

**SANDFIRE RESOURCES, INC.  
BLACK BUTTE COPPER  
PROJECT AMBIENT AIR  
MONITORING PROGRAM  
Quarterly Data Report  
Third Quarter 2019**

*Prepared for:*

**Sandfire Resources, Inc.**  
PO Box 431  
White Sulphur Springs, MT 59645

*Prepared by:*

**Bison Engineering, Inc.**  
2751 Enterprise Ave., Ste. 2  
Billings, MT 59102  
(406) 896-1716  
<http://www.bison-eng.com>

November 15, 2019

## CERTIFICATION OF DATA INTEGRITY

Bison Engineering, Inc., certifies the data in this report is an accurate summary of the air quality conditions measured at the Black Butte Copper Project air monitoring site. Every effort was made to obtain accurate and representative data and to comply with the procedures set forth in the project-specific *Quality Assurance Project Plan*, the *State of Montana Ambient Air Monitoring Program Quality Assurance Project Plan (April 2013)*, and the Environmental Protection Agency's *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume I, A Field Guide to Environmental Quality Assurance (April 1994)*, *Volume II, Ambient Air Quality Program (May 2013)*, and *Volume IV, Meteorological Measurements (March 2008)*.

Preparer: Jeffrey S. Bell

Signature: 

Title: Senior Field Technician

Date: 10/8/2019

Reviewer: Steven R. Heck

Signature: 

Title: Meteorologist

Date: 10-15-2019

## **TABLE OF CONTENTS**

---

CERTIFICATION OF DATA INTEGRITY .....	ii
1.0 INTRODUCTION .....	1
2.0 MONITORING SYSTEM OPERATIONS .....	3
3.0 PERFORMANCE AUDIT DATA .....	4
4.0 CALIBRATION DATA .....	5
5.0 DATA COMPLETENESS .....	6
6.0 MONITORING DATA .....	10

## **LIST OF TABLES**

---

Table 1. Monthly Data Completeness .....	6
Table 2. Quarterly Data Completeness .....	9
Table 3. Missing Data Codes .....	11
Table 4. Monthly Wind Rose Summary, Black Butte Copper Project Met Tower .....	12
Table 5. Monthly Wind Rose Summary, Black Butte Copper Project Met Tower .....	13
Table 6. Monthly Wind Rose Summary, Black Butte Copper Project Met Tower .....	14
Table 7. Quarterly Wind Rose Summary, Black Butte Copper Project Met Tower .....	15

## **LIST OF FIGURES**

---

Figure 1. Monitoring Site Location .....	2
Figure 2. Monthly Wind Rose, Black Butte Copper Project Met Tower .....	16
Figure 3. Monthly Wind Rose, Black Butte Copper Project Met Tower .....	17
Figure 4. Monthly Wind Rose, Black Butte Copper Project Met Tower .....	18
Figure 5. Quarterly Wind Rose, Black Butte Copper Project Met Tower .....	19

## **APPENDICES**

---

- Appendix A: Meteorological Data
- Appendix B: Performance Audit Reports

## 1.0 INTRODUCTION

---

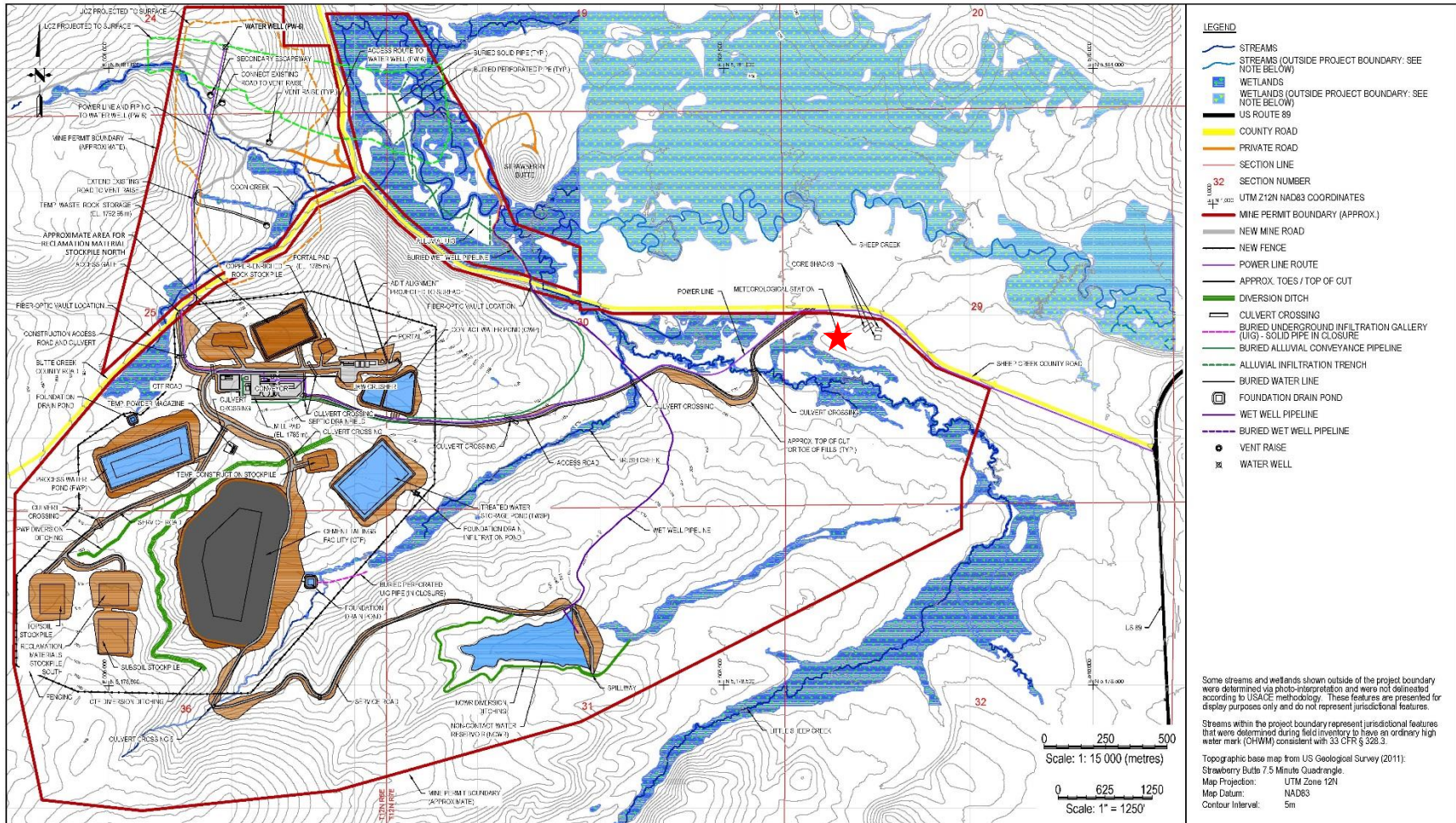
Sandfire Resources, Inc. established an ambient air monitoring site to measure wind speed, wind direction, standard deviation of wind direction, temperature at 9 meters and 2 meters, delta temperature, solar radiation, barometric pressure, and precipitation. The station was established to accurately characterize the local meteorology and collect baseline data in support of an operating permit application and various environmental studies.

The meteorological monitoring system was installed in April 2012. The site is operated by Bison Engineering, Inc., of Helena and Billings. Figure 1 shows the current location of the monitoring site, depicted by a red star. It is located to the west-southwest of the core shed buildings. On February 6, 2018 the tower was shut down to move it to a new location approximately 300 feet southwest of the original location, where monitoring resumed on March 7, 2018. Relocation activities were documented in the monitoring report for the first quarter of 2018.

This report presents the data collected during the third quarter (July through September) of 2019. In addition, a description of the monitoring system operations is presented, together with summaries of quality assurance activities, including calibrations and performance audits. Tabular summaries of the data completeness achieved, and the periods of missing data also are presented. Appendix A presents hourly meteorological data collected.

On June 23, 2015, an evaporation pan and manual precipitation gauge were installed adjacent to the existing meteorological system. The evaporation data will be used for hydrological / water balance studies. The manual rain gauge was installed to provide a backup data source for the existing automatic rain gauge, which has experienced occasional mechanical problems. Also, the automatic rain gauge is sometimes unreliable for measuring frozen precipitation. The evaporation pan was not operated during the third quarter of 2019.

**Figure 1. Monitoring Site Location**



Prepared by Tetra Tech Inc. (Revised October 2018 to include alluvial UIG as included in the December 2018 Integrated Discharge Permit Application Narrative Report by Hydrometrics that was revised in February 2018, Completeness Determination by MT DEQ on May 25, 2018.)



**FIGURE 1.3**  
**Facilities Site Plan**  
**Black Butte Copper Project**  
**Mine Operating Permit Application**  
Meagher County, Montana

## 2.0 MONITORING SYSTEM OPERATIONS

---

The original meteorological monitoring system began collecting data on April 30, 2012. Data were collected continuously at that location until February 6, 2018 at 1400 MST when the existing meteorological tower was relocated approximately 300 feet to the southwest of the original location. All instruments except the automatic rain gauge were operational starting March 7 at 1800 MST; the rain gauge became operational on March 8 at 1500 MST.

The rain gauge was not working at the start of the third quarter due to a failed reed switch. On July 16, the gauge was temporarily replaced with an older unit, which was calibrated at the time of installation. The defective gauge was removed and sent to the manufacturer for repair under warranty. The repaired gauge was received in late August and was re-installed at the site on September 24 as part of quarterly audit/calibration activities. The temporary gauge was audited just prior to removal and found to be working correctly. The repaired gauge was calibrated immediately following installation and was also found to be working correctly.

In addition to replacing the rain gauge, Steve Heck of Bison conducted performance audits of the entire meteorological system on September 24, 2019. All parameters as-found audit results were satisfactory, and no calibration adjustments were needed.

### **3.0 PERFORMANCE AUDIT DATA**

---

Steve Heck of Bison conducted performance audits of the meteorological system on September 24, 2019 and made any necessary calibration adjustments to the meteorological system following the audits. As discussed in Section 2.0, the temporary rain gauge was audited just prior to removal and a calibration check of the original repaired gauge was performed immediately following installation.

The Bison report of the audits are presented in Appendix B.

## **4.0 CALIBRATION DATA**

---

Steve Heck of Bison conducted performance audits of the meteorological system on September 24, 2019, as discussed in Section 3.0. The as-found audit results were satisfactory for all parameters, and no calibration adjustments were needed. The temperature sensor aspirator fans were replaced as preventive maintenance; both were working properly at the time of removal.



## 5.0 DATA COMPLETENESS

The meteorological percentages of data recovery achieved during the third quarter of 2019 are given in Tables 1 and 2. In these tables, the number of possible data values during each month of the quarter is given, together with the number of valid readings and the number of hours spent on quality assurance activities (such as calibrations, performance audits, and maintenance on the sensors). The quality assurance hours are added to the number of hours of valid data to compute the net percentage data recovery.

During the third quarter the net percentage data recovery was 98.3 percent for all parameters.

**Table 1. Monthly Data Completeness**

<b>July 2019</b>					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	744	744	100.0	0	100.0
Wind Direction	744	744	100.0	0	100.0
Standard Deviation	744	744	100.0	0	100.0
Temperature 9 Meters	744	744	100.0	0	100.0
Temperature 2 Meters	744	744	100.0	0	100.0
Temperature Delta T	744	744	100.0	0	100.0
Solar Radiation	744	744	100.0	0	100.0
Barometric Pressure	744	744	100.0	0	100.0
Relative Humidity	744	744	100.0	0	100.0
Precipitation	744	370	49.7	2	50.0
<b>Total</b>	<b>7,440</b>	<b>7,066</b>	<b>95.0</b>	<b>2</b>	<b>95.0</b>

**Table 1. Monthly Data Completeness (Continued)**

<b>August 2019</b>					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	744	744	100.0	0	100.0
Wind Direction	744	744	100.0	0	100.0
Standard Deviation	744	744	100.0	0	100.0
Temperature 9 Meters	744	744	100.0	0	100.0
Temperature 2 Meters	744	744	100.0	0	100.0
Temperature Delta T	744	744	100.0	0	100.0
Solar Radiation	744	744	100.0	0	100.0
Barometric Pressure	744	744	100.0	0	100.0
Relative Humidity	744	744	100.0	0	100.0
Precipitation	744	744	100.0	0	100.0
<b>Total</b>	<b>7,440</b>	<b>7,440</b>	<b>100.0</b>	<b>0</b>	<b>100.0</b>

**Table 1. Monthly Data Completeness (Continued)**

<b>September 2019</b>					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	720	715	99.3	5	100.0
Wind Direction	720	715	99.3	5	100.0
Standard Deviation	720	715	99.3	5	100.0
Temperature 9 Meters	720	715	99.3	5	100.0
Temperature 2 Meters	720	715	99.3	5	100.0
Temperature Delta T	720	715	99.3	5	100.0
Solar Radiation	720	715	99.3	5	100.0
Barometric Pressure	720	715	99.3	5	100.0
Relative Humidity	720	715	99.3	5	100.0
Precipitation	720	715	99.3	5	100.0
<b>Total</b>	<b>7,200</b>	<b>7,150</b>	<b>99.3</b>	<b>50</b>	<b>100.0</b>

**Table 2. Quarterly Data Completeness**

<b>Third Quarter 2019</b>					
<b>Parameter</b>	<b>Readings Possible</b>	<b>Valid Readings</b>	<b>Percentage Recovery</b>	<b>Quality Assurance Hours</b>	<b>Net Percentage Recovery</b>
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	2,208	2,203	99.8	5	100.0
Wind Direction	2,208	2,203	99.8	5	100.0
Standard Deviation	2,208	2,203	99.8	5	100.0
Temperature 9 Meters	2,208	2,203	99.8	5	100.0
Temperature 2 Meters	2,208	2,203	99.8	5	100.0
Temperature Delta T	2,208	2,203	99.8	5	100.0
Solar Radiation	2,208	2,203	99.8	5	100.0
Barometric Pressure	2,208	2,203	99.8	5	100.0
Relative Humidity	2,208	2,203	99.8	5	100.0
Precipitation	2,208	1,829	82.8	7	83.2
<b>Total</b>	<b>22,080</b>	<b>21,656</b>	<b>98.1</b>	<b>52</b>	<b>98.3</b>

## 6.0 MONITORING DATA

---

The hourly data values collected at the monitoring site are given in the data tables in Appendix A. Each of these tables presents one month's data for one parameter in the monitoring system. In addition, the average, maximum, and minimum values for each parameter for each day are listed (for wind direction, the prevailing wind direction for the day is given). For those hours with missing data, a code is given that explains the reason the data were missing. These codes are given in Table 3.

Monthly and quarterly wind rose distributions from the monitoring site are presented in Tables 4 through 7. These tables give the percentage frequency of occurrence of winds from 16 cardinal directions and from 22 wind speed ranges. These same data are presented graphically in Figures 2 through 5. In the wind rose figures, the length of each "petal" of the rose is proportional to the percentage of time the wind blew from that direction. On the bottom of each figure is a histogram showing the average wind speed from each of the cardinal wind directions.

**Table 3. Missing Data Codes**

<b>Mnemonic Code</b>	<b>Description</b>	<b>Equivalent EPA Null Value Reason Code</b>
Sc	Scheduled but not collected	9972
Ti	Sample time out of limits	9973
Fi	Filter damage	9976
Op	Voided by operator	9978
Mi	Miscellaneous void	9979
ND	Machine malfunction	9980
Wx	Bad weather	9981
Co	Collection error	9983
Lb	Lab error	9984
QA	Poor quality assurance results	9985
ZS	Manual zero/span check	9986
Wa	Monitoring waived	9987
Pw	Power failure	9988
Wi	Wildlife damage	9989
AZ	Automatic zero/span check	9991
Au	Performance audit	9992
Ma	Routine maintenance/repairs	9993
Ca	Multipoint calibration	9995
PZ	Precision/zero/span	9998

**Table 4. Monthly Wind Rose Summary, Black Butte Copper Project Met Tower**

July 2019																	
Direction>>>	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
0.1 - 1.0	0.7	0.4	0.4	0.5	0.5	1.7	2.0	1.3	0.5	0.7	0.3	0.3	0.4	0.4	0.8	0.4	11.4
1.1 - 2.0	1.1	1.1	2.6	3.0	5.4	6.3	6.3	2.4	0.9	0.5	0.1	0.9	0.3	1.1	1.3	2.0	35.3
2.1 - 3.0	0.5	0.4	0.8	1.2	2.8	2.6	1.5	1.2	0.9	0.3	0.3	0.5	1.6	2.6	1.7	0.7	19.6
3.1 - 4.0	0.1	0.0	0.7	0.4	1.3	0.3	0.7	2.0	0.5	0.8	0.4	1.2	2.6	2.6	1.5	0.4	15.5
4.1 - 5.0	0.3	0.0	0.1	0.3	0.3	0.3	0.7	0.8	0.1	0.4	0.0	0.0	1.3	1.7	0.7	0.3	7.3
5.1 - 6.0	0.1	0.0	0.0	0.1	0.3	0.0	0.3	0.4	0.1	0.3	0.1	0.5	0.8	1.1	0.3	0.1	4.6
6.1 - 7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.1	0.3	0.5	0.4	0.4	0.1	0.0	2.7
7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.1	0.0	0.1	0.3	0.1	0.3	0.0	1.6
8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.1	0.0	0.9
9.1 - 10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.1	0.0	0.9
10.1 - 11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
11.1 - 12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.1 - 13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.1 - 14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.1 - 15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.1 - 16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.1 - 17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.1 - 18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.1 - 19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19.1 - 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
> 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calm																	0.0
Total	2.8	1.9	4.6	5.5	10.6	11.2	12.2	8.6	3.5	3.2	1.5	4.4	8.3	10.6	7.1	3.9	100.0
Average Speed	2.1	1.5	2.0	2.1	2.2	1.8	2.2	2.7	2.6	3.1	3.3	3.9	4.2	3.9	3.3	2.2	2.7

**Table 5. Monthly Wind Rose Summary, Black Butte Copper Project Met Tower**

August 2019																		
Direction>>>	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total	
Wind Speed (meters per second)	0.1 - 1.0	0.7	0.7	0.8	0.9	2.2	2.6	2.2	1.7	0.9	0.3	0.3	0.4	0.3	1.1	0.5	0.5	16.0
	1.1 - 2.0	0.8	0.8	1.9	4.6	4.6	7.4	4.8	1.7	0.5	0.4	0.3	0.7	0.5	0.5	0.9	1.1	31.6
	2.1 - 3.0	0.3	0.1	0.7	2.6	1.5	1.7	0.5	0.8	0.1	0.0	0.4	1.3	1.2	1.9	2.3	1.1	16.5
	3.1 - 4.0	0.4	0.0	0.0	0.4	0.8	0.3	0.5	0.7	0.0	0.0	0.4	1.5	2.0	2.3	1.1	0.7	11.0
	4.1 - 5.0	0.3	0.0	0.3	0.0	0.0	0.1	0.4	0.5	0.1	0.0	0.3	0.7	1.9	3.5	1.7	0.1	9.9
	5.1 - 6.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.3	0.0	0.1	0.4	0.5	1.3	2.2	1.1	0.4	6.7
	6.1 - 7.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.1	0.1	0.4	2.0	1.1	0.4	0.1	5.5
	7.1 - 8.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	1.6
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.9
	9.1 - 10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10.1 - 11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	11.1 - 12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	12.1 - 13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	13.1 - 14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	14.1 - 15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15.1 - 16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	16.1 - 17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	17.1 - 18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	18.1 - 19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	19.1 - 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
> 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Calm																		0.0
Total	2.6	1.7	3.8	8.6	9.0	12.1	10.5	6.6	1.7	0.9	2.2	5.5	9.8	12.8	8.2	4.0		100.0
Average Speed	2.3	1.8	1.9	1.9	1.7	1.5	2.7	2.7	1.3	2.5	3.3	3.4	4.6	4.0	3.5	2.7		2.8



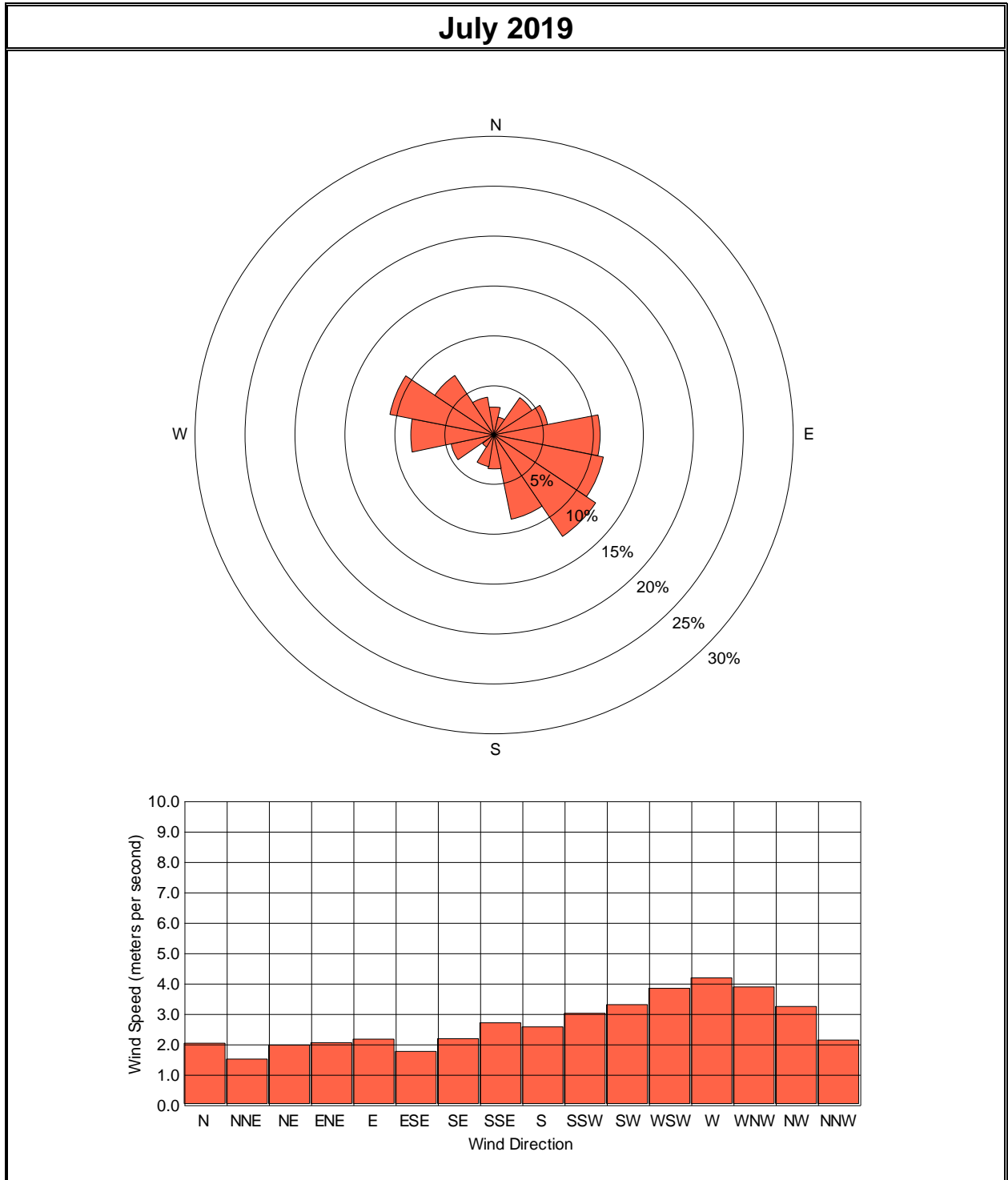
**Table 6. Monthly Wind Rose Summary, Black Butte Copper Project Met Tower**

September 2019																	
Direction>>>	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
0.1 - 1.0	1.5	0.7	1.3	1.0	1.5	1.0	1.8	1.5	0.7	0.1	0.4	0.3	0.7	0.3	0.3	0.3	13.4
1.1 - 2.0	0.3	0.8	1.0	1.7	1.8	6.2	5.3	1.5	0.6	0.3	1.0	1.0	1.0	1.7	1.3	1.8	27.1
2.1 - 3.0	0.7	0.1	0.4	1.3	2.0	1.4	1.4	1.8	0.4	0.0	0.3	0.7	1.5	2.8	2.4	0.8	18.0
3.1 - 4.0	0.3	0.0	0.1	0.1	0.4	1.0	0.6	1.7	0.1	0.1	0.7	2.0	3.4	2.7	2.1	1.0	16.2
4.1 - 5.0	0.0	0.0	0.0	0.1	0.6	0.1	0.4	0.8	0.4	0.1	0.3	0.8	2.7	1.5	1.3	0.4	9.7
5.1 - 6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	0.1	0.0	0.1	1.3	2.0	1.0	0.4	0.0	6.0
6.1 - 7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.7	0.0	0.0	0.3	1.5	0.7	0.0	0.1	3.9
7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.3	0.1	0.1	0.7	0.8	0.0	0.0	2.7
8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.6	0.7	0.0	0.0	1.8
9.1 - 10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.7
10.1 - 11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3
11.1 - 12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
12.1 - 13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.1 - 14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.1 - 15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.1 - 16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.1 - 17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.1 - 18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.1 - 19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19.1 - 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
> 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calm																	0.0
Total	2.8	1.7	2.8	4.2	6.3	9.7	9.8	9.4	3.1	1.0	3.2	6.7	14.7	12.6	7.7	4.5	100.0
Average Speed	1.6	1.4	1.3	1.7	2.1	1.9	1.9	3.2	3.2	3.7	3.2	3.9	4.6	4.2	3.0	2.5	3.0

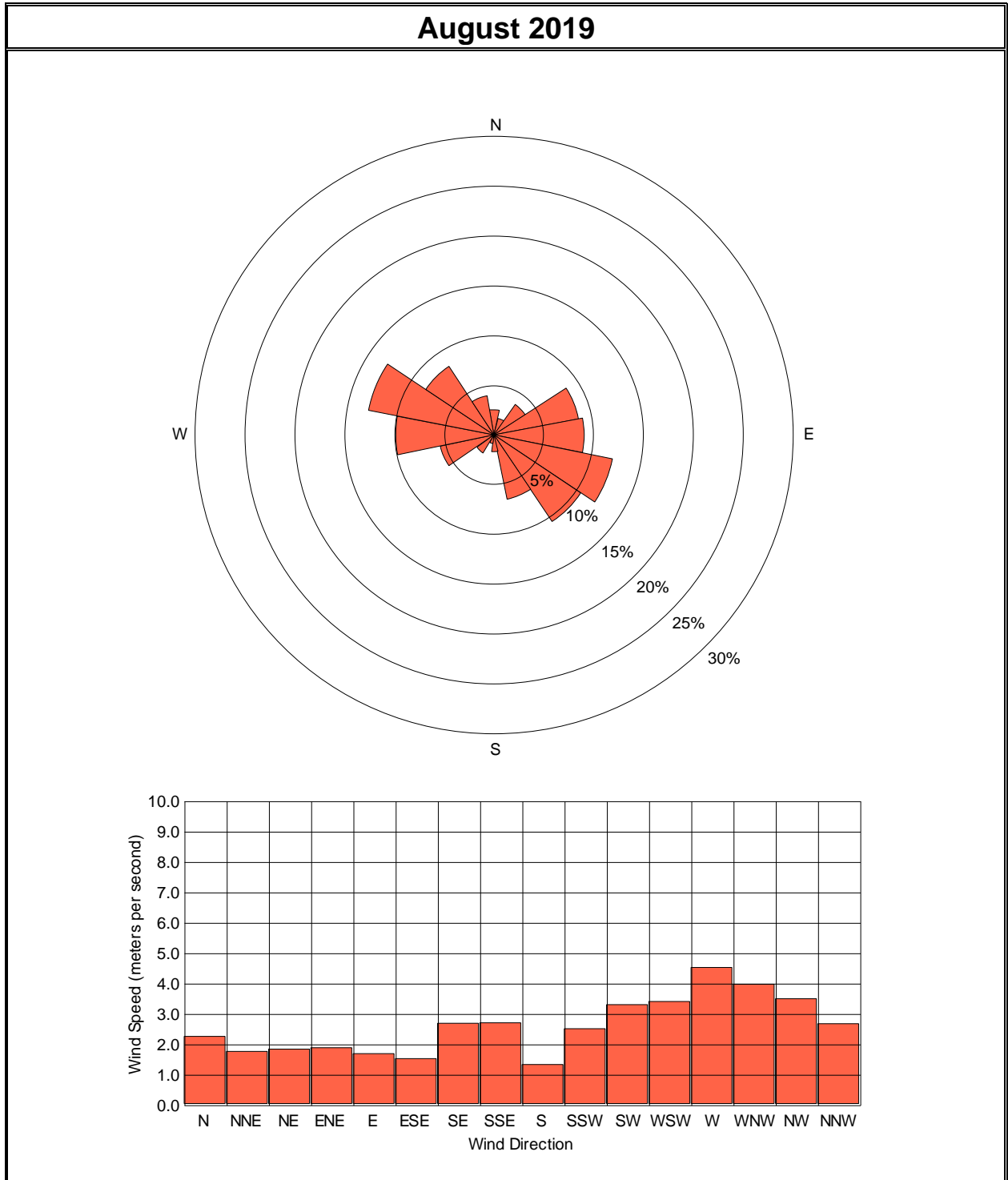
**Table 7. Quarterly Wind Rose Summary, Black Butte Copper Project Met Tower**

Third Quarter 2019																		
Direction>>>	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total	
Wind Speed (meters per second)	0.1 - 1.0	1.0	0.6	0.8	0.8	1.4	1.8	2.0	1.5	0.7	0.4	0.3	0.3	0.5	0.6	0.5	0.4	13.6
	1.1 - 2.0	0.7	0.9	1.8	3.1	3.9	6.6	5.5	1.9	0.7	0.4	0.5	0.9	0.6	1.1	1.2	1.6	31.4
	2.1 - 3.0	0.5	0.2	0.6	1.7	2.1	1.9	1.1	1.3	0.5	0.1	0.3	0.9	1.5	2.4	2.1	0.9	18.1
	3.1 - 4.0	0.3	0.0	0.3	0.3	0.9	0.5	0.6	1.5	0.2	0.3	0.5	1.5	2.6	2.5	1.5	0.7	14.2
	4.1 - 5.0	0.2	0.0	0.1	0.1	0.3	0.2	0.5	0.7	0.2	0.2	0.2	0.5	2.0	2.3	1.2	0.3	8.9
	5.1 - 6.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.5	0.1	0.1	0.2	0.8	1.4	1.4	0.6	0.2	5.8
	6.1 - 7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.3	0.1	0.1	0.4	1.3	0.7	0.2	0.1	4.0
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.1	0.0	0.1	0.4	0.4	0.1	0.0	2.0
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.1	0.5	0.3	0.1	0.0	1.2
	9.1 - 10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.5
	10.1 - 11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2
	11.1 - 12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	12.1 - 13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	13.1 - 14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	14.1 - 15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15.1 - 16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	16.1 - 17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	17.1 - 18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	18.1 - 19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	19.1 - 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
> 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Calm																		0.0
Total	2.7	1.8	3.7	6.1	8.7	11.0	10.8	8.2	2.8	1.7	2.3	5.5	10.9	12.0	7.7	4.1		100.0
Average Speed	2.0	1.6	1.8	1.9	2.0	1.7	2.3	2.9	2.6	3.1	3.3	3.8	4.5	4.1	3.3	2.5		2.8

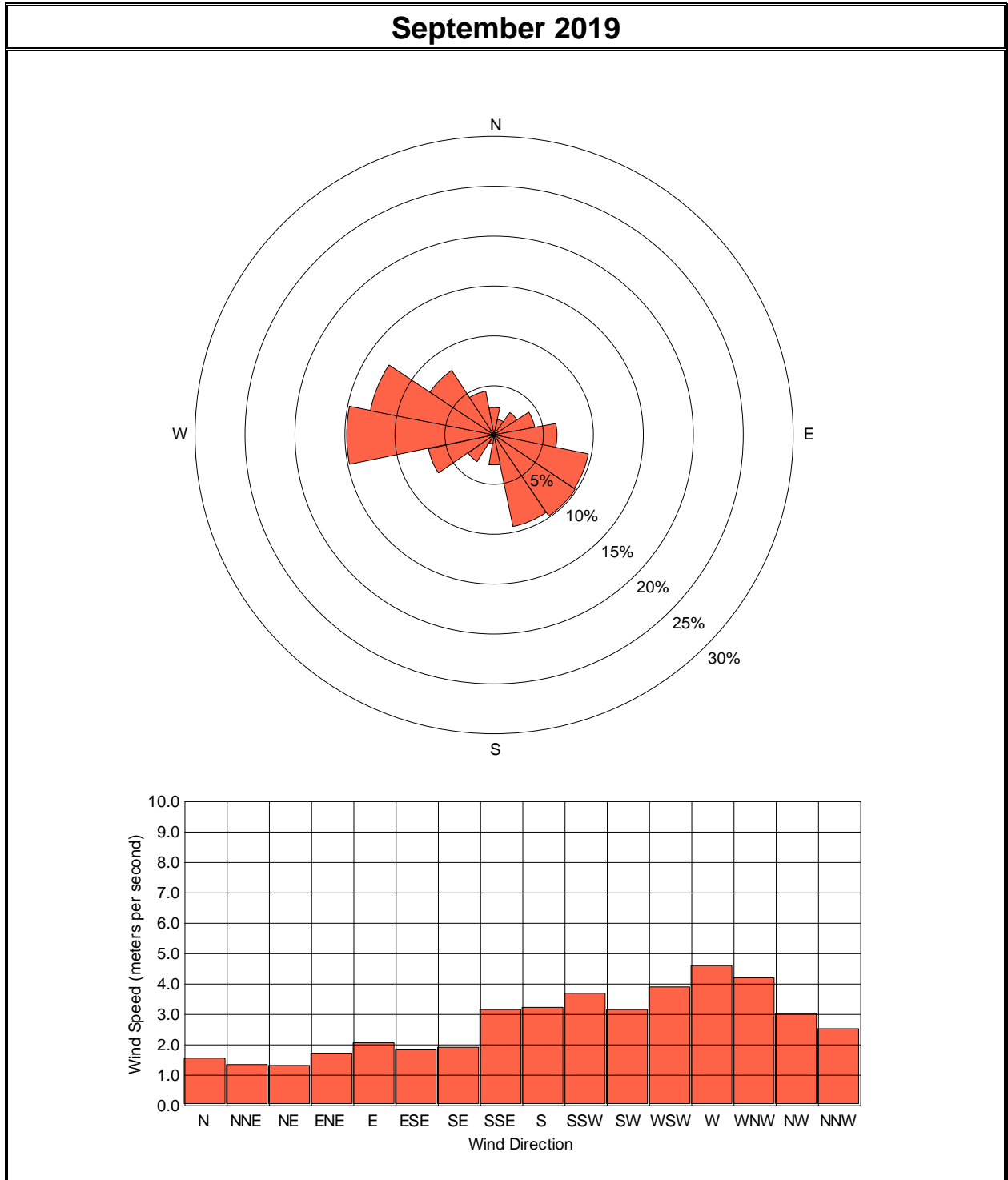
**Figure 2. Monthly Wind Rose, Black Butte Copper Project Met Tower**



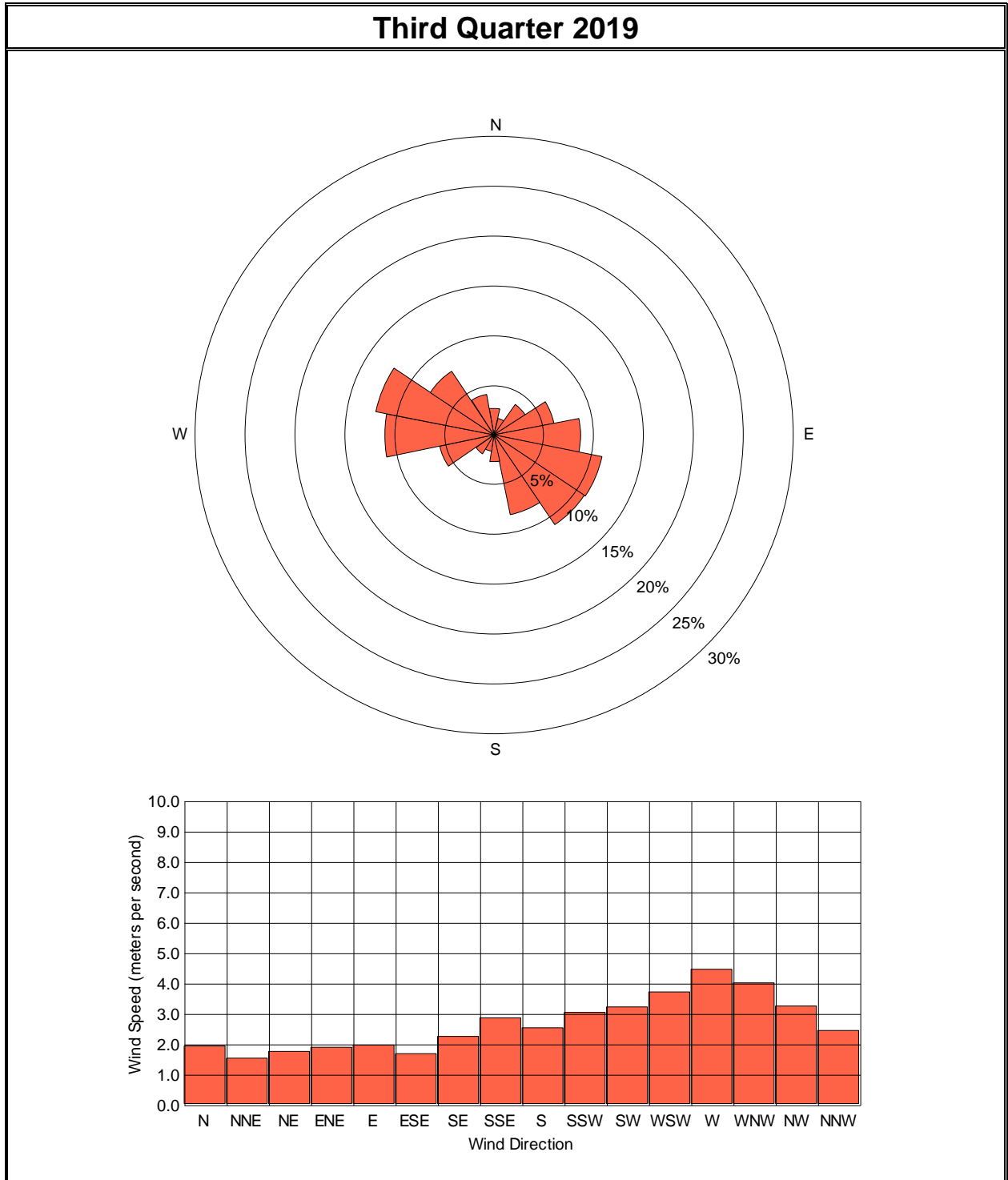
**Figure 3. Monthly Wind Rose, Black Butte Copper Project Met Tower**



**Figure 4. Monthly Wind Rose, Black Butte Copper Project Met Tower**



**Figure 5. Quarterly Wind Rose, Black Butte Copper Project Met Tower**



**APPENDIX A: HOURLY AIR QUALITY AND  
METEOROLOGICAL DATA, THIRD QUARTER 2019**

---

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Wind Speed (meters per second)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	1.8	1.2	1.3	1.7	2.0	1.8	1.1	0.9	3.0	1.8	4.4	3.7	4.3	7.0	6.5	4.9	6.2	4.1	3.4	2.2	1.4	1.8	1.3	1.0	2.9	7.0	0.9
2	1.2	1.5	1.2	0.7	0.8	0.9	1.2	0.9	2.3	3.8	4.2	2.7	2.8	2.5	3.8	7.2	7.3	3.2	4.5	2.4	2.0	1.9	3.4	1.8	2.7	7.3	0.7
3	2.2	1.3	1.6	1.4	1.9	1.5	1.6	1.5	2.7	2.4	3.5	1.8	5.2	3.2	2.8	4.2	4.0	3.5	3.2	1.1	1.4	1.5	1.2	1.4	2.3	5.2	1.1
4	1.2	1.6	1.4	0.8	0.9	0.6	0.8	0.6	0.8	1.7	2.4	3.4	2.9	2.7	3.3	2.9	3.1	4.0	3.4	2.3	3.1	5.0	2.5	2.4	2.2	5.0	0.6
5	1.2	1.3	1.0	1.2	0.9	1.1	1.3	0.6	0.9	1.1	1.4	1.9	2.8	2.8	4.3	5.4	2.6	2.3	3.2	2.2	1.8	1.2	1.5	1.2	1.9	5.4	0.6
6	1.1	0.7	1.2	2.4	3.6	3.6	2.9	4.0	2.3	5.3	4.6	4.5	4.5	3.3	4.7	5.4	5.2	3.3	3.9	3.4	3.2	2.8	1.4	3.3	3.4	5.4	0.7
7	2.1	1.3	1.5	1.7	1.4	1.8	1.1	1.2	3.9	2.7	3.2	1.2	2.5	2.7	2.9	4.1	3.1	6.2	4.4	2.6	1.2	2.4	1.3	1.2	2.4	6.2	1.1
8	1.8	1.9	1.1	1.4	1.2	0.6	0.7	0.9	1.1	1.6	2.1	1.9	2.2	4.1	5.1	5.5	3.2	3.1	4.5	1.7	1.7	1.2	1.7	2.1	2.2	5.5	0.6
9	1.5	0.8	1.2	1.9	2.3	2.2	2.7	2.4	2.5	2.1	2.2	1.9	2.3	2.7	2.6	2.7	2.2	1.7	0.9	1.0	1.8	2.7	2.0	2.5	2.0	2.7	0.8
10	1.7	2.0	1.6	1.6	1.5	1.1	1.0	1.4	1.9	3.4	3.4	2.5	3.5	4.6	5.5	3.3	3.1	2.2	2.0	1.1	1.3	1.1	2.8	2.0	2.3	5.5	1.0
11	2.2	1.8	1.2	1.5	1.3	0.9	1.0	0.6	0.8	1.6	2.3	3.1	3.1	2.9	5.2	4.2	4.4	4.9	4.4	2.8	2.0	3.6	1.2	3.3	2.5	5.2	0.6
12	1.0	1.2	1.3	0.7	1.0	1.2	0.6	0.7	1.7	2.4	3.7	3.4	4.0	3.4	4.1	3.4	3.8	3.1	2.1	7.2	1.6	1.6	1.4	1.6	2.3	7.2	0.6
13	2.4	1.8	2.3	2.1	1.4	1.3	1.3	0.7	1.1	2.9	3.0	2.2	2.5	5.3	3.5	3.2	6.0	3.4	3.2	3.3	3.4	3.3	2.5	2.0	2.7	6.0	0.7
14	2.8	1.7	3.0	2.1	2.7	2.8	1.4	2.7	3.0	2.2	1.8	2.1	3.2	4.5	2.7	5.8	4.4	3.1	1.6	2.6	2.5	2.4	1.6	2.0	2.7	5.8	1.4
15	1.4	1.6	0.9	1.2	1.7	1.6	1.1	0.8	1.0	2.8	2.7	2.6	3.7	3.2	2.4	2.3	1.3	4.7	5.6	1.9	1.6	2.0	1.9	1.2	2.1	5.6	0.8
16	1.9	1.1	1.1	0.7	1.1	1.0	1.1	0.9	3.1	3.2	3.7	4.1	3.9	4.0	3.4	4.0	3.6	2.5	3.8	3.6	1.4	1.0	1.3	0.9	2.3	4.1	0.7
17	1.0	1.1	1.4	1.7	1.7	1.4	0.9	0.8	2.8	5.6	5.2	5.7	5.2	6.2	5.3	3.5	3.3	1.9	1.2	0.9	0.8	1.1	1.4	1.4	2.6	6.2	0.8
18	2.0	2.0	2.1	1.9	2.2	1.4	1.1	3.5	6.1	8.0	9.4	8.6	8.7	8.1	8.7	8.7	9.8	10.6	7.2	4.3	6.0	3.1	1.4	1.7	5.3	10.6	1.1
19	2.2	1.9	1.5	1.3	1.5	1.0	1.0	1.0	1.4	4.7	4.8	5.3	6.2	5.8	6.9	8.7	9.6	9.6	7.9	4.0	1.6	1.7	1.7	2.0	3.9	9.6	1.0
20	1.3	1.2	1.3	1.3	1.2	0.8	0.8	0.8	1.0	2.1	2.6	2.8	3.6	4.2	3.8	4.0	2.7	2.8	2.4	2.0	2.0	5.0	1.8	1.2	2.2	5.0	0.8
21	0.9	1.2	0.8	0.8	0.8	0.9	0.9	0.7	2.6	6.1	5.5	4.5	3.9	3.2	4.0	3.9	5.6	7.5	7.4	6.6	2.1	1.2	1.4	1.1	3.1	7.5	0.7
22	1.7	1.2	0.6	1.2	1.0	0.8	1.1	3.1	6.9	6.2	5.0	4.5	3.6	3.5	2.4	2.1	2.7	2.9	4.2	5.3	1.6	1.7	0.9	1.0	2.7	6.9	0.6
23	1.2	1.9	1.7	2.6	1.9	2.0	1.4	1.0	1.8	3.7	2.8	1.8	1.1	2.2	1.7	1.2	1.2	1.4	3.0	2.8	5.3	2.6	1.6	2.6	2.1	5.3	1.0
24	1.2	1.3	2.6	2.0	1.6	1.7	1.1	1.3	1.8	5.2	5.0	6.9	7.8	7.9	9.6	9.5	8.9	9.7	6.8	4.7	5.2	7.8	3.9	2.5	4.8	9.7	1.1
25	1.9	1.6	1.2	1.4	1.3	1.3	0.9	1.9	5.2	4.8	5.3	6.4	4.7	4.4	4.7	6.8	6.7	6.0	5.6	2.7	1.7	2.1	2.3	1.9	3.4	6.8	0.9
26	1.5	1.2	1.2	0.8	1.0	0.8	0.8	0.8	0.8	3.3	3.7	4.2	4.0	3.7	2.9	3.0	3.4	1.8	2.6	3.4	3.3	3.4	2.8	1.9	2.3	4.2	0.8
27	1.7	1.6	1.1	1.1	1.4	1.4	1.0	0.7	0.7	1.0	6.7	7.2	6.6	5.9	5.1	4.9	4.2	3.7	2.6	1.8	2.0	1.8	2.4	1.9	2.9	7.2	0.7
28	1.6	1.0	1.9	1.7	3.6	3.2	1.8	1.7	4.6	3.2	4.0	4.6	4.0	3.6	3.2	2.4	2.2	1.8	1.4	2.8	2.3	2.2	1.9	2.3	2.6	4.6	1.0
29	2.0	2.4	2.7	1.9	1.8	1.7	2.2	3.7	2.9	3.0	2.7	2.8	3.8	4.5	3.6	3.5	3.1	4.0	6.3	4.2	4.2	3.1	2.0	2.2	3.1	6.3	1.7
30	2.3	2.0	1.8	1.4	1.7	1.2	0.9	1.4	1.0	1.5	3.6	4.4	3.4	4.2	5.7	2.4	2.3	0.8	2.0	2.6	2.8	2.5	2.5	1.8	2.3	5.7	0.8
31	2.0	1.5	1.8	1.4	1.1	1.1	1.1	0.8	0.9	0.9	1.7	1.6	2.2	3.2	3.5	2.1	3.4	2.0	1.7	4.5	4.3	2.2	3.4	2.4	2.1	4.5	0.8
Avg	1.7	1.5	1.5	1.5	1.6	1.4	1.2	1.4	2.3	3.2	3.8	3.7	3.9	4.2	4.3	4.4	4.3	3.9	3.8	3.0	2.5	2.5	1.9	1.9	2.7	6.1	0.9
Max	2.8	2.4	3.0	2.6	3.6	3.6	2.9	4.0	6.9	8.0	9.4	8.6	8.7	8.1	9.6	9.5	9.8	10.6	7.9	7.2	6.0	7.8	3.9	3.3	5.3	10.6	1.7
Min	0.9	0.7	0.6	0.7	0.8	0.6	0.6	0.6	0.7	0.9	1.4	1.2	1.1	2.2	1.7	1.2	1.2	0.8	0.9	0.9	0.8	1.0	0.9	0.9	1.9	2.7	0.6

A-1



**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Wind Speed (meters per second)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	1.8	1.1	1.6	1.4	1.1	1.1	0.7	0.7	1.1	1.7	2.2	3.0	3.6	3.0	5.3	5.4	5.5	6.3	8.1	3.4	1.9	2.2	3.3	2.7	2.8	8.1	0.7
2	2.2	2.0	2.1	1.5	1.9	1.6	0.9	0.9	0.9	1.4	1.8	2.4	4.1	4.2	4.4	3.1	2.6	5.5	6.5	3.9	5.9	1.8	1.8	4.7	2.8	6.5	0.9
3	3.0	2.6	1.0	2.1	1.7	1.2	1.1	0.8	0.9	2.4	2.8	3.5	4.5	5.7	6.3	4.1	3.9	3.0	2.1	2.4	2.8	1.2	1.2	1.8	2.6	6.3	0.8
4	1.1	1.1	1.8	1.5	1.2	1.7	1.2	1.1	0.9	1.1	2.2	3.6	4.0	3.8	3.4	4.2	4.5	4.8	4.5	1.7	1.4	1.1	1.4	1.2	2.3	4.8	0.9
5	1.3	1.1	1.0	1.7	1.1	0.9	1.0	0.7	1.0	2.2	2.1	4.0	3.7	4.0	4.7	5.4	5.2	5.0	4.3	2.5	3.4	3.3	2.2	2.0	2.7	5.4	0.7
6	1.2	1.5	1.2	1.3	0.8	1.1	1.0	0.7	0.7	2.3	4.7	4.4	4.4	4.3	4.8	3.5	2.6	2.6	1.2	1.3	2.1	1.9	2.4	1.4	2.2	4.8	0.7
7	1.9	1.4	1.1	1.0	1.6	0.9	0.5	1.4	1.5	1.2	2.5	3.6	3.7	4.8	4.4	2.5	1.9	1.3	0.9	3.4	1.7	2.7	1.0	0.9	2.0	4.8	0.5
8	1.3	1.1	1.4	1.6	1.7	1.1	1.3	0.6	0.8	1.0	2.5	3.0	3.8	2.9	3.2	2.5	2.6	4.3	4.0	3.5	2.6	1.1	1.1	1.2	2.1	4.3	0.6
9	1.8	1.6	1.0	1.1	0.6	1.0	1.3	1.0	1.9	2.0	3.4	2.6	2.8	6.4	6.2	4.7	3.4	2.5	1.8	2.0	1.0	1.8	1.9	1.9	2.3	6.4	0.6
10	1.1	0.9	0.9	0.9	0.8	0.9	1.1	1.2	2.2	1.3	2.2	3.7	2.2	2.6	4.0	4.9	5.5	4.9	6.5	8.0	3.2	3.5	2.6	2.7	2.8	8.0	0.8
11	2.8	1.3	1.1	2.0	4.6	3.2	3.1	3.7	4.4	2.5	4.5	2.9	2.4	7.3	4.4	4.8	4.0	2.2	3.1	3.2	2.9	5.0	2.7	1.7	3.3	7.3	1.1
12	1.5	1.6	2.9	2.2	1.4	1.0	1.4	4.8	5.4	3.4	2.9	5.5	5.2	6.4	7.0	6.8	6.3	5.3	4.6	3.8	2.7	2.9	2.9	1.8	3.7	7.0	1.0
13	1.5	1.3	1.0	0.9	0.7	1.2	1.0	0.7	0.6	1.7	3.6	3.2	4.0	3.8	3.1	3.7	2.9	1.7	2.4	2.2	2.2	1.8	1.7	1.3	2.0	4.0	0.6
14	0.6	1.2	1.4	1.8	1.4	1.2	1.1	0.5	0.7	1.9	4.4	4.7	4.8	5.1	6.2	5.4	5.2	6.1	3.9	1.8	3.6	1.8	1.2	0.8	2.8	6.2	0.5
15	2.2	3.1	1.3	0.9	1.2	1.2	1.1	0.9	1.1	4.7	4.6	5.6	4.5	5.3	5.5	4.4	4.1	4.6	5.4	4.0	1.8	2.3	2.5	1.6	3.1	5.6	0.9
16	1.4	1.1	1.3	1.5	1.0	1.0	1.2	0.6	3.2	5.4	6.4	6.2	6.4	7.2	6.6	7.0	6.1	5.0	5.8	2.5	3.8	3.1	4.2	2.9	3.8	7.2	0.6
17	2.4	1.4	2.0	2.6	2.1	1.8	2.3	3.0	1.9	1.1	2.3	1.3	2.2	1.1	1.6	3.4	4.1	3.5	4.8	2.1	2.0	2.2	1.4	1.5	2.3	4.8	1.1
18	1.0	0.8	0.8	0.7	0.6	1.0	1.0	0.9	2.3	6.3	6.5	6.5	6.3	6.7	6.7	5.9	4.7	4.0	1.5	2.6	2.8	3.3	2.6	2.2	3.2	6.7	0.6
19	1.2	1.3	1.0	1.2	1.5	1.3	0.9	0.8	1.2	3.2	4.5	6.0	6.7	7.8	6.9	4.1	4.1	2.2	3.2	1.8	1.8	1.8	0.7	1.0	2.8	7.8	0.7
20	0.7	0.9	0.6	0.7	0.7	0.8	0.9	0.9	2.7	5.8	6.9	7.1	6.8	6.5	4.7	5.8	6.7	7.4	6.1	1.6	1.4	1.4	1.6	2.1	3.4	7.4	0.6
21	1.9	1.6	1.1	1.6	1.8	1.8	1.0	0.7	0.9	3.6	6.0	6.8	7.4	7.2	6.9	7.8	9.0	8.3	7.9	7.1	10.2	8.9	5.0	3.1	4.9	10.2	0.7
22	1.9	1.7	1.3	1.3	1.2	1.2	1.5	0.9	2.4	5.8	5.1	5.2	5.1	6.5	5.4	4.6	3.5	2.3	1.9	1.0	1.0	1.6	1.6	1.2	2.7	6.5	0.9
23	1.0	1.2	1.4	1.6	1.5	1.2	0.8	1.9	2.0	1.1	2.7	3.1	3.5	3.8	4.4	3.0	4.5	3.8	2.5	1.7	2.2	2.2	1.6	1.8	2.3	4.5	0.8
24	0.9	1.2	0.8	1.1	1.2	0.9	1.1	1.0	1.0	1.6	4.3	3.6	4.2	4.7	5.9	6.3	5.5	3.6	1.5	3.0	2.4	4.7	5.7	6.3	3.0	6.3	0.8
25	4.0	2.6	1.7	1.7	3.3	2.8	2.8	1.5	1.5	3.9	6.0	5.5	5.3	6.7	8.8	8.5	7.1	8.1	5.4	1.6	0.9	1.1	1.4	1.6	3.9	8.8	0.9
26	1.2	0.8	0.7	1.6	1.1	1.2	0.9	0.6	1.7	5.4	6.1	5.6	5.8	4.6	6.0	5.8	6.0	5.9	4.5	2.1	2.4	1.0	1.5	0.9	3.1	6.1	0.6
27	1.2	1.0	1.1	0.9	0.9	1.1	1.0	0.5	1.1	2.3	2.4	3.4	3.6	3.6	3.5	4.0	4.4	2.9	1.4	2.4	2.6	2.8	3.0	1.2	2.2	4.4	0.5
28	1.4	1.3	0.8	1.2	1.1	1.2	1.1	0.6	0.9	2.1	4.5	3.3	4.2	5.7	6.4	6.8	6.3	4.3	2.9	2.3	3.4	2.6	1.6	1.2	2.8	6.8	0.6
29	1.2	1.2	0.9	0.8	0.8	0.9	1.8	4.2	4.7	3.4	2.7	2.1	2.0	2.9	2.4	2.3	2.3	4.1	3.1	1.7	2.6	0.8	0.9	1.3	2.1	4.7	0.8
30	2.0	1.5	1.2	1.1	0.9	1.4	1.2	0.8	1.0	2.8	3.0	3.3	3.9	4.3	5.6	5.2	4.2	3.0	2.2	1.7	1.8	1.4	1.3	0.8	2.3	5.6	0.8
31	1.5	1.4	0.9	1.2	1.0	0.9	0.8	0.7	0.7	1.5	3.9	5.1	4.6	4.5	4.7	4.1	4.7	3.4	1.7	2.6	3.0	2.0	1.3	0.7	2.4	5.1	0.7
Avg	1.6	1.4	1.2	1.4	1.4	1.3	1.2	1.3	1.7	2.8	3.9	4.2	4.4	4.9	5.1	4.8	4.6	4.3	3.7	2.7	2.7	2.4	2.1	1.9	2.8	6.2	0.7
Max	4.0	3.1	2.9	2.6	4.6	3.2	3.1	4.8	5.4	6.3	6.9	7.1	7.4	7.8	8.8	8.5	9.0	8.3	8.1	8.0	10.2	8.9	5.7	6.3	4.9	10.2	1.1
Min	0.6	0.8	0.6	0.7	0.6	0.8	0.5	0.5	0.6	1.0	1.8	1.3	2.0	1.1	1.6	2.3	1.9	1.3	0.9	1.0	0.9	0.8	0.7	0.7	2.0	4.0	0.5

A-2

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Wind Speed (meters per second)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	1.0	1.1	1.0	1.2	0.9	1.1	1.3	0.8	0.8	1.2	3.5	3.5	3.4	3.4	4.3	4.4	4.5	4.0	6.0	6.3	2.3	1.4	1.8	1.2	2.5	6.3	0.8
2	1.9	1.4	1.2	1.1	0.9	0.8	1.2	0.6	1.1	2.8	4.2	5.7	7.9	8.8	7.3	8.8	7.7	6.8	5.4	2.6	1.3	1.4	2.3	1.7	3.5	8.8	0.6
3	1.0	1.0	0.8	0.9	0.7	0.8	1.2	0.5	0.7	1.3	2.7	3.9	3.6	3.3	4.1	3.6	2.0	1.2	1.4	4.1	2.2	2.1	1.1	2.8	2.0	4.1	0.5
4	0.8	1.2	0.7	0.7	0.8	1.1	1.1	0.7	0.8	4.9	4.7	7.2	9.9	9.7	10.5	8.9	7.5	6.7	4.5	3.0	2.8	2.4	2.3	1.1	3.9	10.5	0.7
5	0.9	1.3	1.5	1.2	0.8	0.9	1.3	0.6	0.7	1.1	3.5	3.6	3.5	3.5	4.1	3.8	2.3	1.6	1.6	2.2	3.9	3.0	4.1	1.9	2.2	4.1	0.6
6	1.9	2.2	2.2	2.1	2.0	1.7	3.2	2.2	2.0	1.6	2.2	2.1	2.6	1.1	1.0	1.4	0.8	1.4	1.4	2.2	0.8	1.0	1.0	2.8	1.8	3.2	0.8
7	1.5	3.6	2.8	1.9	1.9	2.6	2.8	2.5	2.3	3.3	3.2	3.4	3.9	2.8	1.7	2.1	2.9	1.9	2.5	3.7	3.3	3.7	4.8	2.5	2.8	4.8	1.5
8	3.4	4.2	2.8	2.5	2.3	4.0	1.9	2.7	4.6	5.4	4.7	6.9	6.0	5.3	6.1	3.7	7.1	7.8	7.5	3.5	4.1	3.1	2.9	1.5	4.3	7.8	1.5
9	1.1	0.5	0.4	2.7	3.4	3.4	4.0	5.6	3.9	4.3	4.7	5.6	6.5	7.2	5.2	3.9	5.0	5.6	4.8	1.2	1.4	2.1	1.7	1.7	3.6	7.2	0.4
10	1.4	0.8	1.1	1.3	0.7	1.1	1.1	1.4	1.1	1.3	1.9	2.1	3.5	3.3	3.6	2.1	1.7	1.0	2.7	2.7	1.9	3.2	2.4	1.3	1.9	3.6	0.7
11	1.1	1.6	1.0	1.5	1.8	1.7	1.2	1.0	2.2	2.9	3.7	3.3	4.0	3.8	4.0	4.1	3.6	3.3	1.8	2.1	1.2	0.5	0.8	1.3	2.2	4.1	0.5
12	0.9	0.6	0.7	0.5	0.6	0.8	0.7	1.0	0.9	2.7	3.5	3.5	4.5	5.4	6.2	4.8	4.6	3.7	1.7	1.9	2.1	2.3	1.8	1.2	2.4	6.2	0.5
13	1.3	1.2	1.4	0.8	1.1	1.2	1.0	0.7	0.6	0.9	3.7	5.1	5.4	5.6	8.3	4.1	2.7	1.3	2.0	2.6	2.2	2.3	1.7	1.6	2.5	8.3	0.6
14	2.2	1.6	2.5	1.6	1.7	2.0	1.6	1.7	1.5	5.4	6.3	4.0	4.0	3.8	3.0	4.2	5.1	2.4	1.6	3.3	2.9	2.3	2.5	2.1	2.9	6.3	1.5
15	2.5	1.5	1.6	1.7	1.3	1.4	1.6	1.5	1.9	3.3	5.4	6.2	6.7	8.3	8.3	7.2	3.3	2.1	3.8	2.7	2.4	1.3	0.8	0.8	3.2	8.3	0.8
16	0.8	0.9	1.6	1.6	0.6	0.8	0.8	1.2	0.8	1.0	3.5	4.0	5.1	6.5	6.3	7.1	6.2	7.1	7.3	6.0	5.0	2.8	4.2	2.3	3.5	7.3	0.6
17	3.0	2.1	1.7	1.9	1.4	1.6	0.9	1.2	1.0	3.1	5.9	5.4	6.6	6.3	4.0	3.5	4.6	5.0	4.6	1.5	1.7	1.8	2.5	1.9	3.1	6.6	0.9
18	1.3	1.0	0.8	1.5	1.4	1.5	1.8	1.0	1.6	4.0	4.8	4.6	5.2	5.7	6.2	4.8	4.2	2.2	2.3	2.2	2.9	1.6	2.0	1.5	2.8	6.2	0.8
19	1.1	2.6	2.4	2.2	1.4	1.0	1.6	1.3	1.6	3.8	4.1	3.3	4.2	3.7	4.4	4.2	4.1	4.2	3.3	1.4	1.3	1.5	1.2	0.8	2.5	4.4	0.8
20	1.2	1.2	1.0	0.8	0.7	0.7	0.8	1.2	1.2	2.6	1.4	2.0	3.7	4.8	3.7	4.2	3.4	1.7	2.4	2.3	1.3	0.9	2.3	1.1	1.9	4.8	0.7
21	1.2	2.0	2.5	3.3	1.9	2.2	3.0	2.8	3.3	2.4	1.5	3.5	4.8	3.9	2.9	4.5	3.6	2.8	3.0	1.2	1.9	1.7	1.2	0.7	2.6	4.8	0.7
22	0.8	0.8	0.8	0.5	0.8	0.7	0.5	0.7	0.8	4.0	5.5	5.2	4.8	5.3	4.0	4.7	3.4	3.2	1.3	3.0	2.1	1.7	1.8	1.2	2.4	5.5	0.5
23	1.9	1.4	1.3	1.8	1.8	1.7	0.9	0.7	1.6	5.8	8.4	8.4	9.0	10.0	10.0	10.2	7.8	6.3	5.5	5.5	4.9	5.4	5.4	5.4	5.0	10.2	0.7
24	5.3	4.9	2.7	2.7	6.1	3.7	8.5	6.6	4.5	7.7	Au	Au	Au	Au	Au	8.2	7.5	6.4	7.1	8.1	6.6	4.9	3.4	2.8	5.7	8.5	2.7
25	1.7	1.7	1.0	1.2	1.9	1.9	1.5	0.8	0.9	6.4	5.6	6.2	5.2	5.7	6.8	6.2	6.3	5.4	3.3	2.4	1.9	1.5	1.9	1.8	3.3	6.8	0.8
26	2.6	2.1	3.4	2.0	2.9	4.1	2.5	2.5	1.8	4.6	3.4	7.4	10.0	11.7	8.2	7.4	5.8	3.5	4.8	5.3	5.9	4.8	3.0	5.0	4.8	11.7	1.8
27	3.1	2.9	2.2	1.0	1.3	1.6	1.8	1.3	0.8	0.9	1.1	3.1	3.9	3.7	3.9	2.6	2.1	1.4	3.5	3.2	3.2	3.4	4.1	2.4	2.4	4.1	0.8
28	2.0	4.3	4.0	2.9	3.2	1.7	2.9	2.3	1.4	1.8	4.1	4.9	3.3	2.9	2.8	2.2	2.6	1.9	2.7	3.4	3.6	2.8	3.0	2.8	2.9	4.9	1.4
29	3.5	5.2	4.3	3.1	6.4	4.7	4.3	4.2	4.1	4.7	4.0	4.7	5.4	6.2	5.2	4.0	3.9	4.1	3.3	2.4	2.5	3.3	3.5	4.0	4.2	6.4	2.4
30	3.6	3.4	3.8	2.3	1.5	2.3	2.9	2.6	4.1	4.0	3.8	3.1	3.4	3.0	3.0	3.8	3.4	2.5	1.7	1.2	1.3	1.6	1.4	0.9	2.7	4.1	0.9
Avg	1.9	2.0	1.8	1.7	1.8	1.8	2.0	1.8	1.8	3.3	4.0	4.5	5.2	5.3	5.1	4.8	4.3	3.6	3.5	3.1	2.7	2.4	2.4	2.0	3.0	6.3	0.9
Max	5.3	5.2	4.3	3.3	6.4	4.7	8.5	6.6	4.6	7.7	8.4	8.4	10.0	11.7	10.5	10.2	7.8	7.8	7.5	8.1	6.6	5.4	5.4	5.4	5.7	11.7	2.7
Min	0.8	0.5	0.4	0.5	0.6	0.7	0.5	0.5	0.6	0.9	1.1	2.0	2.6	1.1	1.0	1.4	0.8	1.0	1.3	1.2	0.8	0.5	0.8	0.7	1.8	3.2	0.4

A-3

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Wind Direction (degrees)**  
**July 2019**

Day	<< Hour >>																								Prev
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	120	126	71	107	60	144	145	326	130	292	263	277	266	255	215	314	307	288	296	240	56	54	132	100	209
2	92	135	221	208	223	342	319	325	335	322	327	314	185	179	171	145	144	342	349	63	66	256	97	198	254
3	117	156	18	44	65	67	5	158	154	179	239	142	298	281	258	295	284	316	322	322	114	80	39	87	40
4	47	65	71	36	122	272	116	119	124	156	266	283	263	264	253	283	254	228	194	107	69	60	52	336	115
5	9	347	4	297	204	118	151	177	148	154	173	210	298	50	106	86	120	79	97	107	135	149	128	157	126
6	161	117	330	97	86	107	100	167	172	159	142	148	157	159	145	135	325	89	280	52	77	114	103	89	121
7	115	146	131	148	136	112	159	159	263	50	42	289	334	322	133	206	218	170	294	294	170	95	126	33	145
8	75	93	327	3	140	179	10	165	170	252	326	249	199	287	326	76	44	74	79	26	78	25	84	80	60
9	76	125	172	326	312	331	313	294	294	292	313	289	251	286	360	64	66	15	291	59	101	92	101	103	352
10	122	103	128	130	106	112	174	164	131	173	173	180	222	193	209	212	213	150	128	136	120	116	105	95	148
11	82	47	34	60	98	74	148	144	226	343	317	299	279	297	302	304	331	323	319	311	105	154	151	149	360
12	87	57	73	40	314	130	203	269	341	301	271	270	267	286	303	299	335	312	306	148	150	145	117	100	308
13	108	108	100	93	139	99	140	155	350	156	168	155	140	226	158	354	355	102	143	149	153	139	266	139	134
14	114	112	99	115	82	326	303	299	289	300	334	46	274	209	179	281	53	54	94	61	55	31	6	94	39
15	6	60	5	39	73	66	144	251	24	294	280	288	257	257	292	217	328	180	293	291	49	100	122	128	335
16	126	126	131	153	145	113	360	139	301	308	268	288	281	294	296	292	301	299	177	148	145	155	90	90	188
17	134	104	33	84	108	136	40	343	313	271	255	248	244	256	264	242	273	309	240	302	130	241	194	50	257
18	82	90	89	100	99	58	88	267	253	253	256	256	263	272	271	281	285	309	309	293	302	199	187	337	276
19	75	106	44	101	75	112	355	273	343	296	298	293	280	258	283	304	311	303	302	299	118	89	99	104	343
20	17	78	82	124	126	136	128	312	357	326	331	272	322	315	273	286	273	269	255	299	330	8	21	281	323
21	326	156	130	148	153	140	124	31	103	146	147	159	159	162	159	157	147	140	143	139	92	324	268	258	146
22	60	136	146	142	109	57	99	125	154	156	161	160	154	148	194	275	270	234	160	131	118	143	155	163	147
23	140	122	126	89	100	91	123	146	107	161	132	54	354	27	320	318	108	339	303	102	81	102	157	80	95
24	128	86	94	127	132	96	171	79	39	259	268	251	266	279	276	284	282	295	293	281	303	319	255	163	262
25	119	107	109	92	145	96	120	54	295	290	279	261	292	281	266	268	286	279	301	292	305	106	70	55	305
26	94	110	117	144	116	105	106	178	22	316	297	271	270	268	261	268	279	320	300	293	51	94	70	51	6
27	85	105	89	124	113	139	134	193	72	119	190	192	207	198	187	121	87	132	160	197	127	112	99	102	135
28	119	103	145	245	79	87	78	328	284	284	290	291	309	280	276	349	352	330	299	56	91	133	115	138	357
29	117	133	148	107	117	119	123	142	146	150	138	180	237	261	327	314	320	250	228	131	75	100	65	126	139
30	104	85	95	48	149	129	79	152	322	347	297	266	318	279	328	28	124	239	172	70	95	107	95	87	83
31	88	55	104	123	122	115	116	213	338	290	345	34	6	205	204	316	293	307	87	145	128	109	84	58	86
Prev	94	103	92	101	114	104	112	182	337	262	267	254	263	259	253	289	306	301	270	80	96	105	106	100	121

A-4

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Wind Direction (degrees)**  
**August 2019**

Day	<< Hour >>																								Prev
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	19	113	138	157	166	150	356	158	338	111	306	318	289	305	254	239	75	124	130	146	145	117	108	114	131
2	105	105	90	141	69	119	147	153	86	4	40	90	294	299	233	238	277	212	211	222	214	101	157	162	149
3	153	137	38	120	124	114	147	160	28	263	288	284	255	246	259	278	268	263	223	111	65	40	106	77	169
4	61	358	81	130	61	137	196	347	107	122	344	282	284	314	311	283	312	319	1	64	99	231	55	134	23
5	136	145	75	121	129	101	118	173	358	356	308	329	329	284	281	304	315	311	315	305	77	75	61	77	21
6	122	60	106	87	97	124	132	191	124	319	280	299	279	293	311	330	326	336	332	124	114	82	68	35	50
7	95	104	72	35	92	82	71	2	174	140	295	278	284	317	348	302	296	348	121	144	70	73	161	154	67
8	150	95	57	103	59	120	94	244	285	284	317	300	272	344	359	48	99	120	106	79	76	122	114	126	82
9	92	86	91	119	149	120	114	357	104	342	256	251	258	275	6	325	77	66	8	103	97	108	81	76	78
10	36	72	90	2	158	28	35	86	55	223	293	319	317	299	332	50	55	53	340	19	310	93	122	90	31
11	107	117	144	125	142	148	150	167	173	342	305	328	146	284	315	282	91	255	220	273	240	272	236	318	214
12	92	35	80	63	124	246	166	269	261	285	288	268	276	283	282	271	281	285	294	302	335	93	58	44	300
13	92	94	132	116	60	112	111	171	294	18	286	311	315	299	320	290	309	333	341	62	62	78	77	114	36
14	219	133	77	66	64	67	108	134	318	323	292	297	291	294	292	292	308	293	293	182	89	73	154	167	322
15	321	347	44	149	100	54	122	96	24	302	282	280	276	280	279	296	311	306	276	263	148	97	91	104	330
16	116	72	63	81	91	104	135	303	279	285	278	281	273	259	263	270	282	300	332	318	349	307	290	294	303
17	319	174	270	281	295	279	267	251	248	277	301	284	256	249	202	284	288	282	319	307	101	89	92	102	274
18	119	107	97	128	146	156	50	325	67	250	254	270	265	255	270	283	278	264	284	59	67	86	61	48	48
19	131	112	69	111	126	114	140	297	76	226	266	257	264	267	263	286	309	12	359	201	67	117	99	93	127
20	11	329	169	284	16	325	343	130	147	160	153	150	143	141	135	146	149	151	145	140	120	130	119	109	134
21	101	91	55	65	24	121	146	291	328	145	152	151	148	145	136	139	133	136	128	125	128	133	152	154	126
22	118	243	163	74	81	60	90	99	333	278	284	309	292	304	327	286	266	286	168	254	140	122	51	37	328
23	115	127	120	102	94	58	26	314	255	166	246	269	257	262	273	310	244	254	266	121	113	92	112	105	171
24	128	122	164	135	135	72	143	27	312	290	265	264	254	248	234	227	234	237	258	275	311	299	306	316	250
25	274	292	347	356	295	51	68	64	308	254	289	293	288	286	280	281	302	325	333	306	88	86	108	76	323
26	138	114	61	115	28	100	84	217	324	281	315	319	308	294	285	299	302	311	349	41	357	301	134	109	346
27	95	81	101	102	118	122	108	205	143	151	253	247	245	275	269	255	300	284	274	115	102	77	69	29	142
28	119	125	135	122	91	113	105	170	348	323	233	281	283	284	271	300	301	290	290	131	80	71	130	93	128
29	185	67	148	54	125	136	120	140	153	154	152	162	151	252	276	179	131	157	144	129	101	142	39	78	137
30	101	119	327	116	191	66	134	269	115	151	240	257	295	287	292	301	300	281	235	124	74	68	113	116	171
31	54	119	54	125	135	113	121	170	209	352	244	265	249	265	273	276	298	295	310	104	67	83	99	265	185
Prev	105	99	91	102	103	103	112	187	352	277	278	281	272	280	284	283	297	292	294	121	87	92	100	93	90

A-5

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Wind Direction (degrees)**  
**September 2019**

Day	<< Hour >>																								Prev
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	38	20	12	41	127	113	110	267	360	153	162	153	168	216	234	243	207	191	134	133	344	11	142	130	138
2	114	109	54	34	93	95	131	273	312	313	289	290	286	294	286	287	299	293	306	9	324	357	103	106	334
3	65	85	46	75	27	90	134	38	7	71	263	247	285	253	253	241	242	249	100	97	86	51	267	115	67
4	36	144	123	174	125	94	127	23	322	268	267	253	261	280	283	267	283	291	312	104	103	37	134	135	225
5	72	92	74	72	66	87	110	226	306	328	289	297	299	305	333	316	311	346	130	70	81	81	83	132	35
6	130	125	151	158	307	324	103	124	144	144	149	144	160	59	223	290	247	229	248	172	296	269	214	296	187
7	267	264	293	295	289	298	297	294	278	278	276	297	273	280	29	357	316	346	180	162	162	148	153	155	277
8	155	153	160	127	151	129	130	128	148	160	168	157	155	158	151	157	155	155	156	156	159	154	155	149	151
9	190	343	93	272	281	269	266	273	303	290	281	273	266	273	288	287	273	285	278	252	103	93	116	108	274
10	102	159	63	106	174	345	45	157	290	226	179	174	154	234	304	323	293	334	329	334	30	51	322	291	318
11	292	292	67	311	287	297	183	264	297	311	321	311	335	318	335	338	356	335	22	305	264	350	95	66	321
12	30	57	10	299	87	67	39	127	7	301	278	269	257	274	269	276	265	252	230	127	104	63	104	102	346
13	108	125	123	155	138	124	144	158	170	139	227	240	249	231	240	164	83	279	113	59	49	74	56	333	142
14	227	105	91	109	116	118	117	104	74	255	270	282	276	234	249	246	250	248	103	97	102	84	89	87	140
15	91	121	132	122	156	140	133	99	99	122	154	165	180	230	223	227	198	164	89	94	112	126	121	154	141
16	357	121	119	106	43	125	142	151	1	148	116	144	160	173	180	207	191	206	168	150	126	94	83	102	135
17	111	315	51	107	141	141	88	101	353	235	246	248	244	258	255	252	241	266	282	222	140	115	76	97	196
18	127	160	130	130	142	126	125	124	130	164	176	181	174	161	188	169	139	146	79	326	149	211	334	209	152
19	122	294	306	322	31	83	66	98	301	322	281	266	278	302	283	295	281	286	304	226	179	104	109	11	307
20	130	166	150	48	107	353	21	148	244	325	337	297	291	309	331	309	324	66	84	76	114	200	284	337	357
21	318	327	303	306	316	327	299	285	267	273	262	271	245	276	309	280	255	275	247	227	125	110	128	135	278
22	160	85	118	353	268	169	162	159	47	253	259	256	264	257	274	262	270	246	150	100	113	109	133	128	190
23	110	121	73	122	116	125	165	246	279	270	267	264	258	263	274	284	275	277	280	272	264	272	273	281	255
24	279	282	315	290	264	267	284	281	273	265	Au	Au	Au	Au	Au	285	289	281	281	290	296	303	1	78	289
25	110	95	53	71	65	82	112	126	106	292	296	297	304	296	262	261	259	258	295	141	111	105	117	85	89
26	249	289	282	95	270	311	289	77	85	232	250	285	289	270	281	281	263	295	268	280	284	287	264	323	280
27	298	298	292	181	168	161	276	228	143	121	327	262	274	273	276	223	168	21	138	104	102	112	119	129	198
28	138	142	134	144	119	139	166	162	255	348	62	83	67	4	20	63	357	335	306	336	348	360	337	331	44
29	310	317	338	343	328	319	311	308	289	308	282	290	282	265	261	257	255	263	286	267	285	287	286	311	293
30	313	306	298	312	48	306	303	299	280	264	262	252	260	258	265	253	306	269	256	337	321	309	150	144	286
Prev	105	107	71	83	107	97	126	168	312	261	258	253	254	265	271	268	265	274	242	132	103	74	113	106	243

A-6

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Standard Deviation of Wind Direction (degrees)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	30	51	40	38	36	48	71	75	21	85	21	23	23	22	32	21	18	12	14	74	47	51	45	78	41	85	12
2	70	55	56	79	63	82	40	50	17	12	11	36	46	33	42	12	17	50	64	98	56	77	16	87	49	98	11
3	36	54	34	62	12	52	72	53	13	30	53	49	32	40	27	25	37	27	14	57	56	43	52	52	41	72	12
4	33	40	26	61	53	97	95	76	51	47	38	36	56	51	37	33	23	23	26	45	77	31	45	27	47	97	23
5	69	68	72	90	63	73	16	69	30	53	53	58	30	54	19	19	19	16	21	40	20	36	39	56	45	90	16
6	37	64	77	33	54	27	31	58	70	11	15	17	17	29	17	12	101	54	79	39	35	39	35	13	40	101	11
7	24	52	32	36	33	25	35	43	44	41	43	89	51	29	66	24	21	10	43	18	66	42	63	85	42	89	10
8	56	71	72	55	50	98	73	73	59	40	55	80	54	26	36	23	80	10	24	48	23	62	28	35	51	98	10
9	33	36	67	45	17	11	12	21	15	15	23	43	49	34	56	15	31	43	57	49	43	17	18	22	32	67	11
10	28	25	36	24	33	66	50	75	32	27	32	68	48	24	24	36	16	12	14	21	55	54	15	27	35	75	12
11	28	27	44	39	33	58	23	71	83	71	40	30	48	36	17	19	19	12	10	28	40	15	44	10	35	83	10
12	71	66	57	79	85	19	63	87	26	37	29	27	30	34	17	32	30	35	61	26	49	40	48	48	46	87	17
13	18	27	23	57	35	35	18	45	85	20	27	44	51	31	78	51	47	44	20	20	17	27	90	69	41	90	17
14	41	72	47	26	40	65	74	95	27	53	79	33	61	27	42	68	29	20	63	42	74	31	32	32	49	95	20
15	67	41	87	75	57	61	30	79	80	28	28	77	34	30	49	41	50	33	62	74	88	94	74	49	58	94	28
16	36	59	38	36	43	68	67	61	30	22	21	23	25	34	28	27	16	15	63	6	24	60	41	46	37	68	6
17	48	66	41	34	25	15	66	63	39	20	24	15	18	24	16	18	22	43	62	66	30	73	68	71	40	73	15
18	42	60	42	22	29	57	53	39	15	17	14	14	19	17	17	14	12	11	13	19	9	94	75	73	32	94	9
19	37	37	34	47	42	71	65	97	61	14	25	28	20	19	21	13	11	13	10	66	73	77	62	22	40	97	10
20	73	56	43	14	24	83	50	85	61	68	30	46	26	25	24	35	25	36	26	68	65	63	77	55	48	85	14
21	90	46	48	51	30	27	96	95	90	12	14	19	18	28	15	17	11	9	8	9	65	53	35	64	40	96	8
22	60	54	51	31	80	84	38	28	7	10	14	11	17	19	44	61	25	19	15	22	76	13	71	56	38	84	7
23	55	23	31	26	27	27	14	26	50	20	44	63	92	99	49	40	92	81	66	51	11	34	60	45	47	99	11
24	48	62	25	38	20	27	65	58	98	19	22	23	20	15	15	14	14	10	11	10	7	7	73	62	32	98	7
25	27	44	51	63	32	63	72	97	18	28	18	18	25	28	39	17	15	16	10	43	62	50	41	35	38	97	10
26	48	31	59	94	40	51	40	46	68	25	28	37	34	35	45	32	25	24	43	13	48	17	21	29	39	94	13
27	36	26	52	70	72	94	89	70	76	66	22	19	31	37	24	81	28	18	26	39	36	20	47	34	46	94	18
28	22	68	29	87	30	50	52	33	11	36	31	28	41	46	54	62	34	23	19	47	49	22	35	20	39	87	11
29	36	15	15	19	22	17	15	20	27	23	26	53	49	30	20	28	25	28	24	30	8	29	42	36	27	53	8
30	39	40	38	44	40	28	82	50	80	48	30	30	40	37	28	45	29	74	53	88	29	24	24	32	44	88	24
31	34	27	26	50	67	74	53	88	45	64	49	47	64	72	38	66	22	53	44	20	18	37	33	39	47	88	18
Avg	44	47	45	49	42	53	52	62	46	34	31	38	38	34	33	32	30	28	34	41	44	43	47	45	41	88	13
Max	90	72	87	94	85	98	96	97	98	85	79	89	92	99	78	81	101	81	79	98	88	94	90	87	58	101	28
Min	18	15	15	14	12	11	12	20	7	10	11	11	17	15	15	12	11	9	8	6	7	7	15	10	27	53	6

A-7

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Standard Deviation of Wind Direction (degrees)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	45	61	56	46	88	29	54	61	73	46	61	40	29	52	18	81	10	36	10	18	29	18	18	16	41	88	10
2	40	35	35	29	42	20	72	27	50	59	50	99	25	37	25	63	41	10	21	27	22	82	61	38	42	99	10
3	31	26	82	16	18	41	50	47	75	44	34	29	33	32	25	24	25	21	51	27	75	85	84	47	43	85	16
4	81	94	24	20	55	18	85	47	82	82	57	41	44	34	42	34	19	11	32	86	41	84	58	88	52	94	11
5	57	86	51	48	43	52	60	52	58	29	52	12	52	26	19	18	22	19	13	46	21	18	44	80	41	86	12
6	86	57	38	53	81	27	22	87	94	35	21	24	28	27	23	25	18	11	24	58	34	75	47	49	44	94	11
7	44	76	58	72	27	53	88	46	47	79	56	23	33	24	21	61	53	81	48	19	76	40	60	57	52	88	19
8	31	64	80	29	43	50	49	78	51	64	48	44	39	32	47	76	24	17	12	10	19	49	53	39	44	80	10
9	54	54	81	40	43	81	51	92	72	75	38	42	49	24	15	47	25	33	80	39	46	34	33	15	48	92	15
10	34	47	94	63	37	80	90	98	60	68	55	22	38	43	13	31	14	22	54	66	61	46	82	27	52	98	13
11	29	36	68	28	12	13	18	42	27	66	18	47	60	44	12	40	36	70	88	32	28	14	70	52	40	88	12
12	60	76	26	65	57	100	64	12	10	37	44	14	14	15	14	17	15	13	10	9	81	18	12	42	34	100	9
13	42	49	42	93	52	51	43	49	79	44	38	31	22	27	57	46	32	74	17	47	38	41	58	46	47	93	17
14	83	57	28	24	35	52	48	95	80	62	20	16	22	19	13	16	17	12	11	102	19	83	65	78	44	102	11
15	50	32	79	55	49	73	63	91	69	12	23	24	19	20	36	21	19	16	19	39	67	49	26	30	41	91	12
16	27	42	52	30	74	44	40	85	74	16	18	19	15	21	16	16	11	20	10	22	16	26	9	15	30	85	9
17	66	44	65	31	15	31	29	10	56	64	36	57	33	77	44	38	20	17	14	42	30	26	32	34	38	77	10
18	30	43	55	43	35	48	83	84	95	15	20	21	21	18	17	19	16	18	40	49	24	12	22	52	37	95	12
19	54	31	51	35	14	34	33	82	40	58	21	19	22	19	20	30	34	25	49	71	70	43	82	93	43	93	14
20	92	92	85	79	78	91	77	76	53	8	11	9	11	10	22	8	7	5	9	26	31	28	19	33	40	92	5
21	30	35	28	36	40	21	74	54	45	25	11	11	11	10	11	10	10	9	9	10	9	9	12	29	23	74	9
22	46	47	57	93	60	61	58	66	36	12	13	13	24	19	14	19	24	49	34	67	61	38	59	71	43	93	12
23	84	42	73	39	43	56	67	20	34	86	33	24	31	28	25	29	29	18	26	51	22	17	26	32	39	86	17
24	39	36	90	43	44	64	24	51	73	89	19	21	21	17	18	18	12	11	30	21	29	10	9	11	33	90	9
25	21	58	47	46	29	28	19	62	85	16	13	13	22	13	16	13	14	27	19	38	96	59	39	57	35	96	13
26	50	89	77	84	80	33	62	82	86	15	15	18	28	25	22	12	13	16	29	33	44	51	51	32	44	89	12
27	42	55	51	46	70	41	37	85	48	33	64	40	42	33	34	28	17	22	42	28	21	11	17	38	39	85	11
28	53	28	60	56	45	26	31	66	93	82	20	32	28	25	17	18	14	12	26	46	23	36	33	58	39	93	12
29	84	79	65	73	76	50	18	18	9	17	20	41	51	28	19	62	24	11	14	26	20	42	82	88	42	88	9
30	44	35	58	79	73	53	59	84	83	18	35	22	26	29	17	16	23	25	48	20	55	55	74	81	46	84	16
31	43	17	42	20	23	35	44	54	101	74	37	24	27	25	30	33	21	19	85	22	15	58	83	74	42	101	15
Avg	51	52	58	49	48	47	52	61	63	46	32	29	30	28	23	31	21	24	31	39	39	41	46	48	41	90	12
Max	92	94	94	93	88	100	90	98	101	89	64	99	60	77	57	81	53	81	88	102	96	85	84	93	52	102	19
Min	21	17	24	16	12	13	18	10	9	8	11	9	11	10	11	8	7	5	9	9	9	9	9	11	23	74	5

A-8

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Standard Deviation of Wind Direction (degrees)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	38	30	78	76	80	66	77	60	82	59	24	28	33	43	31	39	19	26	6	16	70	93	20	39	47	93	6
2	19	68	32	40	71	82	25	86	65	35	20	21	19	15	15	16	16	14	42	75	87	78	47	25	42	87	14
3	74	55	70	54	53	49	25	79	58	69	51	27	40	44	43	46	62	47	43	13	28	31	94	75	51	94	13
4	89	44	73	91	54	63	43	73	84	34	19	22	19	12	12	16	21	12	14	95	20	48	45	57	44	95	12
5	55	30	57	62	61	49	41	70	56	68	32	33	44	29	21	24	51	52	81	37	15	21	14	37	43	81	14
6	34	43	14	64	95	79	31	18	17	63	14	24	25	63	77	24	98	21	61	18	65	36	82	12	45	98	12
7	54	19	15	17	11	8	8	11	10	9	19	31	22	30	60	83	32	30	29	7	13	17	6	19	23	83	6
8	9	9	41	31	48	25	31	49	29	8	11	15	8	11	8	13	6	5	6	10	6	8	8	15	17	49	5
9	59	67	78	79	9	10	10	15	15	14	11	15	12	14	11	15	38	13	24	95	68	28	35	45	33	95	9
10	40	69	65	48	81	51	51	49	67	64	46	34	18	67	20	33	17	77	12	16	46	19	58	30	45	81	12
11	60	44	98	30	62	44	59	60	14	12	10	14	20	29	29	23	16	13	40	15	43	91	52	24	38	98	10
12	52	75	68	101	69	38	54	51	41	27	30	29	24	26	21	24	19	12	54	19	24	32	42	31	40	101	12
13	39	26	40	49	53	49	36	64	94	60	30	19	22	21	30	35	63	96	42	31	28	38	36	43	44	96	19
14	69	68	18	71	35	42	45	55	80	18	15	22	22	26	25	21	22	7	63	20	16	36	20	25	35	80	7
15	22	20	34	23	25	25	20	64	41	26	16	12	19	15	18	13	13	35	15	14	15	48	36	59	26	64	12
16	68	37	19	32	72	72	57	23	101	42	26	15	12	22	25	15	15	10	17	18	22	37	27	49	35	101	10
17	30	94	60	29	39	34	82	71	70	48	11	15	12	11	11	17	17	13	13	55	33	25	42	37	36	94	11
18	54	49	62	83	42	51	22	31	49	23	18	25	30	18	26	21	29	49	52	86	88	63	83	69	47	88	18
19	95	26	18	54	55	85	49	56	50	20	24	38	25	31	16	15	11	9	11	99	66	31	37	85	42	99	9
20	47	85	57	93	62	94	100	77	98	21	46	31	17	21	15	12	19	15	14	50	31	77	38	56	49	100	12
21	77	27	24	14	20	16	10	14	16	17	38	25	14	18	39	33	15	26	10	72	23	18	19	45	26	77	10
22	39	94	72	89	84	73	60	75	98	31	13	23	18	18	23	15	17	17	73	16	20	24	23	42	44	98	13
23	52	67	62	42	30	28	31	75	76	15	15	14	12	14	16	11	14	11	10	12	14	13	12	14	28	76	10
24	12	11	35	59	15	23	10	10	10	11	Au	Au	Au	Au	Au	11	11	11	10	10	16	11	69	41	20	69	10
25	28	34	69	61	48	49	31	99	73	12	17	14	13	13	20	20	12	13	56	22	40	42	48	52	37	99	12
26	64	66	57	49	52	18	33	53	36	57	19	10	15	11	11	13	10	13	16	11	12	18	77	16	31	77	10
27	13	11	20	90	22	14	35	23	38	75	73	50	30	23	28	36	17	76	62	24	30	21	18	37	36	90	11
28	41	12	17	25	24	92	16	18	55	83	14	10	16	35	41	57	89	55	36	20	16	25	18	30	35	92	10
29	10	11	16	36	12	11	8	11	13	11	16	13	20	8	8	10	10	12	17	21	10	9	15	13	13	36	8
30	8	15	8	49	30	24	10	9	13	12	16	22	19	27	26	22	27	28	40	47	24	48	55	18	25	55	8
Avg	45	44	46	55	47	45	37	48	52	35	24	22	21	25	25	24	27	27	32	35	33	36	39	38	36	85	11
Max	95	94	98	101	95	94	100	99	101	83	73	50	44	67	77	83	98	96	81	99	88	93	94	85	51	101	19
Min	8	9	8	14	9	8	8	9	10	8	10	10	8	8	8	10	6	5	6	7	6	8	6	12	13	36	5

A-9



**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature 9 Meters (degrees Celsius)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	10.7	8.6	6.3	5.6	6.8	6.8	9.1	13.5	16.5	17.9	18.8	18.5	20.0	20.8	20.1	20.7	21.0	19.5	19.8	18.4	15.0	13.7	12.0	10.6	14.6	21.0	5.6
2	8.0	6.9	6.8	6.7	5.6	5.6	6.2	7.9	11.7	13.8	14.9	17.5	18.9	18.8	18.8	16.7	14.2	11.8	10.9	10.5	9.9	9.7	9.7	9.8	11.3	18.9	5.6
3	9.6	9.7	7.9	7.2	7.0	7.1	7.6	9.6	11.3	11.6	10.7	11.8	10.9	11.5	13.0	13.9	14.5	14.7	14.1	12.1	9.2	7.4	6.0	5.4	10.2	14.7	5.4
4	5.1	5.3	5.0	4.6	4.1	4.5	5.9	8.1	11.1	12.6	13.9	15.0	15.7	16.7	17.4	17.7	17.8	17.6	16.7	15.4	13.5	12.4	11.0	9.0	11.5	17.8	4.1
5	8.1	6.8	7.2	7.1	6.5	6.9	7.7	8.6	9.9	11.7	14.6	16.3	16.7	15.6	12.7	13.7	14.1	14.4	14.9	13.7	11.9	11.2	11.3	11.2	11.4	16.7	6.5
6	10.1	8.0	6.6	7.6	8.2	8.7	10.8	12.6	13.7	15.7	17.4	18.7	19.9	20.7	21.2	20.7	17.7	13.4	12.9	11.8	11.8	10.2	9.8	9.2	13.2	21.2	6.6
7	7.5	6.9	6.5	7.0	6.9	7.0	9.3	13.8	15.1	12.9	13.5	16.3	18.4	18.9	20.0	20.6	19.9	17.2	14.6	13.6	11.5	10.2	9.2	8.5	12.7	20.6	6.5
8	8.6	8.5	8.7	7.4	6.7	7.0	7.9	10.6	13.6	15.8	16.8	17.4	18.1	18.2	17.4	15.2	11.2	10.1	10.2	10.3	9.3	8.1	7.9	7.9	11.4	18.2	6.7
9	7.7	7.5	7.6	7.8	8.0	7.8	8.2	8.2	7.9	8.2	8.8	10.2	12.3	13.1	13.6	13.5	14.6	15.3	15.6	15.0	10.9	9.0	7.2	6.1	10.2	15.6	6.1
10	5.1	5.0	4.4	3.9	4.6	5.8	8.1	12.2	15.7	18.2	19.5	20.5	21.3	22.2	23.1	23.4	22.8	22.5	21.5	20.3	18.4	16.5	13.7	13.0	15.1	23.4	3.9
11	12.0	11.6	10.3	9.0	8.4	7.8	10.0	14.2	18.5	20.1	20.9	22.0	23.1	23.2	24.1	24.3	24.3	24.0	23.3	22.2	19.7	17.5	16.3	15.5	17.6	24.3	7.8
12	13.9	13.0	11.6	10.8	10.6	10.8	12.0	14.4	17.5	19.3	20.2	20.8	21.9	22.9	23.8	24.5	24.7	24.8	23.5	18.1	15.5	13.9	12.5	10.6	17.2	24.8	10.6
13	10.5	9.5	8.8	8.3	7.4	7.3	9.8	14.6	19.0	22.3	23.8	24.8	25.8	23.9	20.9	21.0	19.4	20.1	18.4	18.5	16.9	16.0	15.7	14.9	16.6	25.8	7.3
14	13.4	12.3	12.3	12.2	10.5	11.1	13.6	14.8	16.3	18.1	18.9	20.1	23.1	23.9	23.4	17.6	13.9	16.6	18.5	16.7	15.5	13.5	11.7	10.8	15.8	23.9	10.5
15	9.4	9.5	8.4	7.4	7.0	7.6	8.9	12.0	15.8	17.6	18.5	19.2	20.4	20.9	21.1	21.6	21.6	20.2	13.4	13.1	12.2	12.5	12.5	12.2	14.3	21.6	7.0
16	11.9	10.4	9.5	9.4	9.3	9.4	10.5	12.7	14.2	14.9	15.8	16.5	17.5	18.3	18.5	19.1	19.1	18.3	16.2	14.1	13.5	12.2	11.4	10.5	13.9	19.1	9.3
17	10.1	9.8	9.1	7.8	6.0	5.4	7.8	11.0	13.9	15.4	15.7	16.7	16.8	17.2	16.9	16.8	16.8	16.6	16.2	14.5	13.3	12.2	12.5	9.9	12.9	17.2	5.4
18	9.5	8.0	7.0	5.9	5.5	4.9	8.0	13.4	15.5	16.9	17.7	18.3	18.7	19.4	19.7	19.9	19.8	18.7	17.8	16.5	14.9	12.9	10.2	8.2	13.6	19.9	4.9
19	7.4	4.8	3.9	3.4	2.7	2.9	4.5	6.7	10.1	12.1	13.5	14.7	15.9	16.4	17.1	17.1	16.4	15.7	14.8	13.6	11.5	6.9	3.8	2.5	9.9	17.1	2.5
20	1.2	0.1	-0.5	-1.7	-2.3	-2.6	0.0	5.6	10.6	12.5	13.9	15.0	16.0	16.8	18.0	18.4	18.9	18.9	18.0	15.9	14.7	12.1	10.3	8.4	9.9	18.9	-2.6
21	6.6	4.4	2.7	1.8	1.2	0.8	2.8	7.8	12.7	14.9	15.5	16.4	17.3	18.2	19.0	19.8	19.9	19.3	18.4	17.1	15.6	14.9	13.7	14.1	12.3	19.9	0.8
22	14.2	13.0	12.2	11.1	9.2	8.8	11.4	16.3	17.9	19.1	20.7	22.6	23.6	24.4	25.4	26.2	26.3	25.9	22.9	21.9	21.3	19.8	17.9	15.5	18.6	26.3	8.8
23	14.6	13.5	12.3	11.5	10.3	10.3	11.1	14.4	20.8	23.7	22.7	23.7	25.4	27.1	27.5	26.9	25.2	22.9	22.9	21.7	17.6	16.3	15.5	15.6	18.9	27.5	10.3
24	14.9	14.2	13.1	11.7	11.3	10.8	12.3	17.6	21.3	22.7	23.2	24.1	24.5	24.5	24.7	24.5	24.0	22.8	21.4	19.6	17.4	15.6	14.7	11.5	18.4	24.7	10.8
25	7.7	4.0	2.0	0.9	0.0	-0.5	1.1	9.7	15.7	16.7	17.8	19.0	20.3	21.3	22.2	22.8	23.4	23.2	22.2	20.5	17.0	11.8	9.2	7.4	13.1	23.4	-0.5
26	5.5	4.0	3.0	2.0	1.7	1.5	4.3	10.3	16.3	19.9	21.1	22.3	23.4	24.2	24.5	24.9	24.9	24.6	24.8	23.9	19.3	14.1	12.4	11.7	15.2	24.9	1.5
27	9.0	8.2	7.2	8.3	9.1	9.7	10.3	12.2	14.2	17.6	21.5	22.6	23.5	23.9	23.8	19.0	20.0	22.4	22.3	19.3	16.1	13.6	10.6	8.7	15.5	23.9	7.2
28	7.0	5.8	5.2	9.1	8.8	7.0	8.3	13.2	15.5	16.6	17.7	18.3	19.1	19.8	20.4	21.1	21.3	21.3	20.3	17.6	15.2	12.5	11.8	9.8	14.3	21.3	5.2
29	13.4	14.6	13.1	12.6	11.6	11.7	13.1	15.1	16.9	18.3	19.8	21.4	23.0	23.9	24.4	24.6	25.2	24.8	22.6	19.5	17.1	13.2	13.3	11.3	17.7	25.2	11.3
30	9.5	9.0	7.3	6.6	6.1	5.8	7.0	11.7	18.3	20.7	22.4	23.4	24.4	23.7	20.2	21.7	22.6	22.4	20.6	19.7	16.4	13.3	11.0	9.5	15.6	24.4	5.8
31	8.3	7.7	6.9	5.1	5.3	5.0	6.7	11.9	17.0	22.0	23.7	24.0	24.9	26.0	26.6	26.7	26.9	26.6	25.8	22.2	20.6	17.7	14.3	13.5	17.3	26.9	5.0
Avg	9.4	8.4	7.5	7.0	6.6	6.5	8.2	11.8	15.0	16.8	17.9	19.0	20.0	20.5	20.6	20.5	20.1	19.6	18.6	17.0	14.9	12.9	11.6	10.4	14.2	21.6	6.0
Max	14.9	14.6	13.1	12.6	11.6	11.7	13.6	17.6	21.3	23.7	23.8	24.8	25.8	27.1	27.5	26.9	26.9	26.6	25.8	23.9	21.3	19.8	17.9	15.6	18.9	27.5	11.3
Min	1.2	0.1	-0.5	-1.7	-2.3	-2.6	0.0	5.6	7.9	8.2	8.8	10.2	10.9	11.5	12.7	13.5	11.2	10.1	10.2	10.3	9.2	6.9	3.8	2.5	9.9	14.7	-2.6

A-10

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature 9 Meters (degrees Celsius)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	13.3	10.8	8.6	8.2	7.3	6.8	8.9	13.8	19.5	22.9	24.1	25.2	26.1	26.7	26.2	24.2	22.1	22.6	20.4	18.1	16.9	14.4	13.0	12.0	17.2	26.7	6.8
2	11.0	9.5	7.9	6.9	6.7	6.0	7.3	12.7	18.4	21.6	23.7	25.4	26.1	26.3	26.4	26.9	27.1	26.5	24.8	23.3	21.3	19.1	16.9	17.1	18.3	27.1	6.0
3	14.9	13.5	11.3	8.8	7.3	6.2	7.7	12.4	17.2	19.8	21.0	22.5	23.7	24.7	25.4	25.1	25.7	25.4	24.1	20.6	17.8	15.7	13.8	11.9	17.4	25.7	6.2
4	12.6	11.6	10.2	8.2	7.6	6.8	9.0	14.1	18.9	21.9	23.5	24.7	25.6	26.1	26.9	27.4	27.1	26.3	24.7	21.8	19.9	16.5	14.4	12.1	18.2	27.4	6.8
5	10.5	8.9	7.7	6.9	5.9	5.7	7.0	12.3	17.6	20.6	22.4	22.6	23.7	25.1	25.4	26.3	26.8	26.4	25.2	23.6	18.6	14.2	11.1	8.9	16.8	26.8	5.7
6	7.8	6.3	5.1	4.2	3.9	3.4	4.8	9.9	16.4	21.2	22.3	23.3	24.3	24.9	25.3	25.1	24.5	24.7	24.6	21.3	15.9	13.2	12.5	11.1	15.7	25.3	3.4
7	9.6	8.6	9.4	8.4	7.2	6.3	8.3	12.6	15.9	18.4	20.9	22.0	23.2	24.2	24.9	25.2	25.7	25.7	25.1	21.2	19.9	18.9	16.2	15.8	17.2	25.7	6.3
8	14.0	13.2	12.9	13.1	12.9	12.4	12.4	13.8	17.4	21.6	24.0	25.0	25.8	25.6	26.3	26.6	26.5	24.9	24.6	22.0	20.3	18.2	17.0	15.6	19.4	26.6	12.4
9	13.7	13.4	13.0	12.6	12.4	11.7	12.4	15.6	18.3	19.6	19.7	21.0	21.8	20.8	18.3	16.5	14.1	14.7	14.4	13.6	12.6	10.9	10.0	9.6	15.0	21.8	9.6
10	8.6	7.7	7.2	6.4	6.3	5.8	7.3	9.6	11.8	14.4	16.3	17.1	18.5	19.4	19.8	19.6	18.2	16.3	13.9	12.3	12.2	11.1	10.8	11.2	12.6	19.8	5.8
11	11.0	10.6	9.3	9.8	11.6	11.1	11.9	12.5	12.6	13.6	12.7	14.4	16.5	14.6	12.6	12.3	9.4	10.0	10.0	9.8	9.0	9.1	8.4	8.2	11.3	16.5	8.2
12	8.1	6.4	5.4	5.3	4.8	4.1	5.9	10.2	10.8	11.5	12.2	13.3	14.0	15.1	15.9	16.2	16.6	16.1	15.6	14.8	12.2	8.4	7.1	5.6	10.6	16.6	4.1
13	4.0	3.1	2.4	1.5	1.5	0.9	1.6	6.0	11.2	14.5	15.9	16.5	17.3	18.4	19.3	20.1	20.4	20.5	19.7	16.1	12.4	9.9	8.8	7.0	11.2	20.5	0.9
14	6.3	5.6	5.6	5.5	4.8	4.3	4.9	9.1	13.7	17.4	19.0	19.5	20.3	20.4	20.6	21.1	21.4	21.5	20.2	17.7	13.4	12.0	12.9	11.4	13.7	21.5	4.3
15	10.8	12.3	11.3	8.5	5.9	4.1	4.8	8.8	13.4	16.0	17.0	18.2	18.1	18.7	19.4	19.9	20.1	19.8	18.3	15.6	12.0	9.2	7.5	5.8	13.1	20.1	4.1
16	4.3	3.4	3.1	2.6	2.0	1.6	2.3	6.5	13.0	15.5	16.4	17.0	17.8	17.9	18.3	19.0	18.5	17.7	15.7	14.4	13.3	11.4	10.0	9.8	11.3	19.0	1.6
17	8.9	8.4	7.5	6.8	6.6	6.4	6.4	6.4	7.1	7.5	7.3	8.2	8.6	9.4	10.2	12.6	13.7	13.3	11.1	10.0	8.4	7.4	5.8	4.3	8.4	13.7	4.3
18	3.2	2.4	1.7	1.5	0.9	0.6	1.1	5.1	11.0	14.2	15.8	17.3	18.6	19.9	21.2	22.1	22.6	22.8	21.6	17.3	14.1	11.7	10.5	9.2	11.9	22.8	0.6
19	7.0	5.5	5.2	4.4	3.7	3.1	4.2	8.3	15.2	20.5	21.9	23.0	24.6	25.4	25.8	26.1	25.0	23.0	20.7	17.2	14.0	11.9	10.7	9.5	14.8	26.1	3.1
20	8.9	8.9	8.3	7.4	7.1	6.7	7.4	11.9	18.1	20.2	20.9	21.8	23.1	23.2	23.7	23.2	23.1	22.3	20.7	19.3	17.5	17.4	15.6	14.6	16.3	23.7	6.7
21	13.0	10.8	9.3	8.0	8.4	7.2	8.0	11.0	16.7	21.4	22.8	23.7	24.9	25.4	25.8	25.7	25.1	24.2	23.5	22.7	22.5	22.2	21.0	20.5	18.5	25.8	7.2
22	19.6	18.0	16.4	13.8	11.4	9.7	10.6	12.9	15.3	17.8	17.7	18.0	18.3	17.7	18.0	17.7	14.8	14.0	13.2	11.9	10.3	9.8	10.0	9.6	14.4	19.6	9.6
23	9.9	9.5	9.3	10.1	10.3	10.3	10.2	11.2	12.6	14.4	15.1	16.5	17.6	18.2	18.4	18.3	19.6	19.5	17.8	14.4	11.2	9.6	7.7	7.2	13.3	19.6	7.2
24	6.9	7.1	7.5	6.8	6.5	5.8	6.9	9.7	13.6	16.7	18.3	18.0	18.5	19.7	21.6	22.2	22.0	21.6	20.4	19.4	17.4	18.3	17.1	16.5	14.9	22.2	5.8
25	16.5	15.7	14.3	12.3	12.3	8.6	6.5	10.2	12.9	13.8	14.8	15.5	16.4	17.5	18.0	17.4	16.4	14.5	11.0	9.8	8.7	8.3	6.3	4.7	12.6	18.0	4.7
26	5.2	4.4	3.9	4.6	4.8	4.3	3.3	5.9	9.5	11.7	12.1	12.9	14.3	14.8	16.0	16.4	16.7	16.4	14.7	12.3	11.5	9.1	6.7	4.7	9.8	16.7	3.3
27	3.4	1.6	0.5	0.5	-0.4	-1.2	-1.1	3.0	9.0	11.9	13.6	14.8	15.5	16.6	17.4	18.4	19.0	19.2	18.5	13.0	8.6	7.7	6.9	4.4	9.2	19.2	-1.2
28	3.2	2.1	1.5	1.2	1.1	0.8	1.2	5.7	12.9	18.1	19.6	21.1	22.9	24.1	24.7	25.0	24.9	24.5	23.3	17.6	13.0	11.3	7.9	6.6	13.1	25.0	0.8
29	6.2	4.9	3.4	2.2	2.4	2.6	9.3	11.8	13.7	14.9	16.2	17.7	19.7	20.6	20.8	20.5	20.1	19.0	18.0	16.8	15.5	14.7	12.2	11.3	13.1	20.8	2.2
30	11.3	11.4	11.3	10.9	10.7	10.4	10.0	10.7	13.9	16.3	17.0	17.1	18.5	19.2	20.8	20.9	20.9	20.9	19.0	15.2	13.8	12.7	10.6	8.7	14.7	20.9	8.7
31	7.7	5.8	4.7	4.0	3.4	2.7	3.0	6.9	12.6	17.3	19.4	20.5	21.5	23.0	23.9	24.4	24.7	24.3	21.8	16.2	15.1	13.0	11.9	11.0	14.1	24.7	2.7
Avg	9.4	8.4	7.6	6.8	6.4	5.7	6.6	10.0	14.2	17.0	18.2	19.2	20.2	20.8	21.2	21.4	21.1	20.6	19.2	16.8	14.5	12.8	11.3	10.2	14.1	22.1	5.1
Max	19.6	18.0	16.4	13.8	12.9	12.4	12.4	15.6	19.5	22.9	24.1	25.4	26.1	26.7	26.9	27.4	27.1	26.5	25.2	23.6	22.5	22.2	21.0	20.5	19.4	27.4	12.4
Min	3.2	1.6	0.5	0.5	-0.4	-1.2	-1.1	3.0	7.1	7.5	7.3	8.2	8.6	9.4	10.2	12.3	9.4	10.0	10.0	9.8	8.4	7.4	5.8	4.3	8.4	13.7	-1.2

A-11

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature 9 Meters (degrees Celsius)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	9.5	8.6	8.2	8.4	8.3	7.0	6.5	10.2	15.0	19.6	21.7	22.9	23.8	24.8	25.2	25.7	25.9	25.6	23.3	22.1	20.4	19.6	18.5	17.9	17.4	25.9	6.5
2	15.6	12.6	11.3	9.1	8.0	7.0	6.4	9.4	15.3	19.6	20.8	22.2	23.5	23.7	24.3	24.5	24.3	23.8	21.9	18.2	16.1	14.0	10.7	8.6	16.3	24.5	6.4
3	6.3	6.0	4.8	4.2	3.5	2.6	2.5	6.4	13.1	18.1	20.9	21.9	23.2	24.4	25.1	25.5	25.7	25.6	23.2	16.6	13.7	12.5	10.9	13.4	14.6	25.7	2.5
4	12.0	9.1	8.0	8.1	8.2	7.2	6.8	9.9	17.4	22.8	23.8	25.3	26.2	26.5	26.8	26.9	26.7	26.0	23.9	19.3	14.3	11.2	10.0	7.5	16.8	26.9	6.8
5	5.4	5.2	3.9	4.0	3.2	3.0	2.6	6.7	13.0	19.8	22.3	23.3	24.3	25.0	25.6	26.0	26.1	26.0	22.3	19.2	17.7	18.3	19.0	17.5	15.8	26.1	2.6
6	17.3	16.9	15.8	16.4	15.5	13.9	13.6	13.4	14.8	16.4	17.7	18.9	17.2	15.6	14.8	14.8	15.1	15.0	14.2	13.1	12.2	11.6	11.6	11.2	14.9	18.9	11.2
7	11.0	10.9	10.7	10.4	10.4	10.4	10.5	10.6	10.9	11.1	11.4	11.9	12.4	13.3	13.9	13.9	14.3	14.2	13.1	11.2	10.4	10.0	9.5	8.8	11.5	14.3	8.8
8	8.3	8.1	7.7	7.8	7.6	7.9	7.9	8.5	9.5	10.4	12.1	11.7	12.3	13.0	12.8	14.4	12.7	10.1	9.3	9.5	9.5	9.6	9.5	9.2	10.0	14.4	7.6
9	9.1	8.9	8.8	8.7	8.4	8.3	8.1	8.2	8.6	8.3	8.7	9.7	9.9	11.3	11.8	12.4	12.8	12.3	10.3	8.6	5.8	4.1	3.2	1.9	8.7	12.8	1.9
10	1.0	0.0	-0.4	-1.0	-1.3	-1.1	-0.8	0.7	3.9	9.1	10.5	10.8	11.3	10.5	8.7	7.7	7.4	7.4	6.7	6.5	6.5	5.9	5.3	5.0	5.0	11.3	-1.3
11	5.1	5.5	5.5	5.6	5.9	5.8	5.9	5.6	5.6	5.4	5.9	6.7	8.0	9.0	9.3	8.5	8.2	7.8	7.6	6.9	5.5	3.5	2.3	0.9	6.1	9.3	0.9
12	-0.1	-0.7	-1.5	-1.5	-1.0	-0.7	-0.8	0.0	5.1	8.6	10.0	10.9	12.3	13.1	14.1	14.2	14.7	14.4	12.1	7.9	5.7	4.5	2.9	1.9	6.1	14.7	-1.5
13	1.3	0.6	0.3	0.2	0.0	-0.2	0.0	2.0	5.4	11.9	15.8	16.9	17.7	18.4	14.2	12.1	13.5	11.8	10.5	9.6	8.9	8.2	7.8	8.1	8.1	18.4	-0.2
14	10.8	10.4	9.0	7.8	6.9	6.3	6.1	8.4	12.6	14.8	15.3	15.6	16.7	17.9	18.6	20.2	20.8	19.9	15.6	12.6	11.1	10.2	8.5	7.7	12.7	20.8	6.1
15	6.8	5.4	4.9	4.3	4.3	3.9	3.6	6.2	11.7	19.0	21.7	23.2	24.6	25.3	25.5	24.8	23.9	23.7	18.2	14.7	12.5	11.1	9.5	8.3	14.0	25.5	3.6
16	7.1	6.1	5.7	5.5	4.5	5.3	5.4	6.5	8.5	14.1	20.1	20.9	22.3	23.9	24.0	23.7	23.3	23.2	20.5	18.1	17.1	14.8	12.9	11.3	14.4	24.0	4.5
17	12.1	13.4	12.4	11.5	9.6	7.4	6.6	7.1	9.7	12.8	12.8	12.7	12.4	11.4	9.1	9.3	10.3	10.3	9.7	7.8	5.8	3.5	2.4	1.1	9.2	13.4	1.1
18	0.1	-0.4	-0.7	0.4	0.5	0.9	1.1	2.7	8.2	11.8	13.2	14.4	15.6	16.2	17.2	17.1	16.8	15.3	14.3	13.0	14.3	11.8	10.6	9.1	9.3	17.2	-0.7
19	6.6	5.5	5.3	4.5	3.7	4.2	3.8	5.7	8.6	10.0	10.8	11.6	12.2	12.5	13.1	12.6	12.5	12.0	10.5	8.6	6.6	5.1	4.0	3.8	8.1	13.1	3.7
20	4.1	4.6	4.4	4.5	4.5	4.6	3.9	3.8	5.4	7.4	8.3	9.2	9.6	9.9	9.6	9.4	8.8	7.7	6.8	6.2	5.9	5.6	5.8	5.4	6.5	9.9	3.8
21	5.5	5.6	5.8	5.5	5.4	5.5	5.6	5.3	4.9	5.0	5.9	7.1	8.1	9.0	9.1	8.6	9.4	9.6	8.4	5.6	3.2	2.1	0.7	-0.4	5.9	9.6	-0.4
22	-1.1	-1.0	0.3	0.8	1.3	1.1	1.0	3.3	6.7	9.6	10.4	12.0	13.1	14.2	15.2	16.1	16.5	15.9	11.4	8.1	5.5	4.7	4.0	3.1	7.2	16.5	-1.1
23	2.8	3.0	4.0	3.4	3.1	2.1	2.5	4.4	8.8	12.7	13.2	13.7	14.1	15.1	15.2	15.4	14.8	13.6	12.4	12.1	11.4	11.3	10.8	10.8	9.6	15.4	2.1
24	10.2	9.7	9.2	9.5	9.7	9.8	9.7	9.2	9.3	9.9	Au	Au	Au	Au	Au	12.6	12.0	11.4	10.7	10.3	9.5	8.9	6.8	3.0	9.5	12.6	3.0
25	0.6	-0.1	-0.5	-0.9	-0.8	-1.5	-2.0	-1.1	2.7	8.5	9.2	10.2	10.1	10.7	11.5	11.6	11.4	10.6	8.6	5.1	2.7	1.0	0.0	2.4	4.6	11.6	-2.0
26	6.7	8.2	8.3	6.5	8.1	9.2	8.5	7.9	8.1	11.1	12.0	12.2	10.8	10.8	10.2	10.0	9.2	9.1	8.1	7.9	7.4	7.3	6.1	5.2	8.7	12.2	5.2
27	4.0	3.4	3.0	2.2	1.9	1.9	2.0	2.1	2.9	3.5	4.0	5.7	6.6	7.4	7.2	5.9	5.2	4.5	3.2	2.5	2.8	2.9	2.2	1.7	3.7	7.4	1.7
28	2.0	1.9	2.3	2.0	1.2	0.9	0.7	0.4	0.6	1.4	1.5	1.3	0.6	-0.4	-0.8	-1.1	-2.0	-2.9	-2.7	-2.8	-3.2	-3.2	-3.4	-3.6	-0.4	2.3	-3.6
29	-3.6	-3.7	-3.6	-3.8	-4.0	-4.4	-4.5	-4.3	-4.1	-3.0	-2.7	-2.7	-1.9	-3.2	-3.6	-3.4	-3.6	-3.9	-4.0	-4.4	-4.3	-4.5	-4.6	-5.0	-3.8	-1.9	-5.0
30	-5.5	-6.1	-5.8	-6.1	-6.6	-5.9	-6.1	-6.3	-6.1	-5.6	-4.8	-4.0	-2.6	-2.1	-1.1	-1.1	-1.1	-2.1	-3.5	-4.3	-4.6	-4.1	-4.0	-4.0	-4.3	-1.1	-6.6
Avg	5.7	5.3	4.9	4.6	4.3	4.1	3.9	5.1	7.9	10.8	12.2	13.0	13.6	14.0	14.0	13.9	13.9	13.3	11.6	9.7	8.3	7.4	6.5	5.7	8.9	15.1	2.3
Max	17.3	16.9	15.8	16.4	15.5	13.9	13.6	13.4	17.4	22.8	23.8	25.3	26.2	26.5	26.8	26.9	26.7	26.0	23.9	22.1	20.4	19.6	19.0	17.9	17.4	26.9	11.2
Min	-5.5	-6.1	-5.8	-6.1	-6.6	-5.9	-6.1	-6.3	-6.1	-5.6	-4.8	-4.0	-2.6	-3.2	-3.6	-3.4	-3.6	-3.9	-4.0	-4.4	-4.6	-4.5	-4.6	-5.0	-4.3	-1.9	-6.6

A-12

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature 2 Meters (degrees Celsius)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	10.1	7.4	5.1	4.8	6.7	6.5	9.3	14.2	17.0	18.6	19.5	19.0	20.8	21.2	20.5	21.5	21.7	19.1	19.7	17.7	13.5	13.0	11.2	9.6	14.5	21.7	4.8
2	6.5	5.2	5.8	6.4	4.7	5.6	6.5	8.6	12.7	14.7	15.9	18.5	19.6	19.2	19.3	17.0	14.3	11.6	10.8	10.4	9.9	9.7	9.7	9.8	11.4	19.6	4.7
3	9.6	9.3	7.5	6.9	6.9	7.1	7.7	9.9	11.6	11.8	10.8	12.1	11.3	12.0	13.7	14.9	15.3	15.5	14.4	11.8	8.6	6.9	5.4	4.8	10.2	15.5	4.8
4	4.7	5.1	4.2	4.1	3.8	4.4	6.1	8.3	11.5	13.0	14.4	15.7	16.4	17.5	18.2	18.3	18.3	17.9	16.7	15.0	13.4	12.3	10.7	8.4	11.6	18.3	3.8
5	7.4	6.4	6.9	6.7	6.3	6.9	7.9	8.8	10.1	12.0	15.1	16.9	17.1	15.6	12.9	14.2	14.2	14.7	15.1	13.6	11.4	10.7	10.4	10.3	11.3	17.1	6.3
6	8.6	6.7	5.3	6.8	7.8	8.5	10.6	12.5	13.8	16.2	18.1	19.4	20.6	21.3	21.8	20.7	17.2	13.0	12.7	11.6	11.5	9.8	9.2	8.8	13.0	21.8	5.3
7	6.7	6.3	5.8	6.4	6.1	6.6	9.5	14.0	15.0	12.9	13.7	16.8	19.0	19.5	20.4	20.7	19.4	17.2	14.5	13.5	10.6	9.8	8.5	7.9	12.5	20.7	5.8
8	8.3	8.4	8.1	6.7	6.3	6.8	8.1	10.9	14.0	16.2	17.5	18.0	18.5	18.5	17.9	15.3	11.0	10.1	10.2	10.1	9.0	8.0	8.0	7.9	11.4	18.5	6.3
9	7.7	7.5	7.7	7.8	7.8	7.9	8.2	8.3	8.0	8.5	9.3	10.7	13.0	13.6	14.1	13.8	15.0	16.0	16.2	14.9	10.4	8.6	6.6	5.2	10.3	16.2	5.2
10	4.2	4.0	3.7	2.7	3.6	5.5	8.2	12.4	16.1	18.6	20.0	20.9	21.8	22.6	23.5	23.5	22.5	22.2	20.8	19.6	17.4	15.1	12.6	12.4	14.7	23.5	2.7
11	11.3	11.1	9.2	8.0	7.5	7.2	10.1	14.6	19.0	20.6	21.7	22.7	23.8	23.6	24.7	25.0	24.9	24.2	23.2	21.1	18.9	17.0	15.8	14.9	17.5	25.0	7.2
12	13.1	12.1	11.0	10.2	10.1	10.6	12.2	14.9	18.3	20.0	20.8	21.4	22.6	23.6	24.6	25.2	25.2	25.0	22.7	17.7	15.1	13.1	11.6	10.1	17.1	25.2	10.1
13	9.9	8.8	8.1	7.5	6.5	6.5	9.9	14.9	19.7	22.6	24.2	25.2	26.1	23.4	21.1	20.7	19.8	20.0	18.1	18.1	16.0	15.5	15.2	14.3	16.3	26.1	6.5
14	12.6	11.8	12.0	11.6	10.1	10.8	13.7	14.8	16.9	18.8	19.1	20.5	23.7	24.5	23.2	16.7	13.7	17.1	18.5	16.7	15.2	12.9	11.1	10.2	15.7	24.5	10.1
15	8.8	9.0	7.6	6.4	6.5	7.2	9.0	12.4	16.4	18.2	19.2	19.8	21.0	21.4	21.6	22.0	21.9	19.5	13.4	13.0	12.1	12.3	12.1	11.9	14.3	22.0	6.4
16	11.5	9.9	9.0	9.1	9.1	9.4	10.9	13.1	14.8	15.5	16.4	17.2	18.3	19.2	19.0	19.7	19.6	18.2	15.9	13.7	12.9	11.6	11.1	10.1	14.0	19.7	9.0
17	9.8	9.3	8.6	7.2	5.0	4.5	8.2	11.8	14.3	16.0	16.2	17.3	17.4	17.5	17.1	16.9	16.6	16.4	15.8	14.2	13.1	11.5	11.3	8.9	12.7	17.5	4.5
18	7.6	6.8	6.5	5.1	4.8	4.4	8.3	13.7	15.8	17.3	18.2	18.9	19.3	20.0	20.2	20.5	20.2	18.9	17.8	16.1	14.0	11.9	8.9	6.5	13.4	20.5	4.4
19	6.0	3.7	3.5	2.7	1.9	2.6	4.7	6.9	10.6	12.6	14.5	15.6	16.8	17.2	17.9	17.7	16.9	16.0	14.9	13.1	9.9	5.1	2.8	1.4	9.8	17.9	1.4
20	0.3	-1.0	-1.7	-2.9	-3.3	-3.2	0.1	6.3	11.3	13.3	14.8	15.9	17.0	17.9	18.9	19.3	19.6	19.1	17.4	15.2	13.9	11.5	9.7	7.4	9.9	19.6	-3.3
21	5.7	2.9	1.4	0.6	-0.3	-0.3	2.9	8.4	13.4	15.6	16.4	17.2	18.2	18.9	19.7	20.5	20.4	19.6	18.4	16.7	14.9	13.5	11.8	13.2	12.1	20.5	-0.3
22	13.3	11.6	10.4	8.8	6.7	6.8	10.4	16.6	18.3	19.7	21.4	23.3	24.2	25.1	26.0	26.9	26.5	25.2	22.5	21.6	20.8	18.8	16.5	14.0	18.1	26.9	6.7
23	13.2	12.2	10.7	10.5	8.9	9.3	10.8	14.6	21.2	23.6	22.4	23.6	25.8	27.7	28.0	26.9	24.3	21.9	22.2	20.9	17.3	15.9	15.0	15.3	18.4	28.0	8.9
24	14.2	13.6	12.7	10.5	9.9	10.1	12.2	18.2	21.8	23.1	23.9	24.7	25.1	25.3	25.3	25.0	24.3	22.9	21.2	18.5	14.5	14.2	13.6	8.7	18.1	25.3	8.7
25	5.8	2.3	0.4	-0.7	-1.9	-1.8	1.3	10.1	16.2	17.4	18.7	19.9	21.2	22.4	23.1	23.5	23.9	23.4	22.0	19.7	15.6	10.1	8.4	6.2	12.8	23.9	-1.9
26	4.2	2.4	1.6	0.8	-0.2	0.2	4.1	10.7	17.0	20.7	22.0	23.1	24.4	25.1	25.1	25.4	24.9	24.8	24.4	23.0	18.4	13.2	11.8	10.7	14.9	25.4	-0.2
27	7.9	6.5	6.2	7.3	8.3	9.1	10.2	12.3	14.5	18.0	22.0	23.2	24.1	24.6	23.9	18.4	20.3	22.5	21.8	17.9	14.4	12.3	9.4	7.6	15.1	24.6	6.2
28	5.4	4.2	3.1	7.3	7.0	6.1	8.3	13.8	16.0	17.3	18.5	19.2	20.0	20.7	21.3	21.8	21.9	21.8	20.1	17.1	14.3	10.4	10.0	7.9	13.9	21.9	3.1
29	12.0	13.5	11.7	11.5	10.3	9.4	12.3	15.3	17.4	18.9	20.5	22.2	23.8	24.8	25.2	24.7	25.8	24.4	22.1	19.0	16.4	12.0	12.7	10.5	17.3	25.8	9.4
30	8.9	8.3	6.2	5.2	4.9	4.9	6.8	12.1	19.0	21.5	23.2	24.3	25.3	23.4	19.6	22.4	23.0	22.2	20.0	19.0	15.2	11.9	9.9	8.3	15.2	25.3	4.9
31	6.3	6.3	4.9	4.0	3.8	3.6	6.6	12.5	17.9	22.6	24.7	24.4	25.4	26.7	27.1	26.9	27.5	26.5	25.2	21.3	19.3	16.3	13.4	13.1	16.9	27.5	3.6
Avg	8.4	7.5	6.6	6.1	5.7	5.9	8.2	12.1	15.5	17.3	18.5	19.6	20.7	21.1	21.1	20.8	20.3	19.6	18.3	16.5	14.1	12.1	10.8	9.6	14.0	22.1	5.0
Max	14.2	13.6	12.7	11.6	10.3	10.8	13.7	18.2	21.8	23.6	24.7	25.2	26.1	27.7	28.0	26.9	27.5	26.5	25.2	23.0	20.8	18.8	16.5	15.3	18.4	28.0	10.1
Min	0.3	-1.0	-1.7	-2.9	-3.3	-3.2	0.1	6.3	8.0	8.5	9.3	10.7	11.3	12.0	12.9	13.8	11.0	10.1	10.2	10.1	8.6	5.1	2.8	1.4	9.8	15.5	-3.3

A-13

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature 2 Meters (degrees Celsius)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	12.3	9.7	7.2	6.8	6.1	5.5	9.2	14.1	20.2	23.6	24.9	26.1	27.2	27.6	26.3	24.0	22.5	22.6	20.3	17.6	16.0	12.9	12.2	11.4	16.9	27.6	5.5
2	10.0	8.2	6.8	5.4	5.4	4.5	7.3	13.1	19.1	22.4	24.6	26.3	27.2	27.0	26.8	27.4	27.3	25.8	24.0	22.4	20.9	18.4	15.7	16.5	18.0	27.4	4.5
3	14.1	12.3	10.3	7.2	5.7	4.8	7.6	12.8	18.0	20.5	21.9	23.5	24.7	25.6	26.3	25.5	26.4	25.8	23.0	20.0	17.1	14.3	12.1	10.3	17.1	26.4	4.8
4	11.7	10.0	8.5	6.6	6.0	5.0	8.8	14.8	19.6	22.5	24.5	25.6	26.6	27.2	27.7	28.2	27.6	26.7	24.5	20.7	18.9	14.5	12.7	10.1	17.9	28.2	5.0
5	9.1	7.4	6.1	5.3	4.4	4.4	6.9	12.7	18.4	21.3	23.2	23.3	24.7	26.0	25.7	26.7	27.3	26.5	24.6	22.2	16.8	13.8	10.0	7.2	16.4	27.3	4.4
6	6.1	4.7	3.3	2.4	2.2	2.0	4.3	10.3	17.1	22.1	23.3	24.4	25.5	26.1	26.2	25.7	24.4	24.9	24.6	20.0	14.6	11.8	11.3	9.8	15.3	26.2	2.0
7	7.7	7.2	7.9	7.4	6.3	5.6	8.8	13.4	16.3	19.1	21.8	23.0	24.2	25.3	25.8	25.9	26.5	26.1	24.7	20.4	18.9	17.7	14.4	13.1	17.0	26.5	5.6
8	12.0	11.7	12.2	12.2	12.2	11.6	12.1	14.0	18.0	22.4	24.8	26.0	27.1	26.3	26.9	27.4	26.9	24.6	24.4	21.6	19.7	17.2	15.7	14.3	19.2	27.4	11.6
9	12.8	12.6	12.2	11.8	11.5	11.0	12.1	16.0	18.9	20.1	20.2	21.7	22.4	21.2	18.5	16.3	14.1	14.9	14.3	13.5	12.3	10.4	9.6	9.5	14.9	22.4	9.5
10	8.2	7.4	6.8	6.1	6.2	5.7	7.4	9.9	12.1	14.8	17.1	18.2	19.4	20.3	20.8	20.2	18.6	16.3	13.7	12.2	11.8	11.0	10.4	10.9	12.7	20.8	5.7
11	10.7	10.4	8.3	7.6	10.9	10.6	11.8	12.6	12.7	14.3	13.3	15.2	17.2	14.9	13.5	12.4	9.4	9.9	10.0	9.4	8.7	8.8	8.0	8.0	11.2	17.2	7.6
12	7.9	6.0	5.1	5.3	4.5	3.7	5.9	10.3	11.0	11.7	12.5	13.6	14.3	15.4	16.3	16.6	17.1	16.2	15.5	14.3	11.0	7.7	6.8	5.0	10.6	17.1	3.7
13	2.7	1.9	1.3	0.7	0.2	-0.1	1.4	6.3	12.0	15.4	16.6	17.2	18.1	19.4	20.2	20.9	21.2	21.0	19.3	15.5	11.9	8.8	8.1	5.4	11.1	21.2	-0.1
14	4.9	4.0	4.0	4.4	3.3	2.9	4.4	9.6	14.4	18.2	19.7	20.3	21.1	20.9	21.0	21.8	22.1	21.7	19.5	16.3	12.4	11.2	11.0	9.5	13.3	22.1	2.9
15	9.5	11.5	10.6	7.3	4.6	3.0	4.4	9.3	14.1	16.9	18.0	19.1	18.6	19.3	20.2	20.8	20.8	20.1	18.1	15.0	10.3	8.3	6.8	4.6	13.0	20.8	3.0
16	3.0	2.3	1.9	1.3	1.0	0.0	1.8	7.1	13.6	16.3	17.1	17.3	18.4	18.3	18.9	19.4	18.7	17.6	15.4	13.7	12.9	11.1	10.0	9.7	11.1	19.4	0.0
17	8.8	8.3	7.5	6.8	6.6	6.5	6.6	6.7	7.3	7.7	7.5	8.5	8.8	9.8	10.5	13.4	14.5	13.4	10.9	9.3	7.9	7.0	5.2	3.5	8.5	14.5	3.5
18	2.4	1.6	1.1	0.7	0.2	-0.2	1.0	5.7	11.6	14.9	16.5	18.1	19.5	20.7	22.1	22.9	23.2	22.9	21.3	16.7	13.6	10.9	9.7	8.2	11.9	23.2	-0.2
19	5.6	4.3	3.8	2.7	2.3	1.9	3.6	8.9	15.8	21.0	22.6	23.7	25.4	26.2	26.5	26.7	24.5	22.5	19.6	16.2	13.3	10.8	9.3	8.2	14.4	26.7	1.9
20	7.9	7.4	7.1	6.1	5.5	5.2	6.6	12.2	18.5	20.7	21.5	22.6	24.1	23.9	24.4	23.4	23.4	22.4	20.5	18.7	16.6	16.1	14.6	13.5	16.0	24.4	5.2
21	11.5	9.2	8.0	6.9	7.4	5.5	7.3	11.7	17.6	22.0	23.5	24.5	25.7	26.3	26.7	26.4	25.3	24.0	23.2	22.3	22.1	21.8	20.4	19.8	18.3	26.7	5.5
22	18.6	16.0	14.5	12.5	10.2	8.3	9.9	13.0	15.5	18.3	18.0	18.4	18.6	18.0	18.3	17.8	14.6	13.9	12.9	11.3	9.4	9.1	9.9	9.3	14.0	18.6	8.3
23	9.7	9.0	8.8	10.0	10.3	10.3	10.2	11.6	13.0	15.1	15.6	17.4	18.5	19.0	19.2	18.7	20.4	19.9	17.2	13.6	10.0	8.5	6.6	5.8	13.3	20.4	5.8
24	6.0	6.5	7.0	6.1	5.4	5.0	6.5	10.0	14.1	17.2	18.7	18.3	19.1	20.4	22.5	22.7	22.2	21.4	19.5	18.1	16.3	16.9	15.8	16.0	14.7	22.7	5.0
25	15.7	15.1	12.9	10.8	10.9	6.7	6.5	10.6	13.1	14.0	15.3	16.2	17.2	18.1	18.6	18.0	17.0	14.9	11.0	9.2	7.6	7.3	5.0	3.6	12.3	18.6	3.6
26	4.7	3.7	3.6	4.4	4.7	3.8	2.9	6.2	10.3	12.5	12.6	13.6	15.3	15.6	17.0	17.4	17.5	16.9	14.5	11.8	10.3	7.9	5.4	3.3	9.8	17.5	2.9
27	1.7	0.4	-0.7	-1.0	-1.7	-2.5	-1.6	3.5	9.6	12.5	14.3	15.7	16.5	17.8	18.4	19.3	19.9	19.7	18.3	11.6	7.5	6.2	6.0	2.8	8.9	19.9	-2.5
28	1.6	0.5	0.0	-0.4	-0.4	-0.5	0.1	6.1	13.7	18.9	20.4	22.1	24.0	25.2	25.7	25.9	25.5	24.6	22.5	15.5	12.1	9.7	5.9	4.7	12.6	25.9	-0.5
29	4.0	2.9	2.0	1.1	0.7	0.5	6.1	12.0	14.3	15.5	16.8	18.4	20.3	21.2	21.1	20.6	20.1	18.7	17.7	15.9	14.9	13.4	10.8	10.7	12.5	21.2	0.5
30	10.7	10.3	10.2	10.1	9.7	9.9	9.8	11.0	14.3	16.6	17.3	17.5	19.4	20.1	22.0	21.8	21.6	21.2	18.0	14.3	13.3	11.7	9.0	7.1	14.5	22.0	7.1
31	6.4	3.9	3.4	2.7	1.7	1.3	2.0	7.2	13.3	18.1	20.3	21.6	22.5	24.1	25.0	25.3	25.4	24.7	20.5	15.4	14.6	12.1	10.3	9.1	13.8	25.4	1.3
Avg	8.3	7.3	6.5	5.7	5.3	4.6	6.2	10.4	14.8	17.6	18.9	19.9	21.0	21.5	21.9	21.9	21.5	20.7	18.8	16.0	13.7	11.8	10.3	9.1	13.9	22.8	4.0
Max	18.6	16.0	14.5	12.5	12.2	11.6	12.1	16.0	20.2	23.6	24.9	26.3	27.2	27.6	27.7	28.2	27.6	26.7	24.7	22.4	22.1	21.8	20.4	19.8	19.2	28.2	11.6
Min	1.6	0.4	-0.7	-1.0	-1.7	-2.5	-1.6	3.5	7.3	7.7	7.5	8.5	8.8	9.8	10.5	12.4	9.4	9.9	10.0	9.2	7.5	6.2	5.0	2.8	8.5	14.5	-2.5

A-14

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature 2 Meters (degrees Celsius)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	8.1	7.7	6.8	7.2	6.9	5.7	6.0	10.7	15.7	20.2	22.4	23.8	24.8	25.6	26.1	26.6	26.4	25.5	22.7	21.5	19.7	19.1	17.8	17.4	17.3	26.6	5.7
2	14.1	10.3	9.8	7.8	6.3	5.7	5.2	9.9	16.0	20.5	21.8	23.3	24.5	24.7	25.4	25.2	24.8	24.0	21.4	17.4	15.1	12.8	9.2	7.1	15.9	25.4	5.2
3	5.2	4.4	2.9	2.7	1.9	0.9	1.5	7.1	14.0	18.8	21.8	22.9	24.3	25.3	26.1	26.3	26.3	26.0	22.4	15.8	12.1	11.4	9.6	12.6	14.3	26.3	0.9
4	10.3	7.2	6.2	6.7	6.2	5.5	5.5	10.3	18.1	23.5	24.7	26.2	27.1	27.5	27.6	27.6	27.2	26.1	22.4	16.2	12.8	9.5	7.8	5.5	16.2	27.6	5.5
5	3.7	2.9	1.7	1.9	1.3	1.2	1.2	7.1	13.7	20.6	23.3	24.3	25.3	26.2	26.7	27.0	26.9	26.3	21.0	18.3	16.9	17.0	18.3	15.5	15.3	27.0	1.2
6	15.7	15.2	13.6	15.4	14.5	13.4	13.0	13.2	15.0	16.6	18.0	19.1	16.8	15.7	14.9	14.9	15.2	14.9	14.0	12.9	12.0	11.4	11.5	11.0	14.5	19.1	11.0
7	11.0	10.9	10.7	10.4	10.3	10.3	10.5	10.7	11.0	11.2	11.6	12.4	13.0	14.1	14.2	14.3	14.9	14.6	13.1	11.0	10.0	9.8	9.5	8.6	11.6	14.9	8.6
8	7.9	7.9	7.4	7.7	6.9	7.7	7.5	8.6	9.9	11.0	12.8	12.6	13.0	13.9	13.7	15.2	13.2	10.3	9.4	9.5	9.5	9.5	9.4	9.1	10.2	15.2	6.9
9	9.1	8.9	8.8	8.7	8.4	8.2	8.1	8.2	8.7	8.5	9.0	10.0	10.1	12.0	12.5	12.9	13.2	12.4	10.2	8.0	5.0	3.7	2.5	1.1	8.7	13.2	1.1
10	0.2	-0.6	-1.1	-1.4	-1.9	-1.9	-2.0	0.5	4.3	9.4	11.0	11.2	11.7	10.7	8.8	7.6	7.4	7.4	6.5	6.3	6.4	5.8	5.2	5.1	4.9	11.7	-2.0
11	5.2	5.4	5.5	5.5	5.8	5.7	5.8	5.7	5.7	5.6	6.1	7.1	8.6	9.6	9.8	8.6	8.3	7.9	7.5	6.5	4.9	2.6	1.4	0.4	6.0	9.8	0.4
12	-0.5	-0.9	-1.8	-2.0	-1.6	-1.3	-1.7	0.0	5.8	9.3	10.9	11.7	13.3	13.8	14.9	14.8	15.3	14.4	11.2	7.0	4.5	3.9	1.8	0.9	6.0	15.3	-2.0
13	0.1	-0.5	-0.7	-0.5	-1.2	-1.2	-0.8	2.0	5.9	12.3	16.4	17.6	18.5	19.0	13.7	12.1	13.4	11.6	10.3	9.4	8.5	7.6	7.5	7.2	7.8	19.0	-1.2
14	9.6	9.6	8.2	7.0	6.3	5.5	5.6	8.7	13.1	15.1	15.6	16.0	17.2	18.4	18.9	20.7	20.9	18.7	14.5	12.2	10.6	9.5	7.7	6.5	12.3	20.9	5.5
15	5.7	4.0	3.5	3.1	2.9	2.2	2.5	6.1	12.0	19.4	22.2	23.8	25.1	25.9	26.0	24.6	23.2	23.3	17.4	13.1	9.7	8.7	7.2	6.4	13.2	26.0	2.2
16	5.0	4.2	2.7	2.8	3.1	3.6	3.8	5.7	8.6	14.4	20.3	21.1	22.6	24.3	24.2	23.6	23.4	23.0	20.0	17.6	16.5	13.6	12.1	10.7	13.6	24.3	2.7
17	11.4	12.6	11.8	10.9	8.7	6.2	5.5	6.9	10.1	13.3	13.3	13.1	12.9	11.5	9.1	9.4	10.8	10.2	9.5	7.1	4.6	2.7	1.9	0.4	8.9	13.3	0.4
18	-0.7	-1.3	-1.7	-0.5	-0.4	-0.3	0.2	2.6	8.6	12.4	13.9	15.1	16.4	16.9	17.9	17.4	16.8	15.1	13.8	12.5	13.5	11.3	10.0	8.1	9.1	17.9	-1.7
19	5.4	4.8	5.1	3.7	3.2	4.0	3.6	5.9	9.1	10.6	11.6	12.5	13.2	13.6	14.2	13.2	12.9	12.2	9.7	8.0	5.5	3.7	3.3	3.4	8.0	14.2	3.2
20	3.8	4.3	4.0	4.4	4.4	4.4	3.1	3.6	5.7	7.8	8.5	9.6	10.2	10.1	9.8	9.4	8.6	7.7	6.7	6.1	5.8	5.5	5.5	5.3	6.4	10.2	3.1
21	5.5	5.6	5.7	5.4	5.3	5.5	5.5	5.4	5.1	5.2	6.2	7.5	8.4	9.4	9.3	8.9	9.5	9.6	7.7	4.9	2.7	1.2	0.0	-1.4	5.8	9.6	-1.4
22	-1.5	-1.0	0.2	0.8	1.0	0.6	0.3	3.4	7.0	10.0	11.1	12.8	13.9	15.1	16.1	16.8	17.0	15.7	10.7	7.6	4.3	3.6	2.9	1.7	7.1	17.0	-1.5
23	1.7	2.0	3.2	2.3	2.0	1.0	1.9	4.7	9.3	13.2	13.7	14.3	14.6	15.8	15.9	16.0	14.9	13.5	12.1	12.0	11.2	11.0	10.4	10.4	9.5	16.0	1.0
24	9.8	9.1	8.7	9.1	9.4	9.6	9.4	9.0	9.3	10.0	Au	Au	Au	Au	Au	12.7	12.0	11.2	10.4	9.9	9.0	8.3	5.7	2.0	9.2	12.7	2.0
25	-0.2	-1.1	-1.3	-1.8	-1.6	-2.4	-3.0	-1.2	3.1	8.7	9.5	11.1	10.5	11.2	12.4	12.3	11.8	10.5	7.5	3.8	1.5	-0.2	-1.0	0.5	4.2	12.4	-3.0
26	4.9	7.7	7.8	5.4	7.4	8.8	7.9	7.4	8.0	11.1	11.8	12.1	10.6	10.8	10.2	10.0	9.2	9.0	7.8	7.4	6.9	6.9	5.6	4.9	8.3	12.1	4.9
27	3.7	3.2	2.6	1.6	1.6	2.0	2.1	2.3	3.1	3.8	4.3	6.3	7.3	8.1	7.5	6.1	5.4	4.5	3.2	2.5	2.6	2.8	2.1	1.7	3.8	8.1	1.6
28	2.0	1.8	2.2	1.9	1.2	0.7	0.7	0.4	0.7	1.6	1.6	1.6	0.8	-0.2	-0.6	-1.0	-1.9	-2.8	-2.7	-2.8	-3.2	-3.2	-3.4	-3.6	-0.3	2.2	-3.6
29	-3.6	-3.7	-3.6	-3.7	-4.0	-4.3	-4.4	-4.2	-3.9	-2.6	-2.4	-2.3	-1.3	-2.8	-3.3	-3.1	-3.3	-3.7	-4.0	-4.4	-4.4	-4.6	-4.6	-4.9	-3.6	-1.3	-4.9
30	-5.9	-6.7	-6.2	-6.7	-6.8	-5.9	-6.1	-6.0	-5.7	-5.1	-4.1	-3.3	-1.7	-1.2	-0.2	-0.2	-0.4	-1.9	-3.8	-4.6	-4.5	-4.0	-4.3	-4.1	-4.1	-0.2	-6.8
Avg	4.9	4.5	4.1	3.9	3.6	3.4	3.3	5.2	8.2	11.2	12.7	13.6	14.2	14.7	14.5	14.3	14.1	13.2	11.1	9.1	7.7	6.7	5.8	5.0	8.7	15.6	1.5
Max	15.7	15.2	13.6	15.4	14.5	13.4	13.0	13.2	18.1	23.5	24.7	26.2	27.1	27.5	27.6	27.6	27.2	26.3	22.7	21.5	19.7	19.1	18.3	17.4	17.3	27.6	11.0
Min	-5.9	-6.7	-6.2	-6.7	-6.8	-5.9	-6.1	-6.0	-5.7	-5.1	-4.1	-3.3	-1.7	-2.8	-3.3	-3.1	-3.3	-3.7	-4.0	-4.6	-4.5	-4.6	-4.6	-4.9	-4.1	-1.3	-6.8

A-15

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature Delta T (degrees Celsius)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	0.62	1.20	1.12	0.83	0.18	0.35	-0.21	-0.65	-0.51	-0.65	-0.69	-0.50	-0.80	-0.32	-0.39	-0.86	-0.66	0.40	0.10	0.66	1.49	0.66	0.82	1.00	0.13	1.49	-0.86
2	1.44	1.74	1.06	0.36	0.83	0.05	-0.31	-0.72	-1.00	-0.92	-1.00	-1.01	-0.71	-0.45	-0.49	-0.30	-0.09	0.16	0.09	0.09	0.04	0.07	0.00	0.07	-0.04	1.74	-1.01
3	0.07	0.39	0.39	0.36	0.05	-0.05	-0.07	-0.28	-0.34	-0.18	-0.13	-0.26	-0.38	-0.46	-0.61	-0.93	-0.74	-0.82	-0.27	0.31	0.57	0.47	0.57	0.53	-0.08	0.57	-0.93
4	0.36	0.23	0.72	0.49	0.30	0.10	-0.24	-0.26	-0.34	-0.37	-0.52	-0.72	-0.65	-0.73	-0.76	-0.55	-0.44	-0.25	0.01	0.48	0.18	0.09	0.27	0.60	-0.08	0.72	-0.76
5	0.65	0.42	0.30	0.48	0.22	0.02	-0.14	-0.16	-0.18	-0.31	-0.53	-0.54	-0.40	-0.04	-0.20	-0.51	-0.07	-0.28	-0.17	0.14	0.53	0.51	0.91	0.90	0.06	0.91	-0.54
6	1.42	1.30	1.28	0.80	0.37	0.21	0.20	0.04	-0.09	-0.51	-0.65	-0.66	-0.63	-0.58	-0.60	-0.03	0.46	0.41	0.23	0.15	0.34	0.40	0.60	0.37	0.20	1.42	-0.66
7	0.79	0.64	0.69	0.60	0.74	0.41	-0.18	-0.24	0.08	0.08	-0.18	-0.51	-0.63	-0.56	-0.39	-0.10	0.53	0.06	0.09	0.14	0.87	0.46	0.64	0.57	0.19	0.87	-0.63
8	0.31	0.07	0.54	0.64	0.42	0.21	-0.18	-0.28	-0.35	-0.43	-0.69	-0.54	-0.44	-0.32	-0.44	-0.08	0.16	-0.03	0.00	0.11	0.25	0.14	-0.01	0.05	-0.04	0.64	-0.69
9	0.06	0.00	-0.02	0.01	0.14	-0.06	-0.07	-0.11	-0.10	-0.25	-0.42	-0.57	-0.71	-0.46	-0.52	-0.28	-0.44	-0.66	-0.51	0.11	0.47	0.38	0.64	0.93	-0.10	0.93	-0.71
10	0.89	1.07	0.69	1.26	0.93	0.23	-0.03	-0.21	-0.32	-0.40	-0.50	-0.37	-0.49	-0.42	-0.40	-0.13	0.28	0.31	0.73	0.62	1.01	1.40	1.13	0.58	0.33	1.40	-0.50
11	0.62	0.51	1.05	0.99	0.90	0.60	-0.15	-0.40	-0.51	-0.55	-0.72	-0.68	-0.66	-0.42	-0.66	-0.71	-0.52	-0.24	0.11	1.12	0.80	0.50	0.56	0.59	0.09	1.12	-0.72
12	0.75	0.85	0.64	0.57	0.43	0.18	-0.24	-0.42	-0.82	-0.71	-0.64	-0.51	-0.69	-0.68	-0.80	-0.65	-0.49	-0.26	0.77	0.38	0.44	0.84	0.84	0.51	0.01	0.85	-0.82
13	0.57	0.70	0.73	0.87	0.93	0.72	-0.14	-0.34	-0.67	-0.34	-0.41	-0.44	-0.36	0.43	-0.21	0.31	-0.34	0.12	0.34	0.31	0.89	0.53	0.55	0.62	0.22	0.93	-0.67
14	0.71	0.50	0.31	0.67	0.36	0.23	-0.10	0.08	-0.61	-0.68	-0.27	-0.47	-0.60	-0.54	0.20	0.91	0.19	-0.49	0.02	0.01	0.38	0.62	0.61	0.63	0.11	0.91	-0.68
15	0.64	0.51	0.84	0.95	0.52	0.33	-0.12	-0.38	-0.55	-0.62	-0.64	-0.58	-0.66	-0.47	-0.53	-0.40	-0.36	0.76	0.05	0.16	0.12	0.20	0.41	0.32	0.02	0.95	-0.66
16	0.41	0.50	0.45	0.34	0.19	0.08	-0.36	-0.37	-0.61	-0.61	-0.64	-0.67	-0.76	-0.82	-0.46	-0.61	-0.50	0.16	0.37	0.44	0.58	0.56	0.29	0.45	-0.07	0.58	-0.82
17	0.30	0.46	0.50	0.60	1.02	0.97	-0.41	-0.78	-0.34	-0.63	-0.48	-0.67	-0.58	-0.39	-0.16	-0.11	0.16	0.19	0.39	0.35	0.20	0.75	1.18	1.02	0.15	1.18	-0.78
18	1.87	1.16	0.50	0.74	0.77	0.42	-0.33	-0.27	-0.34	-0.43	-0.50	-0.59	-0.64	-0.60	-0.51	-0.52	-0.35	-0.17	-0.03	0.38	0.93	0.97	1.33	1.69	0.23	1.87	-0.64
19	1.35	1.10	0.44	0.76	0.76	0.27	-0.21	-0.26	-0.53	-0.49	-0.96	-0.85	-0.90	-0.75	-0.79	-0.64	-0.48	-0.26	-0.03	0.43	1.59	1.86	0.97	1.15	0.15	1.86	-0.96
20	0.91	1.14	1.21	1.22	1.03	0.63	-0.14	-0.68	-0.76	-0.81	-0.88	-0.86	-1.02	-1.02	-0.94	-0.86	-0.68	-0.18	0.57	0.66	0.76	0.55	0.63	0.95	0.06	1.22	-1.02
21	0.90	1.50	1.35	1.24	1.58	1.19	-0.07	-0.64	-0.73	-0.69	-0.85	-0.79	-0.87	-0.71	-0.76	-0.70	-0.58	-0.30	0.04	0.39	0.73	1.34	1.92	0.90	0.22	1.92	-0.87
22	0.92	1.39	1.73	2.31	2.57	2.01	0.98	-0.30	-0.41	-0.59	-0.67	-0.73	-0.61	-0.74	-0.51	-0.71	-0.14	0.74	0.40	0.29	0.49	1.00	1.40	1.47	0.51	2.57	-0.74
23	1.45	1.29	1.57	0.96	1.38	1.00	0.29	-0.24	-0.39	0.09	0.35	0.10	-0.42	-0.64	-0.52	-0.02	0.94	0.97	0.66	0.81	0.28	0.46	0.54	0.29	0.47	1.57	-0.64
24	0.69	0.62	0.44	1.12	1.35	0.74	0.08	-0.54	-0.52	-0.47	-0.64	-0.52	-0.64	-0.75	-0.62	-0.49	-0.33	-0.09	0.21	1.09	2.91	1.37	1.13	2.88	0.38	2.91	-0.75
25	1.93	1.77	1.62	1.62	1.98	1.34	-0.23	-0.40	-0.50	-0.67	-0.84	-0.83	-0.95	-1.00	-0.88	-0.64	-0.50	-0.21	0.18	0.79	1.40	1.69	0.84	1.19	0.36	1.98	-1.00
26	1.27	1.54	1.41	1.20	1.89	1.25	0.18	-0.35	-0.73	-0.74	-0.81	-0.87	-1.01	-0.92	-0.57	-0.52	-0.03	-0.15	0.33	0.88	0.94	0.85	0.57	0.99	0.27	1.89	-1.01
27	1.11	1.71	1.05	1.00	0.81	0.55	0.17	-0.15	-0.28	-0.35	-0.49	-0.66	-0.59	-0.66	-0.11	0.54	-0.33	-0.09	0.58	1.34	1.75	1.34	1.18	1.08	0.44	1.75	-0.66
28	1.56	1.59	2.13	1.80	1.87	0.90	0.00	-0.55	-0.46	-0.71	-0.85	-0.86	-0.92	-0.94	-0.91	-0.70	-0.53	-0.46	0.12	0.55	0.86	2.14	1.85	1.94	0.39	2.14	-0.94
29	1.41	1.10	1.43	1.18	1.28	2.29	0.78	-0.20	-0.48	-0.62	-0.71	-0.74	-0.78	-0.82	-0.79	-0.13	-0.62	0.41	0.55	0.51	0.70	1.23	0.54	0.86	0.35	2.29	-0.82
30	0.59	0.71	1.09	1.36	1.22	0.90	0.18	-0.34	-0.66	-0.82	-0.85	-0.93	-0.95	0.34	0.53	-0.62	-0.31	0.25	0.52	0.63	1.14	1.37	1.04	1.14	0.31	1.37	-0.95
31	1.94	1.41	1.91	1.17	1.52	1.38	0.14	-0.55	-0.86	-0.70	-0.96	-0.39	-0.57	-0.69	-0.52	-0.18	-0.55	0.13	0.64	0.95	1.27	1.40	0.85	0.43	0.38	1.94	-0.96
Avg	0.92	0.94	0.94	0.92	0.92	0.63	-0.03	-0.35	-0.48	-0.52	-0.61	-0.62	-0.68	-0.55	-0.49	-0.36	-0.24	0.00	0.23	0.49	0.80	0.84	0.80	0.86	0.18	1.44	-0.79
Max	1.94	1.77	2.13	2.31	2.57	2.29	0.98	0.08	0.08	0.09	0.35	0.10	-0.36	0.43	0.53	0.91	0.94	0.97	0.77	1.34	2.91	2.14	1.92	2.88	0.51	2.91	-0.50
Min	0.06	0.00	-0.02	0.01	0.05	-0.06	-0.41	-0.78	-1.00	-0.92	-1.00	-1.01	-1.02	-1.02	-0.94	-0.93	-0.74	-0.82	-0.51	0.01	0.04	0.07	-0.01	0.05	-0.10	0.57	-1.02

A-16

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature Delta T (degrees Celsius)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	0.97	1.17	1.39	1.38	1.22	1.28	-0.30	-0.32	-0.69	-0.64	-0.79	-0.89	-1.10	-0.93	-0.01	0.22	-0.38	0.06	0.01	0.55	0.95	1.54	0.75	0.59	0.25	1.54	-1.10
2	0.96	1.33	1.14	1.51	1.38	1.46	-0.02	-0.33	-0.68	-0.81	-0.87	-0.87	-1.08	-0.73	-0.37	-0.50	-0.18	0.71	0.82	0.88	0.39	0.69	1.19	0.55	0.27	1.51	-1.08
3	0.80	1.21	0.95	1.58	1.64	1.41	0.05	-0.33	-0.73	-0.68	-0.86	-0.97	-0.94	-0.92	-0.95	-0.41	-0.70	-0.36	1.13	0.62	0.67	1.42	1.72	1.61	0.29	1.72	-0.97
4	0.92	1.58	1.66	1.52	1.60	1.84	0.22	-0.74	-0.65	-0.64	-0.96	-0.92	-0.99	-1.13	-0.80	-0.81	-0.57	-0.32	0.21	1.15	1.04	1.97	1.70	1.92	0.37	1.97	-1.13
5	1.45	1.50	1.60	1.63	1.54	1.26	0.11	-0.37	-0.83	-0.70	-0.77	-0.64	-0.98	-0.90	-0.27	-0.46	-0.52	-0.14	0.60	1.42	1.84	0.39	1.04	1.70	0.40	1.84	-0.98
6	1.72	1.63	1.80	1.84	1.69	1.47	0.51	-0.46	-0.70	-0.94	-0.94	-1.05	-1.21	-1.15	-0.88	-0.51	0.05	-0.27	0.05	1.34	1.28	1.42	1.14	1.29	0.38	1.84	-1.21
7	1.94	1.46	1.49	1.00	0.89	0.66	-0.49	-0.80	-0.47	-0.63	-0.91	-0.97	-1.03	-1.08	-0.92	-0.64	-0.76	-0.38	0.39	0.81	0.95	1.16	1.79	2.76	0.26	2.76	-1.08
8	2.02	1.42	0.75	0.83	0.61	0.79	0.31	-0.21	-0.61	-0.73	-0.79	-0.95	-1.27	-0.66	-0.67	-0.78	-0.34	0.33	0.20	0.49	0.58	1.07	1.35	1.21	0.21	2.02	-1.27
9	0.86	0.82	0.77	0.78	0.88	0.74	0.34	-0.36	-0.52	-0.57	-0.44	-0.76	-0.52	-0.44	-0.27	0.19	0.00	-0.15	0.08	0.12	0.28	0.51	0.42	0.15	0.12	0.88	-0.76
10	0.43	0.27	0.36	0.23	0.13	0.06	-0.02	-0.23	-0.35	-0.44	-0.83	-1.07	-0.93	-0.86	-1.00	-0.59	-0.30	-0.02	0.14	0.18	0.42	0.14	0.44	0.30	-0.15	0.44	-1.07
11	0.22	0.28	1.05	2.23	0.70	0.53	0.17	-0.08	-0.09	-0.68	-0.54	-0.83	-0.68	-0.27	-0.88	-0.03	0.01	0.08	0.00	0.42	0.30	0.30	0.37	0.21	0.12	2.23	-0.88
12	0.20	0.43	0.32	0.06	0.28	0.38	-0.03	-0.14	-0.23	-0.24	-0.33	-0.35	-0.29	-0.37	-0.44	-0.41	-0.57	-0.10	0.13	0.55	1.23	0.73	0.34	0.58	0.07	1.23	-0.57
13	1.27	1.18	1.13	0.85	1.33	0.98	0.21	-0.31	-0.72	-0.81	-0.74	-0.73	-0.82	-0.93	-0.86	-0.79	-0.76	-0.49	0.40	0.58	0.50	1.03	0.71	1.61	0.16	1.61	-0.93
14	1.33	1.62	1.62	1.10	1.47	1.44	0.49	-0.55	-0.73	-0.81	-0.68	-0.72	-0.82	-0.46	-0.45	-0.73	-0.71	-0.20	0.68	1.37	0.99	0.81	1.86	1.85	0.41	1.86	-0.82
15	1.22	0.78	0.73	1.21	1.28	1.11	0.37	-0.55	-0.73	-0.89	-0.91	-0.95	-0.51	-0.61	-0.75	-0.85	-0.70	-0.28	0.22	0.59	1.67	0.87	0.72	1.28	0.18	1.67	-0.95
16	1.25	1.05	1.25	1.22	1.03	1.62	0.41	-0.64	-0.56	-0.77	-0.66	-0.34	-0.56	-0.39	-0.54	-0.44	-0.18	0.12	0.35	0.70	0.37	0.24	0.03	0.15	0.20	1.62	-0.77
17	0.14	0.07	0.03	-0.05	-0.06	-0.11	-0.17	-0.25	-0.18	-0.16	-0.23	-0.31	-0.28	-0.36	-0.36	-0.80	-0.72	-0.16	0.23	0.65	0.51	0.39	0.63	0.81	-0.03	0.81	-0.80
18	0.82	0.87	0.60	0.84	0.71	0.82	0.12	-0.57	-0.66	-0.65	-0.70	-0.83	-0.88	-0.83	-0.87	-0.80	-0.62	-0.12	0.35	0.62	0.49	0.75	0.74	1.01	0.05	1.01	-0.88
19	1.40	1.19	1.47	1.68	1.38	1.18	0.63	-0.58	-0.62	-0.49	-0.67	-0.71	-0.83	-0.85	-0.67	-0.58	0.48	0.53	1.05	1.05	0.71	1.08	1.39	1.32	0.44	1.68	-0.85
20	0.96	1.43	1.22	1.31	1.65	1.57	0.74	-0.29	-0.41	-0.50	-0.61	-0.72	-0.94	-0.76	-0.77	-0.24	-0.36	-0.11	0.26	0.62	0.96	1.26	1.01	1.13	0.35	1.65	-0.94
21	1.50	1.54	1.28	1.01	0.99	1.65	0.69	-0.68	-0.97	-0.53	-0.69	-0.78	-0.83	-0.89	-0.90	-0.68	-0.21	0.17	0.32	0.45	0.35	0.38	0.60	0.65	0.18	1.65	-0.97
22	1.06	2.06	1.83	1.35	1.24	1.40	0.70	-0.11	-0.19	-0.46	-0.23	-0.36	-0.29	-0.27	-0.36	-0.13	0.23	0.04	0.27	0.58	0.85	0.71	0.11	0.30	0.43	2.06	-0.46
23	0.21	0.44	0.43	0.15	0.04	0.03	-0.02	-0.35	-0.42	-0.72	-0.48	-0.92	-0.86	-0.83	-0.75	-0.38	-0.80	-0.42	0.67	0.78	1.19	1.09	1.13	1.40	0.03	1.40	-0.92
24	0.87	0.59	0.52	0.69	1.07	0.73	0.37	-0.34	-0.45	-0.45	-0.35	-0.30	-0.60	-0.71	-0.80	-0.58	-0.20	0.27	0.96	1.32	1.17	1.40	1.23	0.49	0.29	1.40	-0.80
25	0.79	0.62	1.40	1.50	1.40	1.84	0.01	-0.40	-0.21	-0.18	-0.49	-0.73	-0.77	-0.65	-0.54	-0.59	-0.59	-0.37	-0.02	0.67	1.08	1.03	1.25	1.10	0.30	1.84	-0.77
26	0.55	0.66	0.25	0.26	0.18	0.49	0.35	-0.37	-0.74	-0.72	-0.47	-0.65	-0.98	-0.82	-1.00	-1.01	-0.77	-0.47	0.16	0.52	1.17	1.11	1.36	1.32	0.02	1.36	-1.01
27	1.67	1.15	1.30	1.48	1.31	1.29	0.52	-0.50	-0.56	-0.64	-0.75	-0.86	-1.02	-1.17	-1.02	-0.89	-0.90	-0.53	0.20	1.36	1.08	1.46	0.88	1.57	0.27	1.67	-1.17
28	1.60	1.52	1.45	1.64	1.60	1.35	1.02	-0.43	-0.83	-0.78	-0.77	-0.98	-1.11	-1.14	-1.01	-0.90	-0.53	-0.14	0.79	2.06	0.91	1.59	2.00	1.95	0.45	2.06	-1.14
29	2.13	2.00	1.41	1.16	1.70	2.15	3.23	-0.23	-0.60	-0.68	-0.64	-0.69	-0.58	-0.60	-0.33	-0.08	0.04	0.32	0.32	0.90	0.59	1.28	1.40	0.63	0.62	3.23	-0.69
30	0.58	1.16	1.02	0.77	0.92	0.53	0.22	-0.30	-0.45	-0.38	-0.30	-0.40	-0.91	-0.86	-1.24	-0.90	-0.68	-0.31	1.01	0.83	0.49	1.00	1.67	1.64	0.21	1.67	-1.24
31	1.34	1.87	1.30	1.36	1.62	1.39	0.95	-0.30	-0.70	-0.82	-0.85	-1.05	-1.00	-1.08	-1.09	-0.83	-0.70	-0.41	1.27	0.84	0.45	0.97	1.57	1.82	0.33	1.87	-1.09
Avg	1.07	1.13	1.08	1.10	1.08	1.08	0.38	-0.39	-0.56	-0.62	-0.65	-0.75	-0.83	-0.76	-0.70	-0.55	-0.42	-0.10	0.43	0.81	0.82	0.96	1.05	1.13	0.24	1.68	-0.95
Max	2.13	2.06	1.83	2.23	1.70	2.15	3.23	-0.08	-0.09	-0.16	-0.23	-0.30	-0.28	-0.27	-0.01	0.22	0.48	0.71	1.27	2.06	1.84	1.97	2.00	2.76	0.62	3.23	-0.46
Min	0.14	0.07	0.03	-0.05	-0.06	-0.11	-0.49	-0.80	-0.97	-0.94	-0.96	-1.07	-1.27	-1.17	-1.24	-1.01	-0.90	-0.53	-0.02	0.12	0.28	0.14	0.03	0.15	-0.15	0.44	-1.27



**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Temperature Delta T (degrees Celsius)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	1.39	0.96	1.36	1.15	1.39	1.31	0.53	-0.49	-0.65	-0.63	-0.78	-0.88	-0.91	-0.85	-0.86	-0.83	-0.44	0.04	0.60	0.55	0.70	0.48	0.74	0.52	0.18	1.39	-0.91
2	1.51	2.32	1.41	1.31	1.66	1.24	1.24	-0.55	-0.70	-0.89	-1.01	-1.11	-1.00	-0.99	-1.10	-0.77	-0.58	-0.20	0.49	0.82	0.94	1.27	1.42	1.50	0.34	2.32	-1.11
3	1.18	1.62	1.88	1.57	1.62	1.63	1.02	-0.68	-0.89	-0.74	-0.82	-0.98	-1.02	-0.97	-1.04	-0.82	-0.60	-0.38	0.75	0.85	1.58	1.10	1.33	0.78	0.33	1.88	-1.04
4	1.73	1.90	1.72	1.40	1.94	1.68	1.30	-0.40	-0.72	-0.71	-0.88	-0.92	-0.88	-0.95	-0.84	-0.70	-0.49	-0.11	1.46	3.07	1.43	1.67	2.12	2.03	0.66	3.07	-0.95
5	1.76	2.29	2.19	2.11	1.94	1.79	1.40	-0.41	-0.74	-0.75	-0.95	-1.03	-1.07	-1.25	-1.08	-1.03	-0.79	-0.30	1.25	0.92	0.76	1.23	0.68	1.94	0.45	2.29	-1.25
6	1.59	1.67	2.20	1.06	1.03	0.48	0.57	0.16	-0.21	-0.18	-0.33	-0.19	0.40	-0.12	-0.07	-0.15	-0.18	0.07	0.16	0.24	0.18	0.13	0.08	0.13	0.36	2.20	-0.33
7	0.06	0.07	0.05	0.03	0.06	0.09	0.07	-0.04	-0.12	-0.18	-0.25	-0.53	-0.53	-0.75	-0.36	-0.42	-0.59	-0.42	0.04	0.27	0.38	0.24	0.08	0.21	-0.11	0.38	-0.75
8	0.31	0.20	0.33	0.12	0.79	0.22	0.38	-0.13	-0.35	-0.58	-0.68	-0.94	-0.69	-0.95	-0.85	-0.81	-0.51	-0.17	-0.09	-0.04	0.05	0.08	0.08	0.05	-0.17	0.79	-0.95
9	0.01	-0.03	-0.03	0.01	0.06	0.03	0.00	-0.04	-0.15	-0.21	-0.23	-0.30	-0.18	-0.68	-0.66	-0.52	-0.43	-0.07	0.11	0.57	0.83	0.41	0.75	0.71	-0.00	0.83	-0.68
10	0.81	0.71	0.74	0.44	0.63	0.78	1.23	0.20	-0.39	-0.37	-0.41	-0.35	-0.42	-0.23	-0.09	0.07	-0.04	0.07	0.19	0.15	0.10	0.13	0.07	-0.04	0.17	1.23	-0.42
11	-0.04	0.06	-0.01	0.05	0.10	0.07	0.04	-0.08	-0.07	-0.19	-0.20	-0.37	-0.59	-0.57	-0.43	-0.11	-0.10	-0.02	0.15	0.39	0.53	0.86	0.92	0.48	0.04	0.92	-0.59
12	0.38	0.33	0.36	0.44	0.48	0.62	0.86	-0.02	-0.71	-0.62	-0.88	-0.73	-0.92	-0.72	-0.81	-0.54	-0.53	-0.06	0.89	0.90	1.16	0.58	1.15	1.01	0.11	1.16	-0.92
13	1.22	1.19	1.08	0.81	1.23	1.02	0.90	-0.01	-0.49	-0.41	-0.59	-0.73	-0.78	-0.57	0.42	0.03	0.18	0.21	0.25	0.25	0.36	0.61	0.34	0.83	0.31	1.23	-0.78
14	1.20	0.78	0.77	0.70	0.61	0.76	0.50	-0.28	-0.46	-0.34	-0.38	-0.47	-0.56	-0.50	-0.33	-0.44	-0.07	1.20	1.05	0.42	0.55	0.73	0.80	1.15	0.31	1.20	-0.56
15	1.11	1.42	1.45	1.16	1.41	1.69	1.14	0.06	-0.29	-0.42	-0.53	-0.62	-0.56	-0.57	-0.47	0.14	0.69	0.43	0.79	1.53	2.82	2.40	2.30	1.88	0.79	2.82	-0.62
16	2.09	1.84	3.06	2.68	1.37	1.71	1.60	0.75	-0.10	-0.26	-0.23	-0.22	-0.34	-0.46	-0.13	0.05	-0.05	0.20	0.53	0.48	0.63	1.17	0.79	0.66	0.74	3.06	-0.46
17	0.66	0.76	0.58	0.67	0.94	1.16	1.12	0.16	-0.40	-0.47	-0.48	-0.48	-0.41	-0.15	-0.03	-0.15	-0.42	0.06	0.22	0.74	1.24	0.73	0.49	0.74	0.30	1.24	-0.48
18	0.81	0.91	0.99	0.95	0.99	1.32	0.92	0.02	-0.39	-0.56	-0.73	-0.73	-0.82	-0.75	-0.70	-0.22	0.01	0.25	0.45	0.53	0.80	0.53	0.54	1.05	0.26	1.32	-0.82
19	1.13	0.71	0.23	0.80	0.47	0.14	0.21	-0.23	-0.51	-0.63	-0.83	-0.91	-1.01	-1.05	-1.10	-0.56	-0.40	-0.20	0.83	0.58	1.08	1.36	0.73	0.44	0.05	1.36	-1.10
20	0.28	0.32	0.42	0.16	0.18	0.20	0.77	0.16	-0.21	-0.40	-0.22	-0.39	-0.60	-0.23	-0.14	-0.04	0.17	0.07	0.09	0.09	0.06	0.08	0.22	0.05	0.05	0.77	-0.60
21	0.00	0.05	0.07	0.13	0.08	0.04	0.10	-0.07	-0.20	-0.22	-0.30	-0.43	-0.38	-0.44	-0.25	-0.25	-0.15	-0.05	0.77	0.77	0.51	0.87	0.79	1.00	0.10	1.00	-0.44
22	0.41	0.02	0.17	-0.03	0.26	0.51	0.68	-0.09	-0.30	-0.44	-0.70	-0.83	-0.85	-0.87	-0.92	-0.69	-0.48	0.21	0.75	0.53	1.19	1.04	1.09	1.38	0.09	1.38	-0.92
23	1.04	1.08	0.82	1.11	1.10	1.01	0.56	-0.30	-0.51	-0.57	-0.44	-0.53	-0.48	-0.70	-0.67	-0.61	-0.12	0.17	0.25	0.17	0.24	0.26	0.45	0.35	0.15	1.11	-0.70
24	0.40	0.64	0.56	0.42	0.26	0.25	0.30	0.17	-0.03	-0.07	Au	Au	Au	Au	Au	-0.15	0.10	0.25	0.33	0.37	0.46	0.62	1.03	0.94	0.36	1.03	-0.15
25	0.82	0.97	0.83	0.92	0.73	0.95	1.04	0.09	-0.34	-0.18	-0.27	-0.86	-0.40	-0.50	-0.80	-0.67	-0.37	0.14	1.07	1.31	1.20	1.25	1.08	1.88	0.41	1.88	-0.86
26	1.80	0.47	0.49	1.06	0.69	0.48	0.61	0.48	0.02	0.03	0.16	0.08	0.22	0.04	0.02	-0.03	-0.02	0.11	0.36	0.46	0.50	0.42	0.45	0.22	0.38	1.80	-0.03
27	0.24	0.24	0.39	0.54	0.32	0.00	-0.09	-0.15	-0.18	-0.21	-0.34	-0.63	-0.71	-0.66	-0.34	-0.15	-0.15	-0.03	0.03	0.06	0.17	0.12	0.03	0.00	-0.06	0.54	-0.71
28	0.05	0.12	0.10	0.07	0.03	0.13	0.08	0.00	-0.12	-0.17	-0.12	-0.24	-0.21	-0.20	-0.20	-0.12	-0.10	-0.07	0.03	0.07	0.01	0.00	-0.01	-0.03	-0.04	0.13	-0.24
29	-0.01	-0.03	-0.02	-0.05	-0.03	-0.05	-0.06	-0.15	-0.21	-0.36	-0.27	-0.38	-0.52	-0.36	-0.32	-0.30	-0.25	-0.17	-0.02	-0.04	0.12	0.10	-0.02	-0.09	-0.15	0.12	-0.52
30	0.45	0.60	0.44	0.53	0.23	0.03	-0.02	-0.24	-0.39	-0.49	-0.64	-0.68	-0.88	-0.92	-0.89	-0.87	-0.70	-0.19	0.34	0.24	-0.07	-0.10	0.29	0.19	-0.16	0.60	-0.92
Avg	0.81	0.81	0.82	0.74	0.75	0.71	0.63	-0.07	-0.36	-0.41	-0.49	-0.60	-0.59	-0.62	-0.52	-0.39	-0.25	0.03	0.47	0.57	0.68	0.68	0.69	0.73	0.21	1.37	-0.69
Max	2.09	2.32	3.06	2.68	1.94	1.79	1.60	0.75	0.02	0.03	0.16	0.08	0.40	0.04	0.42	0.14	0.69	1.20	1.46	3.07	2.82	2.40	2.30	2.03	0.79	3.07	-0.03
Min	-0.04	-0.03	-0.03	-0.05	-0.03	-0.05	-0.09	-0.68	-0.89	-0.89	-1.01	-1.11	-1.07	-1.25	-1.10	-1.03	-0.79	-0.42	-0.09	-0.04	-0.07	-0.10	-0.02	-0.09	-0.17	0.12	-1.25

A-18

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Solar Radiation (watts m<sup>2</sup>)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	0	0	0	0	3	18	230	398	572	736	807	584	983	566	663	764	610	107	200	70	3	0	0	0	305	983	0
2	0	0	0	0	3	37	126	350	572	697	824	933	991	623	500	273	117	7	6	6	0	0	0	0	253	991	0
3	0	0	0	0	3	6	73	257	346	129	141	258	330	495	667	769	663	492	225	40	4	0	0	0	204	769	0
4	0	0	0	0	2	48	138	178	404	487	668	859	825	956	960	555	493	378	213	25	1	0	0	0	300	960	0
5	0	0	0	0	4	23	57	81	195	398	890	858	317	163	303	736	101	293	241	81	2	0	0	0	198	890	0
6	0	0	0	0	5	29	81	161	298	718	839	917	931	924	849	334	41	106	11	9	4	0	0	0	261	931	0
7	0	0	0	0	3	70	224	422	120	88	266	816	827	570	787	451	135	232	83	58	2	0	0	0	215	827	0
8	0	0	0	0	2	45	119	266	553	596	781	804	766	426	511	257	18	30	79	27	2	0	0	0	220	804	0
9	0	0	0	0	1	42	53	59	48	100	222	613	946	332	400	348	512	450	240	81	3	0	0	0	185	946	0
10	0	0	0	0	7	28	160	253	494	719	788	750	870	875	843	481	241	244	107	37	2	0	0	0	287	875	0
11	0	0	0	0	3	67	164	381	525	695	843	854	982	623	831	741	585	413	236	73	1	0	0	0	334	982	0
12	0	0	0	0	2	28	183	289	555	655	740	679	907	876	841	752	598	439	101	22	13	0	0	0	320	907	0
13	0	0	0	0	3	64	206	380	555	710	838	869	801	172	535	110	490	178	56	74	3	0	0	0	252	869	0
14	0	0	0	0	2	37	136	104	546	711	254	786	947	943	251	14	174	498	191	70	5	0	0	0	236	947	0
15	0	0	0	0	2	49	209	331	556	707	854	877	1018	705	669	681	355	49	50	35	1	0	0	0	298	1018	0
16	0	0	0	0	1	46	158	415	461	417	707	637	857	799	479	582	456	143	34	30	3	0	0	0	259	857	0
17	0	0	0	0	2	56	211	374	292	683	581	781	632	534	307	234	88	107	42	14	1	0	0	0	206	781	0
18	0	0	0	0	2	50	200	374	561	722	828	865	902	878	745	750	593	415	233	69	2	0	0	0	341	902	0
19	0	0	0	0	3	47	69	154	311	495	904	867	966	869	839	749	603	425	240	72	1	0	0	0	317	966	0
20	0	0	0	0	2	58	206	381	568	724	852	935	964	939	869	751	592	305	107	39	2	0	0	0	346	964	0
21	0	0	0	0	2	49	197	367	549	709	839	922	956	936	867	748	596	415	229	66	2	0	0	0	352	956	0
22	0	0	0	0	2	45	189	359	535	688	814	870	779	905	692	667	430	205	91	31	1	0	0	0	304	905	0
23	0	0	0	0	3	47	105	275	540	418	350	411	667	843	617	238	62	40	101	35	1	0	0	0	198	843	0
24	0	0	0	0	1	23	177	359	535	690	772	797	890	908	859	725	583	406	225	60	1	0	0	0	334	908	0
25	0	0	0	0	1	40	192	361	554	715	844	929	962	940	868	748	595	414	227	60	1	0	0	0	352	962	0
26	0	0	0	0	1	37	189	365	552	712	842	949	986	916	662	615	389	338	214	65	2	0	0	0	326	986	0
27	0	0	0	0	0	14	64	130	168	360	794	904	828	817	387	292	491	366	173	23	1	0	0	0	242	904	0
28	0	0	0	0	1	35	180	353	538	698	842	872	922	925	825	648	498	339	159	34	1	0	0	0	328	925	0
29	0	0	0	0	0	32	172	345	526	687	813	904	930	844	753	385	540	226	39	25	0	0	0	0	301	930	0
30	0	0	0	0	1	23	83	337	508	692	816	927	917	178	408	643	440	135	55	17	1	0	0	0	258	927	0
31	0	0	0	0	0	33	165	332	519	646	833	478	625	843	715	423	483	267	124	17	0	0	0	0	271	843	0
Avg	0	0	0	0	2	40	152	296	453	587	716	790	846	720	661	531	406	273	140	44	2	0	0	0	277	912	0
Max	0	0	0	0	7	70	230	422	572	736	904	949	1018	956	960	769	663	498	241	81	13	0	0	0	352	1018	0
Min	0	0	0	0	0	6	53	59	48	88	141	258	317	163	251	14	18	7	6	6	0	0	0	0	185	769	0

A-19

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Solar Radiation (watts m<sup>2</sup>)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	0	0	0	0	0	27	160	329	511	672	800	886	933	852	284	204	453	226	194	19	0	0	0	0	273	933	0
2	0	0	0	0	0	28	162	333	515	675	801	889	945	682	560	549	329	115	25	9	0	0	0	0	276	945	0
3	0	0	0	0	0	29	162	330	511	670	800	877	881	940	815	429	558	357	88	38	0	0	0	0	312	940	0
4	0	0	0	0	0	23	152	323	506	669	800	890	929	880	715	625	481	356	187	29	0	0	0	0	315	929	0
5	0	0	0	0	0	24	145	314	464	563	599	616	863	715	379	491	497	339	165	30	0	0	0	0	259	863	0
6	0	0	0	0	0	18	153	313	513	677	816	898	929	874	672	468	270	315	169	34	0	0	0	0	297	929	0
7	0	0	0	0	0	23	187	340	500	623	774	738	815	806	803	514	502	316	149	20	0	0	0	0	296	815	0
8	0	0	0	0	0	17	83	127	436	629	767	830	979	544	638	637	360	134	119	9	0	0	0	0	263	979	0
9	0	0	0	0	0	6	80	219	355	375	363	656	409	361	181	38	108	162	22	19	0	0	0	0	140	656	0
10	0	0	0	0	0	11	39	145	260	389	778	752	838	666	753	410	218	20	1	0	0	0	0	0	220	838	0
11	0	0	0	0	0	19	90	177	102	460	250	663	829	166	470	67	26	30	64	14	0	0	0	0	143	829	0
12	0	0	0	0	0	16	106	220	212	165	286	295	311	376	504	427	482	184	97	18	0	0	0	0	154	504	0
13	0	0	0	0	0	16	140	308	491	648	724	706	762	846	796	691	506	337	153	19	0	0	0	0	298	846	0
14	0	0	0	0	0	15	145	278	478	630	632	648	768	441	503	625	538	308	88	10	0	0	0	0	254	768	0
15	0	0	0	0	0	14	125	295	483	656	782	866	455	548	719	618	473	286	100	16	0	0	0	0	268	866	0
16	0	0	0	0	0	13	124	286	470	617	575	321	539	441	536	450	259	103	22	3	0	0	0	0	198	617	0
17	0	0	0	0	0	6	32	69	49	69	111	194	201	218	373	603	418	158	34	6	0	0	0	0	106	603	0
18	0	0	0	0	0	10	120	291	467	640	753	858	895	865	797	665	503	295	114	13	0	0	0	0	304	895	0
19	0	0	0	0	0	10	123	288	472	633	765	847	943	881	761	543	214	128	30	9	0	0	0	0	277	943	0
20	0	0	0	0	0	9	110	285	447	628	682	755	887	733	692	374	437	296	115	7	0	0	0	0	269	887	0
21	0	0	0	0	0	9	107	268	451	610	743	828	862	843	765	643	361	172	84	5	0	0	0	0	281	862	0
22	0	0	0	0	0	9	86	112	162	383	211	286	247	246	294	167	102	97	20	4	0	0	0	0	101	383	0
23	0	0	0	0	0	4	50	160	247	687	357	732	736	592	492	242	570	304	60	6	0	0	0	0	218	736	0
24	0	0	0	0	0	4	50	177	281	377	336	364	554	675	732	607	308	140	34	2	0	0	0	0	193	732	0
25	0	0	0	0	0	5	102	192	173	188	372	482	569	488	491	481	400	272	56	3	0	0	0	0	178	569	0
26	0	0	0	0	0	6	98	280	443	560	376	543	742	531	707	590	442	292	88	2	0	0	0	0	238	742	0
27	0	0	0	0	0	4	107	275	453	617	700	813	867	840	757	634	466	279	92	2	0	0	0	0	288	867	0
28	0	0	0	0	0	4	97	274	461	608	735	837	869	843	764	637	424	237	69	2	0	0	0	0	286	869	0
29	0	0	0	0	0	3	84	260	446	565	636	754	684	452	229	174	137	53	19	1	0	0	0	0	187	754	0
30	0	0	0	0	0	1	20	180	297	303	251	376	682	586	772	514	376	219	40	1	0	0	0	0	192	772	0
31	0	0	0	0	0	3	82	237	419	592	728	820	849	823	743	596	427	252	45	1	0	0	0	0	276	849	0
Avg	0	0	0	0	0	12	107	248	390	535	590	678	735	637	603	475	376	219	82	11	0	0	0	0	237	797	0
Max	0	0	0	0	0	29	187	340	515	687	816	898	979	940	815	691	570	357	194	38	0	0	0	0	315	979	0
Min	0	0	0	0	0	1	20	69	49	69	111	194	201	166	181	38	26	20	1	0	0	0	0	0	101	383	0

A-20

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Solar Radiation (watts m<sup>2</sup>)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	0	0	0	0	0	2	93	224	413	576	697	799	842	713	760	590	430	229	65	1	0	0	0	0	268	842	0
2	0	0	0	0	0	2	67	231	406	573	683	816	752	765	739	587	435	251	63	1	0	0	0	0	265	816	0
3	0	0	0	0	0	2	81	255	432	600	733	821	853	818	733	603	430	241	59	0	0	0	0	0	278	853	0
4	0	0	0	0	0	2	51	232	419	585	716	805	841	805	728	599	423	240	56	0	0	0	0	0	271	841	0
5	0	0	0	0	0	2	66	239	417	582	720	807	803	846	735	589	422	226	24	0	0	0	0	0	270	846	0
6	0	0	0	0	0	0	13	47	141	122	202	164	73	103	131	134	145	30	3	0	0	0	0	0	55	202	0
7	0	0	0	0	0	0	12	34	48	106	145	295	260	488	152	206	265	158	49	0	0	0	0	0	92	488	0
8	0	0	0	0	0	2	25	150	299	429	516	712	458	646	526	529	280	69	10	0	0	0	0	0	194	712	0
9	0	0	0	0	0	0	12	60	122	136	178	300	198	623	409	292	296	126	6	0	0	0	0	0	115	623	0
10	0	0	0	0	0	1	28	131	339	516	312	313	259	95	57	27	47	19	2	0	0	0	0	0	89	516	0
11	0	0	0	0	0	0	9	27	39	113	142	251	573	374	214	80	78	34	11	0	0	0	0	0	81	573	0
12	0	0	0	0	0	0	33	230	366	454	612	556	734	518	621	364	375	165	28	0	0	0	0	0	211	734	0
13	0	0	0	0	0	1	83	94	336	581	687	782	751	573	47	208	110	36	5	0	0	0	0	0	179	782	0
14	0	0	0	0	0	0	43	196	366	413	396	390	468	471	387	440	244	68	13	0	0	0	0	0	162	471	0
15	0	0	0	0	0	0	31	199	329	548	683	778	752	780	662	280	157	188	19	0	0	0	0	0	225	780	0
16	0	0	0	0	0	1	14	55	159	360	407	398	561	616	398	271	336	190	5	0	0	0	0	0	157	616	0
17	0	0	0	0	0	0	16	84	217	399	329	316	265	89	64	150	355	45	10	0	0	0	0	0	97	399	0
18	0	0	0	0	0	1	45	194	379	540	705	748	762	651	632	255	134	31	3	0	0	0	0	0	212	762	0
19	0	0	0	0	0	0	32	151	326	357	507	685	613	624	601	286	210	112	9	0	0	0	0	0	188	685	0
20	0	0	0	0	0	0	8	31	119	198	156	163	249	99	64	48	31	16	2	0	0	0	0	0	49	249	0
21	0	0	0	0	0	0	7	46	89	84	188	257	270	258	209	285	144	68	6	0	0	0	0	0	80	285	0
22	0	0	0	0	0	0	23	194	259	344	609	728	681	705	624	489	315	127	5	0	0	0	0	0	213	728	0
23	0	0	0	0	0	0	19	179	348	516	447	504	487	670	618	537	196	52	2	0	0	0	0	0	191	670	0
24	0	0	0	0	0	0	6	31	73	127	Au	Au	Au	Au	Au	204	67	46	3	0	0	0	0	0	29	204	0
25	0	0	0	0	0	0	24	101	239	218	218	585	225	336	611	450	289	110	2	0	0	0	0	0	142	611	0
26	0	0	0	0	0	0	10	41	65	88	46	81	110	94	63	109	64	17	1	0	0	0	0	0	33	110	0
27	0	0	0	0	0	0	10	44	82	88	202	508	434	403	156	121	61	12	0	0	0	0	0	0	88	508	0
28	0	0	0	0	0	0	0	17	57	86	114	186	127	100	114	48	41	17	1	0	0	0	0	0	38	186	0
29	0	0	0	0	0	0	4	32	65	143	114	198	325	148	104	99	79	19	0	0	0	0	0	0	55	325	0
30	0	0	0	0	0	0	10	54	140	229	385	615	689	646	587	440	276	60	1	0	0	0	0	0	172	689	0
Avg	0	0	0	0	0	1	29	120	236	337	409	502	497	485	405	311	225	100	15	0	0	0	0	0	151	570	0
Max	0	0	0	0	0	2	93	255	432	600	733	821	853	846	760	603	435	251	65	1	0	0	0	0	278	853	0
Min	0	0	0	0	0	0	0	17	39	84	46	81	73	89	47	27	31	12	0	0	0	0	0	0	29	110	0

A-21

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Barometric Pressure (InHg)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	24.57	24.56	24.56	24.55	24.55	24.53	24.52	24.52	24.51	24.50	24.49	24.49	24.47	24.45	24.45	24.44	24.43	24.43	24.42	24.43	24.45	24.47	24.47	24.46	24.49	24.57	24.42
2	24.46	24.46	24.46	24.45	24.46	24.46	24.46	24.45	24.45	24.44	24.43	24.42	24.40	24.38	24.37	24.37	24.37	24.40	24.43	24.44	24.43	24.46	24.45	24.45	24.43	24.46	24.37
3	24.42	24.41	24.41	24.41	24.41	24.42	24.41	24.41	24.41	24.40	24.41	24.40	24.41	24.42	24.42	24.41	24.41	24.42	24.43	24.44	24.45	24.46	24.46	24.45	24.42	24.46	24.40
4	24.45	24.45	24.45	24.45	24.45	24.46	24.47	24.47	24.47	24.47	24.48	24.47	24.46	24.45	24.44	24.45	24.45	24.46	24.47	24.49	24.52	24.55	24.56	24.56	24.47	24.56	24.44
5	24.56	24.56	24.56	24.57	24.58	24.60	24.62	24.63	24.64	24.65	24.65	24.64	24.64	24.65	24.67	24.67	24.68	24.69	24.68	24.68	24.68	24.69	24.68	24.67	24.64	24.69	24.56
6	24.67	24.66	24.65	24.66	24.65	24.65	24.64	24.63	24.62	24.60	24.59	24.58	24.57	24.55	24.52	24.51	24.51	24.52	24.57	24.56	24.53	24.51	24.52	24.50	24.58	24.67	24.50
7	24.48	24.48	24.46	24.45	24.44	24.44	24.44	24.42	24.45	24.49	24.44	24.43	24.43	24.40	24.38	24.37	24.37	24.39	24.41	24.41	24.40	24.39	24.40	24.40	24.42	24.49	24.37
8	24.40	24.41	24.40	24.40	24.41	24.42	24.42	24.43	24.42	24.42	24.42	24.41	24.39	24.38	24.39	24.40	24.44	24.45	24.42	24.43	24.44	24.46	24.45	24.46	24.42	24.46	24.38
9	24.46	24.48	24.48	24.48	24.48	24.49	24.50	24.52	24.53	24.55	24.57	24.57	24.58	24.59	24.60	24.61	24.61	24.61	24.61	24.62	24.63	24.63	24.64	24.63	24.56	24.64	24.46
10	24.63	24.63	24.63	24.62	24.62	24.62	24.63	24.63	24.63	24.63	24.62	24.61	24.61	24.60	24.59	24.58	24.57	24.56	24.55	24.56	24.56	24.57	24.56	24.55	24.60	24.63	24.55
11	24.55	24.55	24.56	24.56	24.57	24.57	24.58	24.58	24.58	24.57	24.56	24.56	24.55	24.55	24.53	24.53	24.52	24.51	24.50	24.51	24.52	24.54	24.55	24.55	24.55	24.58	24.50
12	24.55	24.55	24.54	24.55	24.55	24.56	24.57	24.57	24.57	24.56	24.55	24.54	24.54	24.53	24.51	24.49	24.48	24.48	24.48	24.49	24.52	24.54	24.53	24.54	24.53	24.57	24.48
13	24.54	24.53	24.52	24.51	24.52	24.53	24.53	24.53	24.52	24.51	24.50	24.50	24.48	24.48	24.50	24.50	24.52	24.50	24.50	24.50	24.52	24.53	24.54	24.55	24.51	24.55	24.48
14	24.53	24.54	24.52	24.50	24.52	24.55	24.56	24.57	24.57	24.56	24.55	24.53	24.52	24.50	24.48	24.51	24.49	24.47	24.48	24.49	24.50	24.51	24.53	24.54	24.52	24.57	24.47
15	24.54	24.55	24.55	24.55	24.55	24.56	24.56	24.56	24.56	24.55	24.54	24.53	24.52	24.51	24.49	24.47	24.46	24.46	24.51	24.50	24.51	24.50	24.49	24.49	24.52	24.56	24.46
16	24.48	24.47	24.47	24.47	24.46	24.47	24.47	24.47	24.46	24.46	24.46	24.45	24.44	24.42	24.41	24.40	24.39	24.40	24.41	24.41	24.42	24.43	24.43	24.43	24.44	24.48	24.39
17	24.43	24.42	24.41	24.41	24.41	24.42	24.43	24.42	24.41	24.40	24.39	24.38	24.37	24.38	24.38	24.37	24.37	24.34	24.33	24.33	24.34	24.36	24.35	24.35	24.38	24.43	24.33
18	24.34	24.34	24.34	24.34	24.34	24.33	24.34	24.34	24.32	24.31	24.31	24.30	24.29	24.29	24.29	24.29	24.29	24.29	24.30	24.32	24.33	24.36	24.37	24.37	24.32	24.37	24.29
19	24.37	24.37	24.36	24.36	24.36	24.37	24.37	24.38	24.39	24.38	24.38	24.38	24.37	24.38	24.37	24.37	24.39	24.39	24.41	24.43	24.46	24.48	24.48	24.49	24.40	24.49	24.36
20	24.50	24.50	24.50	24.51	24.51	24.52	24.53	24.54	24.54	24.54	24.53	24.53	24.52	24.51	24.51	24.52	24.50	24.50	24.51	24.53	24.56	24.58	24.60	24.61	24.53	24.61	24.50
21	24.61	24.61	24.61	24.62	24.63	24.65	24.67	24.68	24.68	24.67	24.67	24.67	24.68	24.67	24.67	24.67	24.66	24.65	24.65	24.66	24.67	24.68	24.69	24.69	24.66	24.69	24.61
22	24.68	24.67	24.67	24.66	24.66	24.66	24.67	24.66	24.65	24.65	24.65	24.63	24.63	24.63	24.63	24.63	24.63	24.63	24.63	24.62	24.63	24.65	24.66	24.66	24.65	24.68	24.62
23	24.65	24.64	24.63	24.63	24.64	24.64	24.64	24.65	24.64	24.64	24.64	24.63	24.62	24.60	24.59	24.57	24.57	24.57	24.58	24.58	24.57	24.57	24.58	24.56	24.61	24.65	24.56
24	24.55	24.54	24.53	24.52	24.52	24.53	24.53	24.53	24.52	24.51	24.50	24.49	24.49	24.49	24.49	24.49	24.50	24.51	24.53	24.54	24.56	24.56	24.56	24.57	24.52	24.57	24.49
25	24.58	24.58	24.58	24.58	24.57	24.58	24.59	24.58	24.58	24.58	24.58	24.57	24.57	24.56	24.55	24.54	24.53	24.53	24.53	24.55	24.57	24.58	24.59	24.59	24.57	24.59	24.53
26	24.59	24.59	24.60	24.60	24.60	24.61	24.62	24.63	24.62	24.61	24.61	24.61	24.60	24.59	24.58	24.58	24.57	24.56	24.56	24.57	24.58	24.59	24.59	24.60	24.59	24.63	24.56
27	24.59	24.59	24.59	24.59	24.59	24.59	24.60	24.61	24.61	24.61	24.61	24.59	24.57	24.55	24.53	24.51	24.49	24.49	24.49	24.50	24.53	24.56	24.56	24.57	24.56	24.61	24.49
28	24.57	24.58	24.57	24.58	24.58	24.59	24.61	24.62	24.62	24.62	24.62	24.62	24.62	24.62	24.61	24.59	24.58	24.57	24.57	24.57	24.59	24.60	24.61	24.60	24.60	24.62	24.57
29	24.60	24.59	24.59	24.58	24.58	24.57	24.57	24.57	24.56	24.55	24.54	24.53	24.51	24.50	24.48	24.46	24.45	24.44	24.46	24.49	24.48	24.49	24.51	24.49	24.52	24.60	24.44
30	24.48	24.48	24.47	24.47	24.48	24.49	24.49	24.49	24.49	24.48	24.48	24.47	24.47	24.47	24.53	24.50	24.48	24.48	24.49	24.50	24.51	24.52	24.53	24.53	24.49	24.53	24.47
31	24.53	24.53	24.53	24.54	24.54	24.55	24.56	24.57	24.57	24.56	24.56	24.55	24.55	24.54	24.53	24.52	24.52	24.51	24.50	24.52	24.53	24.53	24.54	24.56	24.54	24.57	24.50
Avg	24.53	24.53	24.52	24.52	24.52	24.53	24.54	24.54	24.54	24.53	24.53	24.52	24.51	24.50	24.50	24.49	24.49	24.49	24.50	24.51	24.52	24.53	24.53	24.53	24.52	24.57	24.47
Max	24.68	24.67	24.67	24.66	24.66	24.66	24.67	24.68	24.68	24.67	24.67	24.67	24.68	24.67	24.67	24.67	24.68	24.69	24.68	24.68	24.68	24.69	24.69	24.69	24.66	24.69	24.62
Min	24.34	24.34	24.34	24.34	24.34	24.33	24.34	24.34	24.32	24.31	24.31	24.30	24.29	24.29	24.29	24.29	24.29	24.29	24.30	24.32	24.33	24.36	24.35	24.35	24.32	24.37	24.29

A-22

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Barometric Pressure (InHg)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1	24.56	24.55	24.55	24.56	24.55	24.56	24.58	24.59	24.59	24.58	24.57	24.57	24.56	24.54	24.54	24.54	24.55	24.56	24.58	24.59	24.61	24.61	24.60	24.61	24.57	24.61	24.54	
2	24.61	24.61	24.60	24.60	24.61	24.61	24.63	24.64	24.63	24.63	24.62	24.62	24.61	24.61	24.59	24.57	24.55	24.55	24.56	24.59	24.61	24.61	24.64	24.66	24.61	24.66	24.55	
3	24.64	24.62	24.61	24.62	24.62	24.62	24.64	24.64	24.63	24.62	24.61	24.60	24.59	24.57	24.56	24.55	24.55	24.54	24.55	24.56	24.57	24.58	24.58	24.60	24.59	24.64	24.54	
4	24.61	24.59	24.58	24.58	24.58	24.58	24.60	24.60	24.59	24.59	24.58	24.57	24.56	24.55	24.53	24.52	24.52	24.52	24.53	24.54	24.57	24.58	24.59	24.59	24.57	24.61	24.52	
5	24.60	24.60	24.60	24.61	24.61	24.61	24.62	24.62	24.61	24.61	24.60	24.59	24.58	24.56	24.54	24.53	24.52	24.51	24.51	24.52	24.53	24.54	24.54	24.55	24.56	24.57	24.62	24.51
6	24.56	24.55	24.55	24.55	24.56	24.56	24.57	24.58	24.57	24.57	24.56	24.55	24.54	24.53	24.52	24.51	24.50	24.49	24.49	24.49	24.51	24.52	24.52	24.52	24.54	24.58	24.49	
7	24.52	24.52	24.53	24.53	24.54	24.54	24.55	24.54	24.54	24.54	24.53	24.53	24.52	24.51	24.50	24.49	24.48	24.47	24.46	24.47	24.49	24.50	24.51	24.51	24.51	24.55	24.46	
8	24.50	24.50	24.50	24.50	24.49	24.50	24.50	24.51	24.51	24.49	24.49	24.48	24.47	24.46	24.45	24.44	24.43	24.43	24.43	24.44	24.46	24.46	24.46	24.47	24.46	24.47	24.43	
9	24.45	24.44	24.44	24.44	24.44	24.44	24.45	24.46	24.46	24.45	24.45	24.45	24.43	24.44	24.45	24.47	24.48	24.48	24.50	24.49	24.50	24.50	24.50	24.50	24.46	24.50	24.43	
10	24.49	24.48	24.48	24.48	24.50	24.52	24.54	24.55	24.53	24.52	24.52	24.52	24.51	24.49	24.48	24.47	24.46	24.46	24.50	24.49	24.53	24.54	24.54	24.54	24.51	24.55	24.46	
11	24.53	24.51	24.49	24.48	24.48	24.49	24.48	24.48	24.50	24.49	24.48	24.47	24.45	24.46	24.47	24.50	24.51	24.48	24.49	24.48	24.49	24.50	24.51	24.52	24.49	24.53	24.45	
12	24.53	24.53	24.52	24.52	24.53	24.53	24.54	24.55	24.56	24.57	24.58	24.58	24.57	24.57	24.57	24.56	24.56	24.57	24.58	24.59	24.61	24.62	24.62	24.63	24.57	24.63	24.52	
13	24.63	24.63	24.63	24.63	24.64	24.64	24.64	24.65	24.65	24.65	24.65	24.65	24.64	24.64	24.63	24.62	24.62	24.62	24.62	24.63	24.64	24.65	24.66	24.66	24.64	24.66	24.62	
14	24.65	24.64	24.64	24.64	24.64	24.63	24.64	24.65	24.64	24.63	24.62	24.62	24.61	24.59	24.59	24.58	24.56	24.56	24.56	24.58	24.59	24.59	24.59	24.59	24.61	24.65	24.56	
15	24.60	24.61	24.60	24.59	24.59	24.59	24.60	24.60	24.60	24.59	24.58	24.57	24.55	24.55	24.53	24.51	24.49	24.49	24.49	24.50	24.51	24.51	24.50	24.50	24.55	24.61	24.49	
16	24.49	24.48	24.47	24.46	24.46	24.45	24.46	24.47	24.46	24.45	24.44	24.43	24.42	24.41	24.40	24.39	24.39	24.39	24.40	24.40	24.41	24.41	24.42	24.42	24.43	24.49	24.39	
17	24.41	24.39	24.37	24.36	24.36	24.36	24.37	24.37	24.37	24.38	24.39	24.38	24.39	24.39	24.38	24.37	24.37	24.36	24.37	24.38	24.39	24.39	24.39	24.39	24.38	24.41	24.36	
18	24.37	24.36	24.36	24.36	24.35	24.36	24.36	24.38	24.37	24.38	24.38	24.38	24.39	24.39	24.38	24.37	24.37	24.37	24.36	24.37	24.39	24.40	24.41	24.41	24.38	24.41	24.35	
19	24.41	24.41	24.41	24.42	24.42	24.42	24.44	24.45	24.45	24.46	24.46	24.46	24.46	24.45	24.44	24.44	24.44	24.45	24.46	24.48	24.51	24.53	24.54	24.55	24.46	24.55	24.41	
20	24.56	24.56	24.57	24.57	24.57	24.59	24.60	24.61	24.61	24.60	24.60	24.59	24.58	24.58	24.58	24.57	24.57	24.57	24.58	24.59	24.61	24.62	24.62	24.61	24.59	24.62	24.56	
21	24.61	24.60	24.59	24.59	24.58	24.58	24.59	24.59	24.58	24.56	24.55	24.53	24.51	24.50	24.47	24.45	24.43	24.41	24.39	24.39	24.40	24.39	24.38	24.36	24.50	24.61	24.36	
22	24.34	24.33	24.31	24.31	24.31	24.32	24.35	24.37	24.37	24.38	24.38	24.39	24.41	24.42	24.41	24.42	24.44	24.45	24.46	24.45	24.47	24.47	24.47	24.46	24.40	24.47	24.31	
23	24.48	24.47	24.48	24.49	24.50	24.50	24.51	24.51	24.51	24.50	24.51	24.49	24.47	24.46	24.45	24.44	24.43	24.43	24.43	24.43	24.44	24.44	24.43	24.42	24.47	24.51	24.42	
24	24.42	24.42	24.42	24.42	24.41	24.41	24.42	24.43	24.42	24.42	24.43	24.43	24.41	24.38	24.37	24.36	24.36	24.35	24.36	24.37	24.38	24.38	24.38	24.39	24.40	24.43	24.35	
25	24.40	24.40	24.40	24.40	24.41	24.41	24.42	24.42	24.42	24.42	24.41	24.41	24.40	24.39	24.39	24.41	24.42	24.44	24.48	24.49	24.51	24.52	24.53	24.54	24.44	24.54	24.39	
26	24.54	24.54	24.55	24.55	24.55	24.55	24.56	24.58	24.58	24.59	24.59	24.59	24.57	24.56	24.55	24.54	24.54	24.55	24.56	24.59	24.61	24.63	24.63	24.63	24.57	24.63	24.54	
27	24.63	24.64	24.64	24.64	24.64	24.64	24.66	24.67	24.66	24.65	24.64	24.63	24.61	24.60	24.59	24.57	24.56	24.55	24.54	24.55	24.56	24.55	24.55	24.54	24.60	24.67	24.54	
28	24.54	24.53	24.53	24.52	24.52	24.51	24.52	24.53	24.52	24.52	24.51	24.51	24.49	24.49	24.48	24.47	24.46	24.46	24.46	24.48	24.50	24.50	24.51	24.52	24.50	24.54	24.46	
29	24.54	24.55	24.55	24.56	24.57	24.57	24.59	24.60	24.59	24.60	24.60	24.59	24.57	24.56	24.55	24.55	24.55	24.54	24.55	24.55	24.54	24.54	24.54	24.55	24.56	24.60	24.54	
30	24.54	24.53	24.53	24.53	24.54	24.54	24.54	24.54	24.54	24.54	24.55	24.54	24.54	24.54	24.52	24.52	24.52	24.52	24.54	24.55	24.57	24.58	24.59	24.60	24.54	24.60	24.52	
31	24.60	24.59	24.59	24.59	24.59	24.60	24.60	24.61	24.61	24.60	24.58	24.58	24.56	24.55	24.54	24.53	24.52	24.52	24.51	24.52	24.54	24.55	24.55	24.55	24.57	24.61	24.51	
Avg	24.53	24.52	24.52	24.52	24.52	24.52	24.53	24.54	24.54	24.53	24.53	24.53	24.52	24.51	24.50	24.49	24.49	24.49	24.49	24.50	24.52	24.52	24.53	24.53	24.52	24.57	24.47	
Max	24.65	24.64	24.64	24.64	24.64	24.64	24.66	24.67	24.66	24.65	24.65	24.65	24.64	24.64	24.63	24.62	24.62	24.62	24.62	24.63	24.64	24.65	24.66	24.66	24.64	24.67	24.62	
Min	24.34	24.33	24.31	24.31	24.31	24.32	24.35	24.37	24.37	24.38	24.38	24.38	24.39	24.38	24.37	24.36	24.36	24.35	24.36	24.37	24.38	24.38	24.38	24.36	24.38	24.41	24.31	

A-23

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Barometric Pressure (InHg)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1	24.55	24.54	24.54	24.54	24.54	24.55	24.55	24.57	24.57	24.56	24.55	24.54	24.53	24.53	24.52	24.50	24.50	24.48	24.47	24.47	24.49	24.48	24.48	24.49	24.52	24.57	24.47	
2	24.49	24.49	24.49	24.49	24.50	24.51	24.52	24.53	24.53	24.52	24.52	24.52	24.51	24.51	24.51	24.51	24.51	24.51	24.52	24.55	24.57	24.59	24.60	24.61	24.53	24.61	24.49	
3	24.62	24.62	24.62	24.63	24.63	24.62	24.63	24.64	24.64	24.64	24.63	24.62	24.61	24.59	24.58	24.57	24.56	24.55	24.54	24.55	24.55	24.55	24.55	24.52	24.59	24.64	24.52	
4	24.52	24.50	24.50	24.50	24.50	24.50	24.50	24.51	24.50	24.50	24.50	24.49	24.49	24.49	24.49	24.48	24.49	24.50	24.51	24.53	24.55	24.55	24.55	24.57	24.51	24.57	24.48	
5	24.59	24.60	24.60	24.61	24.61	24.63	24.64	24.66	24.67	24.68	24.67	24.67	24.67	24.67	24.66	24.65	24.65	24.64	24.63	24.63	24.65	24.66	24.67	24.66	24.66	24.64	24.68	24.59
6	24.66	24.64	24.63	24.61	24.62	24.64	24.63	24.63	24.62	24.60	24.59	24.58	24.58	24.59	24.57	24.56	24.55	24.56	24.56	24.56	24.56	24.56	24.56	24.55	24.59	24.66	24.55	
7	24.54	24.54	24.54	24.54	24.54	24.55	24.56	24.57	24.58	24.59	24.59	24.59	24.59	24.59	24.58	24.58	24.57	24.56	24.55	24.55	24.55	24.54	24.53	24.51	24.56	24.59	24.51	
8	24.49	24.48	24.46	24.45	24.43	24.43	24.42	24.41	24.40	24.37	24.34	24.33	24.32	24.31	24.31	24.28	24.27	24.27	24.28	24.28	24.28	24.27	24.27	24.26	24.35	24.49	24.26	
9	24.24	24.24	24.23	24.24	24.26	24.27	24.28	24.29	24.31	24.32	24.33	24.34	24.34	24.35	24.35	24.35	24.35	24.36	24.38	24.39	24.40	24.41	24.41	24.41	24.33	24.41	24.23	
10	24.40	24.40	24.40	24.41	24.42	24.41	24.41	24.42	24.43	24.43	24.43	24.43	24.42	24.42	24.43	24.44	24.44	24.45	24.45	24.46	24.48	24.48	24.49	24.48	24.43	24.49	24.40	
11	24.48	24.47	24.48	24.48	24.48	24.49	24.51	24.51	24.53	24.53	24.54	24.55	24.55	24.55	24.54	24.56	24.57	24.59	24.60	24.61	24.61	24.62	24.61	24.62	24.55	24.62	24.47	
12	24.62	24.62	24.63	24.64	24.65	24.65	24.66	24.67	24.69	24.69	24.69	24.68	24.68	24.67	24.66	24.65	24.64	24.63	24.63	24.63	24.62	24.62	24.61	24.60	24.65	24.69	24.60	
13	24.60	24.59	24.58	24.57	24.56	24.56	24.56	24.58	24.58	24.58	24.56	24.54	24.53	24.51	24.51	24.50	24.48	24.48	24.48	24.50	24.51	24.51	24.51	24.51	24.48	24.60	24.48	
14	24.51	24.51	24.50	24.50	24.50	24.50	24.50	24.51	24.51	24.50	24.50	24.49	24.48	24.47	24.45	24.43	24.42	24.43	24.43	24.44	24.44	24.44	24.43	24.43	24.47	24.51	24.42	
15	24.42	24.42	24.42	24.41	24.41	24.40	24.40	24.40	24.39	24.38	24.37	24.35	24.33	24.32	24.31	24.30	24.30	24.29	24.28	24.29	24.29	24.29	24.30	24.30	24.35	24.42	24.28	
16	24.30	24.30	24.29	24.29	24.27	24.28	24.29	24.29	24.30	24.31	24.29	24.27	24.25	24.23	24.22	24.21	24.21	24.20	24.21	24.23	24.23	24.25	24.25	24.24	24.26	24.31	24.20	
17	24.26	24.23	24.25	24.24	24.23	24.23	24.25	24.27	24.28	24.29	24.29	24.29	24.30	24.32	24.33	24.35	24.35	24.37	24.39	24.40	24.40	24.40	24.40	24.39	24.31	24.40	24.23	
18	24.39	24.39	24.38	24.38	24.38	24.38	24.39	24.39	24.40	24.39	24.38	24.37	24.36	24.35	24.33	24.32	24.32	24.33	24.33	24.35	24.36	24.36	24.36	24.36	24.37	24.40	24.32	
19	24.34	24.35	24.35	24.36	24.37	24.37	24.37	24.38	24.38	24.38	24.37	24.37	24.36	24.35	24.34	24.34	24.34	24.35	24.35	24.37	24.35	24.35	24.35	24.35	24.36	24.38	24.34	
20	24.35	24.35	24.35	24.36	24.35	24.35	24.34	24.35	24.35	24.35	24.34	24.34	24.33	24.32	24.33	24.34	24.36	24.37	24.37	24.37	24.38	24.39	24.39	24.38	24.35	24.39	24.32	
21	24.38	24.39	24.40	24.41	24.42	24.43	24.45	24.47	24.47	24.48	24.48	24.46	24.46	24.45	24.44	24.43	24.43	24.43	24.43	24.43	24.44	24.44	24.43	24.42	24.44	24.48	24.38	
22	24.42	24.41	24.41	24.40	24.41	24.41	24.41	24.42	24.43	24.44	24.43	24.42	24.41	24.41	24.39	24.39	24.39	24.39	24.38	24.39	24.39	24.39	24.39	24.39	24.40	24.44	24.38	
23	24.39	24.40	24.40	24.40	24.41	24.42	24.43	24.44	24.46	24.46	24.47	24.47	24.45	24.44	24.44	24.43	24.43	24.44	24.46	24.46	24.47	24.46	24.45	24.46	24.44	24.47	24.39	
24	24.46	24.45	24.45	24.45	24.44	24.44	24.45	24.46	24.47	24.47	Au	Au	Au	Au	Au	24.42	24.42	24.42	24.43	24.44	24.44	24.45	24.45	24.45	24.45	24.47	24.42	
25	24.45	24.45	24.45	24.44	24.44	24.45	24.46	24.48	24.50	24.51	24.51	24.52	24.52	24.51	24.50	24.49	24.49	24.48	24.47	24.46	24.45	24.43	24.42	24.41	24.47	24.52	24.41	
26	24.39	24.37	24.35	24.31	24.29	24.27	24.26	24.23	24.21	24.19	24.17	24.17	24.18	24.18	24.20	24.20	24.21	24.23	24.23	24.23	24.24	24.24	24.26	24.26	24.24	24.39	24.17	
27	24.26	24.26	24.27	24.26	24.27	24.28	24.29	24.29	24.30	24.31	24.31	24.30	24.30	24.29	24.28	24.29	24.30	24.30	24.32	24.31	24.30	24.31	24.30	24.29	24.29	24.32	24.26	
28	24.28	24.27	24.26	24.26	24.26	24.26	24.27	24.28	24.28	24.28	24.28	24.26	24.26	24.25	24.24	24.24	24.25	24.26	24.26	24.25	24.25	24.24	24.23	24.22	24.26	24.28	24.22	
29	24.21	24.21	24.19	24.17	24.16	24.17	24.17	24.16	24.16	24.15	24.16	24.16	24.16	24.17	24.18	24.20	24.22	24.25	24.27	24.29	24.31	24.31	24.33	24.32	24.21	24.33	24.15	
30	24.32	24.31	24.33	24.36	24.36	24.36	24.37	24.38	24.38	24.39	24.40	24.40	24.41	24.41	24.41	24.41	24.42	24.43	24.43	24.44	24.45	24.44	24.43	24.42	24.39	24.45	24.31	
Avg	24.43	24.43	24.43	24.42	24.42	24.43	24.43	24.44	24.44	24.44	24.44	24.43	24.43	24.42	24.42	24.41	24.41	24.42	24.42	24.43	24.43	24.43	24.43	24.43	24.43	24.49	24.37	
Max	24.66	24.64	24.63	24.64	24.65	24.65	24.66	24.67	24.69	24.69	24.69	24.68	24.68	24.67	24.66	24.65	24.64	24.63	24.63	24.65	24.66	24.67	24.66	24.66	24.65	24.69	24.60	
Min	24.21	24.21	24.19	24.17	24.16	24.17	24.17	24.16	24.16	24.15	24.16	24.16	24.16	24.17	24.18	24.20	24.21	24.20	24.21	24.23	24.23	24.24	24.23	24.22	24.21	24.28	24.15	

A-24

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Relative Humidity (% RH)**  
**July 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	75.4	83.8	88.3	89.5	87.5	89.2	79.6	63.4	54.8	48.4	46.0	48.9	39.3	30.1	33.6	33.4	33.2	38.7	37.9	39.0	60.3	62.6	70.7	75.0	58.7	89.5	30.1
2	82.0	84.7	84.8	87.4	90.3	92.4	92.4	82.6	70.4	67.3	65.6	57.1	48.2	49.6	53.2	64.7	72.2	84.5	87.1	85.9	88.4	89.2	89.8	88.8	77.4	92.4	48.2
3	89.8	87.6	90.8	91.3	90.8	91.0	91.0	84.1	77.8	77.5	85.8	77.7	81.2	74.2	62.6	56.5	50.8	48.5	51.9	66.2	82.3	85.7	88.7	89.9	78.1	91.3	48.5
4	90.7	90.3	90.5	91.7	91.6	91.5	88.1	83.9	70.3	63.5	54.9	47.7	46.8	42.1	38.2	36.1	36.9	38.7	43.9	53.5	64.5	61.3	68.9	82.2	65.3	91.7	36.1
5	83.6	87.8	88.8	88.3	89.3	89.5	87.1	82.3	78.0	70.3	56.1	46.8	52.0	58.3	76.3	71.0	68.6	66.7	61.1	65.2	74.8	77.6	79.2	81.0	74.2	89.5	46.8
6	86.2	89.4	91.4	92.1	88.5	86.4	82.7	74.4	68.4	61.3	55.3	52.2	47.2	42.7	45.7	52.3	58.7	74.3	79.4	83.9	78.7	84.8	88.1	88.3	73.0	92.1	42.7
7	88.8	90.9	91.6	92.3	91.8	90.2	83.0	72.2	73.2	81.0	78.0	56.7	47.3	44.4	40.5	36.1	43.4	48.5	61.8	67.4	78.9	82.3	84.4	88.3	71.4	92.3	36.1
8	86.2	87.6	87.8	88.6	90.6	90.4	87.3	75.9	59.5	46.4	43.7	44.0	40.6	42.7	50.4	61.6	84.7	88.2	81.8	82.8	85.2	89.7	90.4	90.3	74.0	90.6	40.6
9	90.4	90.9	90.5	91.1	89.7	90.5	86.5	84.3	85.7	83.8	79.6	73.5	63.3	62.9	61.6	65.3	57.7	53.1	51.2	61.7	80.8	86.1	88.4	90.7	77.5	91.1	51.2
10	90.5	91.8	90.7	92.1	93.0	91.7	87.1	75.2	53.7	44.7	42.2	36.4	35.4	34.9	31.7	33.1	38.7	42.8	51.5	56.2	63.1	68.7	76.6	76.3	62.4	93.0	31.7
11	79.6	81.0	86.3	87.9	89.1	87.7	83.6	65.9	47.2	43.4	41.8	41.1	37.7	39.3	36.7	36.1	36.4	36.5	38.3	44.1	55.9	69.2	74.4	77.3	59.0	89.1	36.1
12	80.8	84.5	84.0	88.4	89.3	88.9	80.9	72.3	60.5	45.5	46.5	47.1	44.3	41.0	37.7	33.8	34.2	33.1	42.9	61.0	75.1	83.1	85.6	88.4	63.7	89.3	33.1
13	86.8	88.7	89.4	86.2	90.7	88.3	82.8	62.9	50.6	38.7	36.5	34.9	33.1	40.7	52.9	57.0	56.2	57.6	73.8	72.0	74.6	76.3	77.0	80.2	66.2	90.7	33.1
14	82.6	85.0	83.8	82.2	85.5	84.6	76.6	77.3	65.5	55.0	52.4	50.8	38.1	36.5	43.5	63.7	75.9	66.3	64.6	76.3	80.9	87.5	90.5	90.9	70.7	90.9	36.5
15	92.1	91.1	91.9	92.7	92.6	91.6	84.8	73.1	51.3	42.5	40.7	40.2	36.4	33.4	34.5	31.9	33.6	46.3	81.7	81.7	87.3	85.7	84.6	84.9	66.9	92.7	31.9
16	84.4	88.1	90.5	90.9	91.4	90.5	84.3	70.3	67.7	64.0	58.9	56.4	50.8	46.4	45.1	41.3	39.2	45.4	59.1	74.3	76.2	82.2	81.3	85.9	69.4	91.4	39.2
17	87.7	86.9	88.1	87.7	90.7	92.4	83.4	72.2	61.1	51.9	52.3	50.6	52.9	49.5	50.9	54.7	55.3	54.3	59.5	71.6	75.1	79.5	70.5	78.5	69.1	92.4	49.5
18	83.3	83.4	83.9	87.1	87.5	87.7	79.3	61.8	51.6	42.8	40.5	40.2	39.0	36.3	34.6	30.8	29.2	33.5	34.8	38.0	40.4	46.4	58.4	68.5	55.0	87.7	29.2
19	68.2	77.1	80.8	81.9	85.1	84.2	80.4	73.9	55.1	40.4	38.0	36.3	33.5	32.3	29.5	28.2	28.8	28.1	26.9	27.4	35.4	57.7	70.0	75.1	53.1	85.1	26.9
20	79.5	83.0	84.2	86.5	87.1	84.0	77.4	63.1	37.4	33.3	29.4	26.5	28.9	30.4	28.3	26.5	25.6	27.1	37.4	47.9	47.2	56.7	63.7	73.1	52.7	87.1	25.6
21	77.5	84.8	87.5	89.1	90.1	89.8	84.7	65.6	53.4	47.0	45.3	41.7	39.8	37.1	36.1	33.9	37.1	41.9	47.8	52.1	56.9	60.3	66.2	62.9	59.5	90.1	33.9
22	64.5	69.9	75.8	82.3	85.8	86.7	77.8	65.7	62.2	58.0	53.0	47.6	44.3	44.0	38.6	35.3	33.2	40.7	57.1	60.0	61.8	68.0	77.2	83.6	61.4	86.7	33.2
23	86.5	87.0	89.8	86.2	88.5	85.9	85.4	72.6	50.1	37.3	48.3	44.8	33.3	29.9	28.6	37.0	49.0	59.1	38.2	46.1	68.1	72.5	75.8	74.9	61.5	89.8	28.6
24	79.5	81.3	82.5	86.3	86.7	85.8	78.9	59.8	42.5	38.3	37.4	34.4	32.6	32.0	29.6	24.6	19.7	18.1	18.5	21.2	27.9	23.3	21.1	33.4	45.6	86.7	18.1
25	43.9	59.7	67.6	73.2	77.2	75.3	68.4	47.6	20.3	19.5	18.9	17.2	17.2	17.0	16.4	15.4	15.7	17.1	19.6	23.5	31.0	50.3	57.3	64.7	38.9	77.2	15.4
26	71.9	77.6	80.0	82.2	84.4	82.5	70.9	55.0	37.6	27.5	26.0	21.8	19.3	18.2	17.0	16.8	17.5	22.7	19.3	20.9	34.0	51.8	53.8	57.6	44.4	84.4	16.8
27	69.1	74.2	76.7	74.4	74.1	73.0	74.1	65.7	63.5	51.0	35.2	34.6	31.9	31.0	32.1	58.7	56.2	37.4	40.0	51.9	63.4	69.5	78.6	79.8	58.2	79.8	31.0
28	86.1	87.3	89.3	72.5	73.3	76.3	71.1	50.4	37.2	36.3	35.3	32.9	31.7	28.9	27.6	24.4	25.5	26.6	35.6	44.7	50.1	64.1	61.9	70.3	51.6	89.3	24.4
29	55.2	48.1	52.6	51.9	57.0	59.0	51.9	46.3	39.8	37.0	34.2	31.3	25.6	23.2	22.7	22.9	21.6	24.6	30.6	40.2	50.8	67.4	67.3	74.7	43.2	74.7	21.6
30	78.4	77.7	84.7	85.0	88.5	87.8	84.8	70.1	47.6	39.8	33.0	28.3	24.8	29.3	41.6	36.0	30.5	36.3	50.9	43.0	58.6	68.9	75.6	80.6	57.6	88.5	24.8
31	85.5	86.0	88.6	89.2	89.6	88.9	81.8	65.5	52.0	30.9	27.6	29.5	28.3	24.1	21.4	21.6	20.4	23.0	28.4	37.9	40.1	47.8	59.1	61.2	51.2	89.6	20.4
Avg	80.2	82.8	84.9	85.4	86.7	86.2	80.9	68.9	56.3	49.2	46.4	42.9	39.5	38.1	38.7	40.0	41.5	43.9	48.8	54.8	62.8	69.6	73.4	77.3	61.6	88.6	32.9
Max	92.1	91.8	91.9	92.7	93.0	92.4	92.4	84.3	85.7	83.8	85.8	77.7	81.2	74.2	76.3	71.0	84.7	88.2	87.1	85.9	88.4	89.7	90.5	90.9	78.1	93.0	51.2
Min	43.9	48.1	52.6	51.9	57.0	59.0	51.9	46.3	20.3	19.5	18.9	17.2	17.2	17.0	16.4	15.4	15.7	17.1	18.5	20.9	27.9	23.3	21.1	33.4	38.9	74.7	15.4

A-25



**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Relative Humidity (% RH)**  
**August 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	65.4	74.0	81.2	82.3	83.7	84.7	73.5	58.7	45.7	31.9	28.8	28.4	26.3	22.6	23.7	26.2	42.5	35.6	43.1	53.2	58.9	68.2	70.4	73.1	53.4	84.7	22.6
2	77.0	82.3	84.2	88.6	87.5	88.2	80.4	63.3	42.5	35.5	31.6	25.9	21.7	21.9	23.2	20.1	19.1	20.7	22.8	26.7	33.3	43.7	56.7	58.4	48.1	88.6	19.1
3	70.8	75.4	81.1	86.6	90.1	90.7	82.8	64.0	47.3	40.4	36.4	33.8	29.0	23.8	20.7	23.9	24.3	25.8	34.1	46.1	53.4	61.9	68.9	73.3	53.5	90.7	20.7
4	67.7	73.2	74.8	80.6	83.3	83.7	75.1	56.2	36.6	30.6	27.6	26.5	22.8	21.5	19.7	19.0	20.5	24.8	31.6	41.2	43.4	58.4	64.3	74.5	48.2	83.7	19.0
5	77.0	82.2	84.6	86.5	87.2	87.8	81.1	63.1	48.3	41.8	34.8	36.4	31.7	27.1	25.3	21.8	20.8	20.7	22.3	24.9	41.9	50.9	62.2	72.1	51.4	87.8	20.7
6	75.6	78.7	81.3	83.6	83.1	83.0	73.8	58.1	39.3	25.7	22.8	21.6	20.3	18.9	18.6	18.8	25.6	24.5	23.0	39.0	54.0	61.3	59.3	65.9	48.2	83.6	18.6
7	71.2	75.0	72.6	75.8	77.8	80.8	66.8	60.3	49.8	39.5	34.7	32.0	26.5	25.1	22.9	20.5	17.4	17.0	23.2	43.3	46.3	47.3	59.4	64.9	47.9	80.8	17.0
8	69.1	72.9	73.2	74.3	74.7	77.0	75.9	70.2	54.4	32.9	26.8	23.1	20.4	20.4	19.2	17.6	18.7	26.1	24.7	32.0	35.0	41.4	47.3	53.3	45.0	77.0	17.6
9	60.6	64.6	68.0	71.2	73.0	76.1	75.5	60.9	50.9	45.5	46.6	39.2	37.3	44.8	53.8	65.7	83.3	78.3	84.0	87.7	89.4	91.0	92.3	92.6	68.0	92.6	37.3
10	92.9	93.3	93.3	93.6	93.6	93.8	94.0	93.7	91.8	83.3	67.4	67.8	58.9	55.9	57.4	57.9	61.9	69.4	79.5	78.2	79.4	86.7	86.2	83.8	79.7	94.0	55.9
11	84.5	85.4	88.1	90.3	85.3	84.2	80.2	77.9	79.6	72.5	76.3	69.1	60.2	66.0	68.2	72.9	88.3	86.3	86.9	80.6	77.1	77.6	80.4	83.8	79.2	90.3	60.2
12	84.3	89.6	90.9	90.8	90.9	91.7	91.3	77.3	74.6	71.1	64.9	60.2	54.7	48.6	44.1	43.5	41.3	44.2	46.7	51.4	63.9	82.8	83.5	87.2	69.6	91.7	41.3
13	90.4	91.3	92.2	92.2	92.4	92.9	91.7	77.7	59.1	48.3	41.4	39.2	39.0	35.5	32.6	29.6	26.6	25.8	35.2	48.1	63.9	75.8	80.6	85.3	61.9	92.9	25.8
14	87.9	88.4	90.5	90.5	90.8	92.0	89.1	73.1	57.1	43.6	36.8	35.6	33.0	33.0	31.9	29.8	29.0	26.5	29.7	36.6	56.9	60.8	61.4	69.7	57.2	92.0	26.5
15	70.9	62.4	66.7	78.6	85.6	88.8	83.6	69.2	54.7	44.4	40.1	35.5	35.2	34.0	32.4	29.9	30.0	29.6	34.7	44.4	62.3	71.5	77.4	84.2	56.1	88.8	29.6
16	87.2	88.7	89.6	90.7	90.9	91.2	88.5	74.0	59.4	51.7	46.5	42.3	39.7	40.5	37.7	32.2	34.2	37.6	46.2	54.3	65.6	78.2	86.4	80.9	63.9	91.2	32.2
17	82.2	85.1	89.5	91.5	92.1	92.3	92.2	92.6	90.1	86.3	88.4	82.1	84.1	77.2	76.8	64.2	56.6	61.6	75.0	80.7	85.7	87.2	88.7	90.7	83.0	92.6	56.6
18	91.9	92.3	92.4	92.6	92.7	92.9	93.3	87.8	66.6	55.8	48.4	40.1	35.7	33.5	31.1	29.2	27.7	28.3	34.7	52.1	63.4	72.0	72.7	77.2	62.7	93.3	27.7
19	85.0	88.6	88.7	89.6	91.0	91.1	86.1	70.5	50.0	33.5	29.5	26.8	24.1	22.4	21.9	21.8	28.1	40.9	47.7	65.3	74.0	82.0	86.0	87.6	59.7	91.1	21.8
20	88.0	86.1	87.4	87.6	88.6	88.4	82.2	72.1	49.0	41.3	41.1	38.8	34.0	36.0	34.5	38.6	39.6	42.3	49.0	54.8	61.5	62.7	66.3	69.3	60.0	88.6	34.0
21	75.1	82.6	86.2	87.9	89.5	90.1	86.2	72.8	57.0	44.9	43.2	39.4	35.1	33.7	33.0	33.8	35.9	38.4	41.1	44.0	45.0	46.8	52.5	55.0	56.2	90.1	33.0
22	58.0	68.0	70.9	76.2	81.2	84.4	80.4	74.9	70.0	54.6	54.8	50.8	46.9	45.9	45.6	47.6	69.1	74.1	81.8	87.1	89.7	91.7	90.1	91.2	70.2	91.7	45.6
23	90.7	91.0	91.4	91.5	89.5	89.4	88.9	87.8	79.4	62.3	66.0	58.6	53.0	48.3	49.1	48.9	40.8	39.8	48.2	64.4	78.5	84.1	87.3	89.5	71.6	91.5	39.8
24	90.6	90.2	89.4	90.3	91.5	92.0	91.8	85.0	71.8	55.9	41.6	42.2	39.8	33.3	31.1	30.3	33.2	36.3	44.6	45.2	52.5	40.3	38.4	35.9	58.0	92.0	30.3
25	33.8	33.8	39.6	47.3	45.5	63.8	64.4	54.4	46.1	44.0	44.1	42.3	37.9	32.9	31.7	31.8	37.8	46.4	62.3	72.1	77.3	78.6	83.2	88.0	51.6	88.0	31.7
26	88.8	90.1	91.2	92.0	91.6	92.1	91.5	79.7	65.3	54.5	47.8	43.1	37.5	37.9	32.7	31.9	31.3	33.4	43.8	53.7	58.3	68.0	78.1	83.1	63.2	92.1	31.3
27	86.9	89.4	90.0	91.2	91.4	91.5	89.7	73.2	55.5	45.7	41.1	36.6	34.3	32.0	30.9	24.9	24.2	24.7	29.0	52.4	66.9	72.6	70.8	80.8	59.4	91.5	24.2
28	84.4	86.2	88.2	88.3	88.8	89.6	85.5	67.1	45.6	32.9	29.6	26.6	22.2	17.9	15.4	15.0	16.0	18.2	19.2	36.5	47.2	50.9	65.5	68.4	50.2	89.6	15.0
29	72.2	76.4	78.2	82.2	84.0	84.3	76.0	61.4	54.4	48.6	44.4	39.8	34.5	29.4	29.2	34.6	39.7	44.2	46.3	50.4	55.5	59.3	70.5	72.0	57.0	84.3	29.2
30	74.0	77.2	77.8	79.6	81.6	81.9	84.4	79.9	62.2	50.4	48.1	48.1	42.5	40.0	32.6	32.1	32.1	32.9	42.3	57.5	64.6	68.6	77.8	83.9	60.5	84.4	32.1
31	84.6	89.2	90.0	91.6	91.9	92.4	91.5	76.4	60.3	45.1	40.2	35.0	31.7	26.9	23.1	20.9	20.3	22.6	33.2	49.7	51.9	61.3	68.8	72.5	57.1	92.4	20.3
Avg	78.0	80.8	82.7	85.0	85.8	87.2	83.5	72.0	58.5	48.2	44.3	40.9	37.1	35.1	33.9	33.4	36.0	38.0	44.1	53.3	61.2	67.2	72.0	75.7	59.7	89.1	30.2
Max	92.9	93.3	93.3	93.6	93.6	93.8	94.0	93.7	91.8	86.3	88.4	82.1	84.1	77.2	76.8	72.9	88.3	86.3	86.9	87.7	89.7	91.7	92.3	92.6	83.0	94.0	60.2
Min	33.8	33.8	39.6	47.3	45.5	63.8	64.4	54.4	36.6	25.7	22.8	21.6	20.3	17.9	15.4	15.0	16.0	17.0	19.2	24.9	33.3	40.3	38.4	35.9	45.0	77.0	15.0

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Relative Humidity (% RH)**  
**September 2019**

Day	<< Hour >>																								Avg	Max	Min
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	77.4	79.9	83.4	83.2	85.0	86.8	84.9	67.7	50.3	38.5	35.7	32.1	29.6	26.7	24.2	22.6	20.3	23.6	35.9	38.1	45.8	50.2	54.5	56.5	51.4	86.8	20.3
2	67.7	77.7	83.1	85.9	90.0	90.7	91.2	76.2	57.7	39.6	36.2	31.9	25.8	23.4	22.7	19.4	17.5	18.2	26.9	43.3	50.7	58.9	69.8	76.3	53.4	91.2	17.5
3	82.8	83.9	87.3	88.5	90.0	91.0	88.9	70.7	52.7	39.0	28.9	23.6	18.3	16.2	14.2	12.2	11.7	12.2	22.1	37.8	46.6	50.0	58.3	47.2	48.9	91.0	11.7
4	55.2	64.9	70.4	71.6	73.0	76.9	77.8	60.9	40.1	26.1	24.2	22.5	19.1	15.5	12.5	12.7	13.5	12.8	18.6	31.3	39.7	49.1	55.3	60.3	41.8	77.8	12.5
5	66.8	70.0	73.8	72.1	74.5	75.8	73.6	53.9	40.3	22.4	15.4	15.6	15.5	13.5	14.0	12.8	12.2	13.5	25.2	32.5	35.9	34.9	30.7	36.3	38.8	75.8	12.2
6	35.4	37.6	44.5	42.4	47.0	51.3	61.8	67.2	60.2	52.2	48.8	45.7	62.5	75.6	75.4	72.1	67.0	74.2	77.7	83.2	87.8	89.8	89.8	87.8	64.0	89.8	35.4
7	88.5	89.1	90.3	91.0	91.0	90.7	90.2	89.8	89.7	89.1	86.5	82.9	80.0	73.8	68.5	71.0	66.2	67.8	74.9	86.7	88.9	89.0	89.1	89.6	83.9	91.0	66.2
8	90.8	90.8	90.8	90.4	90.4	89.5	88.1	84.8	79.3	78.0	72.6	74.8	73.0	69.2	69.7	63.0	71.8	82.3	86.1	85.6	87.4	88.7	88.7	89.5	82.3	90.8	63.0
9	89.9	91.0	91.5	91.1	89.4	89.5	89.2	88.9	86.4	87.6	87.3	81.8	75.7	65.7	58.4	55.1	51.7	52.6	64.1	75.4	85.7	89.9	90.9	91.6	80.0	91.6	51.7
10	91.3	91.9	92.3	92.5	92.1	92.2	92.1	93.0	91.5	64.6	58.2	56.9	57.5	67.2	82.8	86.6	87.8	85.2	86.8	88.3	88.2	84.3	87.6	90.2	83.4	93.0	56.9
11	90.7	90.1	90.1	90.6	89.5	90.0	87.8	90.3	89.1	88.1	86.6	85.1	78.2	72.8	71.9	79.0	79.4	80.2	78.5	84.6	86.0	90.4	91.8	92.2	85.5	92.2	71.9
12	92.3	92.4	92.2	92.0	92.0	92.2	92.0	90.8	82.0	72.8	66.9	62.2	54.7	52.0	45.3	45.3	42.4	43.6	55.6	77.2	84.7	87.7	88.5	91.5	74.5	92.4	42.4
13	91.7	92.2	92.2	92.1	91.9	92.3	91.4	88.1	80.7	54.1	39.3	37.3	35.2	33.8	57.3	73.6	61.3	78.8	84.3	86.1	87.6	87.1	86.6	87.5	75.1	92.3	33.8
14	74.8	73.3	82.3	84.8	87.5	87.9	87.0	80.0	59.6	46.7	45.6	45.2	43.1	39.6	38.2	34.3	32.6	39.5	60.5	72.7	77.2	78.3	82.3	85.5	64.1	87.9	32.6
15	85.7	90.5	91.2	91.5	91.8	92.0	92.2	84.3	68.4	34.9	25.5	22.5	17.9	13.4	12.9	14.2	20.6	22.4	42.8	54.2	63.7	67.2	72.4	74.2	56.1	92.2	12.9
16	78.0	78.5	81.0	81.5	81.1	80.9	82.7	81.4	78.5	57.1	28.7	25.0	23.2	18.7	18.1	18.0	18.9	19.1	29.9	38.2	40.1	49.4	58.0	62.8	51.2	82.7	18.0
17	62.8	56.6	61.5	64.5	72.8	81.7	84.1	83.3	72.4	56.8	55.0	57.3	59.8	65.6	85.5	81.4	69.2	64.8	62.7	71.9	79.7	85.9	88.0	89.8	71.4	89.8	55.0
18	90.6	91.1	91.0	91.5	90.7	90.8	89.0	81.0	63.0	42.7	38.2	35.5	34.4	33.4	30.4	31.3	35.6	42.3	47.4	54.2	45.7	56.8	65.9	73.9	60.3	91.5	30.4
19	78.8	88.3	91.0	91.6	91.6	92.4	90.6	85.4	69.9	60.1	57.6	52.8	52.6	52.6	48.4	49.1	51.0	55.1	64.2	72.3	81.1	86.2	88.6	88.9	72.5	92.4	48.4
20	90.1	89.2	90.0	90.0	89.6	90.0	90.7	92.1	87.7	74.9	69.2	65.7	65.5	64.3	63.5	61.1	64.4	71.5	80.6	86.0	88.1	89.9	87.8	89.1	80.5	92.1	61.1
21	89.5	90.5	90.9	89.6	90.7	91.2	89.3	88.1	89.3	89.7	84.7	81.0	77.2	71.2	71.8	72.0	66.0	67.8	72.2	82.0	89.1	90.6	91.5	91.7	83.6	91.7	66.0
22	92.3	92.4	92.7	92.6	92.5	92.5	92.7	89.8	81.2	63.0	58.9	54.4	51.0	47.3	41.3	38.9	37.4	43.0	66.4	81.7	87.2	89.6	90.6	91.2	73.4	92.7	37.4
23	91.7	91.6	90.6	90.2	90.7	91.2	91.8	83.2	68.1	57.6	55.5	51.6	48.4	43.4	41.6	39.4	42.0	46.6	52.3	49.4	54.1	53.5	54.3	51.3	63.8	91.8	39.4
24	51.2	55.8	57.6	56.3	54.6	53.8	60.3	66.5	66.1	64.3	Au	Au	Au	Au	Au	39.2	41.7	42.0	39.5	41.5	47.7	52.2	61.4	76.3	54.1	76.3	39.2
25	82.7	85.5	87.1	87.9	87.6	86.5	87.9	86.0	79.9	48.3	45.8	41.2	40.9	37.8	35.4	33.8	34.3	38.0	46.4	62.2	72.1	79.2	81.7	77.9	64.4	87.9	33.8
26	58.9	43.3	40.7	53.7	43.6	39.2	43.6	51.3	57.6	46.6	44.1	48.3	61.5	55.5	56.6	58.0	64.4	65.5	74.8	70.4	68.7	65.9	73.4	79.9	56.9	79.9	39.2
27	84.4	87.4	88.7	88.5	90.2	91.3	91.6	91.2	86.0	82.2	81.7	70.9	62.3	54.2	58.1	68.9	76.5	83.2	86.3	85.9	80.5	78.9	83.7	85.7	80.8	91.6	54.2
28	83.1	82.4	77.4	80.0	85.6	89.1	86.6	88.6	87.5	81.3	73.9	73.9	79.9	84.2	83.5	79.1	77.7	82.8	78.5	74.7	76.1	75.8	75.8	78.0	80.6	89.1	73.9
29	77.2	76.8	77.0	80.7	79.0	83.0	84.0	83.6	82.7	80.0	80.1	82.1	79.2	84.3	85.2	84.6	84.9	85.3	82.9	84.9	83.9	83.3	82.1	82.7	82.1	85.3	76.8
30	83.8	84.2	80.9	81.5	82.5	80.3	80.5	82.0	82.5	81.5	79.6	76.0	72.7	71.3	65.3	64.7	66.4	76.7	83.8	86.6	87.3	87.5	86.9	86.8	79.6	87.5	64.7
Avg	79.2	80.3	81.8	82.7	83.3	84.1	84.5	80.7	72.7	60.7	55.5	53.0	51.5	49.7	50.1	49.8	49.5	53.0	60.3	67.3	71.2	74.0	76.8	78.7	68.0	88.6	42.6
Max	92.3	92.4	92.7	92.6	92.5	92.5	92.7	93.0	91.5	89.7	87.3	85.1	80.0	84.3	85.5	86.6	87.8	85.3	86.8	88.3	89.1	90.6	91.8	92.2	85.5	93.0	76.8
Min	35.4	37.6	40.7	42.4	43.6	39.2	43.6	51.3	40.1	22.4	15.4	15.6	15.5	13.4	12.5	12.2	11.7	12.2	18.6	31.3	35.9	34.9	30.7	36.3	38.8	75.8	11.7

A-27

**Sandfire Resources America Inc.**  
**Black Butte Copper Project Met Tower Air Monitoring Summary**  
**Precipitation (inches)**  
**July 2019**

Day	<< Hour >>																								Tot	Max		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Ma	Ca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.04
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.12
Max	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08





**APPENDIX B: PERFORMANCE AUDIT REPORTS**  
**THIRD QUARTER 2019**

---



# BISON ENGINEERING, INC.

## Bison Engineering

### Preliminary Meteorological Parameters Audit Form

Audit Dates: 09/24/2019 Tower Lowered : 10:30 MST Tower Back Up : 14:15 MST  
 Client: Tintina Resources  
 Site: Black Butte  
 AUDITOR: Steve Heck PRECEDING CALIBRATION BY: Jeff Bell

#### Temperature

Audit Device: Control Company - digital thermometer Model 4000  
 Meter S/N: 91255639 Temperature Sensor: Climatronics 100093  
 Last certified: Nov 2018 S/N X17929 (Upper), S/N X17927 (Lower) - Matched Set

#### Temperature bath results

	9m	9m	2m	2m	9m - 2m	
Audit Value	DAS Value	DAS Diff.	DAS Value	DAS Diff.	DAS Diff.	
°C	°C	°C	°C	°C	°C	
0.20	0.27	0.07	0.24	0.04	0.03	Replaced both aspirator fans as PM Both of the removed fans were working properly
16.73	16.71	-0.02	16.69	-0.04	0.02	
37.90	38.15	0.25	38.10	0.20	0.05	

#### Wind Direction

	Setpoint	Clockwise	Counter-CW	Diff CW	Diff CCW
Sensor height: 9 Meter	0	0.9	0.8	0.9	0.8
Sensor (Make/model number): Climatronics/ 102083	30	30.7	30.5	0.7	0.5
Serial Number : P1336C	60	60.9	60.7	0.9	0.7
Crossarm orientation (from Garmin GPS): 0.0 / 180.0	90	90.9	90.8	0.9	0.8
<b>GPS location at sensor:</b>	120	120.9	120.8	0.9	0.8
N 46 deg 46.351 min, W 110 deg 52.949 min	150	150.7	150.7	0.7	0.7
<b>GPS location at sighting point:</b>	180	180.9	180.7	0.9	0.7
N 46 deg 46.313 min, W 110 deg 52.949 min	210	210.7	210.4	0.7	0.4
Sensor response aligned with crossarm (as found): 178.0	240	240.6	240.3	0.6	0.3
Sensor response aligned with crossarm (as left): 180.5	270	270.4	270.1	0.4	0.1
Linearity Audit Device: Climatronics 101966, SN 70	300	300.4	300.2	0.4	0.2
	330	330.5	330.2	0.5	0.2
			<b>Max Diff</b>	<b>0.9</b>	<b>0.8</b>

Threshold Torque: 0.06 oz.-in.  
 (Waters Model 366-1 torque watch)

#### Wind Speed

Sensor height: 9 Meter  
 Sensor (Make/model number): Climatronics/ 102083  
 Serial Number : P1336C  
 Calibration device: Weathertronics 300 rpm synchronous motor  
 Weathertronics 600 rpm synchronous motor

#### Synchronous motor checks

Known Value	Known Value	DAS Value	DAS Diff.
RPM	m/s	m/s	m/s
0	0.22	0.22	0.00
300	6.66	6.65	-0.01
600	13.09	13.08	-0.01

Threshold Torque: 0.004 oz.-in.  
 (Waters Model 366-3 torque watch)

### Solar Radiation

Audit Device: Eppley Pyranometer, SN 16166F3 (certified by Eppley January 2019)

Time (MST)	CTS Value (W/m2)	Site Value (W/m2)	Diff. (%)	Diff. (% FS)
1446	601	633	5.3	2.5
1450	523	552	5.5	2.2

### Relative Humidity

Site Sensor: Met One 083E-0-35  
Sensor Height: 2 meters  
Reference Std: Assmann Psychrometer, thermometer calibrations checked September 2019

Ref Dry-Bulb: 11.7 deg C      BP = 24.40 in. Hg  
Ref Wet-Bulb: 7.2 deg C  
Ref RH: 56.3 %RH  
Station RH: 58.0 %RH  
Diff: 1.7 %RH

### Barometric Pressure

Audit Device: Wallace & Tiernan Model FA185260, S/N LL03297.  
Checked against Bison Mercury barometer (Butte) September 2019

Audit Value: 24.40 in Hg  
Station Value: 24.45 in Hg  
Diff: 0.05 in Hg

### Precipitation

Rain Gauge = Met One Model 375D, Serial No. N3939  
This gauge installed as temporary replacement for site gauge which had failed. Gauge had no heater.  
Level checked OK  
Wind Screen in place  
8" opening  
Precip audit performed July 16 at time of installation  
Second precip audit performed September 24 at time of removal. Results for both audits identical.  
559 ml water added  
Calibration is 8.24 ml per tip  
Known audit value is  $559 / 8.24 = 67.8$  tips (so 67 or 68 full tips expected)  
Unit registered 66 tips  
% difference from expected = -1.5%

Rain Gauge = Met One Model 375D, Serial No. X15682  
Repaired gauge re-installed on September 24.  
Level checked OK  
Wind Screen in place  
8" opening  
559 ml water added  
Calibration is 8.24 ml per tip  
Known audit value is  $559 / 8.24 = 67.8$  tips (so 67 or 68 full tips expected)  
Unit registered 63 tips  
% difference from expected = -6.0%