ASX Announcement **28 October 2020**

USA AND BOTSWANA DEVELOPMENT PROJECTS UPDATE

Highlights

- **Feasibility Study and maiden JORC Ore Reserve of 8.8Mt at 2.6% Cu for 226,100t of contained copper completed for the 85%-owned Black Butte Johnny Lee Copper Project in Montana, USA announced by Sandfire Resources America Inc.**
- **Updated JORC Mineral Resource estimate of 8.3Mt at 2.4% Cu for 199,500t of contained copper completed for the Lowry Deposit, located 3km south-east of the Johnny Lee Deposit.**
- **Feasibility Study on the T3 Copper-Silver Project in Botswana nearing completion and scheduled for release in the December 2020 Quarter. Maiden Mineral Resource Estimate for the A4 Dome discovery pending.**

Sandfire Resources Ltd (ASX: SFR; **Sandfire** or **the Company**) is pleased to provide an update on its development projects in the USA and Botswana.

The Company notes the completion of the Feasibility Study for the Black Butte Johnny Lee Copper Project in Montana, USA by its 85%-owned North American subsidiary, Sandfire Resources America Inc. (**Sandfire America**). The Feasibility Study outlines a **maiden JORC Ore Reserve of 8.8Mt at 2.6% Cu for 226,100t of contained copper** for the cornerstone Johnny Lee Deposit which underpins an 8-year mine life at a mine production rate of 1.2Mtpa.

In addition, Sandfire America has also completed an **updated JORC Mineral Resource estimate of 8.3Mt at 2.4% Cu for 199,500t of contained copper** for the nearby Lowry Deposit, located 3km south-east of the Johnny Lee Deposit.

Sandfire America's announcement on the Black Butte Copper Project Feasibility Study, Ore Reserve, updated Lowry Mineral Resource and JORC Table 1 is appended to this release.

The Company has an active schedule of announcements and project updates between now and the end of the year, including completion and delivery of the Optimised Feasibility Study for the T3 Copper-Silver Project in Botswana, which is scheduled for completion in the December 2020 Quarter, and a maiden Mineral Resource estimate for the A4 Dome in Botswana.

Further, completion of a maiden Mineral Resource estimate for the Old Highway Gold Prospect in the Doolgunna region of Western Australia is scheduled for completion in the second half of the December 2020 Quarter. This will underpin a Scoping Study on the Company's gold development strategy at DeGrussa.

Management Comment

Sandfire's Managing Director and CEO, Karl Simich, said: "The completion of the Black Butte Feasibility Study for the Johnny Lee Deposit marks another important milestone towards the development of a state-of-the-art underground mining project in Montana that meets the highest environmental standards, while also creating significant economic and social benefits for the State of Montana."

“I would like to congratulate Rob Scargill and the team at Sandfire America for delivering this positive Feasibility Study and maiden Mineral Reserve for Johnny Lee, which marks the culmination of several years of hard work by our team in North America.

“Having completed the extensive permitting process for Black Butte – which is the first mining project in Montana to be permitted in over two decades – we are well placed to continue to advance this high-quality, high-grade copper development asset in a measured and sensible manner, and also to respond to and deal with the legal challenges that have been filed in recent months.

“We are also very much looking forward to the completion of the Feasibility Study on our T3 Project in Botswana, which is now in its final stages and scheduled for completion in the December 2020 Quarter. As an A4 resource is defined, and we continue to add to the project, we see great potential for our Motheo Production Hub concept to take shape over the coming months.”

ENDS

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This announcement is authorised for release by Sandfire’s Managing Director and CEO.

Johnny Lee and Lowry Mineral Resource

The information in this announcement that relates to the Johnny Lee and Lowry Mineral Resources is based on information compiled by Mr Erik Ronald (M. Eng., P.Geo, RM-SME, Principal Resource Geology Consultant, SRK). Mr Ronald has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resource and Ore Reserve. Mr Ronald consents to the inclusion of the matters based on his information in the form and context in which it appears.

Johnny Lee Ore Reserve

The information in this announcement that relates to the Johnny Lee Ore Reserve is based on information compiled by Mr Brad Evans (MAusIMM, CP(Mining)). Mr Evans has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resource and Ore Reserve. Mr Evans consents to the inclusion of the matters based on his information in the form and context in which it appears.

Forward-Looking Statements

Certain statements made during or in connection with this announcement contain or comprise certain forward-looking statements regarding Sandfire’s Mineral Resources and Reserves, exploration and project development operations, production rates, life of mine, projected cash flow, capital expenditure, operating costs and other economic performance and financial condition as well as general market outlook. Although Sandfire believes that the expectations reflected in such forward-looking statements are reasonable, such expectations are only predictions and are subject to inherent risks and uncertainties which could cause actual values, results, performance or achievements to differ materially from those expressed, implied or projected in any forward-looking statements and no assurance can be given that such expectations will prove to have been correct.

There is continuing uncertainty as to the full impact of COVID-19 on Sandfire’s business, the Australian economy, share markets and the economies in which Sandfire conducts business. Given the high degree of uncertainty surrounding the extent and duration of the COVID-19 pandemic, it is not currently possible to assess the full impact of COVID-19 on Sandfire’s business or the price of Sandfire securities.

Accordingly, results could differ materially from those set out in the forward-looking statements as a result of, among other factors, changes in economic and market conditions, delays or changes in project development, success of business and operating initiatives, changes in the regulatory environment and other government actions, fluctuations in metals prices and exchange rates and business and operational risk management.

Except for statutory liability which cannot be excluded, each of Sandfire, its officers, employees and advisors expressly disclaim any responsibility for the accuracy or completeness of the material contained in these forward-looking statements and excludes all liability whatsoever (including in negligence) for any loss or damage which may be suffered by any person as a consequence of any information in forward-looking statements or any error or omission. Sandfire undertakes no obligation to update publicly or release any revisions to these forward-looking statements to reflect events or circumstances after today's date or to reflect the occurrence of unanticipated events other than required by the Corporations Act and ASX Listing Rules. Accordingly, you should not place undue reliance on any forward-looking statement.

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Sandfire Resources America Achieves Major Milestones with Completion of Black Butte Copper Project Feasibility Study and Updated Mineral Resource for Lowry Deposit

Feasibility Study underpinned by Maiden Mineral Reserve for the Johnny Lee Deposit of 8.8Mt at 2.6% Cu for 226,100t of copper, underpinning an 8-year life for a state-of-the-art project that either meets or exceeds the stringent Mine Operating Permit conditions

White Sulphur Springs, Montana – October 27, 2020 – Sandfire Resources America Inc. ("Sandfire America" or the "Company") is pleased to announce its maiden Mineral Reserve and the results of the Feasibility Study (the "**Feasibility Study**") for the Johnny Lee deposit at its Black Butte Copper Project in White Sulphur Springs, Montana, USA, pursuant to National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* ("**NI 43-101**").

The Feasibility Study relates solely to Mineral Reserves located on the Johnny Lee copper deposit, the cornerstone deposit at the Black Butte Copper Project (the "**Johnny Lee Deposit" or the "Project"**).

The Company is also pleased to announce an updated Mineral Resource for the Lowry copper deposit (the "**Lowry Deposit**"), which is located approximately 3km south-east of the Johnny Lee Deposit, pursuant to NI 43-101.

All dollars in this announcement are US dollars unless otherwise stated.

Feasibility Study Highlights:

- Maiden Mineral Reserve of **8.8 million tonnes at 2.6% copper for 226,100 tonnes of contained copper** defined for the Johnny Lee Upper and Lower Copper Zones.
- The Project has been designed to **meet or exceed all of the standards and obligations** required under the Project's stringent Mine Operating Permit conditions.
- The Johnny Lee Deposit underpins an **8-year mine life** and is designed to be mined at **1.2 million tonnes of ore per annum.**
- Forecast production totaling 805,000 dry metric tonnes of copper concentrate containing **189,500 tonnes of copper metal** over the life of the mine.
- Average annual production of **~23,000 tonnes of copper metal** at a **C1 cash cost of US$1.51/lb**.
- The Project is forecast to generate **$1.3 billion in gross sales** and **$518 million in pre-tax net cashflow** during mine operations, based on a copper price of US$3.20/lb.
- The Project has a **pre-tax $NPV_{5\%}$ of $124.9 million** (IRR=17%) and a post-tax $NPV_{5\%}$ of $77.6 million (IRR=13%).
- Average **annual post-tax cashflows of $77.8 million per annum** for the first five years of operations.
- Construction capital cost of **$274.7 million**.

- Updated **Inferred Mineral Resource of 8.3 million tonnes at 2.4% copper for 199,500 tonnes of contained copper** completed for the Lowry Deposit, 3km south-east of Johnny Lee:
    - The updated Mineral Resource is based on updated geological modeling, resource estimation, classification, and mineralogy/recovery assumptions.
    - The Lowry Deposit is not covered by the current environmental permits and will need to undergo a further permitting and approvals process.

Commenting on the Feasibility Study completion and key outcomes, Sandfire America CEO and Project Director Rob Scargill stated: *"The positive outcomes of the Feasibility Study show that we can deliver a robust underground mining project at Black Butte that meets the world's highest environmental standards while at the same time creating jobs, opportunities and significant direct and indirect benefits for the State of Montana.*

"This is one of the highest-grade copper deposits in the world and one of the very few fully-permitted and development-ready copper assets globally. The Feasibility Study delineates a clear pathway to unlocking its value for our shareholders in a manner that is consistent with world-best practice in ESG and community engagement.

"The Project will employ 240 full-time, highly paid employees along with 20-30 full-time contractors as well as providing significant economic benefits for all stakeholders in the local community and Montana at large. We have already commenced pre-construction earthworks on the site employing over 30 Montanans through local contractors, in addition to our own dedicated team.

"We are excited about the opportunity to move this high-quality project forward and position it to meet what is increasingly emerging as a new era of demand for copper driven by its growing use as a key input to renewable and clean energy applications, including the electrification of transportation globally.

"Meanwhile, the updated Mineral Resource for the Lowry Deposit demonstrates the significant exploration potential at the Black Butte Copper Project. The deposit is located just 1.8km from the underground access portal for the Johnny Lee Deposit and is a high priority for our next round of exploration."

Black Butte Copper Project Overview

The Black Butte Copper Project consists of 3,223 hectares of fee simple lands under mineral lease by the Company and 525 unpatented mining claims on U.S. Forest Service Lands (USFS), leased by the Company, totaling 4,037 hectares. The Black Butte Copper Project is located in south-central Montana in Meagher County, 27 km north of White Sulphur Springs.

The Johnny Lee copper deposit was discovered by a joint venture between Cominco American Inc. and Utah International in 1985. The Johnny Lee copper deposit is comprised of two zones of mineralization: an upper copper zone ("**UCZ**") situated at depths of 40m – 210m below surface and an underlying lower copper zone ("**LCZ**") at depths of 340m – 520m below surface.

A mine operating plan ("**MOP**") application for the extraction of mineralized rock from both zones of the Johnny Lee Deposit was submitted to the Montana Department of Environmental Quality ("**MT DEQ**") in December 2015 and, following revisions, was deemed to be complete and compliant. A draft MOP permit was issued by the MT DEQ on September 18, 2017 and the Environmental Impact Statement (**"EIS"**) process started soon thereafter and was completed on March 13, 2020. The MOP proposes underground mining of the Johnny Lee Deposit using a drift and fill mining method and production of a copper concentrate by milling and froth flotation. Mill tailings will be used for underground paste-fill support and the surplus deposited in a double-lined cemented tailings storage facility.

A legal challenge to the issuing of the Mine Operating Permit has been filed in the 14th Judicial Court of Montana. The same parties have also objected to the Company's leasing of mitigation water rights

that have preliminary approval from the Montana Department of Natural Resources and Conservation (MT DNRC). The water rights have to be finalized prior to start of production.

To date, the legal challenge has not resulted in any interference with development activities and construction continues. While the Company does not believe that either of these challenges have any merit, they do have the potential to delay the development timeline.

The Lowry Deposit, a similar style copper deposit to the Johnny Lee Deposit, is located approximately 3km to the south-east of the Johnny Lee Deposit.

For further details about the Project, please go to the Sandfire Resources America Inc. website at www.sandfireamerica.com.

Johnny Lee Deposit - Mineral Reserve

The Mineral Reserve was prepared in accordance with Canadian Institute of Mining and Metallurgy and Petroleum ("**CIM**") Definition Standards and will be supported by a technical report (the "**Technical Report**") pursuant to NI 43-101, to be published and filed on the Company's website and SEDAR profile within 45 days.

A net smelter return ("**NSR**") was calculated for each block in a block model based on metallurgical recovery, grade, and payability factors. Mine design shapes were created to reach a cut-off value of $70/t which was used for guidance to create detailed designs. All mining blocks then had dilution and recovery applied to them and were tested for economic viability. The mining stope and level designs with dilution and mining recovery factors applied determined the Mineral Reserve shown in Table 1.

Table 1 – Mineral Reserve Johnny Lee Deposit

Class	Diluted Tonnes	Cu Grade	Contained Cu Metal (t)
Proven	1,998,000	3.0%	60,700
Probable	6,804,000	2.4%	165,400
Total	**8,802,000**	**2.6%**	**226,100**

Notes:

1. *The qualified person, as such term is defined, for the Mineral Reserve is Brad Evans MAusIMM CP(Mining).*
2. *Effective date: October 19, 2020. All Mineral Reserves have been estimated in accordance with CIM definitions, as required under NI 43-101.*
3. *Mineral reserves were estimated using a $3.10 /lb copper price and a NSR cut-off value of $70/t.*
4. *Tonnages are rounded to the nearest 1,000 t, metal grades are rounded to one decimal place. All units are metric.*
5. *Rounding as required by reporting guidelines may result in summation differences.*
6. *Average metallurgical recovery is 84%*

The Mineral Reserves identified in Table 1 comply with CIM definitions and standards for a NI 43-101 Technical Report. Detailed information on mining, processing, metallurgical, and other relevant factors demonstrate, at the time of the Technical Report, that economic extraction is justified. The Feasibility Study did not identify any mining, metallurgical, infrastructure or other relevant factors that may materially affect the estimates of the Mineral Reserves or potential production. Table 2 below shows the Mineral Reserves broken out by zone.

Table 2 – Mineral Reserves for the Johnny Lee Deposit by Zone

Zone	Class	Diluted Tonnes	Cu Grade	Contained Cu Metal (Tonnes)
UCZ	Proven	1,159,000	2.2%	25,900
	Probable	5,693,000	2.1%	116,900
	Total	6,852,000	2.1%	142,800
LCZ	Proven	839,000	4.1%	34,800
	Probable	1,111,000	4.4%	48,500
	Total	1,950,000	4.3%	83,300
Grand Total	Total	8,802,000	2.6%	226,100

Economic Analysis

The Feasibility Study economic analysis is based on the Johnny Lee Deposit Mineral Reserves. The Feasibility Study does NOT include the Lowry Deposit.

The copper price assumption adopted for the base case is $3.20/lb from the start of production.

The Project's pre-tax NPV at a 5% discount rate is estimated to be US$124.9M with an IRR of 17%. Cash Costs (C1) are estimated to be $1.51/lb of copper. The life-of-mine all-in sustaining cost is estimated to be $1.63/lb of copper. Payback of start-up capital is achieved approximately 3 years from commissioning.

Table 3 – Economic Sensitivity Analysis for the Johnny Lee Deposit

Black Butte Copper Project - FS Case Pre-Tax NPV Sensitivity Impacts					
Sensitivity Variables	Confidence Ranges		$ Millions , Pre-Tax		NPV @ 5%
	Worst	Best	Worst	Best	Point
Cu Selling Price	-10%	10%	$30	$216	$125
Cu Grade	-10%	10%	$33	$214	$125
Cu Recovery	-10%	10%	$33	$214	$125
Concentrate Shipping Costs - Land	10%	-10%	$116	$130	$125
Opex - Mining	10%	-10%	$108	$138	$125
Opex - Process	10%	-10%	$107	$140	$125
Capital - Mining	10%	-10%	$113	$133	$125
Capital - Process & Admin	10%	-10%	$105	$142	$125

Johnny Lee Mineral Reserve Estimation Methodology and Parameters

Mining Methods

The Black Butte Copper Project Johnny Lee deposit contains two zones – the UCZ and the LCZ. Both of these zones are characterized as being high-grade, laying at low angles and with relatively narrow widths. All deposits have anomalous silver and cobalt mineralization; however copper is the only economic product considered in the Feasibility Study.

Geotechnical data was gathered from logging of the diamond drill core performed by Sandfire America geologists as well as part of previous work by MDEng (MDEng, 2015). Specific

geotechnical holes were drilled along the projected main decline and one of the ventilation raises and logged by Mining Plus. Mining Plus in collaboration with Sandfire America geologists undertook a quality assurance and quality control (QA/QC) audit of the data gathered. Acoustic Televiewer and oriented core data were used to determine structural information. In addition to the data logging, multiple rock property tests were performed on different rock types.

The Johnny Lee Deposit will be accessed by a single main ramp driven from surface. The ramp dimensions will be 5m wide by 5m high and excavated with a flat back to maximize the stability of the flat dipping joint sets that are prevalent throughout the Project. The ramp will be excavated at a maximum gradient of -15% from the surface and pass to the east of the UCZ and then spiraling down to the LCZ. Ventilation and secondary egress will be through 3 main ventilation raises.

All material handling will be by trackless underground equipment with 51-tonne haul trucks hauling ore directly from stope areas to either a surface ore pad or the surface crusher.

The mining method will be a combination of drift and fill and cut and fill depending on the height of the orebody. All openings will be completely backfilled with Paste Backfill to allow for the complete extraction of the orebody. In the UCZ where the orebody is wider a Primary-Secondary-Tertiary method, where the tertiary stopes are extracted through an unsupported slash retreat.

Mineral Processing and Metallurgical Test Work

Previous metallurgical test work programs undertaken by the Company 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 27.0% 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 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 flotation tests were completed on all 21 UCZ metallurgical composites to determine the optimum primary grind size, reagent suite, rougher regrind size and flowsheet configuration 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. Based on the test work the optimized flowsheet for the UCZ was developed:

Primary grind to 35 µm P80;

Lime addition to rougher flotation circuit to maintain pH = 9.5;

Rougher flotation using aero 3477, mono-sodium phosphate and dextrin;

Regrind of rougher concentrate to 10 µm P80;

Lime addition during regrind to maintain cleaner flotation circuit pH = 9.5;

Additional mono-sodium phosphate and dextrin added during regrind;

Three stage cleaner flotation circuit with cleaner scavenger;

Additional aero 3477 added to cleaner flotation circuit; and

Polyfroth w31 added to cleaner flotation circuit.

The locked-cycle tests on non-supergene altered composites, using the optimized flowsheet recovered 70.6% to 90.1% of the copper into a concentrate assaying 16.9% to 27.1% copper. Locked-cycle testing of a supergene altered UCZ composite recovered 69.8% of the copper into a concentrate assaying 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 assaying 24.4% copper.

Given the amount of variability in non-supergene altered UCZ composites, the relationship between copper recovery and 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:

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 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 flowsheet. 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 ("**ID2**") 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 flotation test on a LCZ composite, using the UCZ flowsheet, recovered 92.3% copper to a concentrate assaying 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 93% copper recovery has been assigned to the LCZ.

Analyses of the copper concentrates from locked-cycle testing of UCZ composites has reported potentially deleterious levels of arsenic. There is no correlation between the arsenic concentration of the feed composites and that in the concentrates as only certain arsenic bearing minerals (primarily tennantite) preferentially deport to the concentrate. There is a strong linear correlation between the tennantite percentage of the feed, estimated using systematic mineragraphy, and the arsenic levels in copper concentrates from locked-cycle tests. This correlation is defined by the formula:

Locked-cycle test cleaner concentrate as grade (ppm) = (8048.4 * tennantite%) + 3202.6

This formula has been used to convert the tennantite concentrations for the systematic mineralogy composites into expected arsenic concentrations in copper concentrate. ID2 interpolation has been used to create an arsenic in concentrate block model which has been integrated with the copper

recovery and Mineral Resource models. Based on the tennantite concentrations, arsenic in UCZ concentrates is expected to range from 3,202 to 14,876 ppm.

Based on analyses of the concentrate produced during locked-cycle testing of a master LCZ composite a global arsenic in concentrate value (230 ppm) has been assigned to LCZ ore.

Recovery Methods

Metallurgical test work indicates that the copper in the UCZ and LCZ can be recovered to a concentrate by crushing, grinding, and froth flotation processes. The UCZ ore requires a fine primary grind (38 µm P80) and a very fine regrind (10 µm P80) of the rougher concentrate to achieve optimized recoveries. The LCZ ore does not require such fine grinds to achieve optimized recoveries. However, as it will be blended with UCZ ore in small volumes, the blended ore will be treated using the process as optimized for UCZ ore. Metallurgical test work has demonstrated that there are no reductions in copper recovery to concentrate from UCZ or LCZ ore by blending and processing the blend using the flowsheet optimized for UCZ ore.

Infrastructure

The layout and surface footprint of all aboveground infrastructure for the Project has been designed as part of the MOP application submitted to the MT DEQ. The ground infrastructure in the MOP includes: access roads, site roads, mine portal, ventilation raises, processing plant, reclamation stockpiles, temporary waste rock storage, cemented tailings facility, process water pond, contact water pond, storage water pond, non-contact water reservoir, sub-surface infiltration gallery, power lines, pipelines, workshops, store, offices and parking.

Capital and Operating Costs

Capital Cost Estimates

The Project capital cost estimate has been developed for the Feasibility Study is based upon an Engineer, Procure and Construction Management ("**EPCM**") approach for the construction and commissioning of the Project facilities. This includes mine, plant and infrastructure, the process plant and infrastructure, general mine infrastructure and roads.

A capital cost of $274.7 million, including contingency, has been developed for the Project and includes all costs before the commencement of production. The capital costs have been estimated to a ±15% accuracy. The breakdown of the Project Capital is given in Table 4.

Table 4 – Project Capital cost breakdown

Area	Capital Cost $M
Mining	$65.1
Site Infrastructure	$91.4
Mineral Processing & WTP	$72.7
Project In-directs (EPCM & Owner Costs)	$20.5
Contingencies (mine, process, infrastructure & in-directs)	$25.0
Total Project	**$274.7**

Mining Operating Costs

Operating costs have been developed using the parameters specified in the process design criteria. Annual operating costs and costs per tonne mined has been developed. The mining operating cost estimate has been developed on the basis of ore to the ROM pad at the same rate as the processing plant name plate of 1.2 million tonnes per annum. The operating cost estimate is $27.8 million per annum or $22.82 per tonne of ore supplied to the ROM.

Process Plant Operating Costs

Operating costs have been developed using the parameters specified in the process design criteria. Annual operating costs and costs per tonne milled has been developed. Operating costs for the treatment plant have been estimated to an accuracy of ±15%. The costs are presented in United State dollars (USD$) and are based on prices obtained during the second quarter of 2019 (2Q19) and exclude the VAT cost components.

The processing operating cost (excluding freight) estimate has been developed on the basis of a process plant feed tonnage of 1.2 million tonnes per annum. The processing operating cost (excluding freight) estimate is $29.43 million per annum or $25.52 per tonne milled.

Risks Affecting Potential Development

Environmental

The Company conducted exploration under Exploration License #00710 issued by the MT DEQ. Regulations include the bonding of exploration disturbances to ensure reclamation is completed. The Company 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 the Company and inspected and approved by the MT DEQ. In addition, there are approximately 37 monitoring wells/test wells, and one water well, and 15 piezometers currently in place that will ultimately need to be removed during closure and reclamation.

Potential short- and long-term impacts caused by mining activities were evaluated from several perspectives: impacts to the environment during operation and closure, issues or impacts that could materially affect the mine's ability to extract the Mineral Reserves, and socio-economic impacts.

Potential impacts to the environment were addressed in detail in the Environmental Impact Statement (MT DEQ, 2019 and 2020).

In addition to the approved MOP there are 27 other permits or plans that need to be approved by Federal, Montana State, or Meagher County authorities. These permits and plans cover: water quality, water rights, water supply, wetlands and streambed preservation, aquatics monitoring, dam safety, sewerage disposal, air quality, invasive vegetation, tribal communications, cultural resources, community impact, mining infrastructure, mining operations and emergency response. Work has been initiated on all but four of these permits/plans (which are largely administrative). To date, five permits/plans have been approved, nine applications have been submitted and nine applications are in the process of being compiled.

Legal

The MOP was designed to meet the requirements of the Montana Metal Mine Reclamation Act and the rules and regulations governing the act. Additional permits, including a Montana Pollutant Discharge Elimination System ("**MPDES**"), were obtained through the MT DEQ.

Compliance with the applicable legal requirements is demonstrated by the MT DEQ's approval of the following: MOP, Air Quality Permit, MPDES and construction storm water permit. A draft Environmental Impact Statement was published by the MT DEQ on March 11, 2019, as required under the Montana Environmental Policy Act, and finalized on March 13, 2020. Subsequently, the MT DEQ issued a Record of Decision for the mine on April 9, 2020, identifying MT DEQ's decision, the reasons for the decision and special conditions surrounding the decision and its implementation.

As previously reported, a legal challenge against the Project regarding the mine operation permit continues with a potential hearing expected in late October in front of Judge Spaulding of the 14th Judicial Court. To date, the legal challenge has not resulted in any interference with development activities and construction continues.

Leasing of mitigation water rights has preliminary approval from the Montana Department of Natural Resources and Conservation (MT DNRC). However, there are objections which will slow down the process. The water rights have to be finalized to start production. While we do not believe that either

of these challenges have any merit, they do have the potential to delay the project development timeline.

For additional information, please refer to the document entitled "*Management Discussion and Analysis for the year ended June 30, 2020*", which the Company filed on the Company's SEDAR profile at www.sedar.com on August 25, 2020.

Lowry Deposit – Mineral Resources

The updated Mineral Resource statement for the Lowry Deposit is summarized in Table 3. The Mineral Resource statement is supported by recent updates to the geological modeling, resource estimation, and mineralogy with recovery assumptions in addition to historic drilling, analyses, and studies. The Lowry Deposit contains no Mineral Reserves, and therefore is not included in the Feasibility Study. The Lowry Deposit has a much lower density of drilling than the Johnny Lee Deposit. Mineralization is hosted in two distinct zones of > 1.2% Cu mineralization. These zones are termed the Lowry middle copper zone ("LMCZ"), and the Lowry lower copper zone ("LLCZ").

A total of 51 drillholes have been used for the 2020 Lowry Deposit Mineral Resource. Drillhole intersection spacing in the LMCZ ranges from 40 – 100 m. The LMCZ is hosted by a succession of massive sulphide and pyritic shale with interbedded conglomerate, carbonaceous shale and shale.

Ten mineralogical composites from the LMCZ have been investigated (McArthur, 2019). Using the regression-based relationship derived for the Johnny Lee Deposit UCZ, an average Cu recovery of 86% is estimated for the Lowry Deposit in both the LMCZ and the LLCZ.

The >1.2% Cu zones are surrounded by >0.25% Cu mineralization referred to as Halo mineralization. The Halo mineralization is largely confined to the host unit but does transgress the hanging wall and footwall contacts in places.

Many of the drillholes that intersected the LMCZ were stopped-short of the LLCZ, consequently drillhole spacing in the LLCZ is larger than that of the LMCZ, ranging from 60 – 200m.

Mineral Resource classification was assigned to the Lowry Deposit block model by the QP based upon: geological knowledge, continuity of Cu grade within mineralized zones, thickness of the mineralized zones, confidence in the underlying data (logging, assay, and physical testing), spatial continuity as determined through variography for Cu, recovery data, kriging quality variables (kriging efficiency, average distance to samples, and estimation run pass), and drill sample spacing on a domain basis. Blocks within the LMCZ and LLCZ have been categorized as Inferred classification consistent with NI 43-101 and the CIM Definition Standards. Mineralized material in the LUCZ and the halo mineralization was not deemed acceptable for classification at this time but represents mineralization potential with future studies. A combination of wireframe volumes and scripting of specific blocks was used to apply the appropriate block classification of Mineral Resource categories.

Summary Mineral Resources have been estimated and reported using an economic cut-off grade (CoG) applied to copper as estimated in the resource block model. This Mineral Resource statement is supported by drilling, analyses, geological modelling, and extensive metallurgical studies to provide updated recoveries.

Table 5 – Lowry Deposit Mineral Resource effective October 15, 2020 – SRK Consulting (U.S.), Inc.

Category	Quantity (Mt)	Cu (%)	Total Metal (kt)
LMCZ			
Inferred	5.7	2.5	144.5
LLCZ			
Inferred	2.6	2.1	55.0
Combined LMCZ + LLCZ			
Inferred	8.3	2.4	199.5

Source: SRK, 2020

- The effective date for this Mineral Resource is October 15, 2020. 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 assigned to the Lowry Deposit using the mean recovery of 86% Cu based on mineralogical and regression-based analyses;
- To demonstrate reasonable prospects for eventual economic extraction of Mineral Resources, a cut-off grade of 1.20% 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 Analysis of the June 2020 Company Quarterly Report and identified above. All Mineral Resources are located within land currently under control or lease to Sandfire Resources America Inc.

Table 6 shows the tabulated grade-tonnage curve data to assess the sensitivity of Mineral Resources to changes in CoG.

Table 6 - Tabulated Grade-Tonnage Data by Cut-off Grade

Cut-off	cu_pct	Tonnage	Increment	Increment	Inc Grade	Inc Tonnage
0.25	2.29	9,020,421	0.25	0.50	0.41	2,807
0.50	2.30	9,017,614	0.50	0.75	0.67	59,156
0.75	2.31	8,958,458	0.75	1.00	0.90	249,515
1.00	2.35	8,708,943	1.00	1.25	1.15	604,577
1.25	2.44	8,104,366	1.25	1.50	1.37	837,993
1.50	2.56	7,266,373	1.50	1.75	1.63	827,930
1.75	2.68	6,438,443	1.75	2.00	1.88	1,079,210
2.00	2.84	5,359,232	2.00	2.25	2.12	1,380,083
2.25	3.09	3,979,150	2.25	2.50	2.36	865,160
2.50	3.29	3,113,990	2.50	2.75	2.62	816,074
2.75	3.53	2,297,915	2.75	3.00	2.87	505,766
3.00	3.71	1,792,150	3.00	3.25	3.12	526,143
3.25	3.96	1,266,006	3.25	3.50	3.37	349,693
3.50	4.18	916,314	3.50	3.75	3.62	250,177
3.75	4.39	666,137	3.75	4.00	3.86	210,985
4.00	4.63	455,152	4.00	>4.00	4.63	455,152

Comparison to Previous Mineral Resource Estimates

The previous Mineral Resource for the Lowry Deposit was completed in 2013 (effective date July 12, 2013) as part of the Company's Preliminary Economic Assessment (the "**PEA**"). Continued flotation testing since the release of the PEA report has shown unfavorable results for polymetallic products other than Cu given the current economic assumptions. Therefore, for the 2020 Mineral Resources at the Lowry Deposit, Co, Ag, and Au have been excluded.

The 2020 updated classification for Lowry Deposit Mineral Resources is aligned with the 2019 Johnny Lee Deposit classification. This has resulted in a change from the 2013 Lowry Deposit Mineral Resources which reported a combination of indicated and inferred Mineral Resources at the time. Updated 3D wireframing of the major mineralized zones, spatial continuity analyses, and a review of estimation criteria has resulted in the updating of Lowry Deposit resources to be entirely classified as inferred Mineral Resources.

The total quantity of Mineral Resources has increased in 2020 from the 2013 statement. This is due to inclusion of the LLCZ, which was not part of the 2013 resource estimate, as well as updated mineralized 3D wireframes and the estimation of Specific Gravity ("SG") values compared to assignment of mean SG data in 2013.

The average Cu grade has decreased in the 2020 Mineral Resources compared to the 2013 statement. This is due to changes in the composite size from 1.0 m in 2013 to 1.5 m in 2020, use of ordinary kriging ("**OK**") estimation method in 2020 compared to Inverse Distance Weighting ("IDW") to the third power, improved search neighborhood incorporating multiple samples and search ellipsoid aligned with the dominant directions of mineralization, reduced CoG of 1.2% Cu from 1.6% Cu in 2013, and modified domains constraining estimation to zones of approximately greater than 1.2% Cu.

Lowry Resource Estimation Methodology and Parameters

Mineral Resource estimation was performed for the Lowry Deposit by SRK Consulting (U.S.) Inc. ("**SRK**") using Maptek™ Vulcan™ software. The focus of estimation was on Cu as the key economic variable of interest. SRK performed an extensive review of all historic geological and drilling data on the Lowry Deposit including QA/QC and general data verification. Estimation of Cu and SG was performed using a combination of OK and IDW to the power of two based on a multi-pass method within modeled domains. Domains were modeled using a combination of lithostratigraphic data and grade shelling.

In areas of limited data that did not meet the minimum criteria for estimation in the final pass, a scripted value was assigned to the block variable by domain. The scripted value assigned is the variable mean from capped composites by domain. A limited number of blocks in the Lowry block model met this criterion and were located primarily in the LUCZ domains and are excluded from Mineral Resource calculations.

SG was estimated in the block model using a two-pass method of IDW2 with varying search neighborhoods by domain. As with quality variables, blocks not estimated in the last pass were scripted a mean value based on composite data. As there is less SG data compared to quality analytical variables, a greater number of blocks were scripted with the domain mean.

Each mineralized domain has a unique search neighborhood based on the Cu variogram, mineralization thickness, and data spacing within the domain. For most domains, the directionality of the search ellipsoid was varied by block based on the average orientation of the domain's modeled wireframe.

The primary mineralized domains of LMCZ and LLCZ show that the majority of blocks were populated in the first pass with all remaining blocks estimated in the second pass. In the LUCZ, due to limited data, the percentage of blocks estimated in the first few passes show that portions of the domain exhibit limited confidence in estimated quality while large portions are low confidence and thus populated in either a large search pass or with scripted mean values. As a result, the LUCZ does

not contain Mineral Resources at this time but represents mineralized potential for targeted future work programs at the Lowry Deposit.

Lowry Deposit Copper Recovery Estimation

Mineralogical test work at the Lowry Deposit was used for a regression-based analysis derived from similar mineralization style observed at the Johnny Lee Deposit. The resultant outcome shows an 86% recovery of Cu assumption. For the purposes of determining Mineral Resources, the average of 86% recovery was applied in the determination of total contained Cu.

Lowry Deposit Determination of Cut-off Grade for Resource

To demonstrate reasonable prospects of eventual economic extraction of Mineral Resources at the Lowry Deposit, a cut-off grade was applied that accounts for assumed metallurgical recovery of Cu, operational costs, and long-term market-driven Cu pricing. Metallurgical recovery was assigned at 86% Cu recovery based on mineralogical test work and regression analysis based on mineralogical similarities with work done at the nearby Johnny Lee Deposit. Operational costs were assumed consistent with work completed at Johnny Lee Deposit with a US$71/tonne assumed cost. Cu price assumptions are based on US$3.20/lb derived from a mean of multiple market-based long-term pricing forecasts. Using these assumptions, a cut-off grade of 1.2% Cu was applied to the Lowry Deposit.

It is the opinion of the QP that the estimation for Cu and SG in the Lowry block model is appropriate given the data spacing, geological model, and data variability per domain. Some domains contain limited data, therefore were estimated using a simplified neighborhood and estimation method such as IDW2. In domains that are better informed with drilling data, OK was used when an acceptable variogram was calculated.

Qualified Persons

The technical information contained in this news release related to the Johnny Lee Deposit has been reviewed and approved by Erik Ronald, M. Eng., P.Geo, RM-SME, Principal Resource Geology Consultant, SRK, Brad Evans, MAusIMM, CP(Mining), and Deepak Malhotra Ph.D. RM-SME, Resource Development Inc. Messrs. Ronald, Evans and Malhotra are qualified persons, as such term is defined in NI 43-101 for Mineral Resources, Mineral Reserves and metallurgical processing respectively. Messrs. Ronald and Malhotra are independent of the Company. For additional detailed information on the key assumptions, parameters and methods used to estimate the Mineral Reserves, along with other information about the Johnny Lee Deposit, please refer to the Technical Report to be filed.

The technical information contained in this news release related to the Lowry Deposit has been reviewed and approved by Messrs. Ronald and Malhotra. The Mineral Resource block model and estimation for the Lowry Deposit was reviewed and accepted by Messrs. Ronald and Malhotra acting as qualified persons for Mineral Resources. The final Mineral Resource classification and calculations were performed by Mr. Ronald using Maptek's Vulcan™ software. Domaining of copper mineralization was performed by Sandfire America staff using Leapfrog Geo™ software and reviewed by the qualified persons.

The qualified persons referred to above have verified the data disclosed in this news release, including sampling, analytical, and test data underlying the information or opinions contained in this news release.

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Additional information on Sandfire Resources America Inc. can be viewed on SEDAR under the Company's profile at www.sedar.com or on Sandfire Resources America Inc.'s website at www.sandfireamerica.com

Cautionary Note Regarding Forward-Looking Statements: Certain disclosures in this document constitute "forward looking information" within the meaning of Canadian securities legislation, including statements regarding the Mineral Resource and Mineral Reserve estimates, the proposed mining plans and recovery methods, estimates of capital, operating costs and sustaining, estimates of other costs and payments, the estimated amount of future production, both produced and metal recovered, cash flow, internal rate of return (IRR), pre and post-net present value, mine life, payback, gross sales, estimated recoveries, the number of persons to be employed by the Project and economic returns and benefits from an operating mine, the Feasibility Study and the expected timing of filing thereof, and expected outcomes.

Forward-looking statements include statements that are predictive in nature, are reliant on future events or conditions, or include words such as "expects", "potential", "anticipates", "plans", "believes", "considers", "significant", "intends", "targets", "estimates", "seeks", attempts", "assumes", and other similar expressions.

In making these forward-looking statements, the Company has applied certain factors and assumptions that the Company believes are reasonable, including those assumptions previously set out in this news release and the following assumptions: that the Company will receive required regulatory approvals, the Company's successful advancement of the Black Butte Copper Project, the expected positive results from the Project based on the estimates and findings contained in the Feasibility Study, that the Company will continue to be able to access sufficient funding to execute its plans, that the Company is able to procure equipment and supplies in sufficient quantities and on a timely basis, that the Company's exploration and development activities on the Black Butte Copper Project will not be affected by actions of environmental activists or other special interest groups, that the results of exploration and development activities will be consistent with management's expectations, the assumptions underlying internal rates of return and net present value are valid, that capital costs and sustaining costs will be as estimated, that the assumptions underlying Mineral Resource and Mineral Reserve estimates are valid, that no unforeseen accident, fire, ground instability, flooding, labor disruption, equipment failure, metallurgical, environmental or other events that could delay or increase the cost of development will occur, that the current price and demand for copper and other metals will be sustained or will improve; that general business and economic conditions will not change in a materially adverse manner; and the continuity of economic and political conditions and operations of the Company.

However, the forward-looking statements in this document are subject to numerous risks, uncertainties and other factors, including factors relating to the Company's operation as a mineral exploration and development company and the Black Butte Copper Project, that may cause future results to differ materially from those expressed or implied in such forward-looking statements, including those risks previously set out in this news release and the following risks: the risk that any of the assumptions on which the forward looking information is based prove to be incorrect or invalid, the risk of unexpected variations in Mineral Resources and Mineral Reserves, grade or recovery rates, the possibility of cost overruns or unanticipated costs and expenses, uncertainties relating to the availability and costs of financing needed in the future, that actual costs of restoration activities are greater than expected and that changes in Project parameters as plans continue to be refined result in increased costs, results of exploration and development activities will not be consistent with management's expectations, uncertainties involved in the interpretation of drilling results and geological tests; delays in obtaining or inability to obtain required government or other regulatory approvals or financing, failure of plant, equipment or processes to operate as anticipated, the risk of accidents, labor disputes, inclement or hazardous weather conditions, unusual or unexpected geological conditions, ground control problems, earthquakes, flooding; interference with the Company's exploration or development activities by environmental activists or other special interest groups; inability to procure equipment and supplies in sufficient quantities and on a timely basis; the risk that estimated costs will be higher than anticipated and the risk that the proposed mine plan and recoveries will not be achieved, the risks disclosed in the Company's most recently filed Management Discussion and Analysis and the Company's other continuous disclosure filings

filed under the Company's profile at www.sedar.com and all of the other risks generally associated with the development and operation of mining facilities.

There can be no assurance that such statements will prove to be accurate, and actual results and future events could differ materially from those anticipated in such statements. Readers are cautioned not to place undue reliance on forward-looking statements. The Company does not intend, and expressly disclaims any intention or obligation to, update or revise any forward-looking statements whether as a result of new information, future events or otherwise, except as required by law.

*CAUTIONARY NOTE TO US READERS. As a Canadian reporting issuer, the Company is subject to rules, policies and regulations issued by Canadian regulatory authorities and is required to provide detailed information regarding its properties including mineralization, drilling, sampling and analysis, security of samples and Mineral Resource and Mineral Reserve estimates. In addition, as a Canadian reporting issuer, the Company is required to describe Mineral Resources associated with its properties utilizing Canadian Institute of Mining, Metallurgy and Petroleum ("**CIM**") definitions of "indicated" or "inferred", which categories of resources are recognized by Canadian regulations but are not recognized by the United States Securities and Exchange Commission ("**SEC**").*

The SEC allows mining companies, in their filings with the SEC to disclose only those mineral deposits they can economically and legally extract or produce. Accordingly, information contained in this News Release regarding our mineral deposits may not be comparable to similar information made public by U.S. companies subject to the reporting and disclosure requirements under the United States federal securities laws and the rules and regulations of the Commission thereunder.

Neither the TSX Venture Exchange nor its Regulation Services Provider (as that term is defined in the policies of the TSX Venture Exchange) accepts responsibility for the adequacy or accuracy of this release.

JORC Code, 2012 Edition – Table 1 for the Johnny Lee Deposit of the Black Butte Copper Project of White Sulphur Springs, Montana, USA

Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• A total of 188 diamond drillholes (31 pre-2010 and 157 post-2010) are used for the Mineral Resource estimate for the Johnny Lee deposit. • Sampling for analytical testing has been performed on diamond drill core either by splitting of core on historical drilling (pre-2010) or by half-core sawing (2010 to present). • Sampling intervals are nominally 1.5 m in length. • Prior to 2010, analyses were undertaken by the previous project owners at internal laboratories. Details on the analytical methods and QA/QC protocols is not available. Six Drillholes were twinned, re-sampled and re-analyzed demonstrating historical data is suitable for Mineral Resource estimation purposes. • The 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. • Post 2010, half-core was analyzed by ALS Laboratories of Reno, Nevada, USA. Samples were weighed and crushed to 70% passing 2mm and then a riffle split 250g-split pulverized to 85%, <75*um.* A 0.25g charge was subjected to four acid digestion and analyzed using ICP-AES. A 30g aliquot was assayed for gold by fire assay with an atomic absorption spectroscopy (AAS finish). • All sampling has been supervised by professional geologists. • A quality assurance program has been in-place since initial exploration on Johnny Lee Deposit that includes regular addition of quality control samples such as blanks, standards, and duplicates. The Competent Person notes that raw QA/QC data collected prior to 2010 is not available, therefore the presence of historic drilling has been taken into account for risk assessment and Mineral Resource

Criteria	JORC Code explanation	Commentary
		classification purposes. • Logging for lithology, alteration, mineralisation, and structure has been performed on all drill core by professional geologists. Based on mineralisation logging, samples are collected within each mineralised zone, identified by visual logging of chalcopyrite content, ensuring at least 9 m of material was sampled above and below the logged mineralised interval.
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	• All drilling is either diamond drill core from surface or collared using a rock bit, switching to diamond core drilling when competent ground is encountered. • All core is either HQ- or NQ-sized diameter. • Core orientation using a Reflex ACT-II or ACT-III tool has been undertaken on all drillholes since 2014. Drillhole core prior to 2014 was not orientated.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Diamond drill core recovery and rock quality designation (RQD) were logged by geologists. • Core recovery in the Johnny Lee Upper Copper Zone (UCZ) is considered acceptable with average recoveries in the Eastern Block Mean = 93.0% (Median = 97.1%) and the Western Block Mean = 91.5% (Median = 96.4%). • Core Recoveries in the Johnny Lee Lower Copper Zone (LCZ) are considerable acceptable with mean recoveries ranging from 98.2% - 100.0% and median recoveries ranging from 99.3 – 100.0%. • Drillers, in collaboration with Company geologists, take measures such as reducing torque and penetration rates of drilling when targeting zones of known fracturing. • It is the opinion of the Competent Person that core recovery loss is not material to overall grade modeling and estimation.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.* • *The total length and percentage of the relevant intersections logged.*	• All diamond drill core from the Johnny Lee Deposit has been geologically logged by geologists. • No quantitative logging has occurred • All core has been photographed using high resolution digital photography. • Data logged includes lithology, alteration, mineralisation, structural geology, veining, recovery, and RQD. • Total length of drilling at the Johnny Lee Deposit is 84,820 m.

Criteria	JORC Code explanation	Commentary
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Sampling for analytical testing has been performed on diamond drill core either by splitting of core on historical drilling (pre-2010) or by half-core sawing (2010 to present). • Details of sample preparation and analyses prior to 2010 are not available. Analyses of samples from six twinned holes has confirmed the validity of the historical data. • All samples subsequent to 2010 were prepared and analysed at ALS Reno, USA or ALS Vancouver, Canada. • The samples were dried for a minimum of eight hours at 100°C. The samples were then coarse-crushed to 70% minus 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% minus 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% minus 75 µm 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 <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 at ALS-Reno , 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. • At ALS Reno, a duplicate 1,000 g fine-crush split was created for selected samples (Laboratory Duplicate) and pulverized to 85% minus 75 µm. ALS Reno was also instructed to retain all analytical sample pulp residues such that a certain proportion could be re-analyzed at a different laboratory (Umpire Samples). • Subsequent to 2010, coarse duplicates were inserted into the sample sequence to monitor potential laboratory contamination during sample preparation. • It is the opinion of the Competent Person that sample interval size is acceptable based on mean copper grade and thresholds used for

Criteria	JORC Code explanation	Commentary
		modeling of mineralised zones.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• 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 base metal 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). • 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-analysed for the over-limit elements in an ore grade level ICP-AES circuit. • 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. • 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 re-analysed for the over-limit elements in an ore grade level ICP-AES circuit. • Sampling, preparation, and analyses for copper are considered appropriate for evaluation of the Johnny Lee Deposit. • Four-acid digestion coupled with ICP-AES provides robust analyses suitable for assessment of mineralisation. • The company utilises an acceptable QA/QC program which includes use of certified reference material (CRM) standards, blanks, and duplicates along with umpire samples at a second independent laboratory. • QA/QC results indicate an acceptable level of accuracy and precision for copper analyses.

Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Significant intercepts of mineralisation have been confirmed over multiple drilling campaigns based on preliminary models. • Six twinned holes have been completed at the Johnny Lee Deposit. • No adjustments to assay data have been required. • Prior to the 2018 program, all logging was conducted using graphic logging sheets. The information recorded included: depth, colour, lithology, mineralogy, oxidation, grain size, texture, sedimentary structures, alteration, mineralization, and structure. • In the 2018/19 drill programs, 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 modelling. • A Structured Query Language (SQL) database is used 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. • Assay laboratory files are electronically supplied to the data base administrator in .sif and text file format. The assay data is loaded into the database by the DBA. Project 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
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Drillhole collars were pegged using either a handheld Global Positioning System (GPS) or a Real-Time Kinetic (RTK) GPS instrument. Prior to the 2018 drill program, drill-rig alignment was completed using a sighting compass and inclinometer. For the 2019 Phase 2 program, a Reflex TN14 Gyrocompass™, north-seeking gyroscopic alignment tool was used to ensure accurate azimuth and dip alignment.

Criteria	JORC Code explanation	Commentary
		• Upon completion of drillholes, the collars were accurately surveyed by a registered surveyor from WWC Engineering of Helena, Montana, USA 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. • Prior to 2014 downhole surveying was completed using either single-shot downhole cameras or single-shot electro-magnetic downhole survey instruments. • For the 2014 and 2015 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 m 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 • The Black Butte Copper Project uses the North American datum of 1983 (NAD83) – universal transverse Mercator (UTM), zone 12 North coordinate system. • Site topography was obtained from a LiDAR survey flown in October 2012 by MT LiDAR of Kalispell, Montana, USA. Surface resolution is less than 1 m.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• It is the opinion of the Competent Person that the drill spacing of the Johnny Lee Deposit and continuity of mineralisation is, in certain areas, adequate to support a Mineral Resource estimate. • Using a cut-off grade that accounts for operational costs and an estimate of metallurgical recovery, a Mineral Resource estimate has been undertaken for the Johnny Lee deposit that classifies the mineralised zones as Measured, Indicated, or Inferred where there is sufficient drill data and confidence to do so. Where there is insufficient drill data, regardless of grade, a Mineral Resource estimate has not been completed and the mineralisation remains unclassified.

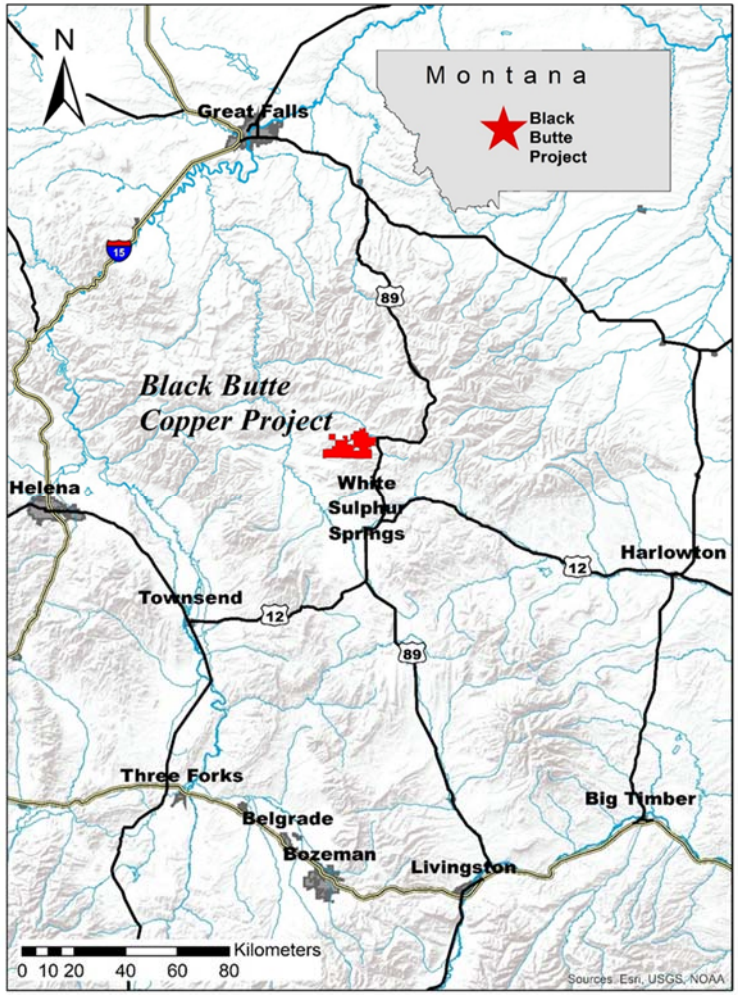
Criteria	JORC Code explanation	Commentary
		• Historic sample intervals range in length from 0.1 to 2.2 m. In recent drilling of 2018 and 2019, sample intervals have been restricted to a range between 0.3 and 1.3 m with the overall sample length. After reviewing compositing at average 1.5 and 2.0 m lengths, it was determined that 1.5 m was most appropriate considering the data and geological model.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Mineralisation at the Johnny Lee deposit is replacement style that is bedding sub-parallel and occurs in sedimentary strata with gentle to moderate dips. Drillholes are steeply inclined such that there is always a high angle between the angle of drilling and the orientation of the mineralization. • The Competent Person has reviewed the various orientations of mineralisation intercepts and concluded that there is not relational bias observed in data.
Sample security	• *The measures taken to ensure sample security.*	• Drill core was collected from the drill rigs daily by staff and delivered directly to a secure core-logging facility, attached to the office in White Sulphur Springs, Montana, USA. After logging, the drill core was stored in a secure warehouse/core-cutting facility, until it was cut and sampled. Access to the logging facility and warehouse/core-cutting facility was restricted to Company geological staff. • Once drill core samples were cut, they were placed in labelled 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 by FedEx Corporation (FedEx). FedEx collected the samples from the 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. ALS Reno has industry standard sample security protocols at all sample preparation and analytical facilities. • The final database housing all geological data is maintained in a secure structured query language (SQL) database housed by the Company with sufficient back-ups in-place. Access to the database is restricted and regulated by specific user permissions to Company

Criteria	JORC Code explanation	Commentary
		staff.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• The drilling, sampling, and logging techniques and data were reviewed and deemed satisfactory by the Competent Person, an independent consultant to the Company.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Black Butte Project – Johnny Lee Deposit is located within Meagher County, Montana, USA, approximately 27 kilometers (km) north of the town of White Sulphur Springs (see figure below).

Criteria	JORC Code explanation	Commentary
		 • The Black Butte Property consists of approximately 3,223.03 hectares of fee simple lands under mineral lease by Sandfire Resources America through Tintina Montana Inc. and 525 unpatented mining claims on U.S. Forest Service (USFS) lands covering approximately 4,036.74 hectares. A summary of mineral lands held on the property is provided in the table below. The project's land holdings are within Sections 19, 29, 30, 31, and 32 of

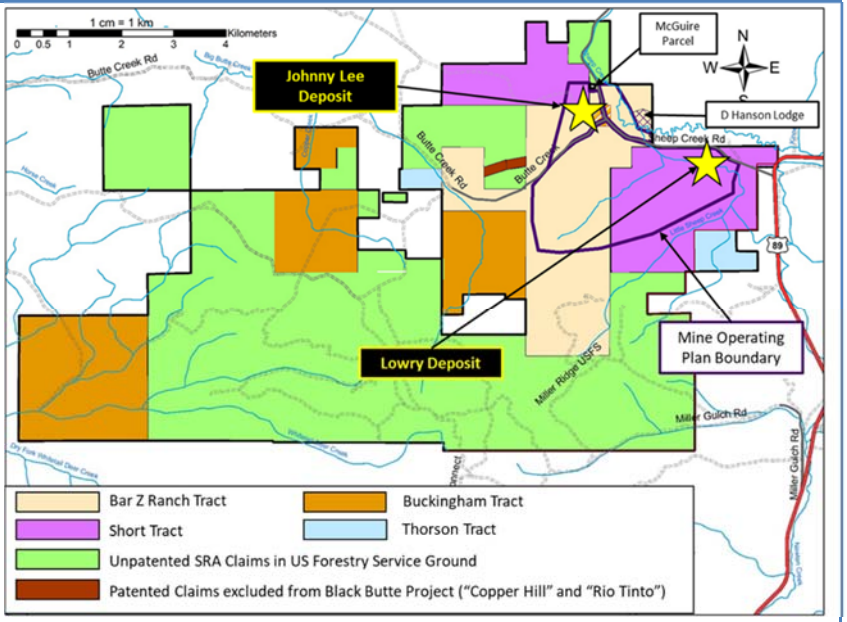
Criteria	JORC Code explanation	Commentary

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 of Township 11 North and Range 6 East, and sections 1 and 12 of Township 11 North and Range 5 East.

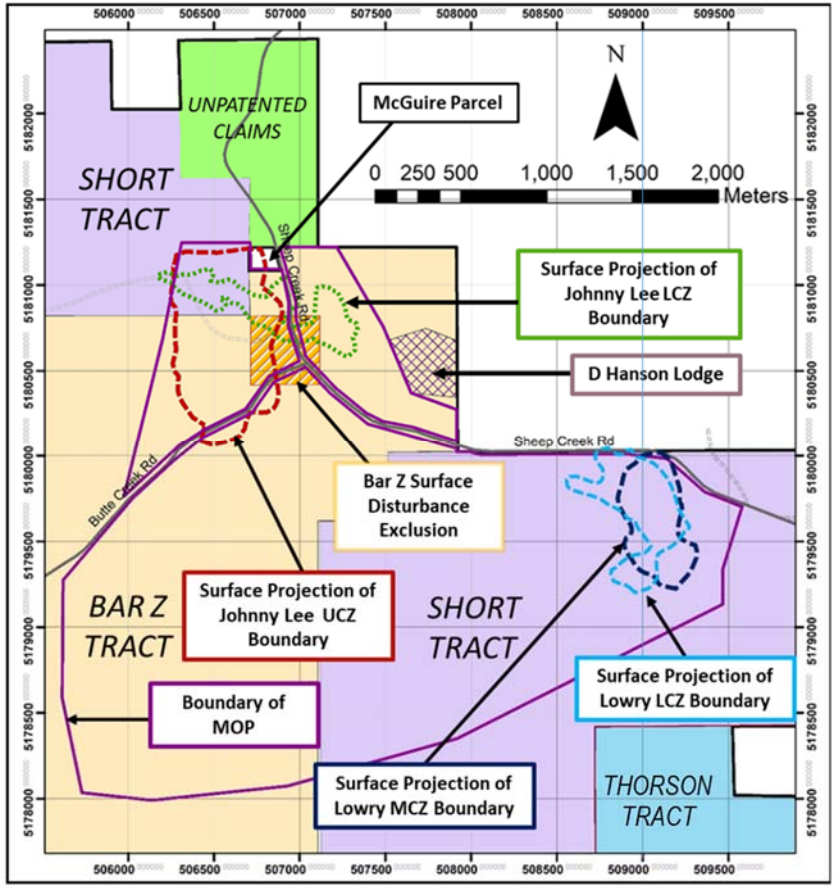
Tract	Surface Estate	Mineral Estate	Date of Agreement	Acres	Hectares
Bar Z Ranch	Hanson	Hanson, Hanson, Dupea	May 2010	2594.28	1049.87
Short, A & J	Short, A & J	Short, A & J (15%) Davis (85%)	November 2014	2120	857.9
Buckingham	Buckingham	Buckingham, Johnston, Bodell	June 2011	2970	1201.9
Thorson Ranch 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

- There are no known impediments to obtaining a licence to operate on the property.

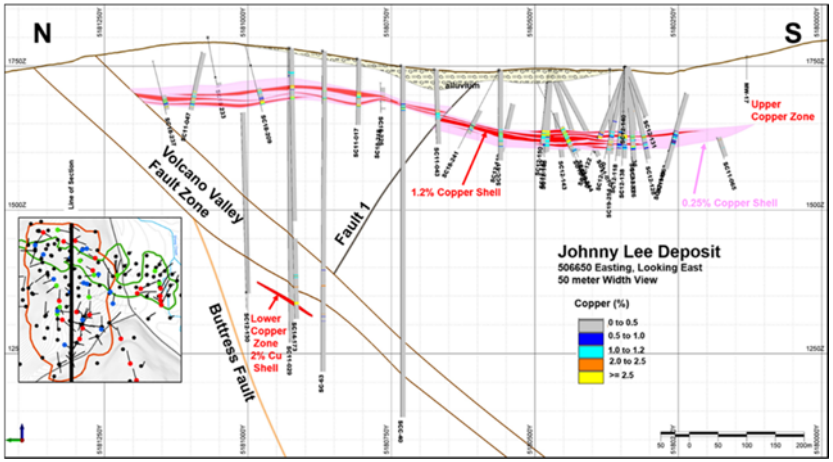
Criteria	JORC Code explanation	Commentary

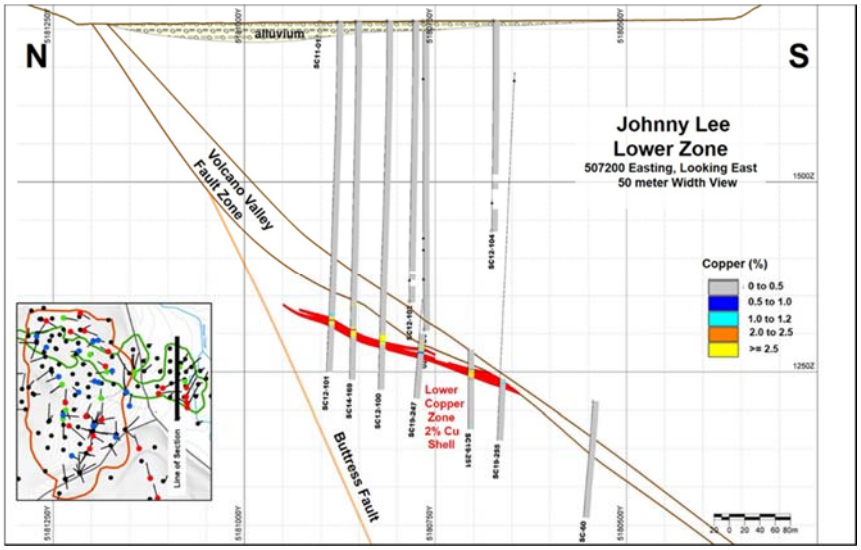


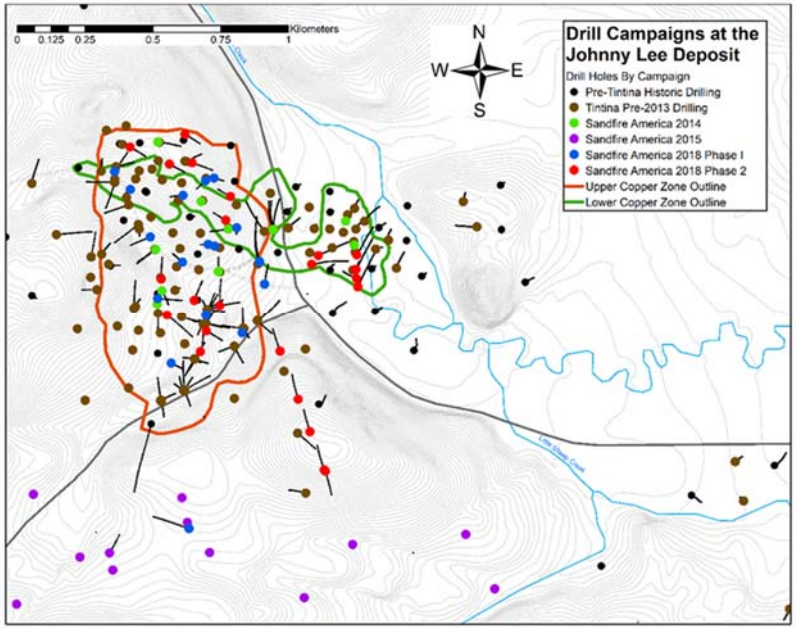
- The Johnny Lee Deposit is located on two tracts of land holding termed the "Bar Z" and "Short" Tracts with a surface use and mineral lease agreement.
- The agreement for the Bar Z tract sets out an advanced royalty payment of US$193,800 per year plus US$75,000.00 per year in surface rent. The mineral interest has a NSR (net smelter royalty) of 5% with an option to buy this down to a 2% NSR for US$5,000,000
- The agreement for the Short Tract sets out an advanced royalty of payment of US$160,802 per year plus US$14,000 per year in surface rent.
- The Johnny Lee deposit underlies portions of the Bar Z and Short Tract that were included within the Mine Operating Plan (MOP) application area.

Criteria	JORC Code explanation	Commentary
		
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Various exploration campaigns have occurred on the Black Butte Copper Project property from 1976 through 1993. Work was conducted by Cominco America, Inc., Utah International Inc., and BHP Billiton Ltd. • Work programs included geological mapping, surface & downhole geochemical sampling, geophysical surveys, and 342 drillholes across the entire property. • Tintina Resources (the predecessor to Sandfire Resources America), conducted exploration activities on the property including compilation

Criteria	JORC Code explanation	Commentary
		and updating of geological maps, soil chemical survey, airborne magnetics and resistivity survey, and a ground-based magnetic survey over the areas that include the Johnny Lee Deposit.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Black Butte deposits feature 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 a Sedex deposits. Whereas Sedex deposits are commonly Pb- and Zn- rich and form on or near the seafloorthe Johnny Lee 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 Johnny Lee deposit shares 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. 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. chalcopyrite). No zonation is evident in the Johnny Lee Deposit but the association of Cu sulphide mineralization with post-lithification veins and hydraulic brecciation supports a partially epigenetic origin. • The Johnny Lee is considered a hybrid deposit exhibiting attributes of a sedimentary exhalative sulphide deposit (SEDEX) and a sediment-hosted stratabound copper deposit (SSC).
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* o *dip and azimuth of the hole*	• The Competent Person has purposely excluded individual drill hole intercepts as the Johnny Lee Deposit contains interpreted, modeled, estimated, and classified Mineral Resources, thus individual drill intercepts are less important to the overall project that the sum of Mineral Resources disclosed.

Criteria	JORC Code explanation	Commentary
	o *down hole length and interception depth* o *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Drilling data has been composited to 1.5 m lengths based on a run-length compositing method bound and broken by 3D modeled wireframes. • Wireframes are constructed based on a combination of structure, lithology, and grade shelling. The primary mineralisation is modeled using a 1.2% Cu cut-off threshold while secondary or “halo” mineralisation is modeled using a 0.25% Cu threshold. • No metal equivalent values are stated for this property as all economics are based on copper. • Capping was applied using Cu grades as follows: Johnny Lee Upper Zone East = 9.11% Cu Johnny Lee Upper Zone West = 8.31% Cu Lower Copper Zone Vein = 17.68% Cu Lower Sulphide Zone = 1.58% Cu
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. ‘down hole length, true width not known’).*	• The mineralisation zones at the Johnny Lee UCZ occur within a gently folded sequence as indicated in the cross-section below:  • Drillholes are inclined such that they intersect mineralisation at high

Criteria	JORC Code explanation	Commentary
		angles. • The mineralisation zones at the Johnny Lee LCZ dip at shallow angles to the south as indicated in the cross-section below:  • Drillholes are inclined such that they intersect mineralisation at high angles

Criteria	JORC Code explanation	Commentary
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• The diagram below shows the outline of the Johnny Lee Upper Copper Zone (UCZ) and Lower Copper Zone (LCZ) along with collars and traces for all drillholes completed to date 
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• The Competent Person has purposely excluded all exploration results as the Johnny Lee Deposit contains Mineral Resources and individual results are not material to the overall deposit.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• 131 drillhole composites from the Johnny Lee deposit were submitted for comprehensive mineragraphy. The results from this study was integrated with metallurgical test work to develop a metallurgical recovery model for the Upper Copper Zone. Mineralogy work has also been completed on the lower copper zone, to support the homogenous results seen from the metallurgical test work completed.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling*	• Additional drilling to convert mineralisation currently classified as Inferred Resource or Unclassified is planned.

Criteria	JORC Code explanation	Commentary
	areas, provided this information is not commercially sensitive.	

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• The Competent Person has performed a validation check on the database used for Mineral Resource reporting. This included a combination of visual, statistical and software validation checks. No issues or errors were found. • The Company has performed multiple validation checks and data verification on recent drilling campaigns. This includes cross-checks of logging to analytical data, verification of collar, survey, and associated data. • The Company has performed validation of all analytical data in reference to the original assay certificates obtained from third-party laboratories for the 2010-2012 drilling campaigns.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The Competent Person visited the Black Butte Copper Project property during November 2018. During the site visit, the CP observed drilling activities, sampling, logging, data entry and toured the core shed, logging facility, and the property.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• The Competent Person's confidence in the geological interpretation of the Johnny Lee Deposit is considered adequate for the estimation, classification, and reporting of Mineral Resources. • Geological modeling was performed by Sandfire Resources America, Inc. personnel in close collaboration with the Competent Person. • Geological modeling was performed using a combination of explicit and implicit modeling techniques based on regional and local geology, understanding of the lithostratigraphic sequence, and aided by analytical data. Multiple iterations of the interpreted geological model were created including use of historic geological models of the deposit. • All modeling was performed in 3D with occasional 2D cross-sectional validation checks performed. • Grade is highly controlled by specific geological horizons and interaction with major structures. The modeled mineralisation envelops were truncated based on supporting data or lack thereof.

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Dimensions</td><td>• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.</td><td>• The Johnny Lee Upper Copper Zone is truncated in the north by the Volcano Valley HW Fault and is transected by Fault 1 which offsets the Upper Copper Zone (UCZ) with 122 m of oblique reverse-dextral displacement. Fault 1 has been used to subdivide the UCZ into Eastern and Western Blocks. The Upper Copper Zone 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). The true width of the Upper Copper Zone in the Western block ranges from 4 to 45 m and the Eastern block from 5 to 37 m.
• The Johnny Lee Lower Copper Zone (LCZ) occurs at depths of 340 to 520 m below surface, strikes approximately east-west and dips at 15° to 30° to the south.
• The LCZ deposit comprises three lenses of mineralization termed the East, Central, and West lenses with dimensions as per the table below:
<table>
<tr><th>LCZ Segment</th><th>Strike Length (m)</th><th>Down Dip Extent (m)</th><th>Thickness (m)</th></tr>
<tr><td>East</td><td>450</td><td>45 to 250</td><td>1 to 15</td></tr>
<tr><td>Central</td><td>360</td><td>35 to 270</td><td>1 to 8</td></tr>
<tr><td>West</td><td>350</td><td>45 to 200</td><td>1 to 6</td></tr>
</table>
</td></tr>
<tr><td>Estimation and modelling techniques</td><td>• The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.
• The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.
• The assumptions made regarding recovery of by-products.
• Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).
• In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.
• Any assumptions behind modelling of selective mining units.</td><td>• Copper and Specific Gravity (SG) were estimated into the modeled 3D mineralised wireframes for the high-grade (> 1.2% Cu) and lower grade sulphide zone at the Johnny Lee Upper Copper Zone (UCZ) and Lower Copper Zone (LCZ).
• Estimation is constrained by hard-boundary domains based on 3D modeled wireframes for the UCZ East, UCZ West, LCZ, and lower-grade “halo” zones.
• Statistical and geostatistical analyses were performed on each zone with an emphasis on copper.
• Analytical data was composited using a run-length composite method at 1.5 m bounded and broken by mineralisation volumes.
• A high-yield capping analysis was performed on copper by zone. Caps are 9.11% Cu for UCZ eastern “vein”, 8.31% Cu for UCZ western “vein”, 17.68% Cu for the LCZ, and 1.58% Cu in the lower-grade zone within the lower sulphide-rich zone.
• Estimation was performed using Ordinary Kriging (OK) in a multiple</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
	• *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	pass neighbourhood for copper and SG. • Due to the undulating nature of mineralisation at the Johnny Lee Deposit, a variable anisotropic search neighbourhood was utilised to optimise estimation. • Block dimensions are parent blocks at 30m x 30m x 5m with sub-blocking to 5m x 5m x 1m. It is the opinion of the Competent Person that block size is appropriate for the data spacing observed at the Johnny Lee Deposit. • No by- or co-products are considered economically viable at this time. Copper is the focus of the Johnny Lee Deposit. • The estimated resource block model was validated against composited data and a nearest neighbour block estimate for copper using visual validation, summary statistical comparisons, and swath plots. The results of the validation show no material biases and it is the opinion of the Competent Person that the model provides adequate representation of drilling data appropriate in block volumes.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• All Mineral Resource tonnes are estimated and reported on a dry basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• To demonstrate reasonable prospects for eventual economic extraction, a cut-off grade of 1.0% Cu was applied. • The cut-off grade was determined based on a variable copper recovery for the Upper Copper Zone (68.2 – 87.9%) and a 94% Recovery for the Lower Copper Zone. • Long-term market average pricing for copper of US$3.20 per pound, and operational costs of US$71 per tonne.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• The assumed mining method is underground drift and fill mining. • No considerations to dilution or a minimum mining width was applied for Mineral Resources purposes.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction*	• Historical Metallurgical studies of the Johnny Lee Upper Copper Zone have indicated that metallurgical Cu Recovery is highly variable • For the purpose of this study, 131 drillhole composites were used for

Criteria	JORC Code explanation	Commentary
	to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	systematic mineragraphy. • Comprehensive metallurgical testing was undertaken on 21 drillhole composites and the results were used to derive a regression-based Cu recovery algorithm using mineragraphy metrics • The Cu Recovery estimation for the Upper Copper Zone is incorporated in the resource block model and ranges from 68.2 – 87.9%. • Metallurgical test work for the Johnny Lee Lower Copper zone has shown relatively consistent Cu recoveries that average 94%, which has been applied for the Mineral Resource estimate.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• Tailings materials generated over the LOM from the on-site process plant will be mixed with binder/cement and either be pumped to the double-lined Cemented Tailings Storage Facility (CTF) for permanent storage on surface or utilized as underground paste backfill during mining operations and mine closure. • Waste rock sourced from the underground mine workings will ultimately be transferred to the CTF for permanent storage where it along with the cemented tailings paste will ultimately be covered with excess bedrock, HDPE liner, and soils in order to minimize any surface water seepage directly into the waste materials and that will allow the surface to be used for beneficial use at the end of the mine life. • Collection of all water pumped out of the mine during construction, operations, and mine closure will be stored in various double-lined ponds. Each of these facilities include the additional protection of constant leak detection systems. • Water will be treated through a two stage Reverse Osmosis (RO) water treatment system capable of treating water to non-degradation standards for groundwater before being ultimately reintroduced (discharged) to the groundwater through the alluvial

Criteria	JORC Code explanation	Commentary
		underground infiltration gallery. Brine reject from the WTP operations will either be stored in the brine cell of the CWP, added to the tailings thickener, or ultimately hauled off site to an approved disposal facility. • In mine closure the planned installation of plugs in declines and shafts will segment the mine at certain locations that will make the planned underground pumping and rinsing more efficient and result in the environmental benefit of reducing flow of contact water through open tunnels and shafts. The Mine Operating Permit satisfies the substantive requirements of the Montana Metal Mine Reclamation Act.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc.), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• Bulk density was measured using the immersion method from diamond drill core. • All SG data was tested by Company staff at the core logging facility. • Composited SG data was capped at an upper limit of 5.0. • SG is estimated in the Johnny Lee Deposit resource block model using Ordinary Kriging (OK). • SG was assigned to waste rock units based on mean values tested.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• Considerations for the Mineral Resource classification at the Johnny Lee Deposit includes deposit geological knowledge, continuity of copper grade within mineralised volumes, the thickness of mineralised zones, confidence in the raw drilling and analytical data, spatial continuity of copper based on variography studies, estimationg quality variables including Kriging Efficiency and Slope of Regression, mean distance to samples, and the estimation pass number. • Based on the above inputs, the Competent Person has assigned a combination of Measured, Indicated, and Inferred Mineral Resources at the Johnny Lee Deposit. • The Competent Person is satisfied that the reported Mineral Resource classification reflects the relevant factors of the deposit.

Criteria	JORC Code explanation	Commentary
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• All stages of the Mineral Resource estimation and classification have undergone reviews by the Competent Person as an independent consultant, and reviews by geological personal within Sandfire Resources America, Inc.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The relevant accuracy and confidence in Mineral Resources reflects the current level of study for the Johnny Lee Deposit at Feasibility-level.

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• The ore reserve is based on the Johnny Lee Mineral Resource Reported on October 25th 2019. • Mineral Resources are reported inclusive of Ore Reserves
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The CP undertook a site visit to the project site in March 2019. • The site visit was to inspect site infrastructure and assess underground core samples to ensure mining and geotechnical parameters were practical.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level*	• The reserves are based on a feasibility study that has determined mining of the ore reserves to be economically viable with the consideration of all modifying factors.

Criteria	JORC Code explanation	Commentary
	has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• A Net Smelter Return was calculated for all blocks to take into account the varying metallurgical recovery and arsenic contents of each block. • The NSR was calculated using a US$3.10/lb Cu Price. • A cut off value of $70/t was used to determine whether or not a stope was economic. • In addition an incremental cut off value of $38/t was used for development that has to be mined to gain access to fully costed economic material.
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	• Underground Ore Reserves have been estimated by generating detailed mining shapes for all areas that contain Measured or Indicated Mineral Resources as well as access development. Internal stope dilution has been designed into the mining shapes and interrogated. External stope dilution and mining recovery factors have been applied post geological block model interrogation to generate final mining diluted and recovered ore tonnage and grade. • Primary mining method employed is cut and fill and drift and fill. • All fill will be cemented paste fill. • The selected mining methods are considered appropriate for the nature of the defined Mineral Resources. • Geotechnical parameters were derived from diamond drill core and application of empirical methods to estimate stable stope size and appropriate ground support. • The Mineral Resource model created to estimate the Mineral Resources as at the 25th October 2019 was used as the basis for stope and development design. The model was modified by zeroing the grade of all blocks classified as Inferred and the calculation of an NSR value for each block. No other modifications were made. • External stope dilution is applied to stopes on an individual basis and is based on mining method and whether there are stopes surrounding. This ranges from 5% to 15% with a weighted average of 11%. External dilution grade varied by zone and

Criteria	JORC Code explanation	Commentary
		location within the zone to ensure that only stopes on the boundary of the zone have graded dilution applied. External Dilution grade varied from 0%-0.25%. • Mining Recovery is expected to be 97.5%. • A minimum mining width of 4.0 m is used based on the nature of the deposit and the equipment employed. • All material classified as Inferred was given a grade of 0% Cu to ensure that no metal is captured from blocks with a lower geological confidence. • The Black Butte Deposit is a greenfield site with no major onsite infrastructure. • All surface infrastructure as well as an underground decline and vent rises will be required to be constructed to mine the deposit.
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• Copper will be recovered by a standard Crushing, Grinding Froth Flotation Process. • Significant recent metallurgical testwork has been performed on the Johnny Lee deposit to a Feasibility Study level. Testwork has shown consistent high copper recoveries from the LCZ while the copper recoveries from the UCZ are generally lower than the LCZ and more variable. • Systematic mineragraphy, correlated with metallurgical test results, has been used to develop a copper recovery block model for the UCZ to create a recoverable copper grade field in the block model. • Arsenic is the only potential deleterious element that is expected to be present in the saleable copper concentrate to be transported off site. This has been accounted for in scheduling to keep the arsenic head grade below penalty rates. It was also accounted for in the economic model when concentration is expected to be above the penalty.
Environmen-tal	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	• All required environmental studies and permits are in place for water management, waste rock and tailings disposal. Water Right modifications have received positive Preliminary Determinations and objections are being reviewed by the State of Montana prior to Final Determinations.
Infrastructure	• *The existence of appropriate infrastructure: availability of land for*	• The Black Butte Copper Deposit is a greenfield deposit with no onsite

Criteria	JORC Code explanation	Commentary
	plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.	infrastructure. • Land access has been secured by Sandfire Resources Americas. • There are no expected concerns with infrastructure construction.
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	• The cost of mine and plant construction has been determined to FS level of accuracy. • The FS capital and operating mining costs are based on detailed quotes from suppliers and mining contractors gathered in Q2 and Q3 2019, supported by first principle estimations and data based on similar operations. • Road and sea transport charges for concentrate are based on concentrate transport studies prepared by a third party. • Treatment and refining charges are included in the payability factors determined from industry standard factors appropriate for the project.
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	• Commodity prices are based on consensus forecasts. • The Cu price used in the reserve estimation was US $3.10/lb. • Payability and deduction terms were based on standard copper concentrate marketing terms and are appropriate for the project.
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	• The project will be a producer of Copper Concentrate. • Pricing is fundamentally on value of contained metals. The price of copper being set based on the LME which is a mature, well established and publically traded exchange. Sandfire Resources America relies upon independent expert publications (CRU, Wood Mac, Metal Bulletin) and other sources (bank reports, trader reports, conferences, other trade publications) in forming a view about future demand and supply and the likely effects of this on both metal prices and concentrate prices.
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• The economic model was calculated using $US3.20/lb. Cu price and 5% discount rate. • The NPV is most sensitive to changes in Cu selling price, Cu head grade and Metallurgical Recovery.
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	• The CP is unaware of any material concerns with Black Butte Copper's License to operate.
Other	• *To the extent relevant, the impact of the following on the project*	• Sandfire Resources Americas has advised that Black Butte

Criteria	JORC Code explanation	Commentary
	and/or on the estimation and classification of the Ore Reserves: • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	Copper is currently compliant with all legal and regulatory requirements. • There is currently a legal challenge to the Record of Decision from the Montana DEQ. • Water Right modifications have received positive Preliminary Determinations and objections are being reviewed by the State of Montana prior to Final Determinations.
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	• Underground Ore Reserves have been derived from a mine plan that is based on extracting the 25th October 2019 Mineral Resources. • Underground Ore Reserves are initially derived from development and stope designs that are evaluated against Mineral Resources. Designs do not inherently honour mineral resource classification boundaries therefore designs contain multiple mineral resource classification material types. • Proved Ore Reserves have been derived from designs that greater than 50% of the Material was classified as Measured. Probable Ore Reserves have been derived from designs that contain greater than 50% Indicated Material. • Proved Ore reserves contain approximately 3% Indicated Mineral Resources and Probable Ore Reserves contain approximately 1% Measured Mineral Resources. • The underground Ore Reserve classification appropriately reflects the competent person's view of the deposit.
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	• All stages of the Mineral Reserve estimation and classification have undergone reviews by the competent person as an independent consultant.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and*	• The project is considered robust with the underground Ore Reserve average copper grade of 2.6% Cu. • There has been an appropriate level of consideration given to all modifying factors, which are established from an operating mine, to support the declaration and classification of underground Ore Reserves. • No statistical or geostatistical procedures were carried out to

Criteria	JORC Code explanation	Commentary
	confidence of the estimate. • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	quantify the accuracy of the underground Ore Reserve. • Underground Ore Reserve tonnes are split 78% UCZ and 23 % LCZ. • Approximately 23% of the underground Ore Reserves tonnes are classified as Proved with the remaining 77% classified as Probable.

JORC Code, 2012 Edition – Table 1 for the Lowry Deposit of the Black Butte Copper Project of White Sulphur Springs, Montana, USA

Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• Sampling for analytical testing has been performed on diamond drill core either by splitting of core on historical drilling (pre-2010) or by half-core sawing (2010 to present). • Sampling intervals are nominally 1.5 m in length with half-core prepared and analyzed by ALS Laboratories of Reno, Nevada, USA. Samples were weighed and crushed to 70% passing 2mm and then a riffle split 250g-split pulverized to 85%, <75*um.* A 0.25g charge was subjected to four acid digestion and analyzed using ICP-AES. A 30g aliquot was assayed for gold by fire assay with an atomic absorption spectroscopy (AAS) finish. • All sampling has been supervised by professional geologists. • A quality assurance program has been in-place since initial exploration on the Lowry Deposit that includes regular addition of quality control samples such as blanks, standards, and duplicates. The Competent Person notes that raw QA/QC data collected prior to 2010 is not available, therefore the presence of historic drilling has been taken into account for risk assessment and Mineral Resource classification purposes. • Logging for lithology, alteration, mineralisation, and structure has been performed on all drill core by professional geologists. Based on mineralisation logging, samples are collected within each mineralised zone, identified by visual logging of chalcopyrite content, ensuring at least 9 m of material was sampled above and below the logged mineralised interval.
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	• All drilling is either diamond drill core from surface or diamond core tail of a rock bit hole to reach deeper mineralisation. • All core is either HQ- or NQ-sized diameter. • No oriented core has been performed.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure*	• Diamond drill core recovery and rock quality designation (RQD) were logged by geologists. • In general, core recovery is considered good to excellent (mean of

Criteria	JORC Code explanation	Commentary
	representative nature of the samples. • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	88.5%) with lower recoveries (< 50%) observed in zones of high faulting. • Drillers, in collaboration with Company geologists, take measures such as reducing torque and penetration rates of drilling when targeting zones of known faulting. • It is the opinion of the Competent Person that core recovery loss is not material to overall grade modeling and estimation.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.* • *The total length and percentage of the relevant intersections logged.*	• All diamond drill core at the Lowry Deposit has been geologically logged by geologists. • No quantitative logging has occurred. • Data logged includes lithology, alteration, mineralisation, major structures, recovery, and RQD. • Total length of drilling at the Lowry Deposit is 29,724 m.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Sampling for analytical testing has been performed on diamond drill core either by splitting of core on historical drilling (pre-2010) or by half-core sawing (2010 to present). • Sample drying and preparation was conducted by an independent, reputable laboratory (ALS) using four-acid digestion and analyses by inductively coupled plasma – atomic emission spectrometry (ICP-AES), fire assay (FA), and atomic absorption spectrometry (AAS). • ALS performed internal laboratory duplicates for quality control on sample preparation. • Umpire samples were successfully completed at American Assay Laboratories (AAL) of Sparks, Nevada, USA with no significant deviations. • Coarse duplicates were created by ALS for duplicate analytical testing as part of the broader QA/QC program. Results demonstrated acceptable repeatability. • It is the opinion of the Competent Person that sample interval size is acceptable based on mean copper grade and thresholds used for modeling of mineralised zones.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors*	• Sampling, preparation, and analyses for copper are considered appropriate for evaluation of the Lowry Deposit. • Four-acid digestion coupled with ICP-AES provides robust analyses suitable for assessment of mineralisation. • The company utilises an acceptable QA/QC program which includes use of certified reference material (CRM) standards, blanks, and

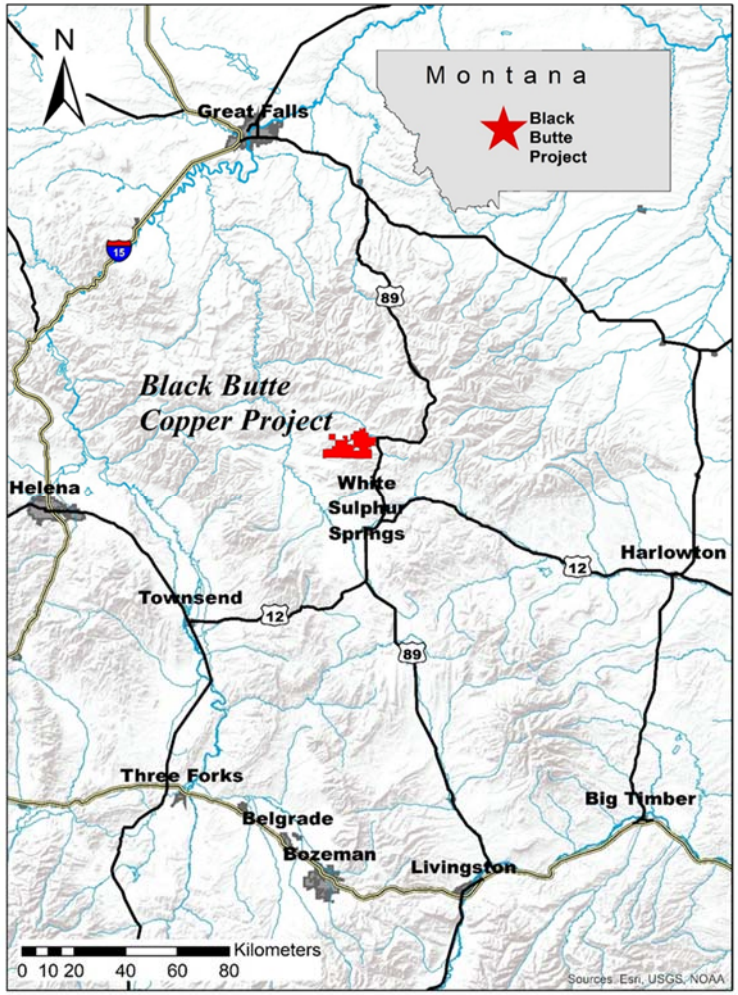
Criteria	JORC Code explanation	Commentary
	applied and their derivation, etc. • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	duplicates along with umpire samples at a second independent laboratory. • QA/QC results indicate an acceptable level of accuracy and precision for copper analyses.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Significant intercepts of mineralisation have been confirmed over multiple drilling campaigns based on preliminary models. • Comparisons of historic (pre-2010) and recent (2010 to current) sampling have demonstrated acceptable comparisons of grade and thickness of mineralisation within the Lowry Deposit. • No twin drilling has been performed at the Lowry Deposit. • Hole SC087 was wedged with minor deviation that provided verification of logging and mineralisation between the two drill holes. • No adjustments to assay data have been required.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Drill collars are surveyed by an independent survey contractor (WWC Engineering of Helena, Montana, USA) using a RTK-GPS survey instrument that determines collar co-ordinates to sub0.2m accuracy. • Downhole survey was completed on all holes using an electronic survey instrument ~~REFLEX tool~~ at approximately 30 m intervals. • The Black Butte Copper Project uses the North American datum of 1983 (NAD83) – universal transverse Mercator (UTM), zone 12 North coordinate system. • Site topography was obtained from a LiDAR survey flown in October 2012 by MT LiDAR of Kalispell, Montana, USA. Surface resolution is less than 1 m.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Data spacing at the Lowry Deposit Middle Copper Zone (LMCZ) ranges from 40 m to 100 m with the Lowry Deposit Lower Copper Zone (LLCZ) ranging from 60 m to 200 m spacing. • It is the opinion of the Competent Person that the current spacing is sufficient for the classification of Mineral Resources. • Samples have been composited using a run-length 1.5 m compositing method bound and broken by the modeled mineralised zones.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a*	• All drilling is collared from surface and angled with the aim of intercepting mineralisation zones at perpendicular angles, when possible. Due to local variations in strike and dip of mineralisation, oblique, but not perpendicular, intersections were obtained in some drillholes.

Criteria	JORC Code explanation	Commentary
	sampling bias, this should be assessed and reported if material.	• The Competent Person has reviewed the various orientations of mineralisation intercepts and concluded that there is not relational bias observed in data.
Sample security	• *The measures taken to ensure sample security.*	• All drill core is collected from the drill rig by Company geologists and brought to a centralized core logging facility. • The logging facility is access-controlled and secure, located in the town of White Sulphur Springs, Montana, USA. • After logging and sample cutting, sample bags are collected at the Company facility by a third-party courier and delivered directly to the independent analytical laboratory. • The final database housing all geological data is maintained in a secure structured query language (SQL) database housed by the Company with sufficient back-ups in-place. Access to the database is restricted and regulated by specific user permissions to Company staff.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• The drilling, sampling, and logging techniques and data were reviewed and deemed satisfactory by the Competent Person, an independent consultant to the Company.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Black Butte Project – Lowry Deposit is located within Meagher County, Montana, USA, approximately 27 kilometers (km) north of the town of White Sulphur Springs (see figure below).

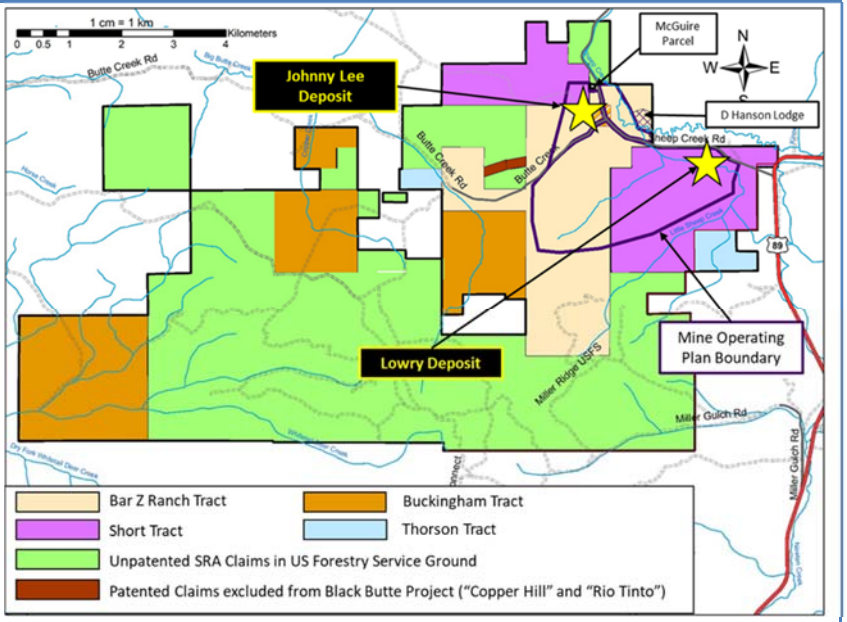
Criteria	JORC Code explanation	Commentary
		 • The Black Butte Property consists of approximately 3,223.03 hectares of fee simple lands under mineral lease by Sandfire Resources America through Tintina Montana Inc. and 525 unpatented mining claims on U.S. Forest Service (USFS) lands covering approximately 4,036.74 hectares. A summary of mineral lands held on the property is provided in the table below. The project's land holdings are within Sections 19, 29, 30, 31, and 32 of

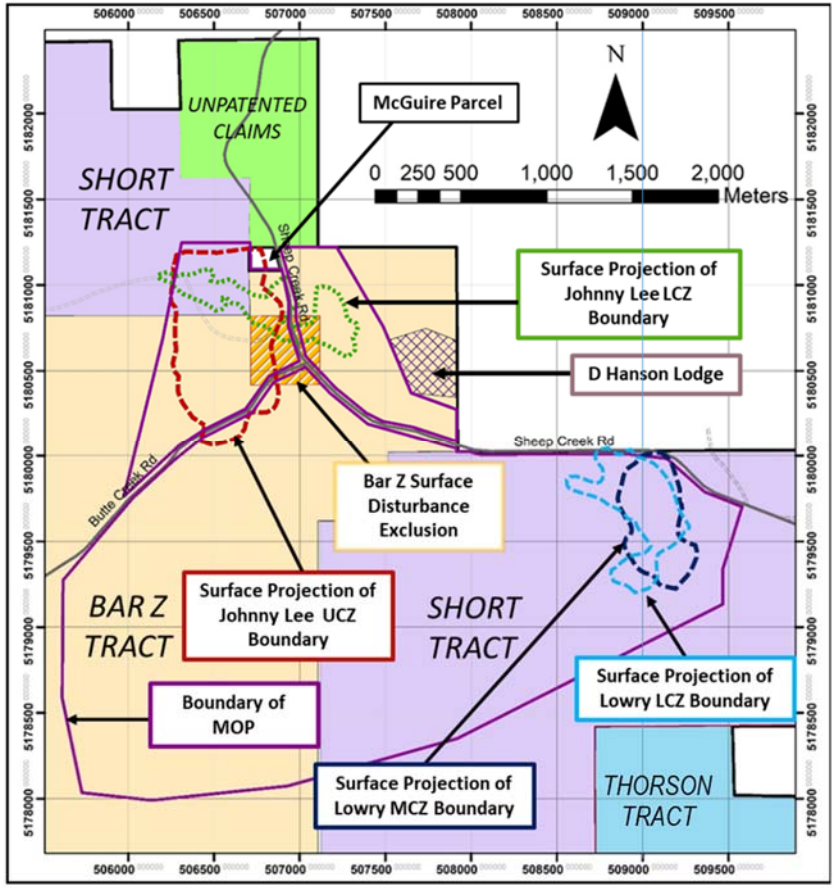
Criteria	JORC Code explanation	Commentary

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 of Township 11 North and Range 6 East, and sections 1 and 12 of Township 11 North and Range 5 East.

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

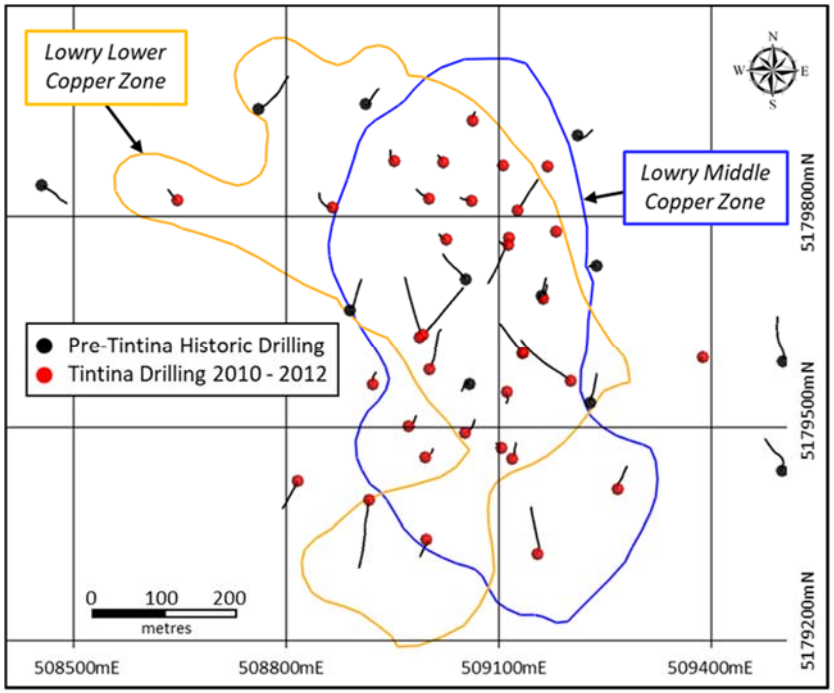
- There are no known impediments to obtaining a licence to operate on the property.

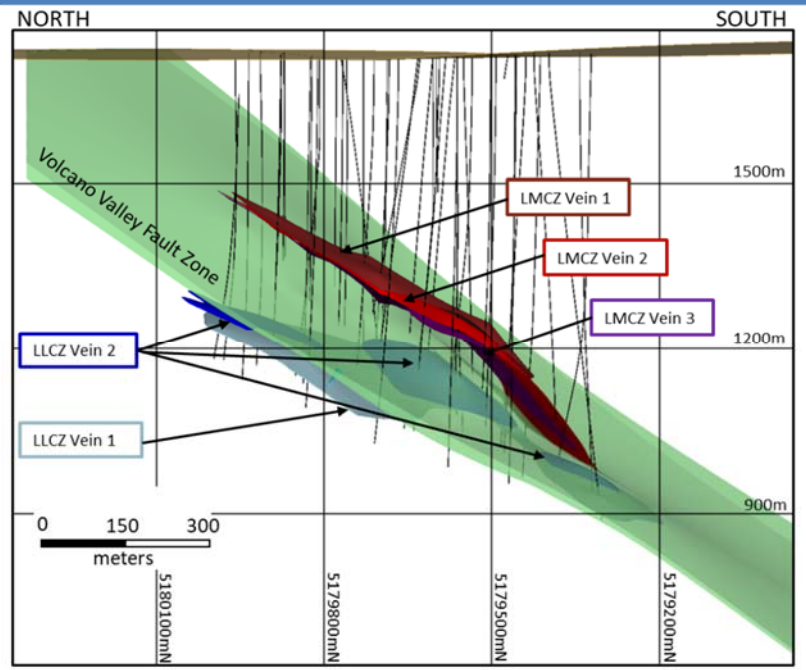
Criteria	JORC Code explanation	Commentary
		 • The Lowry Deposit is located on the land holding termed "Short Tract" with a surface use and mineral lease agreement. The agreement sets out an advanced royalty payment of US$24,120.30 per year plus US$10,000.00 per year in surface rent. • Summary landholdings for the entire Black Butte Copper project property in relation to the mine operating permit (MOP) are provided in the figure below. The Lowry Deposit is shown in the middle right of the figure.

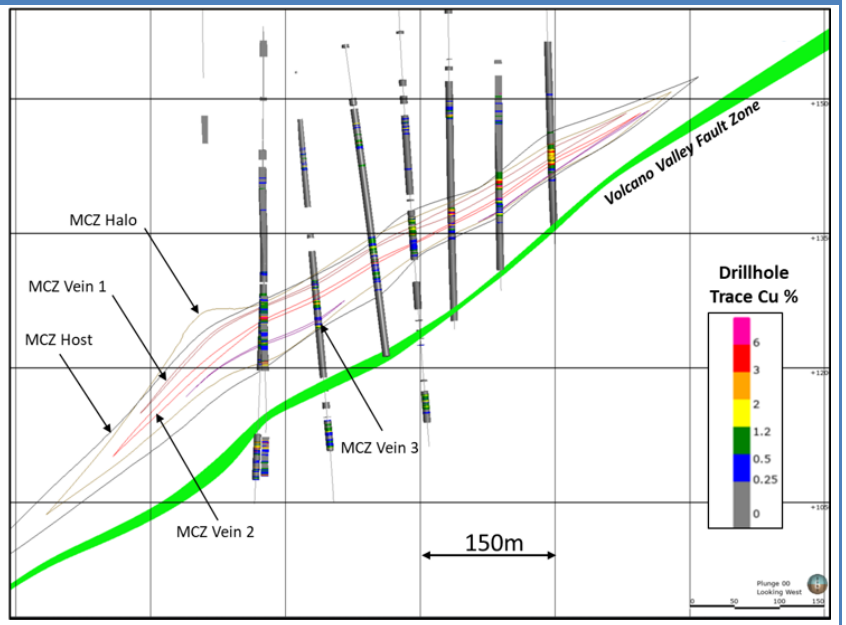
Criteria	JORC Code explanation	Commentary
		
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Various exploration campaigns have occurred on the Black Butte Copper Project property from 1976 through 1993. Work was conducted by Cominco America, Inc., Utah International Inc., and BHP Billiton Ltd. • Work programs included geological mapping, surface & downhole geochemical sampling, geophysical surveys, and 64 drill holes across the entire property. • Tintina Resources (the predecessor to Sandfire Resources America), conducted exploration activities on the property including compilation

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td></td><td>and updating of geological maps, soil chemical survey, airborne magnetics and resistivity survey, and a ground-based magnetic survey over the areas that include the Lowry Deposit.</td></tr>
<tr><td>Geology</td><td>• Deposit type, geological setting and style of mineralisation.</td><td>• The Lowry Deposit is considered a hybrid deposit exhibiting attributes of a sedimentary exhalative sulphide deposit (SEDEX) and a sediment-hosted stratabound copper deposit (SSC).
• Copper mineralisation at the Lowry Deposit is hosted in pyrite-rich sulphide lenses within marine sediments deposited in a continental rift setting.
• The deposit is enriched in copper, cobalt, and silver but lacks significant lead and zinc mineralisation common to SEDEX deposits.
• The current focus of the project is on copper mineralisation.
• Mineralisation of economic significance occurs as lenses within several discrete zones termed the Lowry Upper Copper Zone (LUCZ), Lowry Middle Copper Zone (LMCZ), and the Lowry Lower Copper Zone (LLCZ).</td></tr>
<tr><td>Drill hole Information</td><td>• A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:
o easting and northing of the drill hole collar
o elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar
o dip and azimuth of the hole
o down hole length and interception depth
o hole length.
• If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</td><td>• The Lowry Deposit includes 51 diamond drill holes.
• A total of 29,723m has been drilled on the deposit, with the average hole depth of 583m.
• All drilling has been completed from surface at various inclinations and bearing across the deposit.
• The Competent Person has purposely excluded individual drillhole intercepts as the Lowry Deposit contains interpreted, modeled, estimated, and classified Mineral Resources, thus individual drill intercepts are less important to the overall project that the sum of Mineral Resources disclosed.
• A summary of drilling is provided in the table below.
<table>
<tr><th rowspan="2">Year</th><th colspan="2">Diamond drill holes</th><th rowspan="2">Company</th></tr>
<tr><th># holes</th><th>meters</th></tr>
<tr><td>1978-1993</td><td>16</td><td>10,194</td><td>Cominco/Cominco-BHP JV</td></tr>
<tr><td>2010</td><td>1</td><td>580</td><td>Tintina Resources</td></tr>
<tr><td>2011</td><td>17</td><td>10,861</td><td>Tintina Resources</td></tr>
<tr><td>2012</td><td>17</td><td>8,089</td><td>Tintina Resources</td></tr>
</table>
</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Drilling data has been composited to 1.5 m lengths based on a run-length compositing method bound and broken by 3D modeled wireframes. • Wireframes are constructed based on a combination of structure, lithology, and grade shelling. The primary mineralisation is modeled using a 1.2% Cu cut-off threshold while secondary or "halo" mineralisation is modeled using a 0.25% Cu threshold. • No metal equivalent values are stated for this property as all economics are based on copper. • A high-yield capping analysis was performed with an upper cap of 8.7% Cu applied.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• The mineralisation zones at the Lowry Deposit are represented within moderately dipping lenses with localised undulations. • Dips of the mineralised zones average ~ 40-degree ~~dips~~. • Drillholes were inclined to intersect mineralisation approximately perpendicular to mineralisation trends. Local variations in strike and dip result in non-perpendicular intersections in some locations. All zones of mineralisation have been modelled in 3D.

Criteria	JORC Code explanation	Commentary
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• Drill hole collar locations in relation to approximate mineralisation boundaries (> 1.2% Cu) for the Lowry Deposit are shown in the figure below.  • An east-looking cross-section is provided below showing the general trend of modeled mineralisation at the Lowry Deposit with drill hole traces and the Volcano Valley Fault Zone.

Criteria	JORC Code explanation	Commentary
		 • A cross-section of the LMCZ looking east:

Criteria	JORC Code explanation	Commentary
		
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• The Competent Person has purposely excluded all exploration results as the Lowry Deposit contains Mineral Resources and individual results are not material to the overall deposit.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Metallurgical testing in the form of comprehensive mineralogical analyses have been completed on samples from the Lowry Deposit. Testing results are similar to those obtained at the nearby Johnny Lee Deposit, also located on the Black Butte Copper Project property. Use of regression analysis has resulted in an expected 86% average copper recovery for the Lowry Deposit.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Additional work is in the planning stages for the Lowry Deposit. This includes additional infill diamond drill core to improve data spacing across all three identified mineralisation domains, additional metallurgical analysis, with updated modeling and estimation.

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• The Competent Person has performed a validation check on the database used for Mineral Resource reporting. This included a combination of visual, statistical and software validation checks. No issues or errors were found. • The Company has performed multiple validation checks and data verification on recent drilling campaigns. This includes cross-checks of logging to analytical data, verification of collar, survey, and associated data. • The Company has performed validation of all analytical data in reference to the original assay certificates obtained from third-party laboratories for the 2010-2012 drilling campaigns.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The Competent Person visited the Black Butte Copper Project property during November 2018. During the site visit, the CP observed drilling activities, sampling, logging, data entry and toured the core shed, logging facility, and the property.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• The Competent Person's confidence in the geological interpretation of the Lowry Deposit is considered adequate for the estimation, classification, and reporting of Mineral Resources. • Geological modeling was performed by Sandfire Resources America, Inc. personnel in close collaboration with the Competent Person. • Geological modeling was performed using a combination of explicit and implicit modeling techniques based on regional and local geology, understanding of the lithostratigraphic sequence, and aided by analytical data. Multiple iterations of the interpreted geological model were created including use of historic geological models of the deposit. • All modeling was performed in 3D with occasional 2D cross-sectional validation checks performed. • Grade is highly controlled by specific geological horizons and interaction with major structures. The modeled mineralisation envelops were truncated based on supporting data or lack thereof.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• Modeled mineralisation at the Lowry Deposit extends approximately 700m North to South and up to 875 m West to East. Mineralisation can be locally discontinuous within select lenses of the LMCZ and LLCZ.

Criteria	JORC Code explanation	Commentary
		• High-grade (> 1.2% Cu) mineralisation thickness averages 3-6 m with a broader and lower grade (> 0.25% Cu) “halo” zone extending around the high-grade up to 5m thickness.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• Multiple quality attributes (Cu, Ag, Co, As) and Specific Gravity (SG) were estimated into the modeled 3D mineralised wireframes for the high-grade (> 1.2% Cu) and “halo” zones for the LUCZ, LMCZ, and LLCZ. Only the LMCZ and LLCZ are considered acceptable for reporting of Mineral Resources at this time. • Statistical and geostatistical analyses were performed on all zones with an emphasis on copper. • Analytical data was composited using a run-length composite method at 1.5 m bounded and broken by mineralisation volumes. • A high-yield capping analysis was performed on copper with a top cap of 8.7% Cu applied to all composited data. • Estimation was performed using a combination of Ordinary Kriging (OK) and inverse distance weighting to the second power (IDW2) in a multiple pass neighborhood for copper. SG was estimated using IDW2 and a unique neighborhood by domain. • Block dimensions are parent blocks at 20m x 20m x 5m with sub-blocking to 5m x 5m x 1m. It is the opinion of the Competent Person that block size is appropriate for the variable data spacing observed at the LMCZ and LLCZ. • No by- or co-products are considered economically viable at this time. Copper is the focus of the Lowry Deposit. • The estimated resource block model was validated against composited data and a nearest neighbour block estimate for copper using visual validation, summary statistical comparisons, and swath plots. The results of the validation show no material biases and it is the opinion of the Competent Person that the model provides adequate representation of drilling data appropriate in block volumes.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• All Mineral Resource tonnes are estimated and reported on a dry basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• In order to demonstrate reasonable prospects for eventual economic extraction, a cut-off grade of 1.2% Cu was applied. • The cut-off grade was determined based on 86% copper recovery, long-term market average pricing for copper of US$3.20 per pound, and operational costs of US$71 per tonne. Operational costs

Criteria	JORC Code explanation	Commentary
		assumed are based on studies conducted on the adjacent Johnny Lee Deposit located on the same property.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• The assumed mining method is underground cut & paste fill mining. • No considerations to dilution or a minimum mining width was applied for Mineral Resources purposes.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• Mineralogical testing at the Lowry Deposit was used in combination of recovery regression curves derived from the nearby Johnny Lee Deposit. As the mineralogical testing was considered comparable to data collected at Johnny Lee Deposit, these regressions were used. • A mean copper recovery was calculated at 86%, therefore this was applied across the entire Lowry Deposit for the purposes of determining cut-off grade.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• No direct assumptions were applied for environmental considerations in Mineral Resource calculations at the Lowry Deposit. • Assumptions on waste disposal and impacts are that the Lowry Deposit would utilise planned infrastructure as part of the Johnny Lee Deposit development and operation. Tailings would be incorporated into a paste plant and utilised in the cut & paste fill mining method with excess stored in the Johnny Lee Deposit long-term storage facility.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc.), moisture and differences between rock and alteration zones within the deposit.*	• Bulk density was measured using the immersion method from diamond drill core. • All SG data was tested by Sandfire Resources America Inc. staff at the core logging facility. • Composited SG data was capped at an upper limit of 5.0. • Bulk density was estimated in the Lowry Deposit resource block model using IDW2. • SG was assigned to waste rock units based on mean values tested.

Criteria	JORC Code explanation	Commentary
	• *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• Considerations for the Mineral Resource classification at the Lowry Deposit includes deposit geological knowledge, continuity of copper grade within mineralised volumes, the thickness of mineralised zones, confidence in the raw drilling and analytical data, spatial continuity of copper based on variography studies, estimation quality variables including Kriging Efficiency and Slope of Regression, mean distance to samples, and the estimation pass number. • Based on the above inputs, the Competent Person assigned all Mineral Resources at the Lowry Deposit a classification of Inferred. Though many aspects of the classification basis are considered well-understood or robust, the relatively wide spacing of data within the LMCZ and LLCZ in relation to the copper spatial continuity was the primary limiting factor. Additional uncertainty was introduced with use of historic data, limited specific gravity data across the deposit, and limited metallurgical/recovery testing information. • The Competent Person is satisfied that the reported Mineral Resource classification reflects the relevant factors of the deposit.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• All stages of the Mineral Resource estimation and classification have undergone reviews by the Competent Person as an independent consultant, and reviews by geological personal within Sandfire Resources America, Inc.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The relevant accuracy and confidence in Mineral Resources reflects the current level of study for the Lowry Deposit as this is an initial Mineral Resource Estimate on the deposit. • The Competent Person has relied on assumptions applied to the nearby Johnny Lee Deposit due to the similarity of mineralisation and minerology observed in both deposits located on the Black Butte Copper Project property. • The Inferred Mineral Resources on the Lowry Deposit are considered too speculative for the application of modifying factors used in determining Ore Reserves. Additional studies and work programs are required on the deposit.