), which is an east-west striking, 70° south dipping brittle fault characterized by a 3 to 5 m wide zone of brecciation and gouge. The Buttress fault is not exposed at surface as it is truncated by the VVFZ in the central portion of the lithostratigraphic model (Figure 7-5) and sub-outcrops below the Flathead Formation in the eastern and western portions of the model (where the arcuate nature of the VVFZ allows the Buttress fault to project to the base of the Flathead Formation).



Source: SRA, 2019
Coordinate System Is NAD83 UTM Zone 12N.

Figure 7-5: Plan View Of The 3-D Lithostratigraphic Model Of The Johnny Lee Area Showing Major Structures And Location Of Cross-Section Line A – B (Figure 7-6)



Source: SRA, 2019

Figure 7-6: Cross-Section From A To B, Looking West, Of The 3-D Lithostratigraphic Model Shown In Figure 7-5

No linear fabric elements, nor kinematic indicators have been recorded from drill core intersections of the Buttress Fault, thus actual movement sense on the fault cannot be determined. Juxtaposition of the Newland and Chamberlain Formations against the Neihart Formation and Proterozoic basement across the Buttress Fault indicate a minimum of 300 m of apparent normal displacement on the Buttress Fault.

The Buttress Fault is interpreted by Godlewski and Zieg (1984) to be a syn-sedimentary, basin-margin fault that developed during formation of the Belt Supergroup depository. The Buttress Fault truncates the LSZ (Figure 7-7), and adjacent Newland Formation lithofacies, that are the host for the Johnny Lee LCZ deposit. Thus, final movement on the Buttress fault post-dates deposition of these lithofacies.

Folding

The Newland Formation strata in the hanging-wall of the VVFZ have been gently folded to form a syncline-anticline pair with upright, west-northwest to east-southeast (W/NW-E/SE) striking axial planes (Figure 7-5 and Figure 7-6). In the Johnny-Lee area, these folds have a variable plunge that range from 2° to 15° to the W/NW. Within the greater Black Butte project area (Figure 7-2), folds are periclinal, plunging to both the W/NW and E/SE.

Folding was accompanied by the development of bedding parallel faults and brittle-ductile shear zones, consistent with folding by flexural-slip (LeBrun, 2018). Folding was accompanied by the development of fold-related longitudinal and diagonal joint sets (Lebrun, 2018).

Layer-parallel movement during folding by flexural slip has not caused significant displacement of mineralization but, outside of the fault zones that have been identified, poor geotechnical ground conditions can often be related to zones of closely spaced, shallow dipping flexural-slip fractures or steeply dipping fold-related joints. In zones where both steeply-dipping and shallow-dipping fold related fracture zones are developed, with a high fracture density, poor ground conditions may be developed.

Volcano Valley Fault Zone

Within the project area (Figure 7-2 and Figure 7-5), the VVFZ is an arcuate, W/NW to E/SE striking, 50 to 170 m wide, southward dipping zone of brittle-ductile to brittle deformation. The edges of the VVFZ are marked by two significant faults termed the Volcano Valley Hangingwall (HW) and Footwall (FW) faults. These faults are characterized by zones of clay-gouge and/or fault breccia that range in width from 2 to 10 m.

Between the two bounding faults, the VVFZ comprises a tectonic melangé of Neihart Formation, Newland Formation, and Chamberlain Formation lithofacies fault blocks bounded by brittle-ductile shear zones, brittle faults or brittle-ductile shear zones that have been reactivated as brittle faults. The brittle-ductile shear zones are characterized by zones of foliation, quartz-carbonate veining and mineral elongation lineations defined by rod-shaped aggregates of quartz and micacous minerals. The brittle faults comprise zones of clay gouge (typically in shales) or fault breccia (in more competent lithotypes) and often have slickenlines on bounding surfaces. Where both brittle-ductile and brittle structural elements are developed at the same location, the brittle elements overprint the brittle-ductile fabric elements.

Both mineral elongation lineations and slickenlines within the VVFZ dip at moderate angles (30° to 50°) to the west suggesting they formed during the same progressive deformation event. Kinematic indicators such as composite planar fabrics, slickenside steps, asymmetrical clasts and asymetrical pressure shadows indicate oblique reverse-sinistral movement sense during deformation along the VVFZ (Lebrun, 2018). Accurate displacement on the VVFZ within the project area has not been determined but based on stratigraphic juxtaposition of the upper Newland Formation and the Flathead Formation to the east of the project area, a minimum of 2,500 m apparent displacement has occurred.

The Volcano Valley FW Fault truncates the UCZ deposit. The Volcano Valley HW Fault truncates the LCZ deposit (Figure 7-6).

Black Butte Fault

The Black Butte fault has been mapped south of the Johnny Lee deposit (Figure 7-2 and Figure 7-5) and has been intersected in one drillhole displaying an 8 m downhole width of brecciation and fault gouge. It is a curvi-planar fault striking and dipping sub-parallel to the VVFZ. It is interpreted to have developed during the same deformation event that formed the VVFZ and have similar kinematics. The Black Butte fault does not impact any of the currently proposed mining and development activity.

Fault 1

Fault 1 is interpreted from drilling data as a north-northeast (N/NE) striking, 70° to 75° west dipping fault that transects and displaces the UCZ. The fault zone comprises a 0.1 to 0.6 m wide zone of clay-gouge and breccia surrounded by a 0.7 to 3.0 m wide zone of fracturing. No kinematic indicators have been observed and, as core orientation typically fails within the fracture zone, no lineations have been measured within Fault 1.

As there is a high drill density in the vicinity of Fault 1, accurate lithological and mineralization wireframes have been constructed and have been used to determine movement vectors on the fault plane. The dip-slip component of movement was 20 m of reverse-sense displacement, the strike slip component was 120 m of dextral diplacement. Fault 1 is thus a reverse-dextral fault with approximately 122 m displacement. Fault 1 is truncated by the VVFZ in the north and is interpreted to be truncated by the Black Butte fault in the south.

With the exception of the Buttress fault, all structural elements described above are interpreted to have formed by progressive deformation during the Cretaceous Laramide Orogeny. Northeast to southwest (NE-SW) orientated compression produced E/NE-W/NW trending folds. Further shortening led to the development of oblique reverse-sinistral faults, such as the Volcano Valley and Black Butte faults. Although the oblique reverse-dextral Fault 1 is truncated by the VVFZ, and the Black Butte fault, the similarity in fabric elements between Fault 1 and the VVFZ suggest that Fault 1 is a second-order fault that developed as a conjugate to the VVFZ during NE-SW directed compression.

7.3 Significant Mineralized Zones

Economic copper mineralization has been identified in the Newland Formation at the UCZ and the LCZ. The mineralization in both of these deposits is largely hosted by massive sulphide units referred to as the USZ and LSZ, respectively. Although not included in the MOP application nor studied for this report, copper mineralization also occurs at the Lowry deposit situated 3 km southeast of the Johnny Lee deposit (Figure 7-2). Copper mineralization at the near Lowry deposit is partly hosted by a unit referred to as the MSZ.

Copper mineralization in the USZ, MSZ, and LSZ is localized (i.e. does not occur throughout the entire stratigraphic unit), nor does it occur in the numerous other massive sulphide zones in the Newland Formation (Figure 7-4).

While copper mineralization in the southern part of the UCZ is mostly restricted to massive sulphide lithofacies, it is common for economically-significant copper mineralization to occur in shale and conglomerate lithofacies, interlayered with the massive sulphide in the northern part of the UCZ. Copper mineralization also occurs in shale and conglomerate lithofacies adjacent to the LSZ and in shale, carbonate, and conglomerate lithofacies adjacent to the MSZ.

McGoldrick and Zieg (2004) interpreted the bedded pyrite massive sulphides to have formed at syn-sedimentary hydrothermal vent sites during deposition of the host clastic sediments. Sulphides are deformed by soft-sediment folding and sulphide accumulations include evidence of vent biota. Barite is commonly observed within both massive sulphide units and sediment horizons and is interpreted to have formed during hydrothermal vent activity.

The massive sulphide units in the Newland Formation range from several meters of centimeter-scale beds interbedded with shale or massive lenses of >50% pyrite up to 40 m thick. The pyrite that forms these accumulations shows significant microtextural variation but can be broadly classified into three categories (McArthur, 2017a, 2017b, 2018, 2019):

- Framboidal: Spherical, biogenic forms sometimes coalescing into bands;
- Melnikovite: Porous, amorphous or sub-microcrystalline, often seen as colloform growths; and
- Crystalline: Euhedral or annealed showing planar crystal faces.

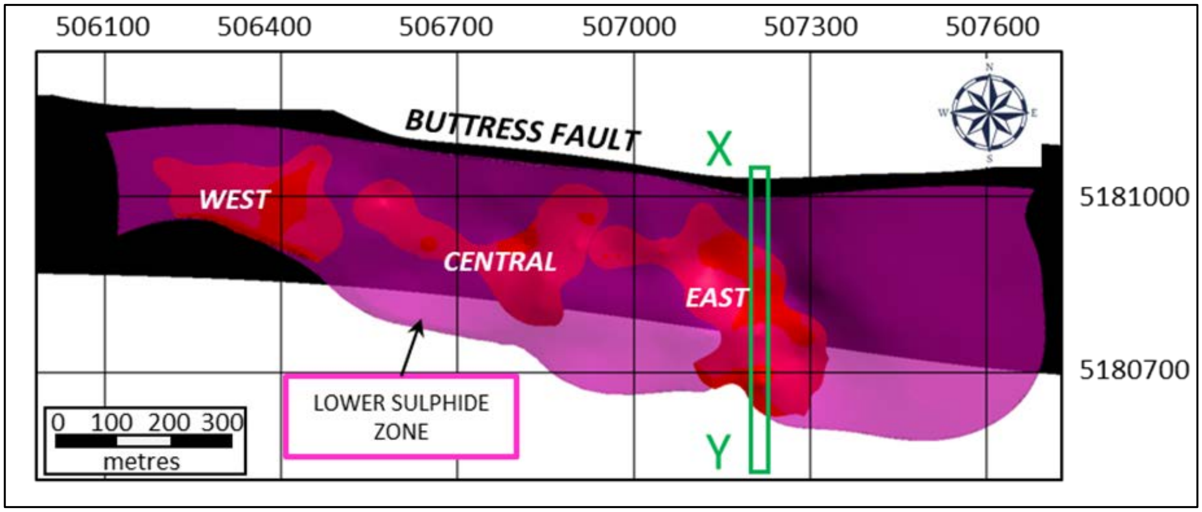
The framboidal and melnikovite forms are considered early (i.e., primitive). Subsequent hydrothermal activity resulted in increasing recrystallization until the presence of planar crystal faces leads the pyrite forms to be classified as crystalline (McArthur, 2018).

Non-supergene altered copper mineralization occurs as chalcopyrite, tennantite, and bornite. Textural variations of these copper sulphide minerals reflect a complex paragenesis. Whilst minor amounts of copper sulphides occur in association with primitive pyrite (such as in colloform melnikovite bands), the vast majority of copper sulphides texturally overprint the early pyrite forms, typically replacing the gangue minerals and interstices surrounding the pyrite (McArthur, 2018). These observations are interpreted to indicate that whilst some copper sulphide mineralization accompanied formation of the bedded pyritic units, the majority was introduced during progressive hydrothermal activity that post-dated formation of the massive sulphide units.

In all three deposits (UCZ, LCZ, and Lowry), veinlets and disseminations of copper sulphides occur within shale, conglomerate, and carbonate lithofacies adjacent to bedded pyrite, as well as in the bedded pyrite itself. These copper mineralizing events have been interpreted as either an extended progressive hydrothermal event(s), or copper sulphide remobilization during a later tectono-thermal event.

7.3.1 Johnny Lee Lower Copper Zone (LCZ)

The LCZ occurs at depths of 340 to 520 m below surface, strikes approximately east-west and dips at 15° to 30° to the south. Mineralization in the LCZ is primarily hosted by the LSZ located in the footwall of the VVFZ and hanging-wall of the Buttress fault (Figure 7-7 and Figure 7-8). The LSZ is overlain by a unit comprising interlayered shale and conglomerate and is underlain by a conglomerate unit. The LCZ deposit comprises three lenses of mineralization termed the East, Central, and West lenses (Figure 7-7). These lenses are defined by the outer limit of >2.0% Cu mineralization, which extends outside of the LSZ into the hanging-wall intercalated conglomerate and shale unit (Figure 7-8 and Figure 7-9). Minor Cu mineralization also occurs in the conglomerate below the LSZ but does not exceed 2.0% Cu. Table 7-1 shows the approximate dimensions of the three mineralization lenses that collectively form the LCZ deposit.



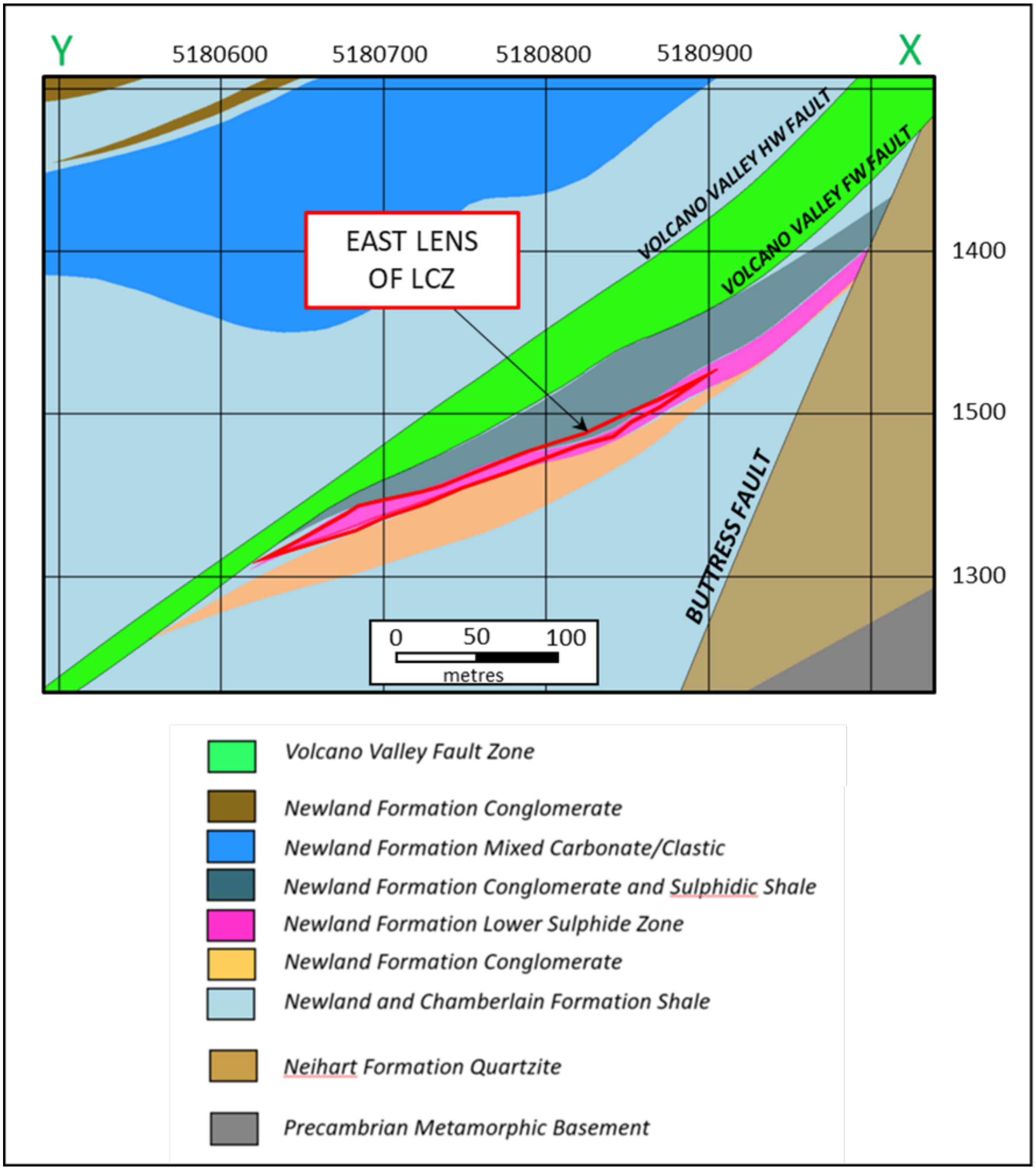
Source: SRA, 2019
The Volcano Valley Fault Zone has been removed for clarity. The Position of cross-section X-Y (Figure 7-8) is indicated.

Figure 7-7: Plan View of the Lower Sulphide Zone Showing the West, Central, and East Lenses of the Lower Copper Zone

Table 7-1: Summary of Lower Copper Zone Dimensions

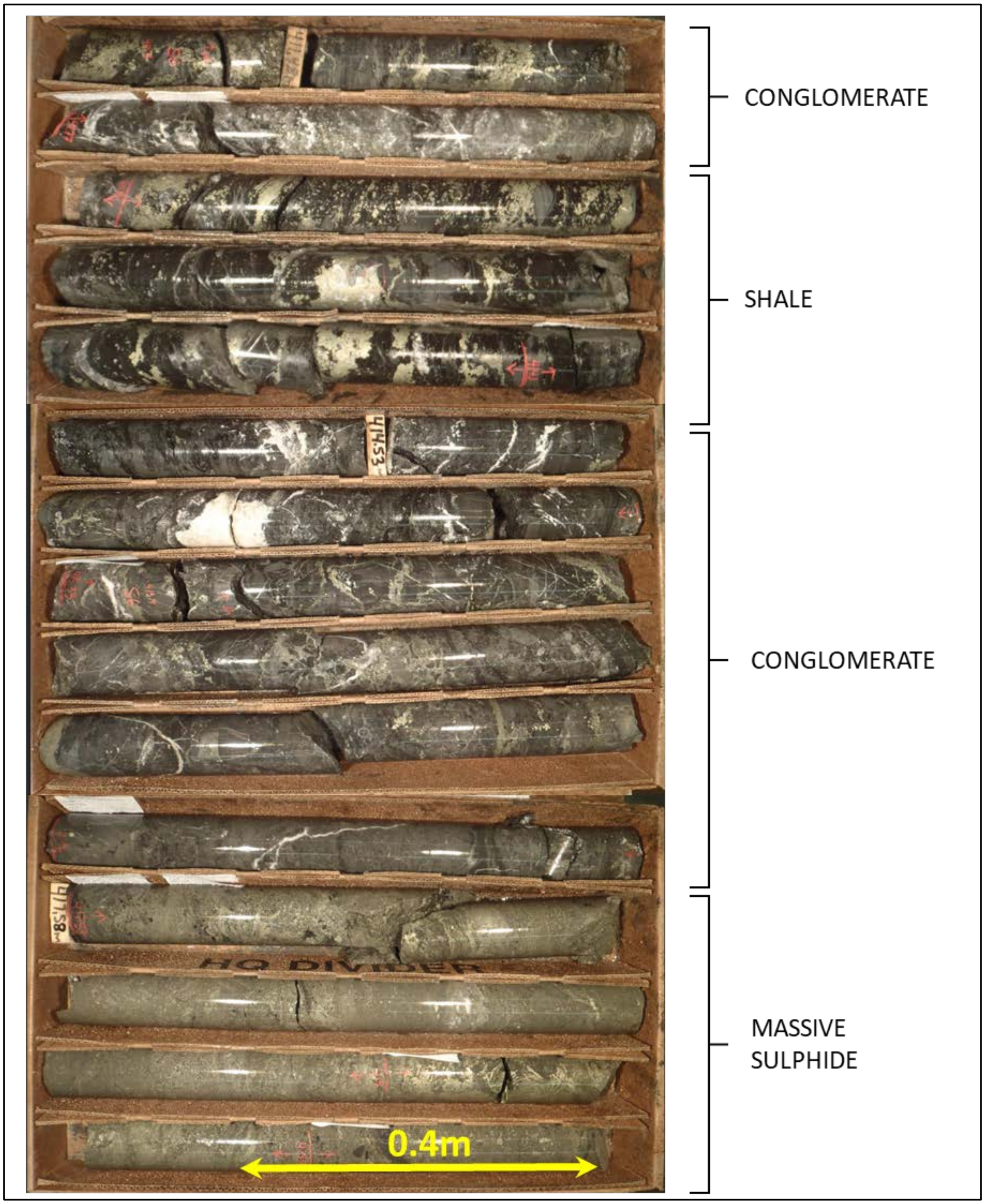
LCZ Segment	Strike Length (m)	Down Dip Extent (m)	Thickness (m)
East	450	45 to 250	1 to 15
Central	360	35 to 270	1 to 8
West	350	45 to 200	1 to 6

Source: SRA, 2019



Source: SRA, 2019

Figure 7-8: Cross-Section Of The East Lens Of The LCZ, From X – Y(Figure 7-7), Looking West



Source: SRA, 2019
From 411.2 m (Top) to 419.7 m (Base) Showing Chalcopyrite Hosted Copper Mineralization Extending from Massive Sulphide of the LSZ Into Interlayered Shale and Conglomerate.

Figure 7-9: Core Photographs of Drillhole SC11-011

Pyrite in the LCZ is predominantly crystalline, although minor relict, fine-grained, partially recrystallized framboidal or melnikovite pyrite occurs. Copper mineralization in the LCZ is almost entirely hosted by chalcopyrite that is coarse grained in comparison with that of the UCZ (McArthur, 2017b). Trace amounts of tennantite are rarely observed, typically interstitial to primitive pyrite.

Both siliceous and dolomitic alteration occur in association with the LCZ. Silica alteration is most intense in the conglomerate unit immediately below the LSZ where it presents as very fine-grained replacement of the host lithotype. Variable amounts of non-pervasive dolomitic alteration occur through the LSZ and into the overlying interlayered conglomerate and shale unit. The dolomitic alteration is characterized by zones of dolomite crystals up to 5 centimeters (cm) (Figure 7-10).

Source: SRA, 2019

Figure 7-10: Coarse Dolomite Alteration in the LCZ in SC19-251 at 533.6 M Depth

The previous Mineral Resource estimate for the LCZ (Winckers, et al, 2013) included estimates for Ag, Au, and Co. Insufficient work has been done to determine the residency of these elements in the LCZ, although Steadman and Large (2015) noted that high Au (more than 30 g/t) and Co (more than 10,000 ppm) concentrations occur within discrete bands in colloform pyrite. Metallurgical tests conducted during this study were focused on Cu recovery with resultant Au, Ag, and Co within flotation concentrates below current economic thresholds for the Project.

7.3.2 Johnny Lee Upper Copper Zone

The northeastern corner of the UCZ is exposed on surface (Figure 7-11) and the top of the mineralized zone extends to a depth of 210 m below surface. The high-grade portion of the UCZ (more than 1.2% Cu) is entirely encapsulated by the USZ although a more than 0.25% Cu halo mineralization extends into the shale that is located in the HW and FW of the USZ (Figure 7-11). The UCZ is gently folded by a W/NW plunging syncline-anticline pair such that strike is variable and dip ranges between 0° and 20°.

With the exception of its extreme northeastern corner, the UCZ is situated below the level of surficial oxidation. Acidic groundwater, preferentially focused along a layer parallel, brittle-ductile shear zone, result in localized supergene alteration of copper sulphides below the base of oxidation. The volume of supergene altered Cu sulphide minerals along the shear zone is generally low, except at the junction of the shear zone with Fault 1.

The UCZ is truncated in the north by the Volcano Valley HW Fault and is transected by Fault 1 which offsets the UCZ with 122 m of oblique reverse-dextral displacement. Fault 1 has been used to subdivide the UCZ into Eastern and Western blocks (Figure 7-12). The UCZ in the Western block has plan-view dimensions of 1,000 m (NE-SW) by 200 to 440 m (NW-SE), in the Eastern Block 950 m (NE-SW) by 140 to 285 m (NW-SE). True-width of the UCZ in the Western block ranges from 4 to 45 m and the Eastern block from 5 to 37 m.

Discontinuous lenses of conglomerate occur interlayered with pyritic massive sulphide in the USZ. Shale and carbonaceous shale layers, ranging in thickness from 1 mm to 2.5 m, are ubiquitous throughout the USZ. The proportion of clastic sediment layers is highly variable but shows an overall decrease from north to south.

The bedded pyrite in the UCZ exhibits a significantly larger degree of textural variation when compared with that of the LCZ; whereas the LCZ is dominated by crystalline pyrite, with only minor relict fragments of primitive textures (e.g., melnikovite or framboidal pyrite). UCZ samples show a complete continuum ranging from 26.6% to 96.9% volume primitive pyrite (McArthur, 2018). Although a significant amount of local variation occurs, there is a general trend of increasing pyrite crystallinity from the southern half of the orebody (average 72.1% primitive pyrite) to the northern part of the orebody (average 62.7% primitive pyrite) (McArthur, 2018).

Bedded pyrite in the USZ commonly contains layers of primitive pyrite (variably recrystallized colloform melnikovite or framboidal pyrite) ovoids (Figure 7-13) that when viewed in section present as small pyrite halos surrounding cores of later barite ± quartz infill (Figure 7-14). These intervals are termed atoll-textured units.

In contrast to the LCZ, where the Cu is hosted almost entirely by chalcopyrite (with rare occurrences of trace tennantite), the non-supergene altered Cu sulphide mineralogy of the UCZ is both mineralogically and texturally diverse. The dominant Cu sulphide mineral is chalcopyrite, comprising up to 15.8% by weight (McArthur, 2018). Tennantite is present in concentrations of up to 1.88% by weight, primary bornite up to 0.50% by weight, and cuprian siegenite up to 0.85% by weight (McArthur, 2018). Samples from the southern half of the LCZ orebody have lower chalcopyrite concentrations (average 3.60% by weight) when compared with the northern half of the orebody (average 6.33% by weight), higher tennantite concentrations (average 0.49% by weight in the south and 0.32% by weight in the north), higher bornite concentrations (average 0.12% by weight in the south and trace amounts in the north) and lower cuprian siegenite (average 0.05% by weight in the south and average 0.13% by weight in the north) (McArthur, 2018).

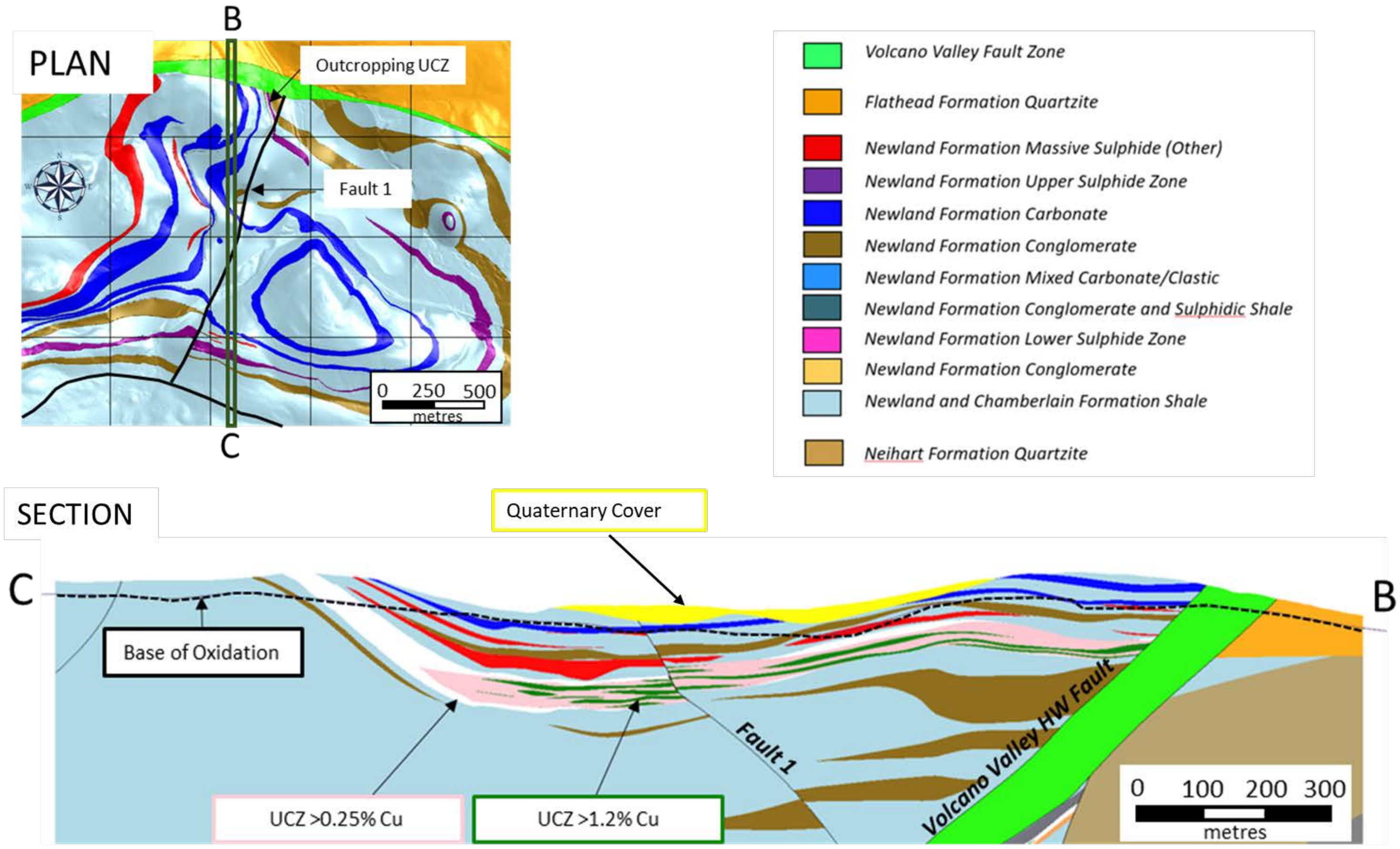
Figure 7-15 shows all mineralogical composites in which supergene alteration of the Cu sulphides exceeding 0.1% was observed. In these composites, primary Cu sulphides are partially altered to one or more of: secondary bornite, chalcocite, and covellite (McArthur, 2018). In cross-section (Figure 7-16), it is apparent that the supergene alteration is focused along a layer-parallel, brittle-ductile shear zone identified by Lebrun (2018). Fracturing that formed during development of the shear zone has led to water infiltration and supergene alteration. The amount of supergene alteration of the Cu sulphides is <5% except where Fault 1 intersects and offsets the shear zone (Figure 7-17). In this area, amplified fracturing in the intersection zone has resulted in enhanced water infiltration resulting in between 17% to 90% supergene alteration of primary Cu sulphides.

Table 7-2 shows the Cu metal deportment for the northern and southern parts of the UCZ as determined using 86 mineralogy composites from mineralized intersections, with average mineral Cu content determined by electron microprobe and high-resolution scanning electron microscope (SEM) microanalyses (McArthur, 2018). The majority of the Cu in both the northern and southern halves of the orebody is hosted by chalcopyrite but in the southern part of the orebody, a much larger contribution is made by tennantite and bornite (both primary and secondary). An average of 3.4% of the Cu occurs in pyrite grains. The contribution to total copper metal from chalcocite and covellite is higher in the southern half of the orebody reflecting more intense supergene alteration at the intersection of the shear zone with Fault 1. Although only a small proportion of the contained Cu, cuprian siegenite and marcasite contribute higher amounts of Cu in the northern half of the orebody.

Table 7-2: Cu Metal Distribution for the UCZ Based on Mineralogical Evaluation Calibrated Using Mineral Microanalyses

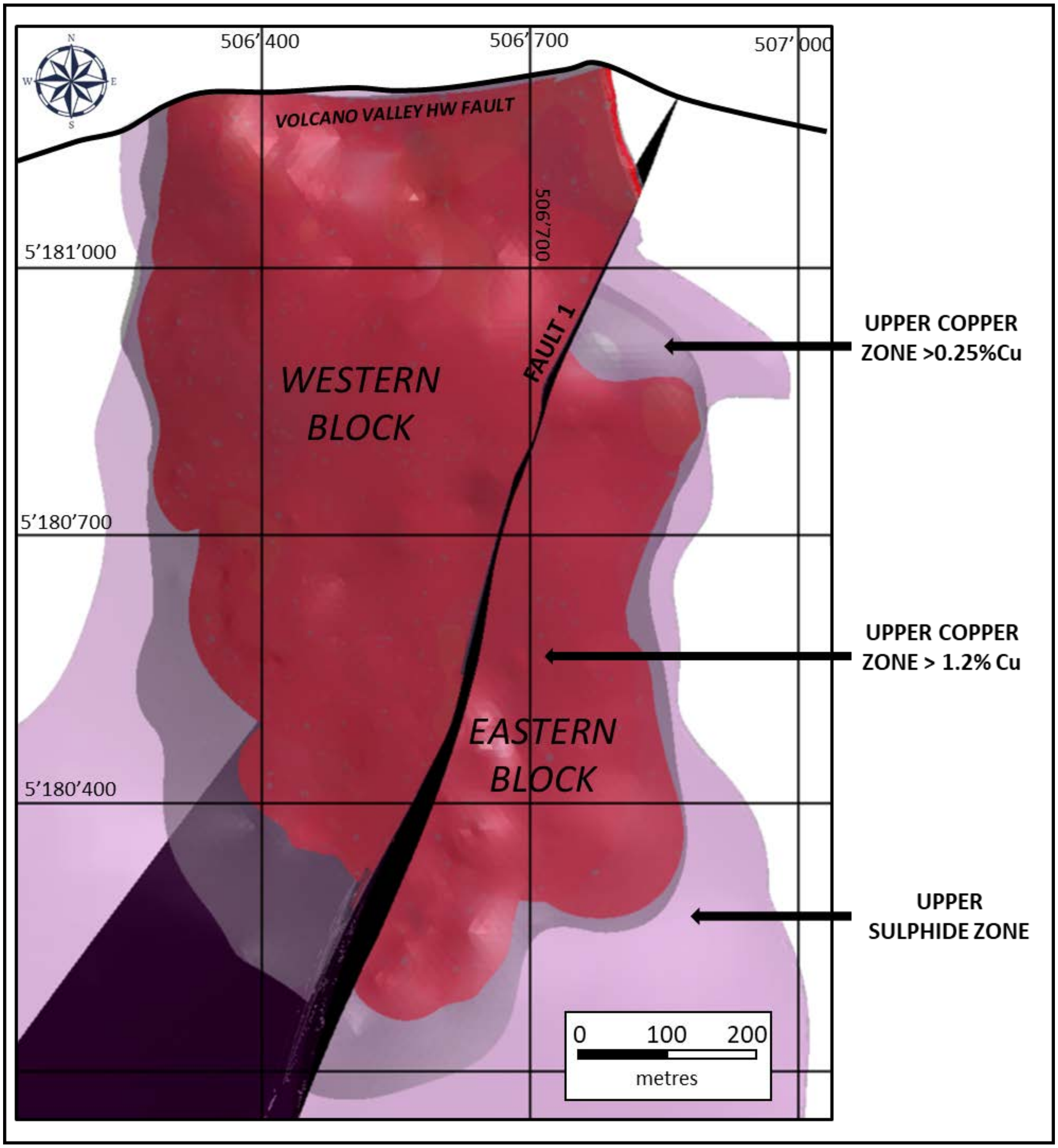
CU Metal Distribution%									
	Chalcopyrite	**Tennantite**	**Pyrite**	**Bornite**	**Chalcocite**	**Covellite**	**Cuprian Siegenite**	**Colusite**	**Marcasite**
North	90.1	5.4	2.6	0.0	0.3	0.3	1.0	0.0	0.3
South	77.0	12.0	3.92	3.6	2.1	1.0	0.2	0.1	0.1
Total	81.8	9.6	3.4	2.3	1.5	0.8	0.5	0.1	0.1

Source: Modified after McArthur (2018) by SRA (2019)



Source: SRA, 2019
Note that the USZ (Purple in the plan) has been made transparent in the cross-section such that the UCZ can be observed.

Figure 7-11: Plan View and Cross-Section of the Lithostratigraphic Model of the Johnny Lee Area

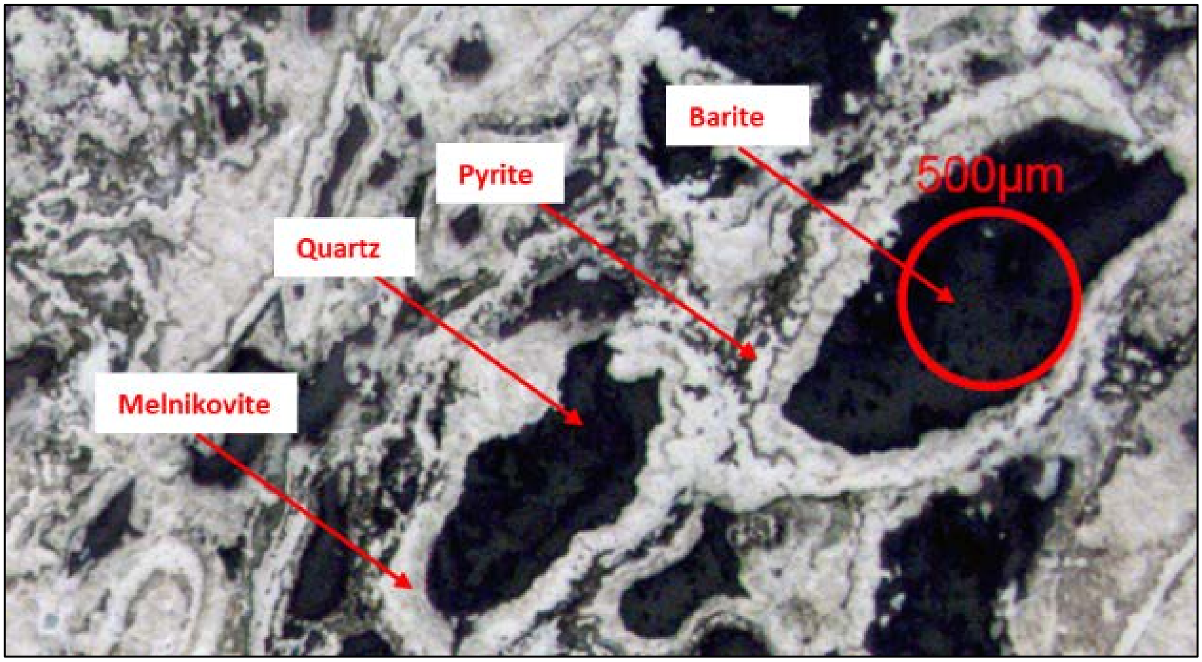


Source: SRA 2019

Figure 7-12: Plan View of the UCZ and Part of the USZ

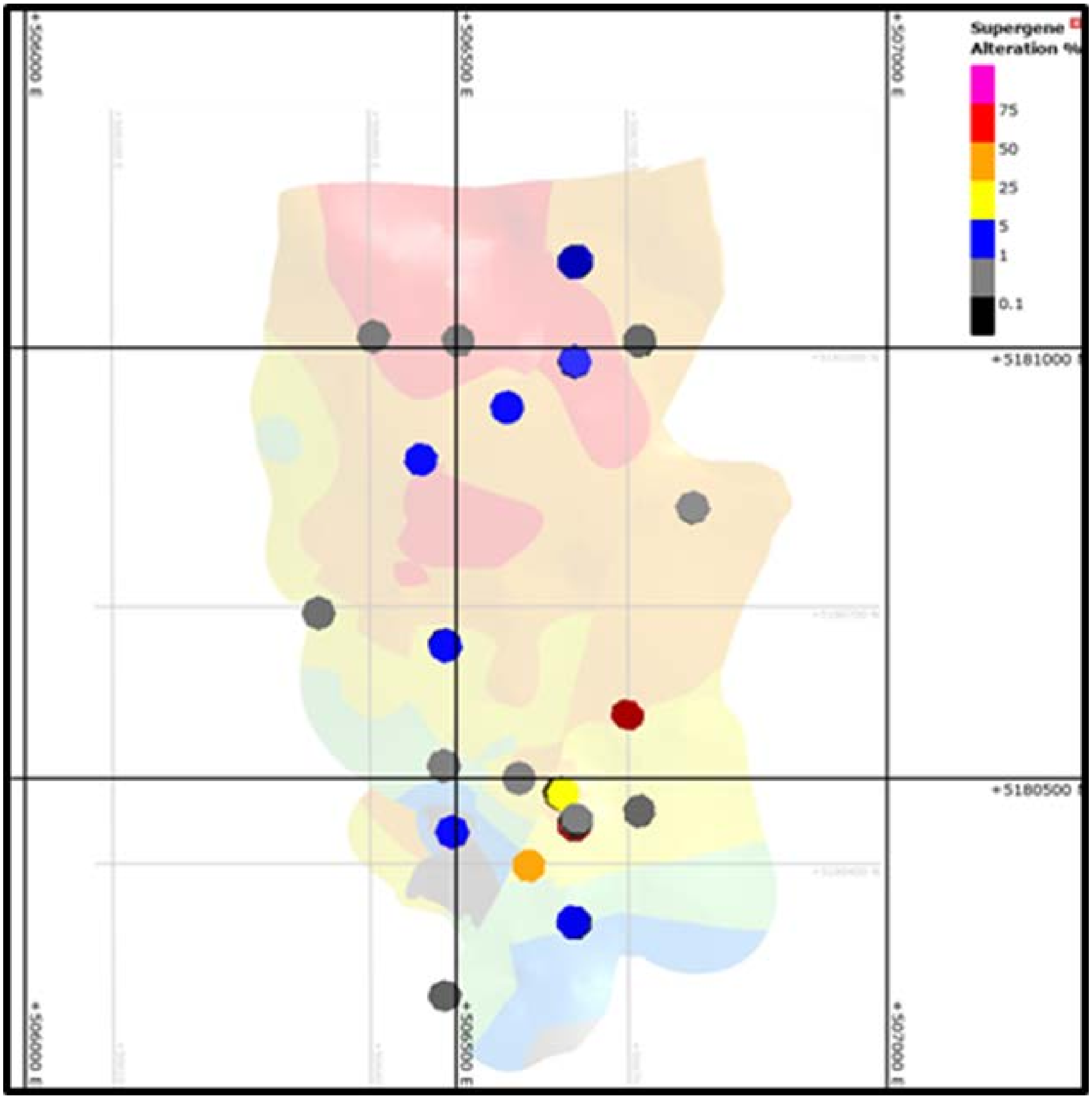
Source: SRA, 2019
Maximum size of atoll ovoid's is 5 mm. Core diameter is 63.5 mm.

Figure 7-13: Photograph of USZ Bedded Pyrite Massive Sulphide Containing Light Colored Atoll-Textured Units



Source: Modified after McArthur, 2018 by SRA, 2019
Minimum size of atoll ovoid's is 50 µm. Reflected light.

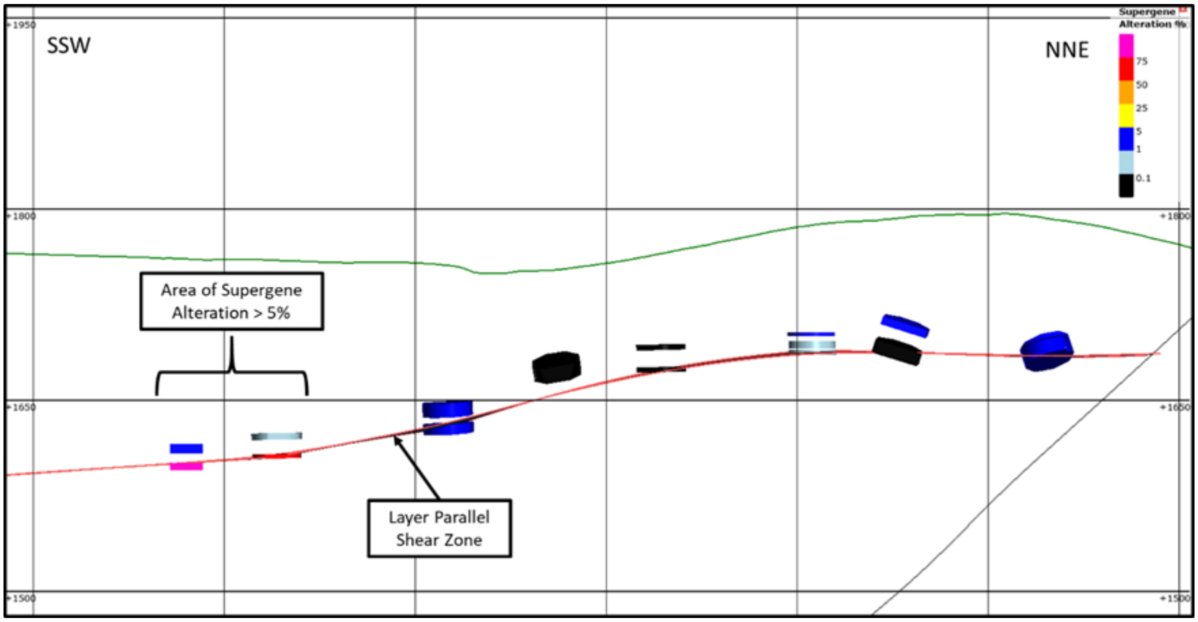
Figure 7-14: Photomicrograph of Sample BBPET50 (From Drillhole SC12-121 at Depth 118.2 m) Showing Atoll Texture



Source: SRA, 2019

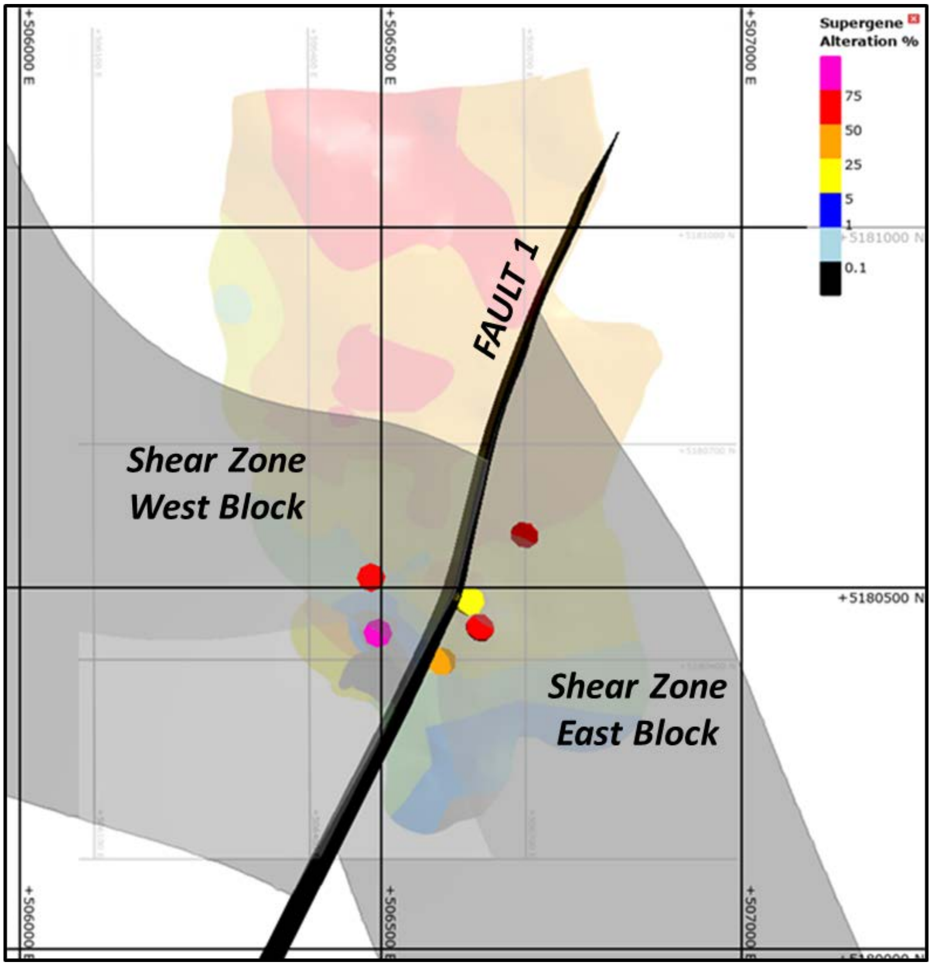
Showing mineralogy composites that exhibit supergene alteration that are colored according to the amount of supergene alteration of Cu sulphides.

Figure 7-15: Plan View of UCZ (Contoured Using A Recovery Model)



Source: SRA, 2019

Figure 7-16: NNE-SSW Cross-Section of the UCZ Showing Supergene Alteration of Cu Sulphides Developed Along the Brittle-Ductile Shear Zone

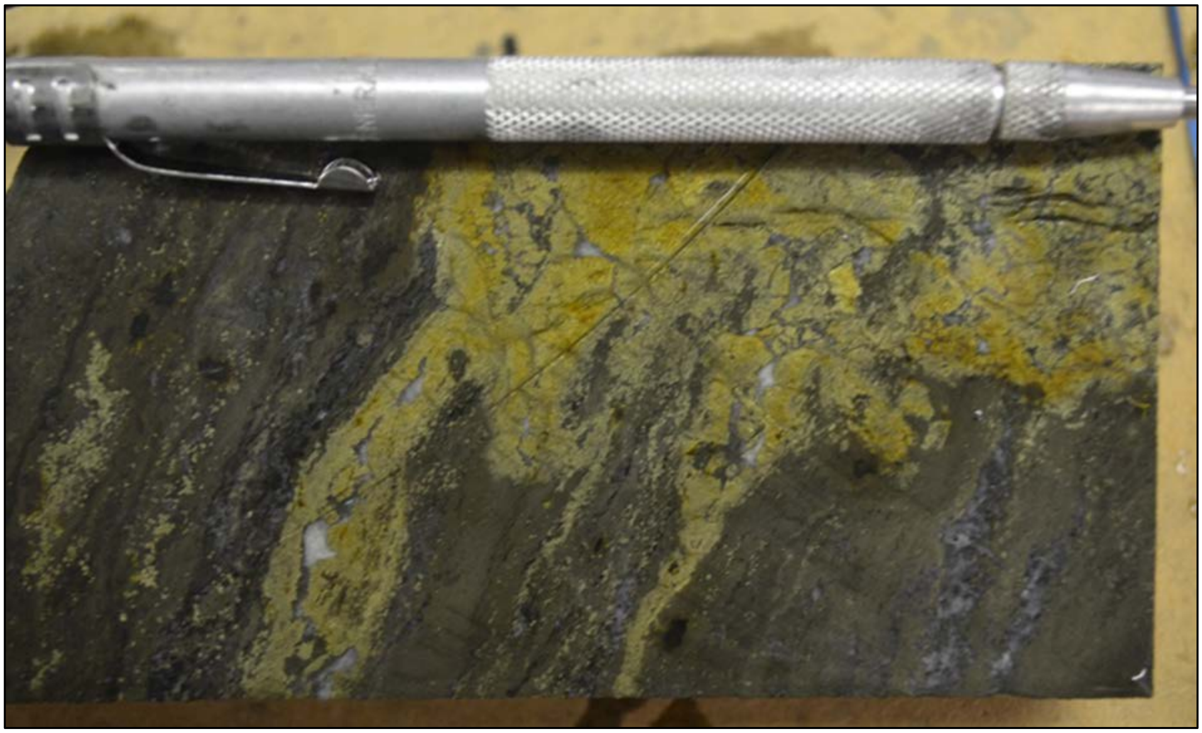


Source: SRA, 2019

Figure 7-17: Plan View of the UCZ Showing Mineralogical Composites With >5% Supergene Alteration of Cu Sulphides

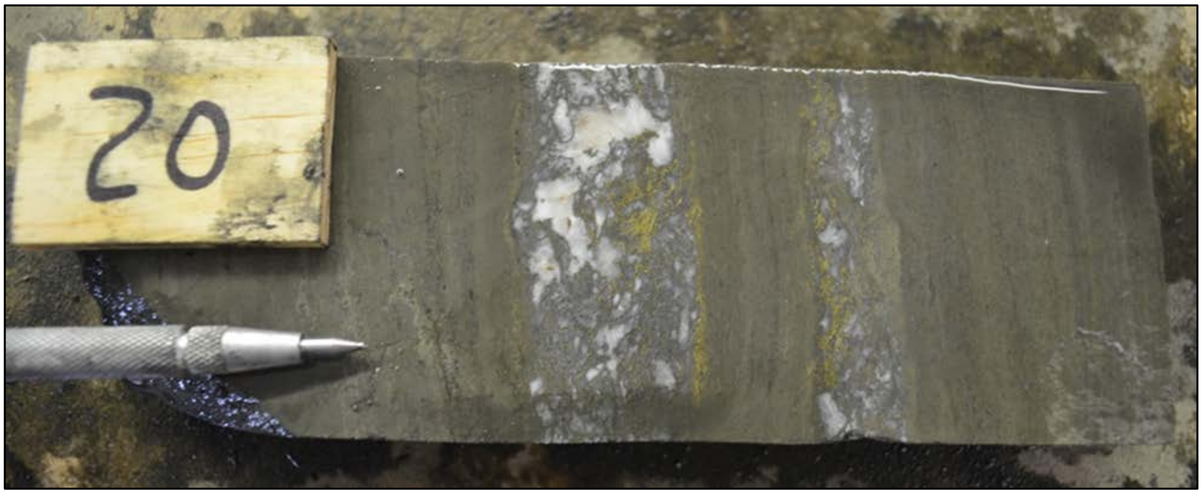
The mineralogical differences, albeit with significant local variability, between the northern and southern parts of the UCZ are also accompanied by differences observable in core samples. Representative observations regarding pyrite texture (proportions of primitive versus crystalline) and the amount of fine-grained Cu sulphide (which includes most tennantite and an appreciable amount of the chalcopyrite) are physically not possible, even when using a pocket-microscope. (This was attempted during geometallurgical logging of all UCZ drillholes from the 2010 to 2018 Phase 1 Drill Programs but proved unsuccessful). The metrics that can be consistently recorded during logging are the proportions of: bedded pyrite, sediment, atoll-textured units (ATU’s), and coarse (i.e., visually observable) chalcopyrite.

Coarse chalcopyrite in the southern half of the UCZ typically occurs as irregular veinlets that cross-cut layering in the bedded pyrite that have infiltrated and caused partial or complete replacement of bedding layers within the USZ (Figure 7-18). Whilst this does occur along bedded pyrite layers, it is much more prevalent along ATU’s (Figure 7-19).



Source: SRA, 2019

Figure 7-18: Coarse Chalcopyrite Veinlet Cross-Cutting Layered Bedded Pyrite with Narrow ATU Layers. Note the Replacement Along Certain Layers



Source: SRA, 2019

Figure 7-19: Preferential Replacement of ATU Layers Within Bedded Pyrite of the UCZ

Attempts to correlate the proportion of coarse chalcopyrite with Cu grades in the southern part of the UCZ were unsuccessful. Typically, the calculated Cu grade (from visual estimates of coarse chalcopyrite percentage) was significantly lower than the analyzed grade, indicating a larger proportion of fine-grained Cu sulphide. In certain drillhole intersections (typically bedded pyrite with no ATU’s), grades in excess of 2.0% Cu occurred with no visible coarse chalcopyrite. Coarse chalcopyrite was rarely observed in sediment horizons in the southern part of the UCZ.

Similar observations to those in the southern part of the UCZ were also observed in the northern part of the UCZ but there are a number of additional macro-scale features. The mineralization in the northern part of the UCZ exhibits extensive brittle fracture, quartz ± carbonate veining, and hydraulic brecciation. Whilst some of the coarse chalcopyrite is cross-cut by the fracturing and veining (Figure 7-20), a significant amount appears to have either been introduced, or remobilized, during the fracturing, veining, and hydraulic brecciation (Figure 7-21 to Figure 7-24).

Source: SRA, 2019
Core diameter is 63.5 mm.

Figure 7-20: Coarse Chalcopyrite, Cross-Cut by Quartz-Carbonate Veins

Source: SRA, 2019
Core diameter is 63.5 mm.

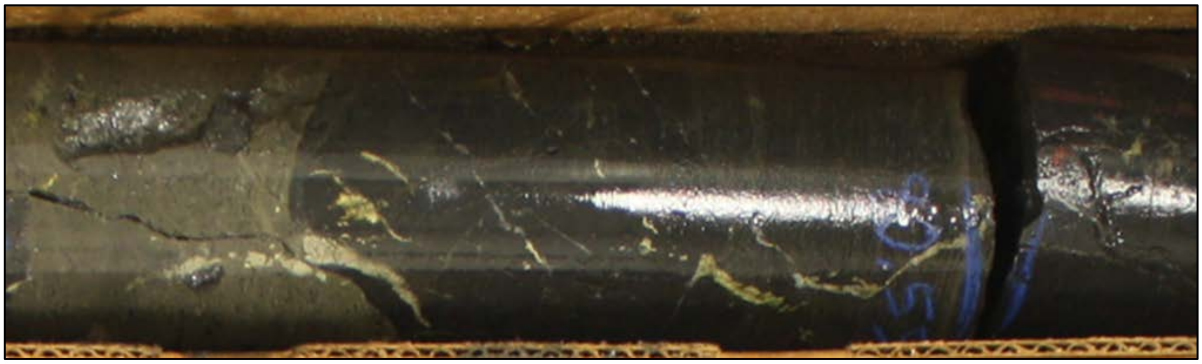
Figure 7-21: Coarse Chalcopyrite that is Synchronous with Hydraulic Brecciation, Fracturing and Quartz Carbonate Veins

Source: SRA, 2019
Coarse chalcopyrite and crystalline pyrite have replaced tabular barite crystals. Coarse chalcopyrite also forms veinlets cross-cutting bedding. Core diameter is 63.5 mm.

Figure 7-22: Interbedded Pyrite with Siltstone Layers from the Northern Part of the UCZ

Source: SRA, 2019
Core diameter is 63.5 mm.

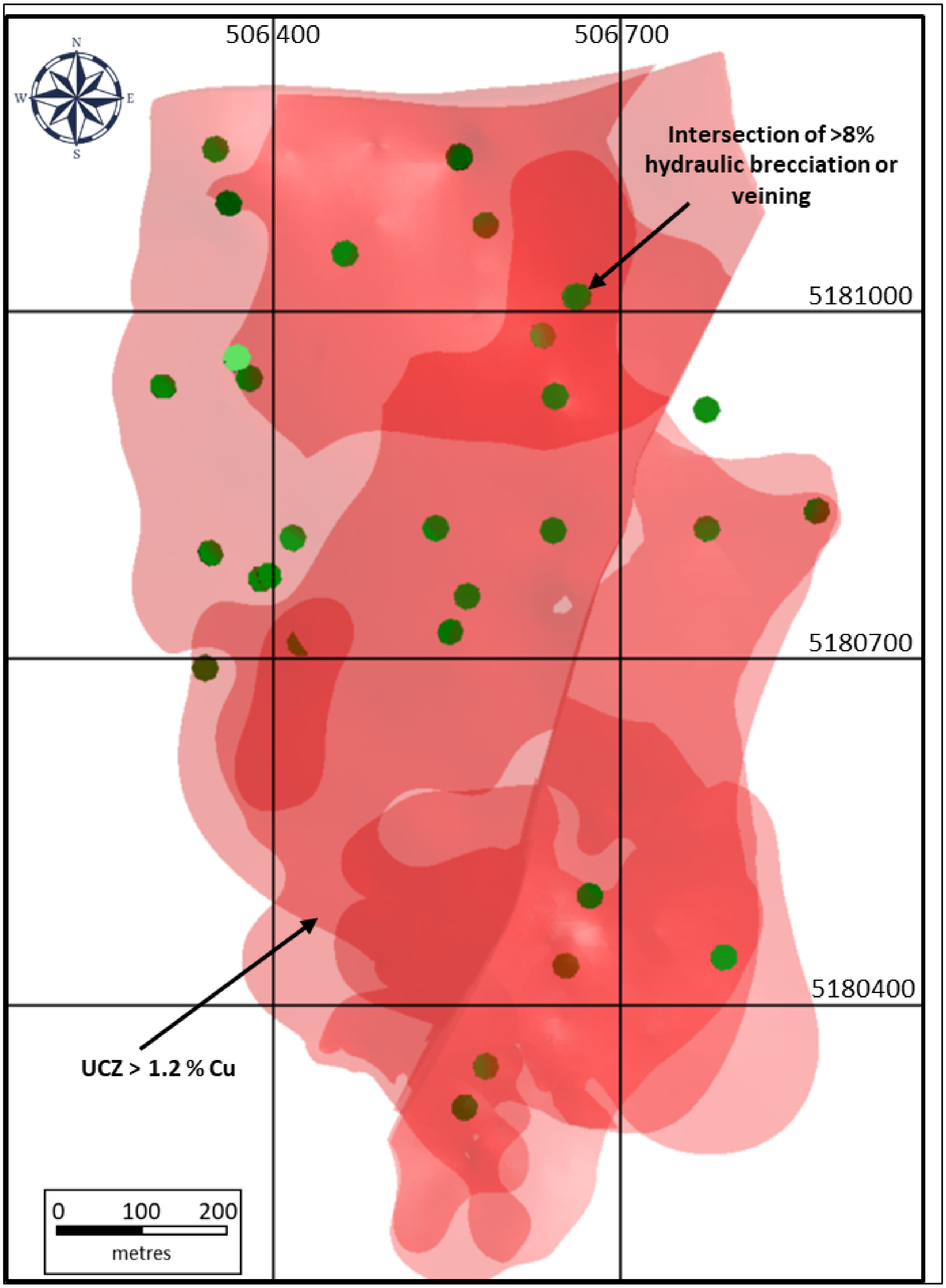
Figure 7-23: Coarse Chalcopyrite that is Both Synchronous and Post-Dates Quartz-Carbonate Veining in the Northern Part of the UCZ



Core diameter is 63.5 mm
Source: SRA, 2019

Figure 7-24: Quartz + Carbonate + Coarse Chalcopyrite Veinlets Cross-Cutting Siltstone and Bedded Pyrite in the Northern Part of the UCZ

Although some localized quartz-carbonate veining and hydraulic brecciation occur in the southern part of the UCZ, it is more consistently developed in the northern part of the UCZ (Figure 7-25). The mineralogical differences observed between the northern and southern parts of the UCZ are thus mirrored by core observations that reflect post-lithification hydrothermal activity that occurred primarily in the northern part of the UCZ.



Drill holes that have >8% Quartz ± Carbonate veining and hydraulic brecciation
Source: SRA, 2019

Figure 7-25: Plan View of the UCZ Showing the Positions of Drillhole Intersections (From the 2010 to 2018 Phase 1 Drilling Programs)

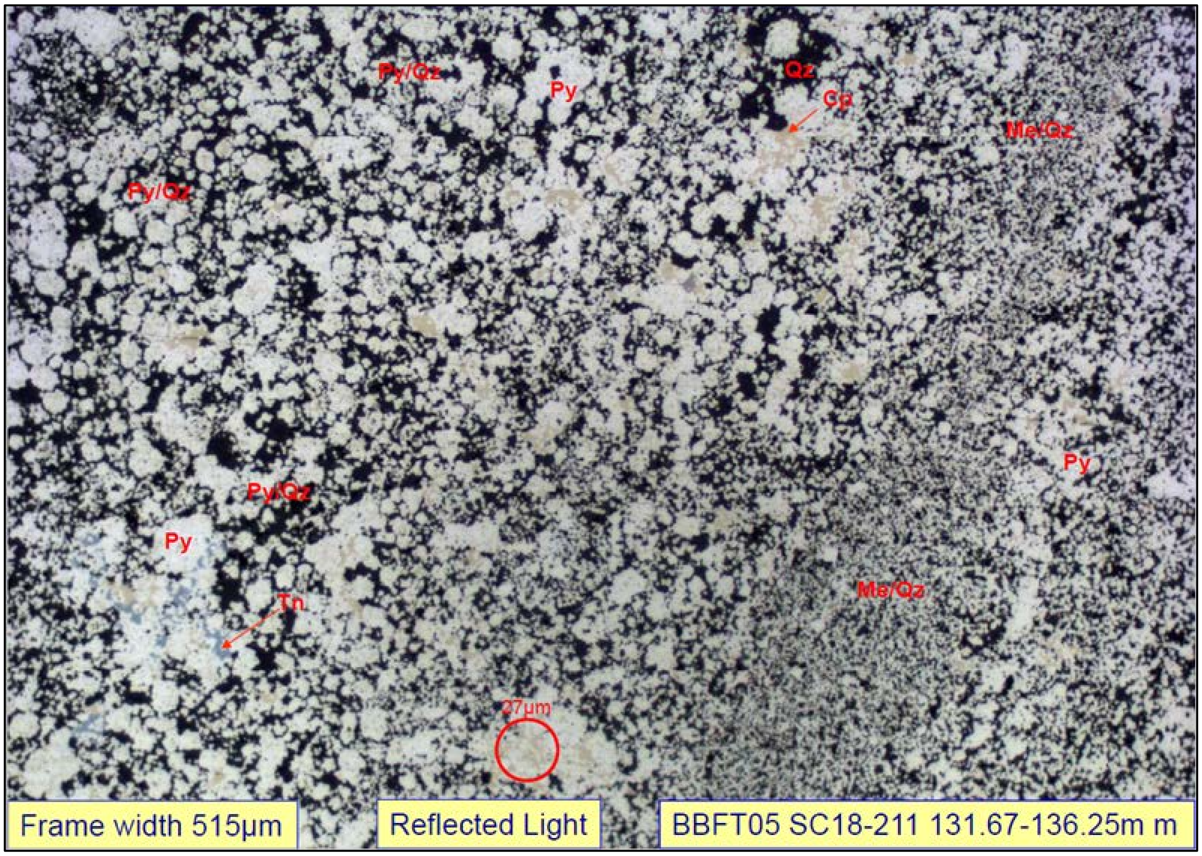
As only the proportions and grain size of coarse copper sulphide were estimated from core, the metrics for all other copper sulphides, and fine-grained chalcopyrite have been constrained using mineralogical investigation (McArthur, 2018). Table 7-3 summarizes the average grain-size of all minerals for the northern and southern parts of the UCZ. In terms of average grain-size of copper sulphide minerals (e.g., chalcopyrite, tennantite, cuprian siegenite, bornite, chalcocite and covellite), those in the southern half of the UCZ are smaller than those of the northern half.

Table 7-3: Average Grain Size of All Minerals in the Northern and Southern Parts of the UCZ Based on Systematic Mineralogy by McArthur (2018)

	Gangue	Pyrite	Chalcopyrite	Cuprian Siegenite Marcasite	Tennantite	Bornite Chalcocite Covellite
	(µm)					
North	43	33	29	25	19	15
South	38	38	22	13	15	11

Source: SRA, 2019

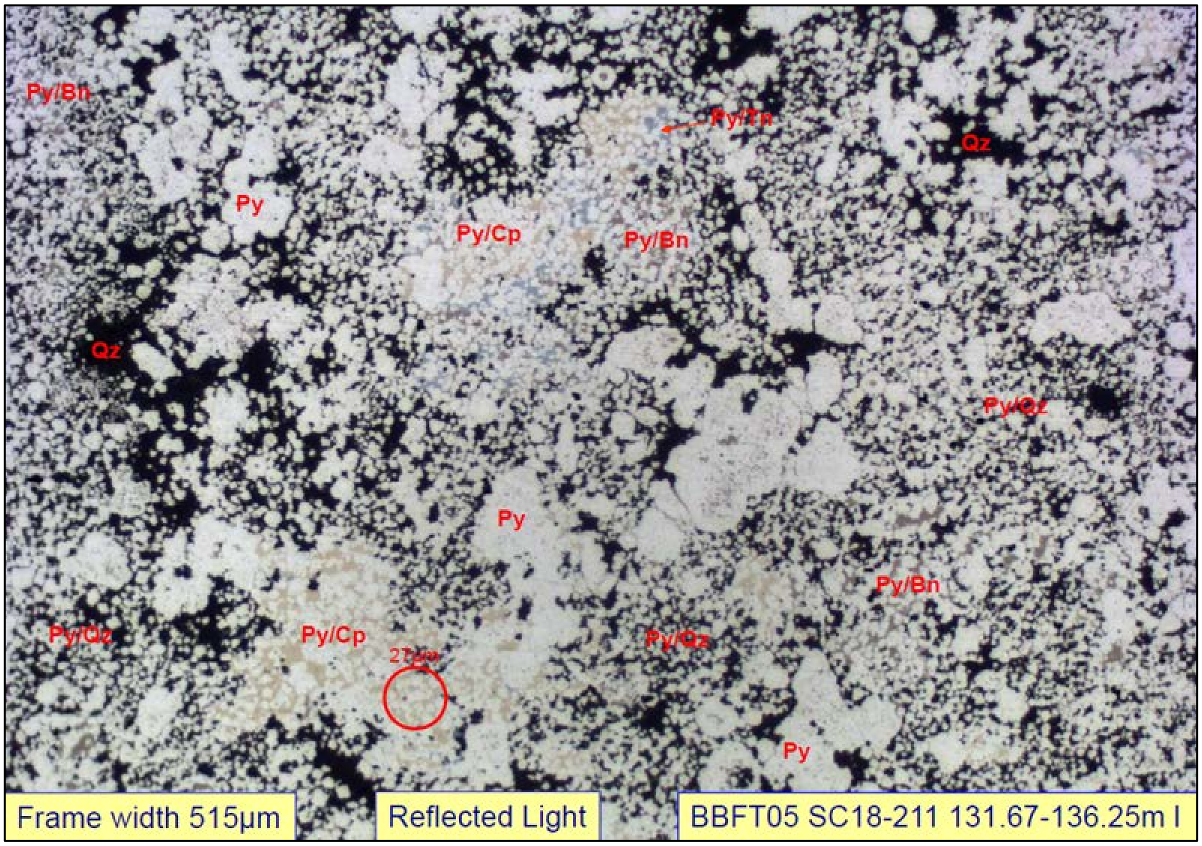
While the average grain size of the copper sulphides differs in the northern and southern parts of the UCZ, there is a significant amount of local textural variation. While much of the southern part exhibits very fine-grained copper sulphides, there are other parts that have coarse-grained copper sulphides. The reverse relationship is observed in the northern part of the UCZ. Figure 7-26 to Figure 7-38 provide an indication of the grain size variability in the northern and southern parts of the UCZ.



Source: McArthur, 2018

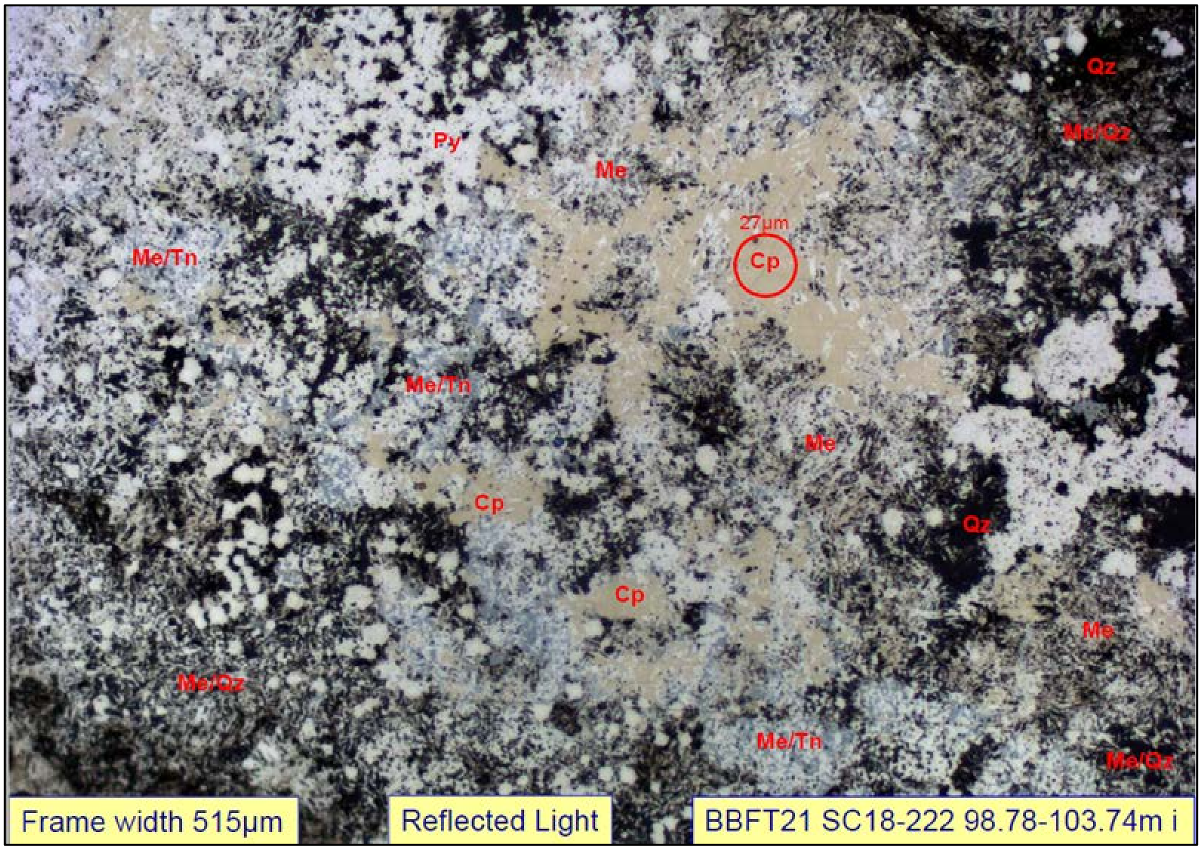
Showing Framboidal Pyrite (Py) and Melnikovite Pyrite (Me) With Very Fine-Grained Interstitial Chalcopyrite (Cp) And Tennantite (Tn). Qz = Quartz. Circle for scale is 27 µm in diameter.

Figure 7-26: Reflected Light Photomicrograph of Composite BBFT05 from the Southern Part of UCZ



Source: McArthur, 2018
Showing framboidal pyrite (Py) with interstitial chalcopyrite (Cp), tennantite (Tn) and bornite (Bn). Qz = quartz. Circle for scale is 27 µm diameter.

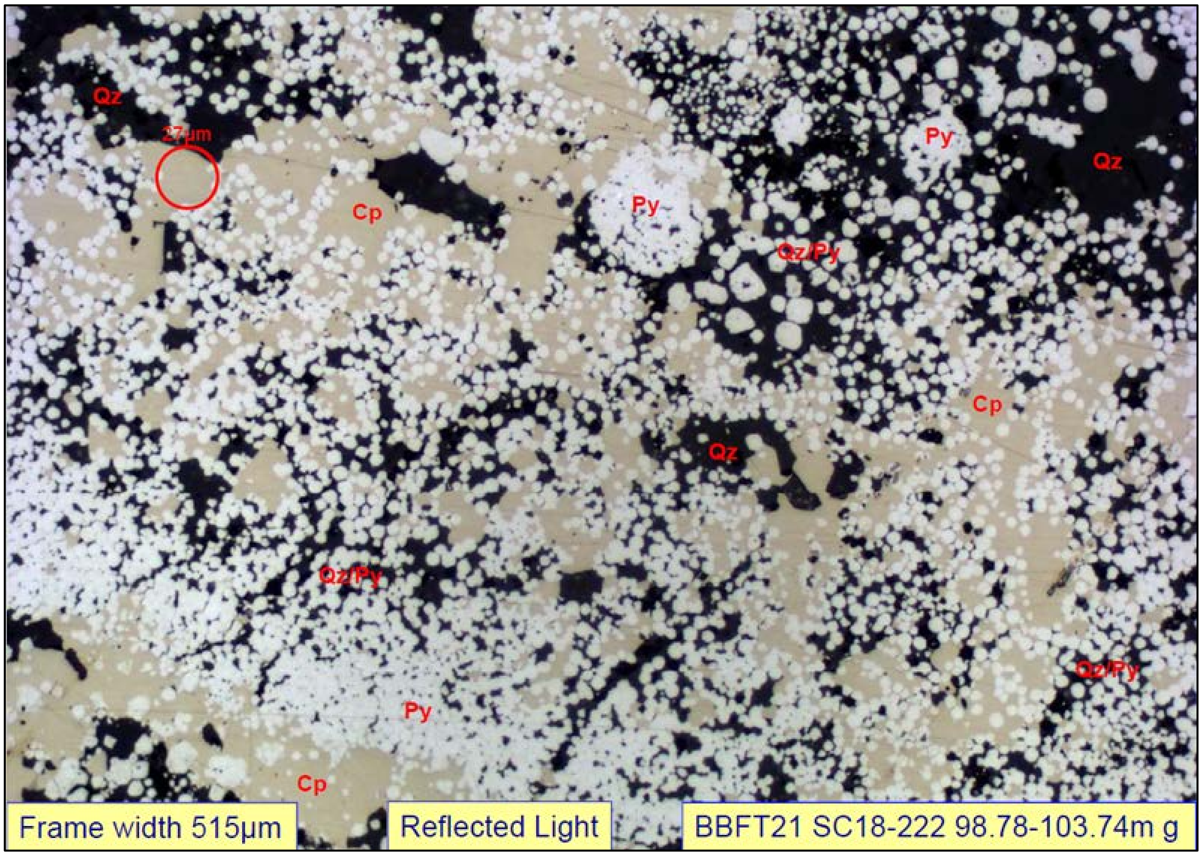
Figure 7-27: Reflected Light Photomicrograph of Composite BBFT05 from the Southern Part of the UCZ



Source: McArthur, 2018

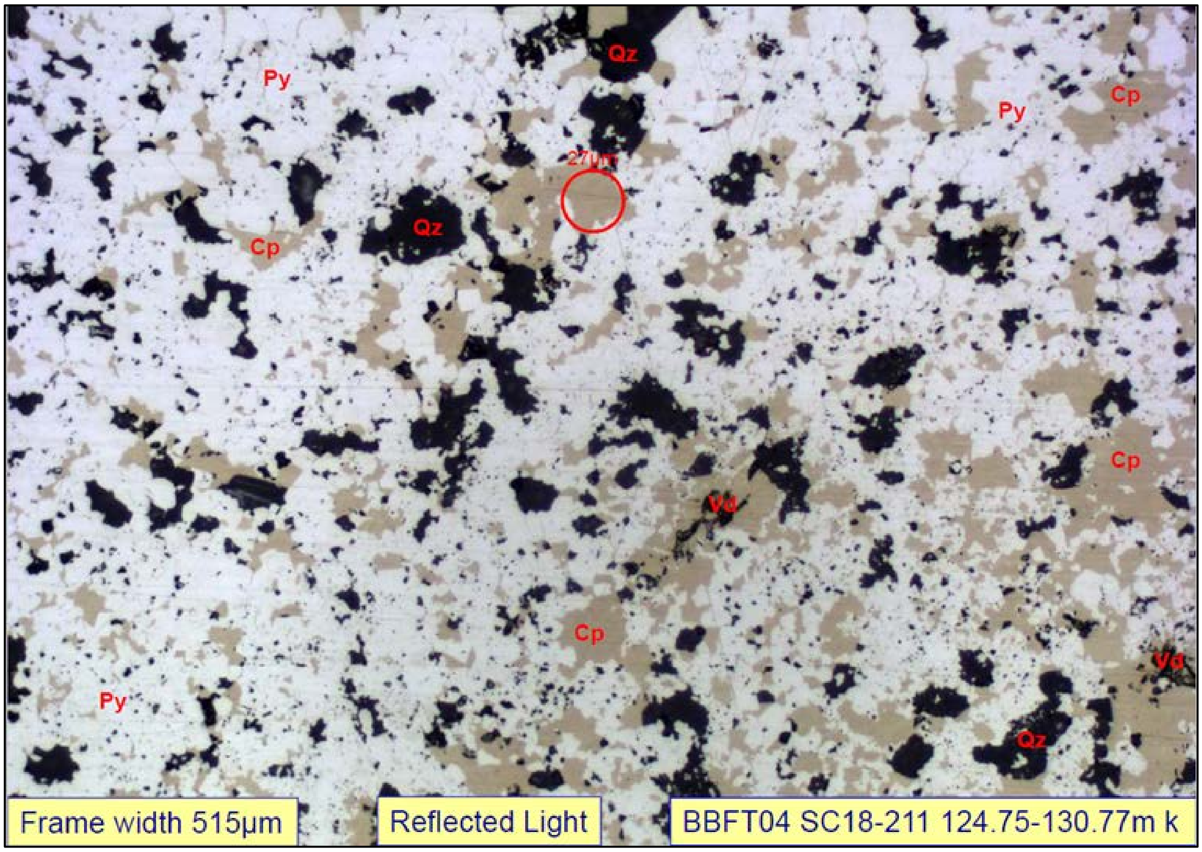
Showing chalcopyrite (Cp) and tennantite (Tn) partially flooding fibrous melnikovite pyrite (Me) and framboidal pyrite (Py). Qz = quartz. Circle for scale is 27 µm in diameter.

Figure 7-28: Reflected Light Photomicrograph of Composite BBFT21 from the Southern Part of the UCZ



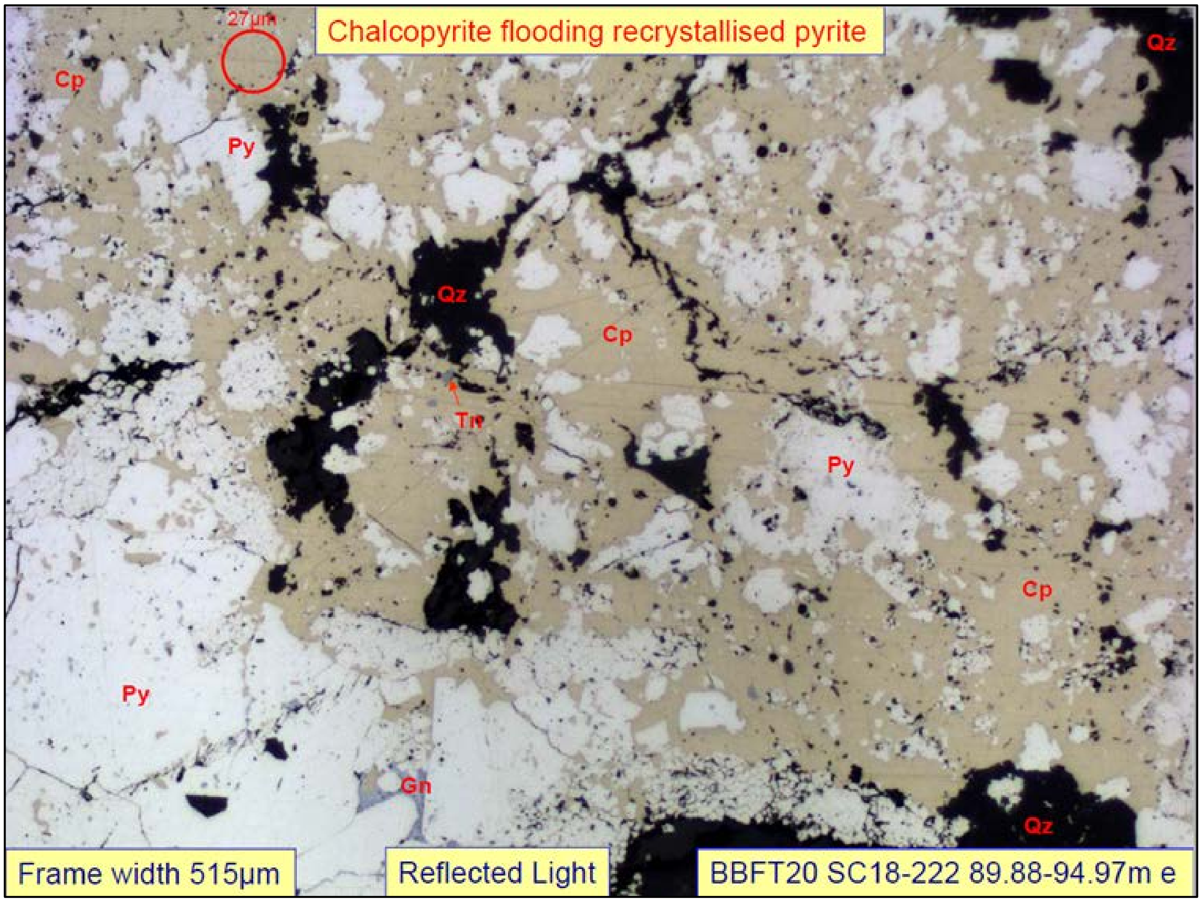
Source: McArthur, 2018
Showing chalcopyrite (Cp) flooding framboidal pyrite (Py). Qz = quartz. Circle for scale is 27 µm in diameter.

Figure 7-29: Reflected Light Photomicrograph of the Composite BBFT21 from the Southern Part of the UCZ



Source: McArthur, 2018
Showing chalcopyrite (Cp) flooding framboidal to partially recrystallized pyrite (Py). Qz = quartz. Vd = void. Circle for scale is 27 µm in diameter.

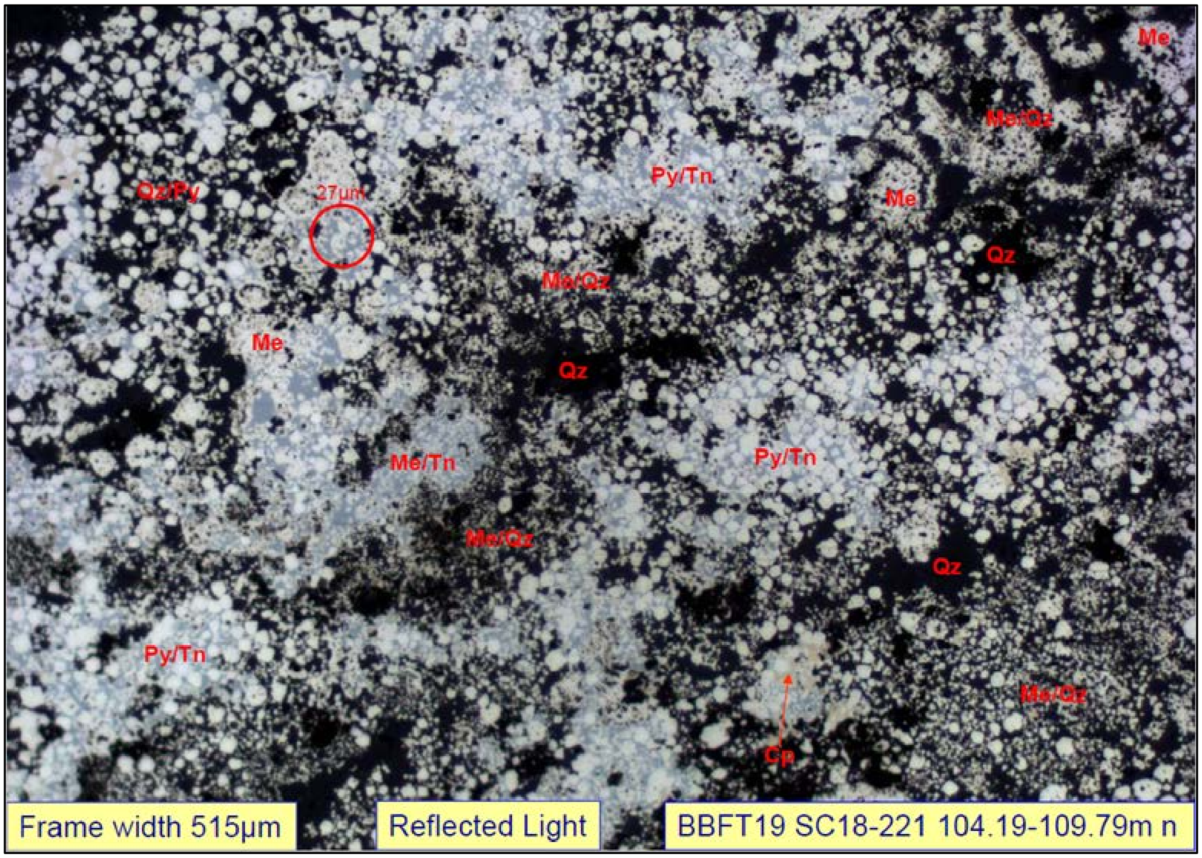
Figure 7-30: Reflected Light Photomicrograph of Composite BBFT04 from the Southern Part of the UCZ



Source: McArthur, 2018

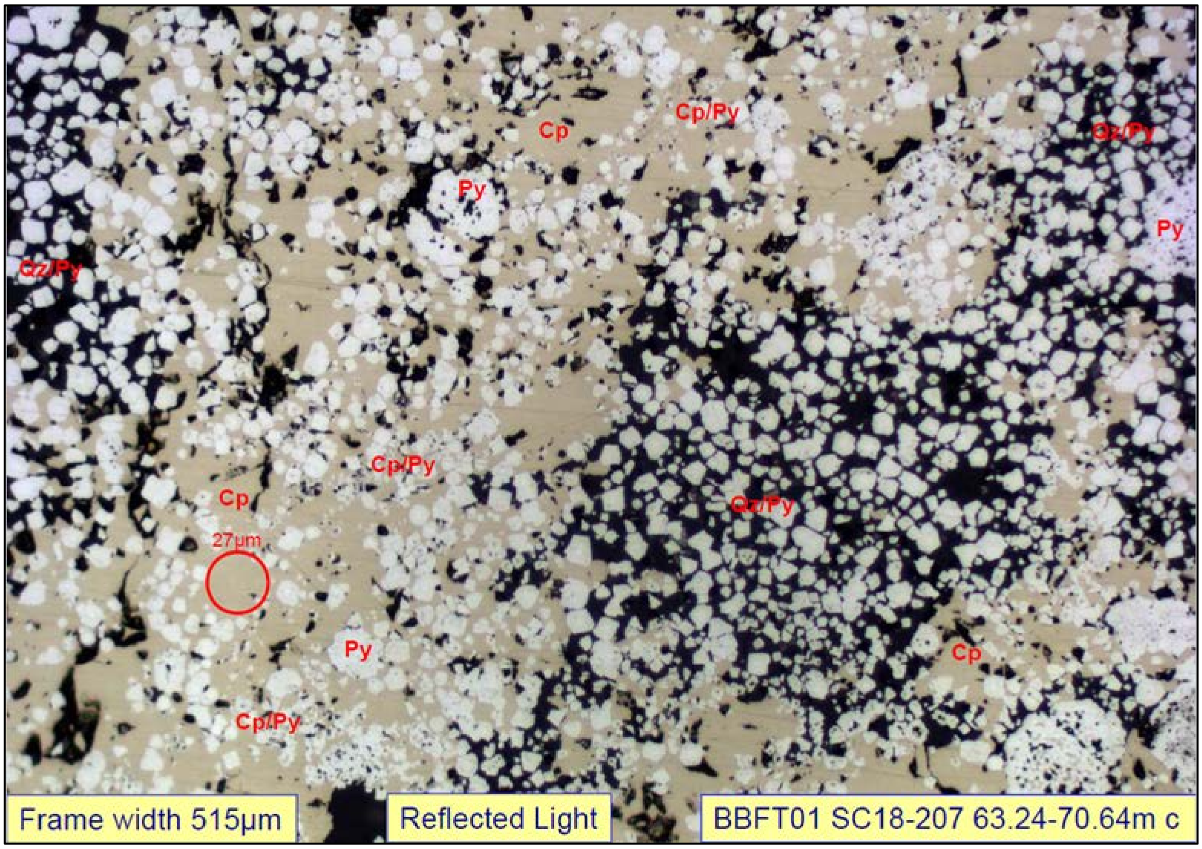
Showing chalcopyrite (Cp) flooding recrystallized pyrite (Py). Tn = tennantite, Gn = galena Qz = quartz. Vd = void. Circle for scale is 27 µm in diameter.

Figure 7-31: Reflected Light Photomicrograph of Composite BBFT20 from the Southern Part of the UCZ



Source: McArthur, 2018
Showing fine grained tennantite (Tn) and chalcopyrite (Cp) interstitial to slightly recrystallized melnikovite pyrite (Me) and framboidal pyrite (Py). Qz = quartz. Circle for scale is 27 µm in diameter.

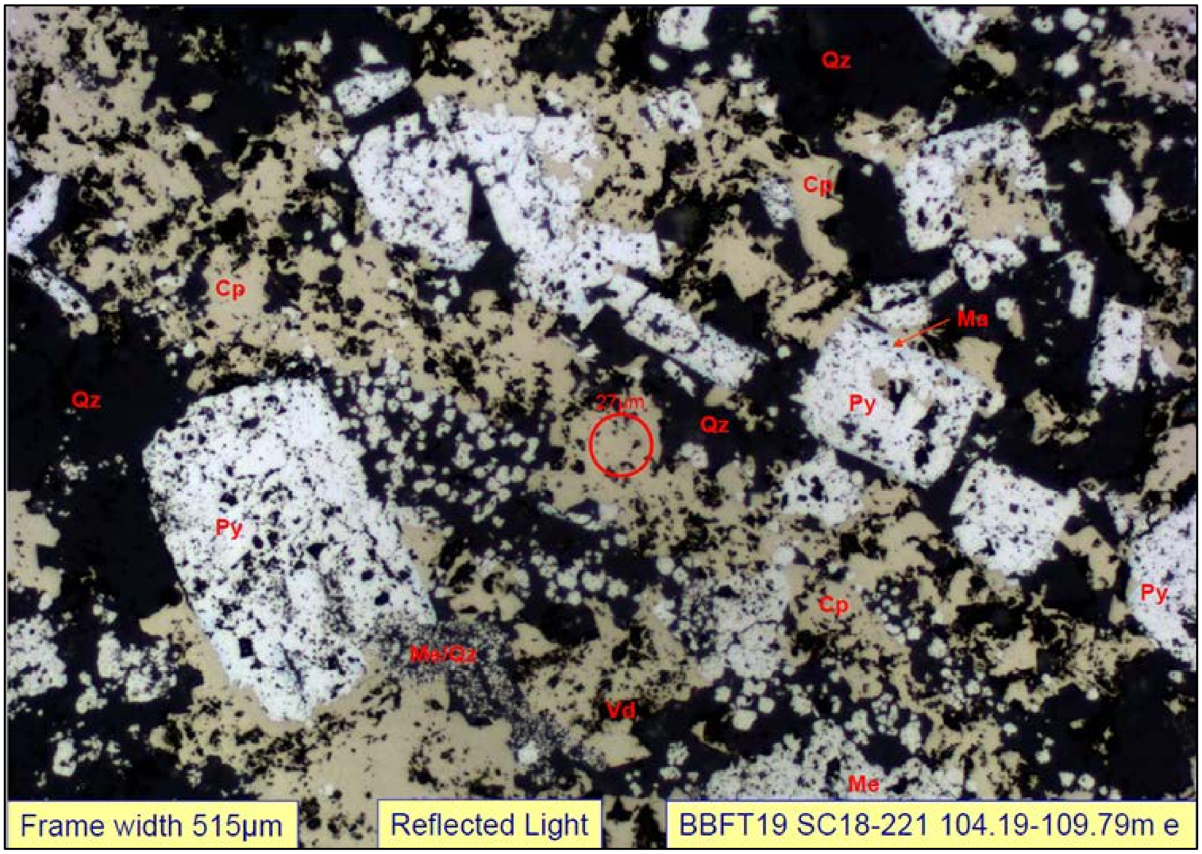
Figure 7-32: Reflected Light Photomicrograph of Composite BBFT19 from the Northern Part of the UCZ



Source: McArthur, 2018

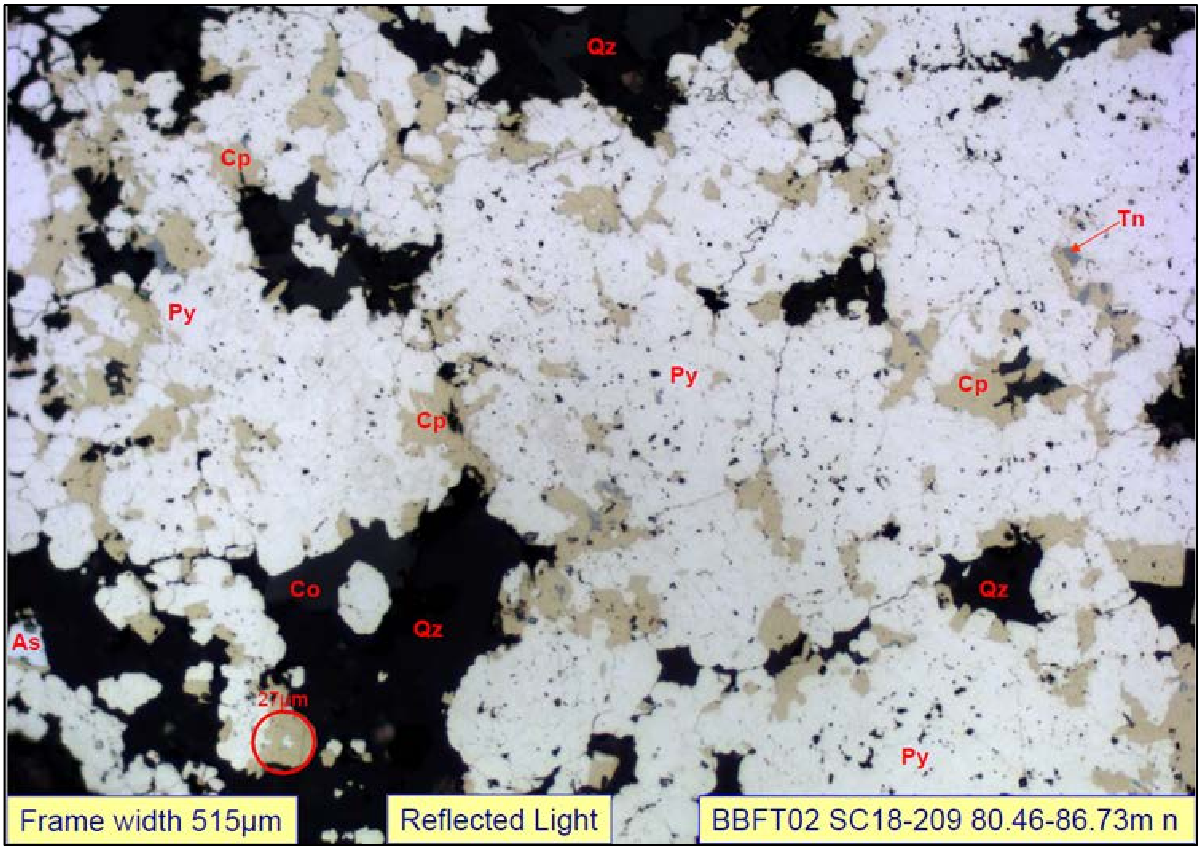
Showing chalcopyrite (Cp) flooding weakly recrystallized framboidal pyrite (Py). Qz = quartz. Circle for scale is 27 µm in diameter.

Figure 7-33: Reflected Light Photomicrograph of Composite BBFT01 from the Northern Part of the UCZ



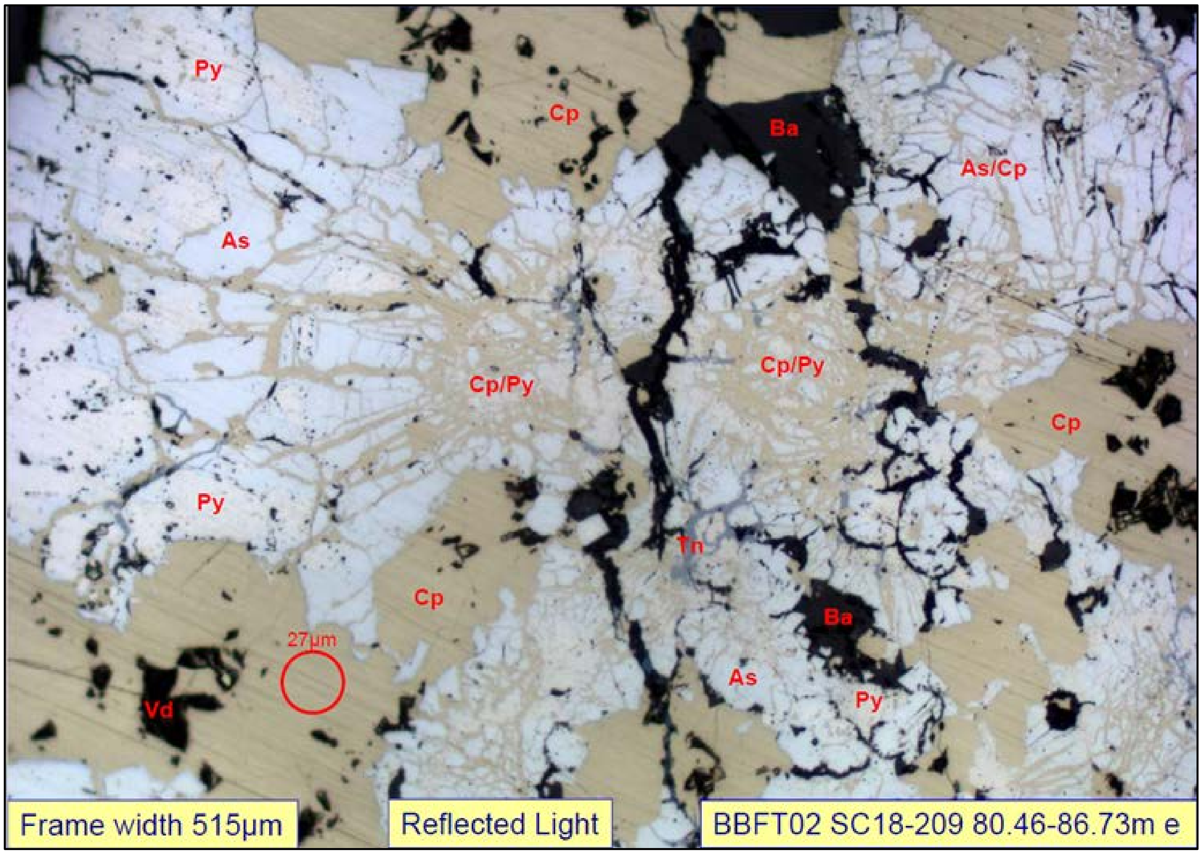
Source: McArthur, 2018
Showing chalcopyrite (Cp) flooding host sediment (Qz = quartz) that contains layers of variably recrystallized melnikovite (Me) and framboidal pyrite (Py). Circle for scale is 27 µm in diameter.

Figure 7-34: Reflected Light Photomicrograph of Composite BBFT19 from the Northern Part of the UCZ



Source: McArthur, 2018
Showing chalcopyrite (Cp) and minor tennantite (Tn) in recrystallized pyrite (Py) with minor marcasite (As). Qz = Quartz, Co = Carbonate. Circle for scale is 27 µm in diameter

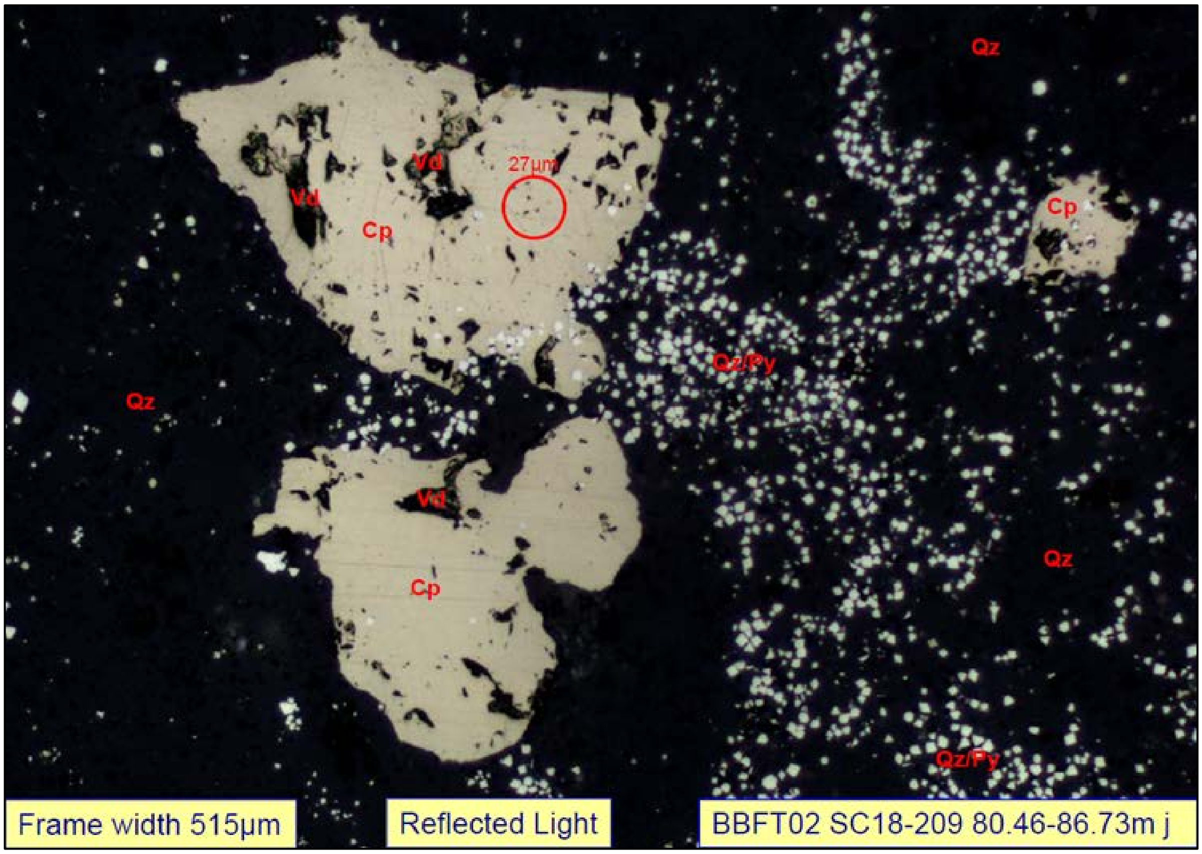
Figure 7-35: Reflected Light Photomicrograph of Composite BBFT02 from the Northern Part of the UCZ



Source: McArthur, 2018

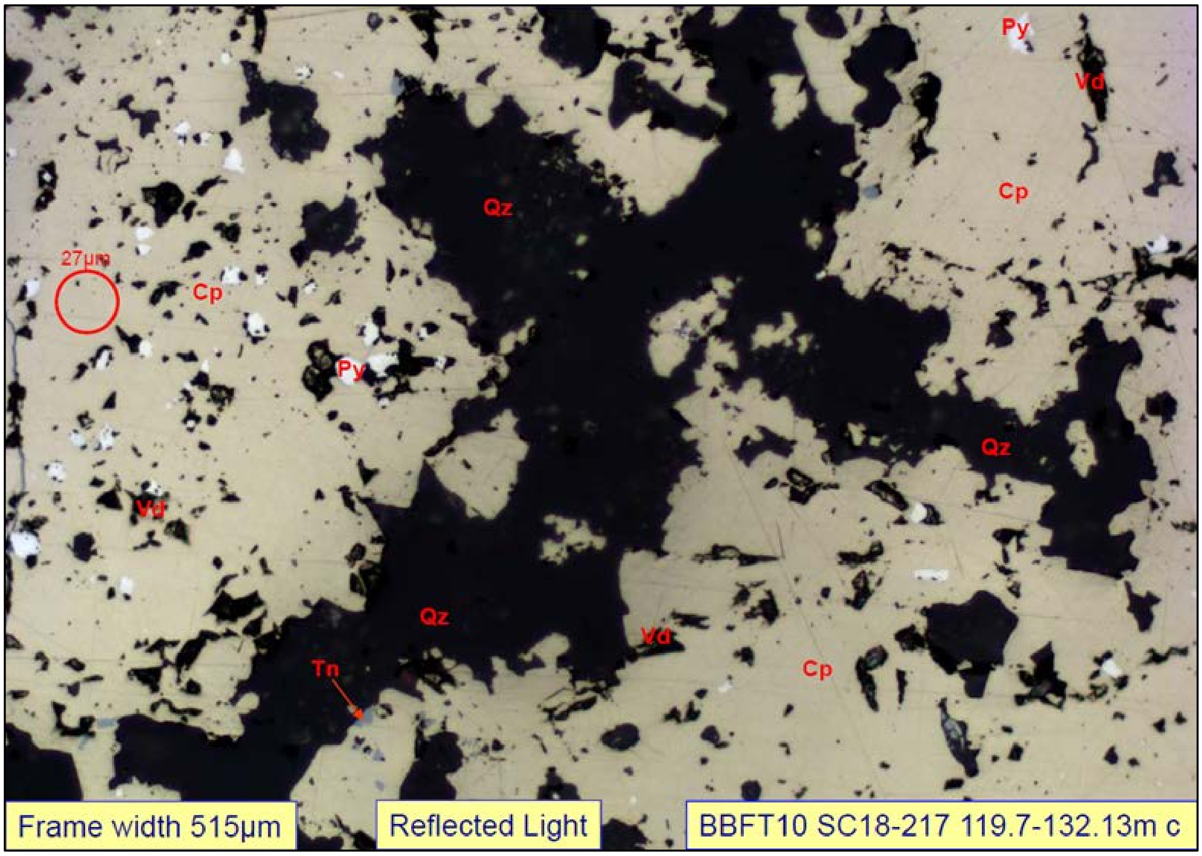
Showing chalcopyrite (Cp) flooding recrystallized pyrite (Py) with extensive peripheral marcasite (As). Ba = Barite. Circle for scale is 27 µm in diameter.

Figure 7-36 Reflected Light Photomicrograph of Composite BBFT02 from the Northern Part of the UCZ



Source: McArthur, 2018
Showing coarse chalcopyrite grains within host sediment (Qz = quartz) that contains layers with minor pyrite (Py). Circle for scale is 27 µm in diameter.

Figure 7-37: Reflected Light Photomicrograph of Composite BBFT02 from the Northern Part of the UCZ



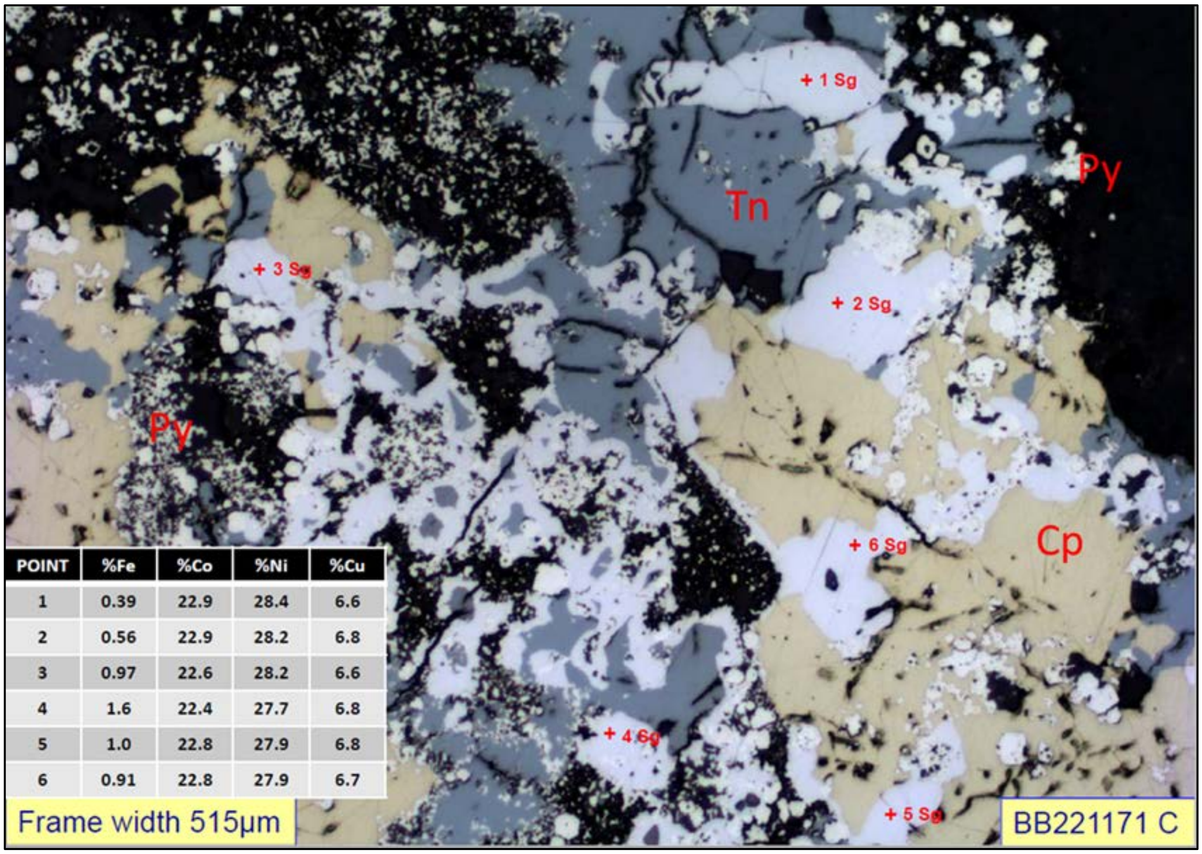
Source: McArthur, 2018
Showing massive chalcopyrite (Cp) with minor tennantite (Tn) within host sediment (Qz = quartz) that contains minor pyrite (Py). Vd - void. Circle for scale is 27 µm in diameter

Figure 7-38: Reflected Light Photomicrograph of Composite BBFT10 from the Northern Part of the UCZ

The 2013 Mineral Resource estimate for the UCZ included estimates for contained Co, Ag, and Au (Winckers, et al, 2013). Estimated Au grades for the UCZ were low (7 to 9 parts per billion [ppb]) and have no economic significance. Co grades reported were 0.10% to 0.13% and Ag grades were 15.2 to 16.3 g/t (Winckers, et al, 2013), both of which have potential economic significance.

SEM and Electron Microprobe analyses of UCZ composite samples (McArthur, 2018) has indicated that Co is resident in pyrite (average 0.11% Co), tennantite (average 0.28% Co), and cuprian siegenite (average 23.1% Co). The average weight percent of these minerals in the UCZ is: pyrite 50.13%; tennantite 0.45%, and cuprian siegenite 0.07% (McArthur, 2018). Approximately 76% of the Co in the UCZ occurs in pyrite, 23% in cuprian siegenite, and 2% in tennantite. Although cuprian siegenite is not observed in every composite; where it has been observed, it is closely associated with chalcopyrite and/or tennantite (Figure 7-39) and shows similar textural relationships to pyrite and gangue minerals.

Marcasite micro-analyses returned average Ag concentrations of 200 parts per million (ppm) and rare sphalerite grains had average Ag concentrations of 100 ppm (McArthur, 2018). Laser ablation, inductively coupled plasma mass-spectrometry (LAICP-MS) microanalyses by Steadman and Large (2015) reported increased Ag concentrations (100 to 1,000 ppm) from crystalline pyrite and the rims of primitive pyrite whereas lower values of 10 to 100 ppm reported from pyrite cores. No Ag analyses above detection limit were reported from tennantite. Therefore, it is concluded that the Ag in the UCZ is hosted by late crystalline pyrite and marcasite.



POINT	%Fe	%Co	%Ni	%Cu
1	0.39	22.9	28.4	6.6
2	0.56	22.9	28.2	6.8
3	0.97	22.6	28.2	6.6
4	1.6	22.4	27.7	6.8
5	1.0	22.8	27.9	6.8
6	0.91	22.8	27.9	6.7

Source: McArthur, 2018
Showing microprobe analysis points for cuprian siegenite (sg) and analytical results. Tn = tennantite, Cp = chalcopyrite, Py = pyrite

Figure 7-39: Reflected Light Photomicrograph of UCZ Sample

Electron microprobe analyses of UCZ composites showed that As occurs in commonly observed pyrite, marcasite, and tennantite, as well as in trace minerals colusite and enargite (McArthur, 2018).

Arsenic concentrations in pyrite vary between the three main textural types. Melnikovite textures contain on average 0.23% As, whereas framboidal and crystalline forms contain, on average, 0.04% and 0.03% As, respectively (McArthur, 2018). Pyrite content in the northern part of the UCZ (31.1%) is lower than that of the southern part (42.4%) (McArthur, 2018). The average weight percent of crystalline pyrite in the northern and southern parts of the UCZ is similar at 11.6% versus 11.8%, respectively, whereas those for melnikovite (north = 1.6%, south = 2.2%) and framboidal (north = 17.9%, south = 28.5%) differ significantly (McArthur, 2018).

The As concentration of marcasite in the UCZ averages 0.06% As and there is a higher proportion of marcasite in the northern part of the UCZ (1.98%) than that of the southern part (0.39%).

Tennantite in the UCZ is an As-rich form (18.91% As) with mean composition, determined by McArthur (2018) of:

$$(Cu_{10.34}Fe_{1.22}Co_{0.07}Zn_{0.05})_{11.68}(As_{3.64}Sb_{0.05}Bi_{0.07})_{3.76}S_{13}$$

The northern part of the UCZ contains an average of 0.32% tennantite whereas the southern part contains an average of 0.49% (McArthur, 2018).

Integrating the observations above allows the average As deportment for the southern and northern parts of the UCZ to be estimated (Table 7-4). In terms of average As deportment, the majority occurs within tennantite. The difference between the southern and northern parts of the UCZ largely reflects the average lower proportion of tennantite observed in the north.

Table 7-4: Average as Content of Main as Containing Mineral Species and Proportions of those Mineral Species in the Northern and Southern Parts of the UCZ

		Northern UCZ		Southern UCZ	
	As Microanalysis (%)	**Mineral %**	**Grade Contribution % As**	**Mineral %**	**Grade Contribution % As**
Melnikovite Pyrite	0.23	1.6	0.004	2.2	0.005
Framboidal Pyrite	0.04	17.9	0.007	28.5	0.011
Crystalline Pyrite	0.03	11.6	0.004	11.8	0.004
Marcasite	0.06	1.98	0.001	0.39	<0.001
Tennantite	18.91	0.32	0.061	0.49	0.086
		TOTAL	**0.077**	**TOTAL**	**0.106**

Source: SRA, 2019

These metrics have been used to produce a mineralogy-based estimate of the average total arsenic concentration (%) and the amount contributed by each mineral species.

8 Deposit Type

8.1 Mineral Deposit

The Black Butte Copper Project deposits exhibit attributes of both sedimentary exhalative sulphide deposits (Sedex deposits, e.g., Emsbo *et al*, 2016) and sediment-hosted stratabound copper deposits (SSC deposits, e.g., Hayes *et al,* 2015). The Johnny Lee deposit is considered a hybrid SCC-Sedex deposit.

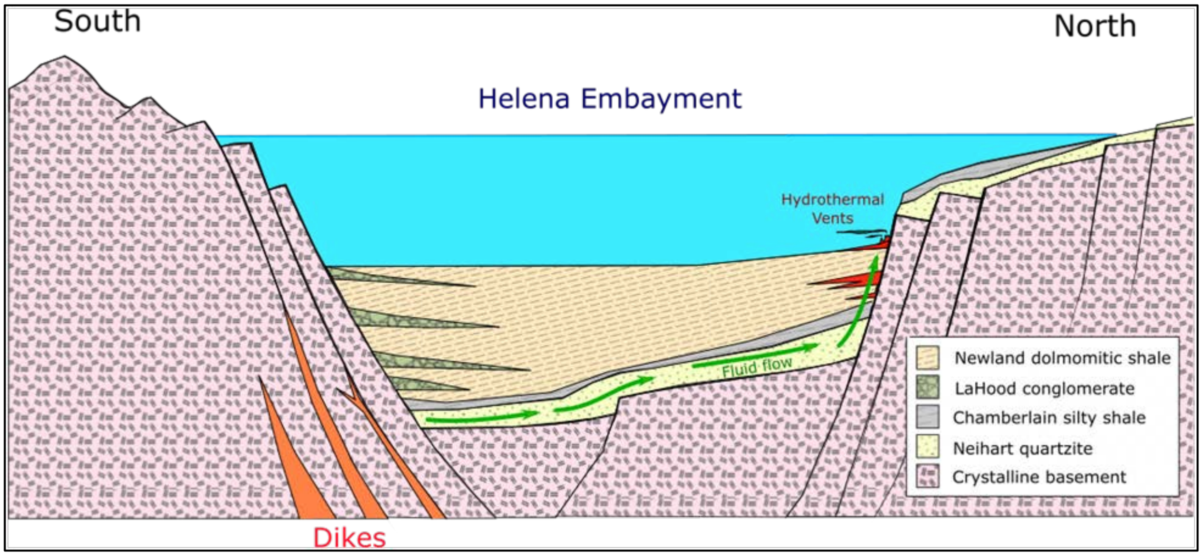
The Black Butte deposits features large pyrite-rich sulphide lenses that occur within marine sediments deposited in a continental rift, a host lithofacies, and paleo-tectonic setting consistent with that of Sedex deposits. Whereas Sedex deposits are commonly Pb- and Zn- rich and form on or near the seafloor (Leach *et al*, 2005), the Black Butte deposit is enriched in Cu-Co-Ag and lacks significant Pb-Zn mineralization. Textural evidence indicates that some Cu sulphides at Johnny Lee formed synchronous with primitive, early pyrite but that the majority of Cu-Co-Ag sulphide mineralization occurred by replacement of early pyrite and that mineralization/remobilization continued post-burial and lithification.

The Black Butte deposits share some features with a sub-class of SSC deposits termed Reduced-facies SSC deposits: Cu-Co-(Ag) mineralization hosted by reduced, organic- and pyrite-bearing shale, silt and carbonaceous dolomitic siltstone (Hayes *et al*, 2015). SSC deposits are epigenetic, and mineralization is typically found as pore fillings or replacement of existing minerals. Mineralization in typical SSC deposits generally shows a zonation from relatively Cu-rich at the base (native copper, chalcocite, digenite) to more iron-rich at the top (i.e. greater chalcopyrite then pyrite). No zonation is evident at Johnny Lee but the association of Cu sulphide mineralization with post-lithification veins and hydraulic brecciation supports a partially epigenetic origin.

8.2 Geological Model

The Black Butte deposits have been interpreted to have formed in two stages: an early Fe- and Ba-rich hydrothermal event, and a later Si- and Cu-rich event (Graham *et al*, 2012; White *et al*, 2014). The early hydrothermal system vented onto the sea-floor where it precipitated extensive sheets of fine-grained pyrite with minor Cu sulphide and associated barite. The second pulse of hydrothermal activity locally replaced the earlier pyrite with crystalline pyrite, introduced considerable Cu sulphide and caused silica ± dolomite alteration of the host rock.

The Helena Embayment (Figure 8-1) was asymmetrical, with deep water and a steep drop-off in the south and more subdued terrain in the north (Schmidt & Garihan, 1986; Zieg, 1986). Heat from dykes and sills emplaced along the southern edge of the embayment during basin extension, are interpreted to have created metalliferous basinal brines (Schmidt and O’Neil, 1982). The asymmetry of the basin allowed these brines to flow through more permeable lithofacies to the northern edge of the depository (Figure 8-1) where they are interpreted to have flowed upwards along the basin-marginal faults and vented to the sea floor, forming finely laminated sulfide mounds (Schmidt and O’Neil, 1982). It is these sulphide mounds that are host to the copper mineralization at the Johnny Lee deposit.



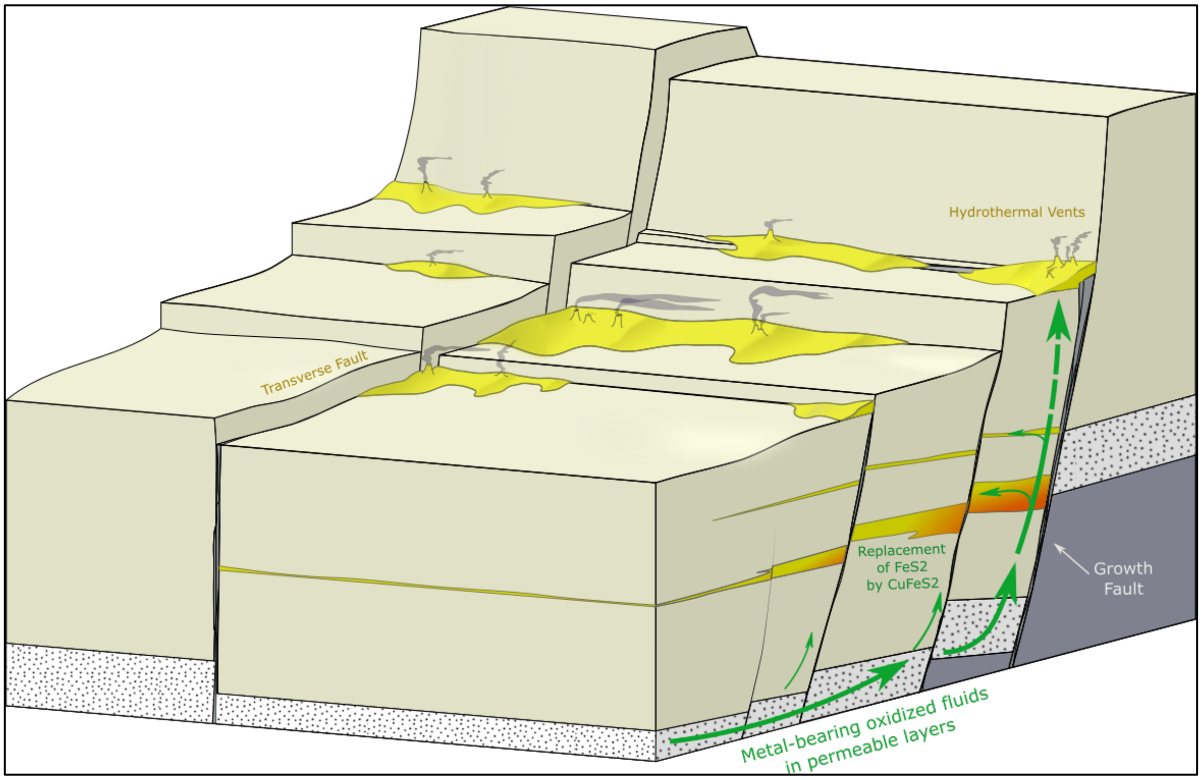
Source: SRA, 2019
Showing interpreted basinal brine fluid flow and formation of sulphide mounds on the northern margin of the depository

Figure 8-1: Schematic Cross Section Through the Helena Embayment

Subsequent to formation and burial of the massive sulphide units, and continuing after lithification, late stage Cu-rich hydrothermal fluids were generated and ascended along fluid pathways along the basin margin (Figure 8-2). The origin of this later generation of mineralizing hydrothermal fluids is uncertain. White *et al* (2014) proposed that reduction of hematite in the Neihart Formation to magnetite would have generated an oxidizing fluid and liberated Cu from both the Neihart Formation and adjacent sediments. Continued intrusive activity associated with crustal extension prolonged the heat source for basinal fluid flow.

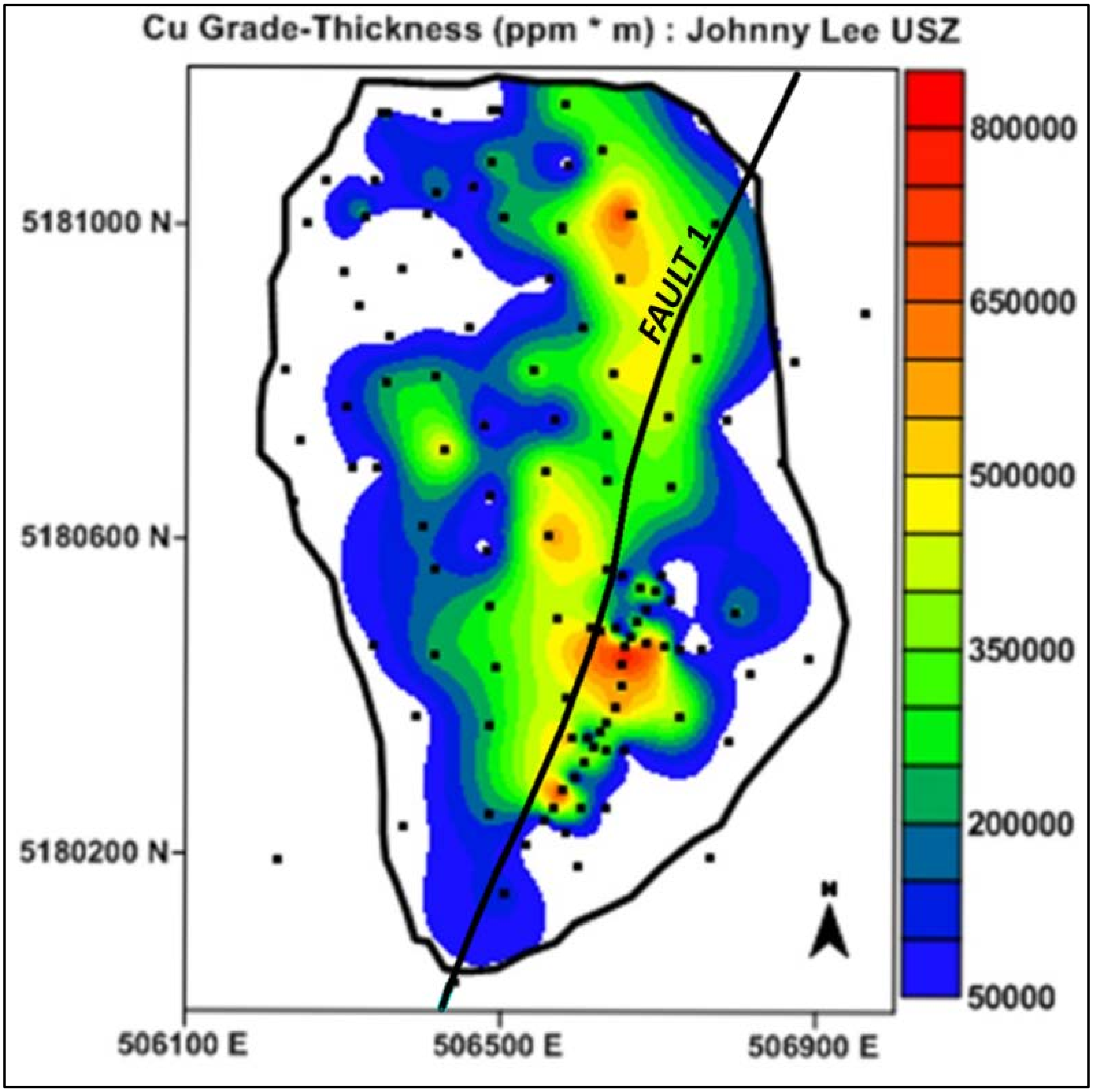
Whereas the formation of the pyrite massive sulphide layers was a regional event throughout the Helena Embayment (where it occurred along basin margin faults), the later main Cu mineralizing event was focussed in specific areas. As the Cu mineralization occurred in buried and potentially lithified sediment, it is reasonable to consider the extant structural framework as a control on permeability and hydrothermal fluid flow.

The UCZ of the Johnny Lee deposit is transected by Fault 1, along which the last movement was post-mineralisation. The current trend of the intersection of Fault 1 with the UCZ is coincident with the most robust Cu mineralisation observed within the deposit (Figure 8-3). These observations suggest that Fault 1 is a long-lived feature that influenced Cu mineralization during the second stage of hydrothermal activity at Johnny Lee.



Source: SRA, 2019

Figure 8-2: Schematic Diagram Showing Fluid Flow Patterns and Replacement Stage 1 Pyrite by Stage 2 Cu-Co-Ag Mineralizing Fluids



Source: SRA, 2019

Figure 8-3: Plan View of A Cu Grade - Thickness Contour Map of the UCZ Showing the Surface Trace of Fault 1

It is proposed that Fault 1 was a transform fault (Figure 8-1) developed orthogonal to the basin-margin Buttress and Volcano Valley faults during formation of the Helena Embayment. Fault 1 and the basin margin faults likely acted as fluid conduits for the initial stage fluids that formed the bedded pyrite-massive sulphide. However, unlike the stage 2 event, hydrothermal fluid flow was not constrained to the intersection zone. Subsequent to burial and lithification of the bedded massive sulphide, stage 2 Cu mineralizing hydrothermal fluids were focused along permable zones formed by the intersections between Fault 1, the Volcano Valley fault zone and the Buttress fault. Importantly, it was this later event that formed the bulk of the Cu mineralization in the Johnny Lee deposit.

Fault 1 and the Volcano Valley fault zone were both reactivated, post-mineralization, during compressional Laramide orogenesis. It is uncertain whether the Buttress fault was reactivated, or retained the original, extensional growth fault geometry.

9 Exploration

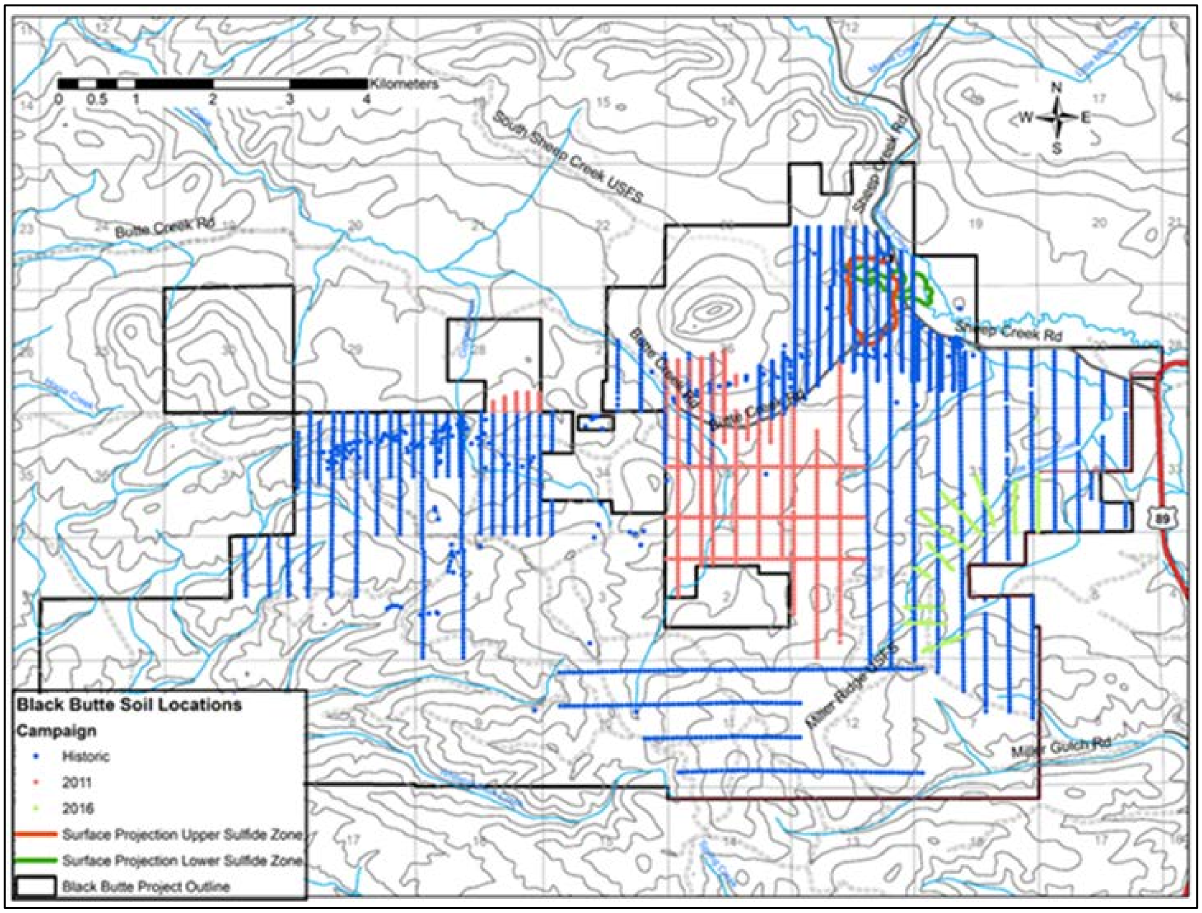
9.1 Relevant Exploration Work

Exploration work conducted prior to 2013 was reviewed by Winckers *et al* (2013) as part of the PEA.

Exploration by SRA, subsequent to 2013, has been limited as work has focused predominantly on permitting for the Johnny Lee deposit. During 2015, SRA conducted localized 1:3,000 scale geologic mapping to better locate the surface expression of the USZ. In 2016, SRA completed additional mapping and collected soil samples of lower Newland stratigraphy (Figure 9-1).

9.2 Sampling Methods and Sample Quality

The soil sampling in 2016 consisted of 413 samples across the Newland-Chamberlain Formation contact on the east-central portion of the property (Figure 9-1). The aim of the program was to test the lower portion of Newland Formation stratigraphy for a geochemical signature of a potential extension to the LCZ mineralization. Predetermined sample lines were located with a handheld global positioning system (GPS), samplers used a compass to maintain azimuth and a handheld GPS to monitor distance. Samples were collected every 30 m (100 feet) along the lines. A small shovel was used to dig below the A soil horizon, and the sampler collected 50 to 100 grams (g) and manually removed coarse fragments.



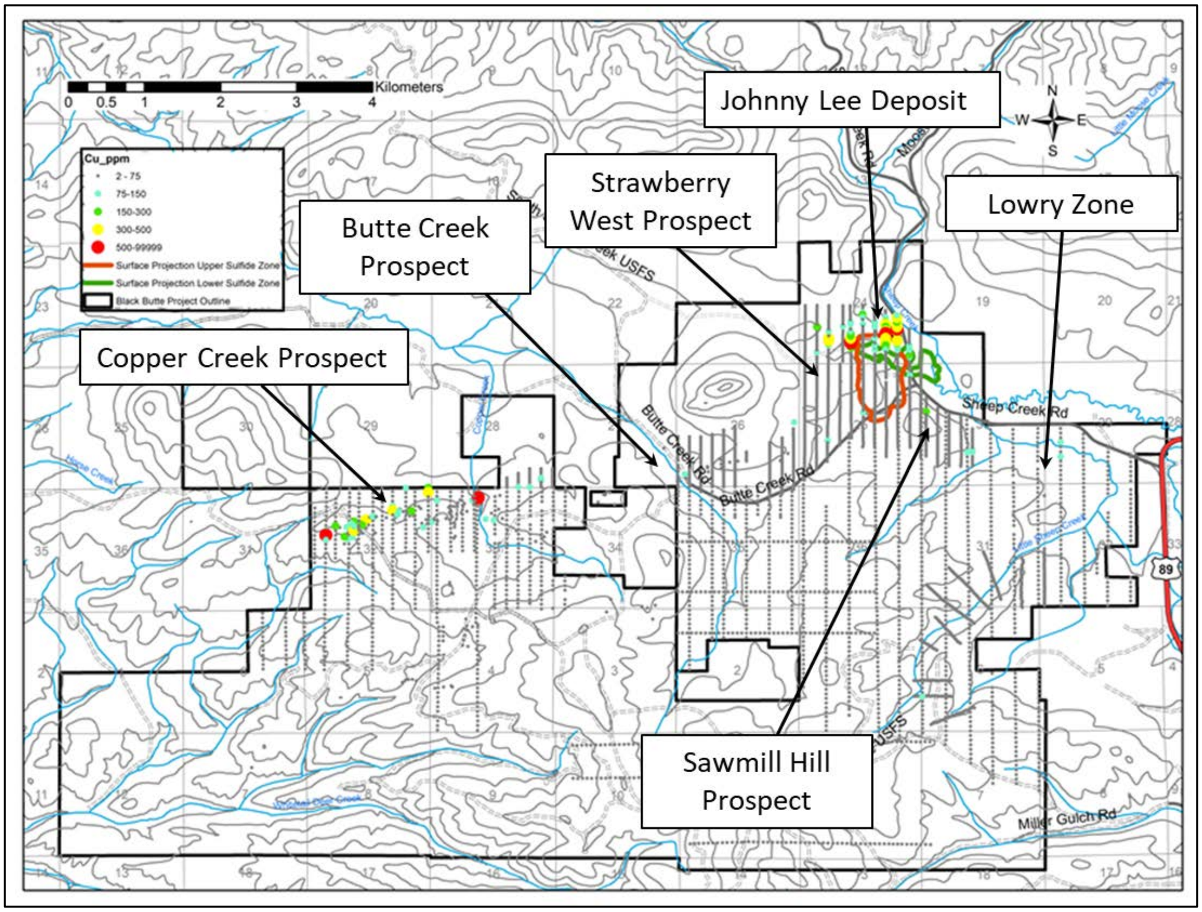
Source: SRA, 2019

Figure 9-1: Map Showing Soil Sampling Campaigns on the Property

Sample analysis was performed by ALS Global in Reno and Vancouver. The samples were screened at the laboratory to minus 180 microns, then digested in aqua-regia and analyzed for 35 elements using inductively coupled plasma-mass spectrometry (ICP-MS).

9.3 Significant Results and Interpretation

Figure 9-2 shows the Cu results from all soil sampling campaigns over the property. The 2016 soil sampling program failed to indicate any significant anomaly. Historic soil sampling outlined significant Cu anomalism at the Johnny Lee Deposit and the Copper Creek prospect. Minor surface Cu anomalism occurs at the Lowry zone (surficial expression of the Lowry deposit), Sawmill Hill prospect, and Butte Creek prospect. SRK has not reviewed the data associated with any prospect or deposit beyond the Johnny Lee Deposit. Additional information on copper prospects in the vicinity of the Johnny Lee deposit are described in more detail in Section 23.



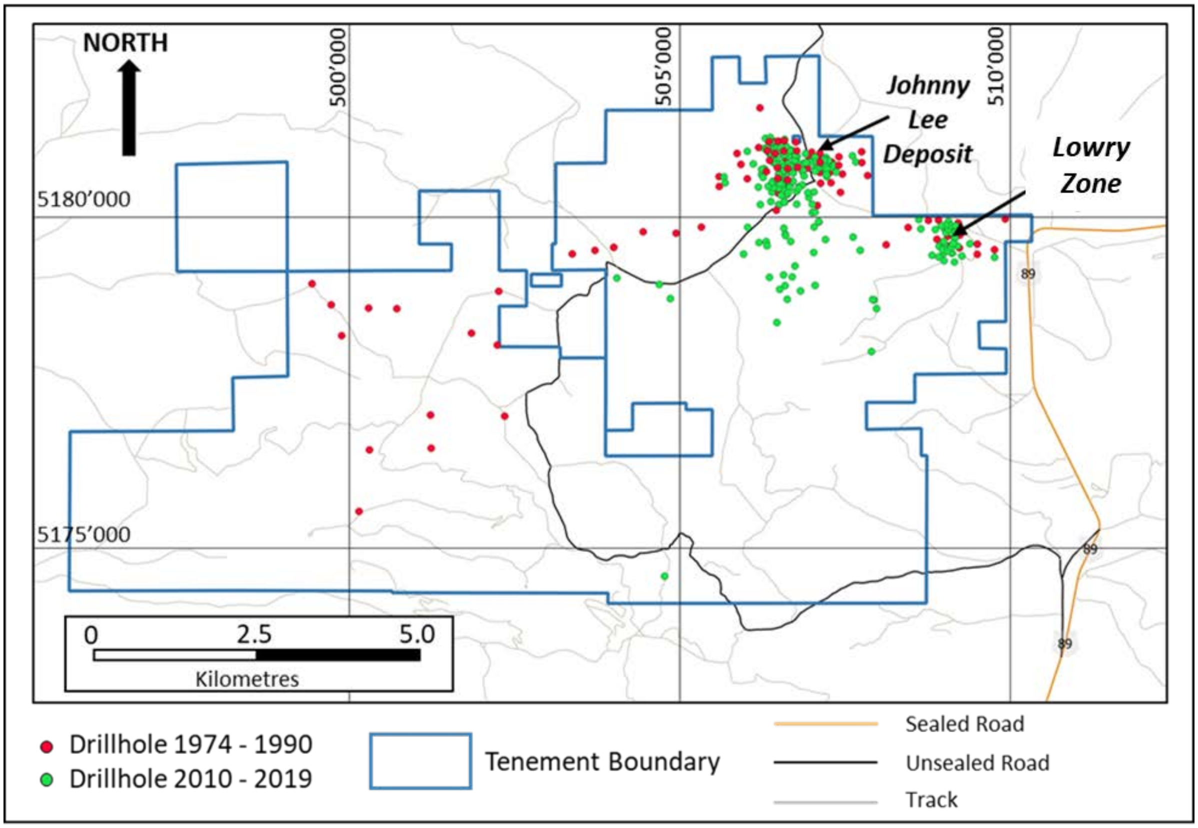
Source: SRA, 2019

Figure 9-2: Plan Showing Soil Sampling Cu Results, Deposits, and Exploration Targets

10 Drilling

10.1 Type and Extent

There are 342 drillholes on the current tenement package that have been completed in numerous campaigns by seven companies (Figure 10-1). The majority of these drillholes are focused on the Johnny Lee deposit and the zone around the defined Lowry deposit termed the Lowry zone.



Source: SRA, 2019
Co-ordinate system is NAD83 UTM Zone 12 North

Figure 10-1: Map of the Project Area Showing Tenement Boundaries and Collar Positions of Drillholes Completed from 1974 to 1990 (Pre-Tintina/SRA) and 2010 to 2019 (Tintina/SRA)

Table 10-1: Black Butte Project Drilling History as of 26 June 2019

Company	Years	No. of Holes	Core Meters Drilled	Core Diameter	RC Meters Drilled	Drill Purpose
Homestake Mining	1974	1	148	Unknown	--	Exploration
Cominco American Inc.	1978 to 1992	43	21,952	Unknown	--	Exploration/Resource/Metallurgy
Anaconda Mining	1978	1	--	--	374	Exploration
EXXON	1984	1	220	Unknown	--	Exploration
Utah International Inc.	1980 to 1984	8	5,498	Unknown	--	Exploration
BHP	1985 to 1990	33	12,764	Unknown	116	Exploration/Resource
Tintina Montana Inc.	2010 to 2012	168	58,677	HQ	--	Resource/metallurgy/Geotechnical
Sandfire Resources America	2014	11	3,245	HQ	--	Resource/metallurgy
Sandfire Resources America	2015	26	999	HQ	--	Geotechnical
Sandfire Resources America	2018: Phase 1	24	4,924	PQ/HQ	--	Metallurgy/Resource/Geotechnical/Sterilization
Sandfire Resources America	2018/19 Phase 2	26	6,115	HQ	--	Resource/Metallurgy/Geotechnical
Total		**342**	**114,544**		**490**	

Homestake Mining Company completed one exploration diamond drillhole in 1974 and abandoned the project shortly thereafter. CAI began work in the area in 1975 and drilled 13 diamond drillholes. Anaconda Mining Company acquired tenements west of CAI in 1977 and drilled one reverse circulation (RC) drillhole. Exxon Minerals drilled one diamond drillhole in 1984. CAI entered into a joint venture on the Anaconda tenements in the early 1980's and drilled two diamond drillholes. None of these early drill programs intersected mineralization of economic significance and the data have not been used for the determination of Mineral Resources of this Project.

CAI entered into a joint venture with Utah International, a BHP subsidiary, who completed eight diamond drillholes between 1980 and 1984. The first mineralization intercept of the Johnny Lee UCZ was drilled by BHP in 1985, subsequent drilling resulted in the discovery of the LCZ. BHP completed 32 diamond drillholes and one reverse circulation drillhole from 1985 to 1990. No mineralization was intersected in the single reverse circulation drillhole and it has not been utilized for the determination of Mineral Resources of this Project.

In 1990, CAI purchased BHP's share in the project, continued to drill-out the Johnny Lee deposit and discovered the Lowry deposit. From 1990 to 1992 CAI drilled an additional 28 diamond drillholes in the project area: 14 in the Lowry deposit, eight in the Johnny Lee deposit, and the remainder regional exploration drillholes. CAI used this drilling to estimate a resource and to undertake preliminary metallurgical testing. The resources estimated by CAI were performed prior to the establishment and are not in accordance with NI 43-101. CAI abandoned the project in 1995.

Tintina leased the mineral rights containing the Johnny Lee deposit and Lowry zone in 2010. From 2010 to 2012, Tintina completed 168 diamond drillholes. These drillholes were utilized for Mineral Resource definition at the Johnny Lee deposit and Lowry zone, metallurgical test-work, and geotechnical studies. Six pre-2010 drillholes were twinned by Tintina to determine the validity of the data for the Mineral Resource estimate (Winckers *et al*, 2013). All historic drilling was evaluated by Winckers *et al* (2013) as part of a PEA completed in 2013. The PEA included a Mineral Resource declaration for the UCZ, LCZ, and Lowry deposit.

SRA acquired the project in 2013 and, in 2014, drilled 11 diamond drillholes into the UCZ for resource infill, geotechnical evaluation, and metallurgical test-work. Twenty-six shallow diamond drillholes were completed to evaluate geotechnical conditions below proposed infrastructure in 2015. The metallurgical test-work on drillholes from the 2014 program (and some earlier drillholes) highlighted significant variability in the UCZ recoveries that had previously not been identified. A geometallurgical study was initiated in 2017 that allowed the spatial distribution of UCZ mineralization with different geometallurgical characteristics to be constrained.

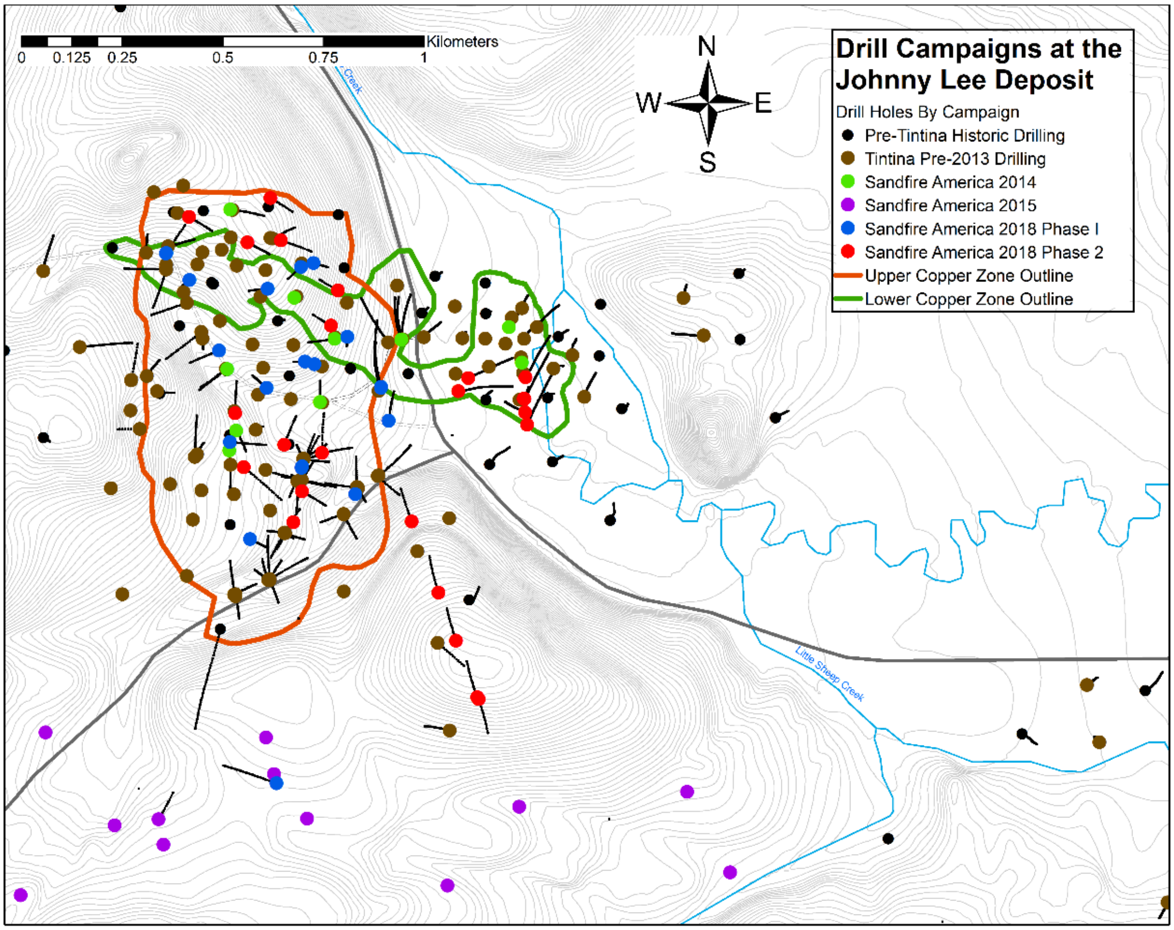
During the 2018 Phase 1 drill program, 19 diamond drillholes were completed into the UCZ to acquire samples of different ore-types for additional metallurgical test-work. These drillholes were planned between existing intercepts such that the information could also be used for resource infill purposes and further constraint of the geometallurgical model. During the same program, two drillholes were completed in the LCZ, targeting a gap that had been identified in the resource definition drilling. Two sterilization drillholes were completed in areas of proposed infrastructure development and one drillhole was completed at a proposed water injection site.

Utilizing the results from the 2018 Phase 1 drill-program, SRA developed a conceptual mine plan that was used as a guide for the additional project definition drilling. The 2018/19 Phase 2 drill-program was designed to provide data to underpin further definition of the resource and comprised the following elements:

- Resource infill/geometallurgical definition drilling in critical parts of the UCZ and LCZ;
- Acquisition of geotechnical information for infrastructure, underground development and stope design;
- Hydrogeological testing of the proposed decline; and
- Collection of additional metallurgical sample material from the LCZ.

A total of 26 diamond drillholes were completed in the 2018/19 Phase 2 drill program for a total of 6,115 m.

The 2019 Mineral Resource estimate is focused on the UCZ and LCZ (Figure 10-2). All drillholes in this area are diamond drillholes that were either pre-collared using a tri-cone bit or cored from surface.



Source: SRA, 2019

Figure 10-2: Topographic Map of the Johnny Lee Area Showing Drillhole Collars from All Drill Programs

34 drillholes (19 for the UCZ and 15 for the LCZ) from pre-Tintina drilling are used to support the Mineral Resource estimate presented in this document. In 2010, Tintina obtained a copy of the electronic drillhole database, including the data from these drillholes, from the Belt Research Center, University of Montana. CAI donated this data to the Belt Research Center after they terminated their interest in the project. Although efforts were made to acquire supporting documentation from Teck (who had acquired CAI subsequent to CAI abandoning the project) these efforts were unsuccessful. Lacking this data, it is not possible to describe in detail the drilling, logging, and analytical protocols used by historic operators prior to 2010.

Given the absence of assay certificates, downhole survey records, and quality assurance and quality control (QA/QC) results for the historic drill data, Tintina twinned six of the historic drillholes in 2010. Winckers *et al* (2013) compared the historic versus new drillhole data from each of the drillhole pairs and concluded that the historic drill data was acceptable for use in a Mineral Resource estimate.

Subsequent to the review by Winckers, et al. (2013), SRA has drilled 87 diamond core holes over four drilling programs. The sections below outline the drill procedures utilized in those campaigns and highlights procedural changes that were implemented as the project advanced.

10.2 Procedures

10.2.1 Grid

All drilling and survey activities at the Black Butte project use the North American 1983 datum (NAD83)/Universal Transverse Mercator (UTM) Zone 12 North coordinate system. Project control was established using several static observation sessions on control points surrounding the project. The static observations were processed through the Online Positioning User Service (OPUS) of the National Geodetic Survey to derive the coordinates and then the project was adjusted and scaled to ground.

10.2.2 Collar Survey

Drillhole collars were pegged using either a handheld GPS or a Real-Time Kinetic (RTK) GPS instrument. Prior to the 2018/19 Phase 2 drill program, drill-rig alignment was completed using a sighting compass and inclinometer. For the 2018/19 Phase 2 program, a Reflex TN14 Gyrocompass™, north-seeking gyroscopic alignment tool was used to ensure accurate azimuth and dip alignment.

Upon completion of drillholes, the collars were accurately surveyed by a registered surveyor from WWC Engineering of Helena, Montana using an RTK GPS instrument (Trimble R8 GNSS™) with horizontal and vertical tolerance set to 0.05 ft (approximately 15 mm). WWC Engineering located and surveyed all historic drillhole collars used for the determination of Mineral Resources.

10.2.3 Downhole Survey

For the 2014 and 2015 SRA drilling programs, a Reflex EZ-Trac™ electro-magnetic survey instrument was used to record downhole survey data. Survey shots were taken at 30 m intervals downhole. During the 2018 Phase 1 and 2018/19 Phase 2 drill programs, a Reflex EZ-Trac™ survey instrument was used to record downhole survey data during drilling. A Reflex EZ-Gyro™ (north seeking gyroscope) was used to survey each hole at 3 to 6 m intervals, upon drillhole completion.

Acceptable correlations between EZ-Trac and EZ-Gyro instruments and low magnetic susceptibility readings indicate that magnetic interference of electro-magnetic survey instruments was not occurring.

10.2.4 Core Orientation

Core orientation was undertaken on all inclined holes completed from 2014 to present. For inclined drillholes, a Reflex ACT™ II or III core orientation tool was utilized by the drillers to record core orientation. Bottom of hole orientation marks were marked on the core by the drill-crew. Core orientation quality was generally good although orientation often failed in highly fractured ground such as that within the VVFZ and adjacent to Fault 1.

10.2.5 Core Handling

Upon completion of each drill-run, the core was extracted from the core barrel, cleaned, and placed in core-racks by the drill-crew. Core blocks showing hole-depth (in ft.) were placed at the end of each drill-run. Core was then placed in waxed cardboard core-boxes. Where it was necessary to break core to fit into the core-boxes, the artificial break was marked on the core, so it was disregarded during rock quality designation (RQD) or geotechnical logging.

Core boxes were picked up twice daily from the drill rig site by SRA technicians and delivered to the logging facility in White Sulphur Springs. Drilling depths were marked at 1 m intervals with core recovery and RQD recorded by geologists or geotechnical assistants. Where lost-core intervals greater than 0.1 m were encountered (and not recovered in subsequent drill-runs), the lost core intervals were marked and integrated with the depth mark-up.

Where core orientation was undertaken, the core for successive runs was laid-out and the quality of core orientation was determined. If orientation marks from adjacent runs were within 10°, a solid bottom-of-hole line was drawn. If orientation marks were more than 10° and less than 20° a dashed line was drawn. If the disconnect between orientation marks was more than 20° no orientation line was drawn.

Subsequent to logging and sampling, each core-box was photographed using a digital camera mounted on a frame for consistency of distance and image size. Digital photograph files were named using the drillhole ID and depth and stored on the SRA server.

Specific gravity determinations were then made of whole-core intervals using an Archimedean (wet/dry) scale. Further description of specific gravity testing methodology is described in section 12.

Intervals selected for sampling were then halved using a core saw. The sample cut was made approximately 5° clockwise (looking downhole) from the orientation line. The half-core that did not contain the orientation line was sampled. Where a field duplicate had been requested by the logging geologist, the remaining half-core was quartered and the quarter without the orientation line was sampled. If core-orientation was not performed, or had failed, the core was cut perpendicular to bedding and the same half-core was consistently sampled. Samples were placed in calico bags and stored in a secure facility until dispatch to the laboratory. Remaining core was stored either at the logging facility in White Sulphur Springs or in the secure core sheds at the project site.

An exception to this workflow is the 2018 Phase 1 UCZ PQ core that was utilized for metallurgical testing. The PQ core was processed in the manner described above but instead of cutting and sampling the core, whole core of each resource sample interval was dispatched to Base Metallurgical Laboratories in Kamloops, British Columbia, Canada. For each sample interval, the entire PQ core interval was fine crushed. A 1,000 g split of the fine crush was pulverized and sent to ALS Vancouver for analyses.

10.2.6 Geological Logging

Prior to the 2018 Phase 1 drill program, all logging was conducted using graphic logging sheets. The information recorded included: depth, color, lithology, mineralogy, oxidation, grain size, texture, sedimentary structures, alteration, mineralization, and structure. Where core orientation had been successfully completed, alpha and beta angles of planar features (bedding, veins, foliation, faults) were recorded using a Kenometer core protractor.

In the 2018/19 Phase 2 drill program, digital logging software (OCRIS™) was utilized to record all logging information using a portable computer. The digital logging was accompanied by summary graphic logging such that sedimentary facies could be identified in a similar manner to the 2014 through 2018 Phase 1 drill programs. All geological logging data was validated prior to use in geological and resource modeling as described in Chapter 12.

10.2.7 Geotechnical Logging

In 2014, SRA drilled a 10 drillhole, HQ diameter program (2,775 m) designed to collect geotechnical data and acquire core samples for metallurgical test work from the UCZ and LCZ. The geotechnical and structural data was used to inform a geotechnical evaluation of the UCZ and LCZ by Mine Design Engineering. A geotechnical engineer from Mine Design Engineering, trained SRA geologists in geotechnical core logging and monitored data quality during the logging process. The logging protocols utilized in this program are described in detail in Kalenchuk *et al* (2015).

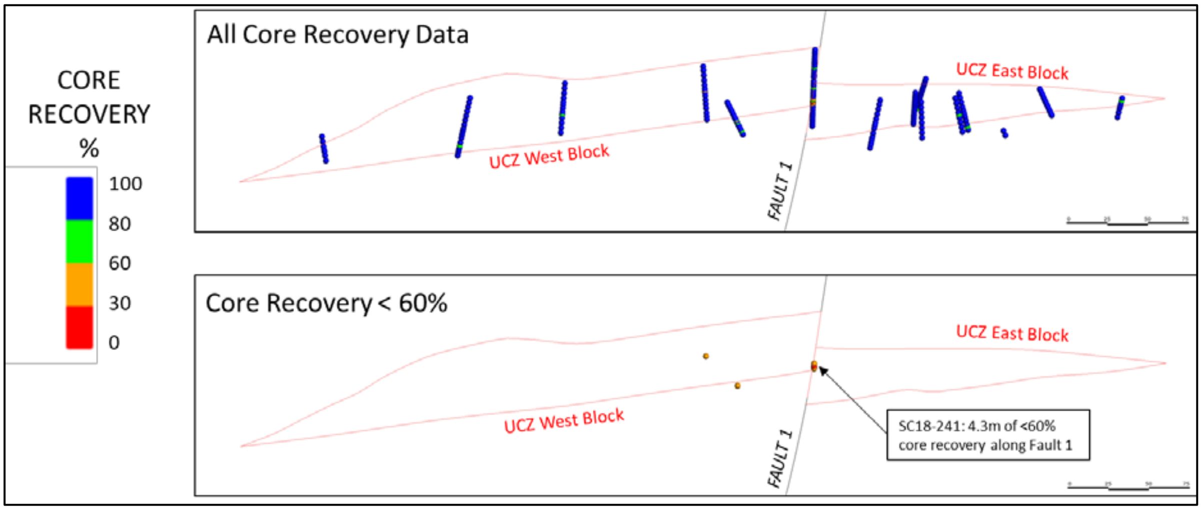
All drillholes completed during the 2018/19 Phase 2 drill program were geotechnically logged. A geotechnical engineer from Mining Plus trained the SRA geologists in the appropriate logging process and monitored data acquisition to ensure it was fit for purpose. The logging protocol is detailed in Mining Plus (In Prep.). One HQ3 geotechnical drillhole was completed at a proposed vent raise location in the UCZ. As the drillhole was vertical, a Reflex Verti-Ori™ core-orientation system was utilized to orient the core. The hole was geotechnically logged by Mining Plus geotechnical engineers.

10.2.8 Core Recovery

Core Recovery in the UCZ is considered acceptable with average recoveries greater than 90%. Within the Eastern Block of the UCZ (including both more than 1.2% Cu mineralization and more than 0.25% Cu halo material) mean core recovery from all drill programs is 93.0% (median = 97.1%). Within the Western Block of the UCZ, mean core recovery is 91.5% (median = 96.4%). Very low core recoveries (less than 60%) in the UCZ generally occur in isolated individual core-runs and thus do not have a significant impact on overall grade estimation or Mineral Resources.

Four drillholes that intersected Fault 1 at low angles (Figure 10-3) exhibited multiple adjacent intervals of less than 60% recovery in individual drillholes. Even in the drillhole with the lowest recovery (SC18-244), visual inspection of core recovered from each core run suggested that the core-loss was systemic, rather than isolated, allowing for meaningful sampling and analyses.

Although poor core recoveries were encountered in the Volcano Valley Fault zone, the recoveries within the LCZ are considered acceptable. Core recoveries in the East, Central, and West zones have mean values of 98.2%, 99.0% and 98.1% respectively. Corresponding median recovery values for the three zones were 99.3%, 100% and 98.0%.



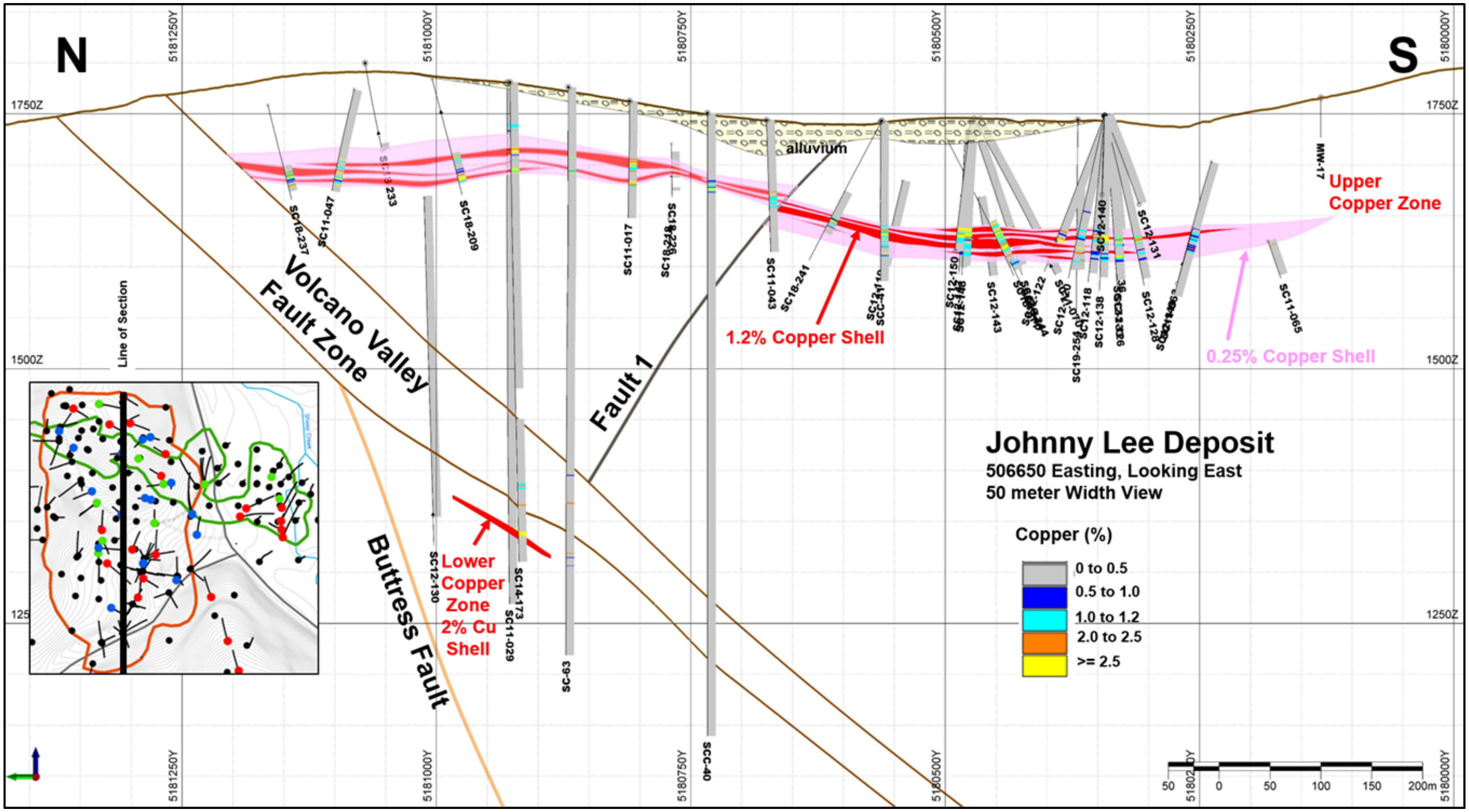
Source: SRA, 2019
The cross-section on the top shows all recovery data. The cross-section on the bottom shows core recoveries <60%.

Figure 10-3: Cross-Section, Looking North, of the UCZ Showing Raw, Un-Composited Core Recovery Data in the Eastern and Western Blocks of the UCZ

10.3 Interpretation and Relevant Results

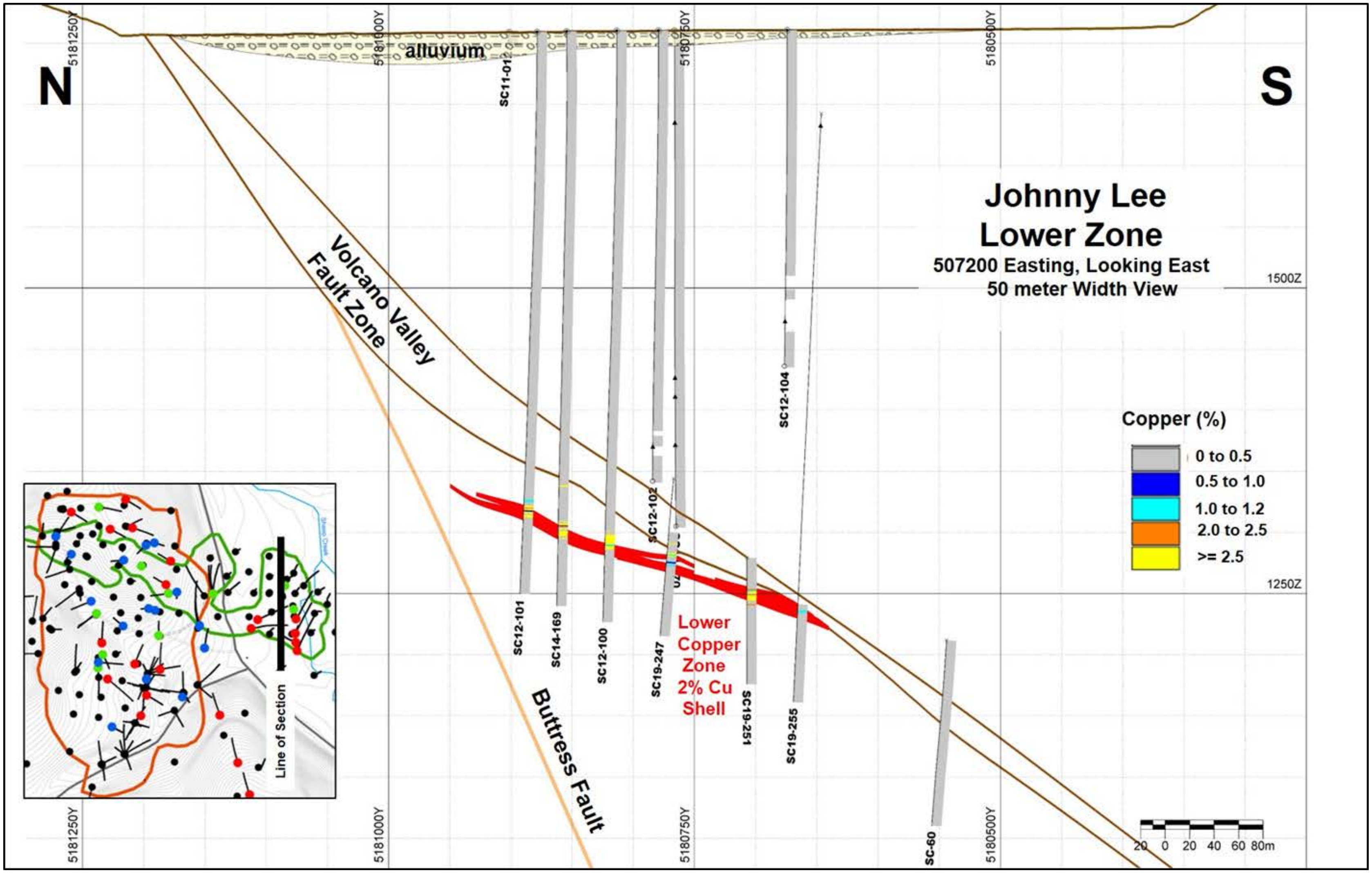
The UCZ (Figure 10-4) is a flat-lying to shallow dipping zone of copper mineralization that ranges in thickness from 3 m to 42 m. Gentle folding about a W/NW trending syncline-anticline pair results in variable dips that range from 0° to 20°. The northern edge of the UCZ is truncated by the hanging-wall fault of the VVFZ. The UCZ is transected and displaced by the N/NE striking, steeply W/NW dipping Fault 1.

The LCZ (Figure 10-4 and Figure 10-5) strikes E/NE and dips to the S/SE at between 5° and 37°. The variable dip reflects gentle folding of the deposit. The LCZ is truncated in the south by the foot-wall fault of the VVFZ and to the north by the Buttress fault.



Source: SRA, 2019
See Inset for line of section (legend for inset as per Figure 10-2)

Figure 10-4: Cross Section of the Johnny Lee Deposit



Source: SRA, June 2019
See Inset for line of section (legend for inset as per Figure 10-2)

Figure 10-5: Cross Section of the Johnny Lee LCZ

Geologists sampled half-core samples continuously through the mineralized zones using 0.3 to 2.0 m sample lengths. Six Certified Reference Materials (CRMs), supplied by WCM Minerals, were inserted into the sample sequence at a minimum ratio of one CRM for every 20 samples. In the 2010 drill-program, chips of un-mineralized sediment were collected from surface outcrops and used as coarse-blanks. In the 2011 and 2012 programs, commercial landscaping marble chips were used as coarse-blanks. The rate of coarse-blank insertion into the sample sequence was a minimum of one coarse-blank for every 20 samples. Field duplicates, comprising quarter-core samples were submitted at a ratio of one field duplicate every 20 samples.

The primary laboratory for sample preparation and analysis of the 2010 to 2012 Tintina drill programs was ALS Global (ALS) of 4977 Energy Way, Reno, Nevada and 2103 Dollarton Highway, North Vancouver, British Columbia. Tintina requested that 803 laboratory duplicates (duplicate pulp from coarse reject) were created, and analyzed, as laboratory duplicates. The mean Cu grade of duplicate analyses was 2% lower than that of the original assays although no bias could be discerned. Seventy umpire analyses were conducted on pulps, prepared by ALS, at Inspectorate Exploration and Mining Services of 11620 Horseshoe Way, Richmond, British Columbia. Umpire analyses for Cu had a mean grade that was 8% lower than that of the original assay although no significant bias could be recognized.

10.4 QP Opinion on Accuracy

Erik Ronald, P.Geo of SRK, acting as QP, has reviewed the drilling data, procedures, and methodology including a site visit to an active diamond core drilling site. It is the opinion of the QP that all drilling data included in this Mineral Resource for the Johnny Lee deposit has been performed to good industry standard and the resultant data is appropriate for use in the Mineral Resource estimation, classification, and disclosure.

11 Sample Preparation, Analysis and Security

11.1 Sample Preparation for Analysis

All SRA samples were sent for sample preparation to ALS Global, 4977 Energy Way, Reno, Nevada (ALS Reno). ALS Reno is ISO/IEC 17025 accredited for sample preparation. The 2018 Phase 1 drilling of the UCZ using PQ core was an exception, with samples prepared by Base Metallurgical Laboratories of 970 McMaster Way, Kamloops, British Columbia, Canada (BML Kamloops). Metallurgical laboratories such as BML Kamloops are not certified to ISO 17025 standards. BML Kamloops follows industry accepted practices and all outputs are signed-off by a Professional Engineer.

Upon receipt at ALS Reno, samples were sorted, checked against the submission sheet, weighed, barcoded and logged into the ALS sample management system.

The samples were dried for a minimum of eight hours at 100°C. The samples were then coarse-crushed to 70% -6 mm using a swing jaw-crusher. Every 30th sample was passed through a dry-sieve to ensure that required crush specifications were obtained.

The coarse-crushed material was then fine-crushed to 70% -2 mm using a Boyd jaw-crusher and a 1,000 g analytical sample was split off using a Boyd rotary splitter. The fine-crushed material from every 20th sample was passed through a dry-sieve for quality control of fine-crushing.

The 1,000 g analytical sample was then pulverized to 85% -75µm using an Essa LM2 vibratory pulverizing mill. A split of the pulverized material from every 20th sample was wet-sieved to ensure that at least 85% of the pulverized material was less than 75 µm.

The 1,000 g pulverized sample (pulp) was tipped-out of the grinding bowl onto a mat and an approximately 130 g sub-sample collected, for fire assay, by scooping an x-pattern through the pulp pile (similar to cone and quartering). A 25 to 50 g sub-sample was collected in the same way for acid-digest ICP-AES. The remaining pulp material (pulp residue) was bagged and stored. Envelopes containing the acid-digest ICP-AES sub-sample were shipped to ALS Vancouver.

Whole core intervals from the 2018 Phase 1 UCZ PQ drilling were sent to BML Kamloops. The PQ samples were dried, coarse-crushed to 70% -20 mm using a Savona Equipment Gladiator jaw-crusher and then fine-crushed to 70% less than 2 mm using a Denver Cone crusher. The sample was then split using a Gilson Riffler SP1. A 1,000 g split of the fine-crushed material was pulverized to 90% less than 75 µm using a TM Engineering ring and puck mill.

The 1,000 g pulverized splits of the 2018 Phase 1 PQ core were sent from BML Kamloops to ALS Vancouver which is ISO 17025 accredited for sample preparation. Prior to undertaking any analytical work, ALS Vancouver completed wet-sieve testing of a proportion of the pulverized splits to check that at least 85% of the pulverized material was passing 75µm.

At both ALS Reno and BML Kamloops a 250 g fine-crush split was also produced and stored for mineralogical investigation.

At ALS Reno, a duplicate 1,000 g fine-crush split was created for selected samples (Laboratory Duplicate) and pulverized to 85% -75 µm. ALS Reno was also instructed to retain all analytical sample pulp residues such that a certain proportion could be reanalyzed at a different laboratory (Umpire Samples).

11.2 Security Measures

For all SRA drilling, drill core was collected from the drill rigs daily by SRA staff and delivered directly to a secure core-logging facility, attached to the SRA office in White Sulphur Springs, MT. After logging, the drill core was stored in a secure warehouse/core-cutting facility, also attached to the SRA office, until it was cut and sampled. Access to the logging facility and warehouse/core-cutting facility was restricted to SRA geological staff.

Once drill core samples were cut, they were placed in labeled calico bags. Multiple calico bags were placed in polypropylene sacks and sealed with cable ties. Polypropylene sacks were placed on wooden pallets and secured using plastic wrap. Samples in preparation were kept in the secure warehouse. Once a pallet of samples was ready for dispatch it was moved to the secure core logging facility.

All samples were shipped to ALS Reno or BML Kamloops by FedEx Corporation (FedEx). FedEx collected the samples from the SRA secure logging facility at which point they assumed responsibility for the chain of custody until delivery to the laboratory.

Upon delivery to the laboratory the samples were unpacked and checked by laboratory staff. Both ALS Reno and BML Kamloops have industry standard sample security protocols at all sample preparation and analytical facilities

11.3 Sample Analysis

A split of the analytical pulp was sent to ALS Global, 2155 Dollarton Highway, North Vancouver, British Columbia (ALS Vancouver). ALS Vancouver is ISO/IEC 17025 accredited for gold assay by lead collection fire assay, four acid sample digestion and multi-element analysis using an Inductively Coupled Plasma Atomic Emission Spectrometer (ICP-AES) for low-grade to high-grade ores.

A four-acid digestion was performed on a 0.4 g aliquot and the analysis of the digest was performed using an ICP-AES, calibrated for intermediate level analyses (low to medium grade ore). Table 11-1 lists analytes and detection ranges for the intermediate level ICP-AES analyses.

When the upper limits of detection for the intermediate level ICP-AES were exceeded for Cu, Ag, Pb or Zn, the digests from the over-limit samples were re-analyzed for the over-limit elements in an “ore grade level” ICP-AES circuit. Table 11-2 lists detection ranges for these elements in the high level ICP-AES.

Gold analyses of the analytical sample was either conducted at ALS Reno or ALS Vancouver using lead collection fire assay on a 30 g charge followed by acid digestion and Atomic Absorption spectroscopic analysis. This technique allowed for gold analyses up to 10 ppm with a lower detection limit of 5 ppb. On the occasions that gold concentrations exceeded 10 ppm repeat analyses were performed by fire assay with a gravimetric finish.

All umpire sample analyses were completed at American Assay Laboratories (AAL), 1506 Glendale Ave, Sparks, Nevada which is ISO/IEC 17025 accredited. Gold analyses of umpire samples were performed using a 30 g charge, lead collection fire-assay, acid digest and an ICP-AES finish. Detection range for gold analyses using this technique at AAL is 0.003 to 10 ppm. AAL use a five acid-digest of a 0.5 g aliquot to produce a digest for 35 element ICP-AES analysis. Table 11-3 outlines analytes and detection ranges for this technique.

Upper limits of detection for the ICP-AES were sometimes exceeded for Cu and Zn. Where this occurred the digests from the over-limit umpire samples were reanalyzed for the over-limit elements in an “ore grade level” ICP-AES circuit. Table 11-4 lists detection ranges for these elements in the high level ICP-AES.

Where concentration of silver in umpire samples exceeded the upper limit of detection in the ICP-AES these sample were reanalyzed for silver using fire assay with a gravimetric finish (lower limit of detection = 7 ppm, no upper limit of detection).

Table 11-1: Analytes and Detection Ranges for Intermediate Level ICP-AES Analyses; ALS Code: ME-ICP61a

Element	Lower Limit of Detection	Upper Limit of Detection	Element	Lower Limit of Detection	Upper Limit of Detection
Ag	1 ppm	200 ppm	Mo	10 ppm	5%
Al	0.05%	30%	Na	0.05%	30%
As	50 ppm	10%	Ni	10 ppm	10%
Ba	50 ppm	5%	P	50ppm	10%
Bi	20 ppm	5%	Pb	20 ppm	10%
Ca	0.05%	50%	S	0.05%	10%
Cd	10 ppm	1%	Sb	50 ppm	5%
Co	10 ppm	5%	Sc	10 ppm	5%
Cr	10 ppm	10%	Sr	10 ppm	10%
Cu	10 ppm	10%	Th	50 ppm	5%
Fe	0.05%	50%	Ti	0.05%	30%
Ga	50 ppm	5%	Tl	50 ppm	5%
K	0.1%	30%	U	50 ppm	5%
La	50 ppm	5%	V	10 ppm	10%
Mg	0.05%	50%	W	50 ppm	5%
Mn	10 ppm	5%	Zn	20 ppm	10%

Source: SRA, 2019

Table 11-2: Analytes and Detection Ranges for “Ore Grade Level” ICP-AES Analyses; ALS Code: OG62

Element	Lower Limit of Detection	Upper Limit of Detection	Element	Lower Limit of Detection (%)	Upper Limit of Detection (%)
Ag	1 ppm	1,500 ppm	Pb	0.001	20
Cu	0.001%	50%	Zn	0.00	30

Source: SRA, 2019

Table 11-3: Analytes and Detection Ranges for Umpire Sample ICP-AES Analyses; AAL Code: ICP-5AO35

Element	Lower Limit of Detection (ppm)	Upper Limit of Detection	Element	Lower Limit of Detection (ppm)	Upper Limit of Detection
Ag	0.5	100ppm	Mo	1	1%
Al	100	20%	Na	100	10%
As	2	1%	Ni	1	1%
Ba	5	0.5%	P	10	1%
Be	0.1	0.1%	Pb	3	1%
Bi	5	1%	S	100	10%
Ca	100	35%	Sb	2	1%
Cd	0.5	0.1%	Sc	1	1%
Co	1	1%	Sr	1	1%
Cr	1	1%	Th	20	1%
Cu	1	1%	Ti	10	10%
Fe	100	50%	Tl	10	0.1%
Ga	10	1%	U	10	1%
K	100	10%	V	1	1%
La	10	1%	W	2	1%
Mg	100	40%	Y	1	0.5%
			Zn	2	1%

Source: SRA, 2019

Table 11-4: Analytes and Detection Ranges for Overlimit ICP-AES Analyses At AAL

Element	Lower Limit of Detection	Upper Limit of Detection	Element	Lower Limit of Detection	Upper Limit of Detection
Cu	0.001%	50%	Zn	0.001%	30%

Source: SRA, 2019

11.4 Quality Assurance/Quality Control Procedures

QA/QC utilized at the Black Butte project have evolved subsequent to acquisition of the project by SRA in 2014. Changes have been made to the QA/QC protocols at the onset of each of the drill programs that inform the Mineral Resource estimate:

- 2014 Drill Program;
- 2018 Phase 1 Drill Program; and
- 2018/19 Phase 2 Drill Program.

The descriptions and documentation of QA/QC procedures that follow are subdivided by drill program.

11.4.1 Standards

2014 Drill Program

Three CRMs were purchased from WCM Minerals, 7729 Patterson Ave, British Columbia (Table 11-5) and inserted into the sample sequence at a minimum ratio of one CRM every 20 samples. The actual CRM insertion rate during the drill program was 7%.

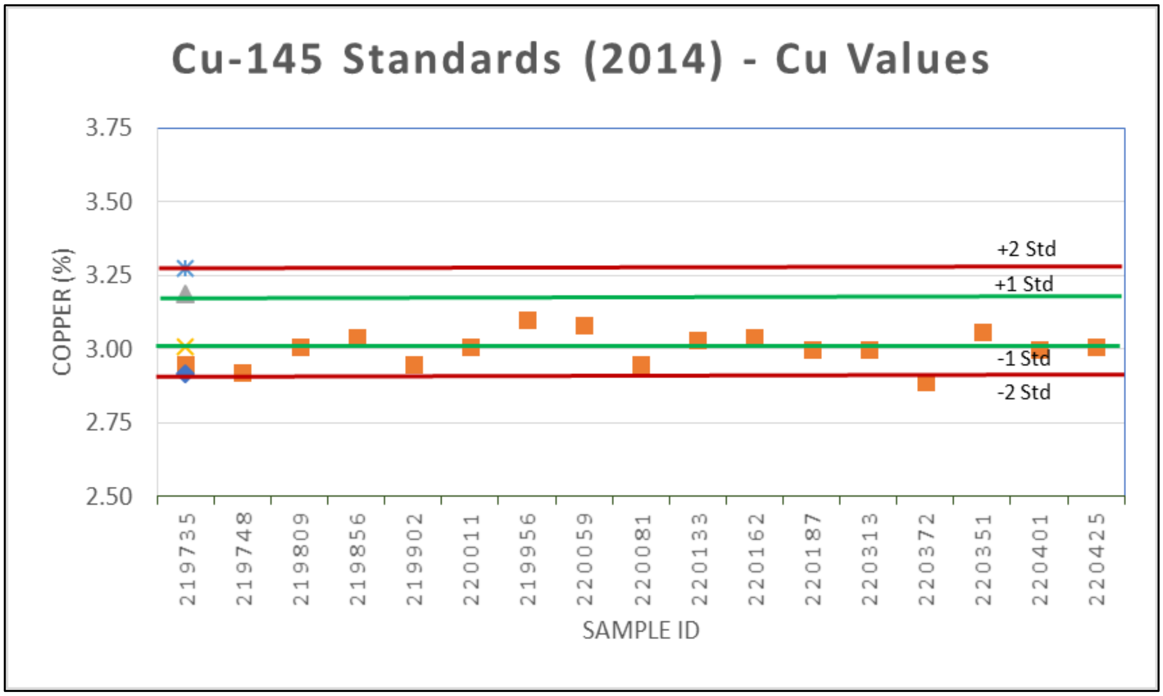
Table 11-5: Certified Values of the WCM Minerals CRM's Used During the 2014 Drill Campaign

	Copper (%)		Silver (g/t)	
WCM Minerals CRM ID	**Expected Value**	**Standard Deviation**	**Expected Value**	**Standard Deviation**
Cu 145	3.100	0.090	93.0	3.366
Ni 116	0.780	0.002	N/A	N/A
Pb 129	0.280	0.012	23.0	1.696

Source: SRA, 2019

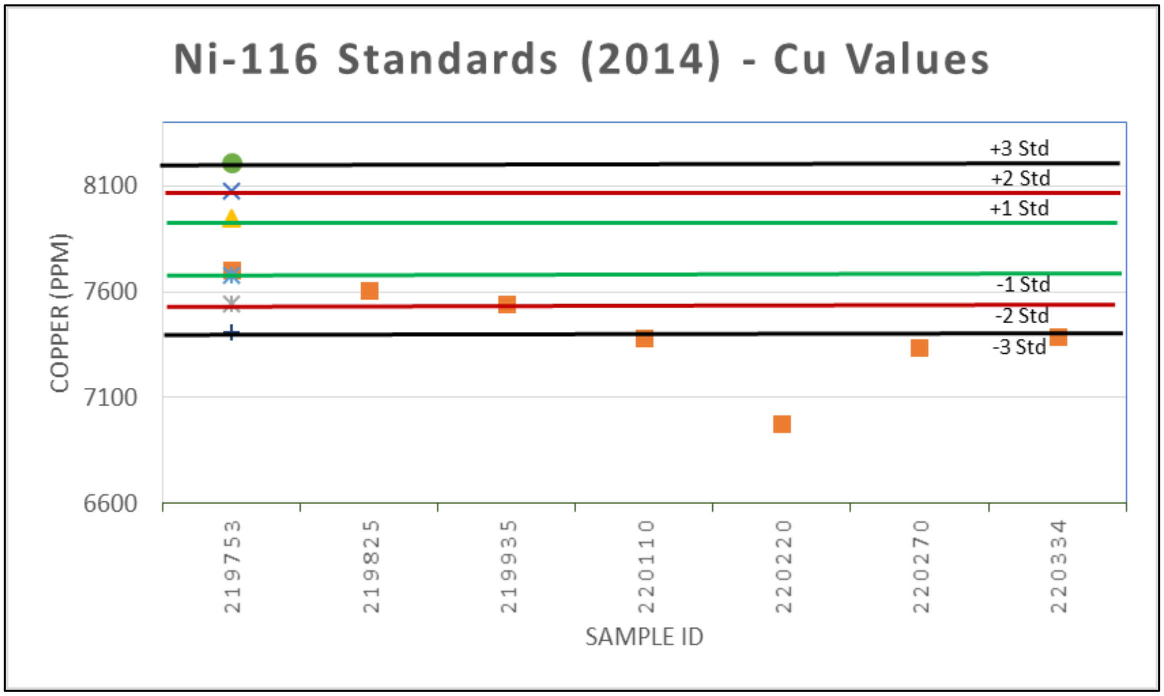
Figure 11-1 to Figure 11-3 show the CRM performance for copper during the 2014 drill program. With the exception of Ni-116, all CRM's returned analyses within acceptable limits (one analysis of Cu-145 assayed slightly outside two standard deviations). NI-116 showed a negative bias with three analyses plotting outside of the three standard deviation envelope. NI-116 is a CRM derived from pyrrhotite – pentlandite, nickel sulphide ore. It was concluded that the negative bias for Ni-116 is related to matrix and analytical technique rather than laboratory inaccuracy.

Figure 11-4 and Figure 11-5 show the performance of the two CRM's that were certified for silver. One analysis exceeding the two standard deviation limit was returned for Cu-145. All other CRM silver performance was acceptable although a positive bias was noted for Cu-145.



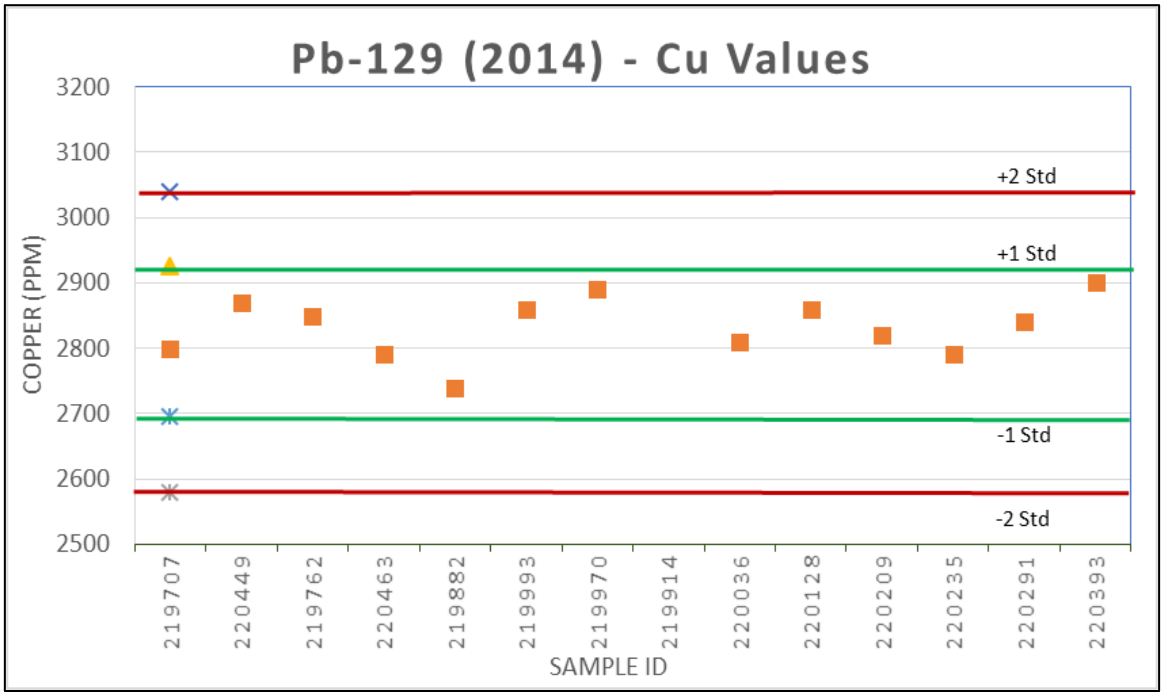
Source: SRA, 2019

Figure 11-1: Cu-145 Copper Values from the 2014 Drill Program



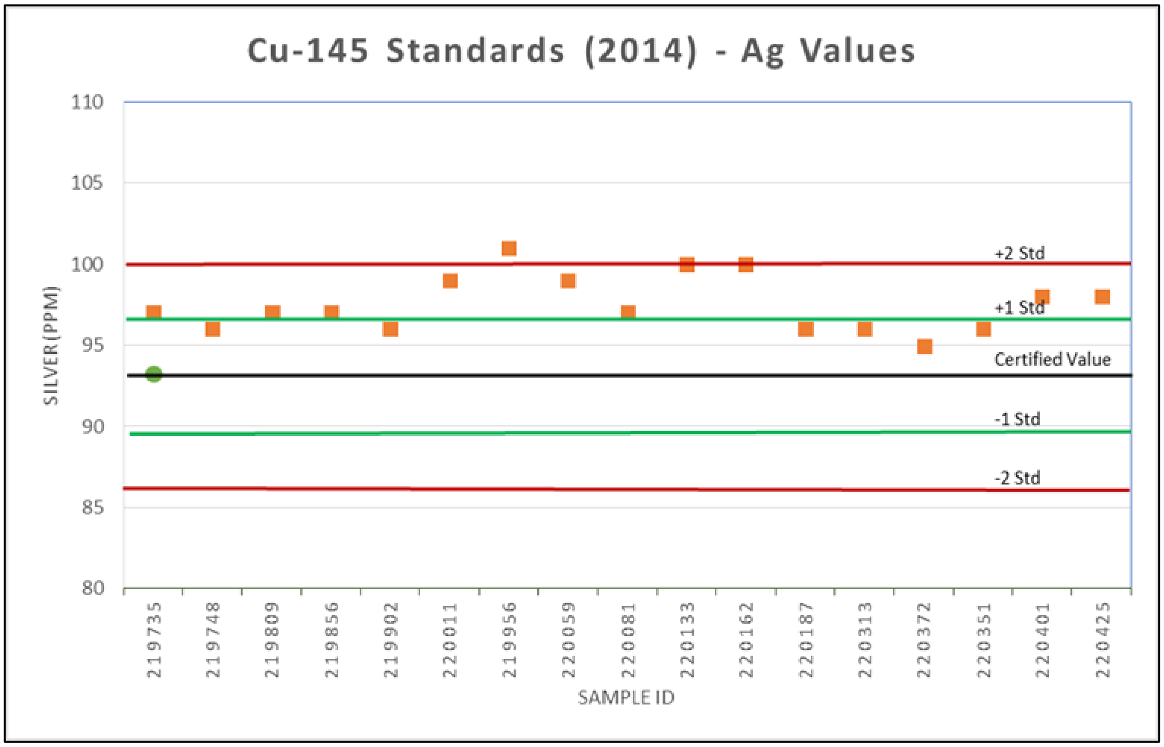
Source: SRA, 2019

Figure 11-2: Ni-116 Copper Values from the 2014 Drill Program



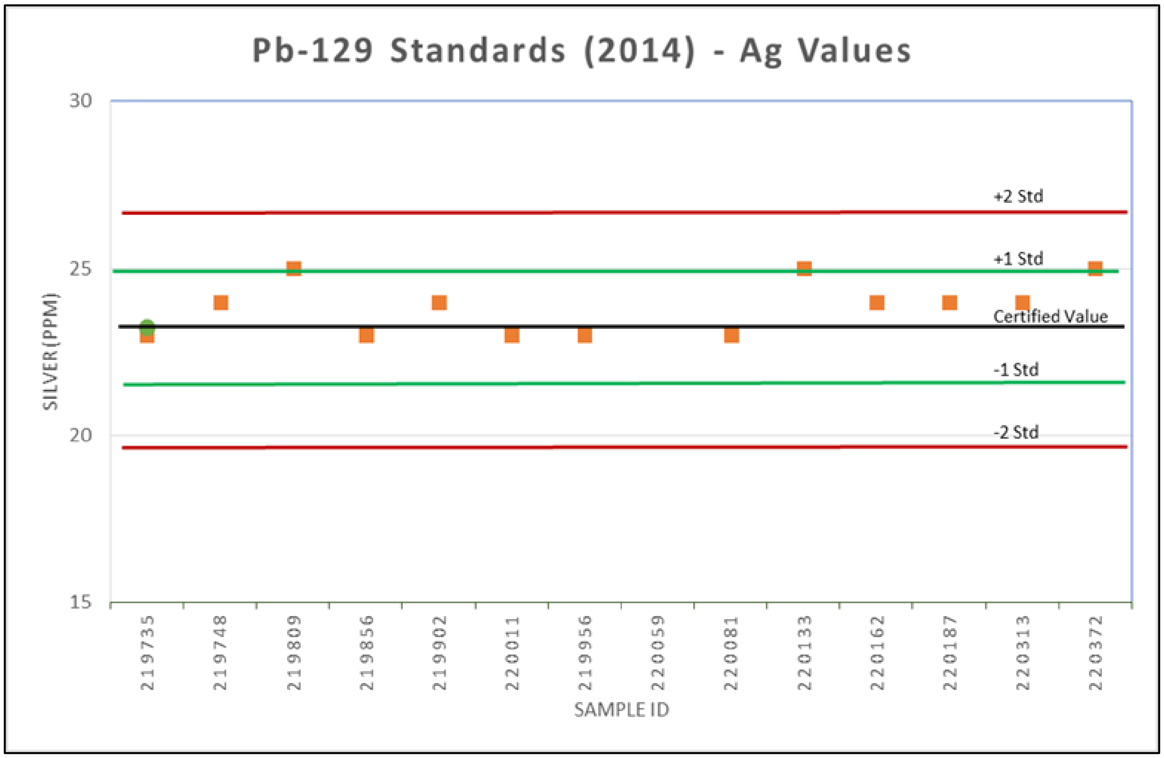
Source: SRA, 2019

Figure 11-3: Pb-129 Copper Values from 2014 Drill Program



Source: SRA, 2019

Figure 11-4: Cu-145 Silver Values from 2014 Drill Program



Source: SRA, 2019

Figure 11-5: Pb-145 Silver Values from 2014 Drill Program

<u>2018 Phase 1 Drill Program</u>

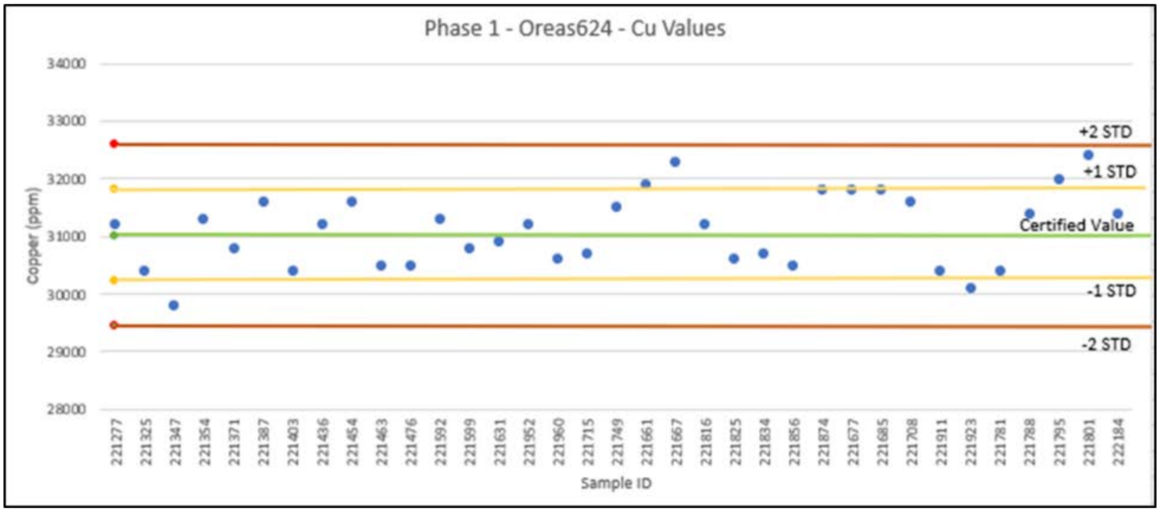
Four CRM’s were purchased from Ore Research and Exploration Pty Ltd (OREAS), 37A Hosie Street, Bayswater North, Victoria, Australia. Table 11-6 lists the certified copper and silver values for these CRM’s.

Table 11-6: Certified Values for Copper and Silver for OREAS CRM’s Used During the 2018 Phase 1 Drill-Program

	Copper (%)		Silver (g/t)	
Ore Research CRM ID	**Expected Value**	**Standard Deviation**	**Expected Value**	**Standard Deviation**
OREAS-624	3.101	0.079	45.30	1.26
OREAS-522	0.916	0.026	1.31	0.11
OREAS-134b	0.135	0.005	209	9
OREAS-136	0.031	0.001	151	5

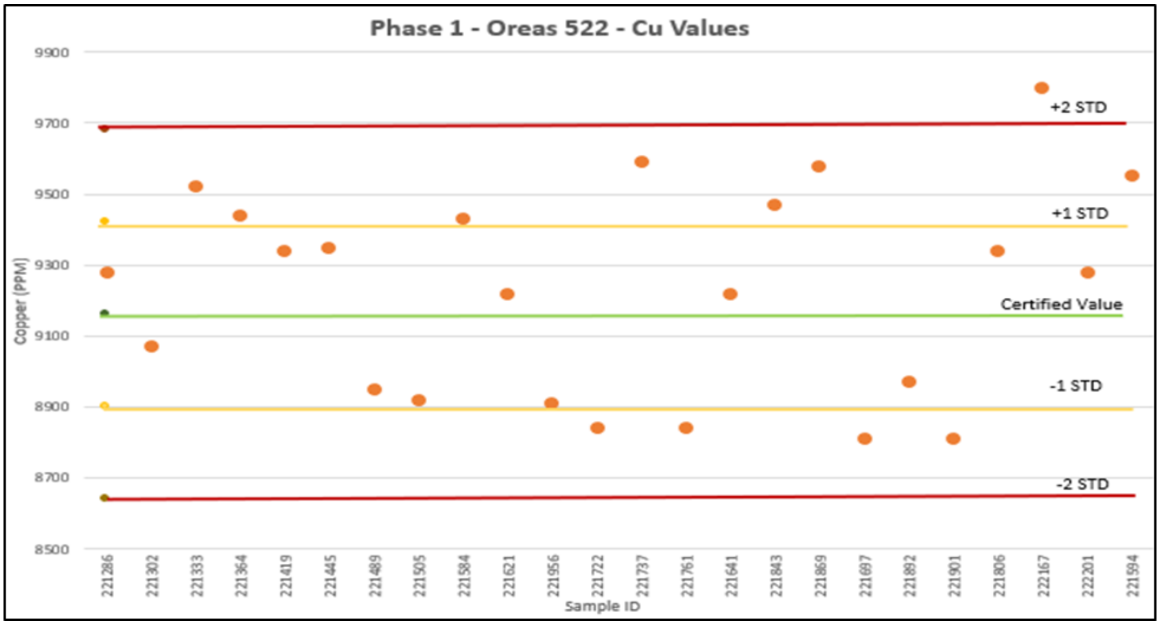
Source: SRA, 2019

CRM’s were inserted into the sample sequence at a minimum rate of two CRM’s for every 20 samples. For the 2018 Phase 1 drill program actual CRM insertion rate was 14%. Figure 11-6 to Figure 11-9 show CRM copper performance during the 2018 drill program. One CRM (OREAS-522) exceeded the two standard deviation tolerance on one occasion, prompting reanalysis of the portion of the batch affected. The re-analyzed samples passed all QA/QC.



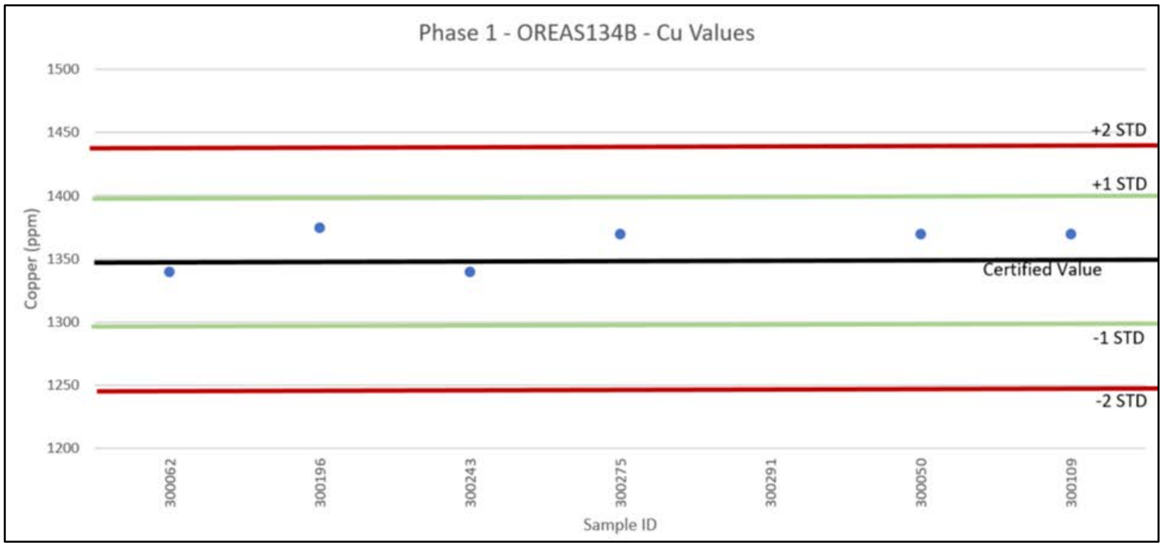
Source: SRA, 2019

Figure 11-5: OREAS-624 Copper Values from 2018 Phase 1 Drill Program



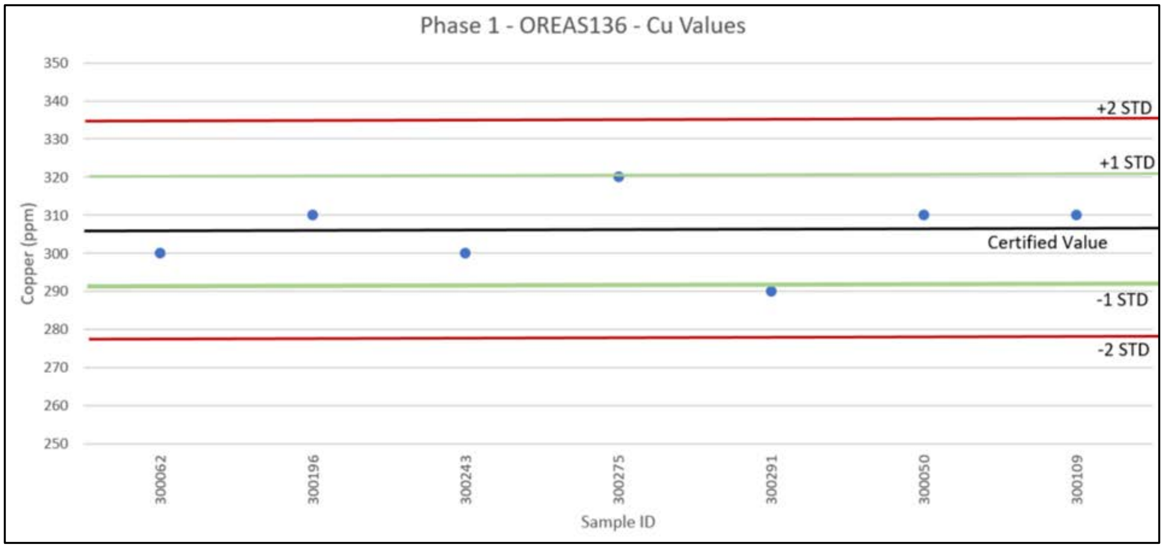
Source: SRA, 2019

Figure 11-6: OREAS-624 Copper Values from the 2018 Phase 1 Drill Program



Source: SRA, 2019

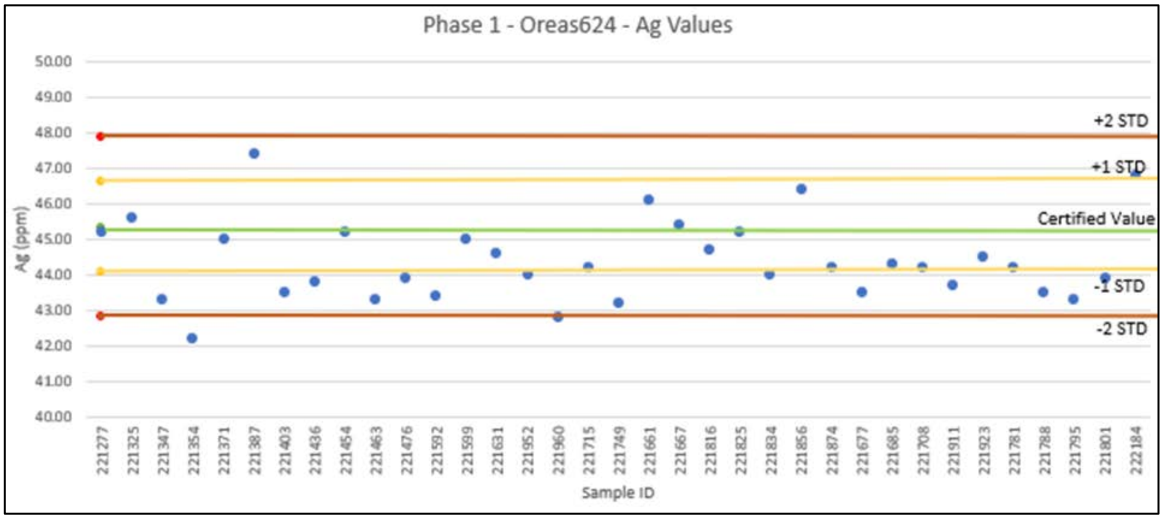
Figure 11-7: OREAS-134b Copper Values from The 2018 Phase 1 Drill Program



Source: SRA, 2019

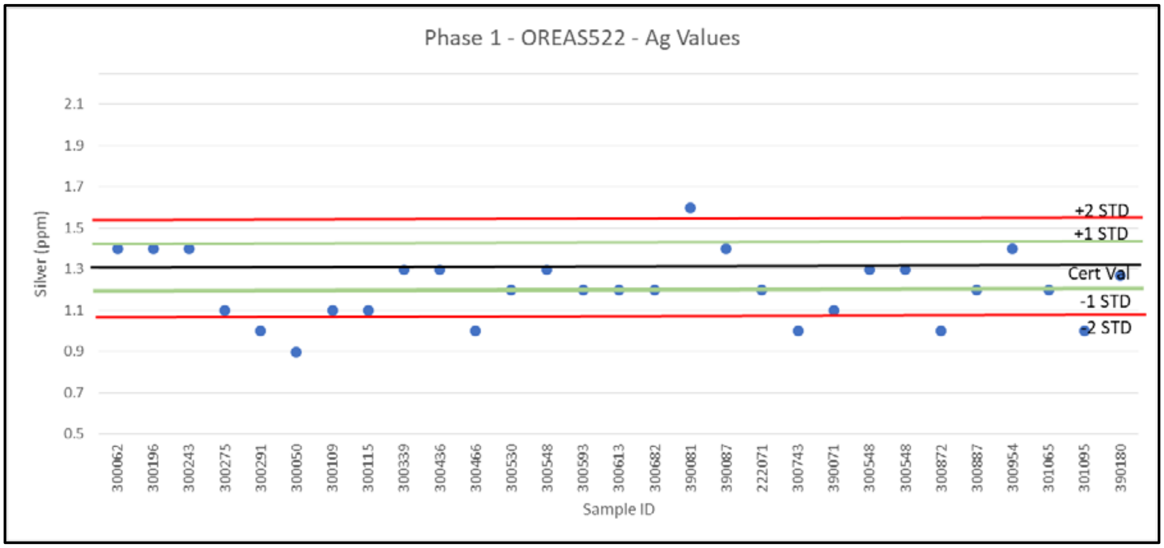
Figure 11-8: OREAS-136 Copper Values from the 2018 Phase 1 Drill Program

Figure 11-9 to Figure 11-12 show CRM silver performance during the 2018 Phase 1 drill campaign. Silver analyses were generally within or close to two standard deviations of the certified value. One OREAS-134B CRM returned an analysis that significantly exceeded the two standard deviation thresholds.



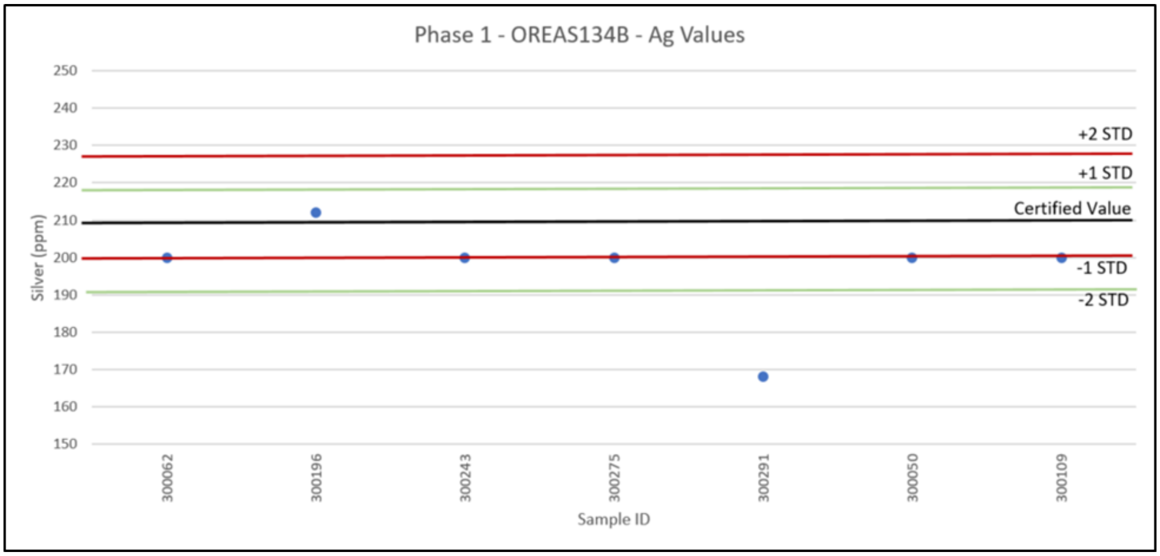
Source: SRA, 2019

Figure 11-9: OREAS-624 Silver Values from the 2018 Phase 1 Drill Program



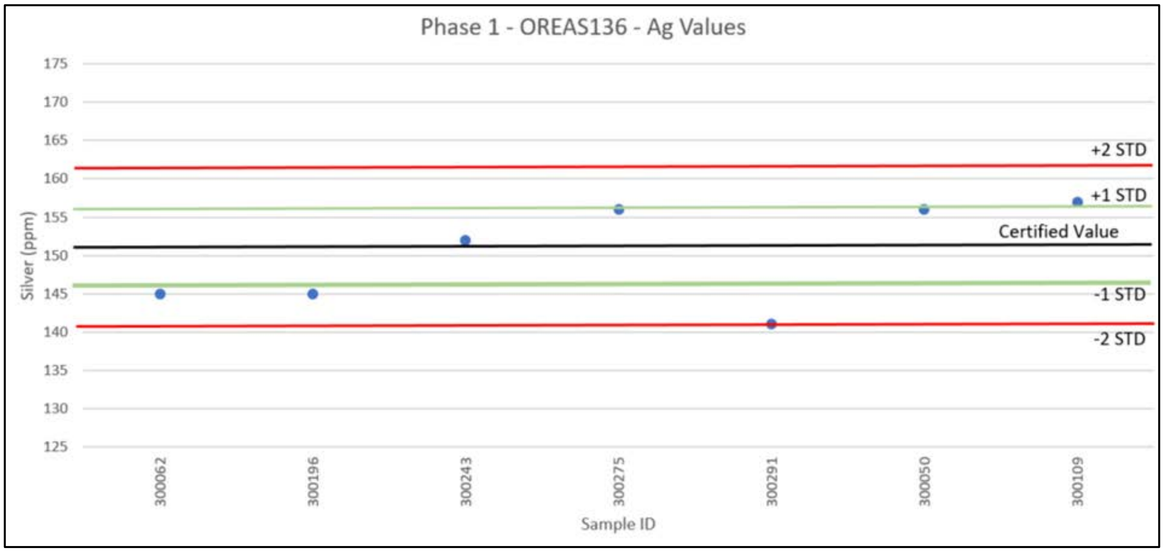
Source: SRA, 2019

Figure 11-10: OREAS-522 Silver Values from the 2018 Phase 1 Drill Program



Source: SRA, 2019

Figure 11-11: OREAS-134B Silver Values from the 2018 Phase 1 Drill Program



Source: SRA, 2019

Figure 11-12: OREAS-136 Silver Values from the 2018 Phase 1 Drill Program

2018/19 Phase 2 Drill Program

The same CRM’s utilized for the 2018 Phase 1 drill program were also used during the 2018/19 Phase 2 program although an additional CRM (OREAS-935) was added to the suite given the high Cu grades expected from the LCZ (Table 11-7).

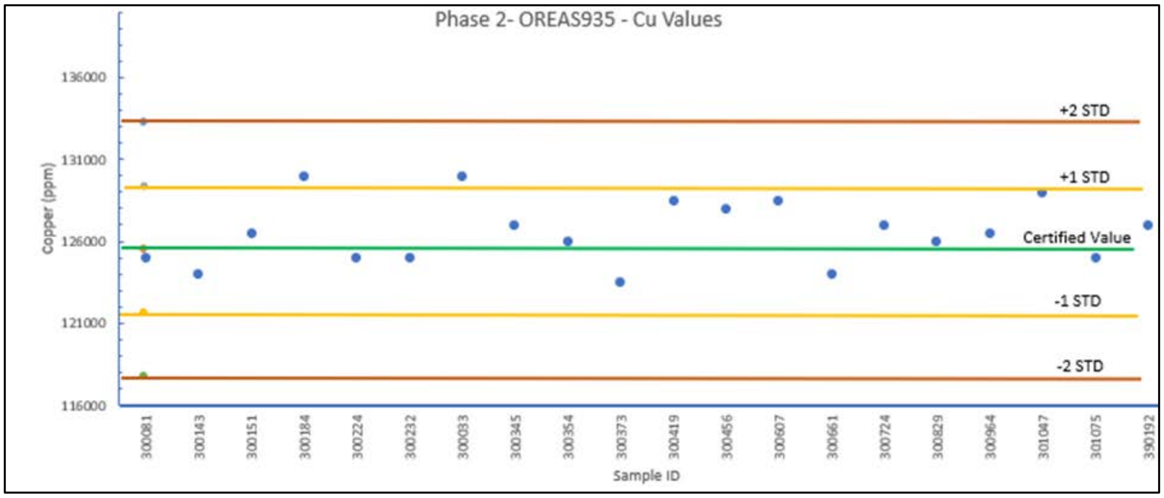
Table 11-7: Certified Values for Copper and Silver for OREAS CRM's Used During the 2018/19 Phase 2 Drill-Program

	Copper (%)		Silver (g/t)	
Ore Research CRM ID	**Expected Value**	**Standard Deviation**	**Expected Value**	**Standard Deviation**
OREAS-935	12.550	0.388	43.87	3.84
OREAS-624	3.101	0.079	45.30	1.26
OREAS-522	0.916	0.026	1.31	0.11
OREAS-134b	0.135	0.005	209	9
OREAS-136	0.031	0.001	151	5

Source: SRA, 2019

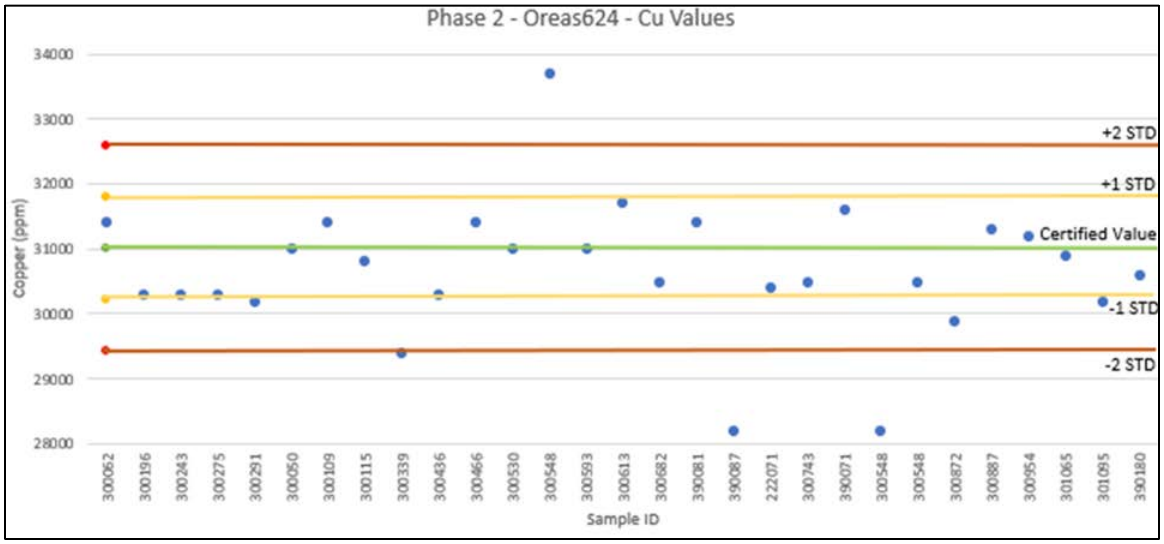
CRM's were inserted into the sample sequence at a minimum insertion ratio of one CRM for every 20 samples. Actual CRM insertion rate for the 2018/19 Phase 2 drill program was 7%.

Figure 11-13 to Figure 11-17 show CRM copper performance for the 2018/19 Phase 2 drill program. Three OREAS-624 CRM analyses exceeded two standard deviations triggering re-analyses of the sample sequence affected. All CRM's in the re-analyzed sequences passed QA/QC.



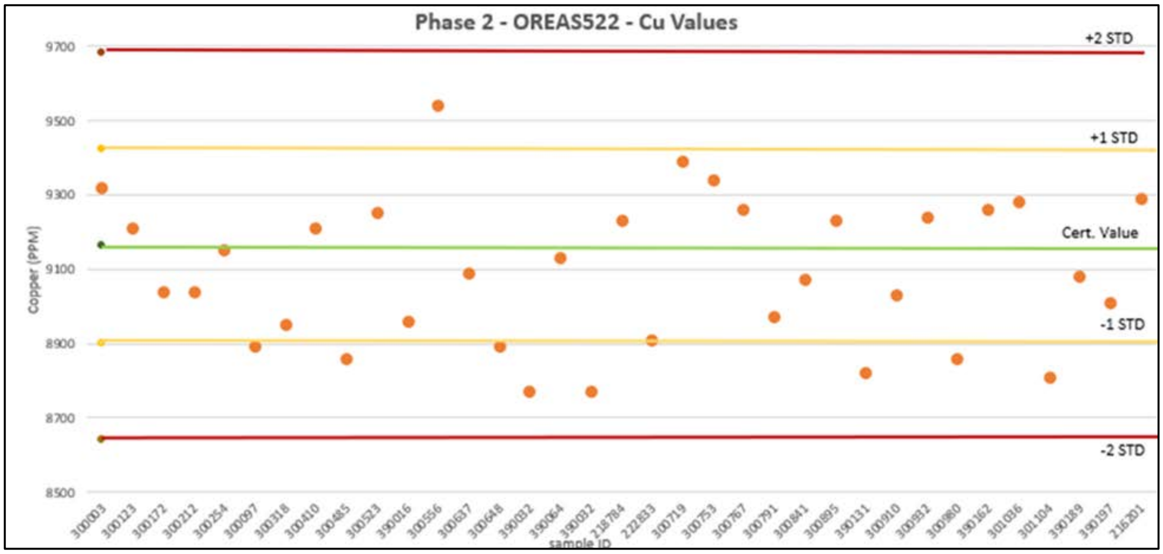
Source: SRA, 2019

Figure 11-13: OREAS-935 Copper Values from 2018/19 Phase 2 Drill Program



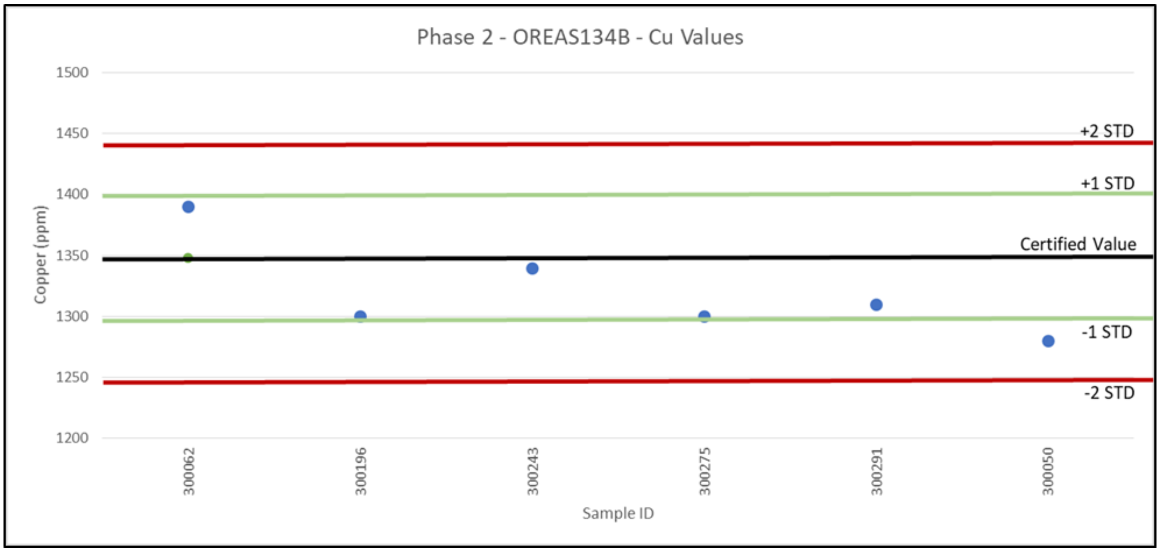
Source: SRA, 2019

Figure 11-14: OREAS-624 Copper Values From 2018/19 Phase 2 Drill Program



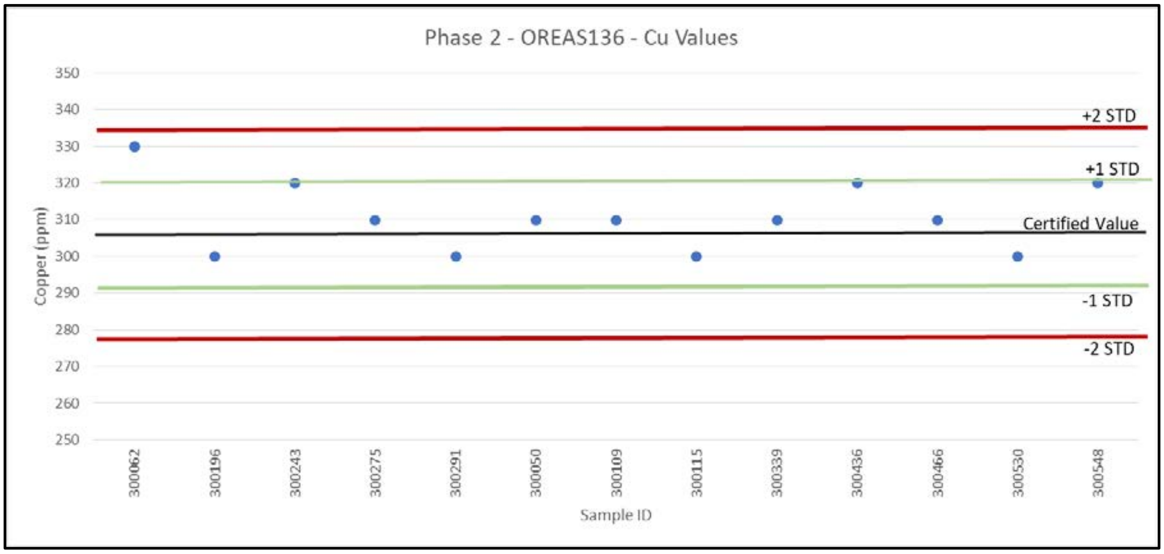
Source: SRA, 2019

Figure 11-15: OREAS-522 Copper Values from 2018/19 Phase 2 Drill Program



Source: SRA, 2019

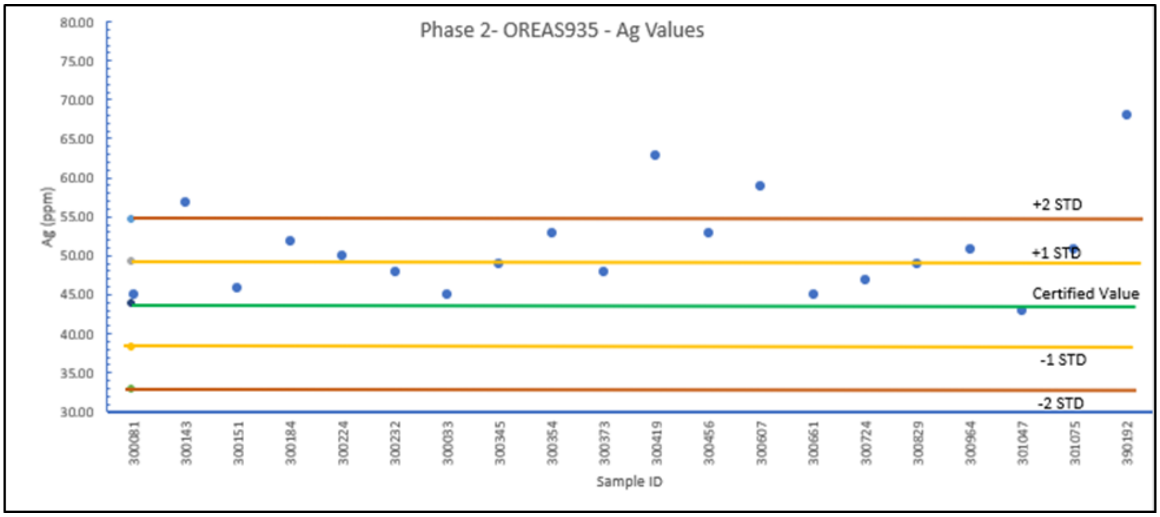
Figure 11-16: OREAS-134B Copper Values from 2018/19 Phase 2 Drill Program



Source: SRA, 2019

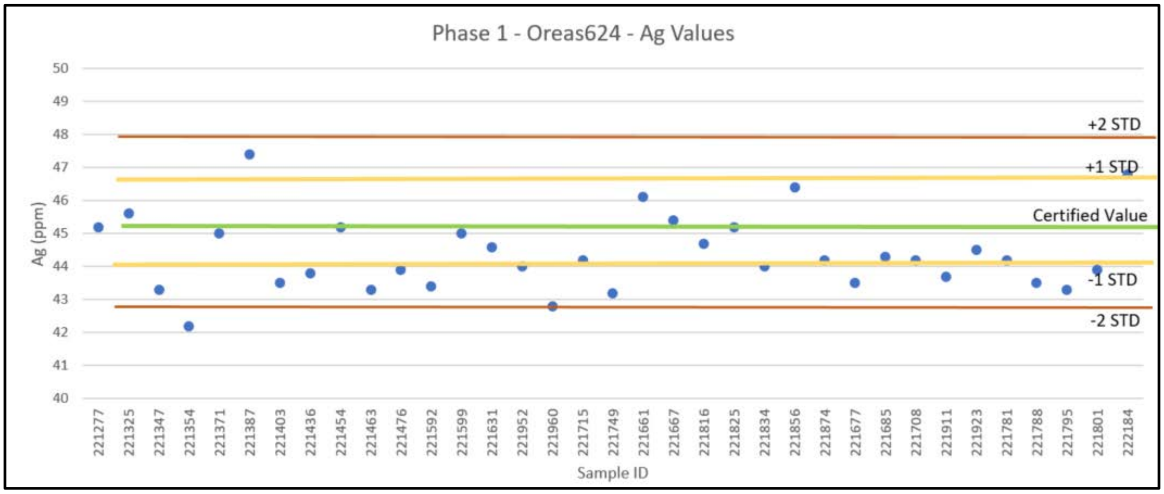
Figure 11-17: OREAS-136 Copper Values from 2018/19 Phase 2 Drill Program

Figure 11-18 to Figure 11-22 show CRM silver performance for the 2018/19 Phase 2 drill program. Analyses outside of the two standard deviation thresholds were returned for eight CRM's (OREAS -935 and OREAS-624, OREAS-522).



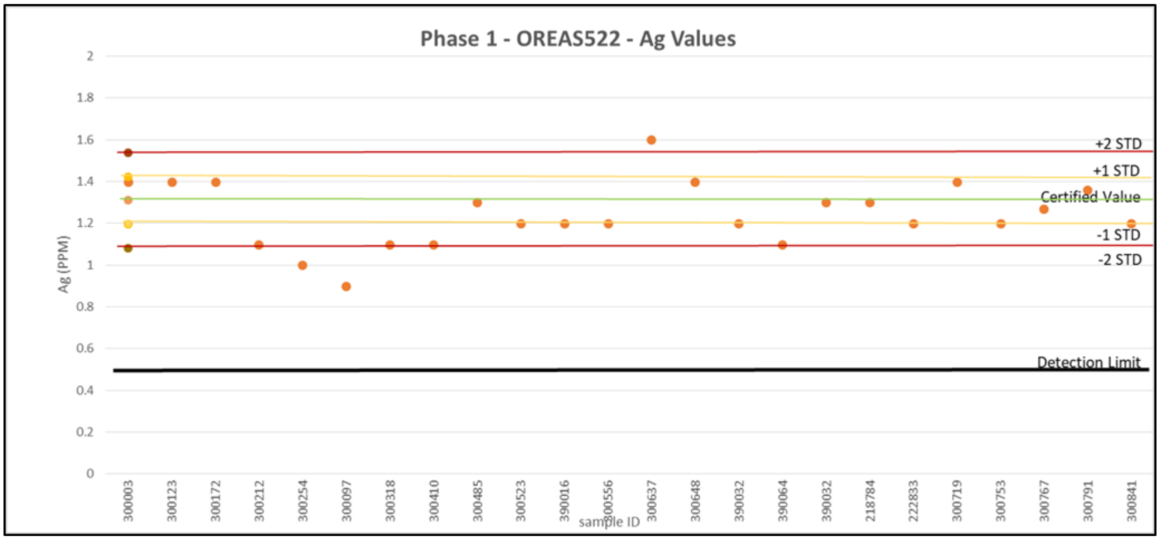
Source: SRA, 2019

Figure 11-18: OREAS-935 Silver Values from 2018/19 Phase 2 Drill Program



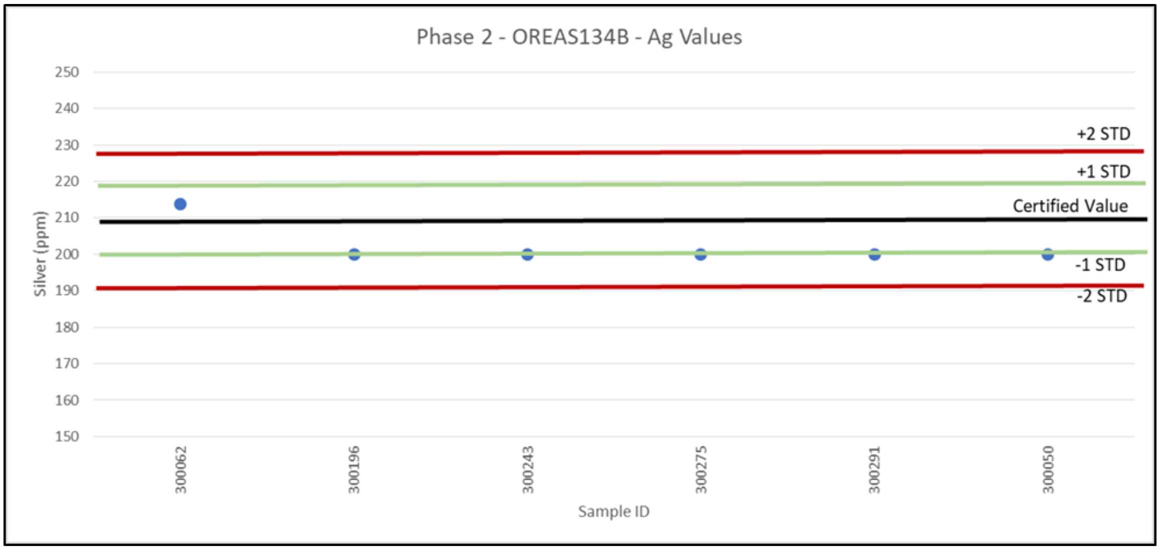
Source: SRA, 2019

Figure 11-19: OREAS-624 Silver Values from 2018/19 Phase 2 Drill Program



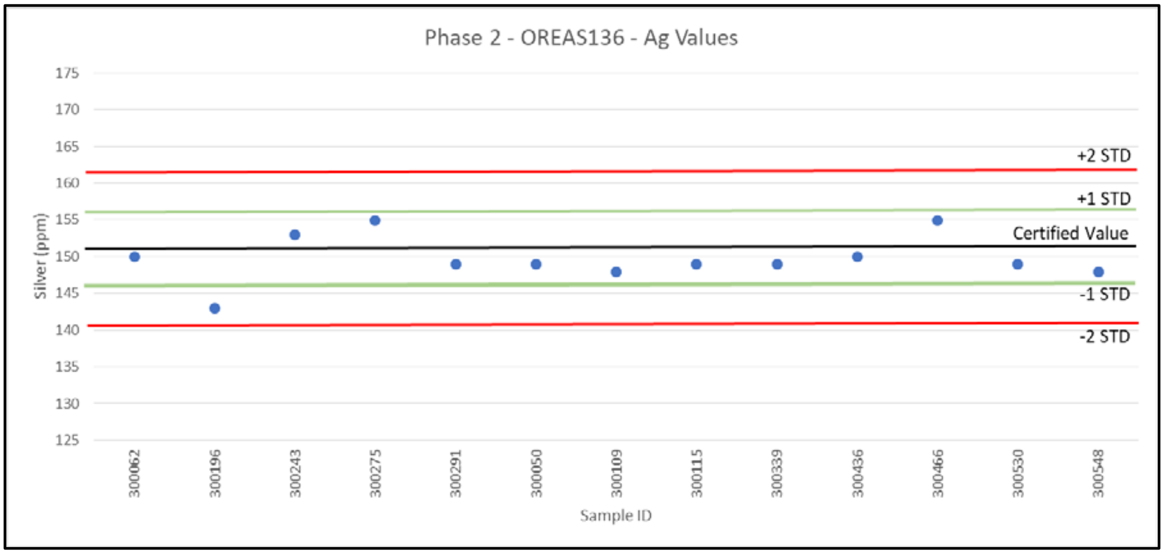
Source: SRA, 2019

Figure 11-20: OREAS-522 Silver Values from 2018/19 Phase 2 Drill Program



Source: SRA, 2019

Figure 11-21: OREAS-134B Silver Values from 2018/19 Phase 2 Drill Program



Source: SRA, 2019

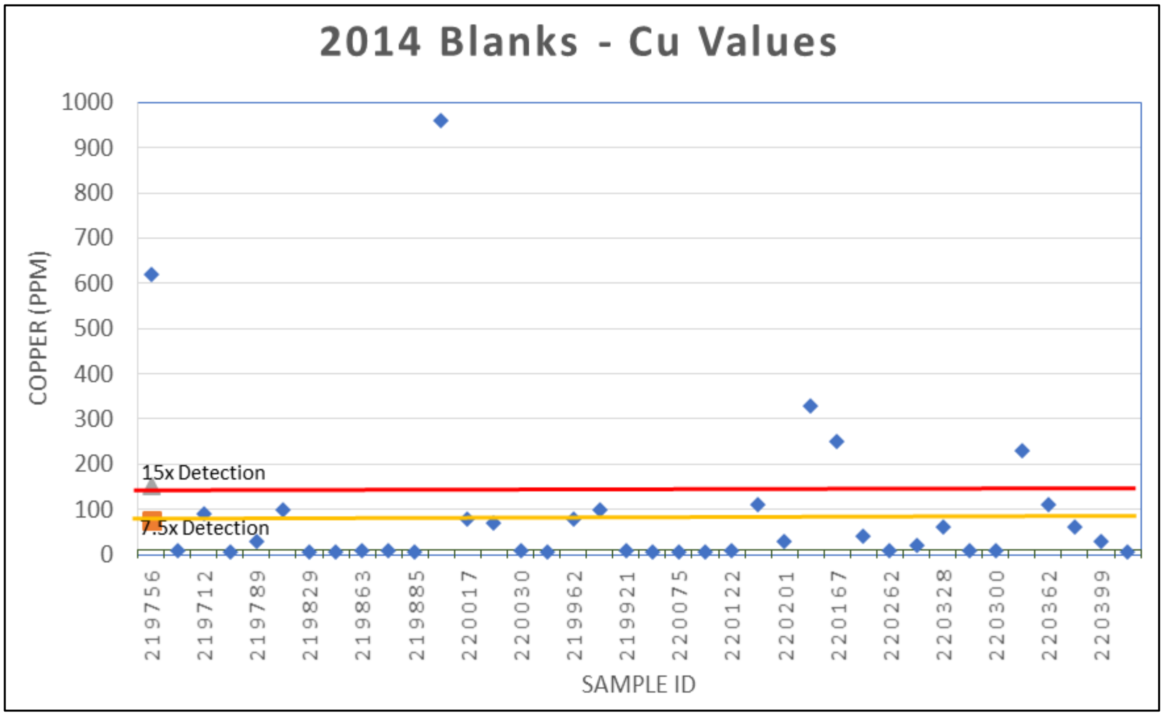
Figure 11-22: OREAS-136 Silver Values from 2018/19 Phase 2 Drill Program

11.4.2 Blanks

2014 Drill Program

Landscaping marble chips that had been used as coarse-blanks in the Tintina 2012 drill-program were also used in the SRA 2014 drill program. Coarse-blanks were inserted at a minimum ratio of one blank every 20 samples. Actual blank insertion rate for the 2014 drill program was 6%.

As indicated on Figure 11-23, these blanks returned poor performance during 2014, often exceeding copper detection limits by >15 times detection. Similar poor coarse-blank performance was reported by Winckers *et al* (2013) from the same landscaping marble chip used as coarse-blanks in the 2012 drill program. It is uncertain whether low level Cu analyses returned from the marble are related to contamination in the laboratory crushing and pulverizing circuit or whether some of the marble contained low levels of copper. The use of the landscape marble was discontinued after 2014.



Source: SRA, 2019

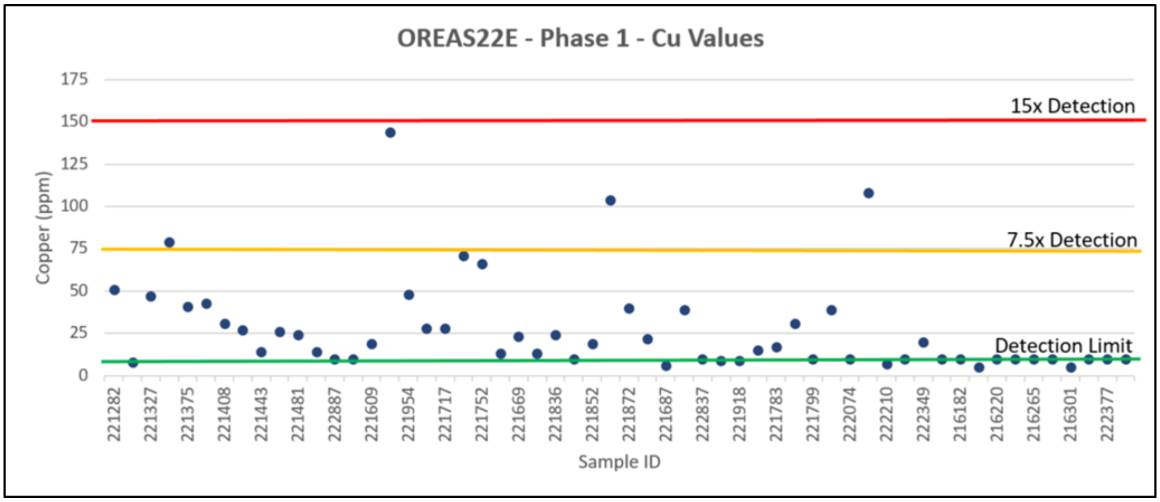
Figure 11-23: Copper Analyses of Landscaping Marble Chips Used as Coarse Blanks During The 2014 Drill Program

2018 Phase 1 Drill Program

With the exception of two LCZ drillholes, all 2018 Phase 1 drill program samples were whole PQ core, designated for metallurgical testing, that were prepared at BML Kamloops. No coarse-blank material was inserted into the sample sequence during crushing and milling. Fine-crushed and pulverized 1,000 g splits were dispatched to ALS Vancouver after BML had inserted CRM's and pulp-blanks into the sample sequence, at positions specified by SRA geologists.

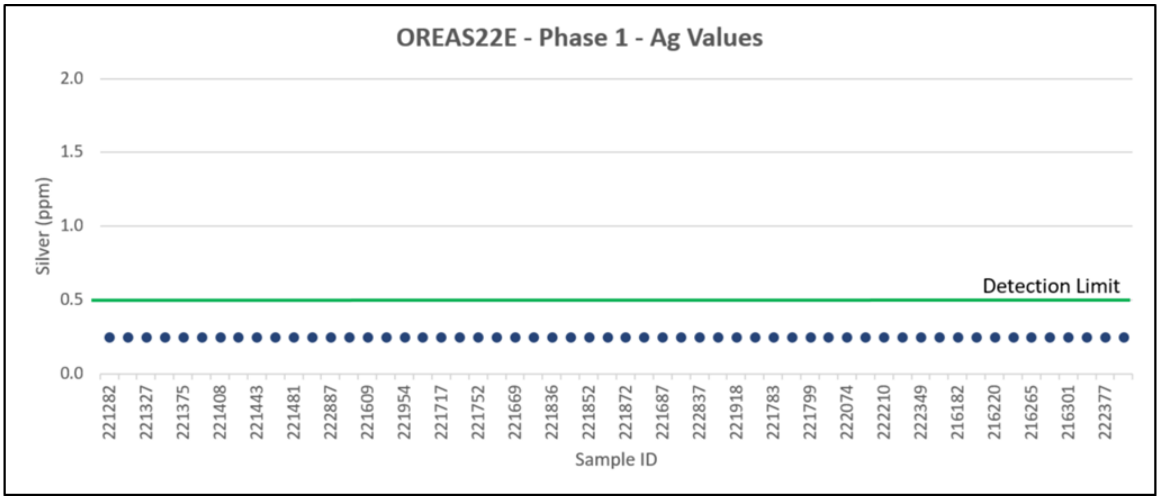
The pulp-blank utilized by SRA was OREAS-22e purchased from Ore Research and Exploration Pty Ltd (OREAS), 37A Hosie Street, Bayswater North, Victoria, Australia. OREAS-22e has a certified value of 7.97 ppm for Cu (standard deviation = 0.746 ppm) and <0.05 ppm for Ag (standard deviation = 0.0495 ppm). All OREAS 22e Cu values plotted below the 15 times detection threshold and the majority below the 7.5 times detection threshold (Figure 11-24).

Silver analyses for OREAS-22e during the 2018 Phase 1 drill program were all below the detection limit for the analytical technique (Figure 11-25).



Source: SRA, 2019
Analyses less than the detection limit have been assigned a value of half the detection limit

Figure 11-24: Copper Analyses of Pulp-Blank OREAS22E During the 2018 Phase 1 Drill Program



Source: SRA, 2019
Analyses less than the detection limit have been assigned a value of half the detection limit

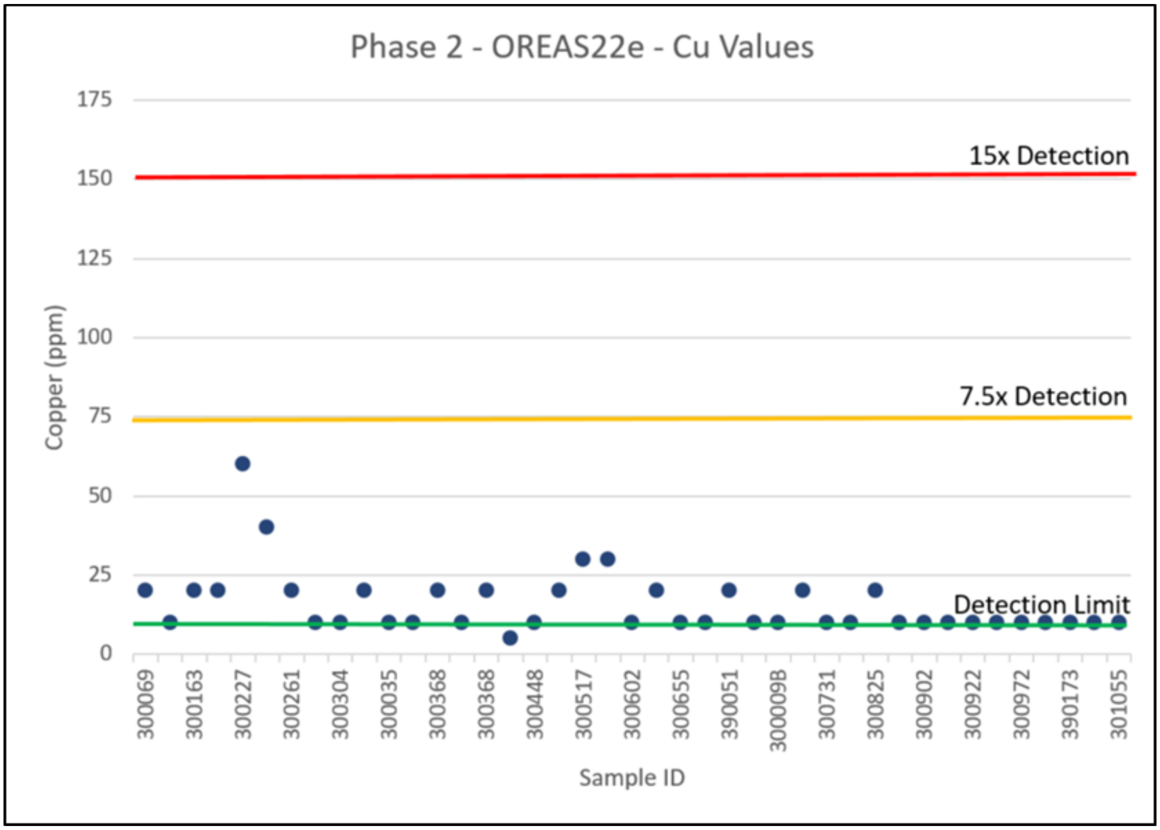
Figure 11-25: Silver Analyses of Pulp-Blank OREAS22E During the 2018 Phase 1 Drill Program

2018/19 Phase 2 Drill Program

During the 2018/19 Phase 2 Drill program, both pulp-blanks (OREAS-22e) and coarse-blanks were inserted in the sample sequence by SRA geologists. Coarse-blanks (coarse silica blank material) were obtained in 0.5 kg packets from Analytical Solutions Ltd. of 878213 5th, Line East, Mulmur, Ontario, Canada. The recommended upper Cu threshold for the coarse blanks is 25 ppm and the upper threshold for Ag is 1 ppm. Blanks were inserted at a minimum ratio of one blank every 20 samples and alternated between a coarse-blank and a pulp-blank. Actual insertion rate of blanks for the 2018/19 drill program was 7%.

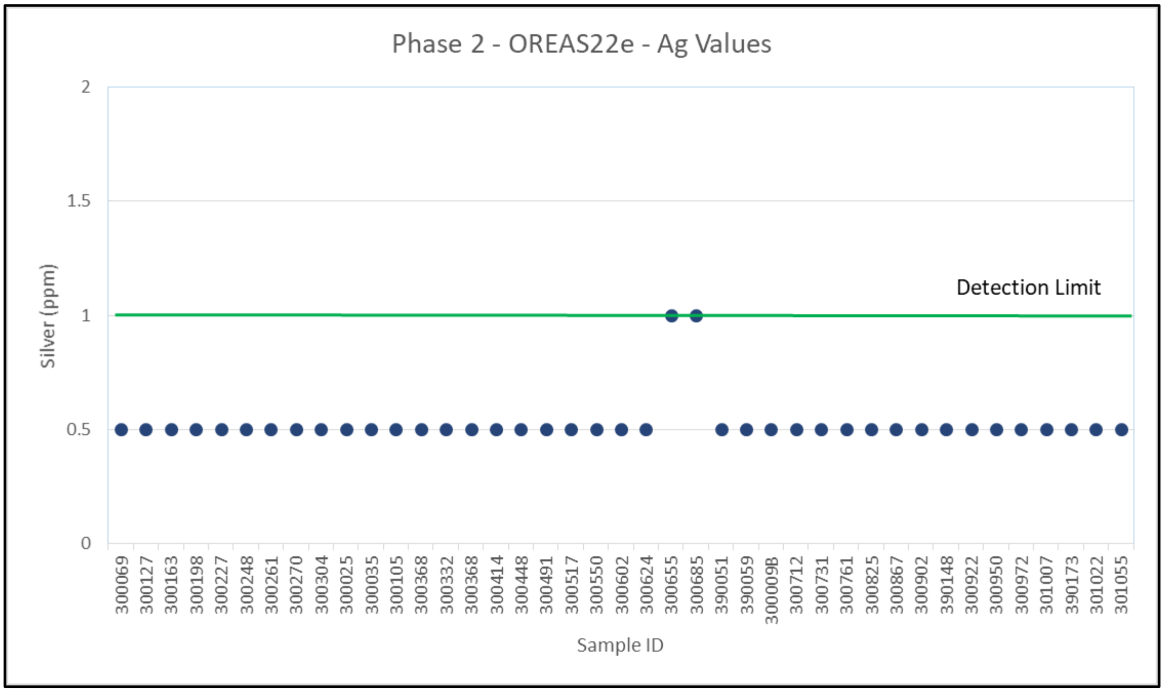
All pulp-blank Cu analyses plotted below the 7.5 times detection threshold (Figure 11-26). All pulp blank Ag analyses reported at, or below the detection limit (Figure 11-27).

Figure 11-28 shows coarse blank copper performance for the coarse silica blank. Analyses reported were generally below 7.5 times detection limit with two analyses exceeding this limit and two analyses exceeding the 15 times detection limit. The coarse blank analyses exceeding the 15 times detection limit were both from the same batch and indicated minor contamination during sample preparation. The two other coarse blanks from this batch both returned values <7.5 times detection. Silver analyses for coarse silica blank all plotted at or below the detection limit (Figure 11-29).



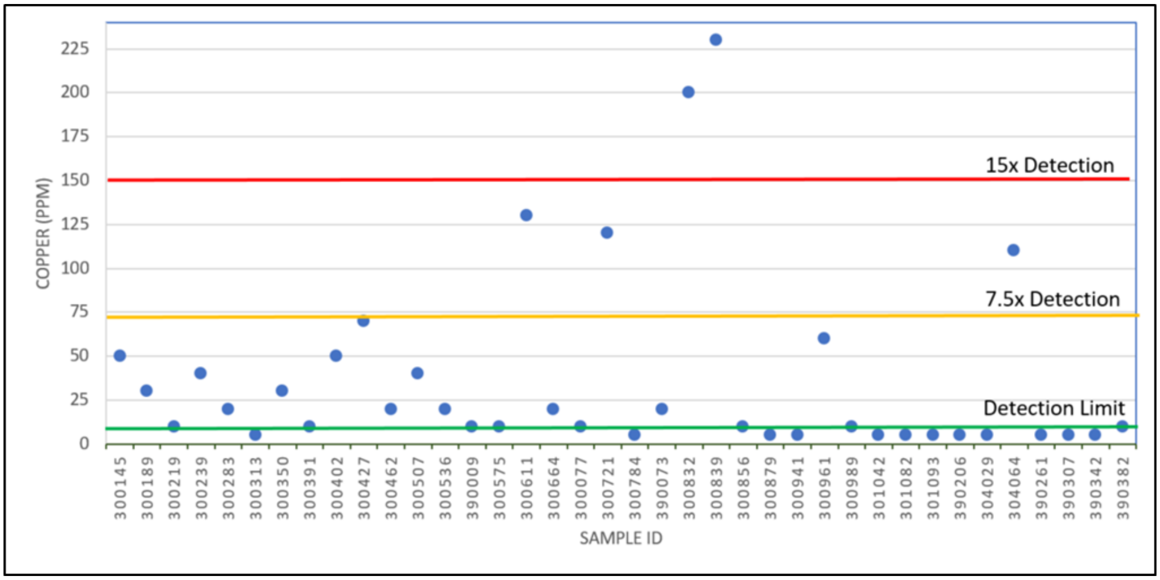
Source: SRA, 2019
Analyses less than the detection limit have been assigned a value of half the detection limit.

Figure 11-26: Copper Results for Pulp Blank OREAS-22e During the 2018/19 Phase 2 Drill Program



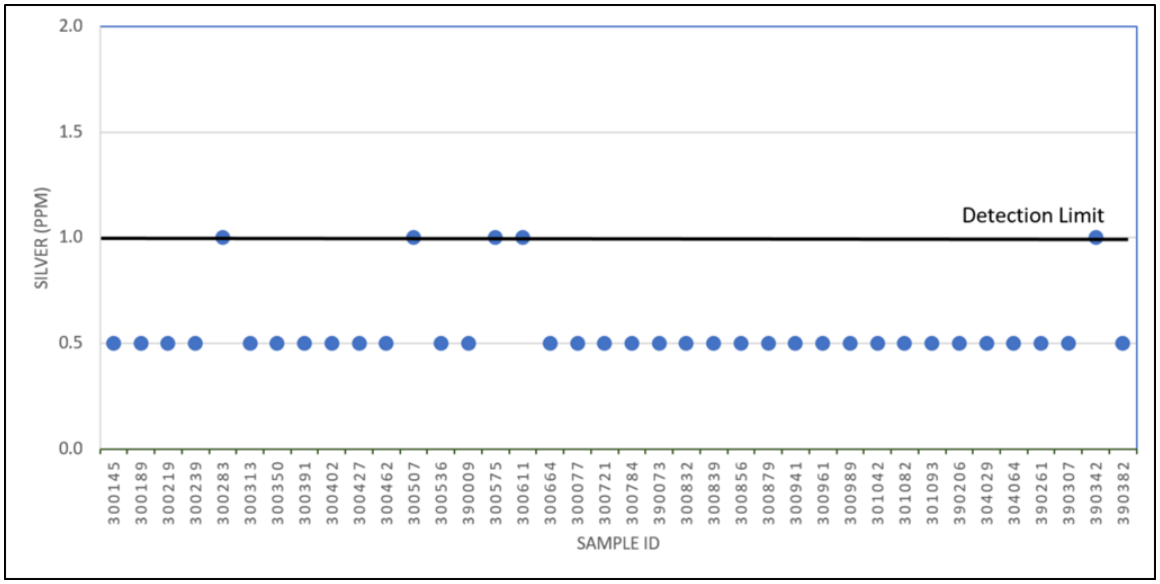
Source: SRA, 2019
Analyses less than the detection limit have been assigned a value of half the detection limit.

Figure 11-27: Silver Results for Pulp Blank OREAS-22e During the 2018/19 Phase 2 Drill Program.



Source: SRA, 2019
Analyses less than the detection limit have been assigned a value of half the detection limit

Figure 11-28: Copper Results for Analytical Solutions Coarse Silica Blank for the 2018/19 Phase 2 Drill Program



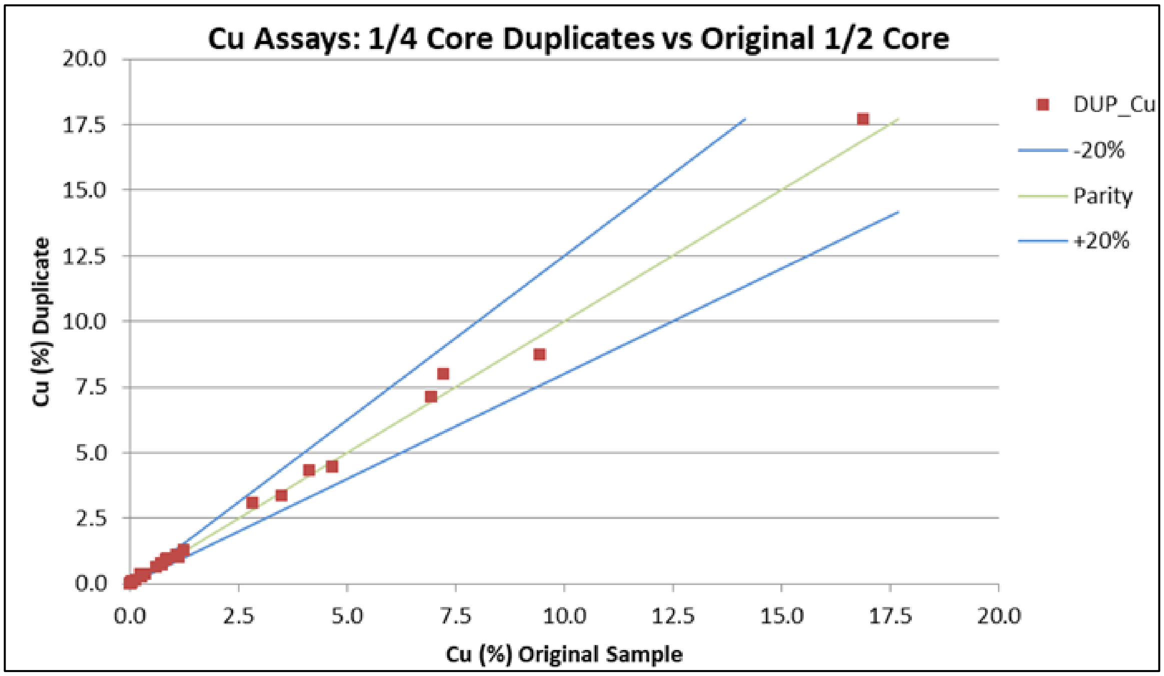
Source: SRA, 2019
Analyses less than the detection limit have been assigned a value of half the detection limit

Figure 11-29: Silver Results for Analytical Solutions Coarse Silica Blank for the 2018/19 Phase 2 Drill Program

11.4.3 Duplicates

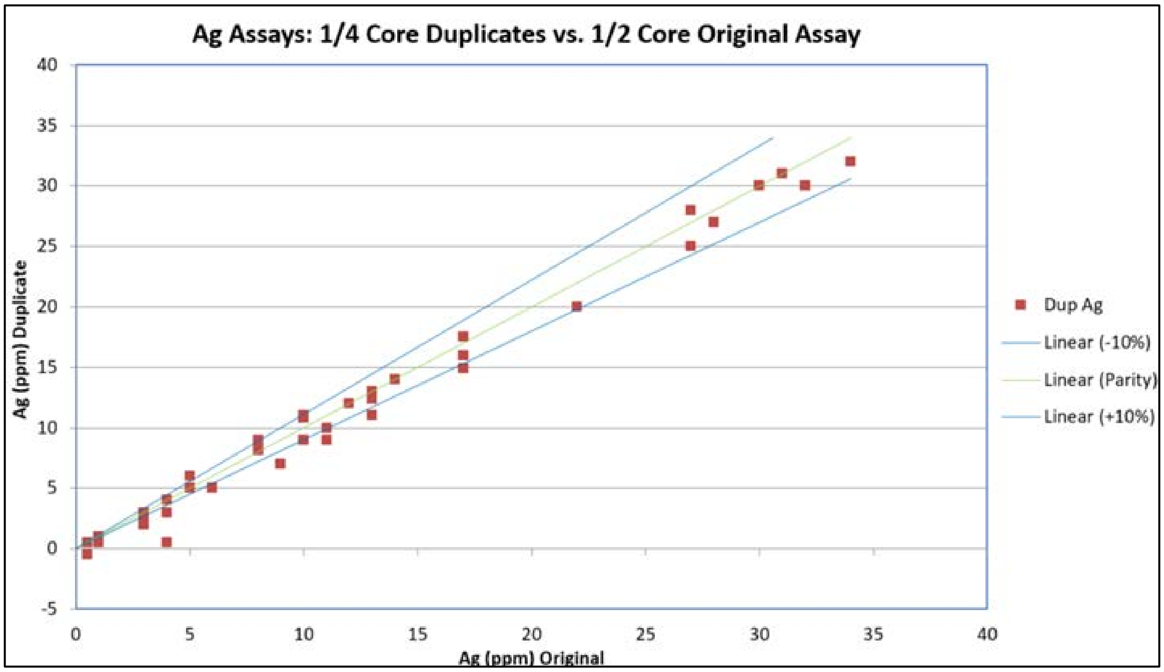
2014 Drill Program

A quarter-core field duplicate was taken at a minimum rate of one sample per 20 samples and inserted into the sample sequence immediately after the original half-core sample. The actual field duplicate insertion rate for 2014 was 9%. The comparison of copper values (Figure 11-30) shows an acceptable correlation. Silver analyses of field duplicates show more variation when compared with the original analyses, especially at lower values, but with no clear bias (Figure 11-31).



Source: SRA, 2019

Figure 11-30: Comparison of Copper Analyses Between Original Sample and Field Duplicates for 2014 Drill-Program



Source: SRA, 2019

Figure 11-31: Comparison of Silver Analyses Between Original Sample and Field Duplicates For 2014 Drill-Program

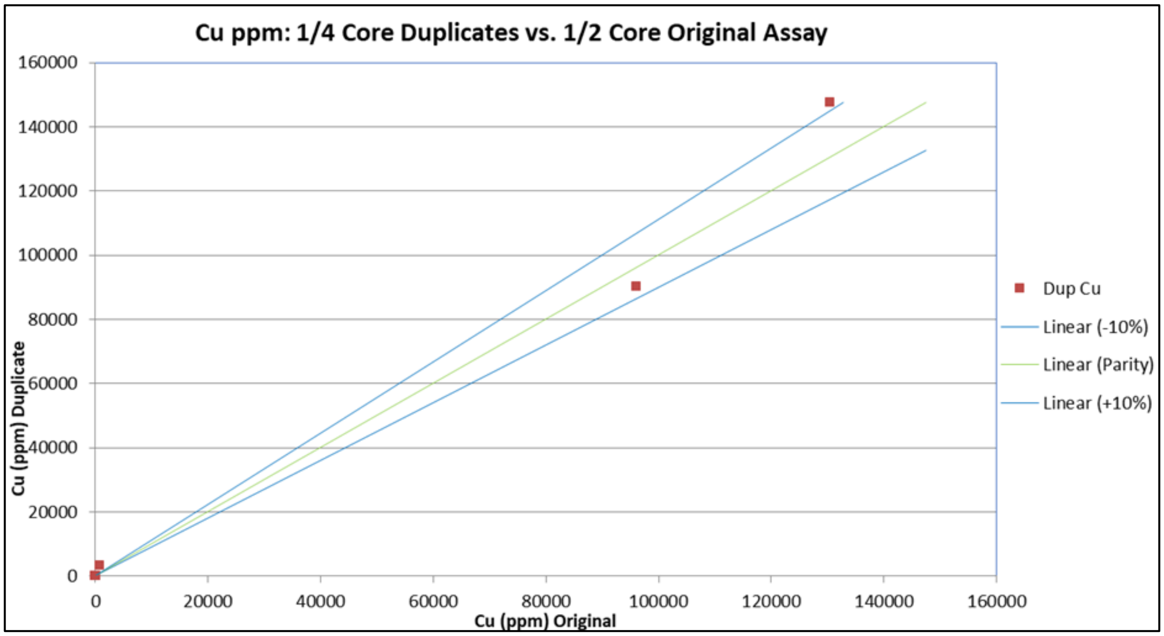
2018 Phase 1 Drill Program

As whole PQ core from the UCZ drillholes was sent to BML Kamloops, no field duplicates were included for these drillholes. Quarter-core field duplicates were included in the samples from the LCZ that were dispatched directly to ALS Reno. Field duplicates were inserted at a minimum ratio of one field duplicate per 20 samples. Given the small number of samples sent to the laboratory, only six field duplicates were inserted. For the 2018 Phase 1 drill program the actual insertion rate was 3%.

Figure 11-32 and Figure 11-33 show comparison of original versus field duplicate analyses for copper and silver. The sample set is too small to be statistically meaningful but the correlation between originals and field duplicates is considered acceptable.

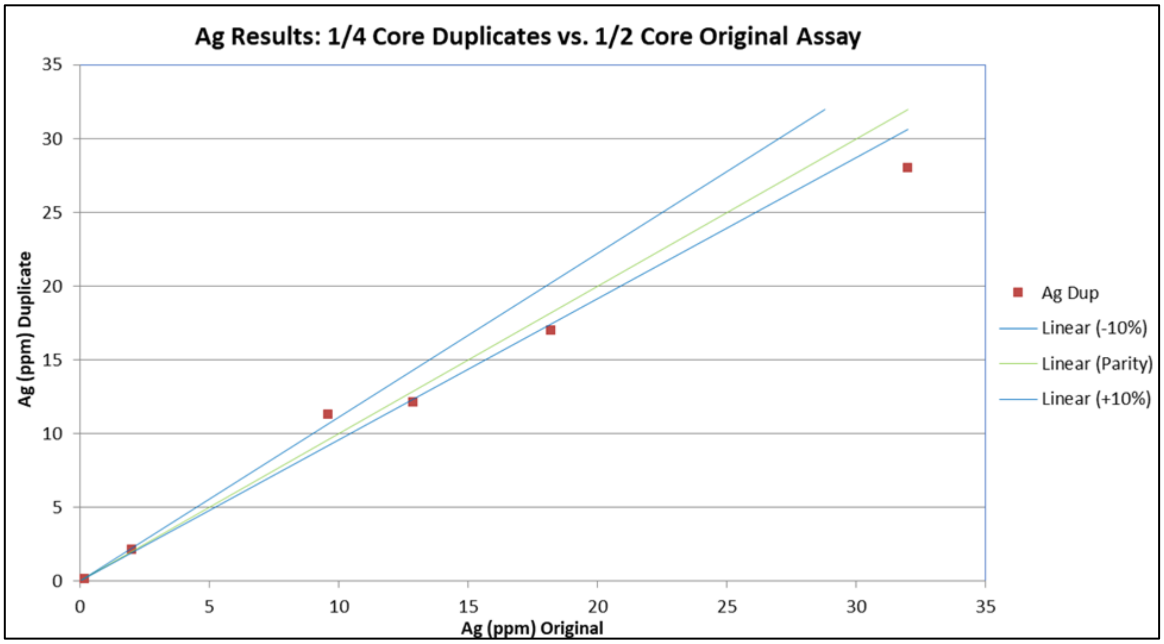
Upon completion of all analyses, ALS Vancouver and ALS Reno returned the pulp residues to SRA. Thirty-nine pulps were selected, representing a range of copper grades, for umpire duplicate analyses at AAL Sparks. The pulps were renumbered by SRA geologists and submitted to AAL for 35 element analyses (including base-metals) by five acid digest ICP-AES (AAL Code ICP-5A035) and gold and silver by fire assay with ICP-AES finish (AAL Code FA-Pb30). A comparison of the umpire copper analyses with original assays is presented in Figure 11-34 and Figure 11-35. These diagrams indicate a reasonable correlation but a positive bias towards the ALS Vancouver results. The four CRM’s inserted in the umpire laboratory sample sequence all returned values within one standard deviation of the certified values. It is interpreted that the bias reflects the influence of a different digest rather than laboratory error.

A comparison of the umpire silver analyses with original assays, shown in Figure 11-36 and Figure 11-37, show acceptable correlation with no bias.



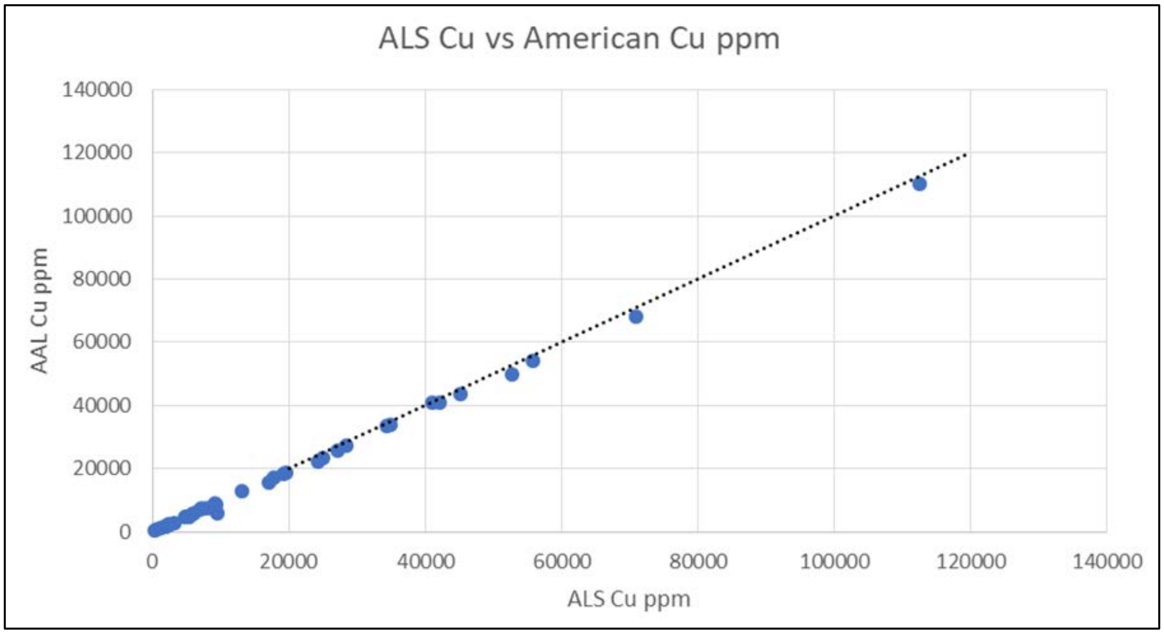
Source: SRA, 2019

Figure 11-32: Comparison of Copper Analyses Between Original Sample and Field Duplicates for 2018 Phase 1 Drill-Program



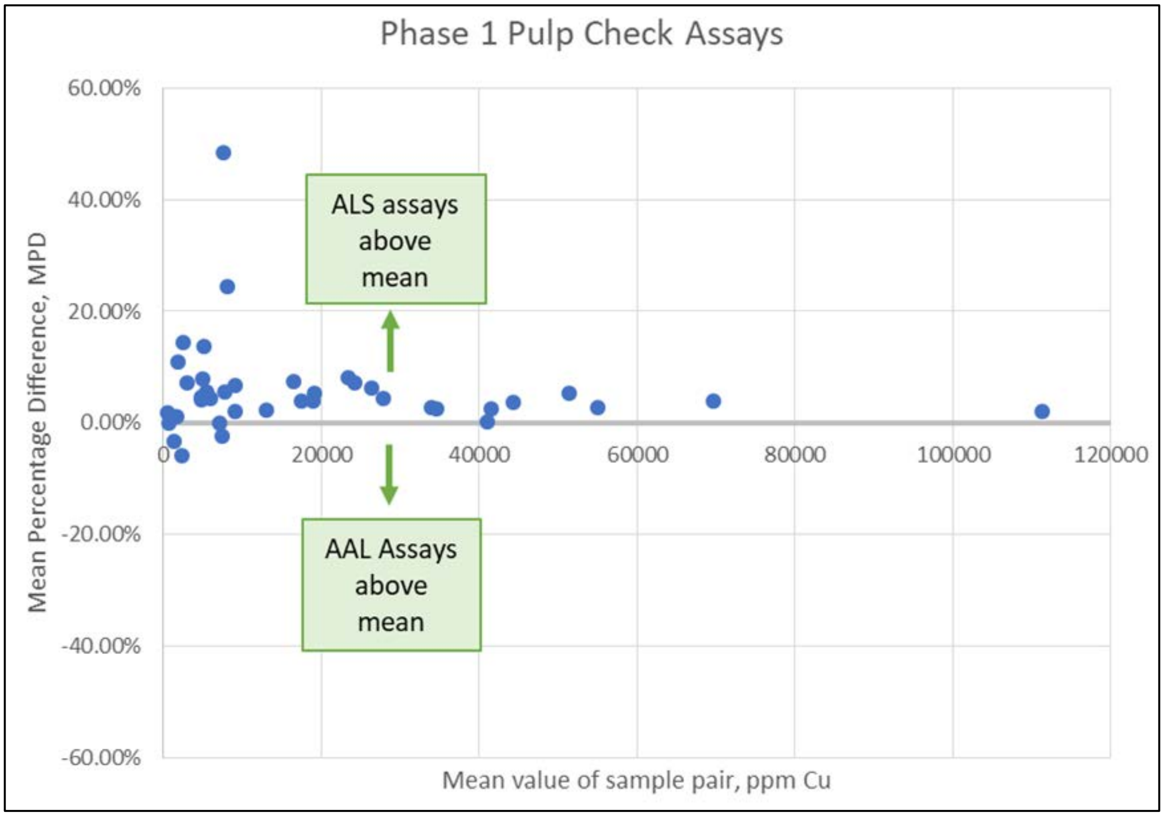
Source: SRA, 2019

Figure 11-33: Comparison of Silver Analyses Between Original Sample and Field Duplicates for 2018 Phase 1 Drill-Program



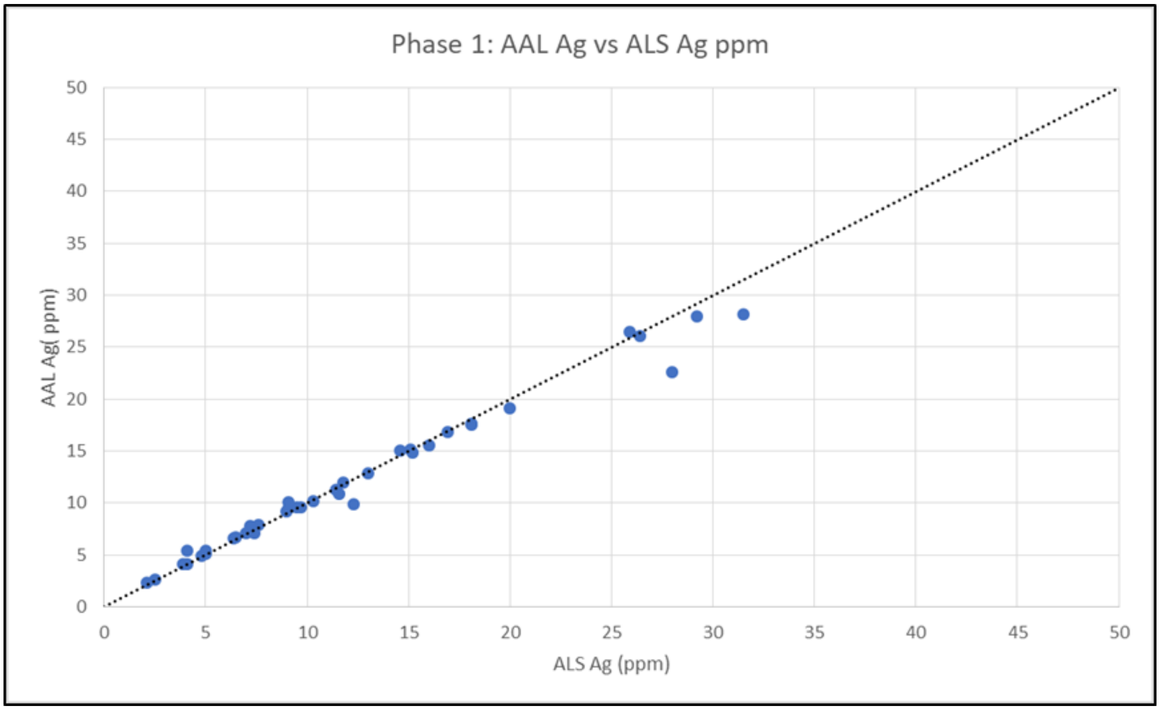
Source: SRA, 2019

Figure 11-34: Comparison Between AAL Umpire Copper Analyses and ALS Original Copper Analyses for 2018 Phase 1 Drill-Program



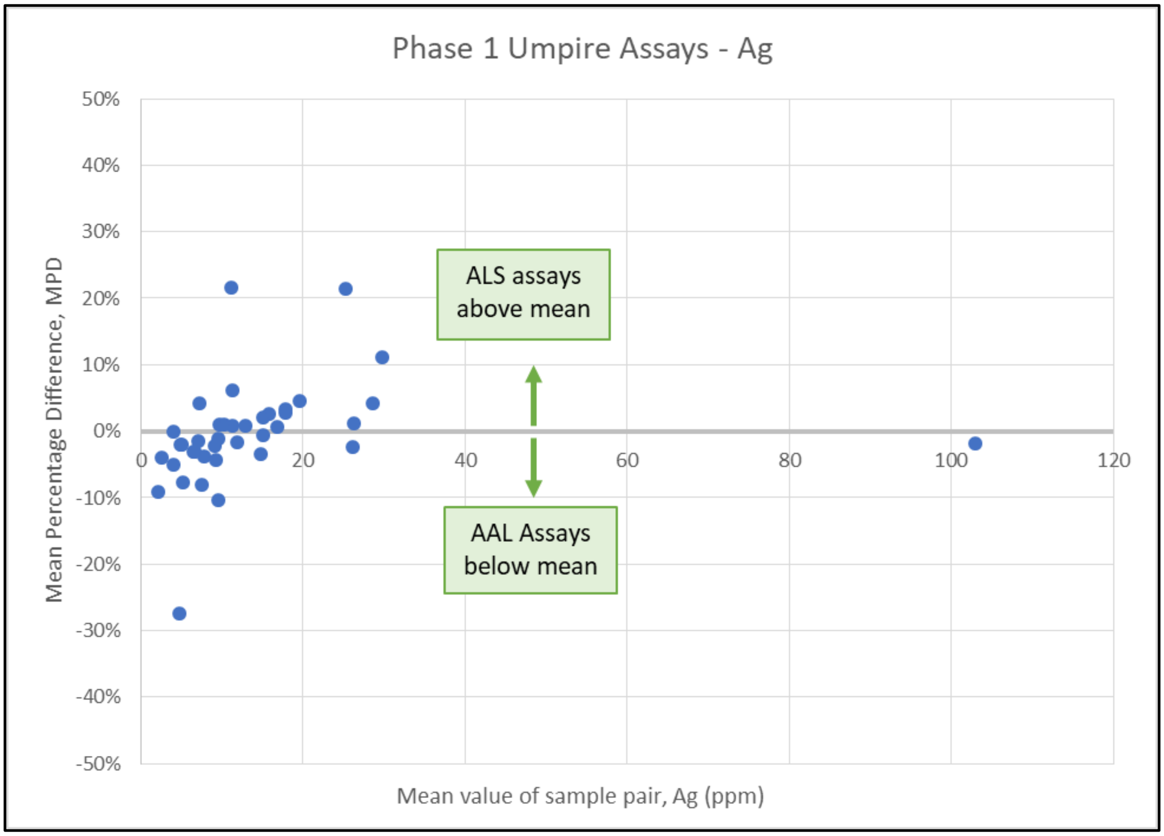
Source: SRA, 2019
Mean Percentage Difference (MPD) at low Cu grades is analytical noise. Analytical bias (MPD) above 7,500 ppm is <8%.

Figure 11-35: Relative Error Plot of AAL Umpire Versus ALS Original Copper Analysis For 2018 Phase 1 Drill Program, Demonstrating Positive Bias In ALS Data



Source: SRA, 2019

Figure 11-36: Comparison Between AAL Umpire Silver Analyses and ALS Original Silver Analyses For 2018 Phase 1 Drill-Program



Source: SRA, 2019

Figure 11-37: Relative Error Plot of AAL Umpire Versus ALS Original Silver Analysis for 2018 Phase 1 Drill Program

2018/19 Phase 2 Drill Program

No quarter-core field duplicates were inserted in the 2018/19 Phase 2 drill program.

SRA geologists selected 211 samples for laboratory duplicate analysis. This represented 14% of the original samples analyzed during the 2018/19 Phase 1 program. ALS Reno were instructed to construct duplicate pulps from a separate 1,000 g split of fine-crushed material. These duplicate pulps were transported to AAL Sparks. AAL renumbered these samples, inserted CRM's and pulp blanks as supplied by SRA geologists and resubmitted the samples to ALS Reno for analysis.

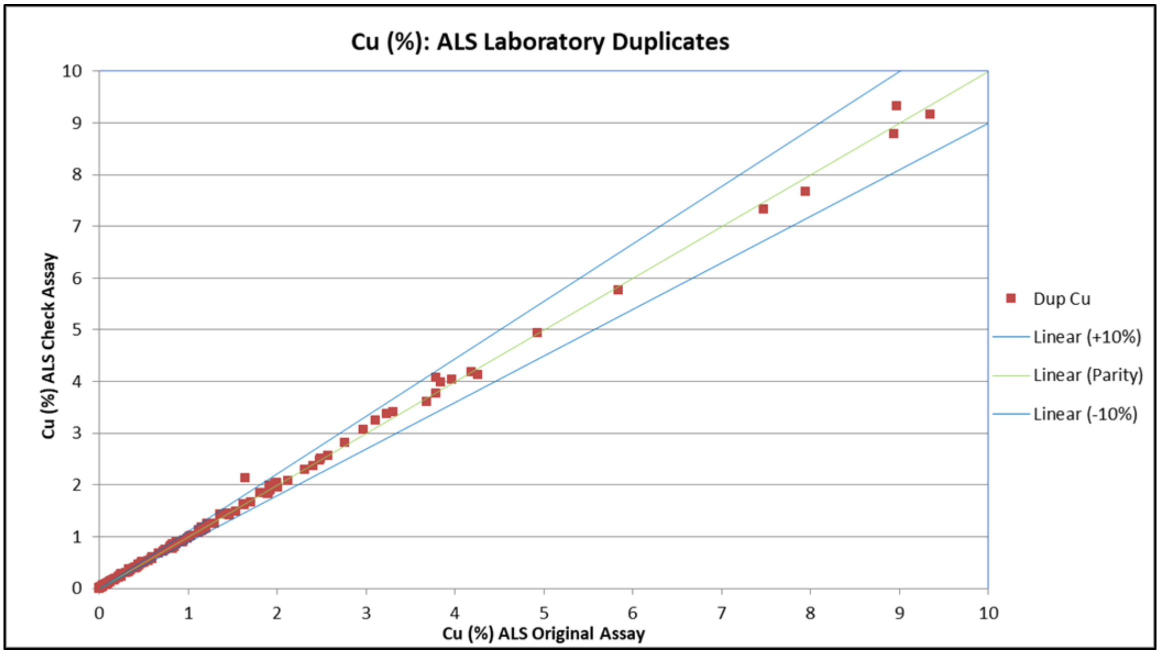
Figure 11-38 show the laboratory duplicate copper analyses compared with that of the original analyses. With the exception of one outlier, duplicate analyses compare favorably with original analyses with no material bias.

Figure 11-39 shows laboratory duplicate silver analyses compared with original analyses. There is minor variation at low concentrations (which is considered analytical noise) but overall correlations are acceptable.

SRA geologists selected 192 pulp residues from ALS (13% of the original assays) for umpire analysis at AAL using five-acid digestion ICP-AES (AAL Code: ICP-5AO35) and Au by fire assay with ICP-AES finish (AAL Code: FA-Pb30). This represents 13% of the total number of original analyses.

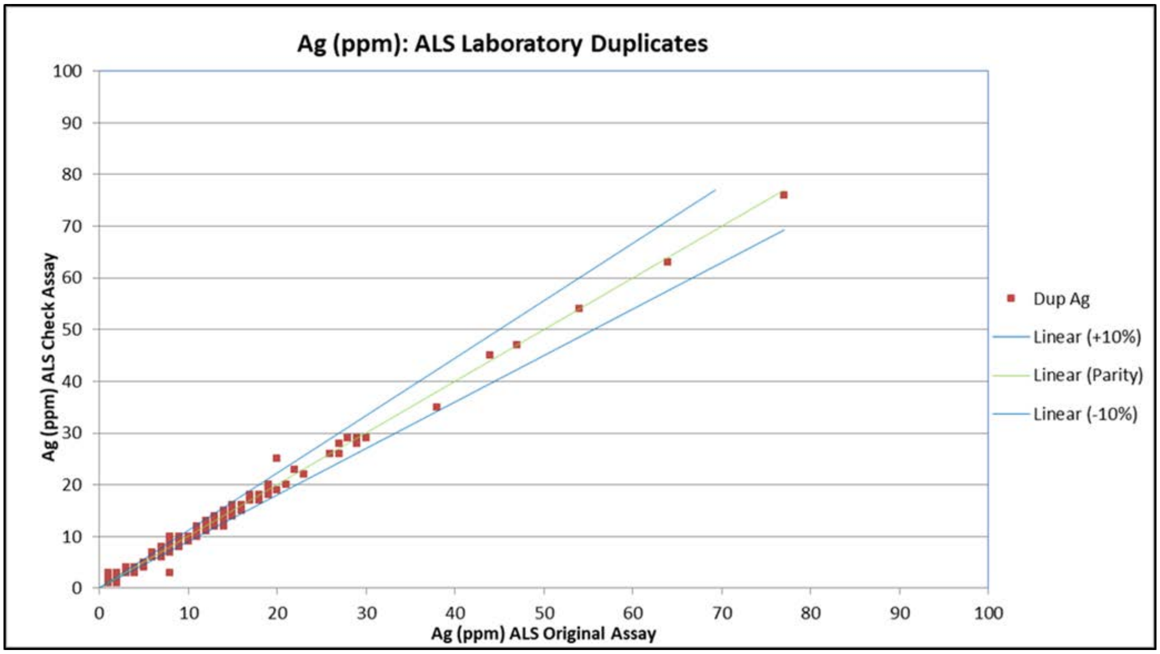
A comparison of the copper results is presented in Figure 11-40 and Figure 11-41. An acceptable correlation with a slight positive bias to the ALS results is evident.

A comparison of the silver results is presented in Figure 11-42 to Figure 11-43. Whilst the correlation is relatively good there is a positive bias in the ALS results.



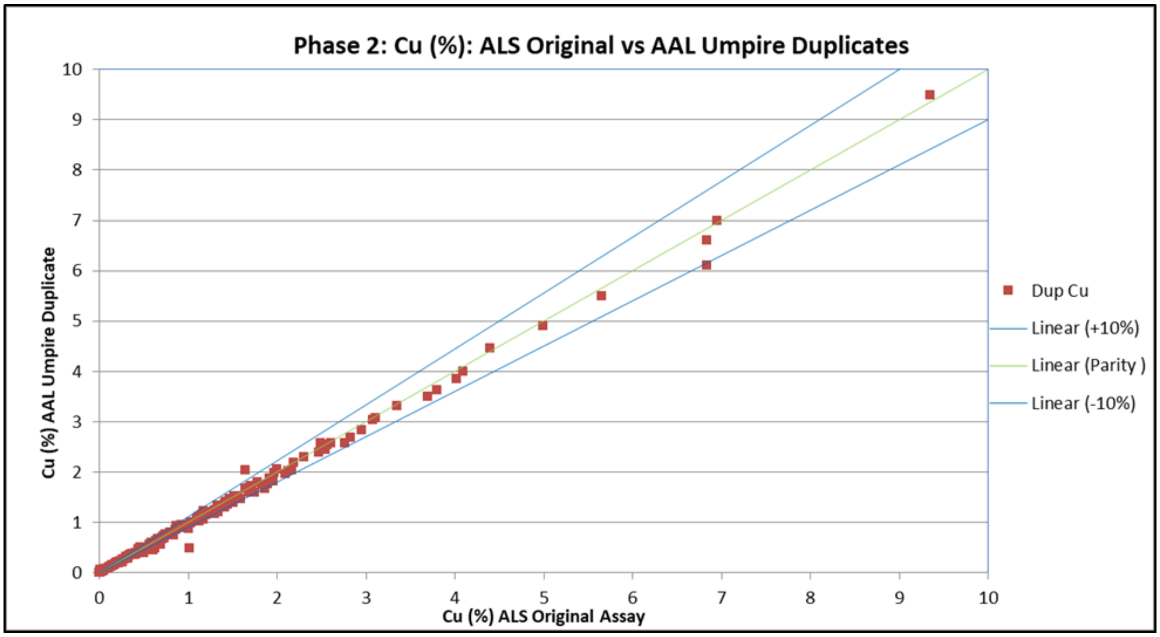
Source: SRA, 2019

Figure 11-38: Scatter Plot of Laboratory Duplicate Copper Analysis Versus Original Analysis for the 2018/19 Phase 2 Drill-Program



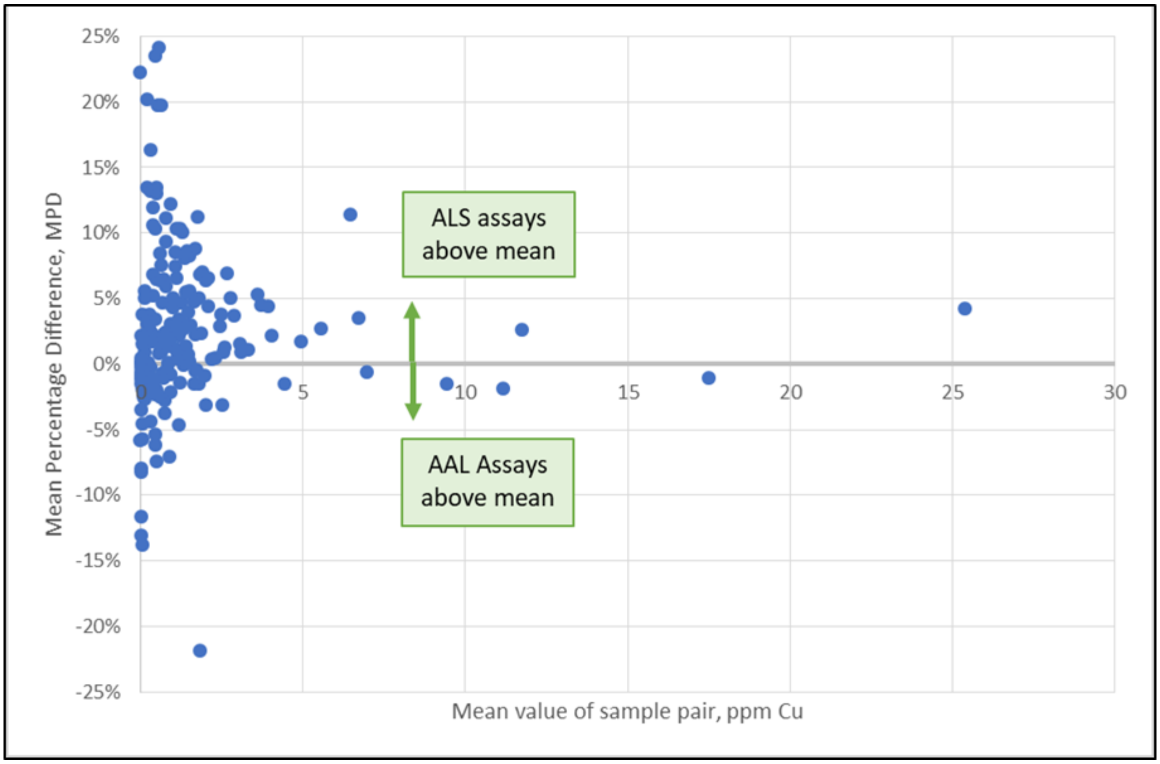
Source: SRA, 2019

Figure 11-39: Scatter Plot of Laboratory Duplicate Silver Analysis Versus Original Analysis for the 2018/19 Phase 2 Drill-Program



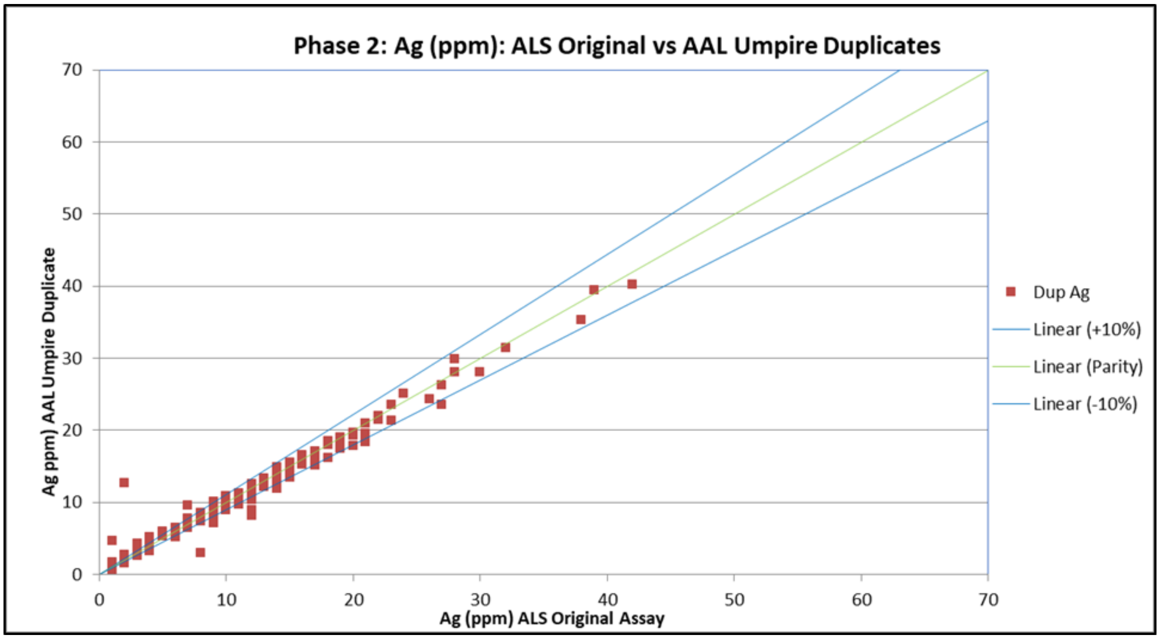
Source: SRA, 2019

Figure 11-40: Scatter Plot of Umpire Duplicate Copper Analysis Versus Original Analysis for the 2018/19 Phase 2 Drill-Program



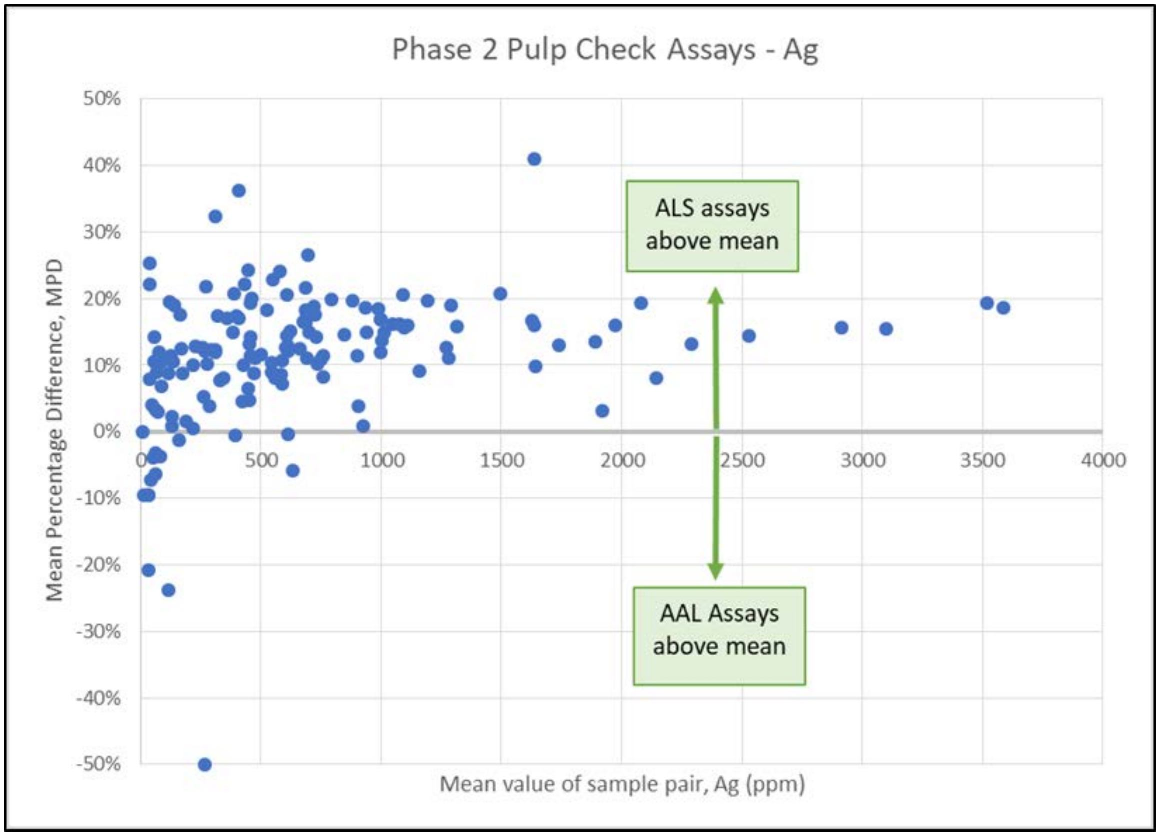
Source: SRA, 2019

Figure 11-41: Relative Error Plot of Umpire Duplicate Copper Analysis Versus Original Analysis for the 2018/19 Phase 2 Drill-Program



Source: SRA, 2019

Figure 11-42: Scatter Plot of Umpire Duplicate Silver Analysis Versus Original Analysis for the 2018/19 Phase 2 Drill-Program



Source: SRA, 2019

Figure 11-43: Relative Error Plot of Umpire Duplicate Silver Analysis Versus Original Analysis for the 2018/19 Phase 2 Drill-Program

11.4.4 Results and Actions

QA/QC evaluation and actions during the 2014 to 2018/19 Phase 2 drill-programs were largely conducted using copper results from CRM's. Analyses of a CRM yielding a copper analyses greater than two standard deviations from the certified value triggered a CRM failure.

The only CRM failures during the 2014 drill-program were on CRM Ni 116 that is interpreted to have a matrix that is unsuitable for use for the analytical protocol utilized for the Black Butte samples. All other CRM's performed adequately.

During the 2018 Phase 1 and 2018/19 Phase 2 drill-programs there were four CRM copper failures on OREAS standards. All of these CRM's triggered reanalyzes of the affected sample series with the insertion of different CRM's and pulp-blanks. The re-analyzed sample series passed all QA/QC criteria and were entered into the database with a Priority assigned as 0. The original analyses, that had failed QA/QC, were assigned a Priority of 1. Only analytical data with a Priority = 0 was exported for use in Mineral Resource estimation protocols.

Copper analyses of coarse blanks, constructed from landscaping marble, that were inserted in the sample series from the 2014 drill-program often returned analyses that would have triggered failure (>15 times detection limit). Given the large number of coarse blanks that returned copper values significantly above the detection limit it was concluded that the landscaping marble contained variable amounts of copper. The use of the landscaping marble was discontinued after the 2014 drill program.

Pulp blanks were utilized during the 2018 Phase 1 drill-program with all blanks performing acceptably.

Pulp blanks and commercially available coarse blanks were used during the 2018/19 Phase 2 drill program. All pulp blanks performed acceptably. Two coarse blanks exhibited minor levels of contamination (<240 ppm Cu) in the sample preparation circuit. Re-analyses of the sample series affected by these coarse blanks was not undertaken.

11.5 Opinion on Adequacy

Erik Ronald, P.Geo of SRK, acting as QP for the Geology and Mineral Resources on the Johnny Lee deposit, has reviewed the sampling procedures, summary QA/QC program, results, and interpretation of data. It is the opinion of the QP that the sampling, preparation, analyses, and security programs are fit-for-purpose and suitable given the type of deposit and nature of mineralization. Quality control samples, results, and interpretation are performed to industry standard and are acceptable for the reporting of Mineral Resources. The limited QC sample failures and interpreted biases are considered immaterial.

12 Data Verification

12.1 Procedures

During November 2018, Erik Ronald, P.Geo of SRK conducted a site visit and tour of the Project site, core shed, and facilities located in White Sulphur Springs, MT. Mr. Ronald reviewed site geology, core logging, density measurements, active diamond core drilling, core storage and handling, and discussed general items associated with the project and future mining operations. The site visit and tour were hosted by SRA and included a team of multi-discipline consultants associated with the Project. Mr. Ronald and the site visit team were given unfettered access to all aspects of the project and staff, with all questions satisfactory addressed by SRA.

It is Mr. Ronald’s opinion that SRA manages the geology and Mineral Resources of the Johnny Lee deposit in an organized and disciplined manner than adheres to accepted industry standards.

12.1.1 Data Management

SRA employs a Structured Query Language (SQL) database as the central data storage system using DataShed™ v4.6.3 as the front-end. User access to the database is restricted and regulated by specific user permissions. Existing protocols maximize data functionality and quality, while minimizing the likelihood of error introduction at primary data collection points and subsequent database upload, storage, and retrieval points.

Prior to 2018, the Project drill database (which includes data from the broader geological district) was managed in a SQL database that was maintained by an off-site independent consultant (Mr. J. Cote, 50914 North 292nd Ave, Phoenix, AZ). When additional data was loaded, Mr. Cote provided an updated database to SRA in Microsoft Access™ format. During 2018, this legacy database was imported into an SQL database that is hosted on the Sandfire Resources NL server in Perth, Australia. The Australian server performs an automatic daily export of data, in a Microsoft Access™ format, suitable for importing into Micromine™, to the SRA server in White Sulphur Springs, MT. Subsequent to 2018, the structure of the SQL database has been modified and augmented as requested by the SRA geological team.

Expedio OCRIS™ Mobile logging software was utilized by SRA geologists for the 2018 and later drilling programs to capture data including collar, survey, lithology, mineralization, structure, sample information, specific gravity, recovery, geotechnical and other meta-data. The OCRIS™ logging templates have been designed to match the tables of the SQL database and have library drop-down boxes where only pre-defined codes can be recorded, that allows interactive, instantaneous data validation. Once a hole has been validated, an .oxo file is exported and sent to database administrators (DBA) to load into the database.

Assay laboratory files are electronically supplied to the DBA and SRA geologists in .sif and text file format. The assay data is loaded into the database by the DBA. SRA geologists assess the QA/QC of the assay batch and decide whether it passes or fails.

The SQL server database is configured for optimal validation through constraints, library tables, triggers, and stored procedures. Data that fails these rules during import is rejected or quarantined until reviewed by a geologist.

12.1.2 Pre-Sandfire Resources America Drilling

In 2010, Tintina twinned six historic drillholes in order to confirm the geology, mineralization grade and thicknesses recorded in the CAI database that was obtained from the Belt Research Center at the University of Montana. The results of this drilling, as well as additional comparison between historic and Tintina drillholes, allowed Winckers *et al* (2013) to conclude that the historic data, included in the CAI database, was suitable for NI 43-101 Mineral Resource estimation purposes.

As part of the 2013 PEA, Winckers *et al* (2013) checked assay certificates against database entries for 935 analyses of Tintina drillhole samples used for the Mineral Resource estimate. No errors were found in the checked subset.

Winckers *et al* (2013) performed spot checks of driller's downhole surveys against the records in the database for the Tintina drilling and found no errors. The number of checks performed was not stated.

12.1.3 2014 Sandfire Resources America Data Verification

In 2014, SRA completed 11 drillholes in the Johnny Lee deposit (SC14-169 to SC14-179) that are used in the Mineral Resource estimate presented in this document.

Validation of these holes was conducted in two parts. SRA geologists validated the physical data utilizing an audit checklist. The audit checklist included verification of Collar Survey, Downhole Survey, Sample Locations, Lithology, Structure, and Specific Gravity. Then, SRA geologists audited the assay information to ensure source data matched with respect to sample number, sample interval, and assay certificates.

A full review of QA/QC data from 2010 to 2015 drilling was undertaken in 2018 by Sandfire Resources NL personal to ensure the validity of assay data. No material issues were identified during this review.

12.1.4 2018-2019 Sandfire Resources America Data Verification

Beginning with the 2018 Phase 1 drill program, SRA geologists validated all data within the database using a two-stage process. Physical validation was completed upon finalization of drilling. Final validation was completed upon receipt of analytical results.

The first stage of validation process involved validation of the recorded Physicals using the checklist shown in Figure 12-1. The validation included checking database entries for Collar Data, Downhole Survey, Recovery, RQD, Lithology, Structure, Sample Mark-up and Specific Gravity data against the source documentation or digital files. If required, corrections were sent to the DBA for entry into the database. As a final check, the data was then reviewed in three-dimensional visualization software (Micromine™) to assure that it was spatially consistent with surrounding drillholes in terms of geology and mineralization positions. Once all these checks were performed the drillhole was assigned a PV code in the Validation field of the Collar table in the database.

The second stage of the validation process was performed once assay results were received from the laboratory. During this stage, analytical data and laboratory reported sample masses were compared against sampling data and core photographs to ensure the copper grades and sample masses were visually consistent with what had been reported from the laboratory. QA/QC of the assay data, including review of certified reference material (CRM), blanks, and duplicates was the performed. If assay data was considered acceptable then it was assigned a V code in the Validation field of the database.

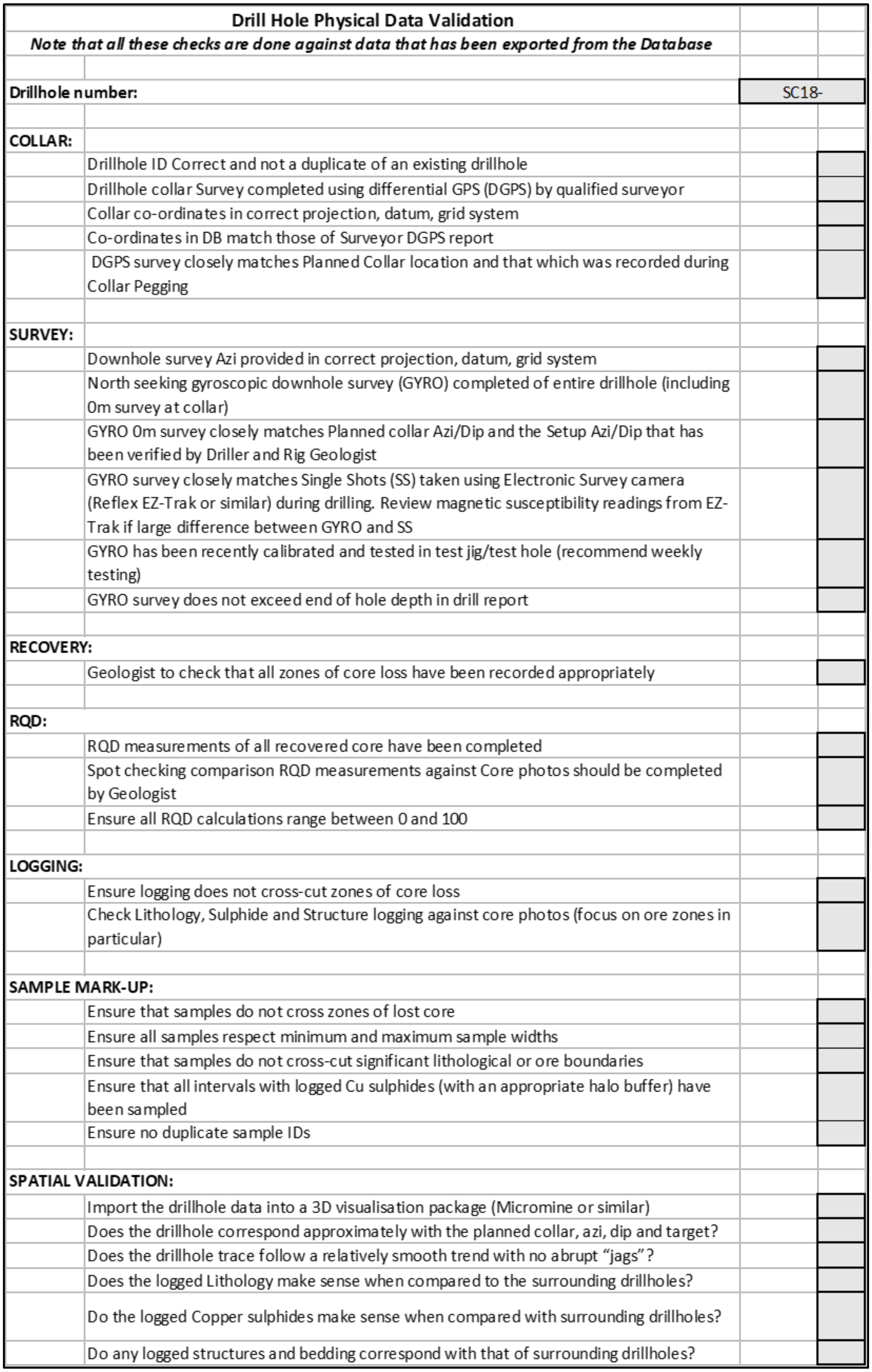
All pre-2018 data has been assigned an H (Historic) code in the Validation field of the database.

12.1.5 SRA Verification of Upper Copper Zone Specific Gravity Data

The previous Mineral Resource model for the UCZ was developed for the PEA (Winckers *et al*, 2013). The PEA Mineral Resource model used the average of 181 specific gravity (SG) measurements to assign a fixed SG of 3.99 to the rocks within the two UCZ mineralization wireframes (UCZ Wireframes 31 and 32). The average of 357 density measurements were used to assign an SG of 3.60 to laminated sulphide zones outside of UCZ Wireframes 31 and 31 but within the USZ. All SG measurements for the PEA Resource Model were taken using Archimedean measurements on individual pieces of core (not entire core runs or resource sample intervals). These SG measurements are referred to here as POINT SG Data. From the 2018 Phase 1 drill program onwards, all SG measurements were taken using entire resource sample intervals (if sampled), on a continuous basis through the mineralized zone, or on entire core runs (if not sampled). This data is referred to here as INTERVAL SG Data.

The POINT and INTERVAL SG data in the database was reviewed and, during error checking, it was noted that there are large number of overlapping intervals for POINT SG Data (approximately 160) and a smaller number for INTERVAL SG data (approximately 40). The INTERVAL overlaps were duplicates that were not correctly coded as such within the Duplicate Column in the database. This error was corrected. The historic POINT SG data are stored in the database as intervals (corresponding to the Resource Sample intervals they occur within) and it is uncertain whether the overlapping POINT samples are duplicates or measurements taken on a different piece of core within one Resource sample interval. Comparison of the SG's of overlapping samples indicated relatively small differences between the measured SG's so the second data record from all of the overlapping intervals was removed from the SG dataset.

The POINT and INTERVAL SG Data were imported into Leapfrog Geo™ as separate interval tables. A spatial filter was applied to extract the SG data that occurred within the more than 1.2% Cu UCZ Eastern Block and UCZ Western Block wireframes (Eastern and Western Blocks are the two portions of the UCZ separated by Fault 1). This was done separately for both the POINT and INTERVAL data.



Drill Hole Physical Data Validation			
Note that all these checks are done against data that has been exported from the Database			
Drillhole number:			SC18-
COLLAR:			
	Drillhole ID Correct and not a duplicate of an existing drillhole		☐
	Drillhole collar Survey completed using differential GPS (DGPS) by qualified surveyor		☐
	Collar co-ordinates in correct projection, datum, grid system		☐
	Co-ordinates in DB match those of Surveyor DGPS report		☐
	DGPS survey closely matches Planned Collar location and that which was recorded during Collar Pegging		☐
SURVEY:			
	Downhole survey Azi provided in correct projection, datum, grid system		☐
	North seeking gyroscopic downhole survey (GYRO) completed of entire drillhole (including 0m survey at collar)		☐
	GYRO 0m survey closely matches Planned collar Azi/Dip and the Setup Azi/Dip that has been verified by Driller and Rig Geologist		☐
	GYRO survey closely matches Single Shots (SS) taken using Electronic Survey camera (Reflex EZ-Trak or similar) during drilling. Review magnetic susceptibility readings from EZ-Trak if large difference between GYRO and SS		☐
	GYRO has been recently calibrated and tested in test jig/test hole (recommend weekly testing)		☐
	GYRO survey does not exceed end of hole depth in drill report		☐
RECOVERY:			
	Geologist to check that all zones of core loss have been recorded appropriately		☐
RQD:			
	RQD measurements of all recovered core have been completed		☐
	Spot checking comparison RQD measurements against Core photos should be completed by Geologist		☐
	Ensure all RQD calculations range between 0 and 100		☐
LOGGING:			
	Ensure logging does not cross-cut zones of core loss		☐
	Check Lithology, Sulphide and Structure logging against core photos (focus on ore zones in particular)		☐
SAMPLE MARK-UP:			
	Ensure that samples do not cross zones of lost core		☐
	Ensure all samples respect minimum and maximum sample widths		☐
	Ensure that samples do not cross-cut significant lithological or ore boundaries		☐
	Ensure that all intervals with logged Cu sulphides (with an appropriate halo buffer) have been sampled		☐
	Ensure no duplicate sample IDs		☐
SPATIAL VALIDATION:			
	Import the drillhole data into a 3D visualisation package (Micromine or similar)		☐
	Does the drillhole correspond approximately with the planned collar, azi, dip and target?		☐
	Does the drillhole trace follow a relatively smooth trend with no abrupt "jags"?		☐
	Does the logged Lithology make sense when compared to the surrounding drillholes?		☐
	Do the logged Copper sulphides make sense when compared with surrounding drillholes?		☐
	Do any logged structures and bedding correspond with that of surrounding drillholes?		☐

Source: SRA, 2019

Figure 12-1: Drill Hole Physical Data Validation Form

Basic statistics were calculated for the POINT and INTERVAL data for both the Eastern Block and Western Block wireframes (Table 12-1 and Table 12-2). These statistics show that the Eastern Block data for the POINT data has slightly higher values than that of the INTERVAL data. The POINT data for the Western Block shows noticeably higher values relative to the INTERVAL data.

Table 12-1: Statistics for UCZ East Block >1.2% Cu Wireframes, SG Data

Data Type	Count	Mean	Std. Dev	Coeff. Var.	Variance	Min	Lower Quartile	Median	Upper Quartile	Max
INTERVAL	209	3.96	0.34	0.09	0.12	2.96	3.79	4.03	4.21	4.60
POINT	169	4.05	0.33	0.08	0.11	2.90	3.97	4.24	4.27	4.69

Source: SRA, 2019

Table 12-2: Statistics for UCZ West Block >1.2% Cu Wireframes, SG Data

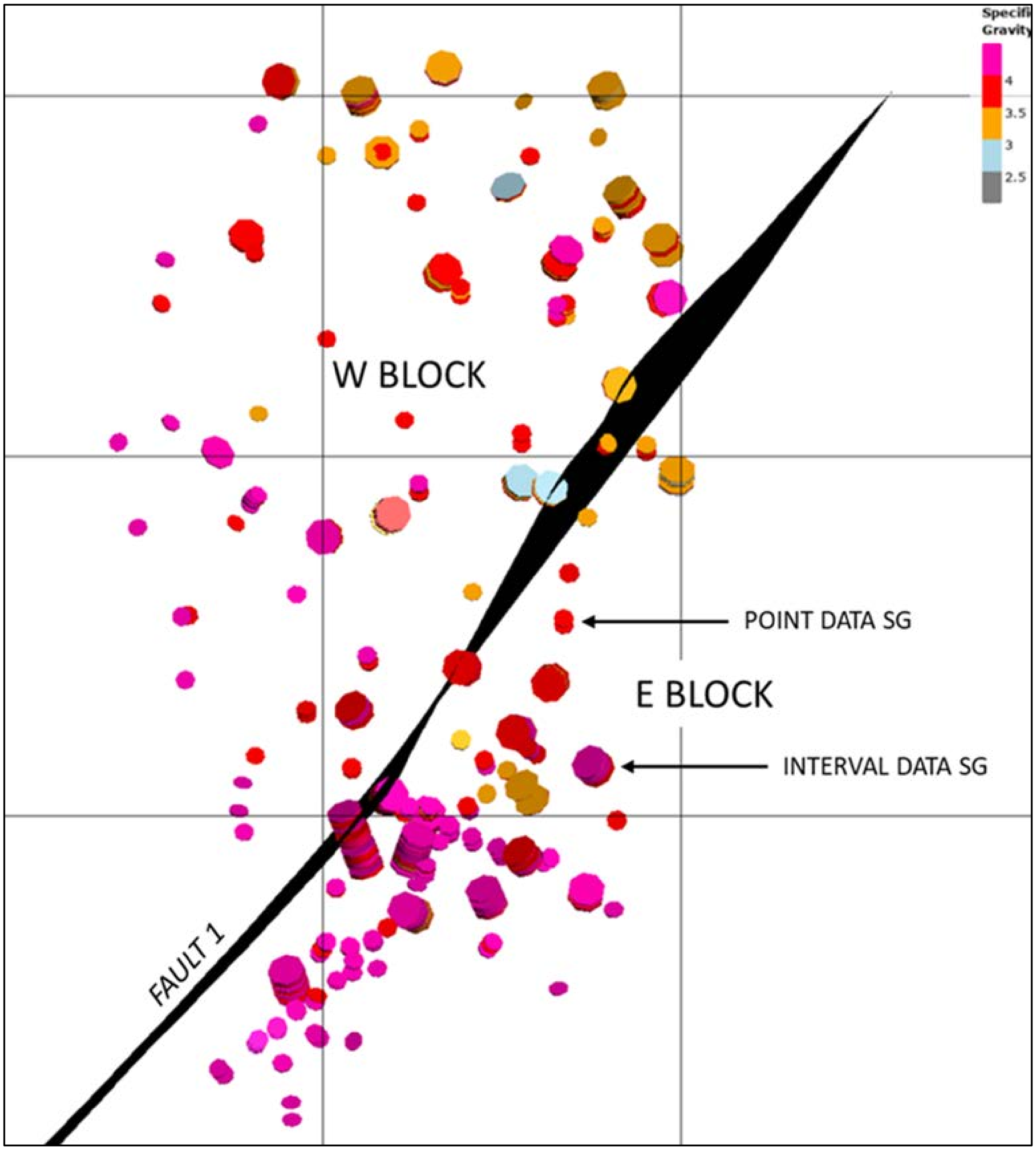
Data Type	Count	Mean	Std. Dev	Coeff. Var.	Variance	Min	Lower Quartile	Median	Upper Quartile	Max
INTERVAL	160	3.58	0.33	0.09	0.11	2.52	3.36	3.56	3.82	4.31
POINT	104	3.82	0.33	0.09	0.11	3.01	3.57	3.81	4.10	4.34

Source: SRA, 2019

In order to evaluate the SG data spatially, the POINT and INTERVAL data were plotted separately (Figure 12-2). The POINT data was collected from a large number of drillholes over several drilling programs prior to 2018 and thus have a comprehensive spatial coverage of the entire UCZ. The INTERVAL data was collected only during the 2018 drilling, which was focused on certain parts of the UCZ, so while locally the data may be of better quality, the spatial coverage is less robust than that of the POINT data.

A significant proportion of the Western Block INTERVAL data occurs within the northern portion of the Western Block (characterized by lower SG’s than the Southern portion). Consequently, the statistically higher SG values from the POINT data in the Western Block are consistent with the spatial distribution of data from the two datasets. The Eastern Block INTERVAL data provides more spatially comprehensive coverage of the Eastern Block (with corresponding greater statistical similarity between the POINT and INTERVAL data).

Spatial comparison between SG values from POINT and INTERVAL data from similar areas within the UCZ from both Eastern and Western Blocks show similar values. It is concluded that the SG data for the POINT and INTERVAL data, whilst not directly comparable in sampling density and methodology are best utilized together to better constrain the highly variable nature of the UCZ density for Mineral Resource estimation purposes.



Source: SRA, 2019

Figure 12-2: Plan View of UCZ Showing SG Data for POINT and INTERVAL Samples

12.1.6 Data Verification by Author

SRA provided SRK with a drilling database of exploration drilling focused on the Jonny Lee Deposit. SRK was provided with Collar, Survey, Geology, Assay, Recovery and RQD, Density, and Structure tables as comma-separated value (.csv) files. Data associated with adjacent properties or other prospects were not provide nor reviewed by SRK.

SRK performed a series of visual, statistical, and software validation checks on the drilling database using Geovariances Isatis™, Seequent Leapfrog Geo™, Maptek Vulcan™, Phinar X10-Geo™ and Microsoft Excel™ software packages. Visual and statistical inspection of drilling data resulted in no material errors or biases observed in the provided database. Automated software data checks from Vulcan and Leapfrog Geo were used as an additional level of validation resulting in no material errors.

As part of the QP site visit, Mr. Ronald observed drilling activities, sampling, logging, cutting, and core photography activities. Each step in the observed process followed established procedures and considered good industry practice in data collection and management.

12.2 Limitations

SRK notes no data limitations.

12.3 Qualified Person's Opinion on Data Verification

It is the opinion of the QP, that data verification checks performed internally by SRA staff in combination with external and independent checks by the QP, have resulted in sufficient validation of the fundamental drilling database at the Black Butte project and that data is acceptable for use in the modeling of geology and calculation of Mineral Resources.

13 Mineral Processing and Metallurgical Testing

Tintina Resources Inc. completed a PEA of the Johnny Lee Deposit (Winckers *et al*, 2013) that included metallurgical and comminution testing of drillhole composites from the UCZ and LCZ (Shi and Redfearn, 2012a; 2012b). Subsequent to the PEA, SRA undertook additional metallurgical and comminution test work of drillhole composites from the UCZ and LCZ (Chiasson *et al*, 2015; Ding and Prout, 2016). This test work is here referred to as the SGS test work. More recently SRA has completed comprehensive metallurgical and comminution test work (Shouldice and Pojhan, 2019) of drillhole composites from the UCZ and LCZ.

Metallurgical testing has focused on Cu sulphide recovery by froth flotation to produce a copper concentrate. During the 2013 Tintina PEA it was identified that there are significant differences in Cu sulphide liberation between the UCZ and the LCZ (Winckers *et al*, 2013). The LCZ mineralization is relatively homogenous and contains coarse grained chalcopyrite, with trace amounts of tennantite (McArthur, 2017). The UCZ contains chalcopyrite, tennantite and bornite with highly variable grain size and liberation characteristics (McArthur, 2018).

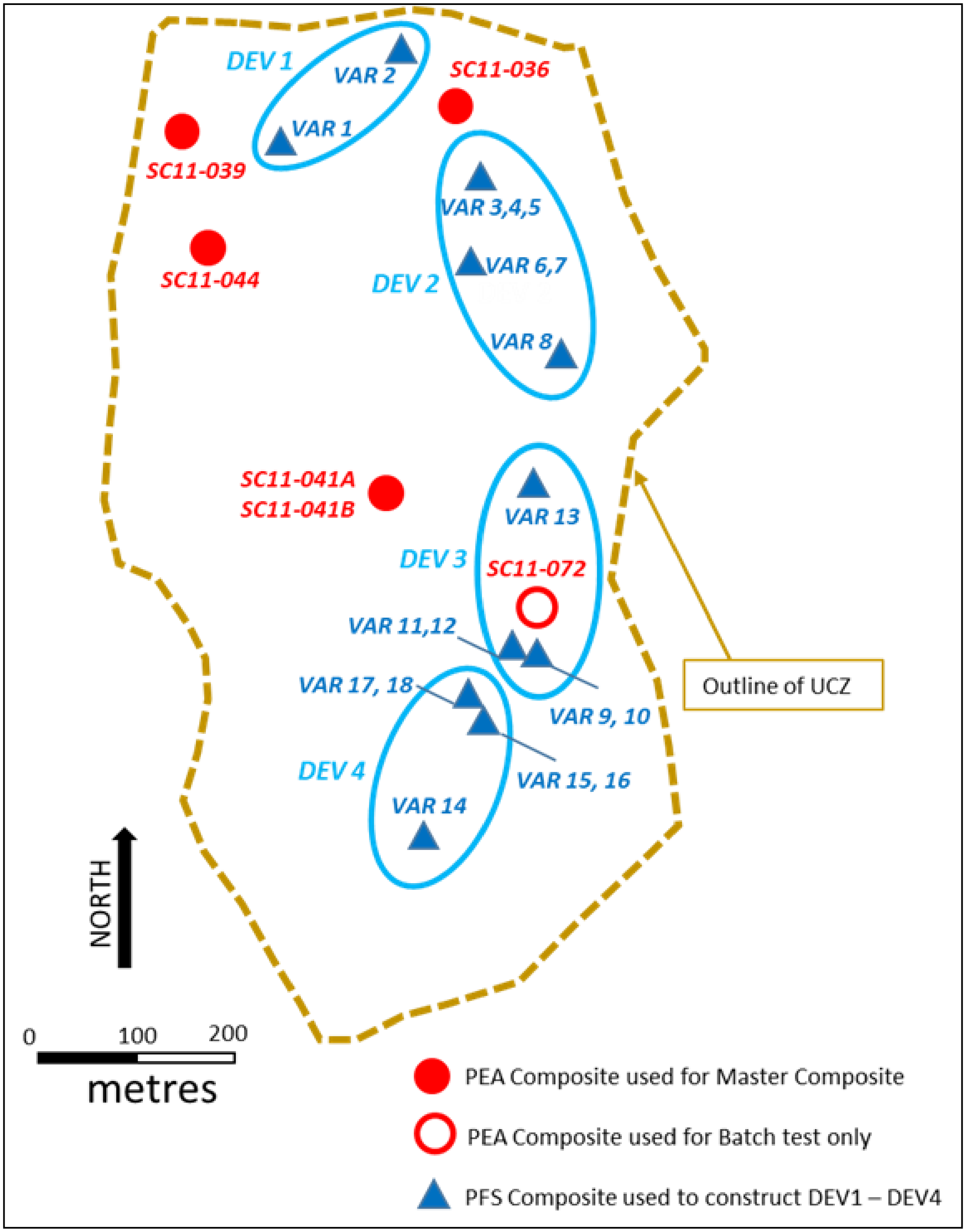
Metallurgical test work of composites from the LCZ exhibits relatively uniform metallurgical performance with good Cu recoveries even at coarse grind sizes (Shi and Redfearn, 2012b; Ding and Prout, 2016) whereas the UCZ requires fine grinding and exhibits a significant range in Cu recovery metrics between different drillhole composites (Ding and Prout, 2016; Shouldice and Pojhan, 2019). Given the good flotation performance of the LCZ most of the more recent test work (Shouldice and Pojhan, 2019) has aimed at optimizing recoveries from the UCZ and developing a predictive geometallurgical model for recoveries from different parts of the UCZ (Hilliard, 2019). Confirmatory testing of a blend of UCZ and LCZ material has also been completed to ensure that the UCZ optimized flow-sheet provides Cu recoveries of LCZ mineralization and does not result in reduced UCZ recovery (Shouldice and Pojhan, 2019).

13.1 Testing and Procedures

13.1.1 Historic UCZ testing

The 2013 Tintina PEA testing was completed using a master composite derived from drillholes in the northern and central parts of the UCZ (Figure 13-1). After initial batch rougher and cleaner optimization, the flow- sheet selected by Shi and Redfearn (2012a) utilized a primary grind of 38 µm K_{80} and a rougher concentrate regrind of 8µm K_{80}. Lime was added as a pH conditioner to suppress pyrite. SIPX and Cytec 3418A were used as collectors and MIBC as a frother (Shi and Redfearn, 2012a).

Locked Cycle Tests (LCT) on the master composite demonstrated Cu Recoveries of 82.2% at an average Cu concentrate grade of 21.7% (Shi and Redfearn, 2012a). Batch cleaner variability tests were conducted on four of the five the drillhole composites used to construct the master composite. Cu recoveries from these variability tests ranged from 71.6% to 79.5% at Cu concentrate grades ranging from 12.9% to 19.7% Cu (Shi and Redfearn, 2012a). Although the batch variability tests are not directly comparable to the LCT's they demonstrated a relatively small amount of variability in flotation response (although the 12.9% Cu concentrate grade for the southernmost sample, from SC11-041, was of concern). This concern was emphasized by subsequent batch cleaner testing on a sample from a drillhole in the southern part of the UCZ (SC11-072) that returned a Cu recovery of 66.7% at a concentrate grade of 10.2% Cu (Shi and Redfearn, 2012b).



Source: SRA, 2019

Figure 13-1: Plan View of Upper Copper Zone Showing Location of Samples Used for Metallurgical Testing During the 2013 Tintina PEA and SGS Testing

The flowsheet developed during SGS testing utilized a 30µm K_{80} primary grind and a 10µm K_{80} regrind of the rougher concentrate.

LCT's during the SGS testing were conducted on four master composites (DEV1 to DEV4) that were constructed from 18 drillhole composites (VAR1 to VAR18) (Figure 13-1). Whereas the drillhole composites used to develop the 2013 Tintina PEA master composite were restricted to the northern and central parts of the UCZ, the drillholes used to construct DEV 1 to DEV 4 extended from the northern to the southern part of the UCZ (Figure 13-1).

Excluding the SGS tests using sodium cyanide addition to the cleaner circuit (not a viable option in Montana for environmental reasons) the DEV1 to DEV4 LCT tests showed Cu recoveries that ranged from 61.9% to 91.2% at Cu concentrate grades of 18.5% to 24.5% (Table 13-1) (Ding and Prout, 2016). Of particular import was that the recoveries in the southern parts of the orebody were significantly lower than those from the north.

Table 13-1: Locked Cycle Test Results from the SGS Metallurgical Test Program

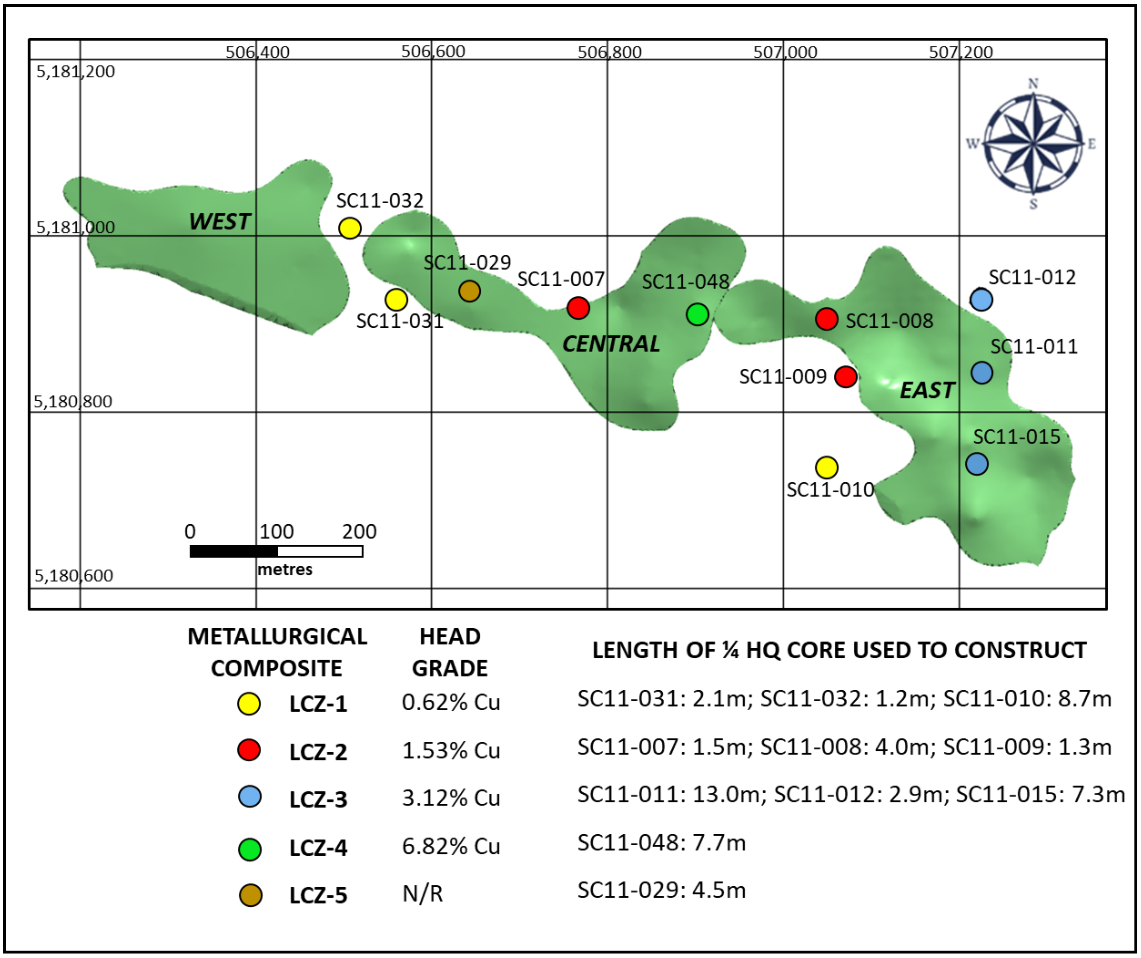
Composite	Cu Recovery	Concentrate Grade
	(%)	(%)
DEV1	84.1 to 88.2	24.5 to 20.6
DEV2	86.1 to 91.2	23.7 to 24.5
DEV3	70.4 to 76.5	18.5 to 23.1
DEV4	61.9 to 68.9	19.7 to 22.7

Source: SRA, 2019
The flow-sheet was not finalized thus recoveries and concentrate grades show the ranges of the different tests. This Table excludes tests where cyanide was added to the cleaner circuit.

The PEA and SGS metallurgical test work indicated that the UCZ is characterized by a large degree of variability in flotation response and suggested that the mineralization from the northern part of the deposit would likely deliver Cu recoveries that were better than that from the south.

13.1.2 Historic LCZ testing

During the PEA testing, five composites, LCZ-1 to LCZ-5, were developed (Figure 13-2) and a master composite (LCZ-OA Head Grade = 4.05% Cu) was constructed using material from each of the five composites.



METALLURGICAL COMPOSITE		HEAD GRADE	LENGTH OF ¼ HQ CORE USED TO CONSTRUCT
🟡	**LCZ-1**	0.62% Cu	SC11-031: 2.1m; SC11-032: 1.2m; SC11-010: 8.7m
🔴	**LCZ-2**	1.53% Cu	SC11-007: 1.5m; SC11-008: 4.0m; SC11-009: 1.3m
🔵	**LCZ-3**	3.12% Cu	SC11-011: 13.0m; SC11-012: 2.9m; SC11-015: 7.3m
🟢	**LCZ-4**	6.82% Cu	SC11-048: 7.7m
🟤	**LCZ-5**	N/R	SC11-029: 4.5m

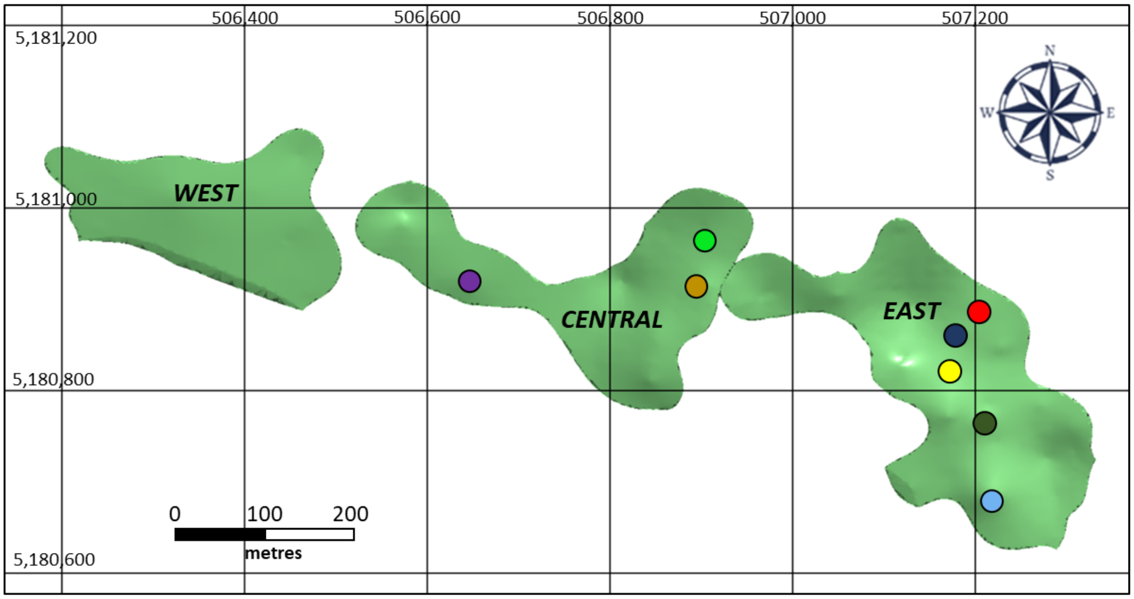
Source: SRA, 2019

Figure 13-2: Plan View of the LCZ Showing >2% Cu Mineralization Wireframes Used for the Current Resource Estimate and Drillhole Intersections Used to Construct the 2013 Tintina PEA Metallurgical Composites

A primary grind of 38µm K_{80} and no regrind was used for the LCZ PEA testing. Batch cleaner variability testing was completed on composites LCZ1 to LCZ4, returning Cu recoveries of 87.6% to 95.0% at concentrate grades of 16.6% to 28.1% Cu. LCT testing of LCZ-OA returned a Cu recovery of 96.6% at a Cu concentrate grade of 26.95% (Shi and Redfearn, 2012b).

For the SGS testing, eight variability composites (VAR19 to VAR26) were constructed (Figure 13-3). A master composite (DEV5; Cu Grade = 5.37%) was created using material from each of the variability composites. For all metallurgical tests on these samples a primary grind of 100 µm K_{80} was used (Ding and Prout, 2016). Cu recoveries from batch variability cleaner testing on VAR19 and VAR23-26) ranged from 88.4% to 98.3% at concentrate grades of 24.9% to 27.3% Cu. Regrind during variability cleaner tests ranged from 26 to 46µm.

A single LCT was completed using the LCZ master-composite (DEV5). For this test a primary grind of 100 µm K and a regrind of 42µm K_{80} was utilized. Cu recovery from this test was 93.3% at a concentrate grade of 30.8% (Ding and Prout, 2016).



METALLURGICAL COMPOSITE	HEAD GRADE	DRILLHOLE	METALLURGICAL COMPOSITE	HEAD GRADE	DRILLHOLE
🟡 **VAR-19**	6.67% Cu	SC12-100	🔵 **VAR-23**	5.99% Cu	SC14-169
🔴 **VAR-20**	6.01% Cu	SC12-101	🟢 **VAR-24**	2.62% Cu	SC14-170
🔵 **VAR-21**	7.46% Cu	SC12-104	🟠 **VAR-25**	7.07% Cu	SC14-172
🟢 **VAR-22**	3.24% Cu	SC12-142	🟣 **VAR-26**	6.64% Cu	SC14-173

Source: SRA, 2019

Figure 13-3: Plan View of the LCZ Showing >2% Cu Mineralization Wireframes Used for the Current Resource Estimate and Drillhole Intersections Used to Construct the SGS Testing Metallurgical Composites

13.1.3 Historic Testing of Blended UCZ/LCZ

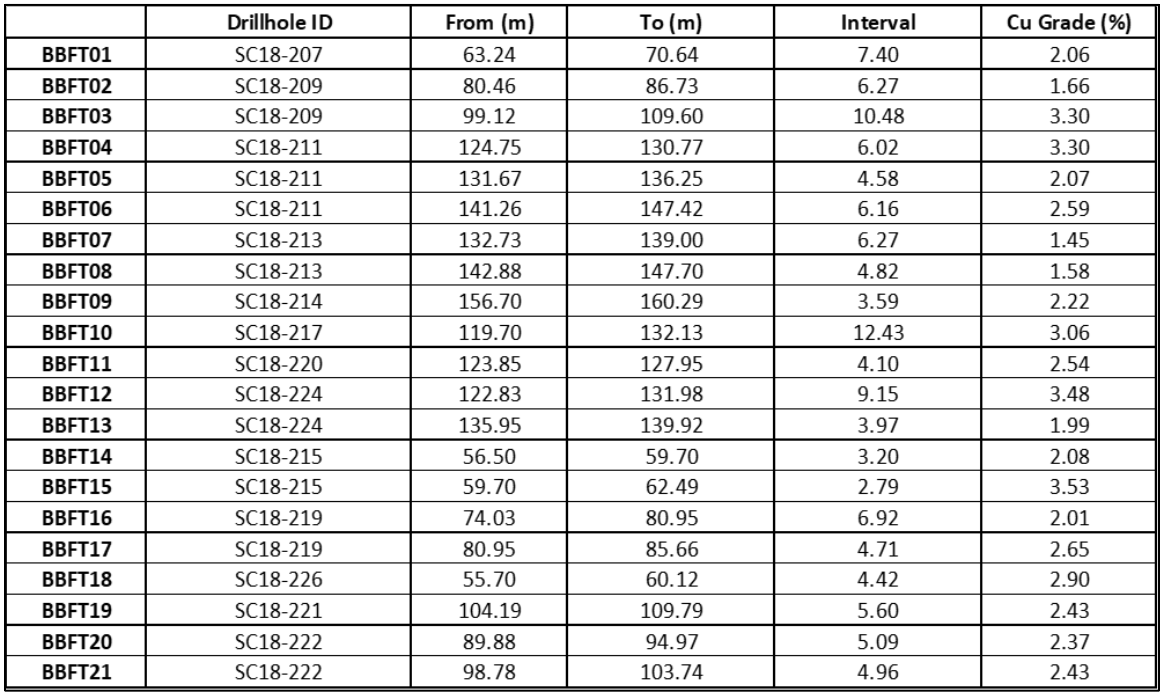
As part of the 2013 Tintina PEA, two locked cycle tests were completed using a blend of UCZ master composite (76%) and LCZ-OA composite (24%) (Shi and Redfearn, 2012a, 2012b). Using a primary grind of 38 µm K_{80} and a regrind of 10µm K_{80} a Cu recovery of 78.1% at a concentrate grade of 22.79% Cu was achieved. In the second locked cycle test a coarser regrind size (15 µm K_{80}) was used and Cu recovery was increased to 89.8% at a concentrate grade of 18.25% Cu. The mass-pull to concentrate in the second test was higher (12.6% versus 9.3%). Shi and Redfearn (2012b) noted that additional work was required to evaluate the flotation kinetics of UCZ/LCZ blends.

No metallurgical test work of blended UCZ and LCZ mineralization was conducted during the SGS testing.

13.1.4 UCZ Testing

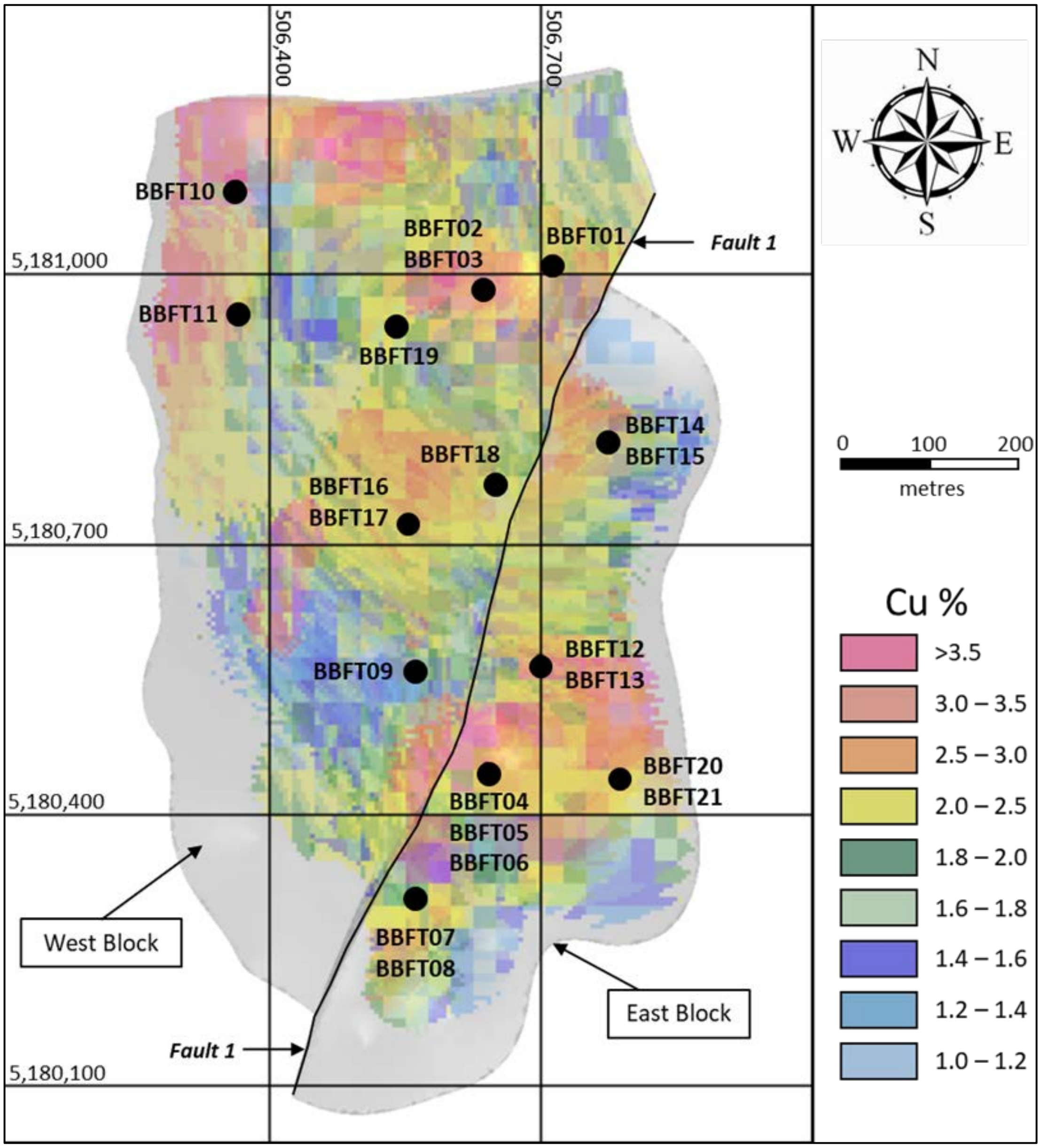
During the 2018 Phase 1 drill program, 19 PQ diameter diamond drillholes were completed in the UCZ for the purpose of acquiring samples for metallurgical test work. The drillholes were sited so as to intersect economically significant Cu mineralization, with different grades, from different ore-types (as defined by mineralogical and geometallurgical logging studies). In particular, the drillholes were sited to provide representative coverage of the orebody in both horizontal and vertical orientations. Of the 19 drillholes, 13 provided intersections that were considered suitable for metallurgical test work. From these 13 drillholes, 21 metallurgical composites were developed (Figure 13-4, Table 13-2).

Table 13-2: Drillhole, Intervals and Cu Grade of Metallurgical Composites BBFT01-21



	Drillhole ID	From (m)	To (m)	Interval	Cu Grade (%)
BBFT01	SC18-207	63.24	70.64	7.40	2.06
BBFT02	SC18-209	80.46	86.73	6.27	1.66
BBFT03	SC18-209	99.12	109.60	10.48	3.30
BBFT04	SC18-211	124.75	130.77	6.02	3.30
BBFT05	SC18-211	131.67	136.25	4.58	2.07
BBFT06	SC18-211	141.26	147.42	6.16	2.59
BBFT07	SC18-213	132.73	139.00	6.27	1.45
BBFT08	SC18-213	142.88	147.70	4.82	1.58
BBFT09	SC18-214	156.70	160.29	3.59	2.22
BBFT10	SC18-217	119.70	132.13	12.43	3.06
BBFT11	SC18-220	123.85	127.95	4.10	2.54
BBFT12	SC18-224	122.83	131.98	9.15	3.48
BBFT13	SC18-224	135.95	139.92	3.97	1.99
BBFT14	SC18-215	56.50	59.70	3.20	2.08
BBFT15	SC18-215	59.70	62.49	2.79	3.53
BBFT16	SC18-219	74.03	80.95	6.92	2.01
BBFT17	SC18-219	80.95	85.66	4.71	2.65
BBFT18	SC18-226	55.70	60.12	4.42	2.90
BBFT19	SC18-221	104.19	109.79	5.60	2.43
BBFT20	SC18-222	89.88	94.97	5.09	2.37
BBFT21	SC18-222	98.78	103.74	4.96	2.43

Source: SRA, 2019



Source: SRA, 2019

Blocks from the Resource model with grade >1.0% Cu are shown. The positions of metallurgical composites (BBFT01-21) are symbolized with black circles. Note that in 7 instances, multiple composites were prepared from the same drillhole to provide vertical coverage.

Figure 13-4: Plan View of the UCZ Showing East and West Blocks (Separated by Fault 1)

In order to construct the composites, whole PQ core Resource sample intervals for the entire mineralized zone (with a buffer zone) were dispatched to Base Metallurgical Laboratories, Kamloops (BML). Each Resource sample interval was coarse crushed, then fine crushed, and then split into 5 kg sub-samples. A 1 kg sub-sample was also split out, pulverized and assayed for Cu by BML. Using the Cu analyses and geometallurgical logging data, representative metallurgical composites were designed. The composite recipes were designed using combined length- and SG-weighting of Resource sample intervals. These recipes were provided to BML who constructed the composites using the specified mass of each Resource sample interval and then homogenized each composite (Shouldice and Pojhan, 2019).

Extensive laboratory metallurgical testing was undertaken at BML to determine the optimum primary grind size, regrind size, reagent suite and flow-sheet (Shouldice and Pojhan, 2019). Batch rougher testing at different primary grind sizes showed that 35µm K_{80} produced the best rougher recoveries.

Optimization of the cleaner circuit investigated several parameters, these included:

- Regrind size;
- Primary grind media type;
- Split flotation circuit Jameson tests; and
- Site water.

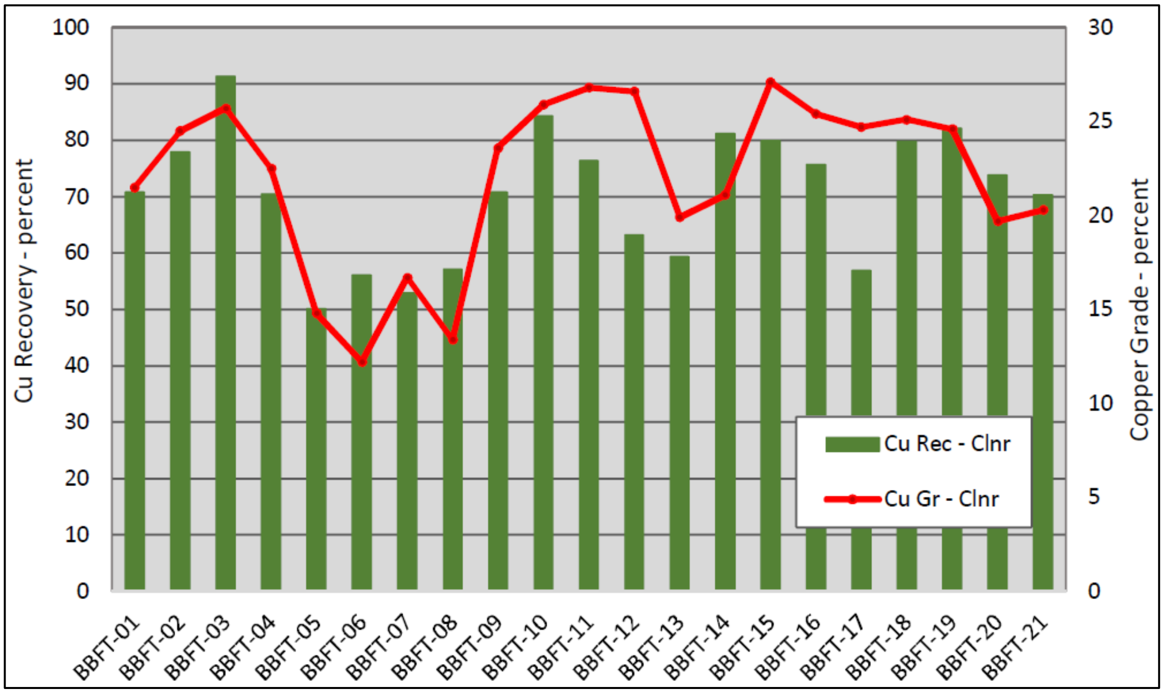
The impact of rougher concentrate re-grind sizes ranging from 5 to 25µm K_{80} was evaluated. For most of the composites, the optimal regrind size was 10µm K_{80}. At regrind sizes coarser than 10µm K_{80} copper recoveries degraded, presumably due to insufficient liberation. At regrind targets finer than 10µm K_{80}, copper recoveries reduced due to higher losses in the cleaner tailing stream. For the finer regrind tests, additional collector was added to account for the increased surface area at finer particle sizes. A regrind target of 10µm K_{80} was adopted for the final standard conditions (Shouldice and Pojhan, 2019)

The use of stainless-steel media in primary grinding was investigated with a series of kinetic first cleaner tests. The data indicated that media type (stainless versus mild) did not have a significant impact on the metallurgical performance. The use of stainless primary grinding media was adopted for the final standard conditions based on reduced media wear and to reduce iron in solution (Shouldice and Pojhan, 2019).

Due to the relatively high rougher mass recovery and very fine regrind size needed for some of the samples an alternative split regrinding and cleaner flowsheet was investigated on three samples. This gave mixed results and whilst showing some potential for reduction of fine liberated Cu in the cleaner tailings (potentially by using a Jameson cell) this was not adopted for the final standard conditions (Shouldice and Pojhan, 2019).

Site water sourced from water monitoring drillholes that intersect the UCZ orebody was used to evaluate the impact of site water on metallurgical performance. There were no significant differences between identical tests performed using site water and Kamloops tap water (Shouldice and Pojhan, 2019).

At the completion of optimization testing, a three-stage batch cleaner test was performed on each of the 21 composites samples using the final standard conditions. The results of this testing show the highly variable metallurgical characteristics of the UCZ (Figure 13-5).



Source: Shouldice and Pojhan, 2019

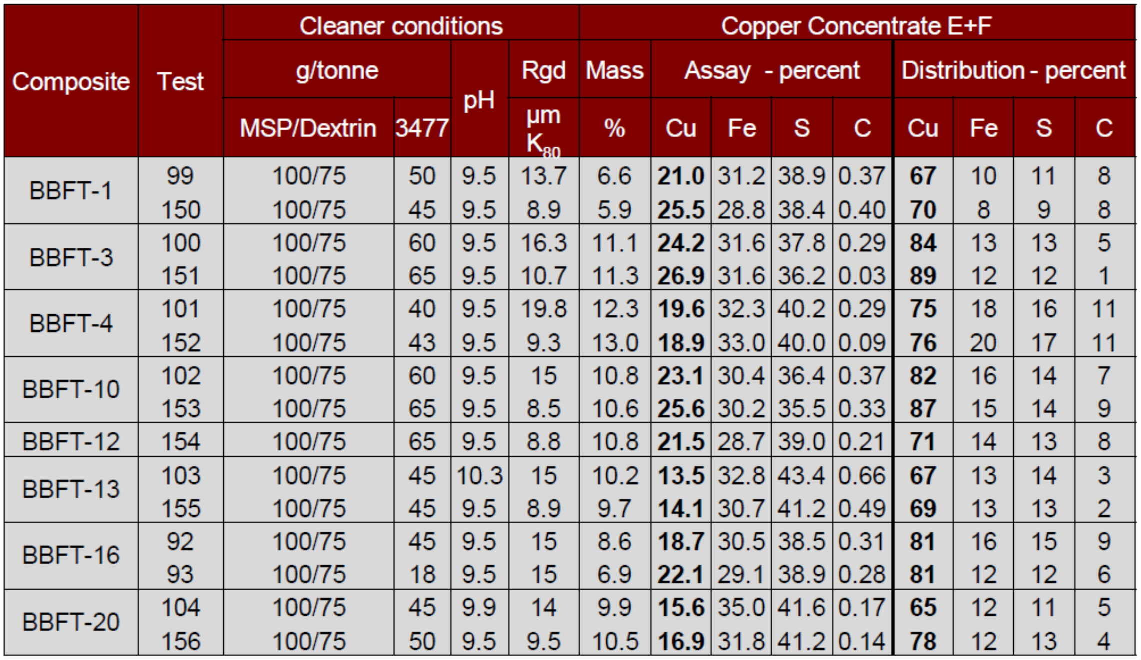
Figure 13-5: Metallurgical Performance of UCZ Metallurgical Composites BBFT-01 to BBFT21 During Cleaner Tests Using the Final Standard Conditions

Two sets of LCT's were performed on a subset of composites from the UCZ (Table 13-3). The composite subset was selected to best represent the overall characteristics of the UCZ in terms of grade, geological variation and spatial location. For the second series an additional composite (BBFT-12) was added to the subset. The flow-sheet used for the UCZ LCT's is show in Figure 13-6.

The first set of LCT's used mild steel primary grinding media, a primary grind of 38 µm K_{80} and a rougher concentrate target regrind size of 15µm K_{80}. After continuing optimization batch tests, the second set of LCT's were performed using a stainless-steel primary grind charge and a finer regrind target of 10 µm K_{80} (Shouldice and Pojhan, 2019).

As shown in Table 13-3, the adjustment in conditions for the second set of LCT's improved the performance of all of the composites. Using a mild steel charge and coarser regrind, Cu was on average 74.5% recovered into a concentrate grading 19.4% Cu. The stainless grinding charge and finer regrind size recovered an average of 77.6% of the Cu from the feed into a concentrate grading 21.4% Cu.

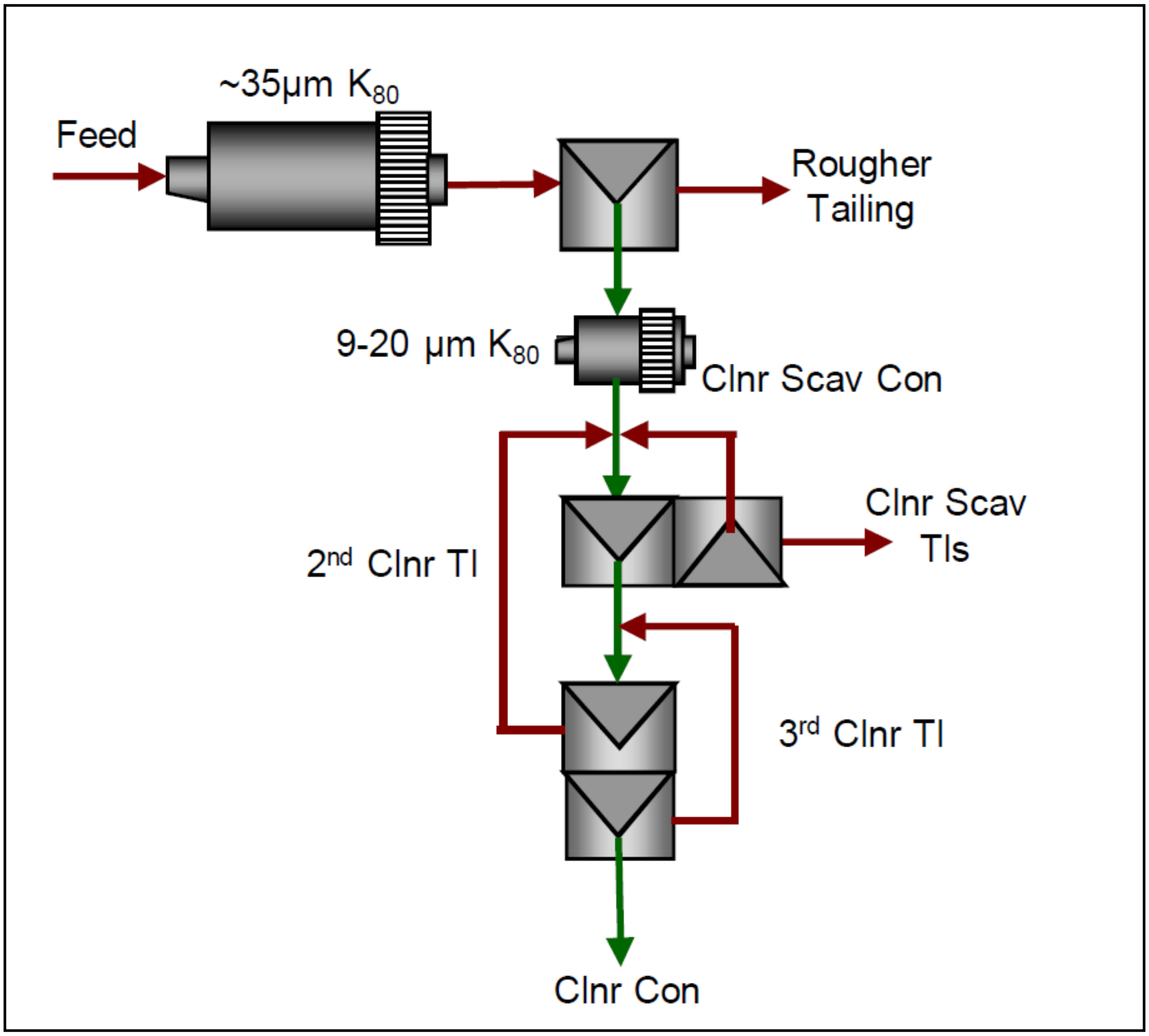
Table 13-3: Results from the Two Sets of Locked Cycle Tests Conducted on UCZ Metallurgical Composites



Composite	Test	Cleaner conditions				Copper Concentrate E+F								
		g/tonne		pH	Rgd	Mass	Assay - percent				Distribution - percent			
		MSP/Dextrin	3477		µm K_{80}	%	Cu	Fe	S	C	Cu	Fe	S	C
BBFT-1	99	100/75	50	9.5	13.7	6.6	**21.0**	31.2	38.9	0.37	**67**	10	11	8
	150	100/75	45	9.5	8.9	5.9	**25.5**	28.8	38.4	0.40	**70**	8	9	8
BBFT-3	100	100/75	60	9.5	16.3	11.1	**24.2**	31.6	37.8	0.29	**84**	13	13	5
	151	100/75	65	9.5	10.7	11.3	**26.9**	31.6	36.2	0.03	**89**	12	12	1
BBFT-4	101	100/75	40	9.5	19.8	12.3	**19.6**	32.3	40.2	0.29	**75**	18	16	11
	152	100/75	43	9.5	9.3	13.0	**18.9**	33.0	40.0	0.09	**76**	20	17	11
BBFT-10	102	100/75	60	9.5	15	10.8	**23.1**	30.4	36.4	0.37	**82**	16	14	7
	153	100/75	65	9.5	8.5	10.6	**25.6**	30.2	35.5	0.33	**87**	15	14	9
BBFT-12	154	100/75	65	9.5	8.8	10.8	**21.5**	28.7	39.0	0.21	**71**	14	13	8
BBFT-13	103	100/75	45	10.3	15	10.2	**13.5**	32.8	43.4	0.66	**67**	13	14	3
	155	100/75	45	9.5	8.9	9.7	**14.1**	30.7	41.2	0.49	**69**	13	13	2
BBFT-16	92	100/75	45	9.5	15	8.6	**18.7**	30.5	38.5	0.31	**81**	16	15	9
	93	100/75	18	9.5	15	6.9	**22.1**	29.1	38.9	0.28	**81**	12	12	6
BBFT-20	104	100/75	45	9.9	14	9.9	**15.6**	35.0	41.6	0.17	**65**	12	11	5
	156	100/75	50	9.5	9.5	10.5	**16.9**	31.8	41.2	0.14	**78**	12	13	4

Source: Shouldice and Pojhan, 2019

The primary grinds for tests 99 to 104 were conducted with mils steel rods. Tests 150-156 were done with stainless steel rods and a finer regrind.

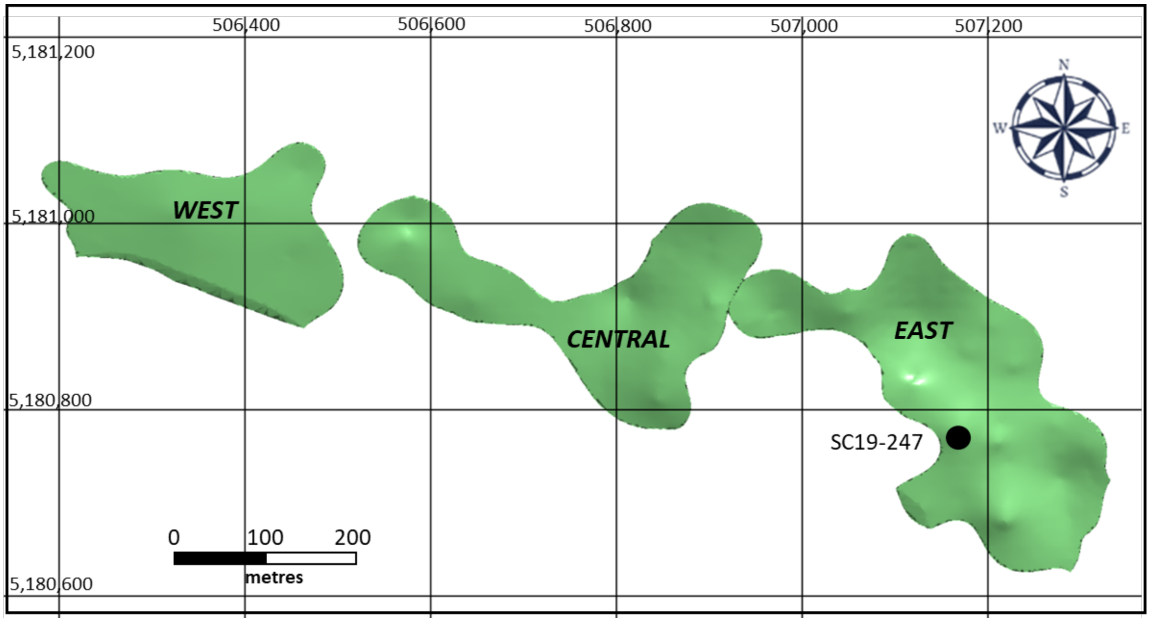


Source: Shouldice and Pojhan, 2019

Figure 13-6: Flow Sheet Adopted for Locked Cycle Tests of UCZ Composites

13.1.5 LCZ Testing

A LCZ composite was constructed using a 7 m drill core intersection from drillhole SC19-247 (Figure 13-7).



Source: SRA, 2019

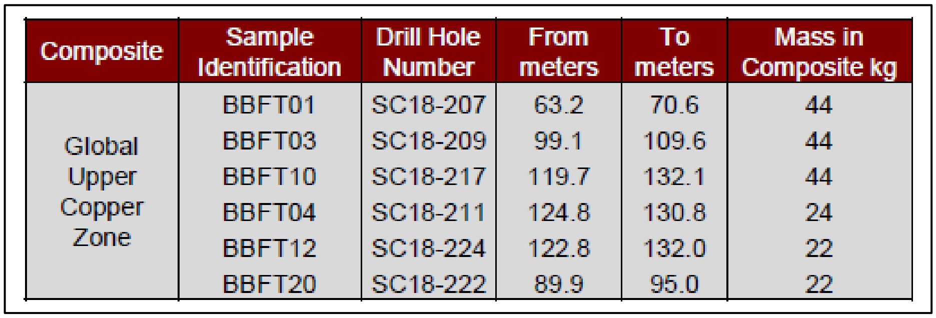
Figure 13-7:Plan View of the LCZ Showing >2% Cu Mineralization Wireframes Used for the Current Resource Estimate and the Drillhole Intersection Used to Construct the 2019 LCZ Metallurgical Composite

A kinetic first cleaner test was performed on the LCZ composite using the flowsheet and conditions developed for the UCZ by Shouldice and Pojhan (2019) but at a coarser primary grind size of 53µm K_{80} and coarser regrind size of 24µm K_{80}. Copper in the feed was 92.3% recovered into a concentrate grading 26.1% Cu. Due to the good first cleaner result, no locked cycle testing was conducted on this composite (Shouldice and Pojhan, 2019).

13.1.6 Blended UCZ/LCZ Testing

A Global UCZ Composite was constructed using six composites that had been used for LCT's Table 13-4. An LCT using the final flow sheet was conducted to produce concentrate and tailings samples for other test work. The Global UCZ composite LCT test returned a Cu recovery of 81.6% into a concentrate grading 24.4% Cu. Using the LCT recoveries from the individual composites that were used to construct the UCZ Global Composite (weighted by mass and head Cu grade) it would have been expected that the UCZ Global Composite would have returned a Cu recovery of 80.5% (which compares very favorably with the actual recovery).

Table 13-4: Proportions of UCZ Composites Used for the Development of the Global UCZ Composite



Composite	Sample Identification	Drill Hole Number	From meters	To meters	Mass in Composite kg
Global Upper Copper Zone	BBFT01	SC18-207	63.2	70.6	44
	BBFT03	SC18-209	99.1	109.6	44
	BBFT10	SC18-217	119.7	132.1	44
	BBFT04	SC18-211	124.8	130.8	24
	BBFT12	SC18-224	122.8	132.0	22
	BBFT20	SC18-222	89.9	95.0	22

Source: Shouldice and Pojhan, 2019

A blend of 76% UCZ Global Composite and 24% LCZ Composite was created to determine the effect of blending LCZ and UCZ ore. The LCT of the UCZ - LCZ blend was conducted using the final standard conditions for the UCZ. Cu in the feed was 93.2% recovered into a concentrate grading 21.5% Cu (Shouldice and Pojhan, 2019). Assuming that the recovery from the portion of the Global UCZ composite in the LCT of the blend was equivalent to that of the LCT for the Global UCZ composite then the metallurgical balance predicts a LCZ recovery in the blend greater than 100%. This test indicated no negative synergies of mixing the two feed sources and highlights potential for positive synergies.

13.1.7 Summary of Metallurgical Test Results

The recent metallurgical testing, conducted by Shouldice and Pojhan (2019), has resulted in the development of a final standard process flow-sheet for the UCZ. LCT's of seven UCZ composites, using this flow sheet, has shown variable Cu recoveries ranging from 70% to 87%. Variability batch cleaner tests on 21 UCZ composites returned Cu recoveries ranging from 49% to 91%.

Historic metallurgical testing of LCZ composites has shown Cu recoveries to concentrate are good and relatively homogenous. This was confirmed using batch cleaner testing using the final standard process flow-sheet for this study wherein a Cu recovery of 92.3% at a concentrate Cu grading 26.1% Cu was achieved. LCT's on the LCZ-OA master composite during the PEA returned a Cu recovery of 96.6% to a concentrate grading 26.95% Cu. LCT's on the DEV5 master composite during the SGS testing showed 93.3% Cu recovery to a concentrate grading 30.8% Cu. Based on these results a LCZ Cu recovery to concentrate using the final standard process flow-sheet is estimated to be 94%.

LCT's of blended UCZ and LCZ composite material, using the standard process flow sheet indicated that there were no negative impacts on recovery estimates for the UCZ or LCZ.

13.1.8 Geometallurgical Model for the UCZ

Due to the high amount of variability in UCZ metallurgical characteristics a geometallurgical study was completed (Hilliard, 2019).

Comparison between mineragraphy observations and metallurgical test results indicated that, once flotation chemistry was optimized, UCZ Cu recovery variability is largely a function of Cu sulphide liberation (McArthur, 2018; Shouldice and Pojhan, 2019; Hilliard, 2019).

Attempts to model the mineralization characteristics using macro-scale physical observation (categorized proportional geometallurgical logging) showed that physical characteristics define broad trends when plotted against Cu recovery estimates but that these trends were not precise enough to allow for Cu recovery estimation (Hilliard, 2019).

Geochemical discrimination, using comprehensive analytical data, between samples with different Cu recovery characteristics was not possible as there is significant geochemical overlap between composites with different Cu recoveries (Blaine and Best, 2017; Blaine, 2018a; Blaine, 2018b). The lack of correlation between metallurgical recovery and mineralized chemistry supports the interpretation that UCZ Cu recovery is primarily a function of Cu sulphide liberation.

Systematic mineragraphy for the 21 UCZ metallurgical composites (BBFT01-21) has been completed by McArthur (2018). The mineralogically estimated pyrite content and chalcopyrite liberation characteristics of these composites correlate with Cu recovery from batch variability cleaner tests conducted on 19, non-supergene altered metallurgical composites (Figure 13-8). A regression-based formula, derived by Shouldice and Pojhan (2019), allows estimation of variability test cleaner Cu recovery using the mineragraphy derived metrics of McArthur (2018):

Variability Test Cu Cleaner Recovery = 94.144 + (0.10615*(A+B)) + (-0.28667*(C+D)) + (-0.26708*E)

_A_ =% Chalcopyrite Interlocked with Marcasite/Siegenite

_B_ =% Chalcopyrite Interlocked with Gangue

_C_ =% Chalcopyrite in Ternary Grains

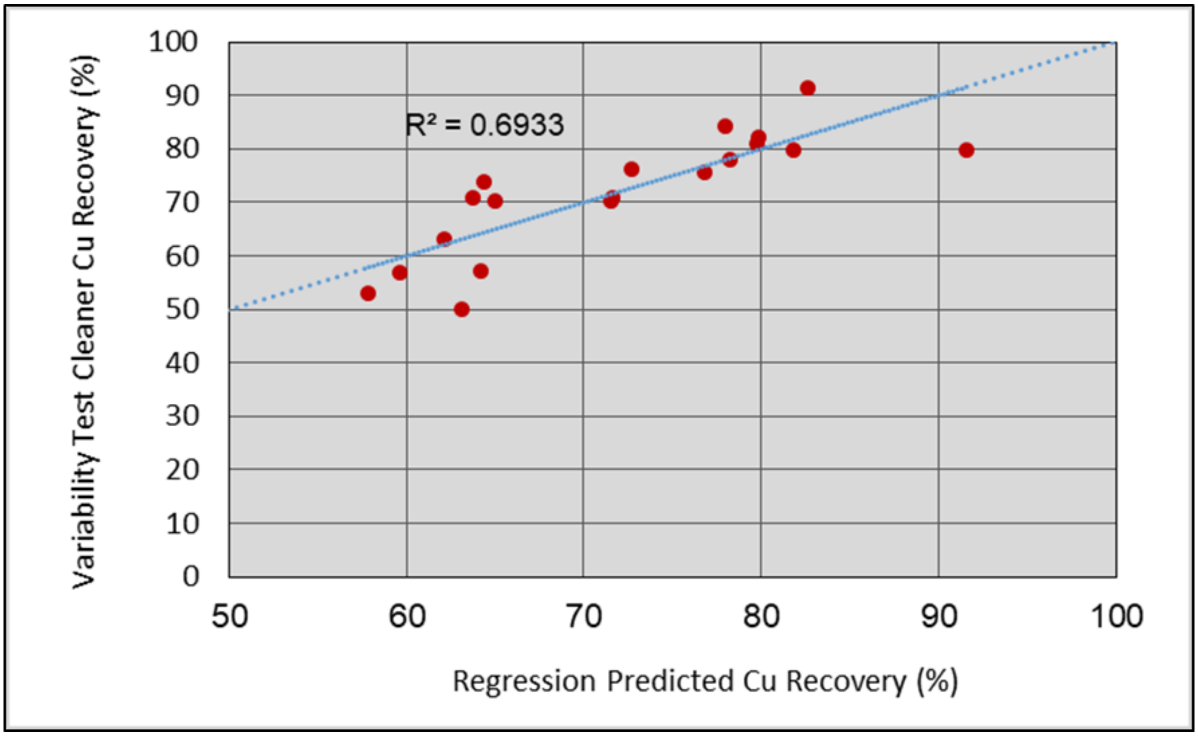
_D_ =% Chalcopyrite in Quaternary Grains

_E_ =% Pyrite

There is a robust linear correlation (Figure 13-9) between the variability test cleaner Cu recovery and LCT cleaner Cu recovery for the 6, non-supergene altered metallurgical composites (Hilliard, 2019):

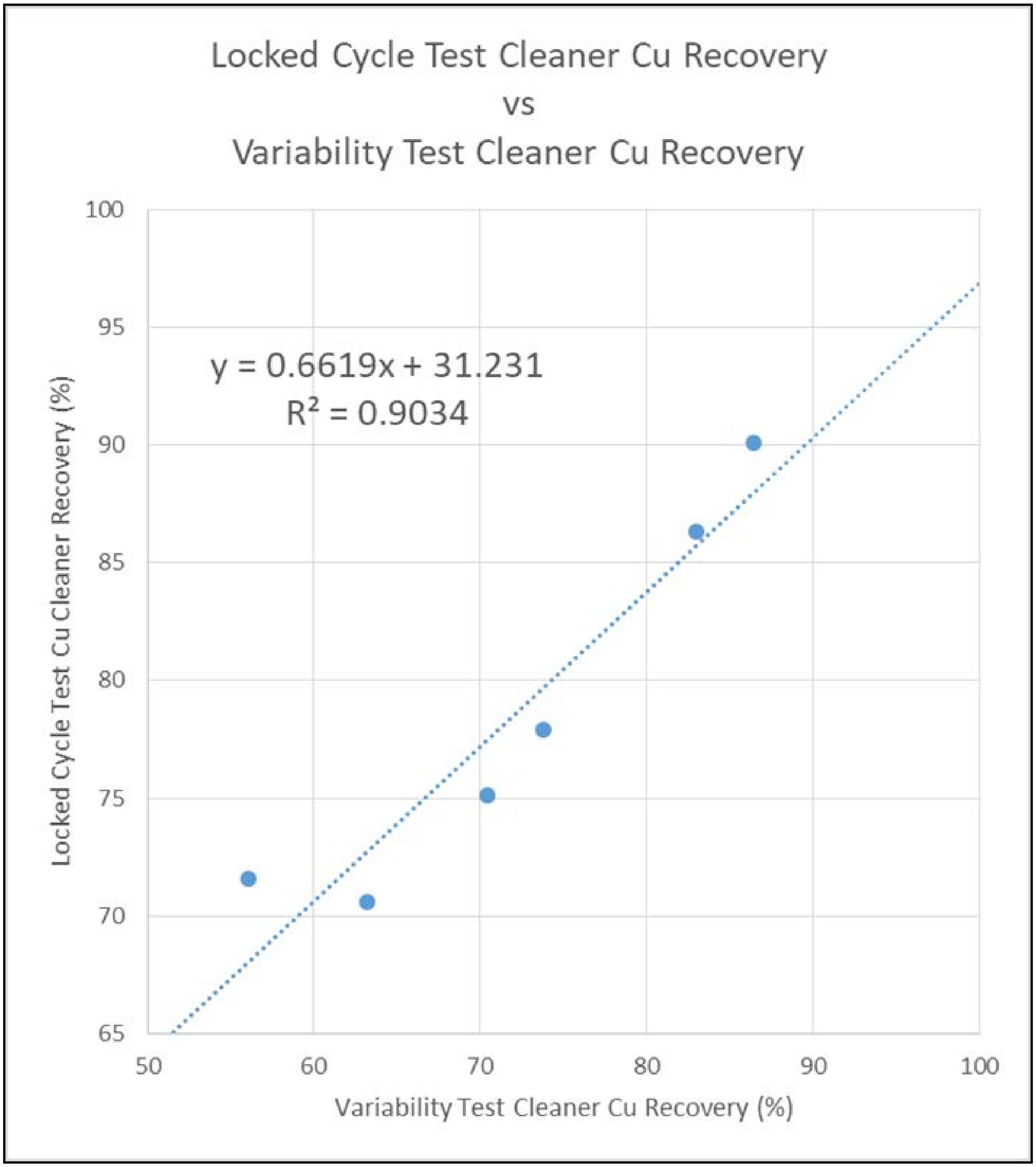
Locked Cycle Test Cu Cleaner Recovery = (0.6619 * Variability Test Cu Cleaner Recovery) + 31.231

Using the two formulae above, systematic mineragraphy metrics from 113, non-supergene altered, UCZ composites (McArthur, 2017a, 2018, 2019), spaced throughout the UCZ (both laterally and vertically) have been converted into LCT cleaner Cu recovery estimates. IDW2 interpolation of these Cu recovery estimates has been completed to create a geometallurgical Cu recovery block model (Figures 13-10 to Figure 13-13) (Hilliard, 2019). The geological model boundaries (wireframes) used to constrain this model are identical to those of the UCZ Mineral Resource estimate, allowing integration of the geometallurgical and Mineral Resource models to develop Recovery and Recoverable Cu Grade fields for the Mineral Resource estimate.



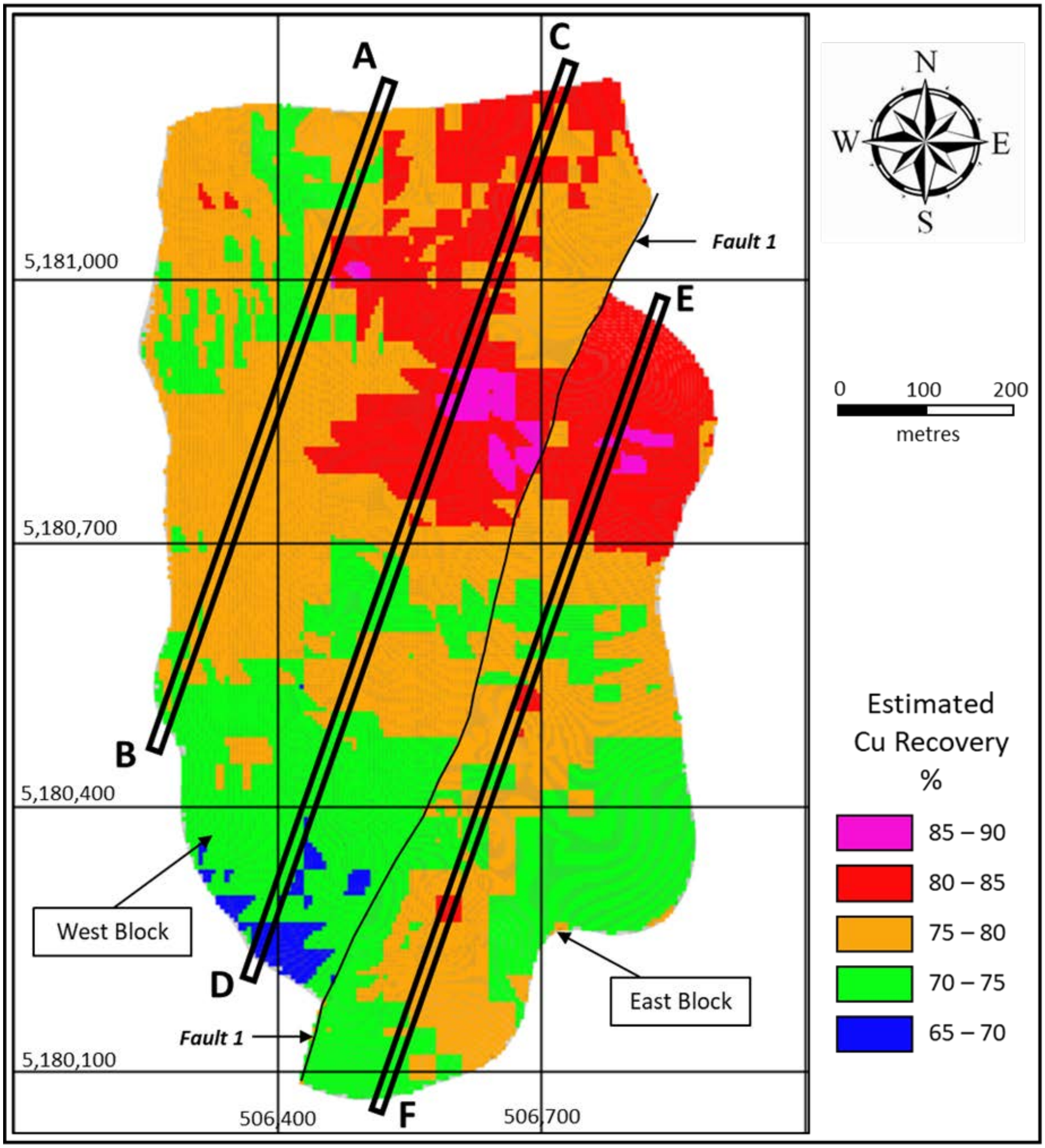
Source: Shouldice and Pojhan, 2019

Figure 13-8: Plot of Variability Test Cu Cleaner Recovery Versus Regression Based Predicted Cu Recovery for Non-Supergene Altered BBFT Composites



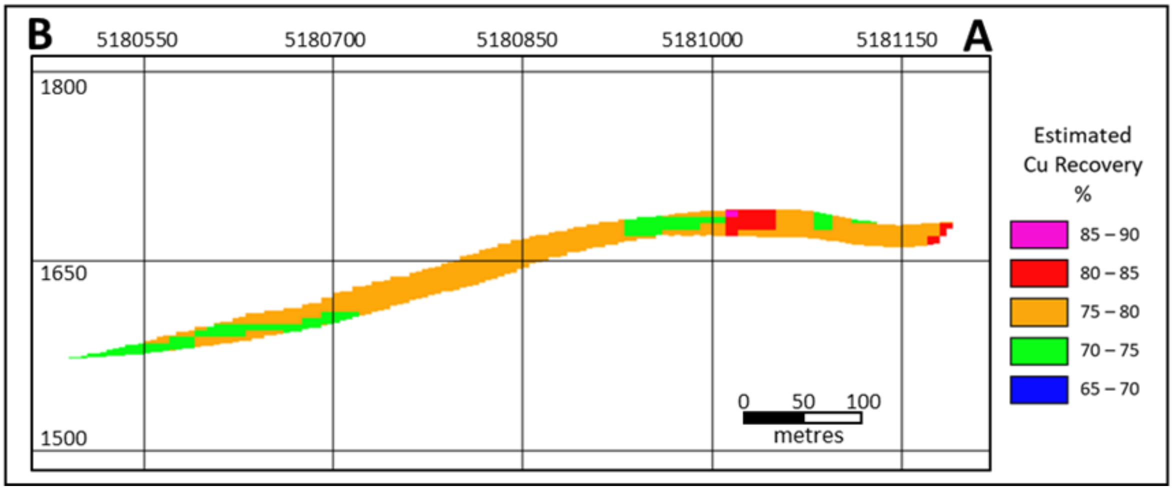
Source: Hilliard, 2019

Figure 13-9: Plot of Locked Cycle Test Cleaner Cu Recovery Versus Cleaner Test Cu Recovery for Non-Supergene Altered BBFT Composites



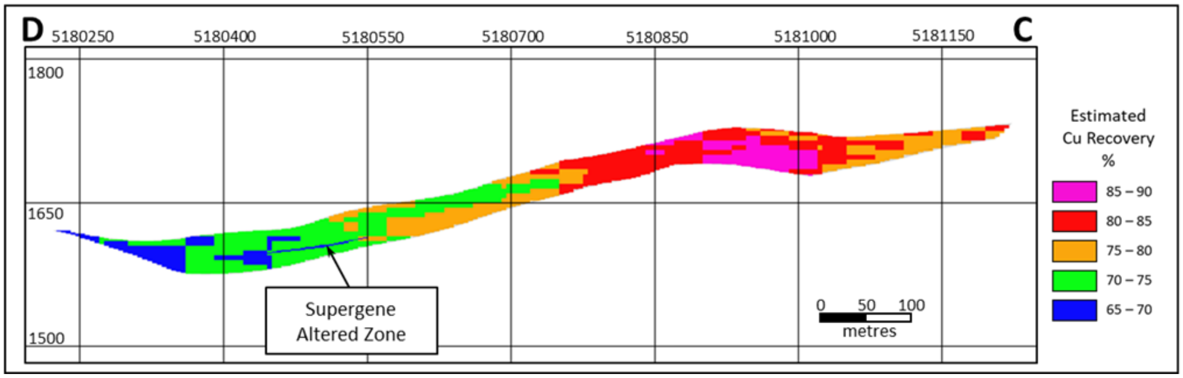
Source: Hilliard, 2019
The Locations of Cross-Sections in Figures 13-11 to 13-13 are indicated.

Figure 13-10: Plan View of the Geometallurgy Block Model, Symbolized by Estimated Cu Recovery



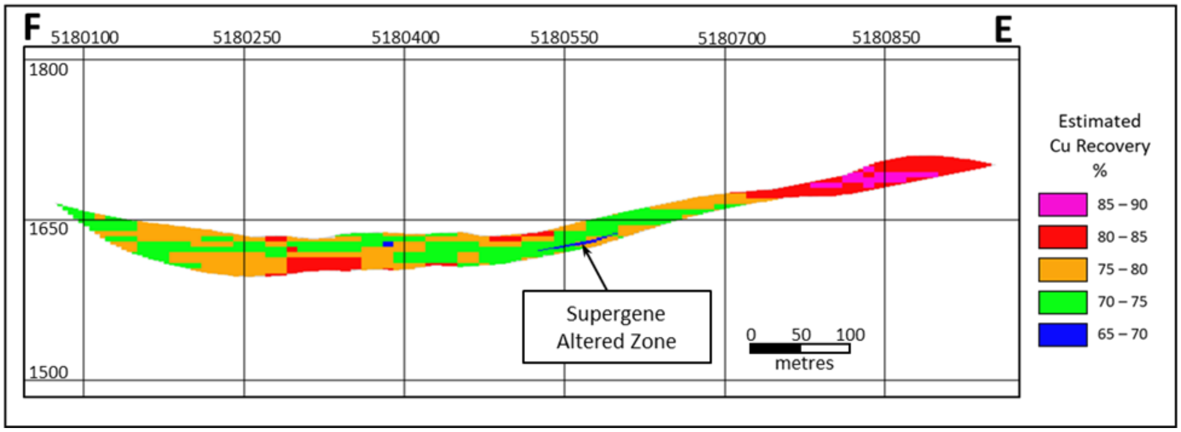
Source: Hilliard, 2019

Figure 13-11: Cross-Section from A to B of the Geometallurgy Block Model (Looking West) Symbolized by Estimated Cu Recovery



Source: Hilliard, 2019

Figure 13-12: Cross-Section from C to D of the Geometallurgy Block Model (Looking West) Symbolized by Estimated Cu Recovery



Source: Hilliard, 2019

Figure 13-13: Cross-Section from E to F of the Geometallurgy Block Model (Looking West) Symbolized by Estimated Cu Recovery

With the exception of a small portion of the northeastern corner of the UCZ, the surficial regolith profile does not intersect the UCZ (Hilliard, 2019). The portion of the UCZ that is surficially oxidized has been excluded from the UCZ Mineral Resource estimate. Structurally controlled supergene alteration of Cu sulphide minerals, below the level of surficial oxidation in the UCZ, occurs along a bedding sub-parallel brittle-ductile shear zone identified by Lebrun (2018). In this supergene alteration zone primary Cu sulphides (chalcopyrite, tennantite, primary bornite) have been altered to chalcocite, covellite and secondary bornite (McArthur, 2017a, 2108, 2019). The amount of supergene alteration of Cu sulphides along the brittle-ductile shear zone is low (generally <5%) and does not materially impact the Cu recovery as estimated using mineragraphy based cumulative yield curves (McArthur, 2017a, 2018, 2019; Hilliard, 2019). Where the brittle-ductile shear zone intersects, and is offset by, Fault 1 the amount of supergene alteration of Cu sulphides exceeds 20% and the impact on cumulative yield curves is significant (Hilliard, 2019). Two geological wireframes have been constructed to encapsulate the zone of >20% supergene alteration (Figures 13-12 and 13-13), one for the West block and one for the East block (Hilliard. 2019).

Two batch cleaner tests were performed on composites of >20% supergene altered material (BBFT06 and BBFT13). The two composites returned similar Cu recoveries that were both markedly lower than those of the surrounding non-supergene altered or weakly supergene altered metallurgical composites (Hilliard, 2019). A LCT on metallurgical composite BBFT13 returned a Cu recovery of 69.8%. This Cu recovery estimate has been applied to the modelled >20% supergene alteration zones in the geometallurgical Cu recovery model.

13.2 Recovery Estimate Assumptions

Metallurgical test work has been used to develop an optimized process flow sheet with the following characteristics:

- Primary Grind 35µm K_{80} using stainless steel grinding media;
- Rougher Flotation;
- Regrind of Rougher Concentrate to 10µm $K_{80;}$ and
- 3 Stage Cleaner Circuit with Cleaner Scavenger.

Using this flow sheet, it is estimated that the LCZ mineralization will report Cu recoveries of 94.0%.

Cu sulphide liberation parameters in non-supergene altered UCZ mineralization are highly variable such that Cu recovery estimates range from 68.2 to 87.9%. Liberation metrics for UCZ Cu sulphides, recorded during systematic mineralogical investigation, correlate with recovery and have been used to develop a Cu recovery block model for the UCZ.

Localized supergene alteration of UCZ mineralization occurs at the intersection of structures and alters the metallurgical characteristics of UCZ mineralization. Cu recovery from supergene altered zones is estimated at 69.8%.

13.3 Significant Factors

Extensive metallurgical testing has resulted in the development of a flexible process flowsheet to produce marketable-grade copper concentrate. The LCZ mineralization is coarse-grained and provides high copper recovery (more than 93%) in a clean concentrate. The UCZ mineralization is more complex due to a fine-grained copper and the presence of arsenic. The metallurgical response of this mineralization is variable, both in copper recovery and concentrate grade. The recent study in geometallurgy has resulted in developing a model to predict copper recovery for the UCZ. Additional testing is recommended to test and refine the model.

Blending of the ores from the UCZ and the LCZ will be beneficial to produce concentrate which will meet the specification for arsenic.

14 Mineral Resource Estimate

SRK's 2019 Mineral Resource block model and estimation for the Johnny Lee deposit of the Black Butte Copper Project was completed by SRA staff using Datamine Studio RM ™ under the guidance of the QP. The final Mineral Resource classification and calculations were performed by Mr. Erik Ronald, P.Geo, of SRK, using Maptek's Vulcan™ software.

14.1 Drillhole Database

The Johnny Lee deposit drilling data was extracted from the Sandfire Resources NL Structured Query Language (SQL) database as seven comma-separated value (.CSV) files with collar, survey, geology, assay, density, recovery, and structure information exported. These were subsequently imported into Datamine Studio RM™ version 1.4.132.0.

A total of 188 drillholes have been used to inform the 2019 Johnny Lee deposit Mineral Resource estimate including historic drilling and more recent drilling between 2010 and present (Table 14-1). A full description of drilling procedures, sample preparation, sample analysis and QA/QC is presented in Sections 10 and 11 of this report. Information relating to data management, and the validation of data is presented in Section 12.

Table 14-1: Number of Drillholes Informing the Mineral Resource Estimate by Drilling Campaign

Drilling Campaign	No. of Holes	Lode intercept meters
Historic Drilling	31	498
Tintina Resources Inc. 2010	5	99
Tintina Resources Inc. 2011	60	1,612
Tintina Resources Inc. 2012	44	1,185
Sandfire America 2014	11	307
Sandfire America 2018 Phase 1 & 2018/19 Phase 2	37	943

Source: SRA, 2019

14.1.1 Geometallurgical Data

A total of 125 UCZ high-grade composites, covering the entire UCZ have been investigated using systematic particle mineralogy (McArthur, 2017; 2018; 2019). Mineralogical observations from these composites allowed the >20% supergene altered areas to be modelled. Mineralogically -determined Cu sulphide liberation estimates (from non-supergene altered UCZ ore) were used, along with the metallurgical test data from variability and locked cycle flotation test work to develop a regression-based relationship between liberation and expected recovery.

After removal of the >20% supergene altered mineralogy composites and compositing of six pairs narrow-interval composites (that occur adjacent to each other in the same drillholes) a total of 113 mineralogy composites are available for Cu recovery estimation. Using the regression-based relationship, fresh rock UCZ Cu recoveries ranges from 68.2% to 87.9% with an average recovery of 77.4%. A recovery of 94% has been applied for the LCZ.

14.2 Geologic Model

A three-dimensional (3-D) lithostratigraphic and structural framework model of the Johnny Lee deposit has been developed. Within the framework of that model, Resource wireframes have been constructed for the Johnny Lee UCZ and Johnny Lee LCZ using Seequent's Leapfrog Geo™ v4.4 software.

14.2.1 Lithostratigraphic and Structural Framework Model

The development of a 3-D lithostratigraphic and structural model is an important element in ensuring that Resource wireframes are consistent with the geological framework within which the ore-bodies occur. A framework model is also a valuable input into geotechnical studies, where different rock types (such as those in the Johnny Lee deposit) exhibit different geomechanical characteristics and where structural elements (folds, faults, shear zones) locally modify those characteristics. In mining areas where rock types outside of the ore-bodies show markedly different densities, a framework model is used to assign densities to different lithotypes such that more accurate development and haulage metrics can be estimated.

As detailed in Section 7.2.2, a 3-D lithostratigraphic and structural framework model has been developed for the Johnny Lee area using Leapfrog Geo™. This model encompasses all areas of proposed mine development associated with the Johnny Lee Deposit.

14.2.2 Upper Copper Zone

The approach utilized for modeling the UCZ is to use the Cu analyses as the principle wireframe constraint but to ensure that the wireframes respect the geological framework and local lithological logging (shale and conglomerate lenses). Multiple mineralogical investigations were conducted to determine whether variations in copper-bearing minerals and their respective properties could be beneficially modeled. Ultimately, it was concluded that total copper grade provided the most robust volume for estimation purposes due to the variable nature of copper mineralization within the UCZ. Multiple Cu values were trialed based on natural breaks in slope or data with a 1.2% Cu shell ultimately providing appropriate mineralization breaks and continuity of mineralization within the UCZ. At grade shells below the 1.2% Cu grade, mineralization appears spotty and incorporates discontinuous pods of potentially uneconomic material at below 0.5% Cu, therefore the basis for the UCZ was selected at 1.2% Cu.

Various compositing methods and intervals were investigated with straight composites exhibiting minimal to no dilution and were the preferred method selected. The raw more than 1.2% Cu data showed the same overall zonation as the composited data but allowed accurate termination of the modelled wireframes at lithological boundaries

The mineralized zones were modelled using the raw analytical data at a 1.2% Cu boundary cut-off grade. In order to create realistic geological wireframes using this approach, it was essential to incorporate intervals of less than 1.2% Cu mineralization within the wireframe. Strict rules regarding inclusion of certain maximum widths of internal low-grade material have not be applied during wireframe generation but rather, geologically realistic solids have been modelled that incorporate variable amounts of <1.2% Cu mineralization.

Modelling of the more than 1.2% Cu mineralized zones was conducted using Interval Selection and the Vein System modelling protocols in Leapfrog Geo™. Mineralized intervals greater than 1.2% Cu were assigned a Vein ID (Interval Selection). The Vein System modelling protocol uses radial base function, implicit interpolation to create a Vein solid by linking HW and FW contacts from intervals that have been assigned the same Vein ID. Vein terminations occur where data–defined trends of

HW and FW contacts cause the surfaces to cross or where drilling data shows that the greater than 1.2% zone of mineralization pinches-out (i.e., a Vein ID has not been interval selected in a drillhole and the Pinch-out function of the Vein System protocol forces the HW and FW contacts to cross, using data defined trends, between the drillholes that contain the Interval selected Vein and the one that does not). Limited use was made of polylines (strings and points) to refine the Vein solids.

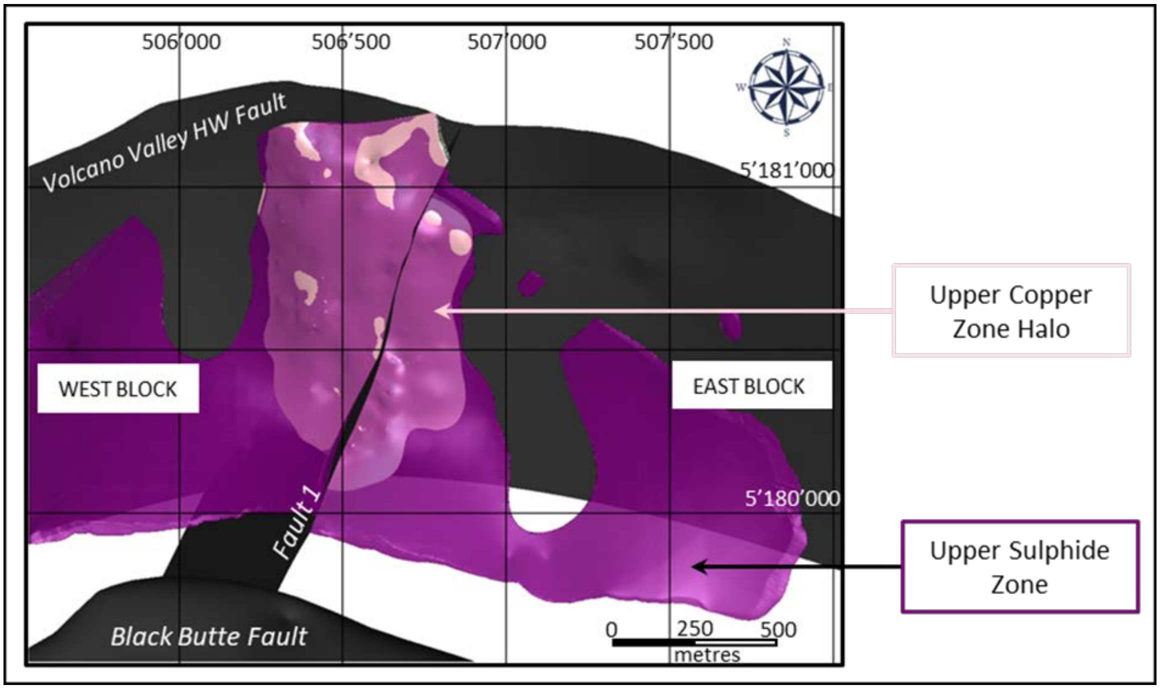
The greater than 1.2% Cu mineralized zones (Veins) within the UCZ are contained within an envelope of greater than 0.25% Cu Halo mineralization. Modelling of the Halo solids was completed in Leapfrog Geo™ by using points to define contacts for the HW and FW of the Halo and then using radial base function implicit modelling to construct HW and FW surfaces. Where data defined trends of HW and FW surfaces did not produce geologically realistic terminations, polylines (strings) were used to pinch out the halo zone.

Both host lithostratigraphy and mineralization are truncated in the north by the Volcano Valley HW fault (Figure 14-1). A master fault plane was constructed for the Volcano Valley HW Fault using points and implicit modelling. This surface was used to truncate both lithostratigraphy and Resource wireframes (Vein and Halo solids).

The UCZ is transected and offset by the north-northeast (N/NE) striking, steeply west dipping Fault 1, the master fault plane has been modelled in a similar manner to that of Volcano Valley HW Fault (Figure 14-1). Fault 1 has been used to divide the lithostratigraphic model into East and West blocks. Lithostratigraphic units and Resource wireframe domains in the East and West blocks have been modelled separately and are truncated by Fault 1 (Figure 14-1 and Figure 14-2).

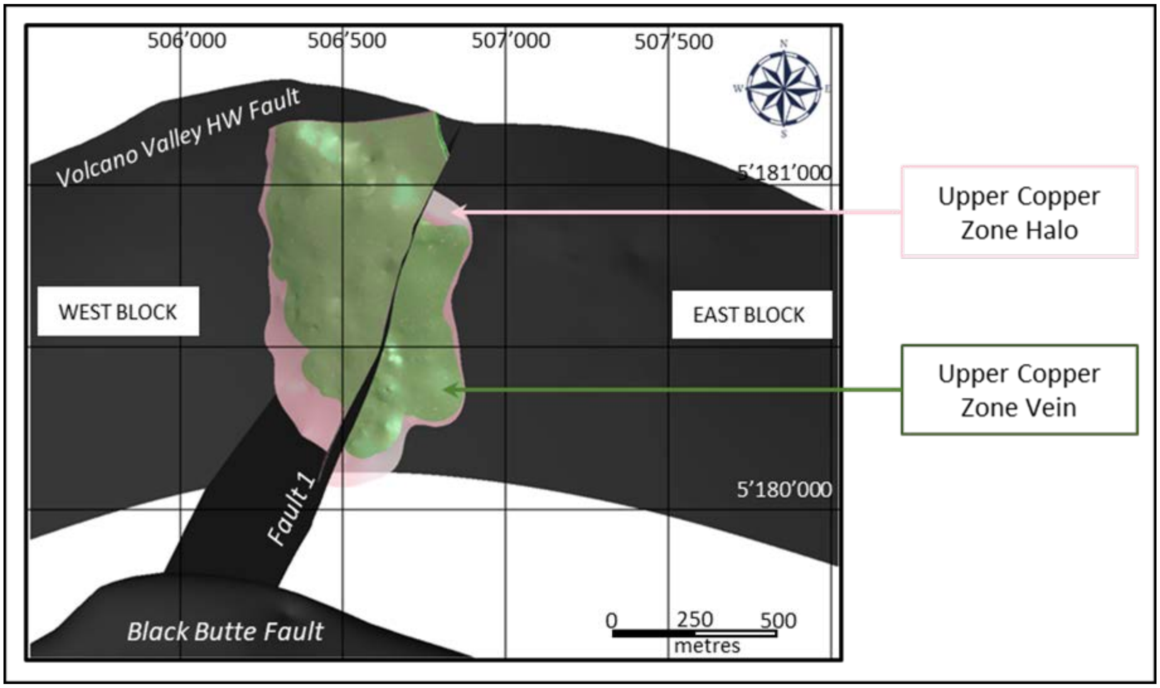
The UCZ Vein models for the East and West blocks are entirely encapsulated within the Halo solids (Figure 14-2). The Halo solids are mostly encapsulated within the USZ but greater than 0.25% Cu mineralization, and the Halo solids that enclose it, does transgress the upper and lower contacts of the USZ into the shale unit that occurs in the HW and FW (Figure 14-1 and Figure 14-2). The greater than 1.2% Cu Vein solids are entirely contained within the USZ.

A base of oxidation surface has been constructed (using points selected on drillholes and implicit modelling in Leapfrog Geo™ for the area included in the lithostratigraphic model (Figure 14-3). The base of oxidation was defined as the base of any recognizable oxidation associated with surficial weathering, so includes any material that is at least partially weathered. The extreme northeastern corner of the UCZ is oxidized to a depth of 13 m below surface. The portion of the UCZ that is surficially oxidized has been excluded in the Mineral Resource estimate presented here.



Source: SRA, 2019

Figure 14-1: Plan View of the USZ (Semi-Transparent) and Johnny Lee UCZ Halo Models for the East and West Blocks Showing Faults That Truncate and Offset the UCZ



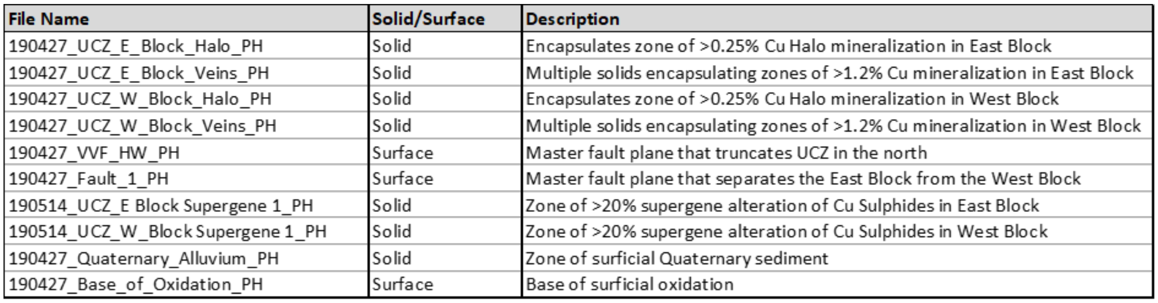
Source: SRA, 2019

Figure 14-2: Plan View of the Johnny Lee Halo (Semi-Transparent) and Vein Models for the East and West Blocks

Although the majority of the UCZ is unaffected by surficial oxidation, localized supergene alteration of Cu sulphides in the UCZ has occurred, at depth, where structures have allowed acidic waters to penetrate the orebody (see section 7.3.3). Whilst the degree of supergene alteration is generally low (more than 5%), there is one area where it exceeds 20% and it materially impacts the metallurgical behavior of the mineralization as demonstrated during flotation test work. The area where this occurs is at the intersection of a bedding parallel, brittle-ductile shear zone and Fault 1. Two supergene altered solids have been modelled that encapsulate the zone of greater than 20% supergene alteration either side of Fault 1 (Figure 14-3).

The surfaces and solids used to directly constrain the Mineral Resource estimate for the UCZ are listed in Table 14-2.

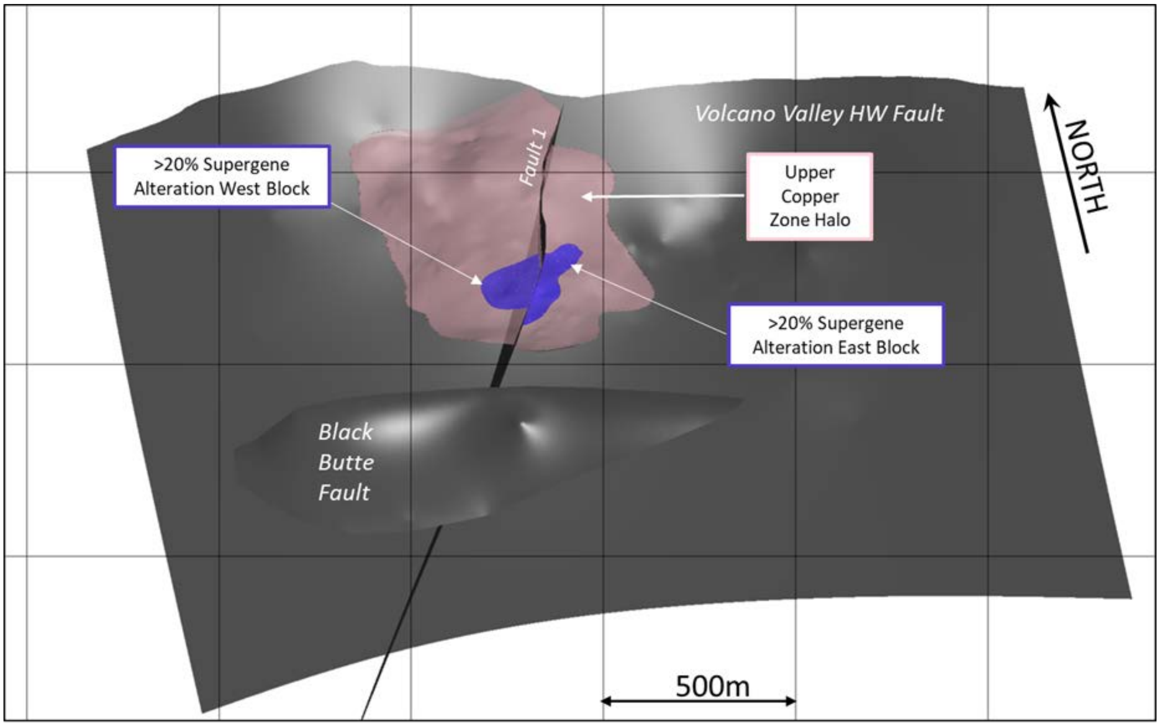
Table 14-2: File Names of Solids and Surfaces Utilized for Constraint of the UCZ Mineral Resource Estimate



File Name	Solid/Surface	Description
190427_UCZ_E_Block_Halo_PH	Solid	Encapsulates zone of >0.25% Cu Halo mineralization in East Block
190427_UCZ_E_Block_Veins_PH	Solid	Multiple solids encapsulating zones of >1.2% Cu mineralization in East Block
190427_UCZ_W_Block_Halo_PH	Solid	Encapsulates zone of >0.25% Cu Halo mineralization in West Block
190427_UCZ_W_Block_Veins_PH	Solid	Multiple solids encapsulating zones of >1.2% Cu mineralization in West Block
190427_VVF_HW_PH	Surface	Master fault plane that truncates UCZ in the north
190427_Fault_1_PH	Surface	Master fault plane that separates the East Block from the West Block
190514_UCZ_E Block Supergene 1_PH	Solid	Zone of >20% supergene alteration of Cu Sulphides in East Block
190514_UCZ_W_Block Supergene 1_PH	Solid	Zone of >20% supergene alteration of Cu Sulphides in West Block
190427_Quaternary_Alluvium_PH	Solid	Zone of surficial Quaternary sediment
190427_Base_of_Oxidation_PH	Surface	Base of surficial oxidation

Source: SRA, 2019

The native format was Leapfrog Geo™ .msh files but these were exported as .dxf and Surpac™. dtm/.str formats for use in other platforms during Mineral Resource estimation.



Source: SRA, 2019
Showing the two zones of supergene alteration modelled at the junction of a brittle-ductile shear zone and Fault 1.

Figure 14-3: Isometric View, Looking NNE Along Fault 1, Of The UCZ

14.2.3 Lower Copper Zone

The LCZ, although having more visible Cu sulphides than the UCZ, also has portions where fine-grained Cu sulphide results in economically significant intersections having little visual contrast with the surrounding lithofacies. A similar modelling protocol to that of the UCZ was adopted for the LCZ. Geological continuity of the LCZ was best achieved using a more than 2% Cu outer cut-off rather than the 1.2% Cu that was used for the UCZ.

The more than 2% Cu mineralization shell was used to define the intervals selected for modelling as Veins in Leapfrog Geo™. Data-defined trends were utilized to create pinch-outs at Vein terminations. Limited use was made of polylines, in areas of lower drill-density, to ensure Veins followed trends consistent with that of the lithostratigraphic host units.

Three separate more than 2% Cu mineralized zones, termed the LCZ West, Central, and East lenses (Figure 14-4 to Figure 14-6) were constructed. All lenses are predominantly enclosed within a bedded pyrite, massive sulphide unit referred to as the LSZ although locally the lenses extend into the overlying clastic sediment unit (Figure 14-4 and Figure 14-5). The LSZ and adjacent clastic sediment lithofacies were modelled as part of the 3-D lithostratigraphic model.

The LSZ is truncated in the north at the Buttress Fault and in the south by the Volcano Valley FW Fault (Figure 14-6). The more than 2% Cu mineralization shell that forms the LCZ lenses does not extend to the Buttress Fault but, in places, does extend south to the Volcano Valley FW Fault, where it is truncated. The master fault planes of the Buttress Fault and Volcano Valley FW Fault were modelled in Leapfrog Geo™ by creating points at drillhole fault intersections and creating a fault surface using radial base function, implicit modelling.

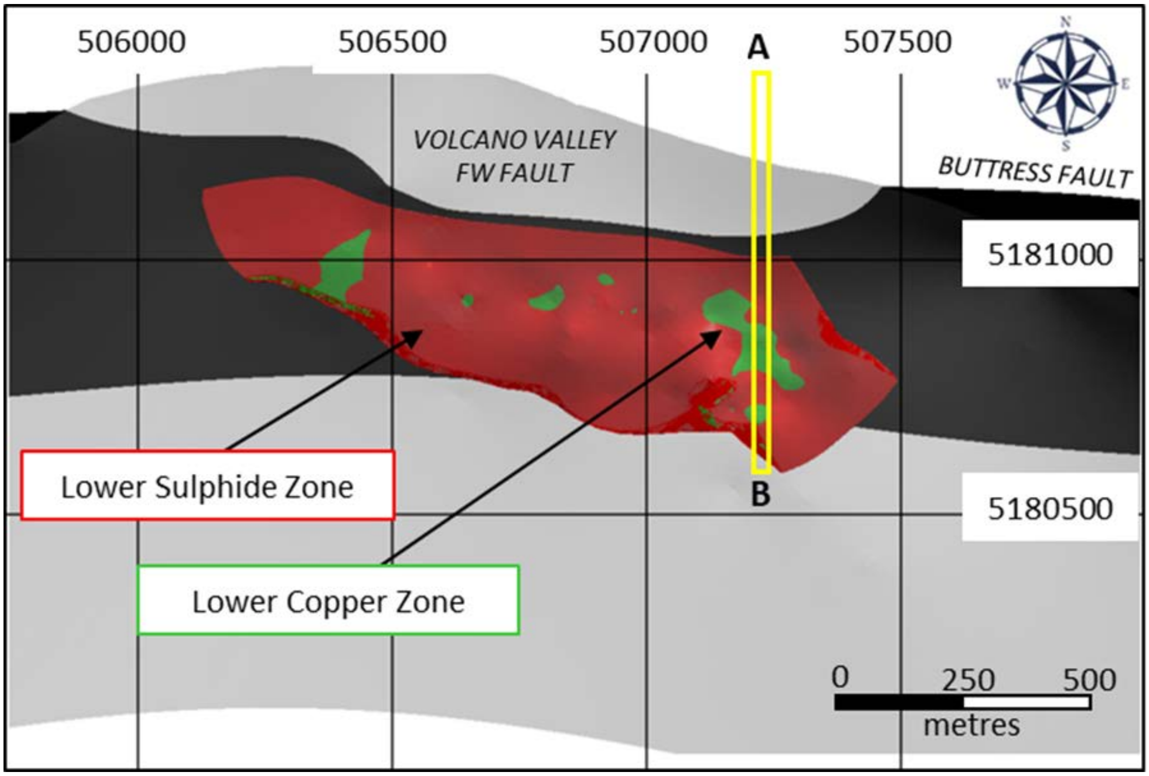
Minor, fault-controlled supergene alteration of the LCZ occurs adjacent to the Buttress and Volcano Valley FW fault. This supergene alteration does not materially affect metallurgical recoveries.

The surfaces and solids used to constrain the Mineral resource estimate for the LCZ are listed in Table 14-3.

Table 14-3: File Names of Solids and Surfaces Utilized for Constraint of the LCZ Mineral Resource Estimate

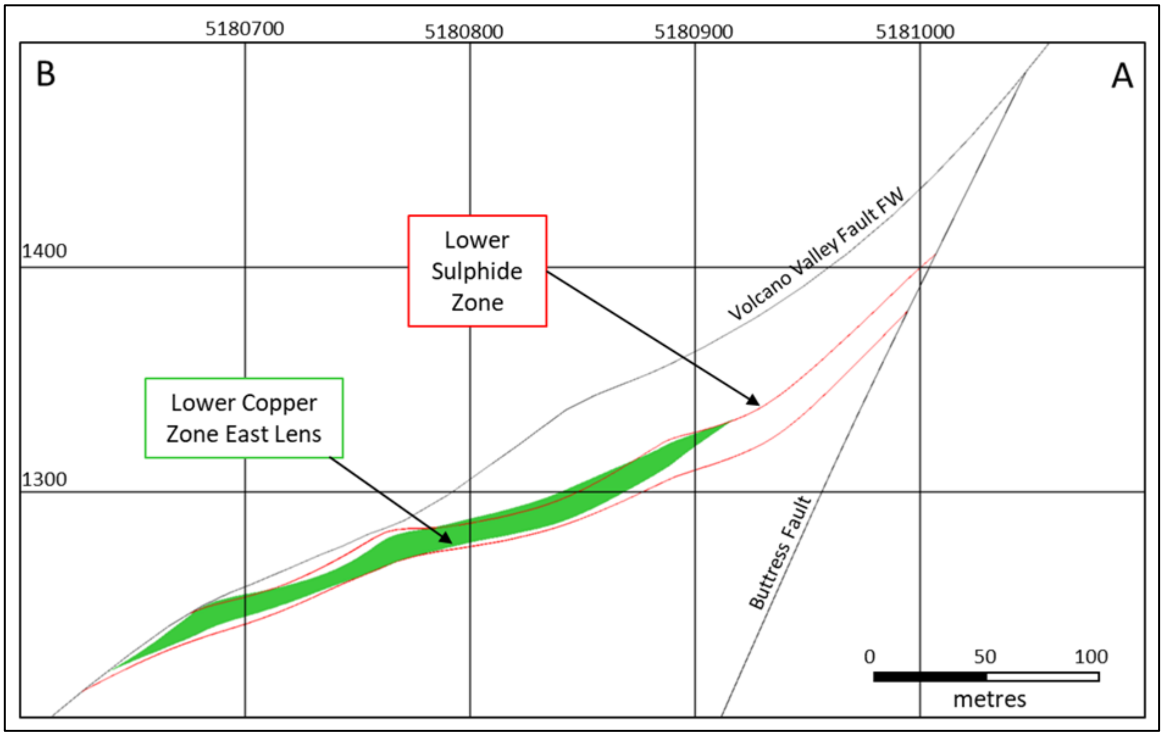
File Name	Solid/Surface	Description
190502_LCZ_West_PH	Solid	>2% Cu Mineralization in Lower Copper Zone West Lens
190502_LCZ_Central_PH	Solid	>2% Cu Mineralization in Lower Copper Zone Central Lens
190502_LCZ_East_PH	Solid	>2% Cu Mineralization in Lower Copper Zone East Lens
190502_LCZ_MASU1_PH	Solid	Lower Sulphide Zone
190423_Buttress_Fault_PH	Surface	Master fault plane that truncates USZ in the north
190423_VVF_Footwall_PH	Surface	Master fault plane that truncates USZ and UCZ in the south

Source: SRA, 2019
The native format was Leapfrog Geo™ .msh files but these were exported as .dxf and Surpac™ .dtm/.str formats for use in other platforms for use in Mineral Resource estimation.



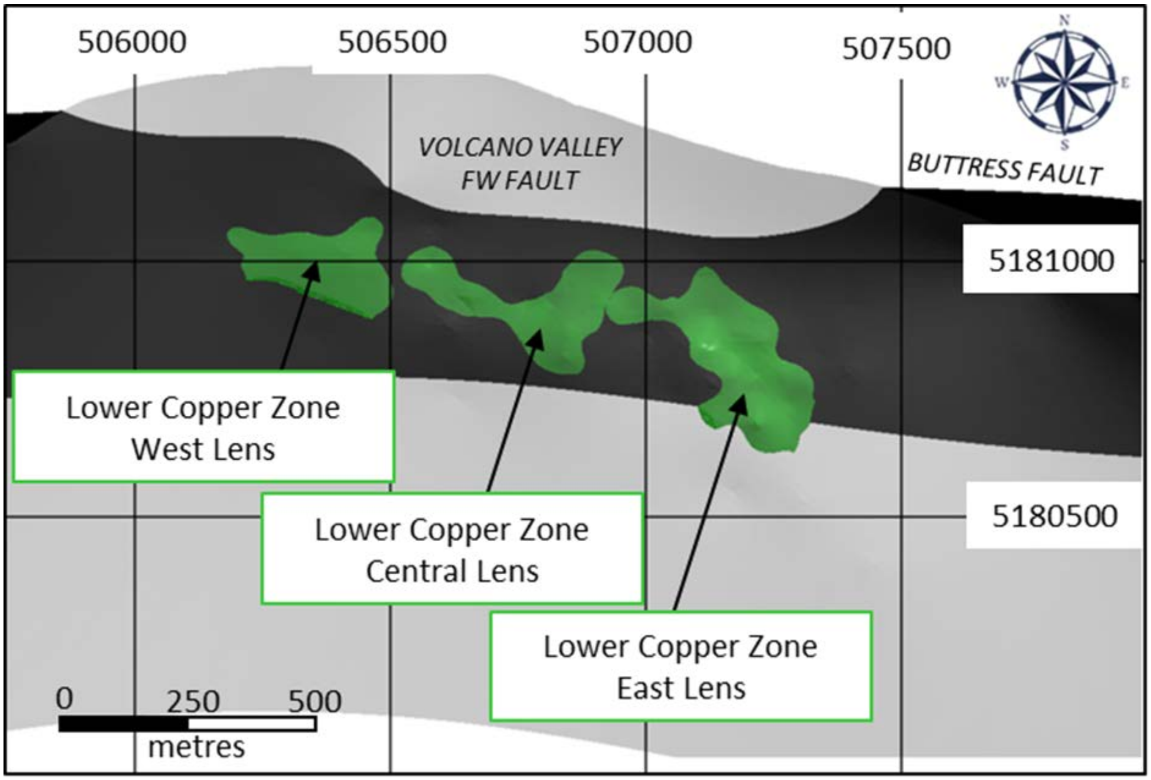
Source: SRA, 2019
The Volcano Valley Fault has been made semi-transparent. Section line A- B for the cross-section in Figure 14-6 is indicated

Figure 14-4: Plan View of the Models of the Lower Sulphide Zone, Lower Copper Zone and Bounding Faults



Source: SRA, 2019

Figure 14-5: Cross-Section from A to B (Figure 14-5), Looking West, of the Lower Copper Zone



Source: SRA, 2019
The Volcano Valley Fault Has Been Made Semi-Transparent

Figure 14-6: Plan View of the Three Lenses That Form the Lower Copper Zone

14.3 Density

Specific gravity (SG) displays variability within both strongly (Vein) and weakly (Halo) Cu mineralized material within the UCZ. In particular, SG of the potentially economic mineralization in the northern part of the UCZ was generally lower (by approximately 0.8) than that of the southern part of the UCZ.

Figure 14-7 and Figure 14-8 show mineralization types in diamond drill core in the northern and southern parts of the UCZ. Although the presence of quartz-carbonate veining, fracturing and oxidation locally contribute to SG variability, the principal driver to the steady increase in SG to the south is the decrease in clastic sediment content of the USZ, the ferruginous unit that hosts the UCZ mineralization.

In the northern part of the USZ, the massive sulphide (for 2018 logging purposes this was defined as >50% sulphide over a >30 cm width) is characterized by an increased proportion of narrow shale and siltstone intercalations within the massive sulphide, compared to the southern part of the USZ.

Historic geological logging has lacked the detail required for domaining of the USZ/UCZ into zones with particular SG characteristics.

Source: SRA, 2019

Resource sample intervals are labelled with SG measurements. Although robust massive sulphide units have an SG that exceeds 4.0, most of the SG's are in the range of 3.1 to 3.7.

Figure 14-7: Core Photographs for SC18-238 (Northern Part of The UCZ) Showing Top and Base of Halo and >1.2% Cu Veins

Source: SRA, 2019

Resource sample intervals are labelled with SG measurements. Much of the UCZ in this area is comprised of robust massive sulphide units that have an SG in the range of 3.7 to 4.4.

Figure 14-8: Core Photographs for SC18-245 (Southern Part of the UCZ) Showing Top and Base of Halo and >1.2% Cu Veins

Due to the variable nature of density in the UCZ and the fact that the UCZ Vein and Halo domains are not suitable to constrain density data for estimation, it was determined that an appropriate approach is to estimate density constrained by the USZ unit. This allows for a robust geologic framework and density dataset for estimation. The density estimate is split into USZ east and USZ west.

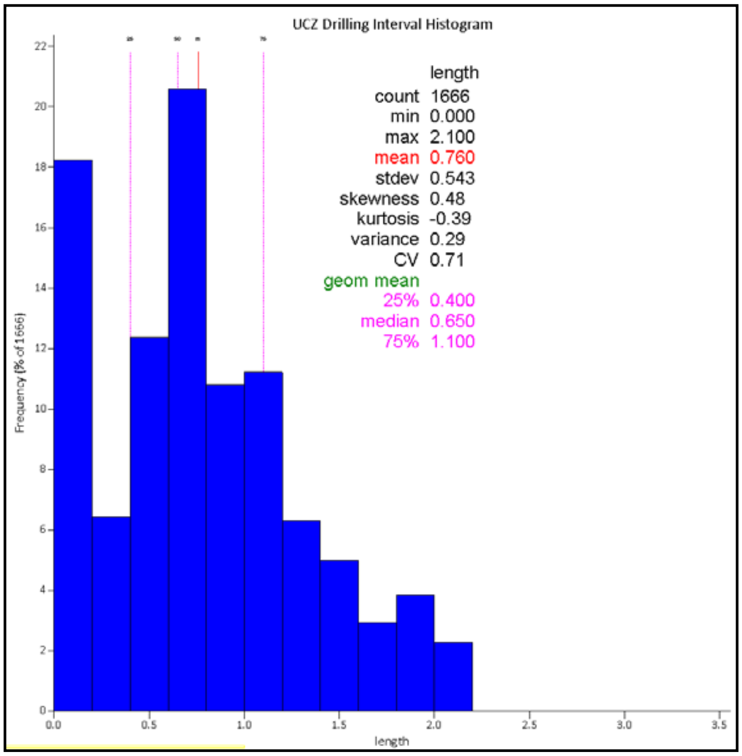
In contrast to the UCZ, the LCZ has a relatively consistent SG values with the only major difference being between the density of the portions of the lenses (East, Central and West) that occur within the LSZ and the portions that transgress into the overlying clastic sediment. Similar to the approach taken for estimation of density in the USZ, density is estimated into the LSZ.

Where UCZ mineralization transgresses the upper and lower contacts of the USZ into the shale unit and where LCZ lenses locally extend into the overlying clastic sediment unit, a mean SG of 3.3 is assigned based on review of local density data points

14.3.1 Compositing, Summary Statistics and Capping

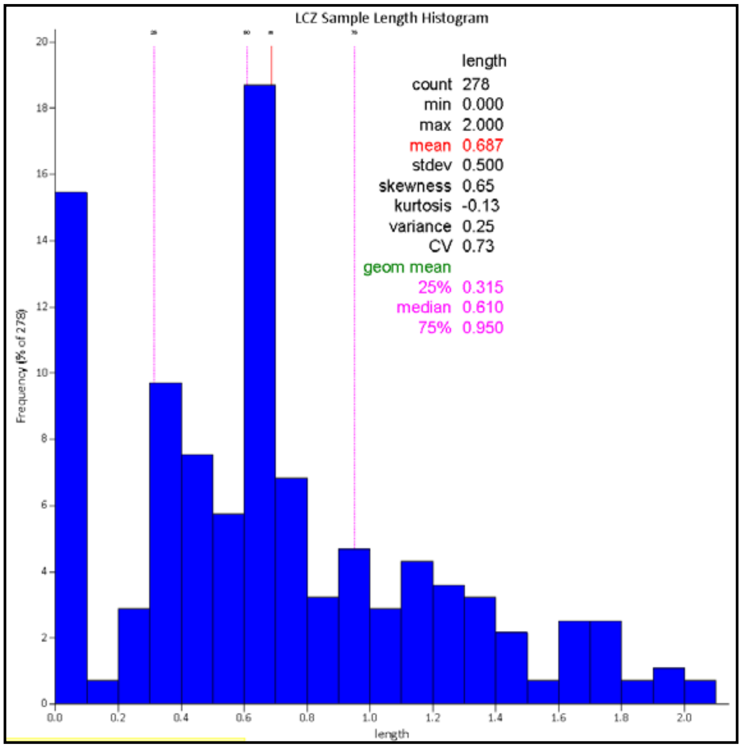
Compositing

Historic sample intervals ranges in length from 0.1 to 2.2 m. In recent drilling of 2018 and 2019. sample intervals have been restricted to a range betweek 0.3 and 1.3 m with the overall sample length distribution presented in Figure 14-9 for the UCZ and Figure 14-10 for the LCZ. After reviewing compositing at average 1.5 and 2.0 m lengths, it was determined that 1.5 m was most appropriate considering the data and geological model. Using Datamine Studio RM™ version 1.4.132.0, data was composited at 1.5 m, with density weighted where data available, and downhole intervals constrained by domain boundaries. Summary composite length histograms are presented in Figure 14-11 by estimation domain. In each histogram, the small intervals represent residual lengths cut by domain boundaries. Where SG data has been measured on a sample interval basis, the data has been composited as above and then merged with the historic point SG data for estimation (See Section 12.1.6 on verification of point SG data).



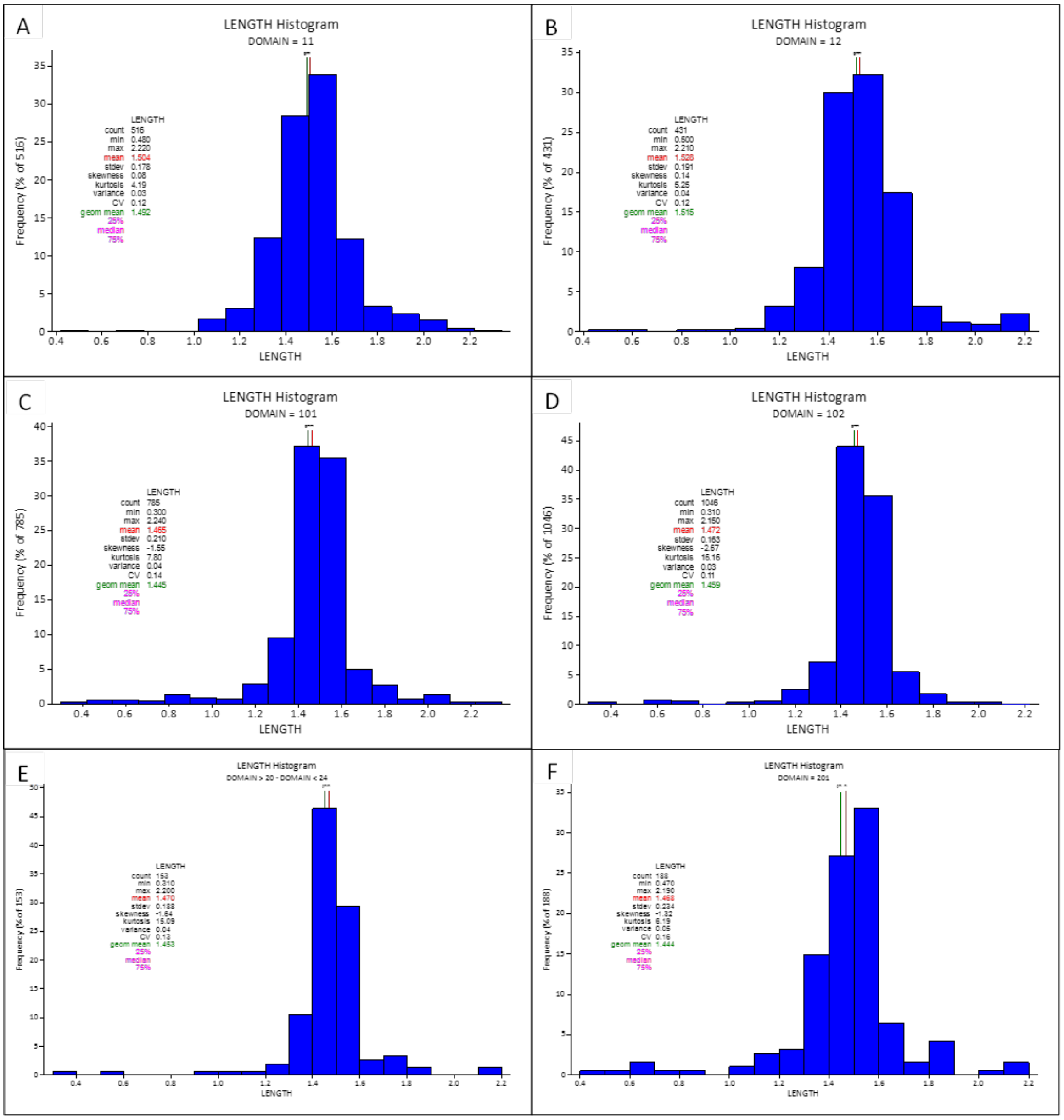
Source: SRK, 2019

Figure 14-9: Drilling Sample Lengths in the UCZ



Source: SRK, 2019

Figure 14-10: Drilling Sample Lengths in the LCZ



Source: SRA, 2019

Figure 14-11: Composite Lengths for Each of the Cu Domains. A = UCZ Vein East, B = UCZ Vein West, C = UCZ Halo East, D = UCZ Halo West, E = LCZ Vein and F = LSZ

Summary Statistics

Summary descriptive statistics for Cu were calculated from composited data whereas for SG statistics were calculated from the merged dataset as stated in Section 14.5.1 (Table 14-4 and Table 14-5). All domains show consistent variance and coefficient of variation (CV) except for the LSZ which has a higher CV due to outliers. Analysis suggests that a stationarity assumption is reasonable for the style of deposit and linear estimation of Cu and SG using modelled domains are appropriate. Log normal histograms for Cu and histograms for SG by domain are presented in Figure 14-12 and Figure 14-13.

Table 14-4: Pre-Capping Composite Statistics by Domain for Cu

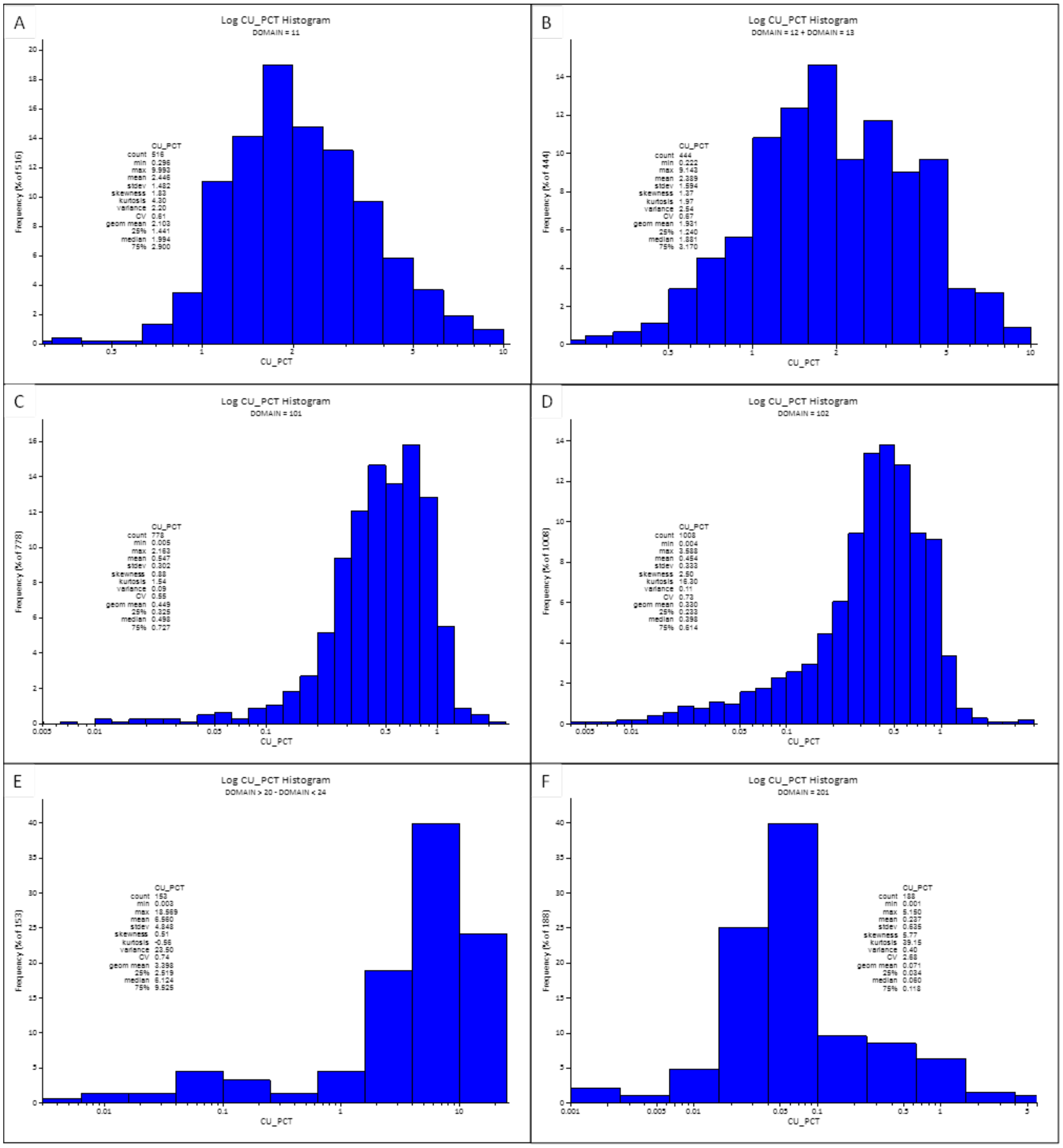
Cu	UCZ Vein East	UCZ Vein West	UCZ Halo East	UCZ Halo West	LCZ Vein	LSZ
Composites	516	431	778	1008	153	188
Average Cu g/t	2.45	2.33	0.55	0.45	6.56	0.24
Min Cu g/t	0.296	0.222	0.005	0.004	0.003	0.001
Max Cu g/t	9.99	8.53	2.16	3.59	18.57	5.15
Variance	2.20	2.27	0.09	0.11	23.50	0.40
Std. Deviation	1.48	0.30	0.30	0.33	4.85	0.63
CV	0.61	0.13	0.55	0.73	0.74	2.68

Source: SRA, 2019

Table 14-5 Pre-Capping Composite Statistics by Domain For SG

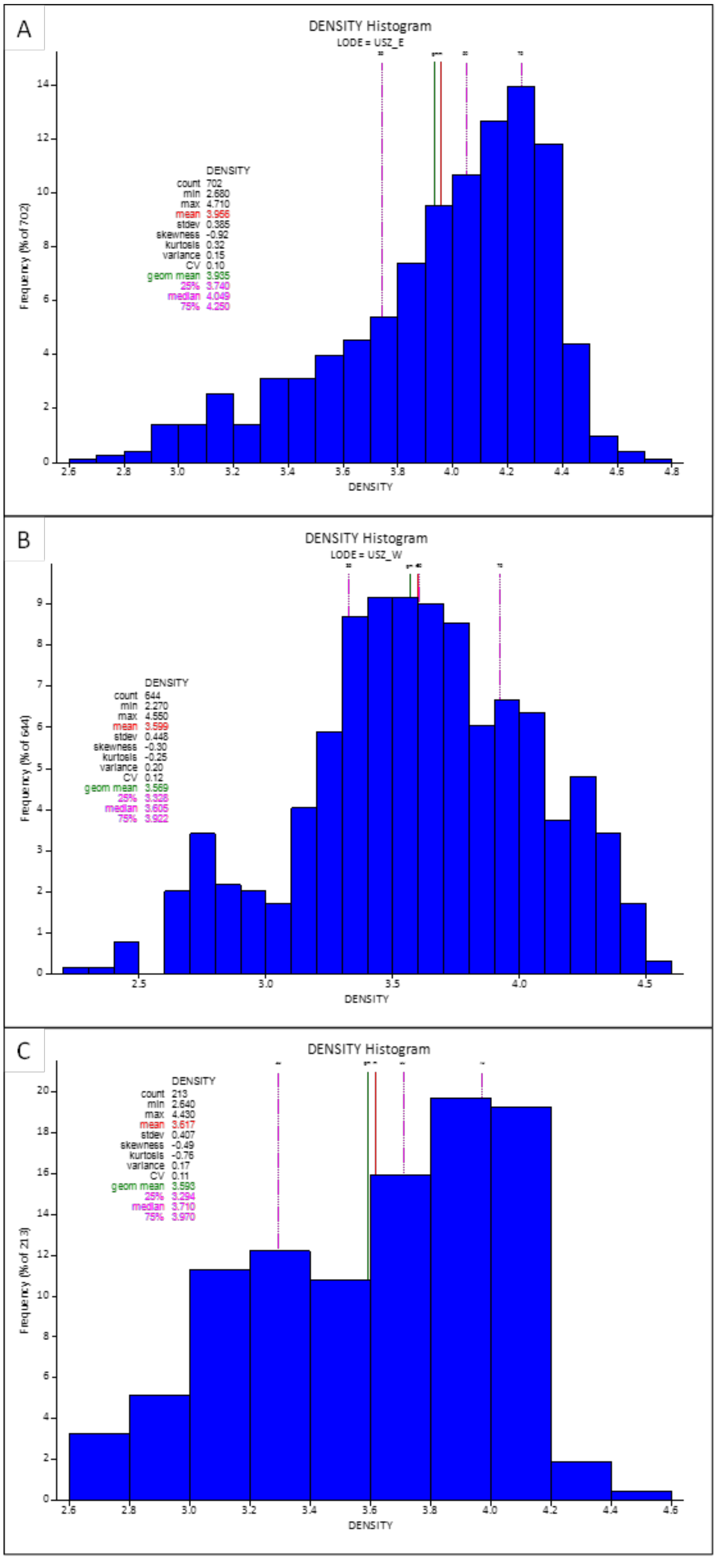
Specific Gravity	USZ East	USZ West	LSZ
Composites	702	644	213
Average SG	4.0	3.6	3.6
Min SG	2.68	2.27	2.64
Max SG	4.71	4.55	4.43
Variance	0.1	0.2	0.2
Std. Deviation	0.4	0.4	0.4
CV	0.1	0.1	0.1

Source: SRA, 2019



Source: SRA, 2019

Figure 14-12: Log Normal Cu Histogram Distributions by Domain. A = UCZ Vein East, B = UCZ Vein West, C = UCZ Halo East, D = UCZ Halo West, E = LCZ Vein and F = LSZ

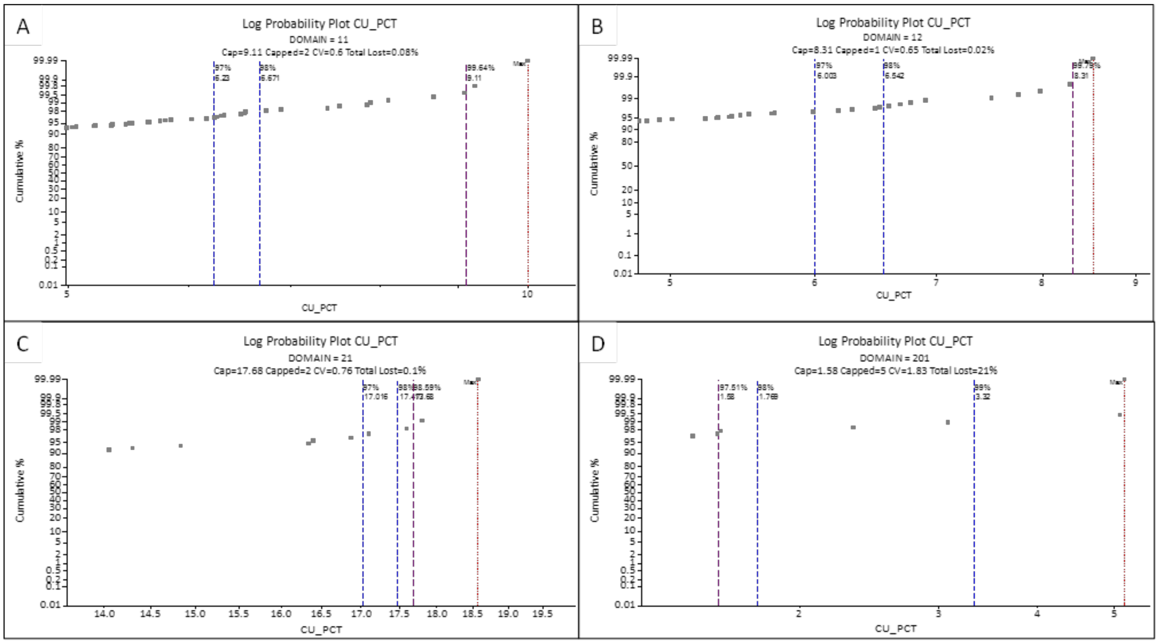


Source: SRA, 2019

Figure 14-13: SG Histogram Distributions by Domain. A = USZ East, B = USZ West and C = LSZ

14.3.2 Outliers and Capping

After compositing, a capping of Cu values was applied to the UCZ Vein East, UCZ Vein West, LCZ Vein, and LSZ domains based on disintegration analysis of Cu log probability plots (Figure 14-14 and summarized in Table 14-6). No capping or cutting of data was applied to the UCZ Halo East or West for Cu, nor was capping applied to SG. The capping was selected to minimize the effect of isolated high-grade outliers, without materially reducing metal or modifying a material proportion of data. Capped values by domain are presented in Table 14-6.



Source: SRA, 2019

Figure 14-14: Copper Log Probability Plots. A = UCZ Vein East, B = UCZ Vein West, C = LCZ Vein and D = LSZ

Table 14-6: Summary of Cu (%) Capping Applied by Domain

Domain	Cap	Capped	Percentile	Capped%	Lost	Min	Max	Mean	Variance	CV
UCZ Vein East	9.11	2	99.64%	0.40%	0.08%	0.296	9.11	2.444	2.17	0.6
UCZ Vein West	8.31	1	99.79%	0.20%	0.02%	0.222	8.31	2.331	2.27	0.65
LCZ Vein	17.68	2	99.59%	1.80%	0.10%	0.027	17.68	6.379	23.37	0.76
LSZ	1.58	5	97.51%	2.70%	21%	0.001	1.58	0.187	0.12	1.83

Source: SRA, 2019

14.4 Variogram Analysis and Modeling

Spatial continuity and anisotropy were modelled using variography to reflect orientations consistent with geological and structural observations of mineralization geometry. Semi-variograms for Cu and SG were calculated and modelled using Geovariances Isatis software by domain with three nested structures: a nugget and two spherical structures.

The UCZ is transected and offset by Fault 1 into the Eastern and Western blocks (see Section 7.3.2 for more detail). Due to the significant offset, data from the east and west are treated as independent domains for the purposes of variography calculations.

The UCZ vein and halo east Cu variograms were modelled using an azimuth of 170°, dip of 5° and a plunge trending south and southwest respectively. The UCZ vein and halo west Cu variograms were modelled using an azimuth of 170°, dip of 10° and a high-grade plunge trending south and southeast respectively. The nugget for the UCZ vein east and west domains is 31% of the total sill and for the halo domains 20% and 25% respectively. The nuggets are determined from downhole variograms and are consistent with Cu variability observed in drillholes through the UCZ sequence. Variograms for both the UCZ east and west exhibit minor D1/D2 anisotropy and strong D1/D3 anisotropy in the nearest lags.

The USZ east and west SG variograms were modelled using an azimuth of 170°, dip of 5° and 10° respectively and plunge trending southeast. The USZ has nuggets of 18% of the total sill for the east and 14% for the west with minor D1/D2 anisotropy and strong D1/D3 anisotropy in the early lags.

The LCZ is split into three separate lenses (West, Central, and East) with the majority of drilling occurring in the East vein. Due to the lower drill density in the West and Central lenses and discontinuous Cu mineralization between the lenses, it was deemed appropriate that variography be conducted using data from the East lens only.

The LCZ vein Cu variogram was modelled using an azimuth of 75°, dip of 20° and plunge trending south. The LSZ Cu variogram was modelled using an azimuth of 75°, dip of 20° and an isotropic trend. Both have relatively low nugget values with 16% of the total sill for the LCZ vein and 12% for LSZ consistent with low intrinsic variability in Cu data. The LCZ vein variogram displays minor D1/D2 anisotropy and strong D1/D3 anisotropy in the nearby lags. The LSZ variogram is isotropic in directions X and Y (near-horizontal) with strong D1/D3 anisotropy.

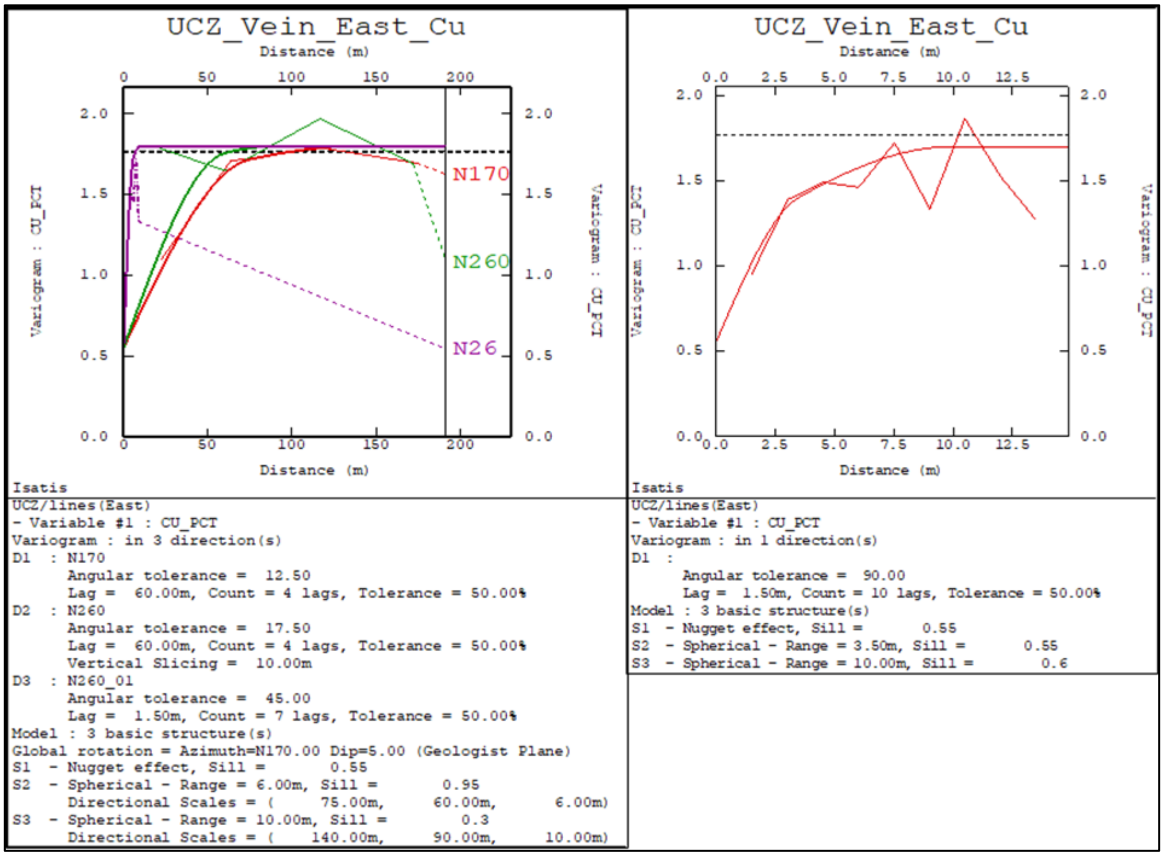
The LSZ SG variogram was modelled using an azimuth of 75°, dip of 20° and west-southwest trend with a 9% nugget minor D1/D2 anisotropy and strong D1/D3 anisotropy in the nearby lags.

Experimental and model variograms for the UCZ and LCZ for Cu and density are summarized in Table 14-7 and presented below in Figure 14-15 to Figure 14-23 with all structures being spherical.

Table 14-7: Summary of Variogram Parameters

		Rotation			Nugget	Sill 1	Structure 1 (m)			Sill 2	Structure 2 (m)		
Variable	Domain	Azimuth	Dip	Pitch			Major	Semi Major	Minor		Major	Semi Major	Minor
CU	UCZ_Vein_East	170	5	0	0.306	0.528	75	60	6	0.166	140	90	10
CU	UCZ_Vein_West	170	10	0	0.314	0.353	120	100	2	0.333	210	130	10
CU	UCZ_Halo_East	170	5	-130	0.2	0.45	75	70	2	0.35	260	210	10
CU	UCZ_Halo_West	170	10	150	0.25	0.45	80	65	4	0.3	230	150	10
SG	USZ_East	170	5	-25	0.175	0.364	90	60	2.5	0.461	250	180	15
SG	USZ_West	170	10	140	0.14	0.39	100	80	4	0.47	200	160	15
CU	LCZ_Vein	75	20	-70	0.16	0.33	85	75	4	0.51	155	130	10
CU	LSZ	75	20	-50	0.12	0.05	90	90	5	0.83	200	200	10
SG	LSZ	75	20	-160	0.094	0.313	80	80	4	0.593	180	120	10

Source: SRA, 2019
Rotation is Isatis's Geologist convention with all Structures Spherical

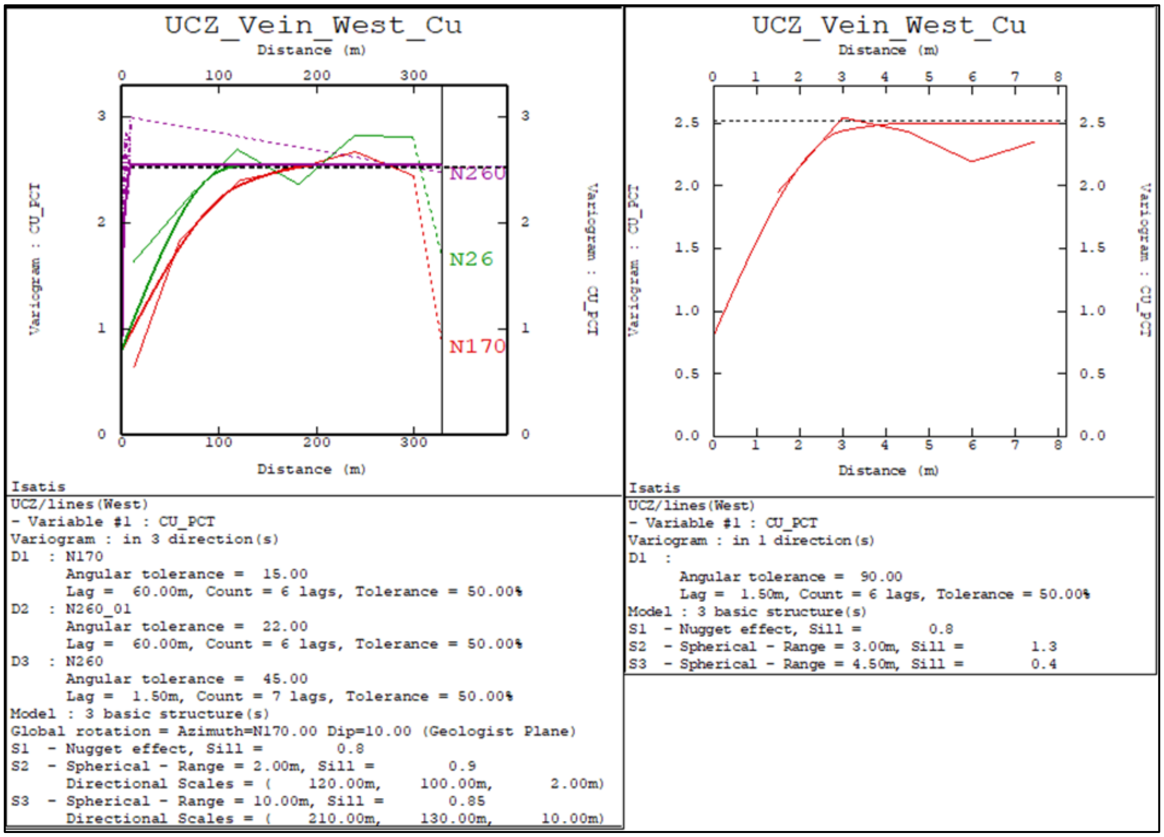


```
UCZ/lines(East)
- Variable #1 : CU_PCT
Variogram : in 3 direction(s)
D1   : N170
       Angular tolerance =  12.50
       Lag =  60.00m, Count = 4 lags, Tolerance = 50.00%
D2   : N260
       Angular tolerance =  17.50
       Lag =  60.00m, Count = 4 lags, Tolerance = 50.00%
       Vertical Slicing =  10.00m
D3   : N260_01
       Angular tolerance =  45.00
       Lag =  1.50m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N170.00 Dip=5.00 (Geologist Plane)
S1   - Nugget effect, Sill =        0.55
S2   - Spherical - Range = 6.00m, Sill =        0.95
       Directional Scales = (     75.00m,     60.00m,      6.00m)
S3   - Spherical - Range = 10.00m, Sill =        0.3
       Directional Scales = (    140.00m,     90.00m,     10.00m)
```

```
UCZ/lines(East)
- Variable #1 : CU_PCT
Variogram : in 1 direction(s)
D1   :
       Angular tolerance =  90.00
       Lag =  1.50m, Count = 10 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =        0.55
S2   - Spherical - Range = 3.50m, Sill =        0.55
S3   - Spherical - Range = 10.00m, Sill =        0.6
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-15: Experimental and Modelled Variogram for UCZ Vein East Cu



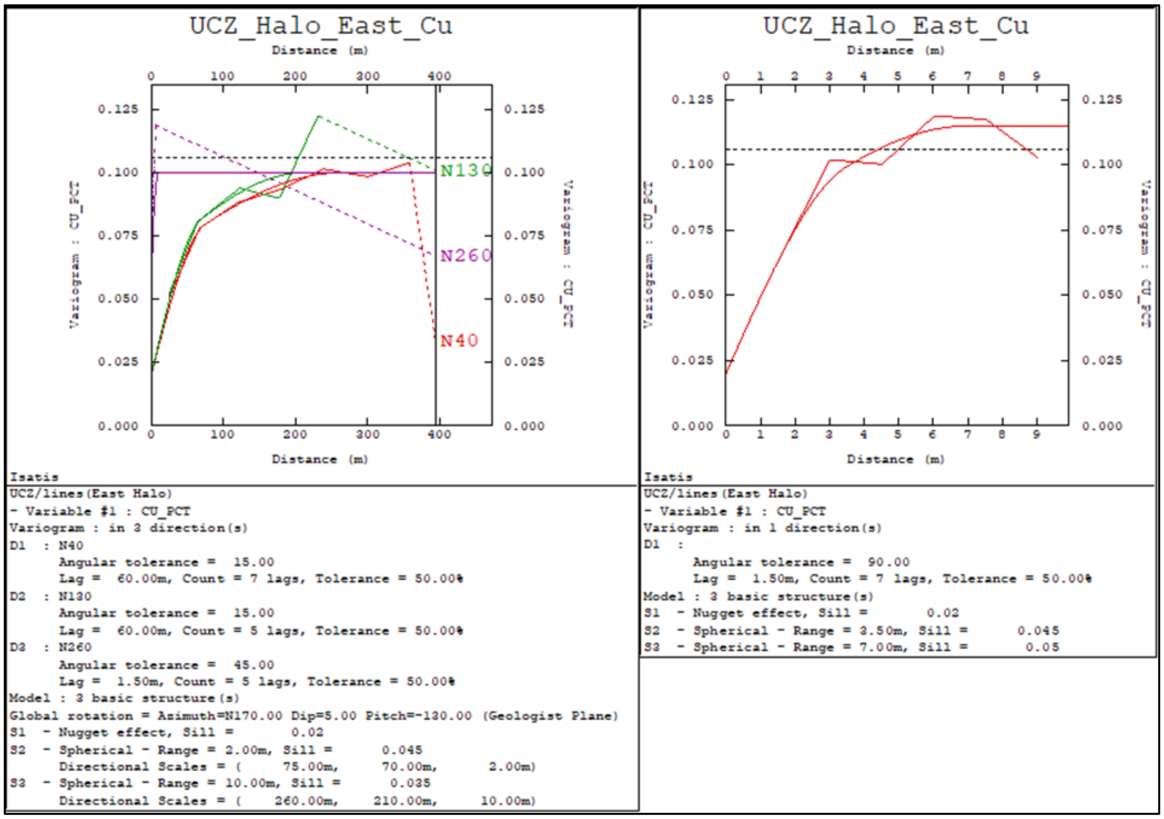
```
UCZ/lines(West)
- Variable #1 : CU_PCT
Variogram : in 3 direction(s)
D1   : N170
       Angular tolerance =  15.00
       Lag =  60.00m, Count = 6 lags, Tolerance = 50.00%
D2   : N260_01
       Angular tolerance =  22.00
       Lag =  60.00m, Count = 6 lags, Tolerance = 50.00%
D3   : N260
       Angular tolerance =  45.00
       Lag =  1.50m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N170.00 Dip=10.00 (Geologist Plane)
S1   - Nugget effect, Sill =        0.8
S2   - Spherical - Range = 2.00m, Sill =        0.9
       Directional Scales = (    120.00m,    100.00m,      2.00m)
S3   - Spherical - Range = 10.00m, Sill =       0.85
       Directional Scales = (    210.00m,    130.00m,     10.00m)
```

```
UCZ/lines(West)
- Variable #1 : CU_PCT
Variogram : in 1 direction(s)
D1   :
       Angular tolerance =  90.00
       Lag =  1.50m, Count = 6 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =        0.8
S2   - Spherical - Range = 3.00m, Sill =        1.3
S3   - Spherical - Range = 4.50m, Sill =        0.4
```

Source: SRA, 2019

Directional variogram on the left and downhole variogram on the right.

Figure 14-16: Experimental and Modelled Variogram for UCZ Vein West Cu

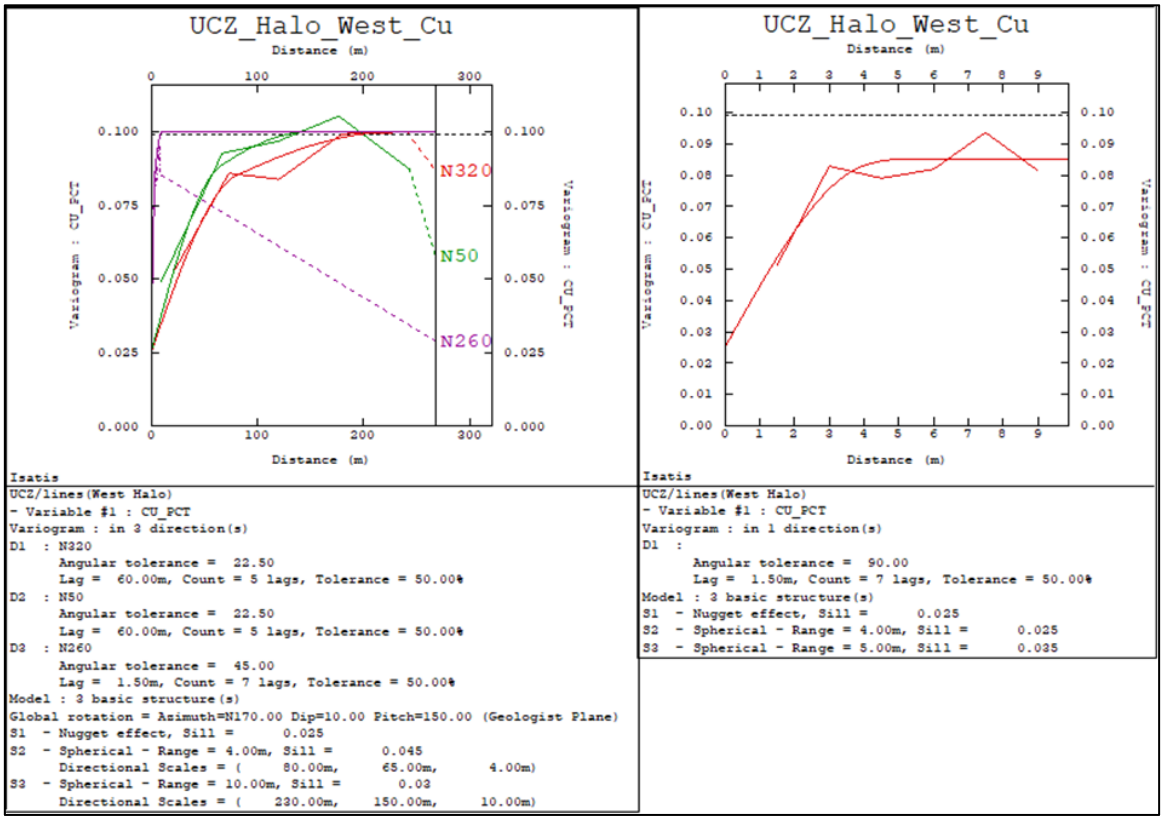


```
UCZ/lines(East Halo)
- Variable #1 : CU_PCT
Variogram : in 3 direction(s)
D1   : N40
      Angular tolerance =  15.00
      Lag =  60.00m, Count = 7 lags, Tolerance = 50.00%
D2   : N130
      Angular tolerance =  15.00
      Lag =  60.00m, Count = 5 lags, Tolerance = 50.00%
D3   : N260
      Angular tolerance =  45.00
      Lag =  1.50m, Count = 5 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N170.00 Dip=5.00 Pitch=-130.00 (Geologist Plane)
S1   - Nugget effect, Sill =       0.02
S2   - Spherical - Range = 2.00m, Sill =      0.045
      Directional Scales = (     75.00m,     70.00m,      2.00m)
S3   - Spherical - Range = 10.00m, Sill =      0.035
      Directional Scales = (    260.00m,    210.00m,     10.00m)
```

```
UCZ/lines(East Halo)
- Variable #1 : CU_PCT
Variogram : in 1 direction(s)
D1   :
      Angular tolerance =  90.00
      Lag =  1.50m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =       0.02
S2   - Spherical - Range = 3.50m, Sill =      0.045
S3   - Spherical - Range = 7.00m, Sill =       0.05
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-17: Experimental and Modelled Variogram for UCZ Halo East Cu

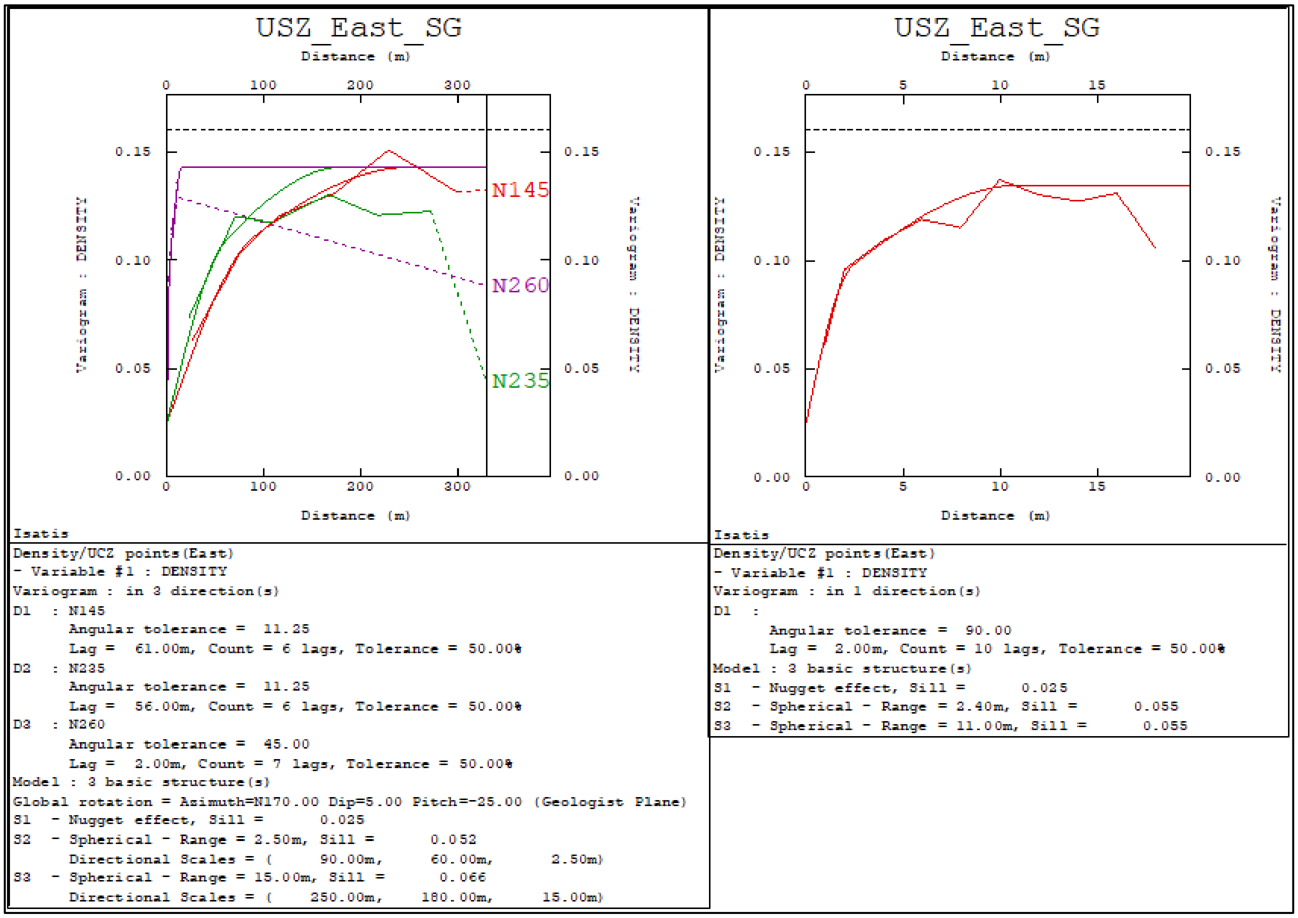


```
UCZ/lines(West Halo)
- Variable #1 : CU_PCT
Variogram : in 3 direction(s)
D1   : N320
       Angular tolerance =  22.50
       Lag =  60.00m, Count = 5 lags, Tolerance = 50.00%
D2   : N50
       Angular tolerance =  22.50
       Lag =  60.00m, Count = 5 lags, Tolerance = 50.00%
D3   : N260
       Angular tolerance =  45.00
       Lag =  1.50m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N170.00 Dip=10.00 Pitch=150.00 (Geologist Plane)
S1   - Nugget effect, Sill =       0.025
S2   - Spherical - Range = 4.00m, Sill =       0.045
       Directional Scales = (     80.00m,      65.00m,       4.00m)
S3   - Spherical - Range = 10.00m, Sill =       0.03
       Directional Scales = (    230.00m,     150.00m,      10.00m)
```

```
UCZ/lines(West Halo)
- Variable #1 : CU_PCT
Variogram : in 1 direction(s)
D1   :
       Angular tolerance =  90.00
       Lag =  1.50m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =       0.025
S2   - Spherical - Range = 4.00m, Sill =       0.025
S3   - Spherical - Range = 5.00m, Sill =       0.035
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-18: Experimental and Modelled Variogram For UCZ Halo West Cu

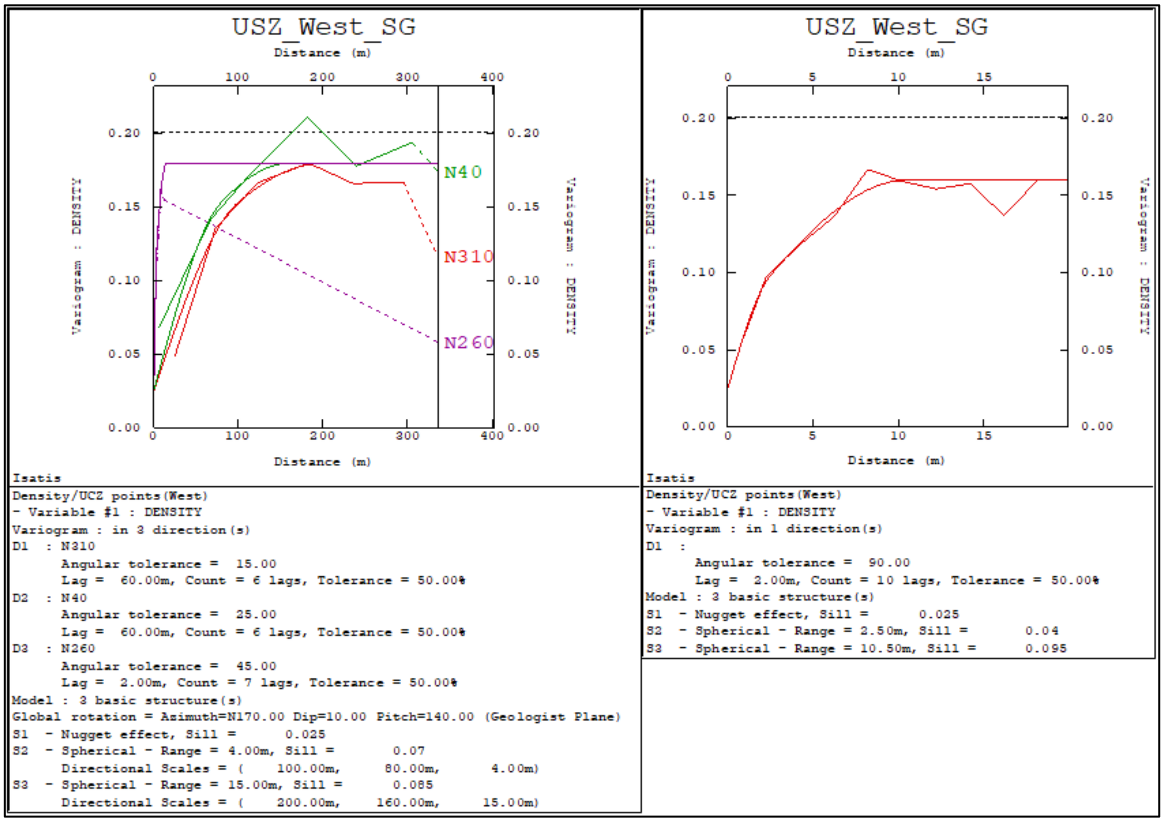


```
Density/UCZ points(East)
- Variable #1 : DENSITY
Variogram : in 3 direction(s)
D1   : N145
       Angular tolerance =  11.25
       Lag =  61.00m, Count = 6 lags, Tolerance = 50.00%
D2   : N235
       Angular tolerance =  11.25
       Lag =  56.00m, Count = 6 lags, Tolerance = 50.00%
D3   : N260
       Angular tolerance =  45.00
       Lag =  2.00m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N170.00 Dip=5.00 Pitch=-25.00 (Geologist Plane)
S1   - Nugget effect, Sill =       0.025
S2   - Spherical - Range = 2.50m, Sill =       0.052
       Directional Scales = (      90.00m,      60.00m,       2.50m)
S3   - Spherical - Range = 15.00m, Sill =       0.066
       Directional Scales = (     250.00m,     180.00m,      15.00m)
```

```
Density/UCZ points(East)
- Variable #1 : DENSITY
Variogram : in 1 direction(s)
D1   :
       Angular tolerance =  90.00
       Lag =  2.00m, Count = 10 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =       0.025
S2   - Spherical - Range = 2.40m, Sill =       0.055
S3   - Spherical - Range = 11.00m, Sill =       0.055
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-19: Experimental and Modelled Variogram for USZ East SG

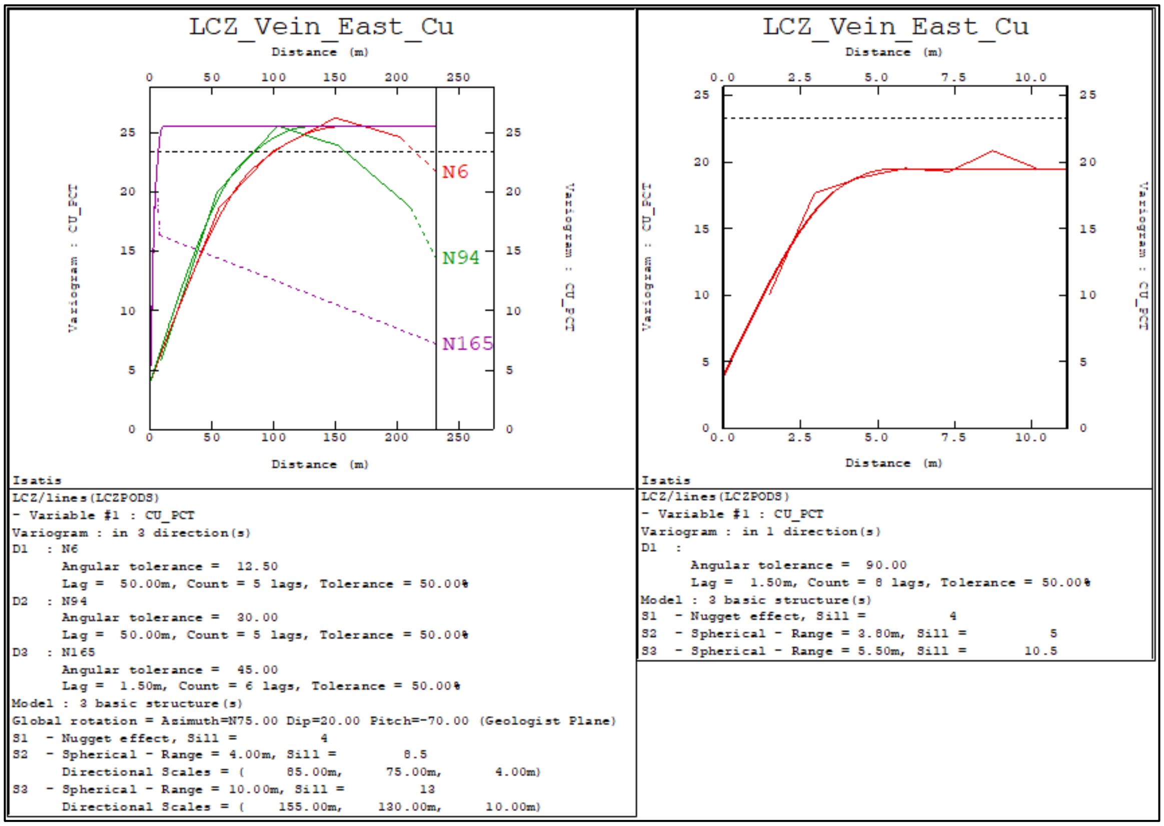


```
Density/UCZ points(West)
- Variable #1 : DENSITY
Variogram : in 3 direction(s)
D1   : N310
       Angular tolerance =  15.00
       Lag =  60.00m, Count = 6 lags, Tolerance = 50.00%
D2   : N40
       Angular tolerance =  25.00
       Lag =  60.00m, Count = 6 lags, Tolerance = 50.00%
D3   : N260
       Angular tolerance =  45.00
       Lag =  2.00m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N170.00 Dip=10.00 Pitch=140.00 (Geologist Plane)
S1   - Nugget effect, Sill =       0.025
S2   - Spherical - Range = 4.00m, Sill =       0.07
       Directional Scales = (    100.00m,      80.00m,       4.00m)
S3   - Spherical - Range = 15.00m, Sill =      0.085
       Directional Scales = (    200.00m,     160.00m,      15.00m)
```

```
Density/UCZ points(West)
- Variable #1 : DENSITY
Variogram : in 1 direction(s)
D1   :
       Angular tolerance =  90.00
       Lag =  2.00m, Count = 10 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =       0.025
S2   - Spherical - Range = 2.50m, Sill =       0.04
S3   - Spherical - Range = 10.50m, Sill =      0.095
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-20: Experimental and Modelled Variogram For USZ West SG

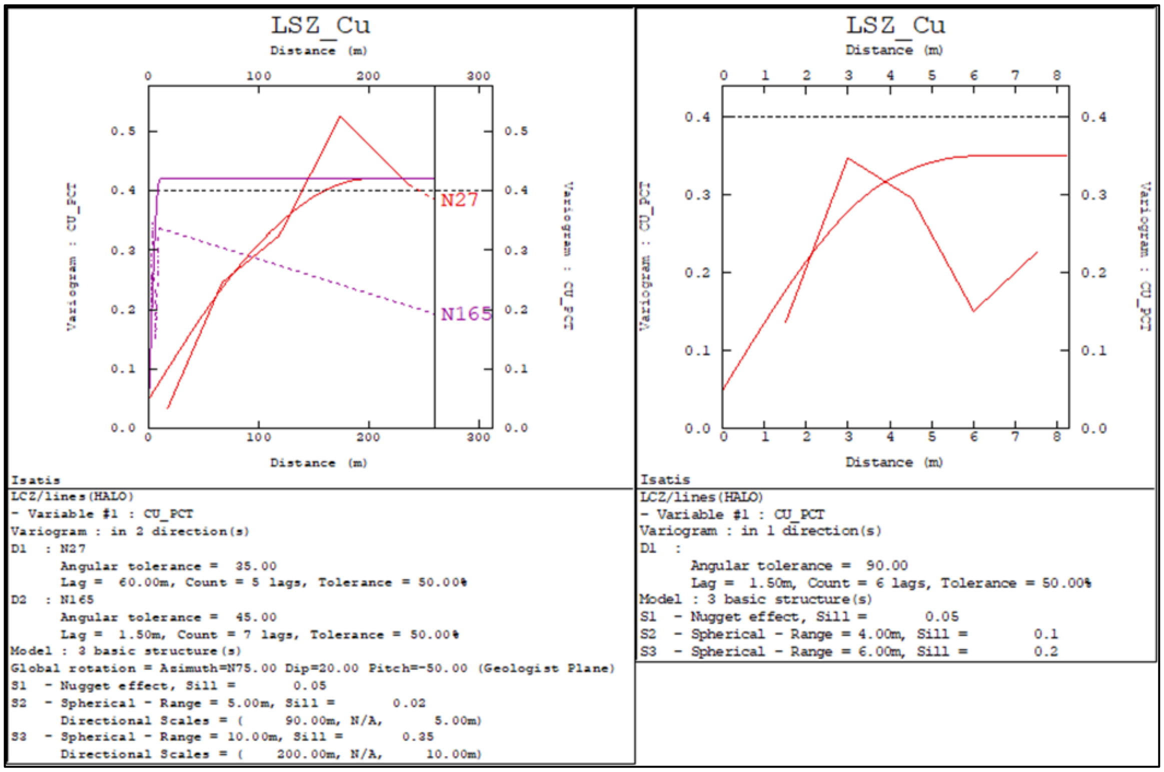


```
LCZ/lines(LCZPODS)
- Variable #1 : CU_PCT
Variogram : in 3 direction(s)
D1   : N6
      Angular tolerance =  12.50
      Lag =  50.00m, Count = 5 lags, Tolerance = 50.00%
D2   : N94
      Angular tolerance =  30.00
      Lag =  50.00m, Count = 5 lags, Tolerance = 50.00%
D3   : N165
      Angular tolerance =  45.00
      Lag =  1.50m, Count = 6 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N75.00 Dip=20.00 Pitch=-70.00 (Geologist Plane)
S1   - Nugget effect, Sill =           4
S2   - Spherical - Range = 4.00m, Sill =        8.5
      Directional Scales = (     85.00m,     75.00m,      4.00m)
S3   - Spherical - Range = 10.00m, Sill =        13
      Directional Scales = (    155.00m,    130.00m,     10.00m)
```

```
LCZ/lines(LCZPODS)
- Variable #1 : CU_PCT
Variogram : in 1 direction(s)
D1   :
      Angular tolerance =  90.00
      Lag =  1.50m, Count = 8 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =           4
S2   - Spherical - Range = 3.80m, Sill =          5
S3   - Spherical - Range = 5.50m, Sill =       10.5
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-21: Experimental and Modelled Variogram for LCZ Vein East Cu

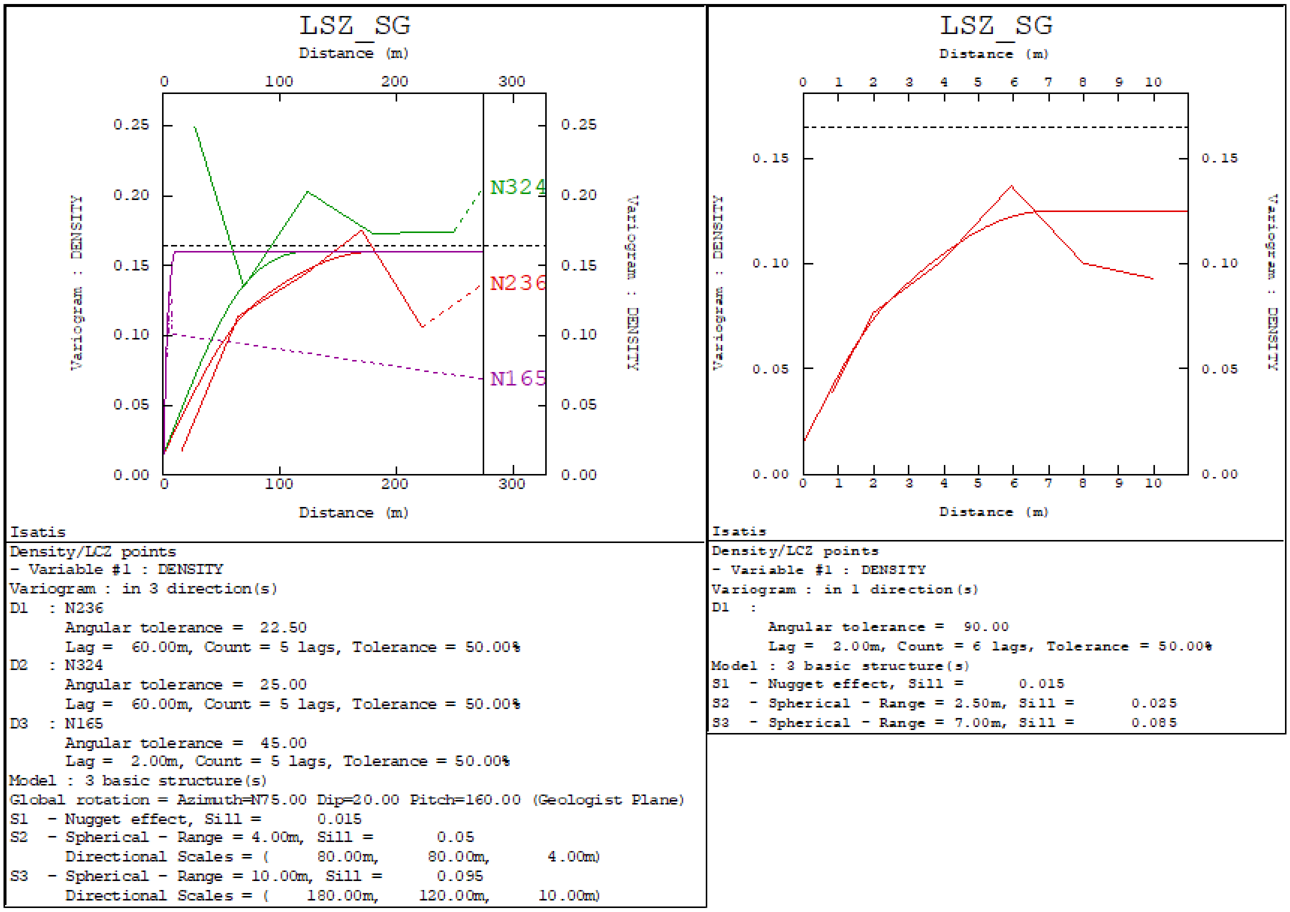


```
LCZ/lines(HALO)
- Variable #1 : CU_PCT
Variogram : in 2 direction(s)
D1   : N27
       Angular tolerance =  35.00
       Lag =  60.00m, Count = 5 lags, Tolerance = 50.00%
D2   : N165
       Angular tolerance =  45.00
       Lag =  1.50m, Count = 7 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Asimuth=N75.00 Dip=20.00 Pitch=-50.00 (Geologist Plane)
S1   - Nugget effect, Sill =       0.05
S2   - Spherical - Range = 5.00m, Sill =       0.02
       Directional Scales = (     90.00m, N/A,       5.00m)
S3   - Spherical - Range = 10.00m, Sill =       0.35
       Directional Scales = (    200.00m, N/A,      10.00m)
```

```
LCZ/lines(HALO)
- Variable #1 : CU_PCT
Variogram : in 1 direction(s)
D1   :
       Angular tolerance =  90.00
       Lag =  1.50m, Count = 6 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =       0.05
S2   - Spherical - Range = 4.00m, Sill =        0.1
S3   - Spherical - Range = 6.00m, Sill =        0.2
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-22: Experimental and Modelled Variogram for LSZ Cu



```
Density/LCZ points
- Variable #1 : DENSITY
Variogram : in 3 direction(s)
D1   : N236
       Angular tolerance =  22.50
       Lag =  60.00m, Count = 5 lags, Tolerance = 50.00%
D2   : N324
       Angular tolerance =  25.00
       Lag =  60.00m, Count = 5 lags, Tolerance = 50.00%
D3   : N165
       Angular tolerance =  45.00
       Lag =  2.00m, Count = 5 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
Global rotation = Azimuth=N75.00 Dip=20.00 Pitch=160.00 (Geologist Plane)
S1   - Nugget effect, Sill =      0.015
S2   - Spherical - Range = 4.00m, Sill =       0.05
       Directional Scales = (     80.00m,     80.00m,      4.00m)
S3   - Spherical - Range = 10.00m, Sill =      0.095
       Directional Scales = (    180.00m,    120.00m,     10.00m)
```

```
Density/LCZ points
- Variable #1 : DENSITY
Variogram : in 1 direction(s)
D1   :
       Angular tolerance =  90.00
       Lag =  2.00m, Count = 6 lags, Tolerance = 50.00%
Model : 3 basic structure(s)
S1   - Nugget effect, Sill =      0.015
S2   - Spherical - Range = 2.50m, Sill =       0.025
S3   - Spherical - Range = 7.00m, Sill =       0.085
```

Source: SRA, 2019
Directional variogram on the left and downhole variogram on the right.

Figure 14-23: Experimental and Modelled Variogram for LSZ SG

14.5 Block Model

The resource block models for the UCZ and LCZ were built and estimated using Datamine Studio RM™ version 1.4.132.0. A summary of model geometries is presented in Table 14-8. The block models are defined in the NAD83/UTM Zone 12 North coordinate system. Due to the different supports for drilling data and geometallurgical data, each block model has an optimal parent block size based on data spacing and is estimated independently.

For the UCZ, once both models are complete the function slimod in Datamine Studio RM™ allows for the IJK (index value giving the location of the parent cell) of the Cu and SG model to be adjusted to match the prototype of the recovery and arsenic in concentrate model and allow the models to be combined into a single resource block model.

Waste blocks encompass both the UCZ and LCZ and are assigned 0.01% Cu, 3.04 SG and 0% recovery.

Block model attributes are presented in Table 14-9.

Table 14-8: Model Geometries

UCZ and LCZ Copper and SG			
	Northing	**Easting**	**Elevation**
Minimum Coordinates	506,100	5,180,000	1,100
Maximum Coordinates	507,500	5,181,300	1,802
Parent Block Size	25 m	25 m	3 m
Minimum Sub-cell	5 m	5 m	1 m
UCZ Recovery and Arsenic in Concentrate			
	Northing	**Easting**	**Elevation**
Minimum Coordinates	506,100	5,180,000	1,100
Maximum Coordinates	507,500	5,181,300	1,820
Parent Block Size	30 m	30 m	5 m
Minimum Sub-cell	5 m	5 m	1 m

Source: SRA, 2019

Table 14-9: Model Attributes

Block Model Attributes	Description
IJK	Parent cell address of the respective blocks
XC	Parent/sub-cell center coordinates in the X direction
YC	Parent/sub-cell center coordinates in the Y direction
ZC	Parent/sub-cell center coordinates in the Z direction
XINC	Increment of cell in meters in the X direction
YINC	Increment of cell in meters in the Y direction
ZINC	Increment of cell in meters in the Z direction
XMORIG	Origin X coordinate - Lower left center of parent cell
YMORIG	Origin Y coordinate - Lower left center of parent cell
ZMORIG	Origin Z coordinate - Lower left center of parent cell
NX	Number of parent cells in the X direction
NY	Number of parent cells in the Y direction
NZ	Number of parent cells in the Z direction
CU	Estimated Copper grade in%
DOMAIN	Numeric Code for Lode (11 – UCZ vein east, 12/13 – UCZ vein west, 101 – UCZ halo east, 102 – UCZ halo west, 103 – USZ east, 104 – USZ west, 21/22/23 LCZ east, central and west veins, 201 – LSZ, 1000 – Waste)
DENSITY	Estimated Density in g/cm3
CLASS	Classification (Mea = Measured, Ind = Indicated and Inf = Inferred)
T REC	Estimated Total Recovery for UCZ. Supergene zones applied 69.8% Recovery (LCZ 94%).
CU R	Recoverable Cu grade = CU * (T_REC/100)
TENNAN	Estimated Tennantite ppm (Arsenic in concentrate) for UCZ (LCZ 230ppm)

Source: SRA, 2019

14.6 Estimation Methodology

The primary Cu and SG domains were estimated using OK. Variography and search neighborhoods (Table 14-10) were defined by the geometry of the orebody and kriging parameters were optimized using Kriging Neighborhood Analysis (KNA). The estimation was performed using two search volumes: the first search is restricted to approximately 90-95% of the variogram range based on review of variograms for each domain which estimates the majority of blocks. The second search is five times the search distances to estimate remaining peripheral blocks that typically contain reduced data support. Due to undulations in the mineralization geometry for the UCZ and LCZ, dynamic anisotropy is employed to control searches and improve the local estimate.

Table 14-10: Search Parameters for Cu and SG by Domain

Variable	Domain	Rotation			Maximum Search Distances			Block Discretization			Optimum Samples	Minimum Samples	Angular Sectors
		Azimuth	Dip	Pitch	U	V	W	X	Y	Z			
CU	UCZ_Vein_East	Dynamic Anisotropy			75	50	10	2	2	2	12	6	1
CU	UCZ_Vein_West	Dynamic Anisotropy			125	80	10	2	2	2	12	6	1
CU	UCZ_Halo_East	Dynamic Anisotropy			190	154	15	2	2	2	12	6	1
CU	UCZ_Halo_West	Dynamic Anisotropy			150	98	15	2	2	2	12	6	1
SG	USZ_East	Dynamic Anisotropy			130	104	15	2	2	2	12	6	1
SG	USZ_West	Dynamic Anisotropy			140	101	15	2	2	2	12	6	1
CU	LCZ_Vein	Dynamic Anisotropy			90	75	10	2	2	2	12	6	1
CU	LSZ	Dynamic Anisotropy			140	140	15	2	2	2	10	6	1
SG	LSZ	Dynamic Anisotropy			120	80	15	2	2	2	12	6	1

Source: SRA, 2019

The estimation of recovery for the UCZ via OK was not suitable due to insufficient data support. In order to convert this data into a 3D geometallurgical model, various interpolation protocols were trialed, including: Radial Base Function isotropic, Radial Base Function anisotropic, IDW2 and inverse distance weighted cubed (IDW3) (Hilliard, 2019). The best correlation between block estimates and the source data, geology, and geometallurgical logging was obtained using IDW2 (see Section 13 for additional information).

The estimation of recovery in concentrate was constrained by the all-encompassing UCZ Halo East and West inclusive of UCZ Vein East and West. The estimation is run in two search volumes, increasing by two times the search distances for the second pass. Dynamic anisotropy is utilized to control the search and optimize the local estimate. Neighborhood search parameters are presented in Table 14-10.

For the LCZ, recovery is assigned a mean value of 94%. It was determined that estimation of block recovery was not required due to the low variability of LCZ recovery testing and consistency in this variable across the LCZ.

Table 14-11: Search Parameters for Recovery by Domain

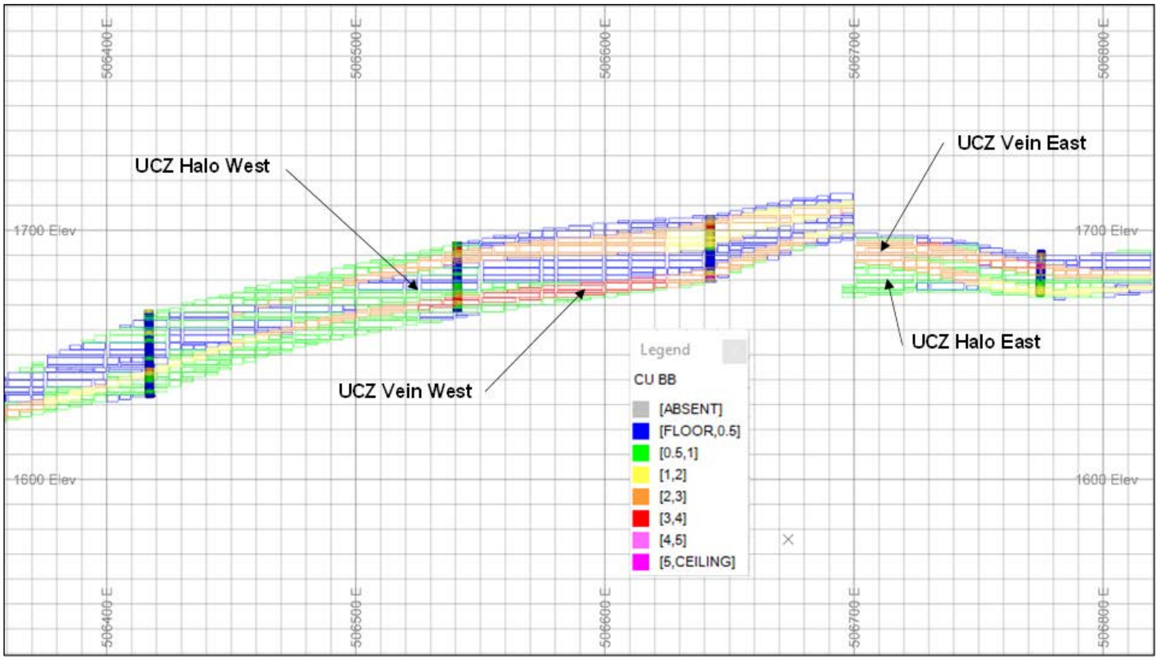
Variable	Domain	Rotation			Maximum Search Distances			Power	Optimum Samples	Minimum Samples
		Azimuth	Dip	Pitch	U	V	W			
Recovery	UCZ_Halo_East	Dynamic Anisotropy			260	210	25	2	4	2
Recovery	UCZ_Halo_West	Dynamic Anisotropy			230	150	25	2	4	2

Source: SRA, 2019

14.7 Model Validation

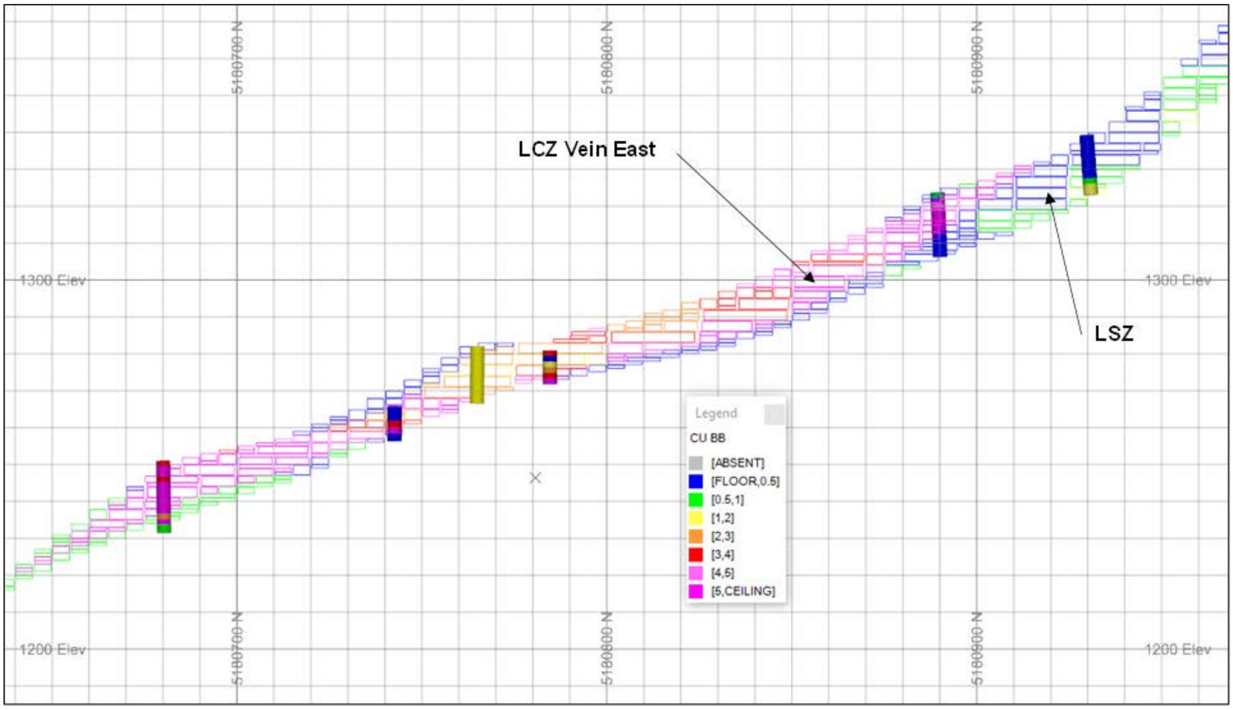
14.7.1 Visual Comparison

Representative cross-sections through the UCZ and LCZ were produced for visual validation of block model Cu grade against composite Cu grade. Examples of these cross-sections are presented below in Figure 14-24 to Figure 14-27 that illustrate the block model grades provide an acceptable representation of composite data.



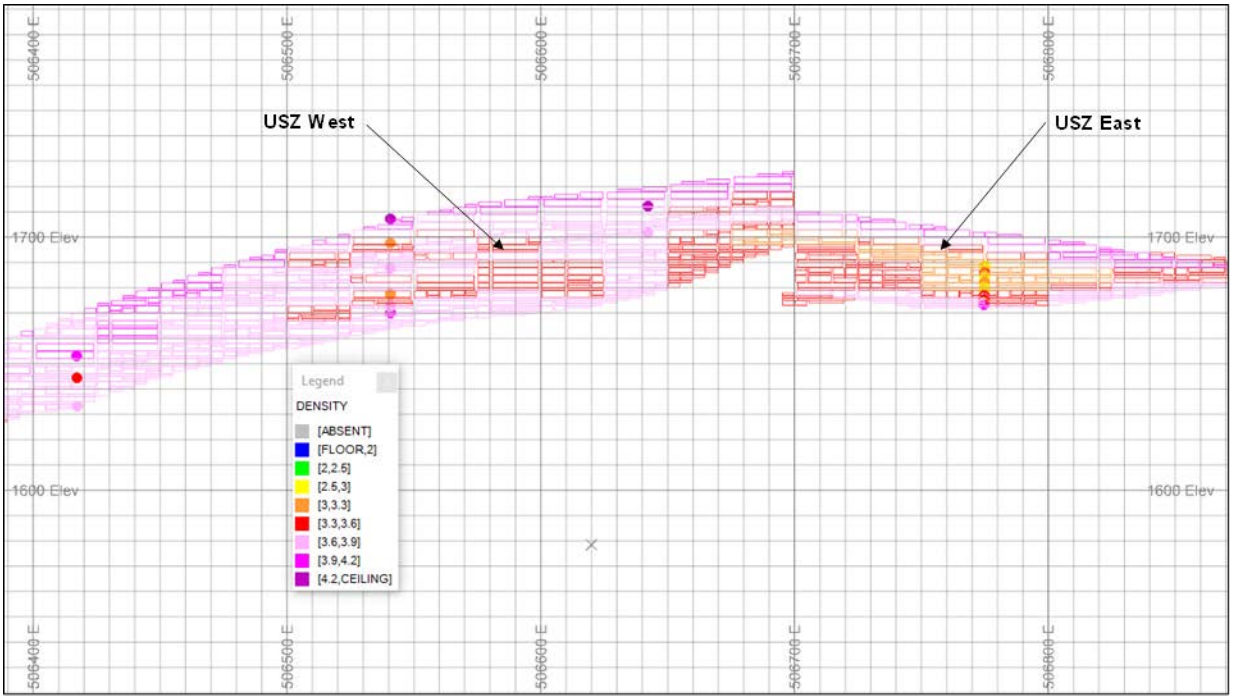
Source: SRA, 2019

Figure 14-24: Section N5180805 Looking North – Cross-Section through UCZ Showing UCZ East and West Cu Block Model versus Cu Composite Data



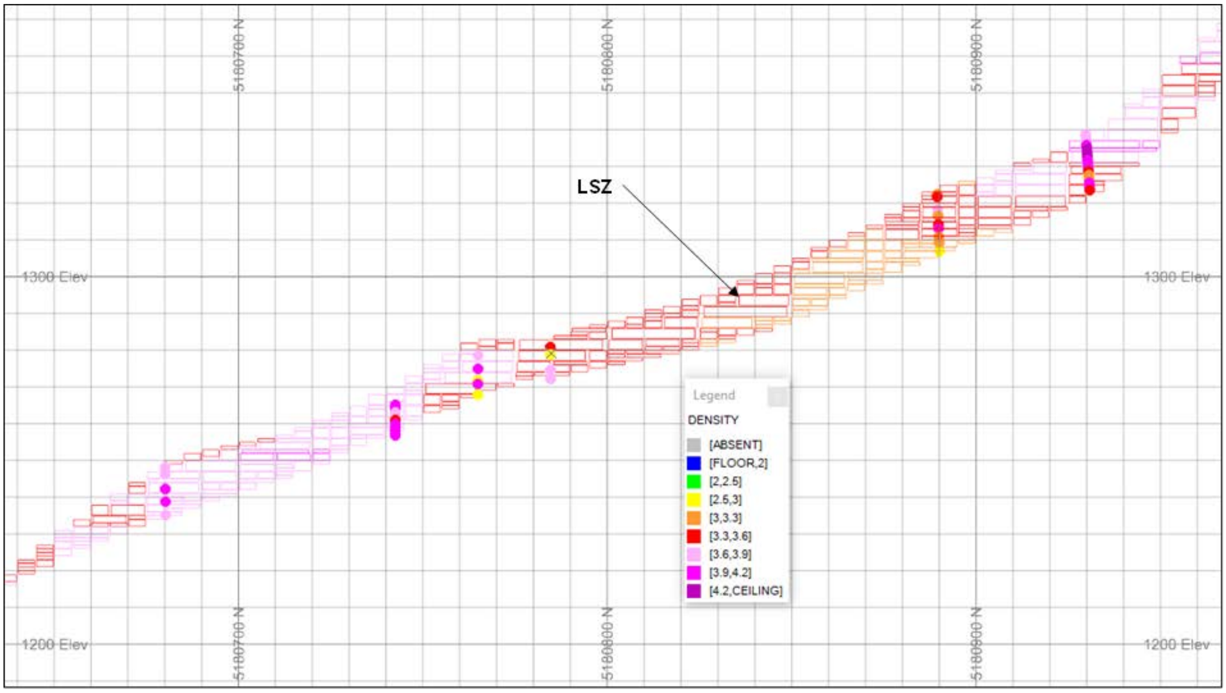
Source: SRA, 2019

Figure 14-25: Section E507210 Looking West - Cross-Section through LCZ Vein East/LSZ Showing Cu Block Model versus Cu Data



Source: SRA, 2019

Figure 14-26: Section N5180805 Looking North – Cross-Section through USZ Showing USZ East and West SG Block Model versus SG Data



Source: SRA, 2019

Figure 14-27: Section E507210 Looking West - Cross-Section through LSZ Showing SG Block Model versus SG Data

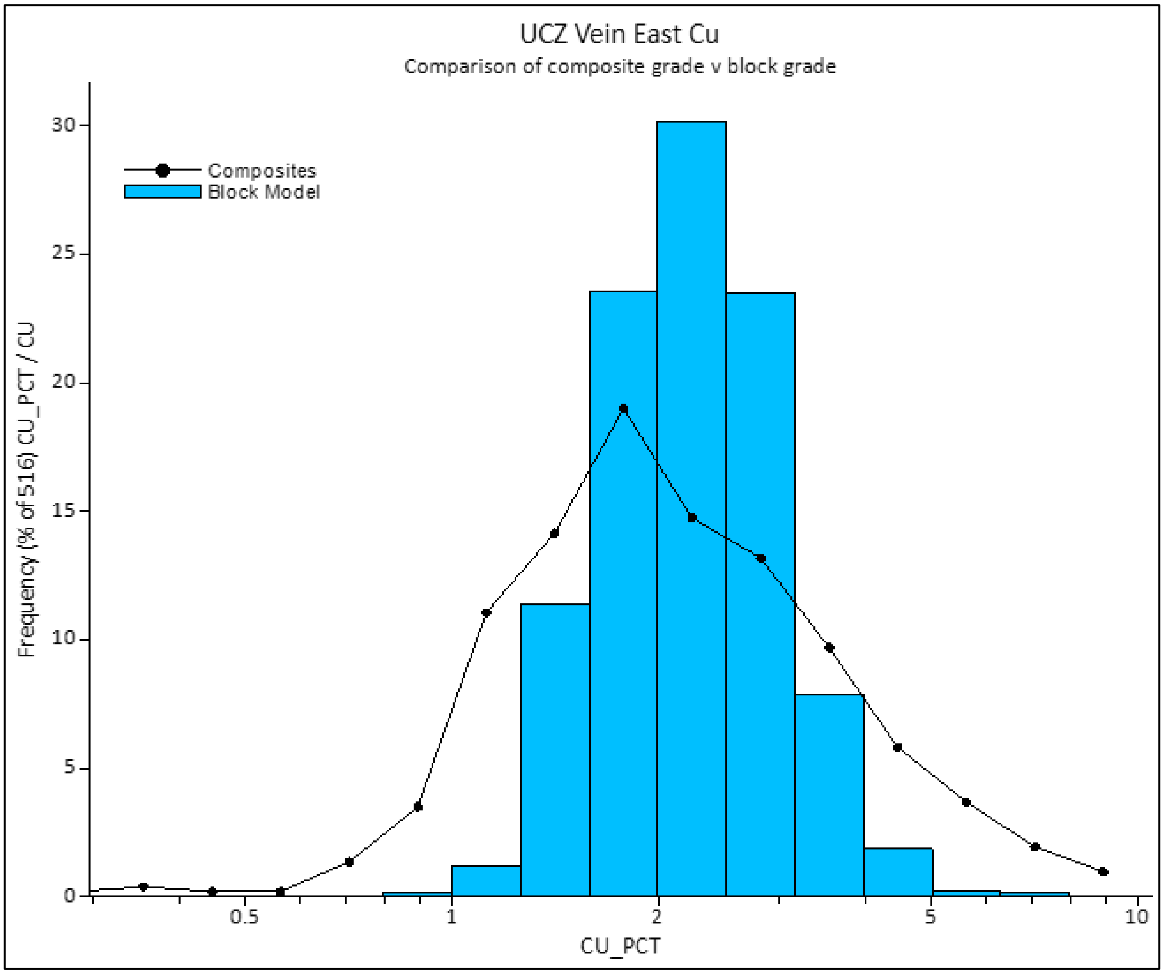
14.7.2 Comparative Statistics

Frequency log histograms of capped composite and block grade distributions were produced to compare and validate the estimation of each domain (Figure 14-28 to Figure 14-36), and are summarized in Table 14-12 and Table 14-13 for copper and SG respectively. The block grade histograms are a reasonable reflection of the composite grade histogram after smoothing of low and high-grade tails.

Table 14-12: Summary Statistics for Cu Composite Grade (Capped) and Block Grade by Domain

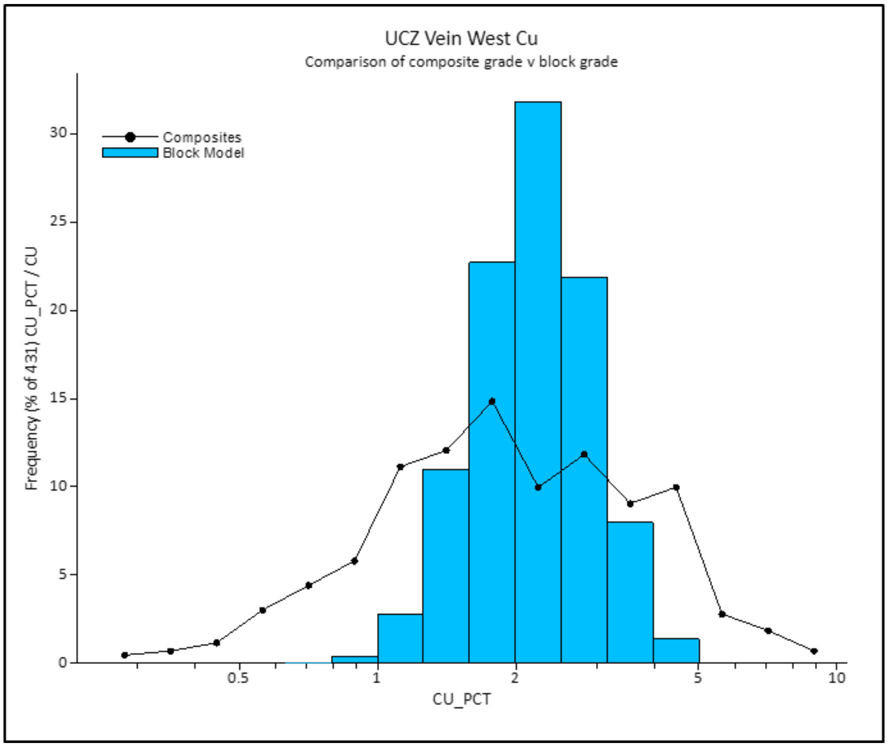
Data Type	Metric	UCZ Vein East	UCZ Vein West	UCZ Halo East	UCZ Halo West	LCZ Vein	LSZ
Composite	Count	516	431	778	1008	153	188
Block	Count	47623	85547	127022	282903	12810	89051
Composite	Mean	2.44	2.33	0.55	0.45	6.55	0.19
Block	Mean	2.31	2.27	0.51	0.46	6.73	0.20
Composite	Minimum	0.296	0.222	0.005	0.004	0.003	0.001
Block	Minimum	0.97	0.72	0.03	0.03	0.98	0.01
Composite	Maximum	9.11	8.31	2.16	3.59	17.68	1.58
Block	Maximum	6.78	4.93	1.27	1.63	14.90	1.15
Composite	Variance	2.17	2.27	0.09	0.11	23.28	0.12
Block	Variance	0.47	0.42	0.03	0.02	7.24	0.03
Composite	Std Deviation	1.47	0.30	0.30	0.33	4.83	0.34
Block	Std Deviation	0.68	0.19	0.19	0.16	2.69	0.18
Composite	CV	0.60	0.13	0.55	0.73	0.74	1.83
Block	CV	0.30	0.08	0.36	0.34	0.40	0.89

Source: SRA, 2019



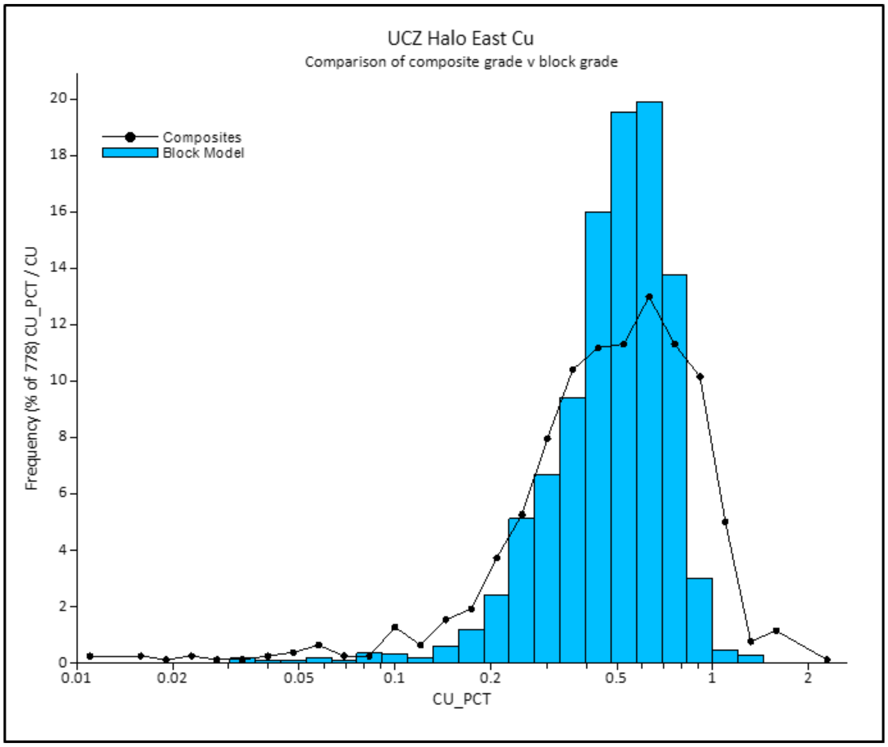
Source: SRA, 2019

Figure 14-28: Comparative Log Histogram of Cu Composite and Block Grade Distributions for the UCZ Vein East



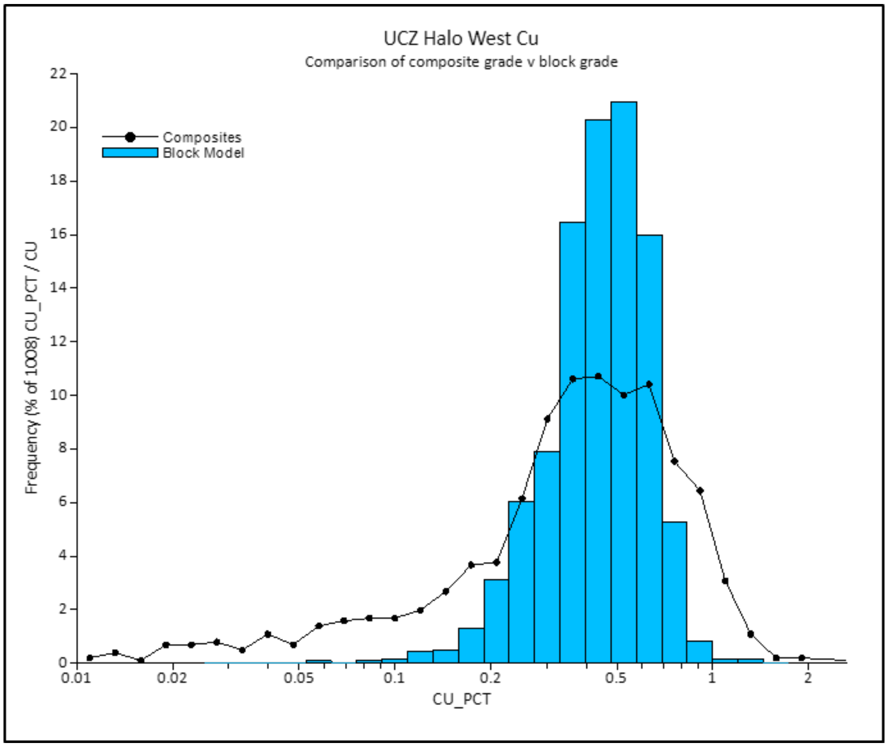
Source: SRA, 2019

Figure 14-29: Comparative Log Histogram of Cu Composite and Block Grade Distributions for the UCZ Vein West



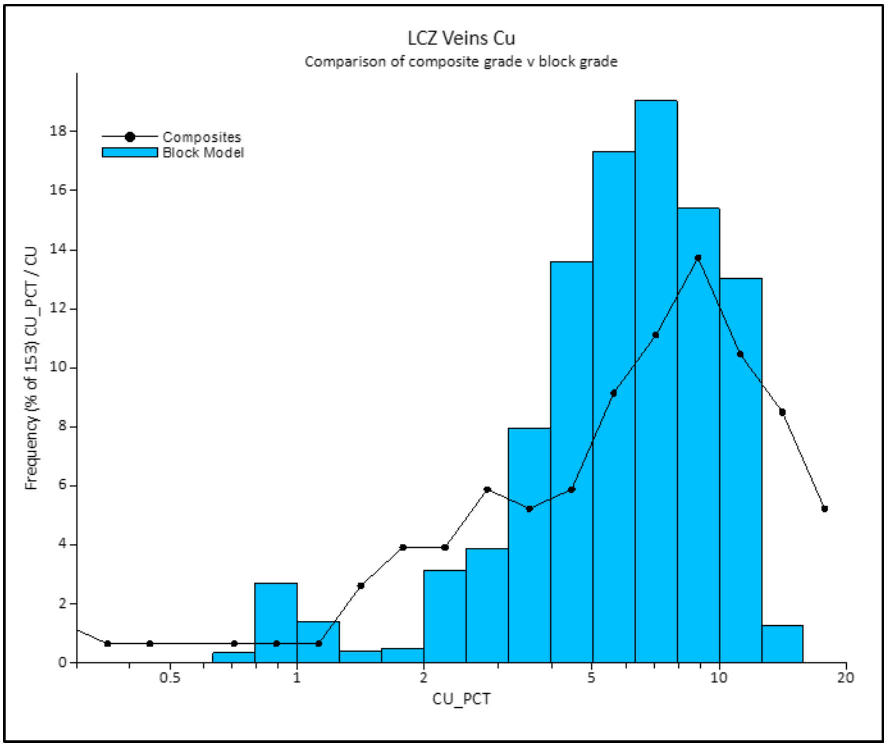
Source: SRA, 2019

Figure 14-30: Comparative Log Histogram of Cu Composite and Block Grade Distributions for the UCZ Halo East



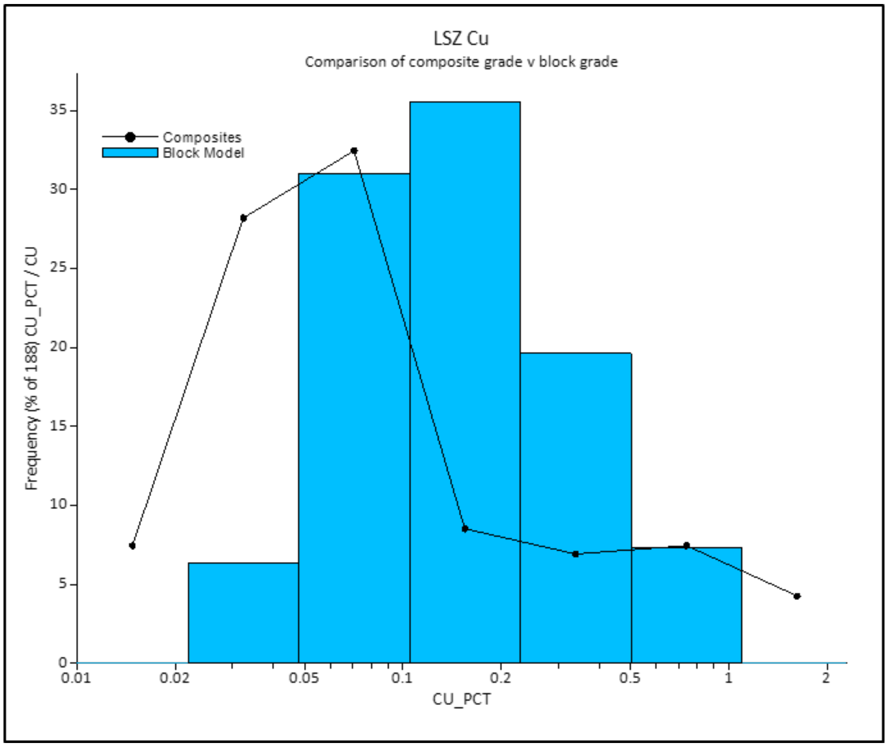
Source: SRA, 2019

Figure 14-31: Comparative Log Histogram of Cu Composite and Block Grade Distributions for the UCZ Vein West



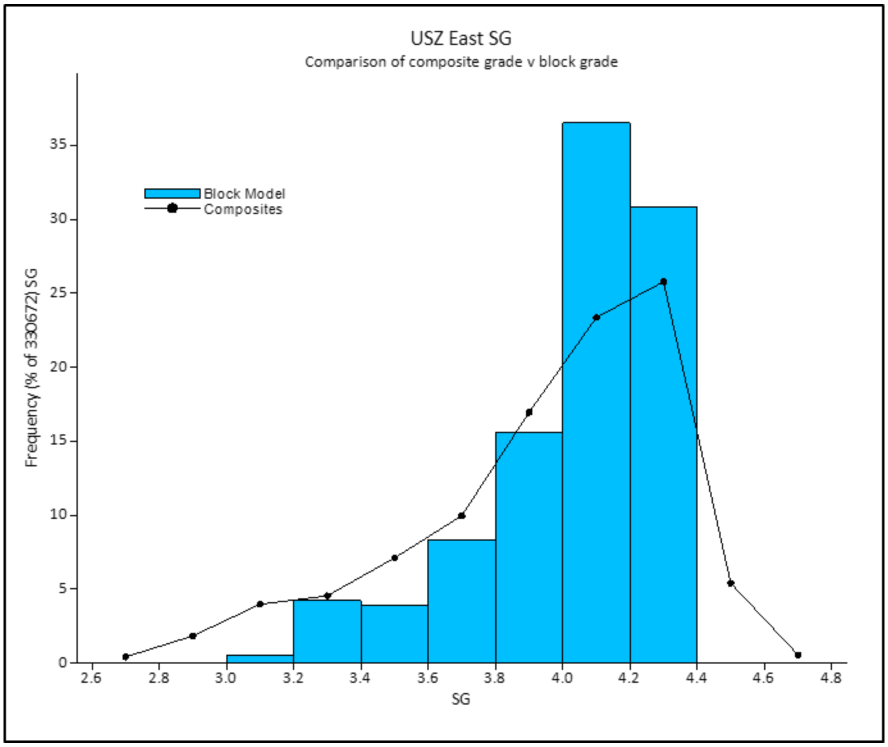
Source: SRA, 2019

Figure 14-32: Comparative Log Histogram of Cu Composite and Block Grade Distributions for the LCZ Veins (West, Central, And East)



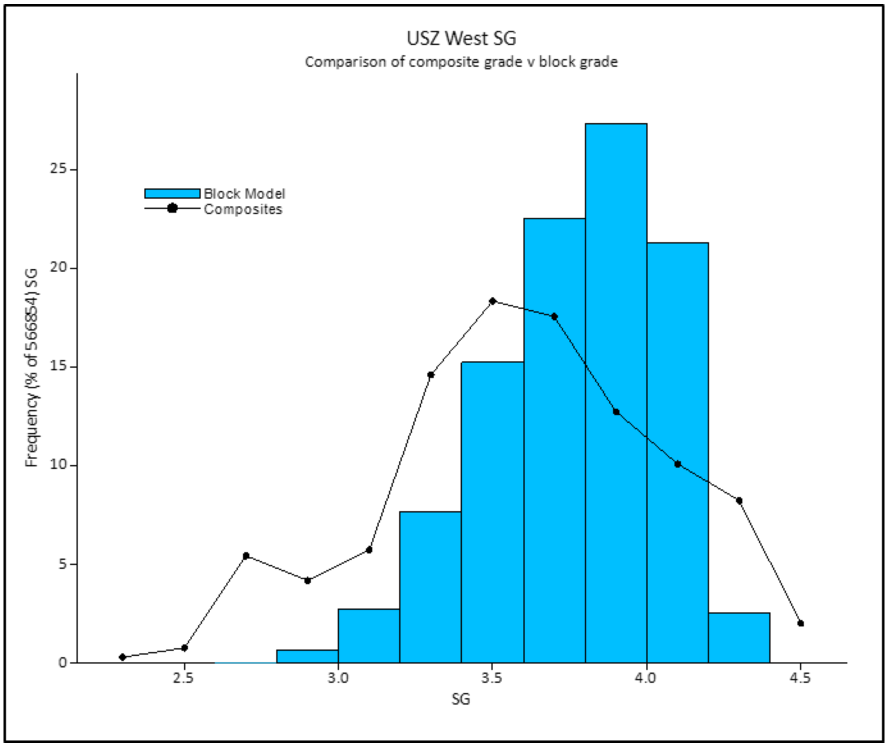
Source: SRA, 2019

Figure 14-33: Comparative Log Histogram of Cu Composite and Block Grade Distributions for the LSZ



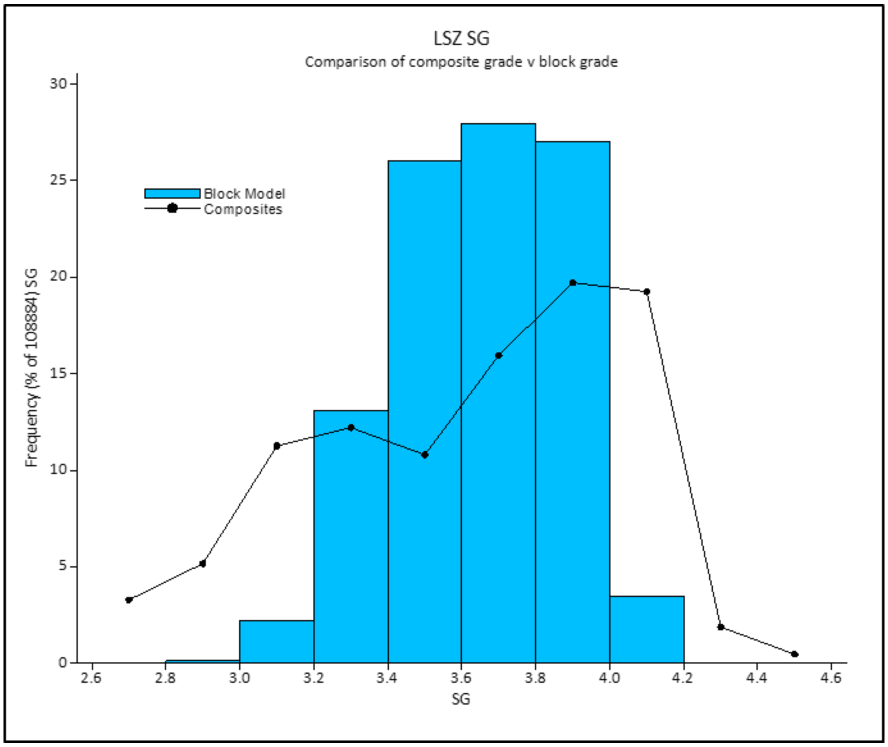
Source: SRA, 2019

Figure 14-34: Comparative Log Histogram of SG Composite and Block ~~SG~~ Distributions for the USZ East



Source: SRA, 2019

Figure 14-35: Comparative Log Histogram of SG Composite and Block SG Distributions for the USZ West



Source: SRA, 2019

Figure 14-36: Comparative Log Histogram of SG Composite and Block SG Distributions for the LSZ

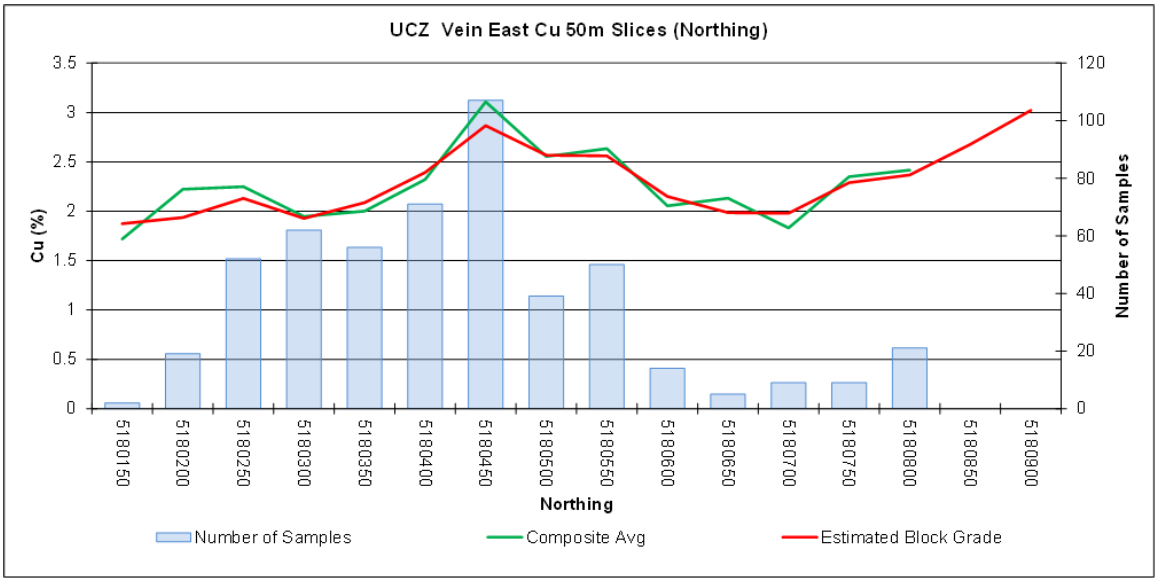
Table 14-13: Summary Statistics for SG Composite Grade and Block Grade by Domain

Data Type	Metric	USZ East	USZ West	LSZ
Composite	Count	702	644	213
Block	Count	330672	566854	108884
Composite	Mean	3.96	3.60	3.62
Block	Mean	4.04	3.77	3.65
Composite	Minimum	2.68	2.27	2.64
Block	Minimum	3.05	2.59	2.94
Composite	Maximum	4.71	4.55	4.43
Block	Maximum	4.39	4.36	4.10
Composite	Variance	0.15	0.20	0.17
Block	Variance	0.07	0.08	0.05
Composite	Std Deviation	0.39	0.45	0.41
Block	Std Deviation	0.27	0.28	0.22
Composite	CV	0.10	0.12	0.11
Block	CV	0.07	0.07	0.06

Source: SRA, 2019

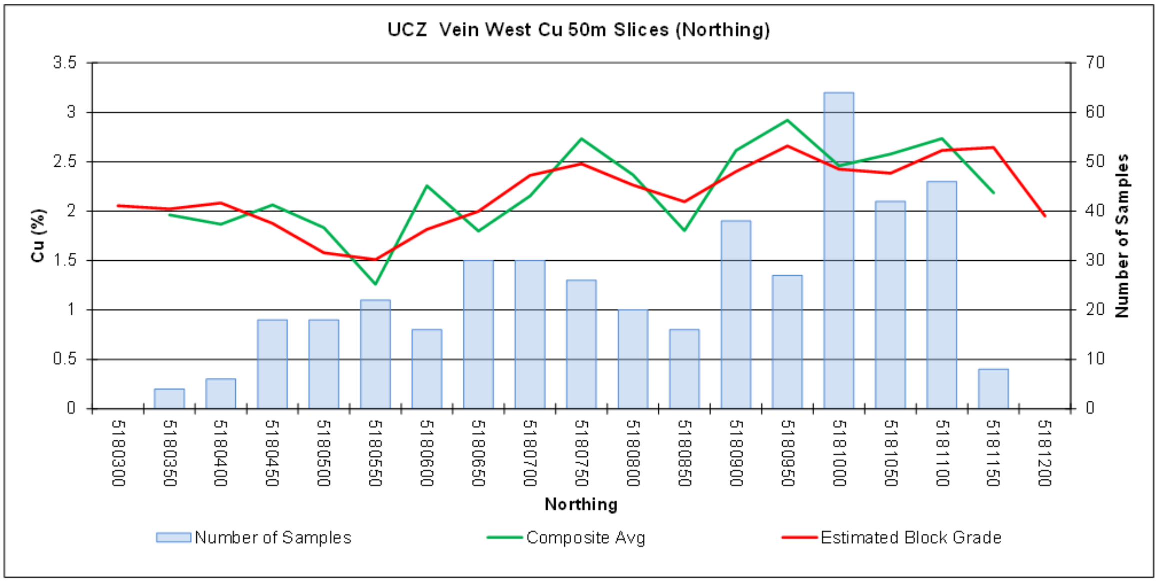
14.7.3 Swath Plots

Swath plots for Cu and SG were generated to validate each mineralized domain. The profiles compare mean block grade and mean composite values by northing for the UCZ and easting for the LCZ (Figure 14-37 to Figure 14-45). The swath plots illustrate an acceptable correlation between composite grades and block model grades. There are no material biases between composited and block grades for Cu and SG.



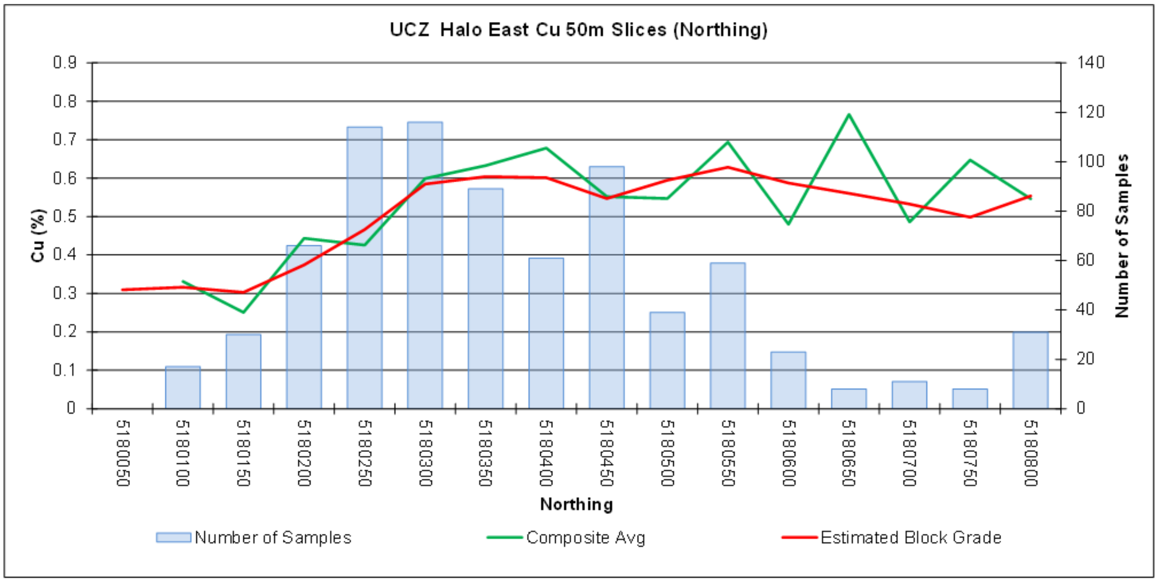
Source: SRA, 2019

Figure 14-37: UCZ Vein East Cu Sectional Profile (Northing) – Composite Grade versus Block Model Grade



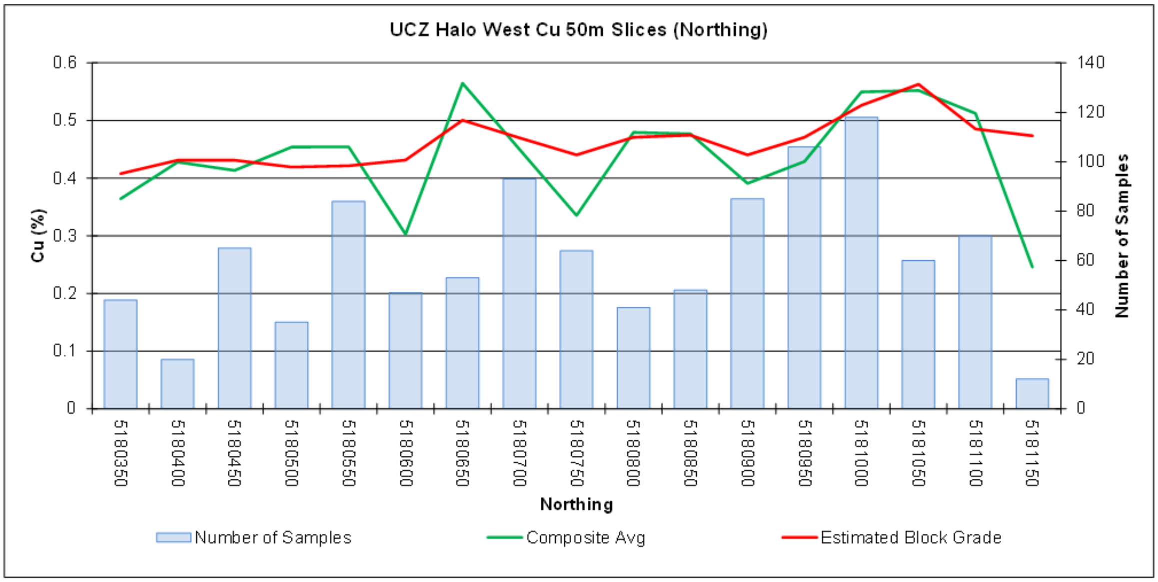
Source: SRA, 2019

Figure 14-38: UCZ Vein West Cu Sectional Profile (Northing) – Composite Grade versus Model Grade



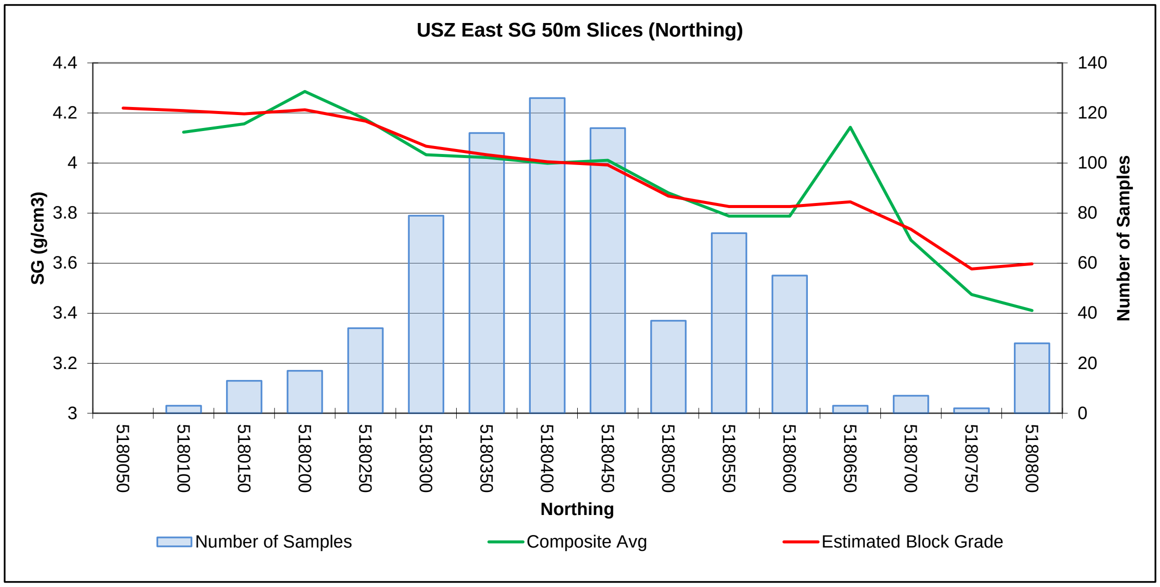
Source: SRA, 2019

Figure 14-39: UCZ Halo East Cu Sectional Profile (Northing) – Composite Grade versus Model Grade



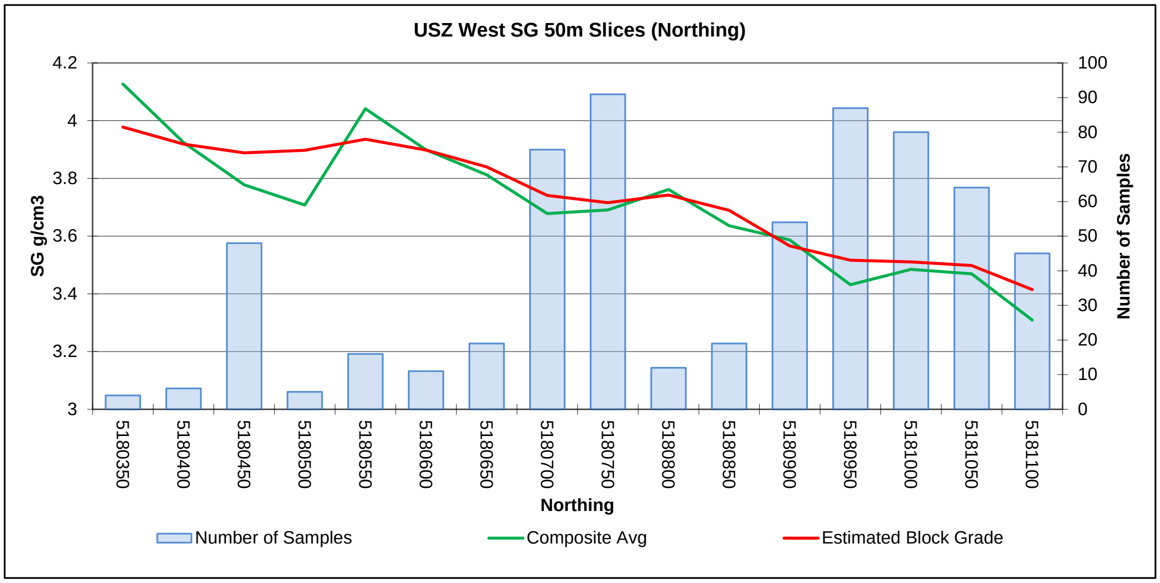
Source: SRA, 2019

Figure 14-40: UCZ Halo West Cu Sectional Profile (Northing) – Composite Grade versus Model Grade



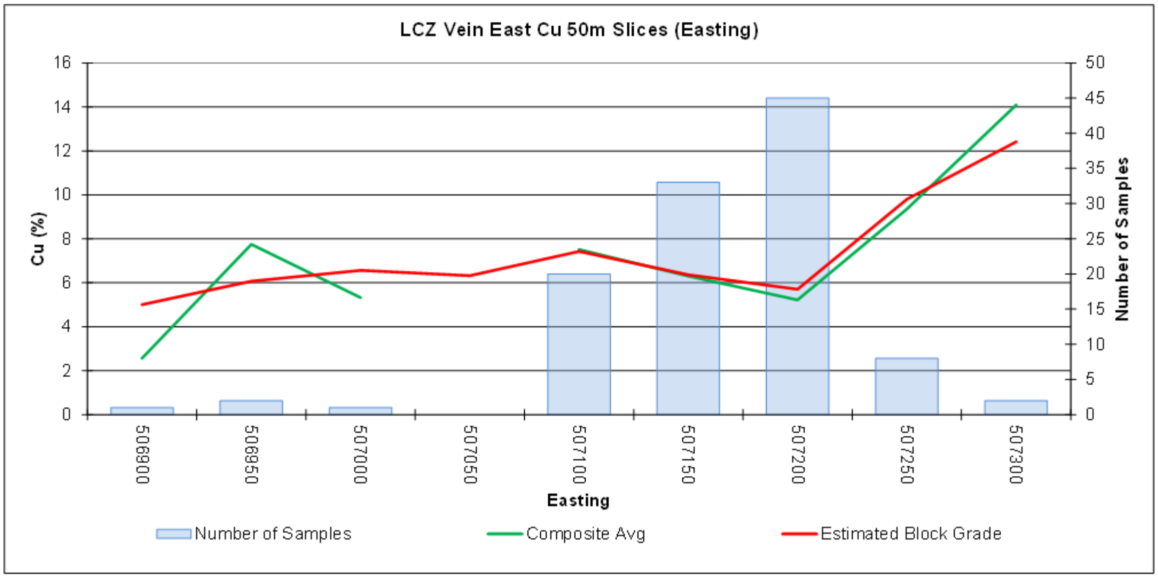
Source: SRA, 2019

Figure 14-41: USZ East SG Sectional Profile (Northing) – Composite Grade versus Model Grade



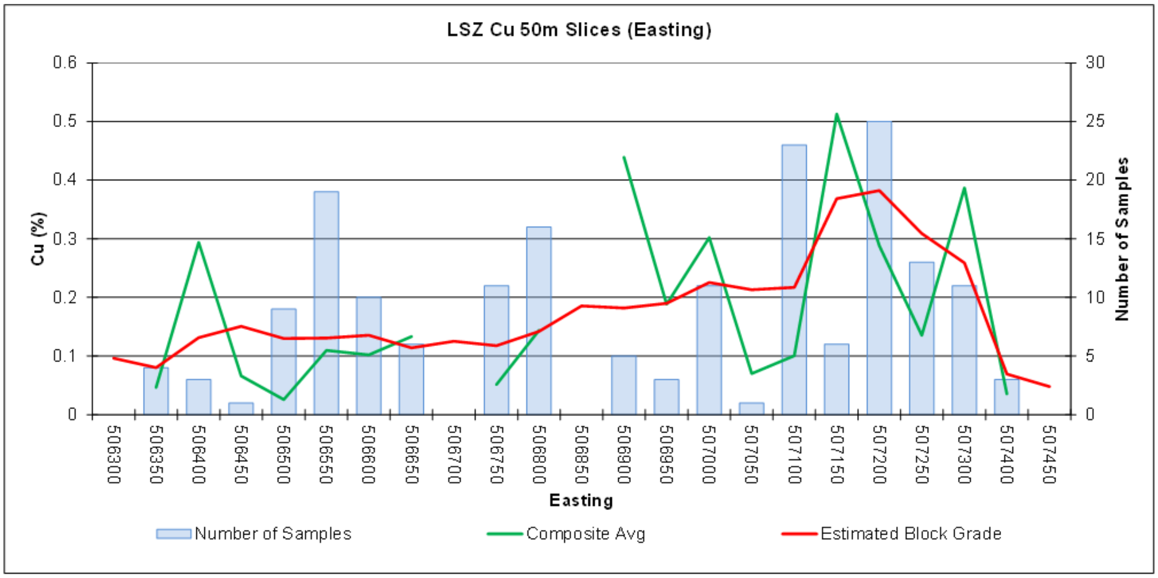
Source: SRA, 2019

Figure 14-42: USZ West SG Sectional Profile (Northing) – Composite Grade versus Model SG



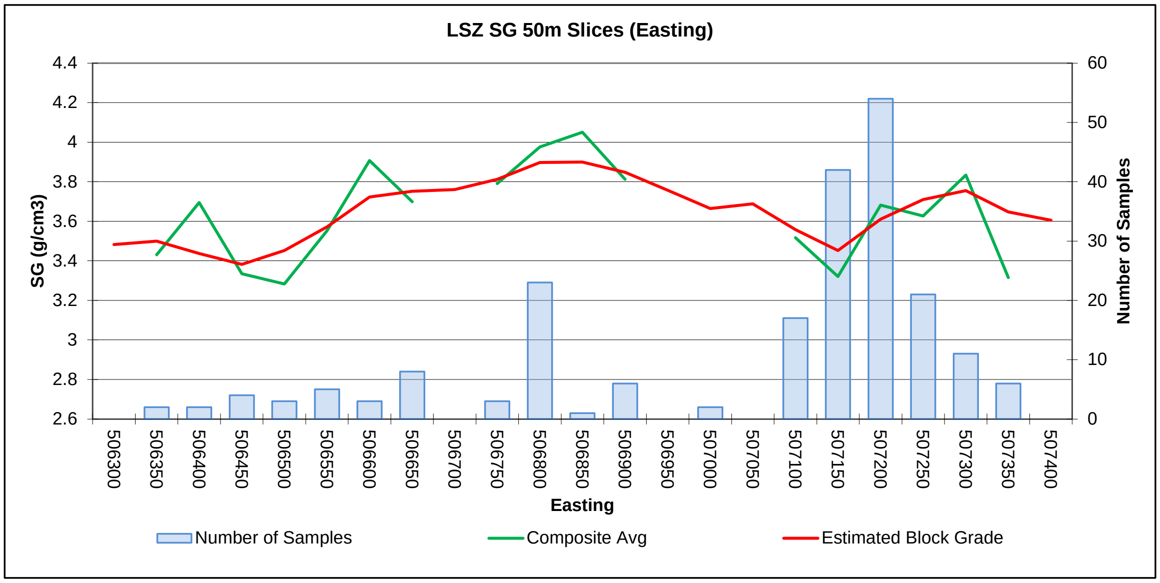
Source: SRA, 2019

Figure 14-43: LCZ Vein East Cu Sectional Profile (Easting) – Composite Grade versus Model Grade



Source: SRA, 2019

Figure 14-44: LSZ Cu Sectional Profile (Easting) – Composite Grade versus Model Grade



Source: SRA, 2019

Figure 14-45: LSZ SG Sectional Profile (Easting) – Composite SG versus Model SG

14.8 Resource Classification

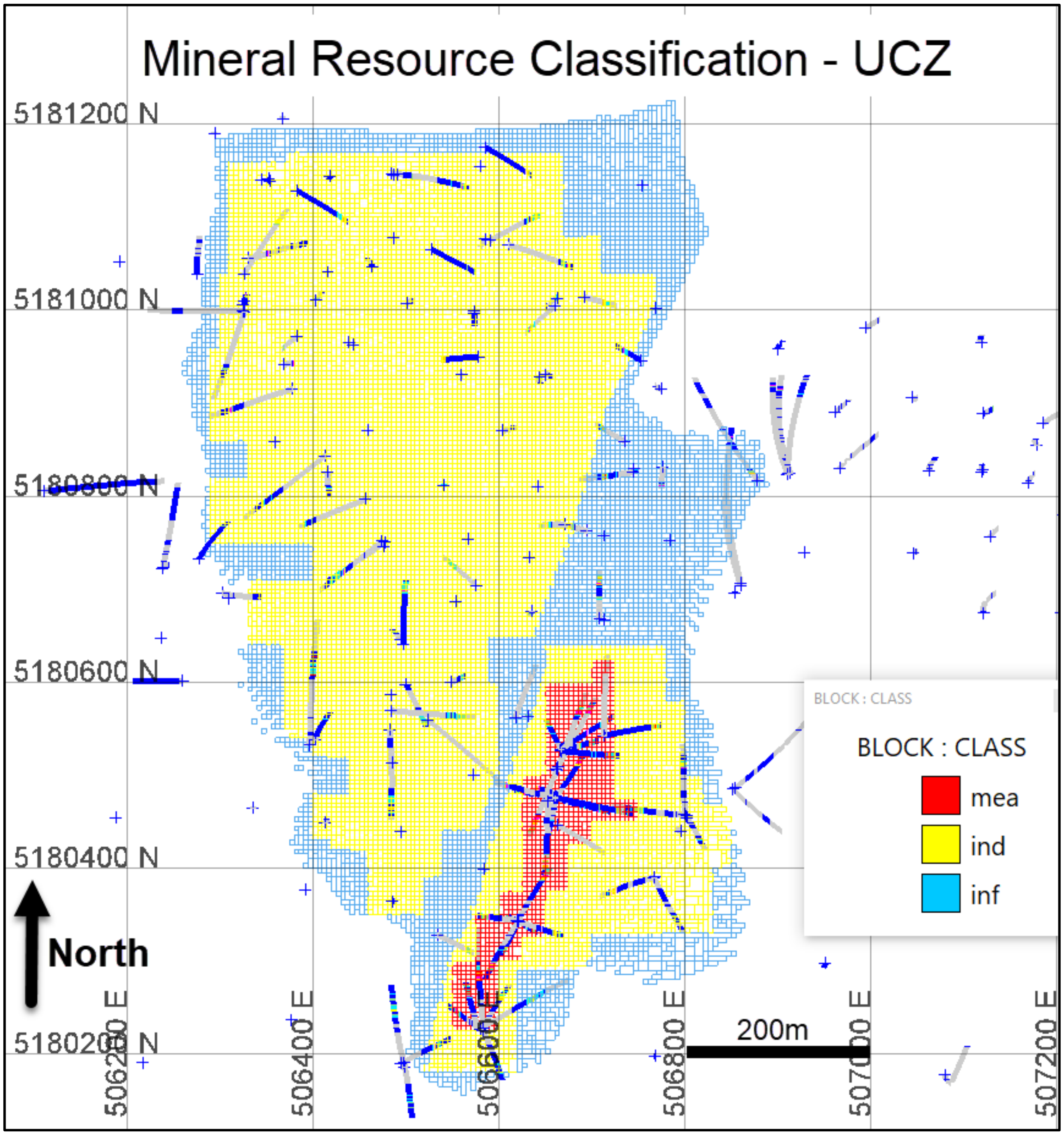
Mineral Resource classification was assigned to the Johnny Lee block models by the QP based upon: geological knowledge, continuity of Cu grade within mineralized zones, confidence in the underlying data (logging, assay, and physical testing), spatial continuity as determined through variography for Cu and SG, spatial continuity of recovery data, Kriging quality variables (kriging efficiency), and drill sample spacing on a domain basis. Blocks within the UCZ and LCZ have been categorized as Measured, Indicated, and Inferred classification consistent with NI 43-101 and the CIM definitions and guidelines (CIM, 2014). A combination of wireframe volumes and scripting of specific blocks was used to apply the appropriate block classification of Mineral Resource categories.

Measured Mineral Resource classification is assigned to blocks based upon high confidence in geology, Cu grade, and SG continuity, acceptable QA/QC of fundamental data, increased confidence in estimation quality based on Kriging efficiency values greater than 0.7, drill spacing less than 50m, and reasonable recovery data. Measured blocks in the UCZ and LCZ are concentrated in zones of tight drill spacing as illustrated in Figure 14-46 and Figure 14-47.

Indicated Mineral Resource classification is assigned to blocks based on moderate to high confidence in geology, Cu grade, and SG continuity, acceptable QA/QC of fundamental data, moderate confidence in estimation quality based on Kriging efficiency values typically less than 0.7, drill spacing of approximately 50m, and reasonable recovery data. Indicated blocks constitute the majority of Mineral Resources.

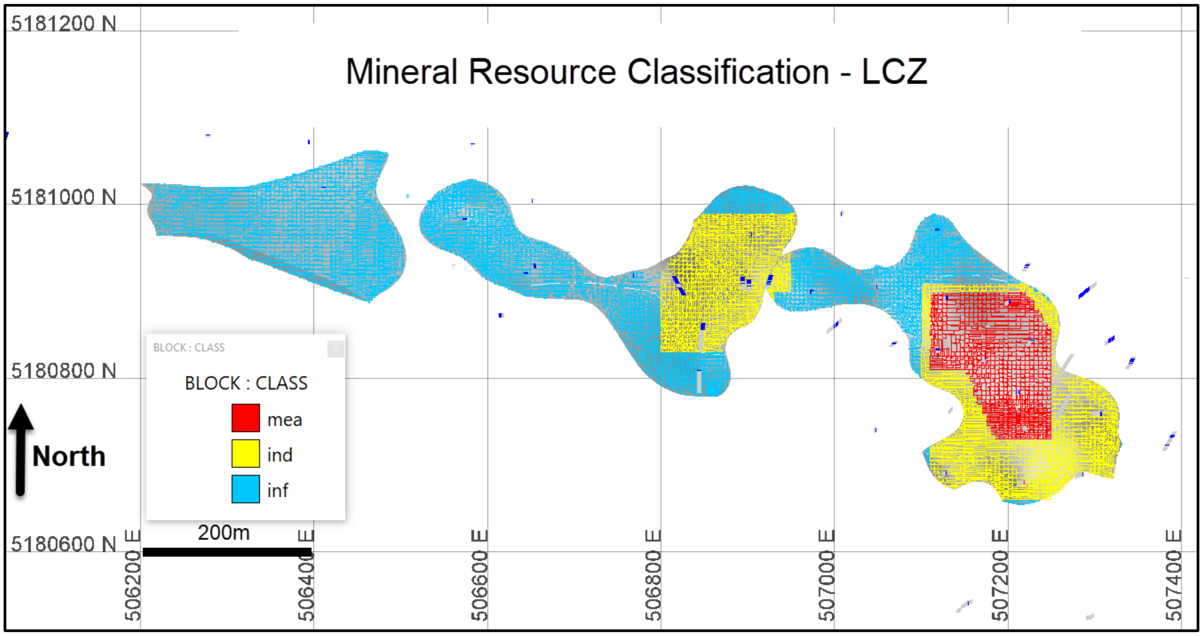
Inferred Mineral Resource classification is assigned to blocks based on moderate confidence in geology, Cu grade, and SG continuity, acceptable QA/QC, low confidence in estimation quality based on Kriging efficiency, and drill spacing greater than 50 m with a low degree of confidence in recovery data. Inferred blocks represent mineralized material within a modeled volume with limited or wide-spaced data supporting the continuity. The modeled volume has been bounded by drilling in most or all directions. The majority of the LCZ has been classified as Inferred Mineral Resources due to wide-spaced drilling in the western portions of the zone.

It is the opinion of the QP that the classification for the Johnny Lee deposit Mineral Resource is reasonable for the type of mineralization and deposit.



Source: SRK, 2019

Figure 14-46: Plan View of the UCZ Showing Mineral Resource Classification



Source: SRK, 2019

Figure 14-47: Plan View of the LCZ Showing Mineral Resource Classification.

14.9 Demonstration of Potential for Economic Extraction

As per CIM definitions of Mineral Resources, material must demonstrate reasonable prospects for eventual economic extraction. For the Black Butte Copper Project, use of a cut-off grades have been applied to each deposit to satisfy this implication.

SRK has applied a CoG that accounts for operational costs based on the assumed mining method proposed, assumed processing costs, assumed general & administrative costs, metallurgical recovery of copper, and market-driven copper pricing. The 2013 Tintina PEA (Winckers et al, 2013) was used as a base guide for total costing while SRK utilized recent metallurgical recovery work and updated copper price projections. The following technical and economic parameters are assumed and accounted for in the determination of CoG:

- Metallurgical recoveries: Estimated variable copper recovery for the UCZ. Assigned mean 94% copper recovery for the LCZ.
- Operational Costs: US$71/t. This includes mining, processing and general and administrative costs.
- Copper Price: A long term copper price of US$3.20 per pound (US$7,055 per t) is based on market consensus forecast for upside copper pricing.

Using these metrics, a cut-off grade of 1.0% Cu based on recovery assumptions was used for the entire Johnny Lee deposit.

14.10 Mineral Resource Statement

Summary Mineral Resources have been calculated and reported using an economic cut-off grade (CoG) applied to copper as estimated in the resource block model. This Mineral Resource statement is based upon recent drilling, analyses, geological modeling, and extensive metallurgical studies to provide updated recoveries. The Mineral Resources are additionally supported upon previous studies including the PEA (effective date: July 12, 2013).

Table 14-14: Black Butte Copper Project Mineral Resource Estimate for the Johnny Lee Deposit as of October 15, 2019– SRK Consulting (U.S.), Inc

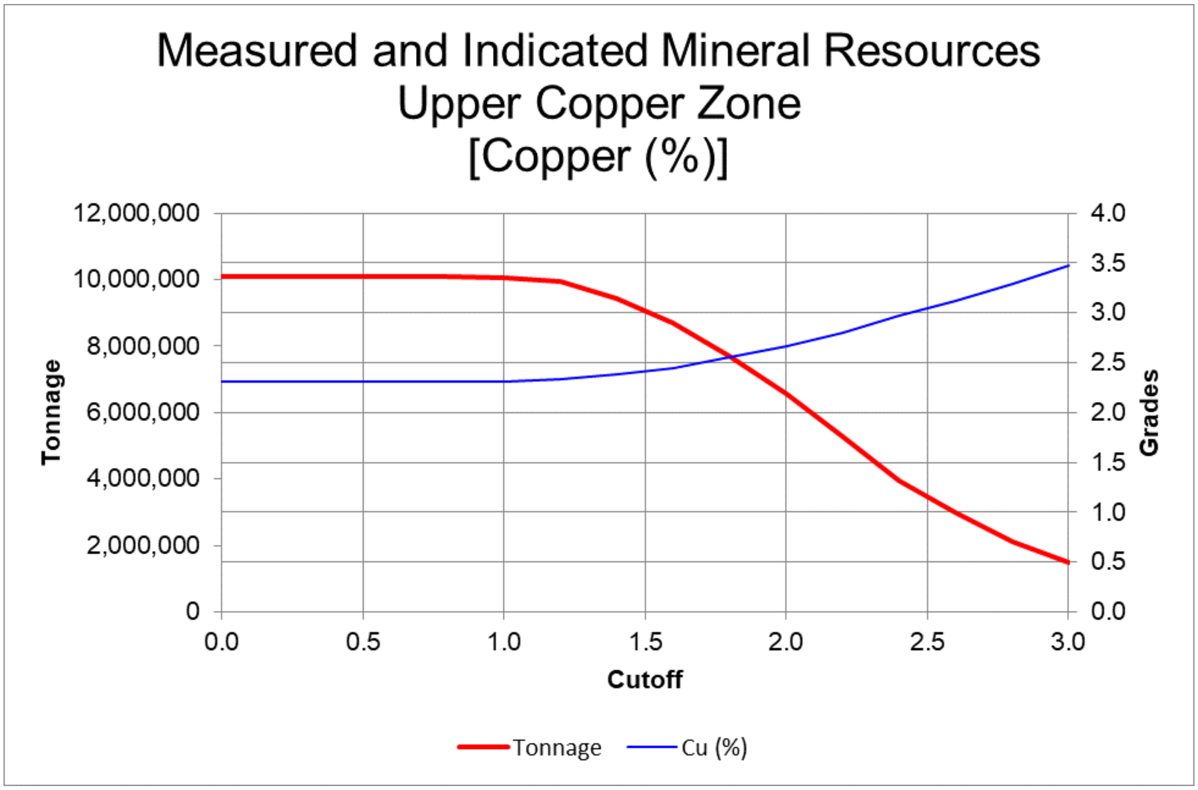
Category	Quantity (Mt)	Cu (%)	Total Metal (kt)
UCZ			
Measured	1.4	2.6	36.2
Indicated	8.3	2.3	191.3
Measured and Indicated	9.7	2.4	227.5
Inferred	2.2	2.2	49.5
LCZ			
Measured	0.6	5.7	32.9
Indicated	0.6	7.9	50.5
Measured and Indicated	1.2	6.8	83.4
Inferred	0.5	6.3	30.3
Combined UCZ + LCZ			
Measured	2.0	3.5	69.1
Indicated	8.9	2.7	241.8
Measured and Indicated	10.9	2.9	310.9
Inferred	2.7	3.0	79.7

Source: SRK, 2019

- The effective date for this Mineral Resource is October 15, 2019. All significant figures are rounded to reflect the relative accuracy of the estimates. Copper assay values were capped where appropriate;
- Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. Inferred Mineral Resources have a high degree of uncertainty as to their economic and technical feasibility. It cannot be assumed that all or any part of an Inferred Mineral Resources can be upgraded to Measured or Indicated Mineral Resources;
- Metallurgical recovery of copper has been estimated on a block basis in the UCZ, averaging 77.4%, with a consistent 94.0% Cu recovery applied to the LCZ;
- To demonstrate reasonable prospects for eventual economic extraction of Mineral Resources, a cut-off grade of 1.00% copper based on metal recoverability assumptions, long-term copper price assumptions of $3.20/lb, mining costs, processing costs, G&A costs totaling $71/t;
- There are no known legal, political, environmental, or other risks that could materially affect the potential development of the Mineral Resources other than those outlined in the Management Discussion and Analyses of the June 2019 Company Quarterly Report. All Mineral Resources are located within land currently under control or lease to Sandfire Resources America Inc.

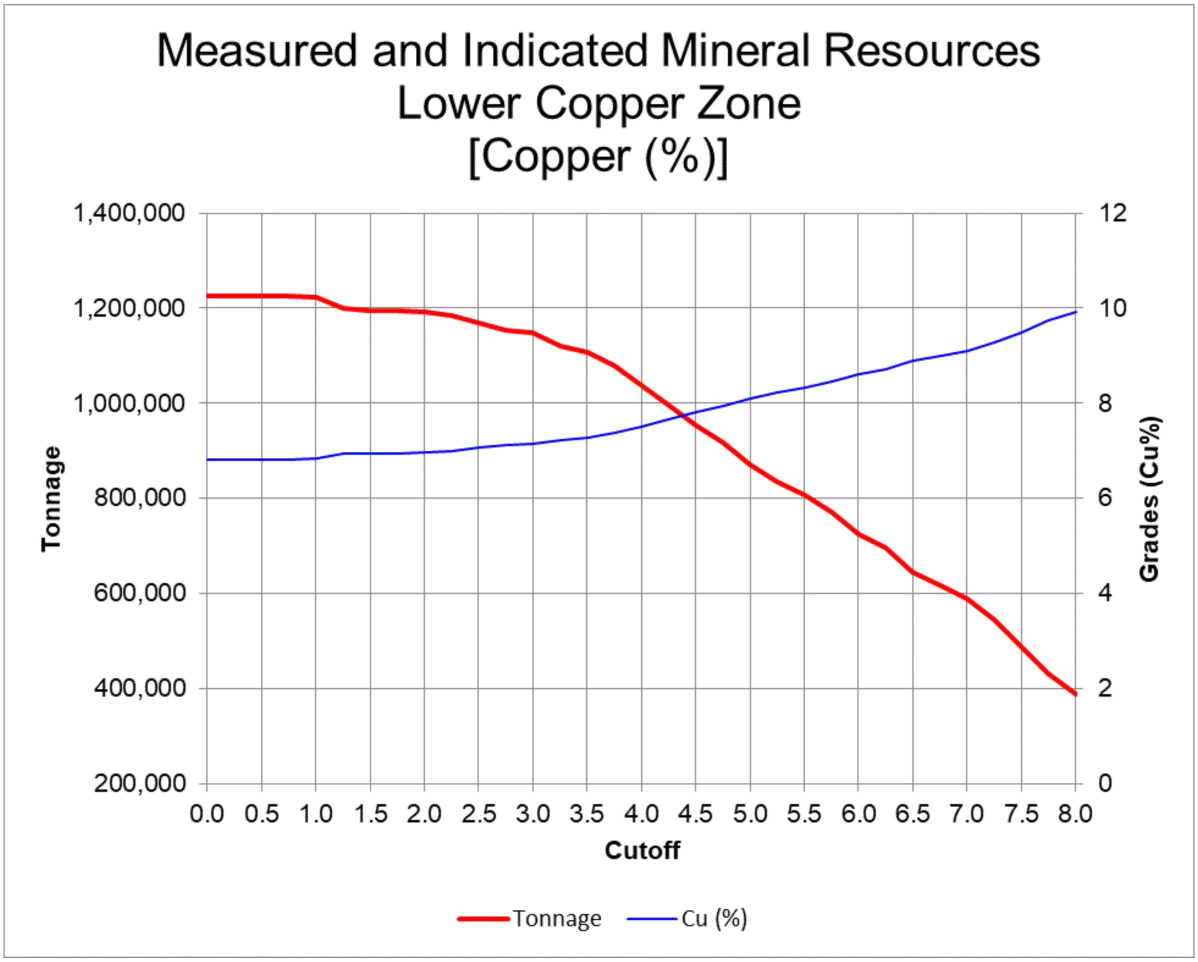
14.11 Mineral Resource Sensitivity

A series of grade-tonnage curves have been calculated to assess the sensitivity of Mineral Resources to changes in CoG. Figure 14-48 and Figure 14-49 show grade-tonnage curves for the UCZ and LCZ respectively. Summary tabulated Mineral Resource sensitivity for Measured and Indicated is presented in Table 14-15.



Source: SRK, 2019

Figure 14-48: Grade-Tonnage Curve for the UCZ Showing Measured and Indicated Mineral Resources



Source: SRK, 2019

Figure 14-49: Grade-Tonnage Curve for the LCZ Showing Measured and Indicated Mineral Resources

Table 14-15: Mineral Resource Sensitivity (Measured and Indicated Only)

Upper Copper Zone		
Cutoff	**Cu (%)**	**Tonnage**
0.0	2.31	10,091,034
0.2	2.31	10,091,034
0.4	2.31	10,091,034
0.6	2.31	10,091,034
0.8	2.31	10,086,602
1.0	2.31	10,053,764
1.2	2.33	9,927,710
1.4	2.38	9,442,759
1.6	2.45	8,693,067
1.8	2.55	7,703,103
2.0	2.66	6,553,338
2.2	2.8	5,266,876
2.4	2.97	3,957,391
2.6	3.12	2,998,815
2.8	3.29	2,122,509
3.0	3.47	1,480,408

Lower Copper Zone		
Cutoff	**Cu (%)**	**Tonnage**
0.0	6.82	1,224,553
0.5	6.82	1,224,553
1.0	6.83	1,221,925
1.5	6.95	1,195,444
2.0	6.97	1,190,870
2.5	7.06	1,168,614
3.0	7.14	1,147,675
3.5	7.28	1,106,614
4.0	7.51	1,038,634
4.5	7.81	953,463
5.0	8.10	870,197
5.5	8.32	807,146
6.0	8.61	723,935
6.5	8.90	645,146
7.0	9.10	589,415
7.5	9.49	488,389
8.0	9.93	388,473

Source: SRK, 2019

14.12 Comparison of Previous Estimate of Mineral Resources

The previous Mineral Resource estimate was completed in 2013 (effective date July 12, 2013) as part of the Tintina PEA (Winckers *et al*, 2013). That Mineral Resource estimated included preliminary assumptions on recovery along with assumed economic viability of multiple elements including: Co, Ag, and Au. Continued work since the release of the PEA report has provided support for variable Cu recoveries in the UCZ and consistently high recovery (94% average) in the LCZ while the economic viability of polymetallic products has shown poor results in current flotation testing.

SRK notes that SRA has not performed additional studies or drilling on the Lowry deposit therefore, assumptions valid in the 2013 PEA (Winckers, et al., 2013) are no longer current relating to the economic and recovery assumptions. As such, no Mineral Resource is declared for the Lowry deposit at this time. SRA is progressing work toward re-issuing a Mineral Resource in the future.

During 2019, SRA decided to focus efforts solely on copper recovery with future plans for additional metallurgical work on improving recovery of other elements. As such, the 2019 Mineral Resources for the Johnny Lee deposit only includes copper. A summary comparison table is presented in Table 14-16 showing percent differences in tonnages and copper grade from the 2013 to the 2019 Mineral Resources.

Changes to the Mineral Resources from 2013 to 2019 are due to the following factors:

- Additional drilling and analytical data from infill drilling programs completed in 2018-2019;
- Improved interpretation and modeling of lithostratigraphy across the Johnny Lee deposit;
- Extensive metallurgical testwork providing improved confidence in copper recovery and variability of recovery across the deposit;
- Updated specific gravity data collection and estimation;
- Updated block modeling and estimation;
- Updated cut-off grade using current economics and market pricing;
- Updated Mineral Resource classification.

Table 14-16: Summary Comparison of Mineral Resources, 2013 to 2019

Upper Copper Zone						
UCZ Category	**2013**		**2019**		**Percent Difference**	
	Quantity (Mt)	**Cu (%)**	**Quantity (Mt)**	**Cu (%)**	**Quantity (Mt)**	**Cu (%)**
Measured	2.66	2.99	1.39	2.61	-48%	-13%
Indicated	6.52	2.77	8.28	2.31	27%	-17%
Measured + Indicated	9.18	2.83	9.66	2.35	5%	-17%
Inferred	1.26	2.52	2.20	2.25	75%	-11%
Lower Copper Zone						
LCZ Category	**2013**		**2019**		**Percent Difference**	
	Quantity (Mt)	**Cu (%)**	**Quantity (Mt)**	**Cu (%)**	**Quantity (Mt)**	**Cu (%)**
Measured	n/a	n/a	0.58	5.70	100%	100%
Indicated	2.39	6.40	0.64	7.90	-73%	23%
Measured + Indicated	2.39	6.40	1.22	6.80	-49%	6%
Inferred	0.21	5.33	0.50	6.30	138%	18%

Source: SRK, 2019 and Winckers *et al*, 2013

For the UCZ, SRK notes similar total quantity of Measured and Indicated Mineral Resources with a reduction in Cu grade for all Mineral Resource categories. For the LCZ, an increase in confidence has resulted in the classification of a Measured Mineral Resource but an overall reduction in Measured and Indicated categories. Inferred Mineral Resources in the LCZ has over doubled. For grade, the LCZ shows a minor increase in copper grade from the historic Mineral Resources.

Previously, the Lowry deposit reported Indicated and Inferred Mineral

14.13 Relevant Factors

For the Johnny Lee deposit, SRK is not aware of any environmental, title, permitting, legal, marketing, political, or other factors that could affect the Mineral Resources for the Johnny Lee deposit of the Black Butte Copper Project. Mineralized material located beneath the McGuire Parcel (Figure 4-2) has been excluded from the calculation of Mineral Resources as this land is not currently under control of SRA.

15 Mineral Reserve Estimate

There are no Mineral Reserves on the property.

16 Mining Methods

In July 2013, Tintina Resources, the precursor to SRA, disclosed the results of a preliminary economic assessment (PEA) detailing mine engineering studies for an underground mine and a processing facility focused on the disclosed Mineral Resources (Winckers, et al., 2013). The 2013 Mineral Resource evaluation is now considered obsolete and is replaced by the Mineral Resource evaluation reported herein.

Since the results of the PEA study disclosed in July 2013 are not current, this section is not required to support the updated Mineral Resource statement. The Black Butte Copper Project is no longer considered to be at a PEA-level as defined in NI 43-101.

SRA is continuing to progress the project through additional studies related to mining, milling/processing, and economics but these studies are not yet completed for disclosure at this time.

17 Recovery Methods

In July 2013, Tintina Resources, the precursor to SRA, disclosed the results of a preliminary economic assessment (PEA) detailing metallurgical and recovery studies for an underground mine and a processing facility focused on the disclosed Mineral Resources (Winckers, et al., 2013). The 2013 Mineral Resource evaluation is now considered obsolete and is replaced by the Mineral Resource evaluation reported herein.

Since the results of the PEA study disclosed in July 2013 are not current, this section is not required to support the updated Mineral Resource statement. The Black Butte Copper Project is no longer considered to be at a PEA-level as defined in NI 43-101.

SRA is continuing to progress the project through additional studies related to mining, milling/processing, and economics but these studies are not yet completed for disclosure at this time.

18 Project Infrastructure

In July 2013, Tintina Resources, the precursor to SRA, disclosed the results of a preliminary economic assessment (PEA) detailing project infrastructure for an underground mine and a processing facility focused on the disclosed Mineral Resources (Winckers, et al., 2013). The 2013 Mineral Resource evaluation is now considered obsolete and is replaced by the Mineral Resource evaluation reported herein.

Since the results of the PEA study disclosed in July 2013 are not current, this section is not required to support the updated Mineral Resource statement. The Black Butte Copper Project is no longer considered to be at a PEA-level as defined in NI 43-101.

SRA is continuing to progress the project through additional studies related to mining, milling/processing, and economics but these studies are not yet completed for disclosure at this time.

19 Market Studies and Contracts

This section is not required at this level of study.

20 Environmental Studies, Permitting and Social or Community Impact

In July 2013, Tintina Resources, the precursor to SRA, disclosed the results of a preliminary economic assessment (PEA) detailing environmental, permitting, and social/community studies for an underground mine and a processing facility focused on the disclosed Mineral Resources (Winckers, et al., 2013). The 2013 Mineral Resource evaluation is now considered obsolete and is replaced by the Mineral Resource evaluation reported herein.

Since the results of the PEA study disclosed in July 2013 are not current, this section is not required to support the updated Mineral Resource statement. The Black Butte Copper Project is no longer considered to be at a PEA-level as defined in NI 43-101.

SRA is continuing to progress the project through additional studies related to mining, milling/processing, and economics but these studies are not yet completed for disclosure at this time.

21 Capital and Operating Costs

In July 2013, Tintina Resources, the precursor to SRA, disclosed the results of a preliminary economic assessment (PEA) detailing capital and operation cost studies for an underground mine and a processing facility focused on the disclosed Mineral Resources (Winckers, et al., 2013). The 2013 Mineral Resource evaluation is now considered obsolete and is replaced by the Mineral Resource evaluation reported herein.

Since the results of the PEA study disclosed in July 2013 are not current, this section is not required to support the updated Mineral Resource statement. The Black Butte Copper Project is no longer considered to be at a PEA-level as defined in NI 43-101.

SRA is continuing to progress the project through additional studies related to mining, milling/processing, and economics but these studies are not yet completed for disclosure at this time.

22 Economic Analysis

In July 2013, Tintina Resources, the precursor to SRA, disclosed the results of a preliminary economic assessment (PEA) detailing economic analysis for an underground mine and a processing facility focused on the disclosed Mineral Resources (Winckers, et al., 2013). The 2013 Mineral Resource evaluation is now considered obsolete and is replaced by the Mineral Resource evaluation reported herein.

Since the results of the PEA study disclosed in July 2013 are not current, this section is not required to support the updated Mineral Resource statement. The Black Butte Copper Project is no longer considered to be at a PEA-level as defined in NI 43-101.

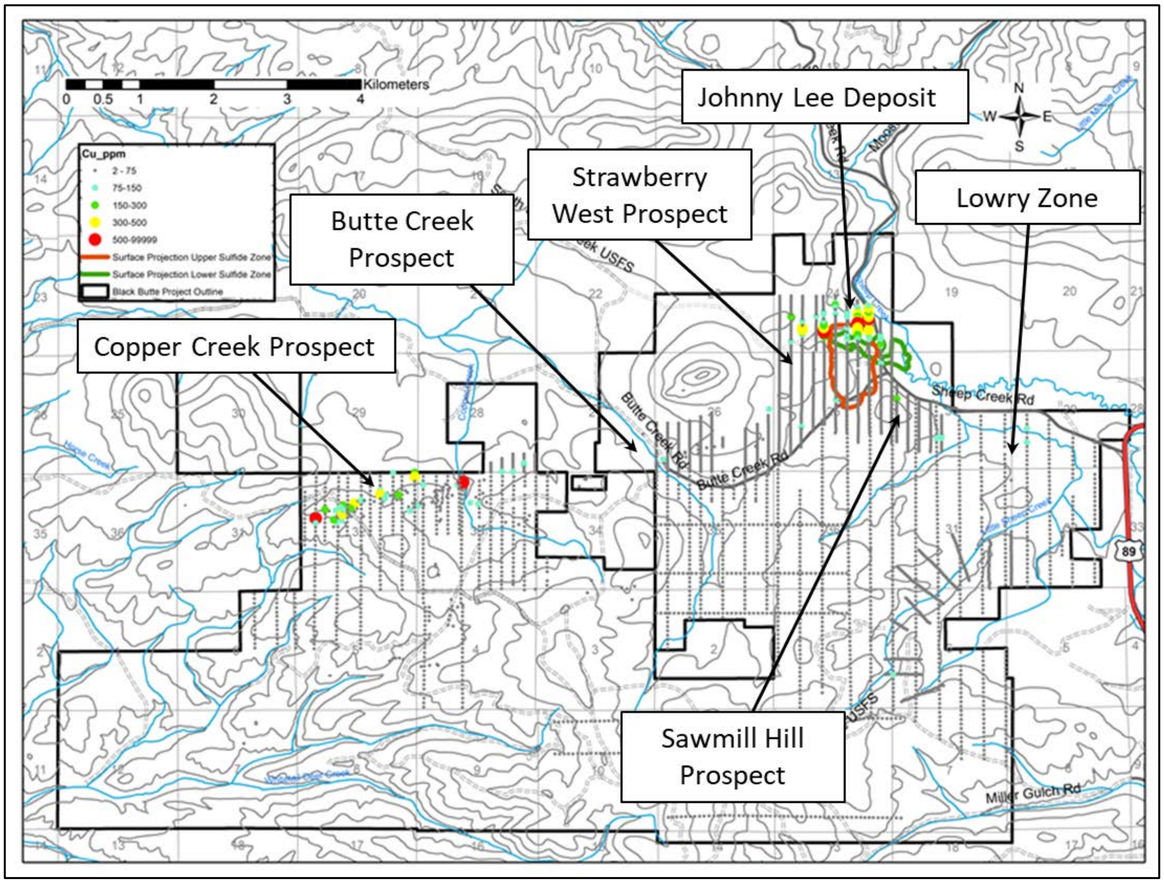
SRA is continuing to progress the project through additional studies related to mining, milling/processing, and economics but these studies are not yet completed for disclosure at this time.

23 Adjacent Properties

There are multiple exploration prospects in the vicinity of the Johnny Lee Deposit including the Lowry copper deposit that includes previously disclosed Mineral Resources as part of the 2013 Tintina PEA (Winckers, et al., 2013). SRK has not reviewed any information associated with the Lowry Deposit or other nearby prospects.

Within Section 24, Township 12 North, Range 6 East are a number of patented claims and unpatented lode mining claims controlled by B. Lower, J Barfuss and C. Lower. At co-ordinates 46°45’28”W; 110°57’14”W, a small scale, open pit iron ore mine (Iron Butte Mine) has been developed, from which oxidized Newland Formation massive sulphide is extracted on an irregular basis and sold to a cement producer in Montana. The Iron Butte mine is located 4.1 kilometers W/SW of the Johnny Lee deposit.

The following sub-sections provide a brief summary of prospects located adjacent to the Johnny Lee Deposit. Figure 23-1 shows the Cu results from all soil sampling campaigns over the property. The 2016 soil sampling program failed to indicate any significant anomaly. Historic soil sampling outlined significant Cu anomalism at the Johnny Lee Deposit and the Copper Creek prospect. Minor surface Cu anomalism occurs at the Lowry zone, Sawmill Hill prospect, and Butte Creek prospect.



Source: SRA, 2019

Figure 23-1: Plan Showing Soil Sampling Cu Results, Deposits and Exploration Targets

23.1 Lowry Zone

A total of 29 drillholes have been completed at the Lowry zone and a Mineral Resource of 4.9 Mt at an average grade of 2.9% Cu has been previously estimated (Winckers, et al, 2013). This zone is not included in current resource estimations and was not updated in 2019. Current stated Mineral Resources effective July 12, 2013 are still relevant.

Mineralization at Lowry is hosted by bedded-pyrite massive sulphide, conglomerate, sedimentary breccia shale and dolomitic shale. Both host lithofacies and mineralization strike E/NE and dip at 30° to 40° to the S/SE. The Lowry zone is truncated in the north by the Volcano Valley fault but is open to the south. At its northern edge, the Lowry deposit is 280 m below surface. The southernmost intercept of the Lowry zone is 670 m below surface. The Lowry zone of mineralization has a strike length of 350 to 400 m and a proven down-dip extent of 750 m.

Visible Cu sulphide mineralization at Lowry is characterized by extensive coarse chalcopyrite that occurs as veinlets and disseminations in both bedded pyrite and clastic sediment lithofacies. Microscopic examination has shown the copper sulphide mineralogy to be similar to that of the Johnny Lee LCZ, comprising coarse chalcopyrite and rare, trace (less than 0.1%) tennantite. Where mineralization occurs within bedded pyrite, the chalcopyrite mostly presents as coarse-grained replacement but some of the chalcopyrite is interstitial to variably recrystallized framboidal and melnikovite pyrite. Mineralization observed in clastic sediment lithofacies is coarse grained chalcopyrite. From a Cu sulphide liberation perspective, the Lowry zone may be considered an intermediate stage between the northern part of the UCZ and LCZ.

23.2 Sawmill Hill Prospect

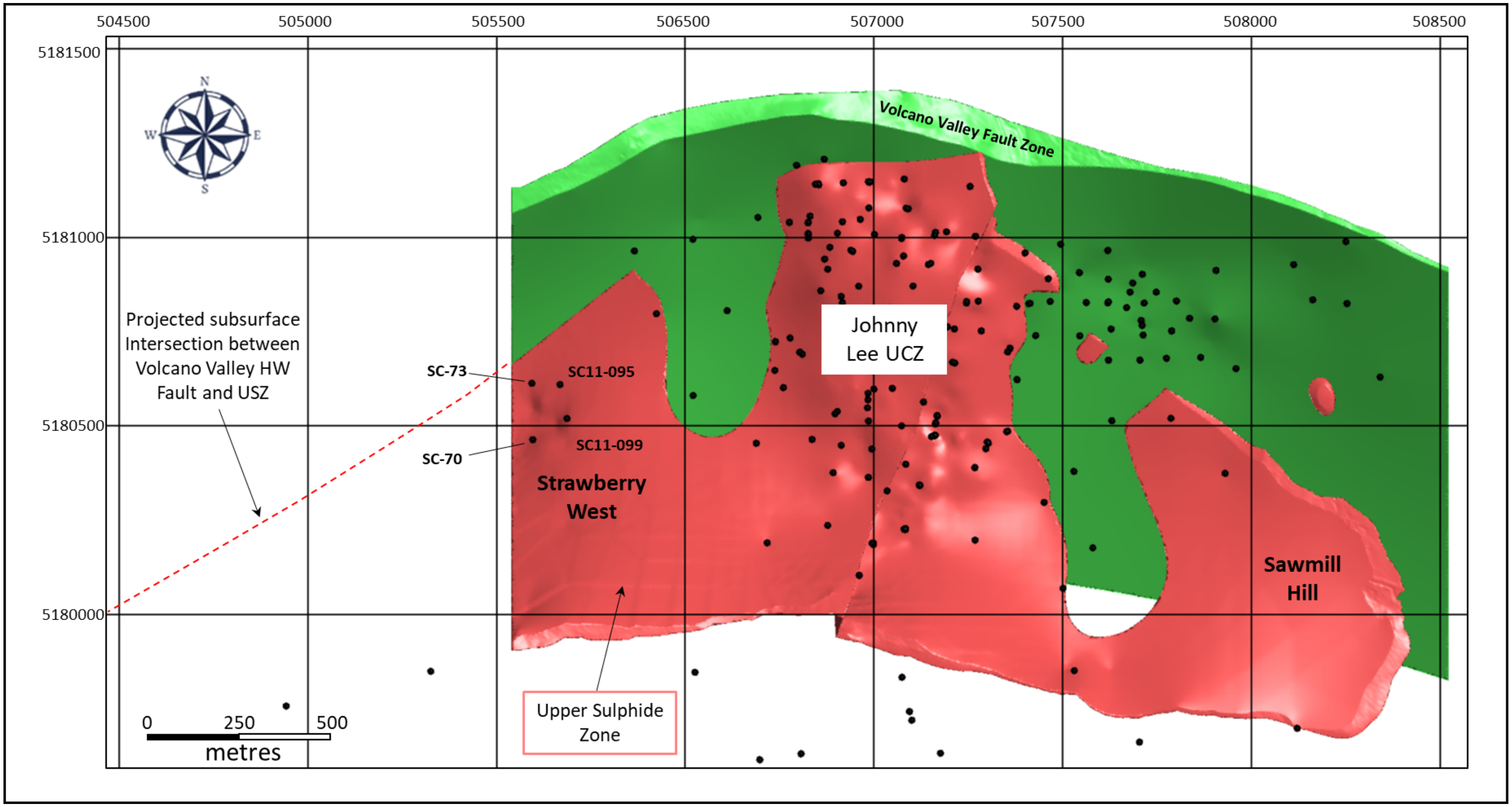
The Sawmill Hill prospect comprises an area of USZ measuring 575 m by 600 m in plan view (Figure 23-1), that is untested by drilling. Discontinuous Cu anomalism has been identified in soil samples along the northern and eastern flanks of Sawmill Hill (Figure 23-1).

23.3 Strawberry West Prospect

Four historic drillholes have been completed in the Strawberry West prospect, targeting the down-plunge extension of the USZ in the axial region of the syncline (Figure 23-2). Two of these drillholes intersected significant Cu mineralization in the USZ:

- SC-73: 12.34 meters at 2.26% Cu from 441.05 to 453.39 m
- SC11-095: 6.79 meters at 1.77% Cu from 455.53 to 462.32 m

The mineralized zone is open for 315 m to the east and no drilling has been completed to the west. The mineralization in SC-73 and SC11-095 has been closed off, 80 to 150 m to the south, by drillholes SC-70 and SC11-099 and is truncated, by the Volcano Valley Fault Zone, 70 to 160 m to the north. The zone of mineralization is 750 m down-plunge of the UCZ but is not a continuation of this deposit; rather, it represents a discrete zone of mineralization. SRA has flagged this prospect for future studies.



Source: SRA, 2919
All overlying units and cover have been removed. All drillholes (including those outside of the modelled area) are indicated with black dots.

Figure 23-2: Plan View of the Volcano Valley Fault Zone and Upper Sulphide Zone Solids from the Johnny Lee Lithostratigraphic Model Showing the Sawmill Hill and Strawberry West Prospects

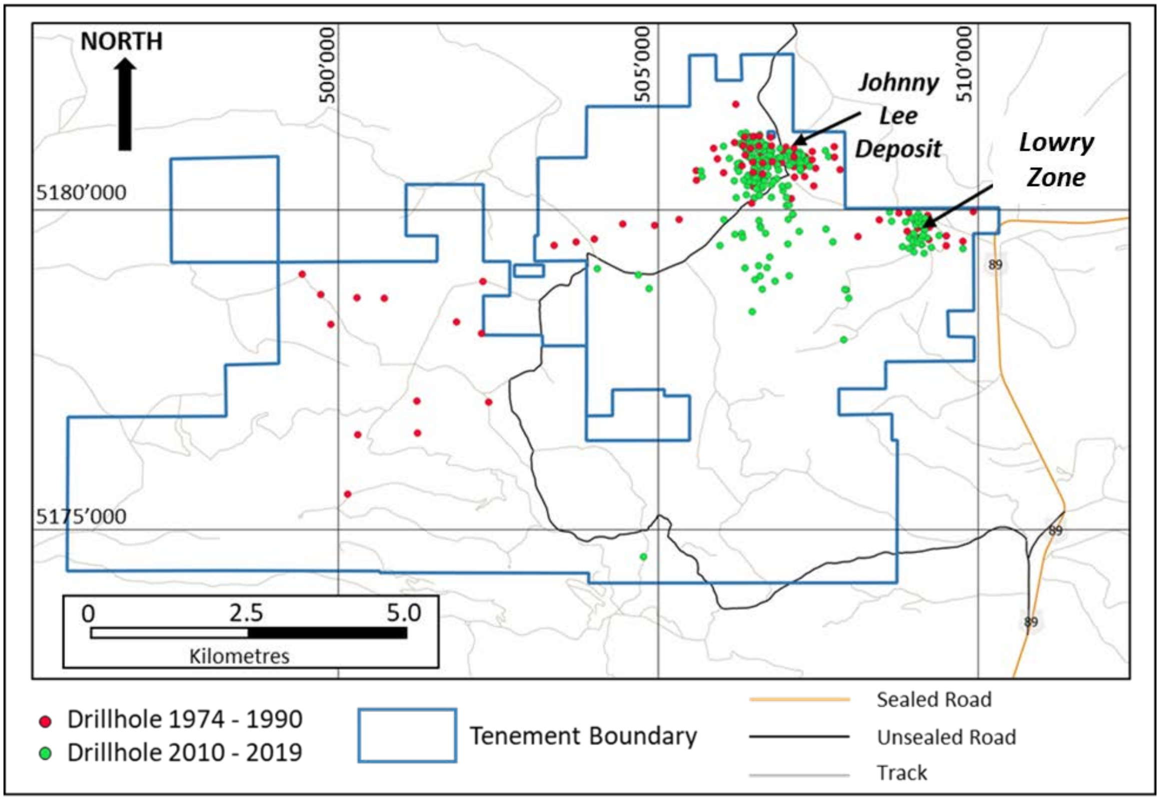
23.4 Butte Creek Prospect

An isolated medium tenor Cu soil anomaly occurs in this area (Figure 23-1) Two historic drillholes (SCC-44 and SC-66) spaced at 500 m intersected anomalous Cu mineralization (0.1% to 0.3% Cu) over narrow intervals (less than 6 m).

23.5 Copper Creek Prospect

The Copper Creek Prospect comprises a 2,500 m strike length and robust Cu in soil anomaly (Figure 23-1). This surface anomaly coincides with mapped gossan that is interpreted to be oxidized massive sulphide of the Newland Formation. Four widely spaced (580 to 1,750 m) drillholes have been completed in this area but did not intersect strongly anomalous or economically significant mineralization. The source of the soil anomalism has yet to be explained.

There is a total of 342 drillholes on the current tenement package that have been completed in numerous campaigns by seven companies (Figure 10-1 and Figure 23-3). The majority of these drillholes are focused on the Johnny Lee deposit and Lowry zone.



Source: SRA, 2019
Co-ordinate system is NAD83 UTM Zone 12 North

Figure 23-3: Map of the Project Area Showing Tenement Boundaries and Collar Positions of Drillholes Completed from 1974 to 1990 (Pre-Tintina/SRA) and 2010 to 2019 (Tintina/SRA)

24 Other Relevant Data and Information

Tintina completed a PEA of the Black Butte project in 2013 (Winckers, *et al*, 2013). Although the PEA included updated Mineral Resource estimates for the UCZ, LCZ and Lowry Zone the PEA did not include the Lowry zone in the economic evaluation.

The PEA included metallurgical test work on UCZ and LCZ as summarized in Section 13 of this report. The recovery of copper to concentrate from the UCZ was estimated to be 83.6% and that for the LCZ was estimated to be 97% (Winckers *et al*, 2013).

The metallurgical flow sheet developed during the PEA and used to design the metallurgical plant envisaged passing the mill feed through a jaw crusher to 125 mm K_{80} and then grinding to 38µm K_{80} in a SAG/ball mill/tower mill circuit. The ground material would then be processed using copper rougher flotation followed by rougher concentrate regrinding in stirred mills to 8µm K_{80}. The reground copper rougher flotation concentrate would then be upgraded by three stages of cleaner flotation. It was envisaged that the final cleaner flotation concentrate would contain on average 23.5% copper and be thickened and filtered before being shipped to smelters. Copper rougher flotation tailings, together with copper cleaner scavenger tailings were planned to be used for paste-fill or delivered to the tailings storage facility (Winckers *et al*, 2013). During the development of the MOP application, subsequent to the PEA, the tailings storage facility was comprehensively redesigned as a double-lined, cemented tailings storage facility.

The preliminary mine design developed for the PEA provided access to both the UCZ and LCZ from a single portal, three main ramps and one decline. The drift-and-fill mining method was selected for mining of both the LCZ and UCZ due to the shallow dip and generally narrow width of the mineralized zones. No geotechnical study of the Johnny Lee deposit was completed for the PEA.

Subsequent to the PEA, Mine Design Engineering were contracted by SRA to complete a geotechnical study of the Johnny Lee deposit (Kalenchuk *et al*, 2015). The study highlighted that the rock mass quality in the USZ and LSZ were expected to be poor to fair and that very poor rock mass quality was expected in the VVFZ. The study concluded that the Johnny Lee deposit is well suited to drift and fill mining (Kalenchuk *et al*, 2013).

25 Interpretation and Conclusions

Based upon the site visit, data review, results of the PEA and recent resource definition drilling, the authors offer the following conclusions:

25.1 Property Description and Ownership

Based upon reliance of other experts, all land and mineral leases are determined to be in good order that are included within the Mineral Resource summary. One land parcel, the McGuire parcel represents approximately five acres in the northern portion of the Johnny Lee Deposit and has been excluded from Mineral Resource calculations as SRA does not have an agreement or current rights for production associated with this parcel. Though this land parcel represents a minimal percentage of the Johnny Lee Deposit, it is recommended by the authors that SRA seek out agreement or ownership to allow the McGuire parcel to be included in future Mineral Resource calculations.

25.2 Geology and Mineralization

It is the opinion of the QP for Geology and Mineral Resources, Erik Ronald, P.Geo #3050 that geological interpretations, drilling, sampling, analytical, modeling, and estimation procedures and methods represent good industry practice and align with CIM guidelines (CIM, 2014). The QA/QC procedures and results have been reviewed and deemed appropriate for use in determining Mineral Resources. Block model estimation and validation is reasonable and appropriate given the style and nature of the Johnny Lee Deposit.

It is recommended that additional drilling and analytical testing at closer spacing within both the UCZ and LCZ will provide improved confidence in grade, recovery, and geological continuity toward increasing the confidence of Mineral Resources.

25.3 Status of Exploration, Development and Operations

The status of exploration activities in the Johnny Lee Deposit area have been performed to good industry standards. As the project has already identified sufficient Mineral Resources, further exploration in the UCZ and LCZ areas are not recommended. The author does suggest testing the Johnny Lee Deposit area for the potential of deeper mineralization as a similar geological environment exists at depth as what currently hosts economic copper mineralization at the Johnny Lee Deposit.

Local geology of the region is considered to be prospective for additional copper and other base metal prospects as evidence by the known prospects described in section 23. Further afield, the region is prospective for other SEDEX or VMS-like deposits with original targeting focused on Pb, Zn, and Ag mineralization.

25.4 Mineral Processing and Metallurgical Testing

Extensive metallurgical studies have been performed to develop a flexible process flowsheet to treat the complex ore. The QP recommends additional test work on tailings to produce pyrite/cobalt concentrate as well as confirm and refine the geometallurgical recovery model.

25.5 Mineral Resource Estimate

The Mineral Resources calculated in this technical report is considered in accord with CIM guidelines and NI 43-101 reporting. The Mineral Resource classification has been performed in a reasonable manner, consistent with CIM standards. The confidence in fundamental drilling data, continuity of geology, copper mineralization, density data, and recovery testing have been used to appropriately classify the Johnny Lee Deposit as Measured, Indicated, or Inferred.

25.6 Foreseeable Impacts of Risks

Risks identified at the Johnny Lee deposit that may have material effects on Mineral Resources and the likelihood of increasing confidence in current Mineral resources include:

- Variable copper recovery in the UCZ. The authors recommend additional data be collected to quantify to a greater level of confidence the variable copper recovery observed in the UCZ.
- Geological and grade continuity of the LCZ. Additional drilling is recommended to upgrade Inferred Mineral Resources identified in the LCZ to either Measured or Indicated.

26 Recommendations

26.1 Property Description and Ownership

SRK recommends that SRA seek to finalize an agreement or ownership over the McGuire parcel in order to secure a continuous mining area and obtain rights to mine all mineralization located as part of the Johnny Lee Deposit.

26.2 Geology and Mineralization

SRK recommends that additional drilling and analytical testing at closer spacing within both the UCZ and LCZ. This will provide improved confidence in grade and geological continuity toward increasing the confidence of Mineral Resources.

26.3 Status of Exploration, Development and Operations

Deeper exploration is recommended in the Johnny Lee Deposit area as the prospective copper-hosting zones appear to be present at depth.

26.4 Mineral Processing and Metallurgical Testing

The QP recommends additional metallurgical testing on poorly responding ores from portions of the UCZ deposit to improve recovery and concentrate grade.

26.5 Mineral Resource Estimate

Upon future acquisition of additional drilling or other data that may provide improved modeling or estimation, it is recommended that an updated geological model and resource estimation occur. Until that time, the current Mineral Resource estimate is considered satisfactory and appropriate for reporting of Mineral Resources at the Johnny Lee deposit.

It is recommended that the Lowry deposit be re-visited to update modeling, estimation, and assumptions to align with Johnny Lee deposit. This additional work and updating will allow SRA to declare a Mineral Resource at the Lowry deposit in the future.

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28 Glossary

The Mineral Resources and Mineral Reserves have been classified according to CIM (CIM, 2014). Accordingly, the Resources have been classified as Measured, Indicated or Inferred, the Reserves have been classified as Proven, and Probable based on the Measured and Indicated Resources as defined below.

28.1 Mineral Resources

A **Mineral Resource** is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

A **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

28.2 Definition of Terms

The following general mining terms may be used in this report.

Table 28-1: Definition of Terms

Term	Definition
Assay	The chemical analysis of mineral samples to determine the metal content.
Capital Expenditure	All other expenditures not classified as operating costs.
Composite	Combining more than one sample result to give an average result over a larger

Term	Definition
	distance.
Concentrate	A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore.
Crushing	Initial process of reducing particle size to render it more amenable for further processing.
Cut-off Grade (CoG)	The grade of mineralized rock, which determines as to whether or not it is economic to recover its gold content by further concentration.
Dilution	Waste, which is unavoidably mined with ore.
Dip	Angle of inclination of a geological feature/rock from the horizontal.
Fault	The surface of a fracture along which movement has occurred.
Footwall	The underlying side of an orebody or stope.
Gangue	Non-valuable components of the ore.
Grade	The measure of concentration of gold within mineralized rock.
Hangingwall	The overlying side of an orebody or slope.
Haulage	A horizontal underground excavation which is used to transport mined ore.
Hydrocyclone	A process whereby material is graded according to size by exploiting centrifugal forces of particulate materials.
Igneous	Primary crystalline rock formed by the solidification of magma.
Kriging	An interpolation method of assigning values from samples to blocks that minimizes the estimation error.
Level	Horizontal tunnel the primary purpose is the transportation of personnel and materials.
Lithological	Geological description pertaining to different rock types.
LoM Plans	Life-of-Mine plans.
LRP	Long Range Plan.
Material Properties	Mine properties.
Milling	A general term used to describe the process in which the material is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product.
Mineral/Mining Lease	A lease area for which mineral rights are held.
Mining Assets	The Material Properties and Significant Exploration Properties.
Ongoing Capital	Capital estimates of a routine nature, which is necessary for sustaining operations.
Ore Reserve	See Mineral Reserve.
Pillar	Rock left behind to help support the excavations in an underground mine.
RoM	Run-of-Mine.
Sedimentary	Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks.
Shaft	An opening cut downwards from the surface for transporting personnel, equipment, supplies, ore and waste.
Sill	A thin, tabular, horizontal to sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness.
Smelting	A high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or doré phase and separated from the gangue components that accumulate in a less dense molten slag phase.
Stope	Underground void created by mining.
Stratigraphy	The study of stratified rocks in terms of time and space.
Strike	Direction of line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction.
Sulfide	A sulfur bearing mineral.
Tailings	Finely ground waste rock from which valuable minerals or metals have been extracted.
Thickening	The process of concentrating solid particles in suspension.
Total Expenditure	All expenditures including those of an operating and capital nature.
Variogram	A statistical representation of the characteristics (usually grade).

28.3 Abbreviations

The following abbreviations may be used in this report.

Table 28-2: Abbreviations

Abbreviation	Unit or Term
A	ampere
AA	atomic absorption
A/m^2	amperes per square meter
ANFO	ammonium nitrate fuel oil
Ag	silver
Au	gold
AuEq	gold equivalent grade
°C	degrees Centigrade
CCD	counter-current decantation
CIL	carbon-in-leach
CoG	cut-off grade
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
cfm	cubic feet per minute
ConfC	confidence code
CRec	core recovery
CSS	closed-side setting
CTW	calculated true width
°	degree (degrees)
dia.	diameter
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
FA	fire assay
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram
gal	gallon
g/L	gram per liter
g-mol	gram-mole
gpm	gallons per minute
g/t	grams per tonne
ha	hectares
HDPE	Height Density Polyethylene
hp	horsepower
HTW	horizontal true width
ICP	induced couple plasma
ID2	inverse-distance squared
ID3	inverse-distance cubed
IFC	International Finance Corporation
ILS	Intermediate Leach Solution
kA	kiloamperes
kg	kilograms
km	kilometer
km^2	square kilometer
koz	thousand troy ounce
kt	thousand tonnes
kt/d	thousand tonnes per day
kt/y	thousand tonnes per year
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour

Abbreviation	**Unit or Term**
kWh/t	kilowatt-hour per metric tonne
L	liter
L/sec	liters per second
L/sec/m	liters per second per meter
lb	pound
LHD	Long-Haul Dump truck
LLDDP	Linear Low Density Polyethylene Plastic
LOI	Loss On Ignition
LoM	Life-of-Mine
m	meter
m^2	square meter
m^3	cubic meter
masl	meters above sea level
MARN	Ministry of the Environment and Natural Resources
MDA	Mine Development Associates
mg/L	milligrams/liter
mm	millimeter
mm^2	square millimeter
mm^3	cubic millimeter
MME	Mine & Mill Engineering
Moz	million troy ounces
Mt	million tonnes
MTW	measured true width
MW	million watts
m.y.	million years
NGO	non-governmental organization
NI 43-101	Canadian National Instrument 43-101
OSC	Ontario Securities Commission
oz	troy ounce
%	percent
PLC	Programmable Logic Controller
PLS	Pregnant Leach Solution
PMF	probable maximum flood
ppb	parts per billion
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RC	rotary circulation drilling
RoM	Run-of-Mine
RQD	Rock Quality Description
SEC	U.S. Securities & Exchange Commission
sec	second
SG	specific gravity
SPT	standard penetration testing
st	short ton (2,000 pounds)
t	tonne (metric ton) (2,204.6 pounds)
t/h	tonnes per hour
t/d	tonnes per day
t/y	tonnes per year
TSF	tailings storage facility
TSP	total suspended particulates
µm	micron or microns
V	volts
VFD	variable frequency drive
W	watt
XRD	x-ray diffraction
y	year

Appendices

Appendix A: Certificates of Qualified Persons

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CERTIFICATE OF QUALIFIED PERSON

I, Erik Ronald, MEng, P.Geo, SME-RM do hereby certify that:

1. I am Principal Resource Geology Consultant of SRK Consulting (U.S.), Inc., 1125 Seventeenth Street, Suite 600, Denver, CO, USA, 80202.
2. This certificate applies to the technical report titled “NI 43-101 Technical Report on Mineral Resources, Black Butte Copper Project, White Sulphur Springs, Montana, USA” with an Effective Date of October 15, 2019 (the “Technical Report”).
3. I graduated with a Bachelor’s degree in Geological Sciences from the University of California, Santa Barbara in 1997. In addition, I have obtained a Master of Engineering degree in Geological Engineering from the Colorado School of Mines in 2001 and a graduate certificate in Geostatistics from the Edith Cowan University in 2015. I am a Professional Geologist of the Professional Geoscientists Ontario (#3050), a Professional Geologist with the State of Wyoming (PG-3568), and a Registered Member of the Society of Mining, Metallurgy, and Exploration (#4129819RM). I have worked as a geologist for a total of 22 years since my graduation from university. My relevant experience includes exploration, mine geology, and resource geology for various companies and mines including over twelve years employed as a geologist with Rio Tinto in the United States and Australia and over two years with SRK Consulting (U.S.), Inc. along with various other roles associated with mining and mineral resources. Recent projects include Mineral Resource modeling and estimation for multiple commodities including copper, iron ore, gold, mineral sands, and industrial minerals.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I visited the Black Butte Copper Project property on November 6, 2018 for 1 day.
6. I am responsible for geology and Mineral Resources. Sections 1 (except 1.8), 2 through 12, 14, 23, and portions of 25 through 28.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 6th Day of December, 2019.

“Signed”

“Stamped”

Erik C. Ronald, MEng, P.Geo (PGO#3050)

CERTIFICATE OF QUALIFIED PERSON

I, Deepak Malhotra, Ph.D, SME-RM do hereby certify that:

1. I am President of Pro Solv, LLC, with a business address at 15450 W. Asbury Avenue, Lakewood, Colorado 80228.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report on Mineral Resources, Black Butte Copper Project, White Sulphur Springs, MT, USA" with an Effective Date of October 15, 2019 (the "Technical Report").
3. I graduated with a degree in Metallurgical Engineering, Master of Science in 1973 from the Colorado School of Mines in Golden, Colorado. In addition, I graduated with a degree in Mineral Economics, Ph.D. in 1978 from the Colorado School of Mines in Golden, Colorado. I have worked as a metallurgist and mineral economist for a total of 46 years since my graduation. I have relevant experience is in the area of metallurgy and mineral economics.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I visited the Black Butte property on November 6, 2018 for 1 day.
6. I am responsible for Mineral Processing and Metallurgical Testing Section 13 and portions of 1, 25 and 26.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 6th Day of December 2019.

"Signed" *"Stamped"*

Deepak Malhotra, Ph.D, SME-RM SME: *2006420*

Appendix B: Property Description

Serial Number	Lead Serial Number	Claim Name	County	Disposition	Case Type	Last Assessment Year	Location Date	Meridian Township Range Section	
MMC220173	MMC220161	BLK 13	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220174	MMC220161	BLK 14	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220175	MMC220161	BLK 15	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220176	MMC220161	BLK 16	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220177	MMC220161	BLK 17	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220178	MMC220161	BLK 18	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220179	MMC220161	BLK 19	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220180	MMC220161	BLK 20	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	NE
MMC220181	MMC220161	BLK 21	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
								20 0120N 0060E 027	NE
MMC220182	MMC220161	BLK 22	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
								20 0120N 0060E 027	NE
MMC220183	MMC220161	BLK 23	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
MMC220184	MMC220161	BLK 24	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
MMC220185	MMC220161	BLK 25	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
MMC220186	MMC220161	BLK 26	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
MMC220187	MMC220161	BLK 27	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
MMC220188	MMC220161	BLK 28	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NW
MMC220189	MMC220161	BLK 29	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE,NW
MMC220190	MMC220161	BLK 30	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE,NW
MMC220191	MMC220161	BLK 31	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220192	MMC220161	BLK 32	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220193	MMC220161	BLK 33	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220194	MMC220161	BLK 34	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220195	MMC220161	BLK 35	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220196	MMC220161	BLK 36	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220197	MMC220161	BLK 37	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220198	MMC220161	BLK 38	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	NE
MMC220199	MMC220161	BLK 39	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	SE
MMC220200	MMC220161	BLK 40	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	SE
MMC220201	MMC220161	BLK 41	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	SE
MMC220202	MMC220161	BLK 42	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 027	SE
MMC220203	MMC220161	BLK 43	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220204	MMC220161	BLK 44	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220205	MMC220161	BLK 45	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220206	MMC220161	BLK 46	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220207	MMC220161	BLK 47	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220208	MMC220161	BLK 48	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE

Serial Number	Lead Serial Number	Claim Name	County	Disposition	Case Type	Last Assessment Year	Location Date	Meridian Township Range Section	
MMC220209	MMC220161	BLK 49	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220210	MMC220161	BLK 50	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220211	MMC220161	BLK 51	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC220212	MMC220161	BLK 52	MEAGHER	ACTIVE	LODE	2019	03/25/2008	20 0120N 0060E 026	SE
MMC223234	MMC223234	SB 1	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223235	MMC223234	SB 2	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223236	MMC223234	SB 3	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223237	MMC223234	SB 4	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223238	MMC223234	SB 5	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223239	MMC223234	SB 6	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223240	MMC223234	SB 7	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223241	MMC223234	SB 8	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223242	MMC223234	SB 9	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223243	MMC223234	SB 10	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223244	MMC223234	SB 11	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223245	MMC223234	SB 12	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW
MMC223246	MMC223234	SB 13	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223247	MMC223234	SB 14	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223248	MMC223234	SB 15	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223249	MMC223234	SB 16	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE
MMC223250	MMC223234	SB 17	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW,SW
MMC223251	MMC223234	SB 18	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SW
MMC223252	MMC223234	SB 19	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NW,SW
MMC223253	MMC223234	SB 20	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SW
MMC223254	MMC223234	SB 21	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE,SE
MMC223255	MMC223234	SB 22	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SE
MMC223256	MMC223234	SB 23	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	NE,SE
MMC223257	MMC223234	SB 24	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SE
MMC223258	MMC223234	SB 25	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SW
MMC223259	MMC223234	SB 26	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SW
MMC223260	MMC223234	SB 27	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SW
MMC223261	MMC223234	SB 28	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SW
MMC223262	MMC223234	SB 29	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SE
MMC223263	MMC223234	SB 30	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SE
MMC223264	MMC223234	SB 31	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SE
MMC223265	MMC223234	SB 32	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0120N 0060E 032	SE
MMC223266	MMC223234	SB 33	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 005	NW
								20 0120N 0060E 032	SW

Serial Number	Lead Serial Number	Claim Name	County	Disposition	Case Type	Last Assessment Year	Location Date	Meridian Township Range Section	
MMC223267	MMC223234	SB 34	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 005 20 0120N 0060E 032	NW SW
MMC223268	MMC223234	SB 35	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 005 20 0120N 0060E 032	NE SE
MMC223269	MMC223234	SB 36	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 005 20 0120N 0060E 032	NE SE
MMC223270	MMC223234	SB 37	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 028	SE
MMC223271	MMC223234	SB 38	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 028	SE
MMC223272	MMC223234	SB 39	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 028	SE
MMC223273	MMC223234	SB 40	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 028	SE
MMC223274	MMC223234	SB 41	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 028	SE
MMC223275	MMC223234	SB 42	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 028	SE
MMC223276	MMC223234	SB 43	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	NW
MMC223277	MMC223234	SB 44	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	NW
MMC223278	MMC223234	SB 45	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	SW
MMC223279	MMC223234	SB 46	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	SW
MMC223280	MMC223234	SB 47	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	SW
MMC223281	MMC223234	SB 48	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	SW
MMC223282	MMC223234	SB 49	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	NW
MMC223283	MMC223234	SB 50	MEAGHER	ACTIVE	LODE	2019	11/04/2010	20 0120N 0060E 034	SW,SE
MMC223284	MMC223234	SB 51	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 003 20 0120N 0060E 034	NE SE
MMC223285	MMC223234	SB 52	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 003 20 0120N 0060E 034	NE SE
MMC223286	MMC223234	SB 53	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 003 20 0120N 0060E 034	NE SE
MMC223287	MMC223234	SB 54	MEAGHER	ACTIVE	LODE	2019	11/05/2010	20 0110N 0060E 003 20 0120N 0060E 034	NE SE
MMC223288	MMC223234	SB 55	MEAGHER	ACTIVE	LODE	2019	11/07/2010	20 0120N 0060E 034	NE,NW
MMC223289	MMC223234	SB 56	MEAGHER	ACTIVE	LODE	2019	11/07/2010	20 0120N 0060E 028	SE
MMC223580	MMC223580	BSP 1	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004 20 0110N 0060E 005 20 0120N 0060E 032 20 0120N 0060E 033	NW NE SE SW
MMC223581	MMC223580	BSP 2	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004 20 0110N 0060E 005	NW,SW NE,SE
MMC223582	MMC223580	BSP 3	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004 20 0120N 0060E 033	NW SW

Serial Number	**Lead Serial Number**	**Claim Name**	**County**	**Disposition**	**Case Type**	**Last Assessment Year**	**Location Date**	**Meridian Township Range Section**	
MMC223583	MMC223580	BSP 4	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NW,SW
MMC223584	MMC223580	BSP 5	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NW
								20 0120N 0060E 033	SW
MMC223585	MMC223580	BSP 6	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NW,SW
MMC223586	MMC223580	BSP 7	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NW
MMC223587	MMC223580	BSP 8	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NW,SW
MMC223588	MMC223580	BSP 9	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE,NW
MMC223589	MMC223580	BSP 10	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE,NW,SW,SE
MMC223590	MMC223580	BSP 11	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE
MMC223591	MMC223580	BSP 12	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE,SE
MMC223592	MMC223580	BSP 13	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE
MMC223593	MMC223580	BSP 14	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE,SE
MMC223594	MMC223580	BSP 15	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE
MMC223595	MMC223580	BSP 16	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE,SE
MMC223596	MMC223580	BSP 17	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE
MMC223597	MMC223580	BSP 18	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 004	NE,SE
MMC223598	MMC223580	BSP 19	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 003	NW
MMC223599	MMC223580	BSP 20	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 003	NW,SW
MMC223600	MMC223580	BSP 21	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NW
MMC223601	MMC223580	BSP 22	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NW,SW
MMC223602	MMC223580	BSP 23	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NW
MMC223603	MMC223580	BSP 24	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NW,SW
MMC223604	MMC223580	BSP 25	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NW
MMC223605	MMC223580	BSP 26	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NW,SW
MMC223606	MMC223580	BSP 27	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE,NW
MMC223607	MMC223580	BSP 28	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE,NW,SW,SE
MMC223608	MMC223580	BSP 29	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE
MMC223609	MMC223580	BSP 30	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE,SE
MMC223610	MMC223580	BSP 31	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE
MMC223611	MMC223580	BSP 32	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE,SE
MMC223612	MMC223580	BSP 33	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE
MMC223613	MMC223580	BSP 34	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE,SE
MMC223614	MMC223580	BSP 35	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE
MMC223615	MMC223580	BSP 36	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	NE,SE
MMC223616	MMC223580	BSP 37	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
MMC223617	MMC223580	BSP 38	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
								20 0110N 0060E 009	NE
								20 0110N 0060E 010	NW

Serial Number	Lead Serial Number	Claim Name	County	Disposition	Case Type	Last Assessment Year	Location Date	Meridian Township Range Section	
MMC223618	MMC223580	BSP 39	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
MMC223619	MMC223580	BSP 40	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
								20 0110N 0060E 010	NW
MMC223620	MMC223580	BSP 41	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
MMC223621	MMC223580	BSP 42	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
								20 0110N 0060E 010	NW
MMC223622	MMC223580	BSP 43	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
MMC223623	MMC223580	BSP 44	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW
								20 0110N 0060E 010	NW
MMC223624	MMC223580	BSP 45	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW,SE
MMC223625	MMC223580	BSP 46	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SW,SE
								20 0110N 0060E 010	NE,NW
MMC223626	MMC223580	BSP 47	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
MMC223627	MMC223580	BSP 48	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
								20 0110N 0060E 010	NE
MMC223628	MMC223580	BSP 49	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
MMC223629	MMC223580	BSP 50	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
								20 0110N 0060E 010	NE
MMC223630	MMC223580	BSP 51	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
MMC223631	MMC223580	BSP 52	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
								20 0110N 0060E 010	NE
MMC223632	MMC223580	BSP 53	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
MMC223633	MMC223580	BSP 54	MEAGHER	ACTIVE	LODE	2019	03/14/2011	20 0110N 0060E 003	SE
								20 0110N 0060E 010	NE
MMC223634	MMC223580	BSP 55	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SW
								20 0110N 0060E 003	SE
MMC223635	MMC223580	BSP 56	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SW
MMC223636	MMC223580	BSP 57	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SW
MMC223637	MMC223580	BSP 58	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SW
MMC223638	MMC223580	BSP 59	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SW,SE
MMC223639	MMC223580	BSP 60	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SE
MMC223640	MMC223580	BSP 61	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SE
MMC223641	MMC223580	BSP 62	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SE
MMC223642	MMC223580	BSP 63	MEAGHER	ACTIVE	LODE	2019	03/13/2011	20 0110N 0060E 002	SE
MMC223643	MMC223580	BSP 64	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 010	NE,SE
								20 0110N 0060E 011	NW,SW
MMC223644	MMC223580	BSP 65	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SW
								20 0110N 0060E 003	SE

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								20 0110N 0060E 010	NE
								20 0110N 0060E 011	NW
MMC223645	MMC223580	BSP 66	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NW,SW
MMC223646	MMC223580	BSP 67	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SW
								20 0110N 0060E 011	NW
MMC223647	MMC223580	BSP 68	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NW,SW
MMC223648	MMC223580	BSP 69	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SW
								20 0110N 0060E 011	NW
MMC223649	MMC223580	BSP 70	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NW,SW
MMC223650	MMC223580	BSP 71	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SW
								20 0110N 0060E 011	NW
MMC223651	MMC223580	BSP 72	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NE,NW,SW,SE
MMC223652	MMC223580	BSP 73	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SW,SE
								20 0110N 0060E 011	NE,NW
MMC223653	MMC223580	BSP 74	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NE,SE
MMC223654	MMC223580	BSP 75	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SE
								20 0110N 0060E 011	NE
MMC223655	MMC223580	BSP 76	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NE,SE
MMC223656	MMC223580	BSP 77	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SE
								20 0110N 0060E 011	NE
MMC223657	MMC223580	BSP 78	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NE,SE
MMC223658	MMC223580	BSP 79	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SE
								20 0110N 0060E 011	NE
MMC223659	MMC223580	BSP 80	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NE,SE
MMC223660	MMC223580	BSP 81	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 002	SE
								20 0110N 0060E 011	NE
MMC223661	MMC223580	BSP 82	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 011	NE,SE
								20 0110N 0060E 012	NW,SW
MMC223662	MMC223580	BSP 83	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SW
								20 0110N 0060E 002	SE
								20 0110N 0060E 011	NE
								20 0110N 0060E 012	NW
MMC223663	MMC223580	BSP 84	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NW,SW
MMC223664	MMC223580	BSP 85	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SW
								20 0110N 0060E 012	NW
MMC223665	MMC223580	BSP 86	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NW,SW
MMC223666	MMC223580	BSP 87	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SW
								20 0110N 0060E 012	NW

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MMC223667	MMC223580	BSP 88	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NW,SW
MMC223668	MMC223580	BSP 89	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SW
								20 0110N 0060E 012	NW
MMC223669	MMC223580	BSP 90	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NE,NW,SW,SE
MMC223670	MMC223580	BSP 91	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SW,SE
								20 0110N 0060E 012	NE,NW
MMC223671	MMC223580	BSP 92	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NE,SE
MMC223672	MMC223580	BSP 93	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SE
								20 0110N 0060E 012	NE
MMC223673	MMC223580	BSP 94	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NE,SE
MMC223674	MMC223580	BSP 95	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SE
								20 0110N 0060E 012	NE
MMC223675	MMC223580	BSP 96	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NE,SE
MMC223676	MMC223580	BSP 97	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SE
								20 0110N 0060E 012	NE
MMC223677	MMC223580	BSP 98	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 012	NE,SE
MMC223678	MMC223580	BSP 99	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0060E 001	SE
								20 0110N 0060E 012	NE
MMC223679	MMC223580	BSP 100	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NW,SW
MMC223680	MMC223580	BSP 101	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SW
								20 0110N 0070E 007	NW
MMC223681	MMC223580	BSP 102	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NW,SW
MMC223682	MMC223580	BSP 103	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SW
								20 0110N 0070E 007	NW
MMC223683	MMC223580	BSP 104	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NW,SW
MMC223684	MMC223580	BSP 105	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SW
								20 0110N 0070E 007	NW
MMC223685	MMC223580	BSP 106	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NW,SW
MMC223686	MMC223580	BSP 107	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SW
								20 0110N 0070E 007	NW
MMC223687	MMC223580	BSP 108	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NE,NW,SW,SE
MMC223688	MMC223580	BSP 109	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SW,SE
								20 0110N 0070E 007	NE,NW
MMC223689	MMC223580	BSP 110	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NE,SE
MMC223690	MMC223580	BSP 111	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SE
								20 0110N 0070E 007	NE
MMC223691	MMC223580	BSP 112	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NE,SE
MMC223692	MMC223580	BSP 113	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SE

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								20 0110N 0070E 007	NE
MMC223693	MMC223580	BSP 114	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NE,SE
MMC223694	MMC223580	BSP 115	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 006	SE
								20 0110N 0070E 007	NE
MMC223695	MMC223580	BSP 116	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 007	NE,SE
								20 0110N 0070E 008	NW,SW
MMC223696	MMC223580	BSP 117	MEAGHER	ACTIVE	LODE	2019	03/11/2011	20 0110N 0070E 005	SW
								20 0110N 0070E 006	SE
								20 0110N 0070E 007	NE
								20 0110N 0070E 008	NW
MMC223697	MMC223580	BSP 118	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 011	SE
								20 0110N 0060E 012	SW
								20 0110N 0060E 013	NW
								20 0110N 0060E 014	NE
MMC223698	MMC223580	BSP 119	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 011	SE
								20 0110N 0060E 012	SW
MMC223699	MMC223580	BSP 120	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW
								20 0110N 0060E 013	NW
MMC223700	MMC223580	BSP 121	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW
MMC223701	MMC223580	BSP 122	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW
								20 0110N 0060E 013	NW
MMC223702	MMC223580	BSP 123	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW
MMC223703	MMC223580	BSP 124	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW
								20 0110N 0060E 013	NW
MMC223704	MMC223580	BSP 125	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW
MMC223705	MMC223580	BSP 126	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW,SE
								20 0110N 0060E 013	NE,NW
MMC223706	MMC223580	BSP 127	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SW,SE
MMC223707	MMC223580	BSP 128	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE
								20 0110N 0060E 013	NE
MMC223708	MMC223580	BSP 129	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE
MMC223709	MMC223580	BSP 130	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE
								20 0110N 0060E 013	NE
MMC223710	MMC223580	BSP 131	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE
MMC223711	MMC223580	BSP 132	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE
								20 0110N 0060E 013	NE
MMC223712	MMC223580	BSP 133	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE
MMC223713	MMC223580	BSP 134	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE

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								20 0110N 0060E 013	NE
MMC223714	MMC223580	BSP 135	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0060E 012	SE
MMC223715	MMC223580	BSP 136	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
								20 0110N 0070E 018	NW
MMC223716	MMC223580	BSP 137	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
MMC223717	MMC223580	BSP 138	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
								20 0110N 0070E 018	NW
MMC223718	MMC223580	BSP 139	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
MMC223719	MMC223580	BSP 140	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
								20 0110N 0070E 018	NW
MMC223720	MMC223580	BSP 141	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
MMC223721	MMC223580	BSP 142	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
								20 0110N 0070E 018	NW
MMC223722	MMC223580	BSP 143	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW
MMC223723	MMC223580	BSP 144	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW,SE
								20 0110N 0070E 018	NE,NW
MMC223724	MMC223580	BSP 145	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SW,SE
MMC223725	MMC223580	BSP 146	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SE
								20 0110N 0070E 018	NE
MMC223726	MMC223580	BSP 147	MEAGHER	ACTIVE	LODE	2019	03/10/2011	20 0110N 0070E 007	SE
MMC223727	MMC223580	BSP 148	MEAGHER	ACTIVE	LODE	2019	03/09/2011	20 0110N 0070E 007	SE
								20 0110N 0070E 018	NE
MMC223728	MMC223580	BSP 149	MEAGHER	ACTIVE	LODE	2019	03/09/2011	20 0110N 0070E 007	SE
MMC223729	MMC223580	BSP 150	MEAGHER	ACTIVE	LODE	2019	03/09/2011	20 0110N 0070E 007	SE
								20 0110N 0070E 018	NE
MMC223730	MMC223580	BSP 151	MEAGHER	ACTIVE	LODE	2019	03/09/2011	20 0110N 0070E 007	SE
MMC223731	MMC223580	BSP 152	MEAGHER	ACTIVE	LODE	2019	03/09/2011	20 0110N 0070E 007	SE
								20 0110N 0070E 008	SW
								20 0110N 0070E 017	NW
								20 0110N 0070E 018	NE
MMC223732	MMC223580	BSP 153	MEAGHER	ACTIVE	LODE	2019	03/09/2011	20 0110N 0070E 007	SE
								20 0110N 0070E 008	SW
MMC223733	MMC223580	BSP 154	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW
MMC223734	MMC223580	BSP 155	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW
MMC223735	MMC223580	BSP 156	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW
MMC223736	MMC223580	BSP 157	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW
MMC223737	MMC223580	BSP 158	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW
MMC223738	MMC223580	BSP 159	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW

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MMC223739	MMC223580	BSP 160	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW
MMC223740	MMC223580	BSP 161	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW
MMC223741	MMC223580	BSP 162	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW,SE
MMC223742	MMC223580	BSP 163	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SW,SE
MMC223743	MMC223580	BSP 164	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SE
MMC223744	MMC223580	BSP 165	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SE
MMC223745	MMC223580	BSP 166	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SE
MMC223746	MMC223580	BSP 167	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SE
MMC223747	MMC223580	BSP 168	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SE
MMC223748	MMC223580	BSP 169	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SE
MMC223749	MMC223580	BSP 170	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 005	SW
								20 0110N 0070E 006	SE
MMC223750	MMC223580	BSP 171	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	SE
MMC223751	MMC223580	BSP 172	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 001	NE
								20 0110N 0070E 006	NW
MMC223752	MMC223580	BSP 173	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 001	NE
								20 0110N 0070E 006	NW
MMC223753	MMC223580	BSP 174	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NW
MMC223754	MMC223580	BSP 175	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NW
MMC223755	MMC223580	BSP 176	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NW
MMC223756	MMC223580	BSP 177	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NW
MMC223757	MMC223580	BSP 178	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NW
MMC223758	MMC223580	BSP 179	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NW
MMC223759	MMC223580	BSP 180	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NE,NW
MMC223760	MMC223580	BSP 181	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NE
MMC223761	MMC223580	BSP 182	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NE
MMC223762	MMC223580	BSP 183	MEAGHER	ACTIVE	LODE	2019	03/12/2011	20 0110N 0070E 006	NE
MMC230573	MMC230573	TR 1	MEAGHER	ACTIVE	LODE	2019	03/16/2014	20 0120N 0060E 024	NE
MMC230574	MMC230573	TR 2	MEAGHER	ACTIVE	LODE	2019	03/16/2014	20 0120N 0060E 024	NE
MMC230575	MMC230573	TR 3	MEAGHER	ACTIVE	LODE	2019	03/16/2014	20 0120N 0060E 024	NE
MMC230576	MMC230573	TR 4	MEAGHER	ACTIVE	LODE	2019	03/16/2014	20 0120N 0060E 024	NE
MMC230577	MMC230573	TR 5	MEAGHER	ACTIVE	LODE	2019	03/16/2014	20 0120N 0060E 024	NE
MMC230578	MMC230573	TR 6	MEAGHER	ACTIVE	LODE	2019	03/16/2014	20 0120N 0060E 024	NE
MMC230579	MMC230573	TR 7	MEAGHER	ACTIVE	LODE	2019	03/15/2014	20 0120N 0060E 024	NE
MMC230580	MMC230573	TR 8	MEAGHER	ACTIVE	LODE	2019	03/15/2014	20 0120N 0060E 024	NE
MMC230581	MMC230573	TR 9	MEAGHER	ACTIVE	LODE	2019	03/15/2014	20 0120N 0060E 024	NE
MMC230582	MMC230573	TR 10	MEAGHER	ACTIVE	LODE	2019	03/15/2014	20 0120N 0060E 024	NE,SE
MMC230583	MMC230573	TR 11	MEAGHER	ACTIVE	LODE	2019	03/15/2014	20 0120N 0060E 024	SE

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MMC230584	MMC230573	TR 12	MEAGHER	ACTIVE	LODE	2019	03/15/2014	20 0120N 0060E 024	SE
MMC230946	MMC230946	AKZ 1	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 006	NE
MMC230947	MMC230946	AKZ 2	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 006	NE,SE
MMC230948	MMC230946	AKZ 3	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 006	NE
MMC230949	MMC230946	AKZ 4	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 006	NE,SE
MMC230950	MMC230946	AKZ 5	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 006	NE
MMC230951	MMC230946	AKZ 6	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 006	NE,SE
MMC230952	MMC230946	AKZ 7	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW
								20 0110N 0060E 006	NE
MMC230953	MMC230946	AKZ 8	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW
								20 0110N 0060E 006	NE,SE
MMC230954	MMC230946	AKZ 9	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW
								20 0120N 0060E 032	SW
MMC230955	MMC230946	AKZ 10	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW
								20 0110N 0060E 006	NE,SE
MMC230956	MMC230946	AKZ 11	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW
								20 0120N 0060E 032	SW
MMC230957	MMC230946	AKZ 12	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW,SW
MMC230958	MMC230946	AKZ 13	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW
								20 0120N 0060E 032	SW
MMC230959	MMC230946	AKZ 14	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW,SW
MMC230960	MMC230946	AKZ 15	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW
								20 0120N 0060E 032	SW
MMC230961	MMC230946	AKZ 16	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NW,SW
MMC230962	MMC230946	AKZ 17	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE,NW
								20 0120N 0060E 032	SW,SE
MMC230963	MMC230946	AKZ 18	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE,NW,SW,SE
MMC230964	MMC230946	AKZ 19	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE
								20 0120N 0060E 032	SE
MMC230965	MMC230946	AKZ 20	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE,SE
MMC230966	MMC230946	AKZ 21	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE
								20 0120N 0060E 032	SE
MMC230967	MMC230946	AKZ 22	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE,SE
MMC230968	MMC230946	AKZ 23	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE
								20 0120N 0060E 032	SE
MMC230969	MMC230946	AKZ 24	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE,SE
MMC230970	MMC230946	AKZ 25	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE
								20 0120N 0060E 032	SE

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MMC230971	MMC230946	AKZ 26	MEAGHER	ACTIVE	LODE	2019	10/28/2014	20 0110N 0060E 005	NE,SE
MMC230972	MMC230946	AKZ 27	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
MMC230973	MMC230946	AKZ 28	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
								20 0110N 0060E 007	NE
MMC230974	MMC230946	AKZ 29	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
MMC230975	MMC230946	AKZ 30	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
								20 0110N 0060E 007	NE
MMC230976	MMC230946	AKZ 31	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
MMC230977	MMC230946	AKZ 32	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
								20 0110N 0060E 007	NE
MMC230978	MMC230946	AKZ 33	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
MMC230979	MMC230946	AKZ 34	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 006	SE
								20 0110N 0060E 007	NE
MMC230980	MMC230946	AKZ 35	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 005	SW
								20 0110N 0060E 006	SE
MMC230981	MMC230946	AKZ 36	MEAGHER	ACTIVE	LODE	2019	10/30/2014	20 0110N 0060E 005	SW
								20 0110N 0060E 006	SE
								20 0110N 0060E 007	NE
								20 0110N 0060E 008	NW
MMC230982	MMC230946	AKZ 37	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW
MMC230983	MMC230946	AKZ 38	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW
								20 0110N 0060E 008	NW
MMC230984	MMC230946	AKZ 39	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW
MMC230985	MMC230946	AKZ 40	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW
								20 0110N 0060E 008	NW
MMC230986	MMC230946	AKZ 41	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW
MMC230987	MMC230946	AKZ 42	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW
								20 0110N 0060E 008	NW
MMC230988	MMC230946	AKZ 43	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW,SE
MMC230989	MMC230946	AKZ 44	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SW,SE
								20 0110N 0060E 008	NE,NW
MMC230990	MMC230946	AKZ 45	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE
MMC230991	MMC230946	AKZ 46	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE
								20 0110N 0060E 008	NE
MMC230992	MMC230946	AKZ 47	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE
MMC230993	MMC230946	AKZ 48	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE
								20 0110N 0060E 008	NE
MMC230994	MMC230946	AKZ 49	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE

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MMC230995	MMC230946	AKZ 50	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE
								20 0110N 0060E 008	NE
MMC230996	MMC230946	AKZ 51	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE
MMC230997	MMC230946	AKZ 52	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 005	SE
								20 0110N 0060E 008	NE
MMC230998	MMC230946	AKZ 53	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
								20 0110N 0060E 005	SE
MMC230999	MMC230946	AKZ 54	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
								20 0110N 0060E 005	SE
MMC231000	MMC230946	AKZ 55	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
MMC231001	MMC230946	AKZ 56	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
								20 0110N 0060E 009	NW
MMC231002	MMC230946	AKZ 57	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
MMC231003	MMC230946	AKZ 58	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
								20 0110N 0060E 009	NW
MMC231004	MMC230946	AKZ 59	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
MMC231005	MMC230946	AKZ 60	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW
								20 0110N 0060E 009	NW
MMC231006	MMC230946	AKZ 61	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW,SE
MMC231007	MMC230946	AKZ 62	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SW,SE
								20 0110N 0060E 009	NE,NW
MMC231008	MMC230946	AKZ 63	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SE
MMC231009	MMC230946	AKZ 64	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SE
								20 0110N 0060E 009	NE
MMC231010	MMC230946	AKZ 65	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SE
MMC231011	MMC230946	AKZ 66	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SE
								20 0110N 0060E 009	NE
MMC231012	MMC230946	AKZ 67	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SE
MMC231013	MMC230946	AKZ 68	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 004	SE
								20 0110N 0060E 009	NE
MMC231014	MMC230946	AKZ 69	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 003	SW
								20 0110N 0060E 004	SE
MMC231015	MMC230946	AKZ 70	MEAGHER	ACTIVE	LODE	2019	10/25/2014	20 0110N 0060E 003	SW
								20 0110N 0060E 004	SE
								20 0110N 0060E 009	NE
MMC231016	MMC230946	AKZ 71	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	NE
MMC231017	MMC230946	AKZ 72	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	NE,SE
MMC231018	MMC230946	AKZ 73	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	NE

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MMC231019	MMC230946	AKZ 74	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	NE,SE
MMC231020	MMC230946	AKZ 75	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	NE
MMC231021	MMC230946	AKZ 76	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	NE,SE
MMC231022	MMC230946	AKZ 77	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 007	NE
MMC231023	MMC230946	AKZ 78	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 007	NE,SE
MMC231024	MMC230946	AKZ 79	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 007	NE
								20 0110N 0060E 008	NW
MMC231025	MMC230946	AKZ 80	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 007	NE,SE
								20 0110N 0060E 008	NW,SW
MMC231026	MMC230946	AKZ 81	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW
MMC231027	MMC230946	AKZ 82	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW,SW
MMC231028	MMC230946	AKZ 83	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW
MMC231029	MMC230946	AKZ 84	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW,SW
MMC231030	MMC230946	AKZ 85	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW
MMC231031	MMC230946	AKZ 86	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW,SW
MMC231032	MMC230946	AKZ 87	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW
MMC231033	MMC230946	AKZ 88	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NW,SW
MMC231034	MMC230946	AKZ 89	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE
MMC231035	MMC230946	AKZ 90	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE,SE
MMC231036	MMC230946	AKZ 91	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE
MMC231037	MMC230946	AKZ 92	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE,SE
MMC231038	MMC230946	AKZ 93	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE
MMC231039	MMC230946	AKZ 94	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE,SE
MMC231040	MMC230946	AKZ 95	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE
MMC231041	MMC230946	AKZ 96	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE,SE
MMC231042	MMC230946	AKZ 97	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE
								20 0110N 0060E 009	NW
MMC231043	MMC230946	AKZ 98	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	NE,SE
								20 0110N 0060E 009	NW,SW
MMC231044	MMC230946	AKZ 99	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NW
MMC231045	MMC230946	AKZ 100	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NW,SW
MMC231046	MMC230946	AKZ 101	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NW
MMC231047	MMC230946	AKZ 102	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NW,SW
MMC231048	MMC230946	AKZ 103	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NW
MMC231049	MMC230946	AKZ 104	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NW,SW
MMC231050	MMC230946	AKZ 105	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NE,NW
MMC231051	MMC230946	AKZ 106	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NE,NW,SW,SE
MMC231052	MMC230946	AKZ 107	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NE

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MMC231053	MMC230946	AKZ 108	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NE,SE
MMC231054	MMC230946	AKZ 109	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NE
MMC231055	MMC230946	AKZ 110	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	NE,SE
MMC231056	MMC230946	AKZ 111	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 009	NE
MMC231057	MMC230946	AKZ 112	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 009	NE,SE
MMC231058	MMC230946	AKZ 113	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 009	NE
MMC231059	MMC230946	AKZ 114	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 009	NE,SE
MMC231060	MMC230946	AKZ 115	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 009	NE
								20 0110N 0060E 010	NW
MMC231061	MMC230946	AKZ 116	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 009	NE,SE
								20 0110N 0060E 010	NW,SW
MMC231062	MMC230946	AKZ 117	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NW
MMC231063	MMC230946	AKZ 118	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NW,SW
MMC231064	MMC230946	AKZ 119	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NW
MMC231065	MMC230946	AKZ 120	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NW,SW
MMC231066	MMC230946	AKZ 121	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NW
MMC231067	MMC230946	AKZ 122	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NW,SW
MMC231068	MMC230946	AKZ 123	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE,NW
MMC231069	MMC230946	AKZ 124	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE,NW,SW,SE
MMC231070	MMC230946	AKZ 125	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE
MMC231071	MMC230946	AKZ 126	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE,SE
MMC231072	MMC230946	AKZ 127	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE
MMC231073	MMC230946	AKZ 128	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE,SE
MMC231074	MMC230946	AKZ 129	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE
MMC231075	MMC230946	AKZ 130	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE,SE
MMC231076	MMC230946	AKZ 131	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE
MMC231077	MMC230946	AKZ 132	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	NE,SE
								20 0110N 0060E 011	NW,SW
MMC231078	MMC230946	AKZ 133	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	SE
MMC231079	MMC230946	AKZ 134	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	SE
MMC231080	MMC230946	AKZ 135	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	SE
MMC231081	MMC230946	AKZ 136	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	SE
MMC231082	MMC230946	AKZ 137	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 007	SE
								20 0110N 0060E 008	SW
MMC231083	MMC230946	AKZ 138	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 008	SW
MMC231084	MMC230946	AKZ 139	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 008	SW
MMC231085	MMC230946	AKZ 140	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 008	SW
MMC231086	MMC230946	AKZ 141	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 008	SW,SE

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MMC231087	MMC230946	AKZ 142	MEAGHER	ACTIVE	LODE	2019	10/26/2014	20 0110N 0060E 008	SE
MMC231088	MMC230946	AKZ 143	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	SE
MMC231089	MMC230946	AKZ 144	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	SE
MMC231090	MMC230946	AKZ 145	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	SE
MMC231091	MMC230946	AKZ 146	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 008	SE
								20 0110N 0060E 009	SW
MMC231092	MMC230946	AKZ 147	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SW
MMC231093	MMC230946	AKZ 148	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SW
MMC231094	MMC230946	AKZ 149	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SW
MMC231095	MMC230946	AKZ 150	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SW,SE
MMC231096	MMC230946	AKZ 151	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SE
MMC231097	MMC230946	AKZ 152	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SE
MMC231098	MMC230946	AKZ 153	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SE
MMC231099	MMC230946	AKZ 154	MEAGHER	ACTIVE	LODE	2019	10/23/2014	20 0110N 0060E 009	SE
MMC231100	MMC230946	AKZ 155	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 009	SE
								20 0110N 0060E 010	SW
MMC231101	MMC230946	AKZ 156	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SW
MMC231102	MMC230946	AKZ 157	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SW
MMC231103	MMC230946	AKZ 158	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SW
MMC231104	MMC230946	AKZ 159	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SW,SE
MMC231105	MMC230946	AKZ 160	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SE
MMC231106	MMC230946	AKZ 161	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SE
MMC231107	MMC230946	AKZ 162	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SE
MMC231108	MMC230946	AKZ 163	MEAGHER	ACTIVE	LODE	2019	10/24/2014	20 0110N 0060E 010	SE
MMC231109	MMC230946	AKZ 164	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
								20 0110N 0060E 014	NW
MMC231110	MMC230946	AKZ 165	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
MMC231111	MMC230946	AKZ 166	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
								20 0110N 0060E 014	NW
MMC231112	MMC230946	AKZ 167	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
MMC231113	MMC230946	AKZ 168	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
								20 0110N 0060E 014	NW
MMC231114	MMC230946	AKZ 169	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
MMC231115	MMC230946	AKZ 170	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
								20 0110N 0060E 014	NW
MMC231116	MMC230946	AKZ 171	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW
MMC231117	MMC230946	AKZ 172	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW,SE
								20 0110N 0060E 014	NE,NW

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MMC231118	MMC230946	AKZ 173	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SW,SE
MMC231119	MMC230946	AKZ 174	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
								20 0110N 0060E 014	NE
MMC231120	MMC230946	AKZ 175	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
MMC231121	MMC230946	AKZ 176	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
								20 0110N 0060E 014	NE
MMC231122	MMC230946	AKZ 177	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
MMC231123	MMC230946	AKZ 178	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
								20 0110N 0060E 014	NE
MMC231124	MMC230946	AKZ 179	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
MMC231125	MMC230946	AKZ 180	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
								20 0110N 0060E 014	NE
MMC231126	MMC230946	AKZ 181	MEAGHER	ACTIVE	LODE	2019	10/27/2014	20 0110N 0060E 011	SE
MMC231127	MMC230946	AKZ 182	MEAGHER	ACTIVE	LODE	2019	10/31/2014	20 0110N 0060E 007	SE
MMC231128	MMC230946	AKZ 183	MEAGHER	ACTIVE	LODE	2019	10/31/2014	20 0110N 0060E 007	SE
MMC231129	MMC230946	AKZ 184	MEAGHER	ACTIVE	LODE	2019	10/31/2014	20 0110N 0060E 007	SE
								20 0110N 0060E 008	SW
MMC231130	MMC230946	AKZ 185	MEAGHER	ACTIVE	LODE	2019	10/31/2014	20 0110N 0060E 008	SW
MMC231131	MMC230946	AKZ 186	MEAGHER	ACTIVE	LODE	2019	10/31/2014	20 0110N 0060E 008	SW,SE
MMC231132	MMC230946	AKZ 187	MEAGHER	ACTIVE	LODE	2019	10/31/2014	20 0110N 0060E 008	SE
								20 0110N 0060E 009	SW
MMC231133	MMC230946	AKZ 188	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	SW
MMC231134	MMC230946	AKZ 189	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	SW,SE
MMC231135	MMC230946	AKZ 190	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	SE
MMC231136	MMC230946	AKZ 191	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 009	SE
								20 0110N 0060E 010	SW
MMC231137	MMC230946	AKZ 192	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 010	SW
MMC231138	MMC230946	AKZ 193	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 010	SW,SE
MMC231139	MMC230946	AKZ 194	MEAGHER	ACTIVE	LODE	2019	10/29/2014	20 0110N 0060E 010	SE
MMC231140	MMC230946	CSZ 1	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW
MMC231141	MMC230946	CSZ 2	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW,SW
MMC231142	MMC230946	CSZ 3	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW
MMC231143	MMC230946	CSZ 4	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW,SW
MMC231144	MMC230946	CSZ 5	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW
MMC231145	MMC230946	CSZ 6	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW,SW
MMC231146	MMC230946	CSZ 7	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW
MMC231147	MMC230946	CSZ 8	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW,SW
MMC231148	MMC230946	CSZ 9	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE,NW

Serial Number	Lead Serial Number	Claim Name	County	Disposition	Case Type	Last Assessment Year	Location Date	Meridian Township Range Section	
MMC231149	MMC230946	CSZ 10	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE,NW,SW,SE
MMC231150	MMC230946	CSZ 11	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE
MMC231151	MMC230946	CSZ 12	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE,SE
MMC231152	MMC230946	CSZ 13	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE
MMC231153	MMC230946	CSZ 14	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE,SE
MMC231154	MMC230946	CSZ 15	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE
MMC231155	MMC230946	CSZ 16	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE,SE
MMC231156	MMC230946	CSZ 17	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE
MMC231157	MMC230946	CSZ 18	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NE,SE
MMC231158	MMC230946	CSZ 19	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231159	MMC230946	CSZ 20	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231160	MMC230946	CSZ 21	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231161	MMC230946	CSZ 22	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231162	MMC230946	CSZ 23	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231163	MMC230946	CSZ 24	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231164	MMC230946	CSZ 25	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231165	MMC230946	CSZ 26	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231166	MMC230946	CSZ 27	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW,SE
MMC231167	MMC230946	CSZ 28	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW,SE
MMC231168	MMC230946	CSZ 29	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231169	MMC230946	CSZ 30	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231170	MMC230946	CSZ 31	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231171	MMC230946	CSZ 32	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231172	MMC230946	CSZ 33	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231173	MMC230946	CSZ 34	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231174	MMC230946	CSZ 35	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231175	MMC230946	CSZ 36	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SE
MMC231176	MMC230946	CSZ 37	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW
MMC231177	MMC230946	CSZ 38	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	NW,SW
MMC231178	MMC230946	CSZ 39	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW
MMC231179	MMC230946	CSZ 40	MEAGHER	ACTIVE	LODE	2019	11/01/2014	20 0120N 0060E 030	SW