

**SANDFIRE RESOURCES, INC.
BLACK BUTTE COPPER
PROJECT AMBIENT AIR
MONITORING PROGRAM
Quarterly Data Report
Third Quarter 2018**

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, 2018

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February 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: 1/14/2019

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Signature: 

Title: Meteorologist

Date: 1-23-2019

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APPENDICES

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

1.0 INTRODUCTION

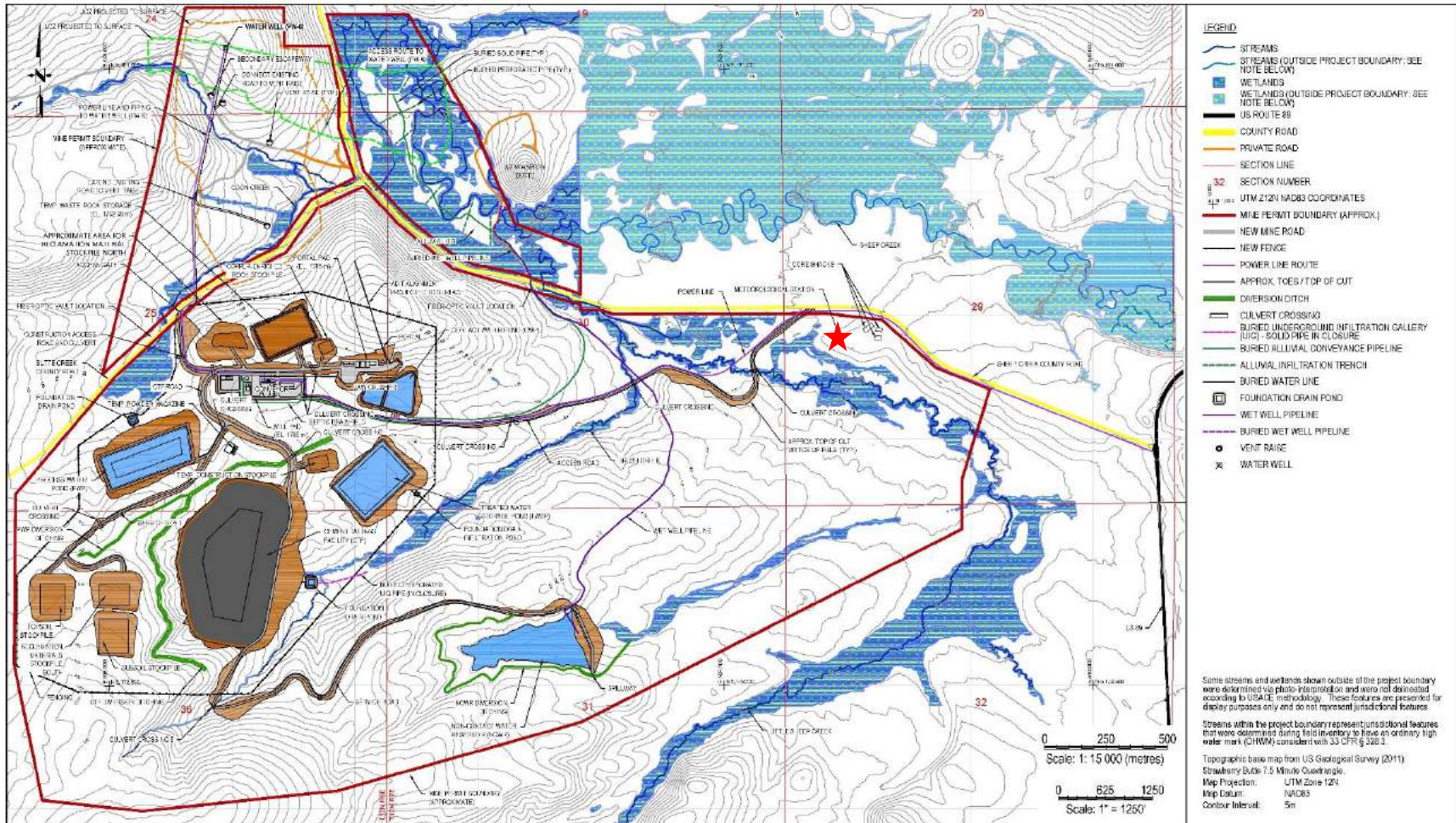
Sandfire Resources, Inc. established an ambient air monitoring site to measure wind speed, wind direction, standard deviation of wind direction, temperature at 9 meters and 2 meters, delta temperature, solar radiation, barometric pressure, and precipitation. The station was established to accurately 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 fourth quarter (October through December) of 2018. 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 and manual rain gauge were not operated during the fourth quarter of 2018.

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, Compliance Determination by MT DED on May 23, 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.

Jeff Bell of Bison conducted performance audits of the meteorological system on November 20, 2018, and made any necessary calibration adjustments to the meteorological system following the audits.

3.0 PERFORMANCE AUDIT DATA

Jeff Bell of Bison conducted performance audits of the meteorological system on November 20, 2018. All as-found audit results were satisfactory and no calibration adjustments were needed

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

4.0 CALIBRATION DATA

Jeff Bell of Bison conducted performance audits of the meteorological system on November 20, 2018, as discussed in Section 3.0. All as-found audit results were satisfactory and no calibration adjustments were needed.

5.0 DATA COMPLETENESS

The meteorological percentages of data recovery achieved during the fourth quarter of 2018 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 fourth quarter the net percentage data recovery was 100.0 percent for all parameters except wind speed and precipitation. The net percentage data recovery was 99.2 percent for wind speed; 18 hours of data were lost in December due to the cups freezing in place during bad weather. The net percentage data recovery was 99.7 percent for precipitation because of a few erroneous values that may have been caused by “bouncing” of the reed switch. The manufacturer recommends putting a capacitor on the rain gauge to stop the effect. The gauge is believed to be working correctly during actual precipitation events. During the next audit a capacitor will be added to filter out any reed switch bouncing effects.

Table 1. Monthly Data Completeness

October 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
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	738	99.2	0	99.2
Total	7,440	7,434	99.9	0	99.9

Table 1. Monthly Data Completeness (Continued)

November 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
Wind Speed	720	717	99.6	3	100.0
Wind Direction	720	717	99.6	3	100.0
Standard Deviation	720	717	99.6	3	100.0
Temperature 9 Meters	720	717	99.6	3	100.0
Temperature 2 Meters	720	717	99.6	3	100.0
Temperature Delta T	720	717	99.6	3	100.0
Solar Radiation	720	717	99.6	3	100.0
Barometric Pressure	720	717	99.6	3	100.0
Relative Humidity	720	717	99.6	3	100.0
Precipitation	720	717	99.6	3	100.0
Total	7,200	7,170	99.6	30	100.0

Table 1. Monthly Data Completeness (Continued)

December 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
Wind Speed	744	726	97.6	0	97.6
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	741	99.6	0	99.6
Total	7,440	7,419	99.7	0	99.7

Table 2. Quarterly Data Completeness

Fourth Quarter 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
Wind Speed	2,208	2,187	99.0	3	99.2
Wind Direction	2,208	2,205	99.9	3	100.0
Standard Deviation	2,208	2,205	99.9	3	100.0
Temperature 9 Meters	2,208	2,205	99.9	3	100.0
Temperature 2 Meters	2,208	2,205	99.9	3	100.0
Temperature Delta T	2,208	2,205	99.9	3	100.0
Solar Radiation	2,208	2,205	99.9	3	100.0
Barometric Pressure	2,208	2,205	99.9	3	100.0
Relative Humidity	2,208	2,205	99.9	3	100.0
Precipitation	2,208	2,196	99.5	3	99.6
Total	22,080	22,023	99.7	30	99.9

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

Mnemonic Code	Description	Equivalent EPA Null Value Reason Code
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

October 2018																		
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	1.1	1.5	1.3	1.2	0.5	2.6	5.1	2.2	1.3	0.1	0.7	0.4	0.7	0.7	1.3	0.9	21.6
	1.1 - 2.0	0.4	0.8	1.6	1.1	3.8	3.6	4.2	2.0	1.5	0.5	1.3	0.7	1.1	2.2	1.3	0.5	26.6
	2.1 - 3.0	0.1	0.1	0.7	0.8	1.5	1.3	0.9	0.8	0.3	0.4	0.4	1.1	1.2	1.3	0.7	0.5	12.2
	3.1 - 4.0	0.0	0.0	0.0	0.4	0.3	0.5	0.4	1.9	0.1	0.3	0.3	0.5	3.0	2.2	0.8	0.4	11.0
	4.1 - 5.0	0.1	0.0	0.0	0.1	0.0	0.4	0.5	1.5	0.1	0.1	0.5	1.2	2.4	1.5	0.7	0.5	9.8
	5.1 - 6.0	0.3	0.0	0.0	0.0	0.0	0.3	0.4	1.2	0.0	0.3	0.4	1.1	1.5	1.3	0.3	0.7	7.7
	6.1 - 7.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.1	0.0	1.1	1.6	1.1	0.4	0.3	5.8
	7.1 - 8.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.1	0.1	0.5	1.2	0.1	0.4	0.3	4.0
	8.1 - 9.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.0	0.0	0.4	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	0.0	0.0	0.0	0.0	0.0
	10.1 - 11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	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	2.4	3.6	3.6	6.0	8.7	11.8	11.2	3.4	2.0	3.9	6.9	12.9	10.3	5.9	4.6		100.0
Average Speed	3.2	1.1	1.4	1.8	1.7	1.8	1.7	3.4	1.4	3.4	2.8	4.5	4.4	3.6	3.0	3.9		2.9

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

November 2018																		
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	1.3	1.1	2.0	2.1	3.3	4.3	4.5	3.2	1.5	1.3	1.5	0.6	0.7	1.5	0.4	0.6	29.8
	1.1 - 2.0	1.1	1.0	2.4	2.4	3.3	5.6	5.4	2.1	0.8	0.4	0.6	1.0	2.0	1.7	0.6	0.6	30.8
	2.1 - 3.0	0.1	0.0	0.0	0.8	1.4	0.8	0.4	0.1	0.6	0.1	0.4	1.0	2.9	2.4	1.3	0.8	13.2
	3.1 - 4.0	0.0	0.0	0.0	0.6	0.4	0.0	0.3	0.3	0.3	0.0	0.1	0.4	3.1	1.8	0.7	0.3	8.2
	4.1 - 5.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.1	1.8	2.8	0.7	0.4	6.7
	5.1 - 6.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.4	1.5	1.0	0.8	0.3	4.6
	6.1 - 7.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.5	0.7	1.0	0.0	4.6
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.1	0.0	1.1
	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	0.0	0.0	0.3	0.1	0.0	0.4
	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	0.3	0.1	0.0	0.0	0.4
	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	0.0	0.0	0.0
	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	3.1	2.1	4.3	5.9	8.6	10.9	10.7	5.9	3.2	2.1	3.1	3.6	15.1	12.8	5.7	2.9		100.0
Average Speed	2.0	1.0	1.1	1.5	1.5	1.3	1.3	1.3	1.4	1.5	1.8	2.6	4.0	3.6	4.1	2.6		2.3

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

December 2018																		
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	0.6	1.8	0.6	1.1	1.5	2.1	2.9	1.8	1.5	0.8	0.4	0.1	0.4	0.4	0.8	0.8	17.6
	1.1 - 2.0	0.1	0.7	1.8	1.9	3.2	4.7	5.5	2.6	1.0	0.4	0.6	0.7	1.0	1.8	1.1	1.1	28.1
	2.1 - 3.0	0.1	0.0	0.4	1.2	1.5	3.3	1.7	0.1	0.3	0.0	0.8	1.7	3.4	2.1	0.7	0.4	17.8
	3.1 - 4.0	0.6	0.0	0.1	0.0	0.7	0.7	1.0	0.8	0.6	0.6	0.4	0.4	3.4	0.6	0.6	0.0	10.3
	4.1 - 5.0	0.1	0.1	0.0	0.0	0.8	0.0	0.1	1.0	0.6	0.3	0.0	1.5	2.5	0.4	0.1	0.1	7.7
	5.1 - 6.0	0.1	0.0	0.0	0.0	0.1	0.0	0.3	0.6	0.6	0.8	0.4	0.4	2.1	1.0	0.1	0.3	6.7
	6.1 - 7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.8	0.1	1.9	0.4	0.0	0.7	4.8
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	1.5	0.3	0.0	0.1	2.5
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.8	0.3	0.0	0.0	2.5
	9.1 - 10.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.6	0.0	0.0	0.0	1.0
	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	0.7	0.0	0.0	0.0	0.7
	11.1 - 12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	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	0.1	0.1
	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	1.8	2.6	2.9	4.3	7.9	10.7	11.4	6.9	4.8	3.9	4.3	5.0	19.3	7.2	3.4	3.7		100.0
Average Speed	3.2	1.0	1.6	1.7	2.1	1.8	1.7	2.2	2.8	4.2	4.7	3.5	5.0	3.4	2.1	3.4		3.0

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

Fourth Quarter 2018																		
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	1.5	1.3	1.5	1.8	3.0	4.2	2.4	1.5	0.7	0.9	0.4	0.6	0.9	0.9	0.8	23.0
	1.1 - 2.0	0.5	0.8	1.9	1.8	3.4	4.6	5.0	2.2	1.1	0.5	0.8	0.8	1.3	1.9	1.0	0.7	28.5
	2.1 - 3.0	0.1	0.0	0.4	1.0	1.5	1.8	1.0	0.4	0.4	0.2	0.5	1.2	2.5	1.9	0.9	0.6	14.4
	3.1 - 4.0	0.2	0.0	0.0	0.3	0.5	0.4	0.5	1.0	0.3	0.3	0.3	0.5	3.2	1.5	0.7	0.2	9.9
	4.1 - 5.0	0.1	0.0	0.0	0.0	0.3	0.2	0.2	0.8	0.2	0.2	0.3	1.0	2.2	1.6	0.5	0.4	8.1
	5.1 - 6.0	0.2	0.0	0.0	0.0	0.0	0.1	0.2	0.6	0.2	0.4	0.3	0.6	1.7	1.1	0.4	0.4	6.4
	6.1 - 7.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.2	0.3	0.5	2.0	0.7	0.5	0.3	5.1
	7.1 - 8.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.1	0.2	1.0	0.3	0.2	0.1	2.6
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.7	0.2	0.0	0.1	1.4
	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	0.3	0.0	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	0.2	0.0	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	2.5	2.4	3.6	4.6	7.5	10.1	11.3	8.0	3.8	2.7	3.7	5.2	15.7	10.1	5.0	3.7		100.0
Average Speed	2.7	1.1	1.3	1.6	1.8	1.6	1.6	2.6	2.0	3.3	3.3	3.8	4.5	3.5	3.2	3.4		2.7

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

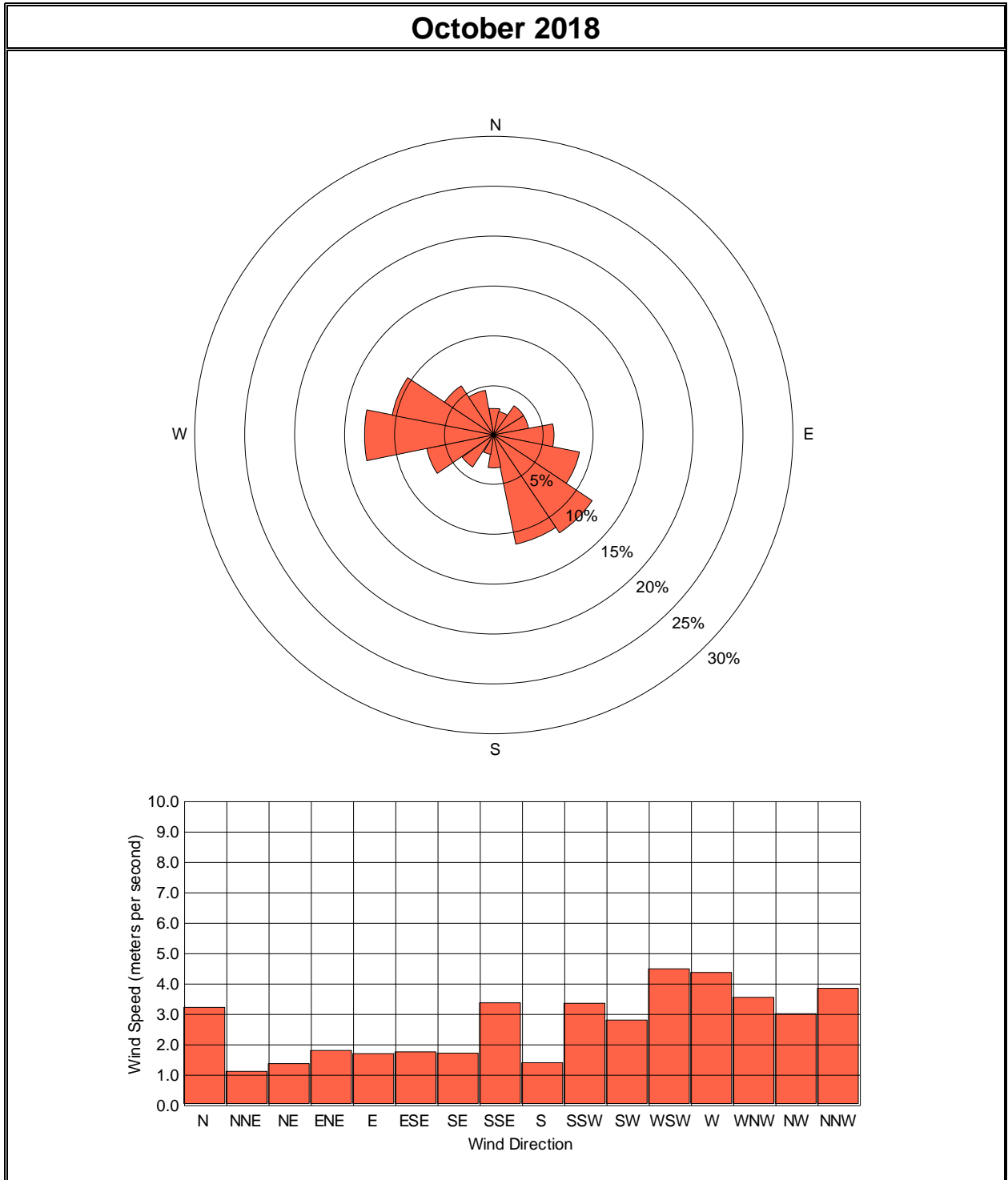


Figure 3. Monthly Wind Rose, Black Butte Copper Project Met Tower

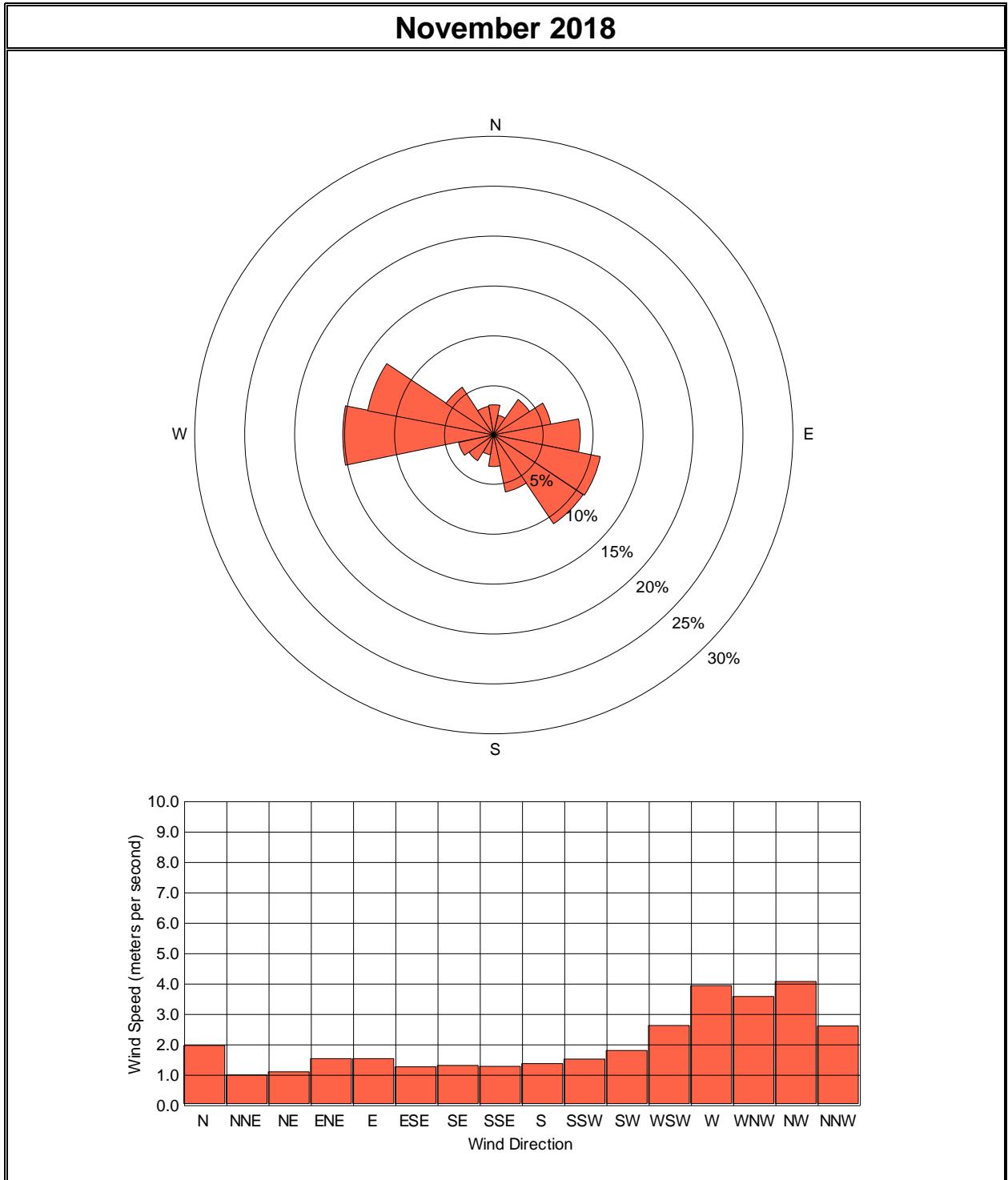


Figure 4. Monthly Wind Rose, Black Butte Copper Project Met Tower

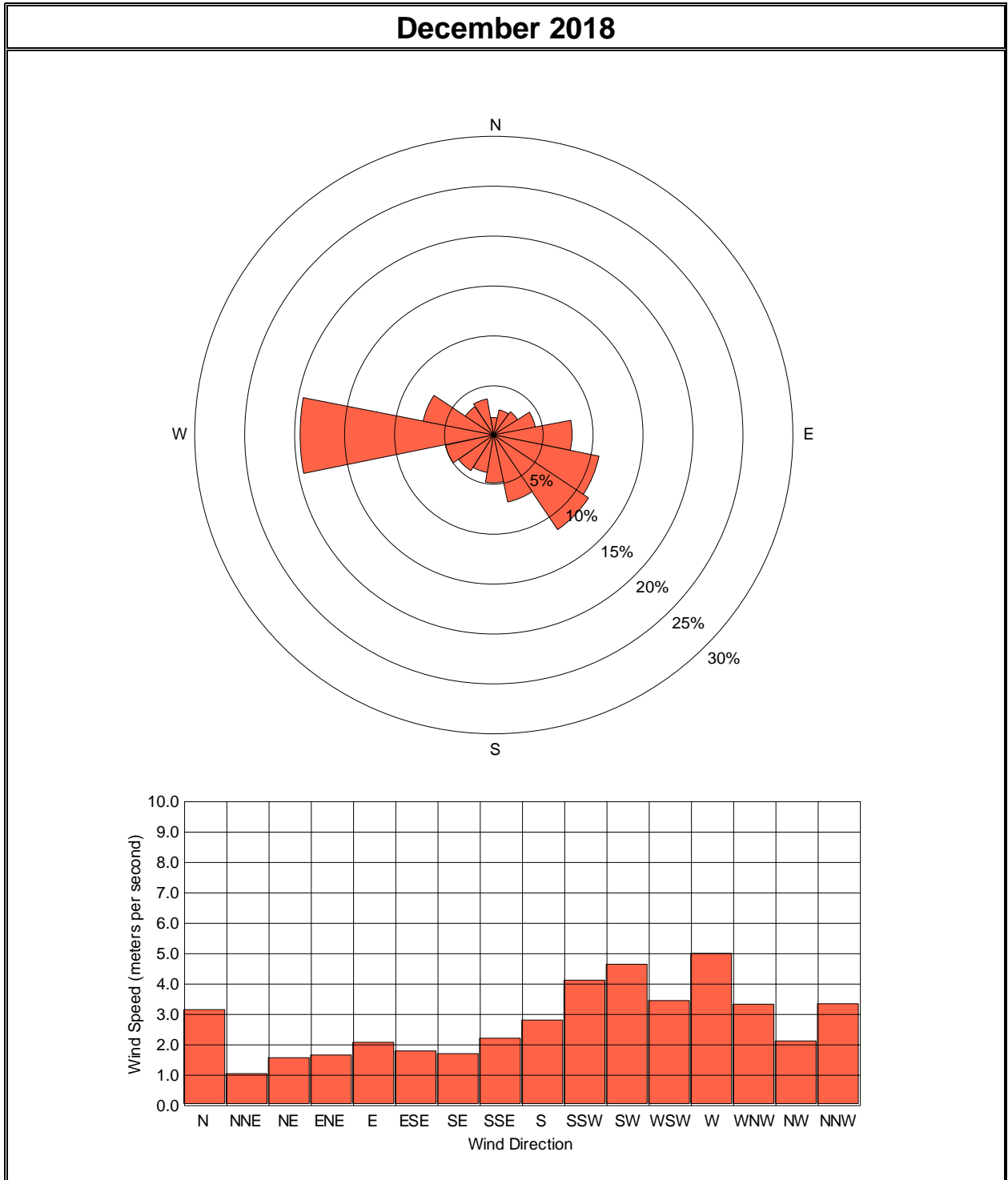
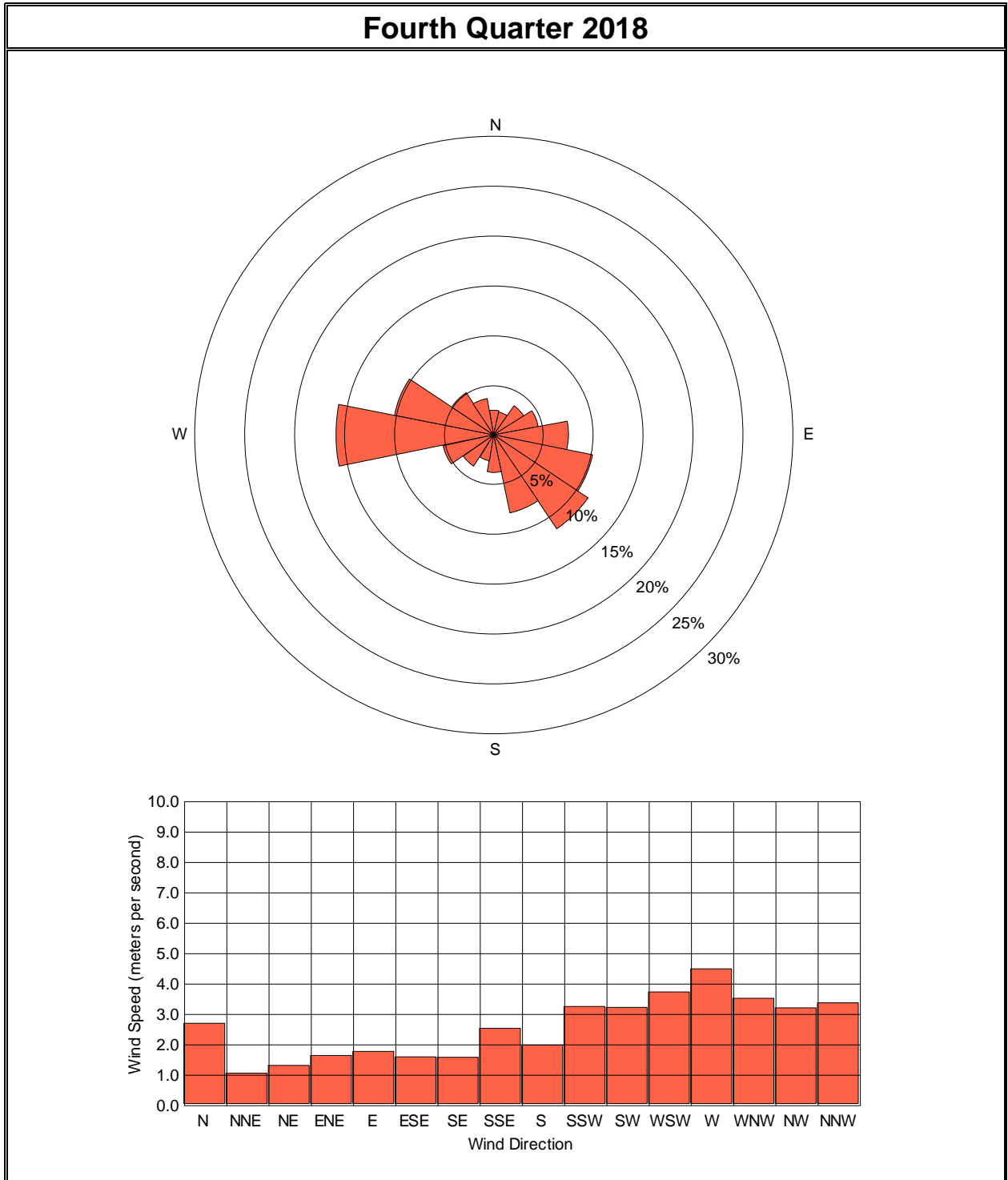


Figure 5. Quarterly Wind Rose, Black Butte Copper Project Met Tower



**APPENDIX A: HOURLY AIR QUALITY AND
METEOROLOGICAL DATA, FOURTH QUARTER 2018**

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Speed (meters per second)
October 2018

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	1.5	0.8	1.3	1.4	1.2	1.3	0.9	0.9	1.0	2.6	4.1	4.1	5.6	6.0	4.5	6.0	4.1	2.1	2.6	2.2	1.6	1.0	0.7	1.1	2.4	6.0	0.7
2	2.1	1.0	1.3	1.3	1.5	2.2	0.9	0.8	0.5	0.9	0.9	1.0	3.6	3.3	1.7	3.6	2.1	1.8	2.3	1.7	1.9	1.5	1.2	1.6	1.7	3.6	0.5
3	3.9	3.7	3.5	6.1	5.0	7.8	6.7	7.6	6.9	5.2	4.3	4.4	3.3	2.4	2.6	1.6	1.4	3.7	5.5	3.3	2.9	2.9	1.8	2.9	4.1	7.8	1.4
4	3.3	4.2	2.1	1.3	1.0	0.9	0.8	0.8	0.7	1.1	2.7	1.5	3.5	3.2	3.3	3.0	3.0	1.8	1.2	1.6	1.5	1.2	1.6	1.4	1.9	4.2	0.7
5	1.2	1.6	0.6	2.0	3.4	2.5	1.8	1.0	2.2	4.7	4.6	3.4	5.0	4.4	4.7	5.1	3.6	1.6	1.9	2.1	0.9	1.6	2.1	1.7	2.7	5.1	0.6
6	1.3	1.3	0.8	1.0	1.8	1.0	0.8	0.8	0.9	0.7	1.1	1.4	1.7	0.9	1.2	1.1	1.8	1.7	1.1	1.4	0.8	1.0	0.9	0.6	1.1	1.8	0.6
7	0.8	0.8	0.5	0.4	0.8	1.1	1.1	1.4	1.6	0.7	0.4	0.6	1.0	1.1	0.8	1.4	1.5	1.4	1.1	1.1	1.0	1.0	0.9	0.6	1.0	1.6	0.4
8	0.5	0.6	0.6	1.1	1.3	0.6	0.5	0.7	1.0	1.7	1.6	3.0	3.3	3.7	4.2	5.9	3.5	0.8	1.1	0.6	0.7	3.2	4.4	3.3	2.0	5.9	0.5
9	3.8	4.7	5.1	5.1	5.5	3.2	3.7	3.0	4.4	4.7	5.1	7.5	7.2	6.3	7.1	7.1	4.3	3.9	3.7	4.1	4.8	4.8	4.8	4.9	4.9	7.5	3.0
10	4.7	5.3	3.8	2.8	3.5	4.5	5.2	5.0	6.3	6.0	6.3	7.1	6.9	5.3	5.3	5.3	4.6	4.0	3.4	2.6	3.4	4.0	4.5	3.7	4.7	7.1	2.6
11	3.7	2.1	1.6	1.2	0.3	0.5	0.6	0.9	1.4	3.1	4.0	4.9	4.5	6.1	4.8	6.1	4.7	2.1	3.1	1.8	1.1	1.1	0.9	0.7	2.6	6.1	0.3
12	0.8	1.3	1.3	1.5	1.3	1.7	1.6	1.6	2.9	4.6	6.8	7.4	6.6	7.7	8.0	6.9	7.1	3.0	3.8	5.1	4.2	1.2	2.6	4.3	3.9	8.0	0.8
13	5.2	6.3	5.8	4.8	8.1	7.8	7.3	4.4	8.5	8.1	8.4	8.0	7.5	7.9	6.9	7.5	5.5	3.4	2.4	4.5	6.1	3.8	4.4	5.6	6.2	8.5	2.4
14	5.7	6.0	6.0	5.0	5.0	3.2	3.6	1.4	2.7	4.6	5.1	6.0	6.4	5.5	5.8	5.8	5.2	3.4	1.0	1.1	1.7	2.5	1.8	2.2	4.0	6.4	1.0
15	1.6	1.2	0.8	0.6	0.6	0.7	1.6	2.1	2.6	2.2	3.4	4.0	4.4	4.6	4.7	4.6	4.0	2.5	1.8	2.4	2.6	2.5	2.1	1.9	2.5	4.7	0.6
16	1.1	1.1	1.0	1.2	0.7	0.7	0.9	1.5	1.1	1.0	2.0	2.7	3.7	3.9	4.0	3.9	3.7	2.0	3.2	3.5	2.9	1.8	0.9	1.0	2.1	4.0	0.7
17	1.1	0.9	0.9	0.9	0.8	0.9	0.9	0.5	0.7	0.8	1.2	2.1	2.7	3.1	2.6	3.0	2.8	2.5	3.2	3.2	2.7	2.4	2.1	1.3	1.8	3.2	0.5
18	1.4	0.8	1.2	1.2	0.9	0.9	0.8	1.0	0.7	0.8	2.6	3.8	4.6	4.1	4.9	5.5	5.3	3.6	1.8	2.6	1.5	1.1	1.6	0.9	2.2	5.5	0.7
19	0.6	0.5	0.7	1.2	0.6	0.4	1.0	0.5	0.7	0.6	2.2	3.4	4.6	4.2	4.8	5.2	5.4	1.5	2.2	3.1	2.8	1.7	0.8	1.7	2.1	5.4	0.4
20	0.9	1.4	0.9	1.2	1.1	1.2	0.9	0.9	1.0	0.9	1.8	3.3	5.3	6.2	5.7	5.4	3.0	1.3	2.5	2.9	1.7	1.6	1.6	1.3	2.3	6.2	0.9
21	1.3	1.1	1.1	0.8	1.5	0.8	1.4	0.9	0.7	0.7	1.0	1.6	2.2	3.9	4.3	3.3	2.1	1.6	1.6	1.8	2.3	1.3	1.1	1.1	1.6	4.3	0.7
22	1.3	0.8	1.2	0.9	1.3	0.7	0.6	0.6	0.5	4.6	6.4	6.9	6.2	5.9	6.4	7.7	5.9	4.2	2.3	2.2	1.1	1.3	1.6	1.3	3.0	7.7	0.5
23	1.0	0.6	0.4	0.5	0.9	0.6	1.0	0.8	0.8	0.7	1.0	1.2	2.8	3.3	3.5	4.3	3.0	3.2	1.2	2.2	2.3	2.1	1.9	1.3	1.7	4.3	0.4
24	1.2	0.9	0.9	1.1	0.7	0.7	0.7	0.7	0.8	1.0	4.1	5.5	6.0	6.4	6.5	6.0	4.1	1.8	1.3	1.4	1.1	1.1	1.1	1.3	2.3	6.5	0.7
25	1.2	0.9	0.7	1.4	2.0	1.6	1.3	1.9	2.1	6.5	7.9	7.1	7.8	8.5	8.5	8.1	6.2	4.7	2.8	2.2	2.4	2.2	1.8	1.0	3.8	8.5	0.7
26	1.1	1.0	0.8	2.7	3.6	3.5	3.0	1.2	0.9	2.4	4.0	6.9	5.1	6.9	5.9	6.2	4.8	6.0	8.5	4.5	6.1	4.8	3.1	2.4	4.0	8.5	0.8
27	1.8	1.0	2.6	7.1	7.1	7.1	5.9	5.5	6.5	7.3	7.0	6.4	6.9	6.3	6.5	6.1	3.9	2.7	1.5	2.9	1.6	1.6	1.6	1.5	4.5	7.3	1.0
28	1.4	1.3	1.8	1.6	1.4	1.5	1.5	1.3	2.0	3.6	6.8	7.4	7.1	8.3	5.7	6.0	5.2	6.9	4.3	3.6	3.6	1.7	3.3	1.6	3.7	8.3	1.3
29	1.9	1.8	1.8	1.8	2.8	3.6	3.8	1.2	1.8	1.8	4.2	5.5	7.4	6.8	6.2	5.0	6.0	5.2	2.5	0.8	1.1	1.2	2.2	1.6	3.2	7.4	0.8
30	3.3	3.9	2.7	1.0	0.7	0.4	0.6	1.2	1.8	3.3	5.6	6.5	6.6	6.7	7.7	7.9	5.9	4.7	4.6	4.4	5.0	4.0	3.6	2.4	3.9	7.9	0.4
31	1.2	1.2	2.7	1.6	0.9	0.8	1.0	1.4	2.4	4.6	4.2	5.4	4.2	1.9	2.2	1.4	1.2	1.3	1.0	0.7	0.6	0.9	1.0	0.6	1.9	5.4	0.6
Avg	2.0	1.9	1.8	2.0	2.2	2.1	2.0	1.7	2.2	3.0	3.9	4.5	5.0	5.0	4.9	5.0	4.0	2.9	2.6	2.5	2.4	2.1	2.1	1.9	2.9	6.0	0.9
Max	5.7	6.3	6.0	7.1	8.1	7.8	7.3	7.6	8.5	8.1	8.4	8.0	7.8	8.5	8.5	8.1	7.1	6.9	8.5	5.1	6.1	4.8	4.8	5.6	6.2	8.5	3.0
Min	0.5	0.5	0.4	0.4	0.3	0.4	0.5	0.5	0.5	0.6	0.4	0.6	1.0	0.9	0.8	1.1	1.2	0.8	1.0	0.6	0.6	0.9	0.7	0.6	1.0	1.6	0.3

A-1

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Speed (meters per second)
November 2018

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	0.8	0.6	1.1	0.9	0.7	0.8	0.4	0.6	0.6	0.7	1.4	3.4	4.3	5.6	4.3	2.5	1.8	1.1	0.8	0.9	0.9	1.0	1.0	0.6	1.5	5.6	0.4
2	0.7	0.6	0.7	1.4	1.3	2.1	2.0	1.1	1.6	2.4	1.6	6.2	7.2	6.3	6.9	6.2	6.7	6.3	6.9	7.6	6.3	5.0	3.3	4.3	3.9	7.6	0.6
3	4.0	3.7	3.5	3.2	2.7	1.1	0.5	0.4	0.5	0.5	0.6	1.7	3.0	4.6	5.1	3.9	4.6	2.9	3.0	2.1	2.0	2.8	4.1	2.8	2.6	5.1	0.4
4	2.1	2.0	2.1	2.9	1.6	1.0	1.6	1.9	1.4	3.2	5.6	4.4	4.4	4.8	5.5	6.3	9.4	9.1	6.1	6.3	4.5	4.4	3.2	3.0	4.0	9.4	1.0
5	4.2	4.2	3.2	1.1	1.7	0.9	1.1	0.8	0.8	2.5	4.6	3.8	4.7	5.5	4.6	4.5	2.7	1.3	0.6	0.8	1.0	0.3	0.7	0.8	2.4	5.5	0.3
6	1.3	1.7	2.1	1.6	1.5	2.8	2.4	2.9	2.4	2.0	2.2	2.8	3.0	3.3	2.1	2.2	0.7	0.8	0.6	1.0	1.3	0.8	0.7	0.6	1.8	3.3	0.6
7	0.6	0.5	0.9	2.4	2.0	2.4	1.7	1.9	1.9	2.5	3.1	3.5	3.6	3.9	4.0	3.8	3.4	2.3	1.7	0.9	0.8	0.3	0.4	0.3	2.0	4.0	0.3
8	0.4	0.5	0.7	0.5	0.4	0.6	0.8	0.6	0.5	0.3	0.5	1.5	3.9	4.5	4.5	4.6	2.9	3.0	1.3	1.1	0.7	1.5	1.2	0.6	1.5	4.6	0.3
9	0.8	0.8	0.6	0.6	0.7	0.6	0.7	0.7	0.5	0.3	0.4	0.5	0.7	1.0	0.9	0.8	0.9	1.3	1.2	2.7	1.6	1.8	3.7	4.3	1.2	4.3	0.3
10	4.5	5.4	7.7	5.8	5.0	4.2	3.3	2.9	2.9	5.6	4.9	6.1	6.1	6.7	6.8	6.3	5.1	3.4	4.0	2.5	0.9	1.1	0.9	0.7	4.3	7.7	0.7
11	0.7	1.2	1.5	0.5	0.6	0.6	0.6	0.4	0.2	0.2	0.2	0.5	3.3	4.3	5.0	6.8	4.9	2.0	3.5	4.0	2.3	2.2	1.1	1.1	2.0	6.8	0.2
12	1.2	0.8	1.0	0.7	0.8	0.9	0.9	0.7	0.6	0.6	0.9	1.0	3.1	2.8	2.3	2.2	2.0	2.3	3.2	1.3	1.0	1.1	1.6	0.9	1.4	3.2	0.6
13	1.0	0.7	0.6	0.8	0.5	0.7	0.7	0.6	0.7	0.6	0.5	0.6	0.5	0.7	0.9	2.1	3.0	2.4	1.6	1.4	1.5	1.4	1.6	1.5	1.1	3.0	0.5
14	1.7	1.6	1.3	1.5	1.0	1.0	1.0	0.9	0.8	0.9	0.6	1.7	5.6	4.9	2.1	1.5	0.9	1.6	1.6	4.6	5.8	5.4	4.8	6.6	2.5	6.6	0.6
15	9.3	7.4	8.4	8.4	7.9	4.1	3.0	1.7	2.1	1.3	3.8	5.3	6.1	5.7	6.1	3.9	2.3	1.5	1.8	2.0	2.2	1.4	3.2	2.8	4.2	9.3	1.3
16	7.0	6.4	6.5	6.5	6.2	4.0	3.0	5.1	7.0	8.0	8.7	6.4	5.3	5.7	5.9	6.1	5.9	4.0	2.7	2.7	3.5	2.2	2.0	2.1	5.1	8.7	2.0
17	1.0	0.6	1.8	0.7	1.0	1.3	1.3	2.6	4.2	3.5	3.2	1.6	1.9	2.9	1.8	1.5	0.8	1.9	1.4	0.9	0.9	0.8	0.9	0.7	1.6	4.2	0.6
18	0.9	0.6	0.7	0.7	0.6	0.7	0.9	0.8	0.7	0.8	0.9	1.8	4.4	3.5	2.2	1.6	1.4	1.3	1.3	1.1	1.3	0.9	0.9	0.9	1.3	4.4	0.6
19	1.1	1.1	1.1	1.5	2.0	1.6	1.3	1.8	1.4	1.1	0.8	1.1	2.4	2.5	2.2	1.5	1.9	2.1	2.5	2.0	1.6	1.2	1.8	1.2	1.6	2.5	0.8
20	0.9	0.3	0.6	0.8	0.8	0.9	1.1	1.2	0.7	0.4	0.4	Au	Au	Au	1.1	1.1	2.5	3.1	2.1	1.5	1.4	1.3	1.0	1.3	1.2	3.1	0.3
21	1.4	1.4	1.6	1.9	2.0	1.9	1.5	1.7	1.7	1.1	0.6	1.1	1.3	2.7	3.5	2.0	1.9	3.9	4.0	2.6	2.4	2.0	1.6	1.7	2.0	4.0	0.6
22	1.7	2.5	1.4	1.5	1.1	1.4	1.1	1.2	1.8	3.3	4.4	3.4	5.8	5.7	4.4	2.6	1.5	1.5	1.9	1.7	1.4	1.4	1.4	1.6	2.3	5.8	1.1
23	1.6	1.1	1.6	3.0	2.2	2.7	2.9	4.4	6.7	5.3	5.3	4.4	5.0	3.2	2.9	3.2	1.5	1.3	1.3	1.5	1.3	1.7	1.2	2.6	2.8	6.7	1.1
24	2.2	1.0	1.0	0.9	1.2	0.9	3.5	5.1	6.9	5.1	4.8	5.6	5.0	4.7	5.4	3.6	2.3	1.8	1.3	0.8	0.9	0.8	0.8	0.7	2.8	6.9	0.7
25	0.8	0.9	0.6	0.8	1.1	1.5	1.1	0.9	1.1	0.7	1.6	3.4	4.8	5.7	4.6	5.1	2.8	2.0	2.5	2.2	2.1	1.5	1.5	1.5	2.1	5.7	0.6
26	1.2	1.3	0.7	0.8	0.7	0.6	0.7	0.7	0.6	0.5	0.6	1.3	1.4	1.3	1.8	1.5	1.6	2.1	1.8	1.7	0.9	1.2	0.9	0.9	1.1	2.1	0.5
27	0.8	1.3	1.2	1.6	1.0	1.6	2.2	1.2	2.2	1.4	2.7	2.7	2.3	4.6	5.0	3.7	2.5	3.1	2.3	3.7	3.0	2.1	1.1	1.6	2.3	5.0	0.8
28	1.4	1.9	3.1	4.3	3.8	5.5	3.7	3.0	1.4	3.7	6.5	7.5	6.3	6.7	5.7	5.3	2.0	1.3	1.3	0.8	1.1	1.1	0.9	1.3	3.3	7.5	0.8
29	1.2	0.9	1.3	1.3	1.6	0.9	0.7	0.7	0.4	0.6	0.5	0.9	1.0	0.7	1.3	0.9	1.7	1.9	1.7	1.9	1.9	1.9	2.0	1.5	1.2	2.0	0.4
30	1.6	1.5	1.8	1.3	1.2	1.4	0.6	0.8	1.0	0.7	0.7	4.0	7.3	5.1	3.8	3.2	2.1	1.3	1.2	1.4	0.8	0.3	0.2	0.6	1.8	7.3	0.2
Avg	1.9	1.8	2.0	2.0	1.8	1.7	1.5	1.6	1.8	2.0	2.4	3.0	3.9	4.1	3.8	3.3	2.8	2.5	2.2	2.2	1.9	1.7	1.7	1.7	2.3	5.4	0.6
Max	9.3	7.4	8.4	8.4	7.9	5.5	3.7	5.1	7.0	8.0	8.7	7.5	7.3	6.7	6.9	6.8	9.4	9.1	6.9	7.6	6.3	5.4	4.8	6.6	5.1	9.4	2.0
Min	0.4	0.3	0.6	0.5	0.4	0.6	0.4	0.4	0.2	0.2	0.2	0.5	0.5	0.7	0.9	0.8	0.7	0.8	0.6	0.8	0.7	0.3	0.2	0.3	1.1	2.0	0.2

A-2

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Speed (meters per second)
December 2018

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	0.4	0.2	0.2	1.0	1.2	1.0	1.1	0.9	2.0	2.2	2.5	4.4	4.9	4.5	3.4	2.0	0.9	1.0	1.1	1.1	0.5	0.5	0.3	0.3	1.6	4.9	0.2
2	0.3	0.3	0.3	Wx	Wx	Wx	Wx	Wx	Wx	Wx	Wx	Wx	0.5	1.5	2.2	2.4	1.2	2.0	1.1	0.8	1.4	1.2	0.8	0.7	1.1	2.4	0.3
3	1.6	1.8	1.1	1.1	0.7	0.5	0.4	0.7	0.7	1.6	1.3	1.5	3.4	3.9	3.5	3.1	1.6	1.3	1.5	2.2	3.0	2.7	2.1	2.1	1.8	3.9	0.4
4	4.0	4.7	4.3	4.0	3.5	2.2	1.3	1.4	1.3	1.6	4.5	4.7	5.2	4.7	5.3	3.8	2.9	1.2	1.7	2.6	2.3	2.2	2.0	2.3	3.1	5.3	1.2
5	2.0	2.7	2.3	3.2	2.3	1.7	1.5	2.1	1.5	0.7	1.6	6.2	5.2	5.1	6.2	4.6	3.8	1.8	1.3	1.0	0.9	1.5	1.1	1.3	2.6	6.2	0.7
6	1.2	1.3	0.9	1.0	1.0	1.1	0.9	0.9	0.6	0.5	0.4	0.5	0.6	2.1	3.1	2.0	1.3	2.0	1.5	1.6	1.4	1.7	1.4	1.5	1.3	3.1	0.4
7	1.2	1.1	0.8	0.7	0.8	1.2	1.0	1.2	1.3	0.9	1.2	2.5	4.5	4.3	4.0	2.9	1.3	2.1	1.5	1.6	2.0	1.5	0.9	1.4	1.7	4.5	0.7
8	1.0	0.9	1.0	1.3	1.0	1.1	1.2	1.4	1.0	0.7	0.5	1.1	4.0	4.8	4.8	3.6	2.5	1.6	3.4	2.4	3.0	2.8	2.3	2.0	2.1	4.8	0.5
9	1.5	1.5	1.0	0.6	0.7	0.8	0.8	0.5	0.6	0.3	0.3	0.6	0.7	1.1	1.9	1.7	2.0	2.4	1.9	2.2	1.5	1.6	1.5	1.6	1.2	2.4	0.3
10	1.3	2.2	1.3	2.1	1.0	1.7	1.9	1.3	1.7	0.8	0.8	0.9	1.2	4.0	4.2	2.7	2.4	2.3	1.4	3.3	2.4	2.6	4.1	5.1	2.2	5.1	0.8
11	5.1	4.0	1.3	2.2	2.2	1.1	2.0	1.9	3.4	4.2	5.7	4.4	3.6	4.8	5.5	3.9	3.4	2.8	6.5	7.2	7.7	6.1	6.6	7.0	4.3	7.7	1.1
12	2.5	3.8	6.4	5.8	6.9	1.3	1.4	5.5	7.2	10.3	10.2	10.3	8.2	9.0	6.7	6.1	8.7	8.0	5.0	4.6	1.3	2.8	5.3	1.7	5.8	10.3	1.3
13	1.5	3.3	4.6	4.2	3.0	4.1	3.9	1.3	1.9	1.2	3.1	3.7	3.9	6.1	3.7	1.6	1.5	2.3	4.6	2.4	1.2	1.4	1.4	1.9	2.8	6.1	1.2
14	2.0	2.3	2.2	2.9	2.7	2.1	1.4	3.7	3.0	4.6	4.2	3.9	3.3	3.6	5.1	5.6	2.7	2.5	4.2	2.3	2.6	5.8	5.8	3.0	3.4	5.8	1.4
15	2.1	2.1	4.9	5.1	6.6	6.3	6.2	6.3	5.9	5.9	6.0	6.8	8.5	5.4	4.2	2.5	2.5	3.7	2.2	2.1	2.5	1.8	2.0	1.8	4.3	8.5	1.8
16	1.5	1.4	1.8	1.6	1.5	1.6	1.5	2.5	3.2	2.4	3.2	3.8	4.9	4.7	3.3	2.7	2.8	3.3	4.5	5.8	2.2	4.0	4.4	5.4	3.1	5.8	1.4
17	5.2	5.0	4.1	1.0	0.8	0.9	0.9	1.5	1.2	1.8	1.3	0.9	1.1	3.2	3.7	2.1	1.6	1.3	1.1	0.7	0.9	1.0	1.6	1.0	1.8	5.2	0.7
18	1.4	1.4	1.6	1.5	3.3	5.3	4.9	4.7	4.4	4.4	6.7	5.7	9.3	11.6	9.0	6.9	8.3	6.5	3.3	6.4	6.8	7.1	8.8	8.9	5.8	11.6	1.4
19	6.8	8.3	8.2	5.5	5.9	3.7	4.6	7.3	7.4	6.5	8.3	7.7	8.6	9.1	8.2	7.1	6.4	5.1	3.9	3.9	3.4	4.9	3.4	1.8	6.1	9.1	1.8
20	2.0	1.6	2.1	1.4	1.2	1.0	1.1	1.4	2.1	2.7	3.3	3.4	3.4	3.6	4.0	4.6	3.2	3.6	1.6	1.9	3.8	9.3	7.5	6.8	3.2	9.3	1.0
21	6.0	5.4	3.1	7.8	8.5	6.9	8.5	10.2	8.6	6.9	9.8	10.5	9.3	9.4	8.2	7.2	6.7	4.9	5.8	7.2	7.5	5.1	3.3	2.2	7.0	10.5	2.2
22	1.9	1.2	0.7	0.8	0.9	1.1	1.0	0.5	0.5	2.4	5.8	7.4	7.4	6.2	5.9	4.0	1.8	1.5	1.1	2.1	2.0	1.7	1.1	1.1	2.5	7.4	0.5
23	0.9	1.2	1.7	2.2	2.7	3.3	3.1	2.7	2.2	2.9	2.4	1.4	1.7	1.9	5.7	5.4	5.8	5.9	3.0	1.9	1.8	1.4	1.7	2.4	2.7	5.9	0.9
24	2.9	1.8	1.2	1.8	2.9	2.2	1.2	2.8	2.6	1.8	1.3	1.1	1.0	2.3	3.0	2.7	1.3	0.8	0.8	0.9	0.8	1.2	1.3	0.8	1.7	3.0	0.8
25	0.8	1.5	2.8	3.0	1.9	1.0	1.1	0.8	1.1	0.7	0.6	0.7	3.5	4.6	4.1	4.5	5.2	2.5	2.8	1.1	0.8	1.3	2.5	1.2	2.1	5.2	0.6
26	0.7	0.7	1.5	1.2	1.1	0.8	0.7	1.1	0.6	1.9	0.9	0.7	2.3	3.0	2.9	1.5	2.7	1.7	1.0	0.9	1.3	0.8	0.3	0.2	1.3	3.0	0.2
27	0.6	0.6	0.5	0.7	0.6	0.8	0.4	0.5	0.3	0.6	0.5	1.2	2.7	3.0	3.6	3.0	2.9	2.3	0.6	1.3	0.8	0.7	0.4	0.6	1.2	3.6	0.3
28	1.0	Wx	Wx	Wx	Wx	Wx	Wx	Wx	Wx	Wx	0.5	2.8	5.0	4.5	5.8	5.2	3.0	2.0	1.1	1.7	2.7	1.9	1.2	1.6	2.7	5.8	0.5
29	2.3	2.3	1.5	1.5	1.0	1.2	1.0	3.8	3.0	3.1	2.3	3.0	2.5	4.9	6.0	4.0	2.1	2.3	2.4	2.5	4.6	5.6	3.4	2.1	2.8	6.0	1.0
30	6.1	8.9	7.6	5.4	4.0	3.4	6.5	6.3	4.8	5.8	5.0	5.1	4.1	5.8	9.4	13.0	7.7	6.6	5.6	5.7	6.9	6.5	4.9	4.9	6.3	13.0	3.4
31	4.0	3.1	3.7	4.8	3.5	2.8	2.1	2.6	2.9	2.5	2.3	2.1	2.3	2.1	2.1	1.5	1.3	1.2	0.7	1.3	1.1	1.5	1.8	1.3	2.3	4.8	0.7
Avg	2.3	2.6	2.5	2.6	2.5	2.1	2.2	2.7	2.7	2.8	3.2	3.6	4.1	4.7	4.8	4.0	3.3	2.9	2.5	2.7	2.6	2.9	2.7	2.5	3.0	6.1	1.0
Max	6.8	8.9	8.2	7.8	8.5	6.9	8.5	10.2	8.6	10.3	10.2	10.5	9.3	11.6	9.4	13.0	8.7	8.0	6.5	7.2	7.7	9.3	8.8	8.9	7.0	13.0	3.4
Min	0.3	0.2	0.2	0.6	0.6	0.5	0.4	0.5	0.3	0.3	0.3	0.5	0.5	1.1	1.9	1.5	0.9	0.8	0.6	0.7	0.5	0.5	0.3	0.2	1.1	2.4	0.2

A-3

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Direction (degrees)
October 2018

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	147	190	150	145	181	142	130	152	138	168	187	220	251	223	235	234	210	206	107	110	116	136	262	61	171
2	162	174	41	130	130	82	134	183	233	154	174	144	184	208	238	265	238	100	137	148	157	186	127	149	162
3	311	310	298	292	286	300	297	307	310	311	288	282	279	327	325	301	220	120	155	147	148	140	138	138	282
4	147	149	129	120	14	139	348	174	142	334	347	298	303	321	292	319	308	326	301	296	328	312	320	324	318
5	321	313	271	259	270	268	296	304	305	283	268	266	251	267	249	243	257	234	115	120	141	132	113	131	258
6	145	142	132	74	104	143	180	55	117	148	169	144	145	119	253	33	272	313	225	213	307	205	131	215	156
7	270	161	118	174	355	275	299	295	291	256	243	259	151	220	89	19	201	102	174	143	71	99	53	63	184
8	319	156	160	115	150	67	304	281	21	313	222	264	319	348	69	154	144	160	79	293	335	156	147	151	153
9	142	136	153	153	150	121	120	129	139	147	146	155	156	148	157	159	147	149	136	141	158	143	115	113	142
10	114	107	116	151	147	153	148	148	153	134	144	147	132	123	143	150	149	161	157	153	151	155	156	162	144
11	161	171	165	158	224	308	4	295	299	283	283	282	303	312	323	294	290	252	227	248	104	125	125	147	255
12	139	125	121	82	86	90	88	113	314	268	263	267	260	272	256	258	245	254	249	289	309	289	347	339	270
13	350	3	357	347	5	351	1	349	336	334	334	349	335	325	338	338	333	292	287	313	341	333	340	341	338
14	333	335	327	322	333	324	267	231	298	294	294	291	297	291	288	291	281	274	246	115	103	90	38	42	307
15	55	85	132	319	351	136	86	47	70	10	290	288	263	253	253	260	261	265	79	54	60	51	32	12	15
16	350	92	291	83	64	24	36	53	90	327	295	265	251	264	262	272	264	222	85	74	74	78	32	51	15
17	118	140	137	143	109	148	119	141	186	301	110	141	162	150	189	192	196	89	89	74	72	85	64	38	127
18	99	52	113	120	103	93	31	111	82	43	286	282	255	278	267	262	258	265	40	73	94	81	58	19	60
19	51	122	332	137	119	102	77	221	169	360	288	260	245	272	286	291	307	278	119	75	94	88	49	129	92
20	118	114	121	91	89	135	128	151	125	331	132	267	270	262	256	258	233	201	97	100	68	99	72	103	129
21	117	54	89	67	121	119	144	12	321	329	323	25	283	286	287	279	272	40	35	359	97	96	22	68	30
22	102	357	140	138	132	129	135	127	37	149	163	159	161	163	156	156	158	153	119	123	128	107	120	52	131
23	3	298	352	108	69	175	136	117	130	309	15	339	282	327	221	214	216	154	135	126	102	85	100	88	107
24	116	135	108	141	143	150	110	114	46	30	254	259	255	257	254	251	232	262	122	46	355	115	25	80	135
25	127	150	130	169	263	85	137	88	36	283	270	271	254	258	261	264	275	273	255	120	92	93	85	127	188
26	237	31	138	286	291	293	278	227	145	266	278	261	281	276	281	266	263	258	254	266	263	266	273	243	265
27	64	136	255	276	265	276	296	298	304	306	293	283	256	254	248	255	250	247	180	108	116	53	100	134	260
28	158	154	139	152	167	146	150	74	112	197	205	197	218	221	227	210	207	240	305	304	276	293	299	265	204
29	191	153	162	270	334	264	280	125	244	299	280	284	275	288	281	273	270	261	288	104	224	180	285	287	260
30	284	292	299	160	59	151	24	299	304	281	276	263	271	261	257	270	275	272	272	273	275	280	285	265	277
31	200	169	236	187	124	167	129	170	278	245	243	271	290	305	251	222	294	341	325	339	140	140	357	236	236
Prev	121	127	135	140	106	133	99	136	57	297	259	261	254	265	256	257	246	238	153	106	98	115	62	92	202

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Direction (degrees)
November 2018

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	61	103	12	38	86	129	291	150	249	73	280	295	298	323	331	299	233	186	90	356	41	62	120	204	22
2	139	207	110	99	164	98	155	92	132	342	152	265	269	267	250	264	270	274	278	299	301	302	303	283	246
3	278	285	279	282	290	303	286	187	118	73	61	285	279	280	277	277	281	266	269	251	239	242	235	228	269
4	245	218	217	184	109	154	135	209	165	269	271	263	270	271	271	273	279	274	270	284	278	292	298	314	252
5	293	268	277	228	134	149	134	331	92	279	282	306	297	324	296	293	281	210	194	138	153	191	176	292	249
6	252	297	295	278	287	279	279	263	286	264	279	275	262	254	254	307	268	221	283	66	78	215	45	266	275
7	162	166	158	304	270	278	271	296	294	300	295	280	260	271	263	270	272	284	243	237	144	218	61	342	265
8	204	137	122	89	197	132	157	96	120	40	78	314	292	301	307	291	291	302	175	276	4	99	111	108	123
9	23	122	86	72	98	129	126	150	217	34	210	276	35	105	311	135	146	139	103	92	79	93	271	292	108
10	297	291	295	300	301	281	290	295	296	295	293	301	315	310	310	316	307	291	309	329	301	109	142	207	298
11	88	50	63	22	124	177	152	195	20	352	146	265	290	304	341	7	354	283	340	346	306	334	114	149	4
12	61	67	118	118	76	143	140	112	92	114	132	50	300	315	329	345	353	59	69	25	37	354	42	3	57
13	46	46	32	17	6	57	78	97	119	133	154	114	8	36	85	74	92	114	141	138	152	151	155	148	93
14	115	138	137	138	151	127	97	149	149	225	87	213	295	291	292	272	232	32	50	263	265	270	275	272	202
15	287	296	291	286	288	296	82	155	339	48	279	269	263	272	267	266	272	104	54	255	79	24	267	254	290
16	282	285	275	276	279	300	324	307	325	319	314	307	300	312	330	325	284	308	306	271	265	264	272	251	295
17	219	37	309	176	109	110	87	71	83	76	72	62	360	311	278	276	297	96	82	85	108	133	152	114	86
18	143	300	143	153	105	104	169	28	144	86	7	336	309	299	300	281	176	107	115	117	144	216	112	121	127
19	43	71	103	103	82	49	56	65	26	133	295	11	296	282	314	332	49	94	58	51	23	8	65	36	42
20	12	55	58	98	78	96	118	136	141	174	215	Au	Au	Au	113	110	88	94	110	72	102	127	106	145	106
21	129	147	113	130	132	128	138	115	121	130	103	332	351	185	170	97	91	64	88	89	104	73	137	65	111
22	69	90	104	111	144	104	104	113	72	100	109	145	193	222	197	130	140	97	80	107	102	124	109	102	116
23	82	44	70	138	164	260	280	285	280	264	249	253	235	189	203	252	283	177	105	129	64	128	146	77	194
24	111	121	352	292	288	252	321	330	355	354	347	306	321	315	282	263	274	272	312	225	164	114	262	174	296
25	169	142	128	107	126	111	155	108	88	117	328	280	281	270	262	257	258	249	105	87	63	102	82	45	126
26	98	108	99	86	79	143	95	157	111	227	34	17	351	357	315	281	263	107	108	138	115	130	140	87	99
27	183	130	240	141	149	139	133	134	268	55	169	349	287	293	284	229	223	253	290	266	271	287	143	123	215
28	300	302	273	271	280	257	269	262	222	305	260	261	272	262	265	265	256	182	165	196	156	98	156	129	247
29	124	147	66	51	128	139	149	125	128	183	244	332	345	325	49	287	95	104	100	105	99	68	80	94	100
30	81	103	109	78	45	104	101	100	124	300	21	130	138	150	158	157	170	283	189	147	160	314	7	146	120
Prev	111	108	92	107	123	138	133	132	116	29	282	299	297	289	285	282	265	194	101	120	102	117	127	141	187

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Direction (degrees)
December 2018

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	150	184	270	193	301	308	327	318	267	279	285	263	268	261	265	307	229	131	93	120	123	139	141	180	239
2	99	137	110	116	81	334	41	92	7	113	51	22	359	298	280	261	223	84	17	339	347	101	103	43	51
3	279	253	81	151	81	155	28	91	107	158	141	327	266	269	276	260	290	283	287	273	271	281	278	273	265
4	258	257	268	271	275	276	207	142	150	256	257	267	266	266	273	256	245	182	94	96	117	106	119	113	228
5	62	84	65	43	48	102	55	144	138	128	341	328	321	292	334	311	268	271	136	62	330	118	71	159	51
6	133	132	172	153	149	137	115	88	132	182	87	14	25	333	304	300	171	89	38	42	51	77	110	145	104
7	142	148	102	125	148	138	151	152	168	175	100	110	147	147	146	156	167	108	94	73	105	147	135	127	134
8	103	93	25	88	69	101	64	93	110	30	25	44	267	252	255	269	247	120	98	66	55	67	86	39	71
9	39	75	127	116	168	143	176	128	156	213	220	336	355	39	140	173	123	119	115	143	141	132	152	135	133
10	141	141	138	111	135	116	118	135	139	177	329	107	345	287	299	298	264	293	358	275	281	300	292	266	237
11	298	273	156	114	89	117	245	243	264	264	261	260	263	241	215	184	157	138	191	192	195	184	200	216	211
12	216	221	225	224	221	331	224	266	271	269	272	277	280	286	282	274	277	276	270	280	26	327	288	316	271
13	275	272	240	240	250	247	270	147	140	154	200	192	199	203	186	171	276	296	237	44	69	139	85	108	206
14	101	108	113	116	115	113	110	97	112	86	93	110	127	139	148	154	124	93	89	123	111	138	146	72	114
15	78	92	188	211	274	247	264	268	256	286	263	269	267	270	252	281	303	304	259	121	93	110	104	130	249
16	142	135	130	122	117	145	159	138	110	125	155	156	173	157	174	173	120	95	92	87	132	94	79	189	133
17	187	98	157	326	299	157	171	99	82	91	88	67	341	306	293	290	304	166	125	296	218	197	194	164	170
18	122	141	169	214	175	175	185	194	176	193	197	201	217	219	226	219	222	221	247	265	263	273	274	275	211
19	276	278	277	273	266	270	279	272	275	262	265	272	275	274	277	279	282	285	272	266	271	284	268	113	273
20	122	107	97	73	90	106	138	145	143	119	99	111	126	138	134	131	153	160	141	155	159	195	195	172	133
21	185	151	200	266	282	268	262	270	267	280	270	263	265	270	273	271	272	270	275	285	283	292	304	257	266
22	290	318	5	95	81	41	24	95	197	257	264	263	268	284	267	263	292	204	145	113	86	91	117	155	240
23	142	140	127	136	123	117	123	121	124	120	75	102	40	57	212	215	204	210	226	174	171	105	93	228	139
24	268	21	305	304	271	254	157	90	68	68	62	15	258	251	255	252	302	191	199	34	145	114	118	126	235
25	359	110	84	66	135	310	93	127	142	323	77	18	143	165	168	165	163	140	169	251	114	114	64	287	120
26	147	140	78	36	336	272	57	96	23	67	65	106	273	239	251	294	226	145	125	144	156	153	160	20	117
27	126	198	338	23	336	105	287	113	143	27	316	302	325	282	276	285	294	308	15	263	191	259	62	88	316
28	47	82	39	76	107	152	197	261	119	178	47	278	260	256	259	270	271	313	320	44	100	111	104	62	86
29	287	287	29	41	91	130	66	290	320	291	338	272	276	275	274	275	226	115	234	269	270	251	223	237	277
30	225	231	234	210	226	261	275	281	267	256	273	288	277	349	350	339	335	337	335	347	342	339	345	358	297
31	6	359	351	15	3	9	321	285	262	305	278	268	268	282	285	275	289	219	176	143	102	122	104	129	304
Prev	147	142	124	118	125	157	156	141	154	197	327	300	275	263	253	254	245	188	157	107	126	135	125	148	188

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Standard Deviation of Wind Direction (degrees)
October 2018

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	34	52	16	25	49	67	67	62	31	22	27	29	25	19	31	22	21	15	33	18	26	37	81	65	36	81	15
2	45	57	77	42	47	46	49	77	68	44	87	15	21	16	64	17	34	33	25	31	43	74	48	28	45	87	15
3	64	27	18	12	17	10	8	9	12	20	18	25	26	46	38	59	91	49	8	13	12	20	20	20	27	91	8
4	11	10	20	35	40	85	79	86	65	84	40	38	30	11	23	16	14	34	35	28	20	25	19	16	36	86	10
5	17	33	55	22	9	12	19	26	16	13	16	18	19	21	18	18	13	26	45	35	42	29	25	18	24	55	9
6	38	19	37	65	31	26	61	66	41	32	17	28	37	84	42	68	26	27	55	34	49	75	22	52	43	84	17
7	31	35	90	51	63	31	51	24	16	27	80	81	36	55	64	65	35	20	60	82	83	54	48	59	52	90	16
8	98	42	98	34	11	54	49	55	65	27	54	70	10	25	56	6	12	40	43	71	38	16	10	15	42	98	6
9	13	10	7	8	10	19	25	21	15	16	18	7	11	13	7	6	14	19	17	18	8	15	12	9	13	25	6
10	16	12	16	15	14	8	7	10	6	17	17	10	11	16	13	8	7	7	6	8	7	7	6	6	10	17	6
11	5	8	9	9	52	55	77	72	34	23	19	14	17	15	14	18	13	16	8	59	38	21	25	50	28	77	5
12	71	39	41	58	47	50	48	51	51	18	16	15	14	17	15	14	9	9	12	14	14	65	34	25	31	71	9
13	16	16	21	18	16	17	18	19	12	13	12	16	19	12	17	12	15	17	19	15	16	15	13	15	16	21	12
14	12	13	9	8	9	15	21	90	36	19	18	15	14	17	17	15	16	19	41	52	31	52	39	26	25	90	8
15	41	47	63	82	78	63	37	29	19	51	16	24	24	18	12	14	14	10	97	37	29	39	28	32	38	97	10
16	53	67	85	79	84	62	44	22	57	52	34	38	25	25	24	20	13	70	17	18	14	36	44	68	44	85	13
17	34	53	63	57	86	24	29	68	54	50	89	35	34	23	31	16	11	86	15	11	22	25	24	35	41	89	11
18	23	53	29	21	43	49	71	75	72	81	54	24	20	26	21	14	9	50	37	18	37	36	22	22	38	81	9
19	45	66	68	22	51	59	32	69	50	62	49	24	15	29	17	14	8	84	32	16	18	25	51	13	38	84	8
20	49	47	45	54	50	18	51	40	90	69	47	40	18	13	16	13	22	94	28	26	40	53	53	64	43	94	13
21	39	58	81	63	24	62	16	100	58	28	78	42	57	25	11	12	18	71	56	32	42	38	43	81	47	100	11
22	52	73	41	74	25	50	85	99	76	34	7	9	9	9	7	6	6	18	16	21	26	38	32	62	36	99	6
23	67	71	97	46	80	72	38	73	46	50	38	57	29	36	28	17	26	12	33	16	24	23	27	43	44	97	12
24	39	28	46	28	52	78	65	68	94	61	35	16	17	14	15	14	10	43	20	34	61	74	57	41	42	94	10
25	27	62	84	55	30	58	49	69	97	12	13	14	14	12	13	10	11	13	49	21	46	63	47	79	40	97	10
26	95	96	83	43	7	11	23	68	74	18	20	14	15	14	14	12	15	15	15	15	12	11	23	38	31	96	7
27	56	66	54	15	11	10	9	10	10	11	16	16	17	15	13	11	9	53	65	25	39	35	47	22	26	66	9
28	33	22	15	23	52	48	51	80	35	82	11	12	15	11	13	16	15	40	12	15	30	72	19	48	32	82	11
29	35	67	59	96	56	20	33	89	60	33	16	20	15	13	12	14	10	12	27	80	63	94	62	46	43	96	10
30	34	13	13	79	53	55	82	65	20	21	16	13	12	12	12	12	11	12	9	10	10	10	10	32	26	82	9
31	41	29	26	34	65	66	53	54	19	19	16	21	13	15	23	45	33	14	21	97	101	81	54	82	43	101	13
Avg	40	42	47	41	41	42	43	56	45	36	32	26	21	22	23	19	18	33	31	31	34	41	34	39	35	81	10
Max	98	96	98	96	86	85	85	100	97	84	89	81	57	84	64	68	91	94	97	97	101	94	81	82	52	101	17
Min	5	8	7	8	7	8	7	9	6	11	7	7	9	9	7	6	6	7	6	8	7	7	6	6	10	17	5

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Standard Deviation of Wind Direction (degrees)
November 2018

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	68	94	55	33	97	72	101	81	78	69	60	17	13	9	10	31	26	82	75	27	67	49	48	87	56	101	9
2	56	94	68	39	90	29	69	77	85	93	89	12	11	14	11	11	10	10	16	19	11	13	23	9	40	94	9
3	11	8	16	10	9	87	45	40	39	39	60	26	12	10	9	10	12	15	12	15	15	17	13	12	23	87	8
4	23	24	29	25	44	50	17	37	59	45	11	14	12	14	13	10	10	9	10	11	12	11	18	9	22	59	9
5	16	14	12	70	28	39	47	67	85	35	14	25	12	12	21	11	15	60	80	43	13	94	52	41	38	94	11
6	23	25	23	26	26	24	18	17	15	17	27	25	15	9	13	13	70	30	65	97	94	75	75	67	37	97	9
7	52	41	43	20	22	24	25	17	29	11	15	21	15	16	19	19	14	27	48	67	66	84	43	69	34	84	11
8	98	78	32	64	101	73	69	72	50	94	56	23	9	8	9	7	12	9	88	37	41	36	47	65	49	101	7
9	66	84	66	80	54	82	64	76	93	88	86	80	100	71	49	88	59	54	73	70	70	83	13	16	69	100	13
10	11	10	7	7	12	10	12	12	15	12	11	11	11	9	9	11	11	8	16	65	65	53	69	70	22	70	7
11	83	57	87	76	36	77	55	51	61	74	30	85	14	18	19	10	22	39	30	40	53	30	50	45	48	87	10
12	62	76	70	78	95	56	48	56	90	89	103	79	28	18	26	14	36	44	29	29	32	92	71	83	59	103	14
13	51	62	77	74	68	75	76	88	73	72	64	63	93	77	50	59	19	25	40	25	35	25	24	30	56	93	19
14	33	58	47	39	70	65	79	61	69	96	89	70	15	9	21	32	57	65	70	19	15	13	14	9	46	96	9
15	8	12	13	9	9	20	26	88	42	51	28	12	9	12	9	16	53	55	99	27	62	52	22	34	32	99	8
16	14	11	11	10	9	26	18	13	11	10	11	15	14	22	12	13	16	15	15	11	14	26	30	13	15	30	9
17	45	82	12	58	41	25	50	26	13	9	10	19	27	16	33	44	70	30	29	52	32	40	41	86	37	86	9
18	47	88	59	67	71	91	73	88	97	92	82	48	10	14	20	39	77	37	27	41	21	73	48	44	56	97	10
19	40	64	62	26	32	50	47	46	53	81	70	40	49	17	30	29	40	37	34	41	38	54	32	52	44	81	17
20	56	63	50	34	50	42	38	17	51	42	76	Au	Au	Au	48	40	40	24	26	40	42	29	53	29	42	76	17
21	24	29	31	12	17	14	18	27	22	25	87	51	29	64	33	38	45	58	41	36	40	53	73	68	39	87	12
22	45	22	60	43	42	48	67	87	55	17	21	10	20	16	45	22	17	43	67	44	37	47	53	62	41	87	10
23	67	90	84	24	32	20	23	18	12	10	13	19	15	37	59	40	63	52	82	31	80	41	37	18	40	90	10
24	26	60	74	59	53	56	29	24	15	26	21	11	14	17	19	18	16	17	65	62	67	61	78	60	40	78	11
25	37	48	36	49	49	33	68	71	77	79	63	13	16	18	13	11	7	38	15	43	48	33	46	56	40	79	7
26	59	74	82	48	61	79	73	72	68	99	82	35	39	46	21	26	51	27	35	27	57	49	89	83	58	99	21
27	74	89	84	35	58	20	84	58	56	30	61	93	37	21	16	15	28	20	26	11	22	78	88	21	47	93	11
28	50	62	15	13	11	9	18	18	56	59	13	9	15	10	11	10	45	40	29	60	20	84	70	54	33	84	9
29	59	37	64	62	60	68	77	59	97	69	92	35	44	42	26	65	37	20	26	21	27	31	35	57	50	97	20
30	39	30	24	53	42	50	99	79	56	89	58	45	11	10	8	12	66	34	56	44	46	40	63	29	45	99	8
Avg	45	53	46	41	46	47	51	51	54	54	50	35	24	23	23	25	35	34	44	39	41	49	47	46	42	88	11
Max	98	94	87	80	101	91	101	88	97	99	103	93	100	77	59	88	77	82	99	97	94	94	89	87	69	103	21
Min	8	8	7	7	9	9	12	12	11	9	10	9	9	8	8	7	7	8	10	11	11	11	13	9	15	30	7

A-8

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Standard Deviation of Wind Direction (degrees)
December 2018

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	26	62	54	17	19	14	27	14	15	18	10	12	7	10	34	53	42	43	40	59	57	25	51	30	62	7
2	90	59	56	51	86	47	59	51	55	39	46	37	38	22	12	8	64	20	81	54	49	32	55	84	50	90	8
3	29	37	59	28	80	72	52	55	81	28	12	97	11	13	14	8	13	23	24	36	12	9	12	25	35	97	8
4	10	10	14	12	16	35	30	43	40	37	17	17	16	15	15	28	15	52	54	31	55	50	41	41	29	55	10
5	52	29	44	21	41	25	53	48	59	68	60	13	13	14	29	22	17	49	52	95	72	27	54	35	41	95	13
6	46	46	48	22	25	19	40	34	80	66	50	76	34	26	13	22	71	39	33	41	31	36	21	19	39	80	13
7	15	58	83	62	71	74	41	29	41	81	61	38	7	7	6	7	49	58	41	35	38	53	76	63	46	83	6
8	82	87	81	79	81	52	72	70	80	90	95	87	19	13	14	10	21	69	29	27	21	29	45	41	54	95	10
9	43	31	27	36	35	39	42	55	38	72	93	59	63	21	31	30	17	24	24	28	28	29	30	41	39	93	17
10	36	20	41	32	65	40	26	17	25	51	62	46	56	12	13	28	30	46	96	15	22	29	17	13	35	96	12
11	12	39	30	41	31	54	20	28	15	17	13	22	23	20	12	18	17	22	40	27	37	48	13	10	25	54	10
12	84	32	14	13	24	65	49	15	13	12	11	14	10	10	10	10	9	9	11	27	101	57	21	73	29	101	9
13	81	20	14	16	19	14	37	41	41	73	20	27	18	14	17	69	83	95	34	102	73	65	52	21	44	102	14
14	40	38	21	18	24	28	42	26	22	17	14	21	9	14	11	7	18	60	22	18	51	35	15	26	25	60	7
15	70	71	17	34	18	26	14	11	16	13	14	17	13	15	16	59	34	38	50	57	71	45	54	37	34	71	11
16	30	47	39	49	37	35	45	19	26	20	19	21	11	8	28	33	19	16	21	20	40	30	40	45	29	49	8
17	24	29	33	98	78	80	97	42	45	41	59	78	49	18	10	22	22	68	77	61	82	68	65	35	53	98	10
18	56	48	52	62	24	13	14	15	14	14	12	26	13	10	11	15	10	10	25	18	14	13	10	11	21	62	10
19	11	11	12	13	12	15	17	12	13	10	10	12	12	12	11	11	10	11	11	10	18	11	34	22	13	34	10
20	45	44	27	52	78	85	63	22	15	19	38	22	9	12	13	14	23	35	27	37	56	7	7	8	32	85	7
21	13	9	32	12	10	13	11	12	11	11	14	12	10	12	13	12	11	11	11	8	7	15	30	40	14	40	7
22	19	54	59	46	26	44	67	52	85	45	12	11	11	12	16	13	37	84	52	21	43	62	55	44	40	85	11
23	53	28	46	15	23	23	24	24	20	37	10	61	19	82	17	18	8	7	31	52	98	53	46	63	36	98	7
24	16	84	75	51	20	25	41	33	26	37	33	52	31	16	11	10	46	53	70	69	67	89	85	48	45	89	10
25	85	38	30	41	27	82	72	68	43	78	68	41	92	10	10	7	6	21	47	65	55	23	49	34	46	92	6
26	21	44	11	44	42	56	54	71	98	18	47	78	47	15	8	43	20	48	24	23	24	56	39	62	41	98	8
27	40	80	72	45	80	84	40	77	66	85	58	29	10	14	20	14	20	56	61	32	25	45	90	43	49	90	10
28	55	51	50	70	36	51	63	79	33	89	77	28	12	16	14	10	14	37	68	38	27	44	61	66	45	89	10
29	41	30	53	40	85	54	96	33	26	20	64	27	27	21	11	11	80	54	97	44	32	19	41	55	44	97	11
30	15	8	11	10	27	36	16	13	9	9	12	16	15	31	26	13	12	10	6	9	9	8	11	11	14	36	6
31	13	17	11	13	13	14	28	11	22	12	32	23	17	28	14	33	30	35	78	11	52	29	26	23	24	78	11
Avg	40	40	39	38	40	43	43	37	38	39	37	36	23	17	15	21	28	39	43	37	44	38	39	38	36	79	10
Max	90	87	83	98	86	85	97	79	98	90	95	97	92	82	31	69	83	95	97	102	101	89	90	84	54	102	17
Min	10	8	11	10	10	13	11	11	9	9	10	10	7	7	6	7	6	7	6	8	7	7	7	8	13	34	6

A-9

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 9 Meters (degrees Celsius)
October 2018

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	-0.6	-1.8	-2.4	-2.6	-3.1	-3.2	-3.8	-1.8	3.2	7.1	8.9	10.5	11.7	12.1	12.9	13.4	13.2	12.5	10.6	8.2	7.4	6.5	6.4	8.4	5.6	13.4	-3.8
2	10.7	9.7	8.1	7.4	7.2	7.4	6.5	6.3	6.6	7.8	9.0	10.5	11.6	12.1	12.2	12.3	9.9	8.6	8.4	8.2	7.7	7.3	5.7	3.8	8.5	12.3	3.8
3	4.9	5.5	5.5	4.4	2.6	1.3	-0.5	-1.8	-2.8	-1.7	0.1	1.8	3.3	4.7	6.0	6.8	7.1	4.8	2.0	1.0	0.0	-0.6	-0.8	-1.2	2.2	7.1	-2.8
4	-1.6	-1.7	-1.7	-2.5	-3.8	-4.3	-4.8	-3.8	-2.2	-0.3	1.6	2.8	4.8	3.7	3.5	2.7	1.8	0.8	0.5	0.3	0.2	0.2	0.3	0.2	-0.1	4.8	-4.8
5	0.3	0.2	0.3	0.5	0.6	0.5	0.3	0.2	0.3	1.1	1.9	2.4	3.1	4.3	5.1	5.4	5.2	3.7	0.6	-0.1	-1.3	-1.2	-1.3	-1.5	1.3	5.4	-1.5
6	-1.4	-2.0	-1.6	-0.9	-0.4	-0.2	0.0	0.4	0.9	1.9	2.6	3.5	4.5	4.6	4.7	5.0	3.7	3.4	3.0	2.0	1.3	1.3	1.0	1.1	1.6	5.0	-2.0
7	1.2	1.3	1.4	1.4	1.5	1.5	1.5	1.5	1.2	0.3	0.7	1.4	1.6	2.6	2.6	3.2	3.9	3.6	2.6	1.8	1.3	0.3	-0.2	-0.7	1.6	3.9	-0.7
8	-0.6	-0.3	-0.4	-0.6	-1.0	-1.0	-0.8	-0.4	1.1	2.5	4.4	5.4	4.9	5.4	5.4	3.7	2.4	1.7	1.5	1.2	1.1	1.2	1.0	1.2	1.6	5.4	-1.0
9	1.0	1.0	0.4	0.0	-0.1	0.2	0.3	0.3	0.5	0.8	1.4	1.0	1.3	1.6	0.6	0.0	0.5	0.0	0.2	0.1	-0.4	-0.3	-0.3	-0.3	0.4	1.6	-0.4
10	-0.6	-0.7	-0.8	-1.1	-1.4	-1.8	-2.1	-1.9	-1.7	-1.2	-0.7	-0.3	-0.1	0.1	-0.1	-0.5	-0.9	-1.3	-2.0	-1.9	-1.9	-2.1	-2.4	-2.5	-1.2	0.1	-2.5
11	-2.6	-2.6	-2.5	-2.4	-2.4	-2.4	-2.2	-2.0	-1.6	-0.9	0.0	1.0	1.1	1.3	1.5	2.3	2.0	1.6	0.9	0.5	-1.9	-2.9	-4.6	-5.8	-1.0	2.3	-5.8
12	-6.1	-6.4	-6.1	-4.6	-3.0	-3.3	-4.3	-3.5	1.8	3.8	5.3	6.3	7.2	8.3	9.1	9.1	8.8	8.1	7.8	7.9	6.8	5.7	4.5	3.0	2.8	9.1	-6.4
13	1.8	0.0	-1.4	-2.1	-2.9	-3.6	-4.1	-4.2	-4.7	-5.4	-5.7	-5.3	-5.2	-5.8	-5.7	-5.3	-5.5	-5.5	-5.5	-5.7	-6.2	-6.6	-7.1	-7.0	-4.5	1.8	-7.1
14	-6.9	-6.8	-6.9	-7.1	-7.1	-7.0	-7.3	-7.6	-6.0	-4.3	-3.2	-2.4	-1.4	-0.6	0.4	0.5	0.5	-0.3	-1.8	-3.0	-5.4	-6.0	-6.9	-7.1	-4.3	0.5	-7.6
15	-7.4	-7.8	-7.5	-6.6	-5.8	-5.5	-5.1	-4.4	-1.8	0.9	2.2	3.8	5.0	6.1	6.6	6.9	6.6	5.5	3.1	-0.5	-1.1	-1.9	-2.3	-2.6	-0.6	6.9	-7.8
16	-3.1	-2.3	-0.9	-0.2	-0.5	-0.7	-0.8	-1.6	1.4	5.1	7.9	9.6	10.6	11.2	11.6	11.6	11.2	8.4	3.9	1.9	0.7	-1.3	-2.7	-3.2	3.2	11.6	-3.2
17	-4.2	-4.7	-5.1	-5.6	-5.8	-5.9	-6.4	-5.3	-1.7	4.0	10.0	12.2	13.6	14.5	15.1	15.3	14.8	10.2	4.6	3.1	1.7	0.2	-0.5	-1.7	3.0	15.3	-6.4
18	-3.1	-3.5	-3.9	-3.9	-4.6	-4.8	-5.4	-4.2	-1.1	5.6	10.1	11.3	12.2	13.6	14.5	14.5	13.7	11.0	9.0	3.7	1.8	0.0	-0.6	-2.0	3.5	14.5	-5.4
19	-2.2	-1.7	-1.1	-0.9	-0.8	-1.4	-2.3	-2.0	0.0	6.0	10.3	11.5	12.2	12.8	13.6	14.0	13.4	11.1	5.7	3.5	1.0	-0.3	-1.4	-2.9	4.1	14.0	-2.9
20	-3.0	-3.2	-3.8	-3.7	-3.9	-3.8	-4.3	-4.2	-0.1	6.3	12.9	15.2	16.1	16.7	17.3	17.4	16.6	13.4	7.5	4.1	2.5	0.4	-0.5	-0.9	4.8	17.4	-4.3
21	-1.7	-1.9	-3.5	-3.7	-3.5	-3.7	-3.8	-3.9	-1.0	4.2	10.5	14.0	15.8	16.2	16.3	16.5	15.4	12.5	9.7	6.7	4.3	0.9	-1.0	-2.2	4.7	16.5	-3.9
22	-3.5	-4.0	-4.3	-4.8	-5.0	-5.9	-5.7	-5.3	-1.0	8.3	10.5	11.6	12.6	13.1	13.5	12.8	11.4	8.8	8.4	7.2	7.2	5.3	3.8	1.6	4.0	13.5	-5.9
23	-0.3	-1.6	-2.5	-3.3	-4.4	-4.0	-4.6	-4.7	-0.8	4.6	10.8	14.5	15.9	16.4	17.0	16.0	14.0	8.6	6.7	4.2	2.2	1.1	-0.1	-1.5	4.3	17.0	-4.7
24	-1.9	-2.2	-2.4	-3.2	-3.2	-3.7	-4.2	-3.8	-0.9	4.4	9.7	10.5	11.4	11.9	12.6	12.3	11.5	9.1	5.6	2.9	2.5	1.1	-0.1	-0.9	3.3	12.6	-4.2
25	-1.7	-2.1	-2.1	0.3	5.4	3.8	0.4	-1.2	2.9	7.0	7.7	8.5	9.3	9.4	9.3	9.4	8.1	7.6	6.2	4.3	2.1	1.0	-0.9	-0.4	3.9	9.4	-2.1
26	0.4	1.3	1.7	6.1	7.8	7.9	7.0	5.4	5.1	6.0	6.9	8.4	8.6	9.5	9.8	9.8	9.9	9.7	9.8	9.8	9.6	9.4	9.3	8.7	7.4	9.9	0.4
27	7.3	5.3	6.5	8.6	7.8	7.2	6.0	5.3	5.5	5.9	6.6	7.7	8.3	8.8	9.1	9.2	8.5	6.4	2.3	-0.4	-2.7	-3.6	-5.0	-5.5	4.8	9.2	-5.5
28	-5.0	-4.3	-3.9	-2.5	-1.1	-0.7	0.5	1.5	4.3	9.7	12.1	13.0	13.2	13.5	13.7	13.4	12.5	11.3	7.3	6.5	5.5	4.3	3.9	3.2	5.5	13.7	-5.0
29	2.8	2.3	1.8	1.8	2.0	1.5	1.0	0.1	1.3	2.1	3.0	3.8	4.4	4.0	3.7	3.7	3.0	1.5	0.9	-0.1	-0.4	-1.1	-0.5	-0.6	1.8	4.4	-1.1
30	-0.2	-0.3	-0.6	-1.4	-1.3	-1.9	-2.1	-1.5	-0.4	0.2	1.3	2.0	2.3	2.6	2.7	2.7	2.4	1.6	1.3	0.9	0.6	0.3	-0.1	-0.8	0.4	2.7	-2.1
31	-2.0	-2.8	-2.1	-2.2	-3.6	-2.4	-1.6	-2.0	-0.2	0.8	1.0	0.7	-1.0	-1.6	-1.4	-1.8	-1.8	-1.8	-1.8	-1.6	-1.3	-1.2	-0.3	-0.2	-1.3	1.0	-3.6
Avg	-0.9	-1.2	-1.3	-1.1	-1.1	-1.3	-1.7	-1.6	0.3	3.0	5.2	6.4	7.1	7.5	7.8	7.8	7.2	5.7	3.8	2.5	1.4	0.6	-0.1	-0.7	2.3	8.5	-3.6
Max	10.7	9.7	8.1	8.6	7.8	7.9	7.0	6.3	6.6	9.7	12.9	15.2	16.1	16.7	17.3	17.4	16.6	13.4	10.6	9.8	9.6	9.4	9.3	8.7	8.5	17.4	3.8
Min	-7.4	-7.8	-7.5	-7.1	-7.1	-7.0	-7.3	-7.6	-6.0	-5.4	-5.7	-5.3	-5.2	-5.8	-5.7	-5.3	-5.5	-5.5	-5.5	-5.7	-6.2	-6.6	-7.1	-7.1	-4.5	0.1	-7.8

A-10

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 9 Meters (degrees Celsius)
November 2018

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	-1.6	-3.9	-5.7	-5.8	-7.4	-9.1	-9.7	-8.5	-8.1	-5.7	-2.4	0.7	2.1	2.3	2.7	2.5	1.9	0.8	0.4	0.1	0.3	0.4	0.4	0.4	-2.2	2.7	-9.7
2	0.4	0.4	0.7	1.7	2.7	2.8	4.1	4.3	5.6	5.5	5.0	6.9	6.6	5.9	5.5	5.4	5.4	4.8	4.3	3.6	2.4	1.1	0.4	0.0	3.6	6.9	0.0
3	-0.4	-0.5	-0.6	-0.6	-0.5	-0.6	-0.6	-0.7	-0.6	-0.1	0.4	0.9	1.6	2.5	2.5	2.2	2.2	1.8	1.7	1.4	1.2	1.4	1.8	1.9	0.8	2.5	-0.7
4	2.0	1.6	0.8	0.8	0.5	0.3	0.3	0.7	0.5	1.9	2.9	2.6	3.0	3.0	3.6	4.0	4.1	3.8	3.2	3.1	2.6	2.0	1.9	1.7	2.1	4.1	0.3
5	1.0	0.2	0.0	-1.4	-3.3	-4.3	-4.4	-3.7	-2.3	-0.3	0.7	1.0	1.4	1.4	0.9	-0.1	-0.5	-1.5	-2.6	-3.3	-3.3	-3.4	-2.8	-2.8	-1.4	1.4	-4.4
6	-2.5	-3.0	-3.6	-3.8	-3.8	-4.4	-4.5	-5.7	-6.3	-6.5	-6.1	-6.2	-6.3	-6.5	-6.0	-5.8	-6.3	-7.0	-7.5	-7.1	-6.9	-6.6	-6.3	-6.0	-5.6	-2.5	-7.5
7	-6.0	-6.1	-6.4	-6.2	-6.9	-8.0	-8.6	-8.9	-8.7	-9.1	-9.2	-9.9	-10.4	-9.8	-9.6	-10.5	-10.8	-11.4	-12.1	-12.8	-13.1	-15.3	-18.0	-20.6	-10.4	-6.0	-20.6
8	-21.8	-23.0	-23.7	-24.5	-24.2	-24.7	-24.6	-24.9	-23.1	-19.7	-15.3	-9.8	-6.8	-5.2	-4.7	-4.2	-4.7	-6.0	-6.9	-9.8	-11.8	-11.9	-13.6	-15.5	-15.0	-4.2	-24.9
9	-16.7	-17.5	-17.8	-18.5	-18.3	-19.1	-19.2	-18.7	-18.1	-15.2	-11.4	-8.6	-6.5	-3.2	-2.6	-2.2	-2.5	-3.1	-3.2	-2.9	-3.0	-2.8	-1.0	-2.0	-9.8	-1.0	-19.2
10	-2.9	-2.9	-3.3	-3.5	-3.7	-3.9	-4.1	-4.4	-4.1	-3.7	-3.6	-3.2	-3.1	-3.3	-3.7	-4.1	-4.8	-5.8	-6.4	-7.8	-8.7	-10.7	-12.8	-13.1	-5.3	-2.9	-13.1
11	-12.4	-13.4	-14.6	-16.0	-16.3	-16.2	-15.8	-14.2	-13.3	-12.5	-10.8	-8.0	-6.0	-5.5	-5.0	-5.4	-6.1	-6.9	-7.6	-7.9	-8.3	-9.0	-12.1	-15.6	-10.8	-5.0	-16.3
12	-16.9	-17.8	-18.7	-20.2	-21.6	-21.9	-22.2	-22.7	-22.1	-19.0	-15.1	-9.7	-5.7	-5.0	-4.2	-3.9	-4.7	-6.7	-7.5	-8.6	-10.5	-11.7	-13.1	-12.3	-13.4	-3.9	-22.7
13	-13.7	-14.4	-14.7	-14.8	-15.0	-15.0	-15.2	-14.6	-13.2	-11.6	-8.8	-5.7	-2.8	-0.2	2.6	1.5	-0.7	-3.0	-4.5	-6.5	-6.9	-7.4	-7.7	-8.0	-8.3	2.6	-15.2
14	-7.6	-7.4	-8.3	-8.0	-8.4	-9.2	-8.5	-8.0	-7.5	-6.2	-4.6	-0.4	6.1	6.5	6.8	6.4	5.4	2.0	1.7	5.0	5.0	4.6	4.4	3.8	-1.1	6.8	-9.2
15	3.2	2.9	3.1	3.1	2.9	2.1	-0.1	0.2	0.6	2.1	3.4	4.0	4.0	4.4	4.4	4.0	3.9	2.8	2.4	3.0	2.7	1.6	4.0	4.7	2.9	4.7	-0.1
16	4.8	4.7	4.5	4.2	2.7	2.2	1.4	1.7	0.3	-1.8	-4.7	-6.3	-7.5	-7.9	-8.2	-8.7	-10.0	-9.9	-10.0	-10.5	-11.5	-11.5	-11.7	-12.5	-4.4	4.8	-12.5
17	-12.9	-12.6	-12.5	-12.6	-14.2	-16.7	-17.2	-15.1	-13.8	-11.8	-10.0	-8.5	-7.7	-7.4	-7.3	-7.4	-8.6	-12.3	-14.5	-16.4	-17.5	-18.8	-18.6	-19.7	-13.1	-7.3	-19.7
18	-20.5	-20.7	-20.6	-20.6	-20.3	-19.9	-19.0	-17.2	-14.8	-12.3	-9.4	-4.2	-1.5	-1.0	-0.9	-1.2	-2.8	-3.8	-4.2	-5.6	-5.8	-5.4	-4.9	-4.5	-10.0	-0.9	-20.7
19	-4.4	-4.1	-4.1	-5.0	-7.6	-9.1	-10.2	-11.4	-11.1	-9.1	-5.9	-1.8	1.1	1.9	2.3	2.4	0.3	-3.9	-4.7	-5.8	-6.0	-6.9	-8.5	-9.3	-5.0	2.4	-11.4
20	-9.9	-10.9	-10.8	-10.8	-10.9	-11.1	-11.1	-11.6	-10.8	-8.0	-5.4	Au	Au	Au	7.4	6.5	1.5	-0.9	-3.3	-4.0	-5.5	-7.0	-8.1	-8.5	-6.3	7.4	-11.6
21	-9.6	-9.5	-10.3	-9.8	-9.4	-9.6	-9.5	-9.7	-9.2	-6.6	-3.2	-0.3	4.6	9.1	8.5	6.9	6.4	2.8	0.7	-0.6	-1.7	-0.2	-2.3	-3.0	-2.7	9.1	-10.3
22	-1.2	1.4	-0.2	-2.5	-5.0	-5.6	-5.4	-4.5	-3.6	2.3	3.8	4.0	4.7	4.3	2.4	1.2	0.6	-1.0	-2.4	-3.4	-3.7	-5.1	-6.7	-7.6	-1.4	4.7	-7.6
23	-7.2	-6.8	-2.7	-0.7	-0.9	-0.9	-1.2	-0.9	-0.4	-0.5	0.1	0.6	1.1	0.9	1.4	1.6	1.1	-1.1	-2.6	-3.1	-3.2	-4.1	-4.1	-3.1	-1.5	1.6	-7.2
24	-3.1	-3.4	-3.3	-3.5	-3.7	-3.6	-2.3	-2.4	-3.5	-4.3	-3.5	-3.5	-3.7	-3.0	-3.9	-4.6	-4.7	-5.0	-5.3	-5.7	-6.4	-6.4	-6.7	-8.6	-4.3	-2.3	-8.6
25	-9.1	-9.1	-8.4	-7.3	-7.4	-9.5	-11.1	-13.0	-13.6	-12.5	-7.0	-3.9	-3.2	-2.7	-2.4	-2.3	-3.4	-5.1	-8.1	-10.3	-11.0	-11.6	-13.0	-12.8	-8.2	-2.3	-13.6
26	-13.3	-13.8	-14.3	-14.5	-14.7	-15.1	-15.0	-15.3	-14.5	-12.1	-8.2	-3.5	1.3	2.1	2.5	2.2	0.9	-0.6	-3.4	-4.6	-6.2	-7.6	-6.3	-5.4	-7.5	2.5	-15.3
27	-3.9	-3.6	-3.2	-2.3	-1.2	-1.0	0.2	0.6	2.0	1.8	3.2	3.7	4.8	5.7	5.6	5.1	4.3	4.2	3.8	3.5	3.1	2.8	1.8	1.2	1.8	5.7	-3.9
28	1.1	1.6	2.2	2.0	1.9	1.6	1.1	0.6	-0.2	0.8	1.8	2.0	2.1	2.1	1.9	1.8	0.9	0.0	-1.0	-1.7	-2.3	-2.1	-3.8	-5.4	0.4	2.2	-5.4
29	-6.5	-8.2	-9.0	-9.7	-10.3	-11.3	-11.5	-10.8	-11.1	-9.8	-8.1	-5.9	-2.2	-0.2	0.5	1.0	-1.8	-4.9	-6.6	-8.2	-9.0	-9.3	-10.1	-10.9	-7.2	1.0	-11.5
30	-11.1	-11.7	-12.5	-12.8	-12.2	-12.2	-11.6	-11.3	-11.4	-9.7	-6.3	-0.1	1.9	0.9	0.9	0.5	-0.9	-2.4	-3.6	-4.2	-4.0	-4.6	-4.6	-4.6	-6.1	1.9	-12.8
Avg	-6.8	-7.0	-7.3	-7.5	-7.9	-8.4	-8.5	-8.3	-7.9	-6.5	-4.6	-2.5	-0.9	-0.3	0.1	-0.2	-1.1	-2.6	-3.7	-4.4	-5.0	-5.5	-6.1	-6.6	-5.0	1.2	-11.2
Max	4.8	4.7	4.5	4.2	2.9	2.8	4.1	4.3	5.6	5.5	5.0	6.9	6.6	9.1	8.5	6.9	6.4	4.8	4.3	5.0	5.0	4.6	4.4	4.7	3.6	9.1	0.3
Min	-21.8	-23.0	-23.7	-24.5	-24.2	-24.7	-24.6	-24.9	-23.1	-19.7	-15.3	-9.9	-10.4	-9.8	-9.6	-10.5	-10.8	-12.3	-14.5	-16.4	-17.5	-18.8	-18.6	-20.6	-15.0	-7.3	-24.9

A-11

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 9 Meters (degrees Celsius)
December 2018

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	-4.4	-4.3	-4.3	-4.3	-4.3	-4.3	-4.4	-4.5	-4.5	-4.1	-3.8	-3.5	-3.3	-3.2	-3.1	-3.2	-4.6	-8.1	-10.8	-12.5	-12.8	-14.8	-16.2	-17.3	-6.7	-3.1	-17.3
2	-17.6	-17.3	-17.4	-17.6	-18.5	-19.2	-19.1	-19.6	-20.1	-17.9	-14.8	-11.1	-8.3	-6.7	-6.4	-6.8	-8.1	-9.1	-9.2	-8.7	-7.7	-7.9	-7.8	-7.6	-12.7	-6.4	-20.1
3	-7.4	-7.5	-7.5	-7.5	-7.6	-7.7	-7.9	-7.9	-8.0	-7.6	-7.2	-6.7	-6.5	-6.6	-6.7	-6.6	-6.8	-7.0	-7.1	-7.2	-7.1	-7.3	-7.3	-7.2	-7.2	-6.5	-8.0
4	-7.1	-7.1	-7.1	-7.2	-7.5	-8.3	-9.3	-9.9	-11.5	-8.9	-7.1	-6.4	-5.7	-5.3	-5.0	-5.0	-6.2	-7.9	-9.7	-11.5	-14.0	-15.2	-14.9	-13.6	-8.8	-5.0	-15.2
5	-11.7	-13.3	-14.6	-15.6	-15.9	-18.9	-19.7	-18.0	-14.7	-13.2	-9.8	-8.7	-9.3	-9.1	-9.8	-10.7	-13.0	-14.7	-16.3	-18.8	-20.2	-21.2	-22.5	-23.0	-15.1	-8.7	-23.0
6	-24.3	-24.7	-24.5	-24.6	-25.3	-25.3	-24.6	-24.4	-24.3	-22.1	-18.5	-14.6	-11.1	-8.6	-8.1	-8.3	-10.1	-14.7	-15.8	-17.0	-18.4	-19.4	-20.4	-20.5	-18.7	-8.1	-25.3
7	-21.2	-20.6	-20.4	-20.1	-19.7	-20.1	-19.9	-20.6	-19.7	-16.5	-11.6	-4.7	-2.1	-1.3	-1.0	-1.3	-4.2	-6.5	-10.2	-11.8	-13.4	-15.1	-15.8	-17.1	-13.1	-1.0	-21.2
8	-17.3	-18.0	-17.6	-17.9	-17.5	-17.8	-17.8	-17.6	-18.2	-16.2	-12.3	-6.0	-2.0	-1.6	-1.6	-2.0	-3.6	-5.7	-9.7	-10.9	-11.4	-12.8	-14.0	-14.6	-11.8	-1.6	-18.2
9	-15.1	-15.7	-16.7	-16.9	-17.3	-18.2	-18.9	-19.4	-18.8	-17.2	-13.5	-10.0	-5.7	-2.3	-0.3	-0.8	-3.9	-7.5	-9.4	-10.5	-10.5	-11.0	-10.2	-9.6	-11.6	-0.3	-19.4
10	-9.6	-9.1	-7.5	-8.8	-8.8	-10.0	-10.8	-11.1	-10.9	-9.9	-8.3	-4.5	-1.2	1.7	1.7	1.2	0.5	0.0	-0.4	-1.1	-1.4	-1.8	-1.9	-2.5	-4.8	1.7	-11.1
11	-2.8	-3.9	-6.4	-9.1	-8.4	-8.8	-6.0	-5.4	-4.6	-3.7	-2.6	-1.9	-1.4	-0.6	-0.2	-0.7	-1.3	-1.2	0.0	0.2	0.3	-0.1	0.0	0.2	-2.9	0.3	-9.1
12	0.4	1.4	1.6	0.7	-0.5	-0.5	-1.0	-0.6	-0.8	-1.1	-1.3	-0.9	-1.0	-1.3	-1.5	-1.5	-2.3	-2.9	-3.5	-3.9	-6.2	-6.1	-5.0	-6.6	-1.8	1.6	-6.6
13	-6.3	-5.2	-4.8	-4.9	-4.7	-4.3	-3.8	-4.9	-5.7	-4.3	-2.9	-2.4	-2.0	-1.2	-0.9	-1.3	-1.5	-1.8	-1.3	-2.0	-3.0	-5.2	-4.4	-3.8	-3.4	-0.9	-6.3
14	-3.5	-4.3	-4.8	-5.9	-6.2	-6.3	-5.6	-6.3	-6.4	-4.6	-2.2	1.5	3.4	4.5	5.0	4.0	2.9	-0.8	-0.1	1.0	0.2	2.6	2.0	2.4	-1.1	5.0	-6.4
15	-0.3	0.9	3.2	2.4	0.8	-0.3	-1.1	-0.5	-1.0	-0.9	-0.7	-0.5	-0.6	-0.4	-0.6	-0.9	-0.4	-1.1	-2.5	-4.4	-6.8	-8.9	-10.4	-11.1	-1.9	3.2	-11.1
16	-11.4	-11.3	-11.7	-10.8	-10.0	-9.7	-10.0	-8.5	-7.5	-3.9	1.8	4.0	5.6	6.0	7.4	7.3	5.9	4.9	0.3	-1.1	-1.3	0.6	0.8	5.0	-2.0	7.4	-11.7
17	4.5	3.3	2.0	0.4	-0.6	-1.1	-1.4	-0.8	-1.1	-0.1	1.7	2.6	3.5	4.9	4.8	4.2	3.3	2.5	1.6	0.9	1.4	0.6	-0.9	-3.2	1.4	4.9	-3.2
18	-4.6	-5.2	-6.0	-4.1	-0.2	0.8	0.9	0.6	1.0	1.9	3.3	4.2	4.9	4.6	3.8	3.5	3.5	2.9	1.9	2.1	2.1	1.9	1.3	0.8	1.1	4.9	-6.0
19	0.9	0.7	0.7	0.0	0.0	-0.2	0.0	-0.1	-0.8	-0.9	0.0	0.3	0.6	0.5	0.2	-0.2	-0.7	-0.9	-1.2	-1.6	-1.6	-1.7	-2.4	-4.3	-0.5	0.9	-4.3
20	-7.1	-8.6	-10.3	-10.8	-11.6	-12.3	-12.2	-11.3	-10.2	-6.9	-3.2	0.2	1.8	2.4	3.7	4.1	2.8	2.7	1.6	-0.1	1.3	4.0	4.2	4.5	-3.0	4.5	-12.3
21	4.1	3.6	3.1	1.3	-0.5	-1.3	-1.7	-2.0	-2.5	-2.6	-2.7	-2.6	-2.4	-2.7	-3.0	-3.6	-4.7	-5.5	-5.3	-5.6	-6.0	-6.6	-7.1	-7.2	-2.6	4.1	-7.2
22	-8.1	-8.9	-9.7	-9.7	-9.5	-10.0	-8.9	-8.6	-9.1	-7.5	-6.5	-6.2	-6.0	-5.6	-4.8	-4.7	-5.3	-6.1	-8.8	-12.1	-14.3	-15.3	-16.5	-17.0	-9.1	-4.7	-17.0
23	-17.3	-16.9	-16.1	-15.6	-13.4	-12.4	-11.8	-10.7	-9.0	-6.3	-5.1	-3.5	-2.5	-1.1	-0.4	0.0	-0.1	-0.3	-0.6	-1.2	-2.0	-2.2	-3.0	-2.2	-6.4	0.0	-17.3
24	-1.9	-2.4	-2.6	-2.3	-1.9	-2.4	-3.5	-4.4	-5.4	-5.5	-4.7	-3.5	-2.5	-1.7	-1.4	-1.4	-2.7	-3.6	-3.8	-3.6	-5.1	-6.0	-8.7	-9.1	-3.8	-1.4	-9.1
25	-10.0	-11.1	-10.3	-10.0	-11.1	-10.7	-10.4	-10.6	-10.8	-9.8	-7.7	-4.8	-3.3	-3.5	-3.8	-3.6	-4.6	-5.9	-6.2	-7.2	-7.7	-7.6	-7.3	-7.2	-7.7	-3.3	-11.1
26	-7.2	-7.3	-7.6	-7.9	-8.3	-9.0	-10.3	-12.1	-12.2	-10.9	-9.6	-7.9	-6.9	-6.5	-6.4	-6.3	-6.6	-9.2	-10.6	-12.3	-13.0	-14.4	-14.9	-14.8	-9.7	-6.3	-14.9
27	-14.2	-13.7	-13.2	-12.6	-12.4	-12.3	-12.0	-11.9	-11.7	-11.0	-9.4	-7.6	-7.1	-7.1	-7.6	-8.5	-9.1	-9.2	-9.9	-10.3	-10.6	-11.0	-11.5	-11.4	-10.6	-7.1	-14.2
28	-12.4	-13.7	-13.4	-13.3	-13.2	-13.0	-12.7	-12.5	-12.2	-11.6	-10.6	-9.0	-8.4	-8.1	-7.7	-7.8	-8.5	-9.3	-10.3	-11.0	-13.1	-15.0	-15.1	-11.9	-11.4	-7.7	-15.1
29	-8.4	-7.9	-7.8	-8.2	-9.3	-8.4	-7.0	-5.5	-5.7	-4.8	-4.1	-3.0	-2.2	-0.8	-0.1	0.1	-0.7	-1.3	-0.9	0.9	1.6	1.9	1.8	1.6	-3.3	1.9	-9.3
30	1.5	1.3	1.4	1.1	1.0	0.6	0.8	0.8	0.2	-0.9	-2.0	-2.1	-2.6	-3.1	-6.1	-8.8	-10.2	-11.2	-12.6	-14.2	-15.3	-15.9	-16.3	-17.1	-5.4	1.5	-17.1
31	-17.6	-18.0	-18.2	-18.4	-18.5	-18.7	-18.7	-18.7	-18.9	-18.6	-18.1	-17.3	-16.8	-16.1	-15.5	-15.2	-15.2	-15.6	-15.9	-16.2	-17.2	-20.4	-23.1	-24.8	-18.0	-15.2	-24.8
Avg	-8.3	-8.5	-8.7	-9.0	-9.1	-9.4	-9.3	-9.3	-9.2	-8.0	-6.2	-4.4	-3.3	-2.6	-2.4	-2.7	-3.7	-5.0	-6.0	-6.8	-7.5	-8.1	-8.6	-8.7	-6.9	-1.5	-13.3
Max	4.5	3.6	3.2	2.4	1.0	0.8	0.9	0.8	1.0	1.9	3.3	4.2	5.6	6.0	7.4	7.3	5.9	4.9	1.9	2.1	2.1	4.0	4.2	5.0	1.4	7.4	-3.2
Min	-24.3	-24.7	-24.5	-24.6	-25.3	-25.3	-24.6	-24.4	-24.3	-22.1	-18.5	-17.3	-16.8	-16.1	-15.5	-15.2	-15.2	-15.6	-16.3	-18.8	-20.2	-21.2	-23.1	-24.8	-18.7	-15.2	-25.3

A-12

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 2 Meters (degrees Celsius)
October 2018

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	-0.9	-2.3	-3.2	-3.4	-4.1	-4.4	-4.7	-2.1	3.4	7.6	9.6	11.1	12.4	12.7	13.4	13.8	13.1	12.0	9.8	7.8	6.8	6.0	5.9	7.2	5.3	13.8	-4.7
2	9.4	8.9	7.1	6.9	6.7	6.7	6.1	6.1	6.6	7.9	9.1	10.6	11.6	12.1	12.3	12.1	9.5	8.3	8.1	7.9	7.2	6.7	4.7	2.8	8.1	12.3	2.8
3	4.4	5.4	5.3	4.3	2.5	1.1	-0.7	-1.8	-2.6	-1.1	0.9	2.7	4.2	5.5	6.8	7.5	7.3	4.6	1.7	0.5	-0.5	-1.1	-1.4	-1.5	2.3	7.5	-2.6
4	-1.9	-2.1	-2.3	-3.5	-4.6	-5.0	-5.8	-3.7	-2.0	0.1	1.9	3.2	5.3	4.1	3.7	2.8	1.8	0.7	0.5	0.3	0.2	0.2	0.2	0.2	-0.2	5.3	-5.8
5	0.3	0.1	0.2	0.4	0.6	0.4	0.2	0.1	0.4	1.4	2.4	2.8	3.6	4.9	5.8	6.0	5.4	3.3	0.4	-0.7	-2.0	-1.9	-1.8	-1.8	1.3	6.0	-2.0
6	-1.9	-2.4	-2.0	-1.1	-0.5	-0.3	-0.1	0.4	1.1	2.1	2.8	3.8	4.8	4.8	5.0	5.2	3.8	3.4	3.0	2.0	1.3	1.4	1.0	1.2	1.6	5.2	-2.4
7	1.3	1.4	1.5	1.5	1.6	1.5	1.5	1.5	1.3	0.4	0.8	1.6	1.8	2.8	2.8	3.6	4.2	3.7	2.5	1.6	0.9	0.0	-0.4	-0.7	1.6	4.2	-0.7
8	-0.5	-0.4	-0.6	-0.9	-1.3	-1.2	-0.8	-0.4	1.6	3.2	4.9	6.1	5.2	5.8	5.8	3.9	2.5	1.8	1.6	1.1	1.1	1.1	1.0	1.1	1.7	6.1	-1.3
9	1.0	0.9	0.4	0.0	-0.1	0.1	0.2	0.4	0.7	1.1	1.9	1.6	1.9	2.1	1.0	0.3	0.7	0.1	0.1	0.1	-0.4	-0.3	-0.3	-0.3	0.5	2.1	-0.4
10	-0.7	-0.8	-0.8	-1.2	-1.4	-1.8	-2.1	-1.8	-1.4	-0.7	-0.1	0.6	0.8	0.7	0.3	-0.2	-0.7	-1.2	-2.0	-1.9	-1.8	-2.1	-2.3	-2.4	-1.0	0.8	-2.4
11	-2.5	-2.5	-2.4	-2.3	-2.3	-2.3	-2.1	-1.9	-1.3	-0.4	0.6	1.9	1.6	1.8	1.9	2.8	2.3	1.2	-0.1	-0.1	-3.0	-4.6	-6.2	-7.1	-1.1	2.8	-7.1
12	-7.2	-7.8	-7.6	-6.7	-5.0	-4.7	-5.6	-4.3	1.8	4.3	5.9	7.0	8.0	9.2	9.8	9.5	8.9	7.5	6.8	7.5	6.1	4.9	3.9	2.7	2.3	9.8	-7.8
13	1.7	-0.1	-1.4	-2.1	-2.8	-3.6	-4.0	-4.0	-4.4	-5.1	-5.3	-4.8	-4.6	-5.2	-5.2	-5.0	-5.3	-5.3	-5.5	-5.7	-6.2	-6.6	-7.1	-7.0	-4.4	1.7	-7.1
14	-6.9	-6.8	-6.9	-7.1	-7.1	-7.1	-7.3	-7.5	-5.6	-3.8	-2.8	-1.9	-0.9	0.1	1.3	1.1	0.9	-0.7	-2.8	-4.8	-6.6	-6.4	-7.4	-7.5	-4.4	1.3	-7.5
15	-8.0	-8.3	-7.5	-6.5	-5.8	-6.1	-5.6	-4.5	-1.6	1.1	2.8	4.7	5.9	7.0	7.3	7.5	6.9	4.7	1.6	-1.0	-1.5	-2.3	-3.0	-3.4	-0.7	7.5	-8.3
16	-3.4	-2.6	-1.3	-0.8	-0.8	-1.1	-1.5	-1.9	1.7	5.9	8.7	10.4	11.5	12.0	12.4	12.3	11.4	7.2	3.0	1.7	0.1	-2.9	-3.8	-4.7	3.1	12.4	-4.7
17	-5.8	-6.1	-6.6	-7.0	-7.3	-7.4	-7.9	-6.4	-1.5	4.8	10.5	12.8	14.2	15.2	15.6	15.8	14.8	8.6	4.0	2.5	1.0	-1.5	-2.1	-3.2	2.4	15.8	-7.9
18	-4.9	-5.0	-5.6	-5.6	-6.1	-6.3	-6.5	-5.3	-0.6	6.2	10.8	12.2	13.1	14.5	15.3	15.1	13.8	10.2	7.0	3.0	0.8	-1.2	-1.6	-2.8	2.9	15.3	-6.5
19	-3.4	-2.4	-1.8	-1.8	-1.8	-2.9	-3.5	-2.9	0.1	6.7	11.0	12.3	13.0	13.7	14.4	14.5	13.4	9.2	4.1	2.9	-0.3	-2.2	-3.0	-4.2	3.5	14.5	-4.2
20	-4.3	-4.8	-5.1	-5.3	-5.1	-5.4	-5.9	-5.0	0.2	6.9	13.4	15.9	16.9	17.5	18.1	17.9	16.7	11.8	6.2	2.4	1.3	-0.8	-2.2	-3.1	4.1	18.1	-5.9
21	-3.3	-3.9	-5.1	-5.3	-5.5	-5.2	-5.7	-5.0	-0.8	4.9	11.1	14.5	16.4	17.0	16.7	16.7	15.2	11.7	8.7	4.9	2.8	-1.1	-2.4	-4.0	3.9	17.0	-5.7
22	-5.2	-5.6	-6.0	-6.7	-6.7	-7.4	-7.3	-6.3	-0.4	8.5	11.2	12.4	13.5	14.0	14.2	13.2	11.5	7.9	6.8	5.2	5.8	2.8	0.6	-1.2	3.1	14.2	-7.4
23	-1.9	-3.1	-4.2	-4.8	-5.9	-6.1	-6.4	-5.8	-0.5	5.4	11.5	15.2	16.7	17.2	17.6	16.3	13.0	7.3	5.1	1.7	0.0	-0.6	-2.3	-3.2	3.4	17.6	-6.4
24	-3.4	-3.9	-4.1	-4.8	-5.0	-5.3	-5.8	-5.1	-0.7	4.9	10.3	11.1	12.3	12.6	13.4	12.7	11.5	7.9	4.1	2.0	1.7	-0.7	-1.3	-2.4	2.6	13.4	-5.8
25	-2.9	-3.4	-3.1	-0.5	4.4	2.2	-1.7	-2.5	2.7	7.4	8.4	9.3	10.1	10.0	9.8	9.8	8.0	7.3	5.6	3.3	1.4	0.2	-1.7	-0.8	3.5	10.1	-3.4
26	0.1	1.0	1.3	5.2	7.4	7.5	6.4	5.0	5.1	6.0	7.0	9.1	8.9	9.6	9.8	9.8	9.9	9.5	9.7	9.6	9.5	9.3	9.0	8.2	7.2	9.9	0.1
27	6.5	4.8	5.9	8.5	7.7	7.0	5.8	5.1	5.3	6.0	7.0	8.4	9.0	9.6	9.7	9.7	8.4	5.3	0.8	-1.4	-4.3	-4.8	-6.5	-7.1	4.4	9.7	-7.1
28	-6.1	-5.9	-4.7	-3.2	-1.9	-1.6	-0.4	0.6	3.6	9.8	12.5	13.7	13.5	13.7	13.9	13.4	12.3	11.1	6.9	6.1	5.2	3.9	3.7	3.0	5.1	13.9	-6.1
29	2.5	2.0	1.5	1.3	1.5	0.8	0.7	-0.1	1.6	2.4	3.5	4.1	5.0	4.2	3.9	3.7	3.0	1.5	0.6	-0.7	-1.0	-2.3	-0.9	-0.9	1.6	5.0	-2.3
30	-0.4	-0.4	-0.9	-1.9	-1.7	-2.6	-2.6	-1.7	-0.4	0.4	1.6	2.3	2.4	2.7	2.8	2.9	2.4	1.5	1.2	0.8	0.5	0.1	-0.4	-1.4	0.3	2.9	-2.6
31	-3.0	-4.1	-3.4	-4.6	-4.8	-3.5	-2.3	-3.1	-0.3	1.1	1.3	1.1	-0.7	-1.3	-1.3	-1.7	-1.7	-1.8	-1.8	-1.7	-1.5	-1.4	-0.5	-0.7	-1.7	1.3	-4.8
Avg	-1.7	-1.9	-2.0	-1.9	-1.8	-2.1	-2.4	-2.1	0.4	3.4	5.7	7.0	7.7	8.1	8.3	8.2	7.3	5.2	3.2	1.8	0.8	-0.3	-0.9	-1.5	2.0	9.0	-4.5
Max	9.4	8.9	7.1	8.5	7.7	7.5	6.4	6.1	6.6	9.8	13.4	15.9	16.9	17.5	18.1	17.9	16.7	12.0	9.8	9.6	9.5	9.3	9.0	8.2	8.1	18.1	2.8
Min	-8.0	-8.3	-7.6	-7.1	-7.3	-7.4	-7.9	-7.5	-5.6	-5.1	-5.3	-4.8	-4.6	-5.2	-5.2	-5.0	-5.3	-5.3	-5.5	-5.7	-6.6	-6.6	-7.4	-7.5	-4.4	0.8	-8.3

A-13

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 2 Meters (degrees Celsius)
November 2018

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	-2.9	-5.4	-7.7	-8.4	-10.2	-11.0	-11.5	-10.1	-9.2	-6.4	-3.4	0.8	2.2	2.4	2.7	2.4	1.7	0.7	0.4	0.2	0.2	0.3	0.4	0.3	-3.0	2.7	-11.5
2	0.3	0.4	0.5	1.1	2.0	2.1	3.3	3.3	4.7	4.4	4.4	6.4	6.2	5.5	5.3	5.1	5.1	4.6	4.1	3.4	2.2	0.9	0.3	0.0	3.2	6.4	0.0
3	-0.4	-0.6	-0.7	-0.6	-0.6	-0.8	-0.8	-0.9	-0.7	0.0	0.6	1.0	1.6	2.5	2.4	2.2	2.1	1.7	1.5	1.0	1.0	1.3	1.7	1.7	0.7	2.5	-0.9
4	1.7	1.3	0.7	0.7	0.4	0.3	0.3	0.7	0.4	1.7	2.7	2.5	2.8	2.8	3.4	3.7	3.9	3.5	3.0	2.9	2.4	1.5	1.5	1.3	1.9	3.9	0.3
5	0.9	0.1	-0.3	-2.3	-4.9	-5.5	-5.4	-4.1	-2.7	-0.2	0.8	1.2	1.6	1.5	1.1	0.1	-0.4	-1.8	-3.1	-3.9	-3.8	-3.5	-3.0	-2.9	-1.7	1.6	-5.5
6	-2.6	-3.0	-3.6	-3.9	-3.8	-4.4	-4.5	-5.6	-6.2	-6.3	-5.8	-5.8	-6.1	-6.2	-5.7	-5.5	-6.0	-7.1	-7.7	-7.2	-7.0	-6.6	-6.2	-6.0	-5.5	-2.6	-7.7
7	-5.9	-6.1	-6.6	-6.1	-6.9	-7.9	-8.5	-8.8	-8.4	-8.7	-8.8	-9.7	-10.2	-9.5	-9.4	-10.3	-10.8	-11.6	-12.5	-13.2	-13.9	-17.2	-19.9	-22.3	-10.6	-5.9	-22.3
8	-23.9	-24.9	-25.6	-26.2	-26.2	-26.5	-26.4	-26.5	-23.8	-19.5	-14.8	-9.3	-6.2	-5.1	-4.8	-4.3	-5.2	-7.4	-8.9	-11.8	-12.7	-14.3	-15.4	-17.0	-16.1	-4.3	-26.5
9	-18.3	-19.6	-19.9	-20.4	-20.3	-20.6	-20.9	-20.5	-18.7	-15.0	-11.3	-8.7	-6.3	-3.2	-2.6	-2.3	-2.9	-3.4	-3.4	-3.1	-3.4	-3.3	-1.2	-2.1	-10.5	-1.2	-20.9
10	-2.9	-3.0	-3.3	-3.6	-3.7	-3.9	-4.2	-4.4	-4.1	-3.6	-3.5	-3.0	-2.8	-3.1	-3.6	-4.1	-4.9	-6.0	-7.2	-8.7	-9.8	-12.0	-14.0	-14.0	-5.6	-2.8	-14.0
11	-13.3	-14.3	-16.1	-17.1	-17.7	-17.0	-16.0	-14.2	-13.2	-12.3	-10.8	-7.8	-5.8	-5.3	-4.9	-5.6	-6.3	-7.2	-8.4	-8.1	-8.5	-9.9	-14.5	-17.4	-11.3	-4.9	-17.7
12	-18.1	-18.9	-20.3	-21.8	-23.4	-23.7	-24.0	-24.4	-23.0	-18.7	-15.1	-9.6	-5.4	-4.6	-3.8	-4.2	-5.5	-7.7	-7.8	-9.3	-11.7	-12.8	-14.4	-13.6	-14.2	-3.8	-24.4
13	-14.8	-15.5	-15.9	-16.3	-16.2	-16.4	-16.6	-16.0	-14.7	-12.3	-9.1	-6.5	-2.7	-0.3	1.9	1.2	-1.1	-4.3	-6.4	-8.6	-8.9	-9.8	-10.0	-10.0	-9.6	1.9	-16.6
14	-9.3	-9.4	-10.3	-10.2	-10.2	-11.1	-10.1	-9.5	-8.8	-7.0	-4.9	-1.9	5.6	6.0	6.4	6.1	4.6	1.0	0.0	4.4	4.7	4.4	4.1	3.4	-2.2	6.4	-11.1
15	2.8	2.6	2.8	2.8	2.5	1.3	-0.6	-0.9	0.1	2.3	3.6	4.1	3.9	4.4	4.3	3.8	3.7	2.1	1.6	2.2	1.8	0.8	3.3	4.5	2.5	4.5	-0.9
16	4.5	4.3	4.3	3.9	2.5	1.9	1.2	1.5	0.2	-1.8	-4.6	-6.0	-7.2	-7.7	-8.1	-8.5	-9.8	-9.8	-9.9	-10.4	-11.4	-11.4	-11.6	-12.7	-4.4	4.5	-12.7
17	-12.9	-12.5	-12.5	-12.6	-15.1	-18.6	-17.7	-15.0	-13.7	-11.7	-9.8	-8.1	-7.3	-6.9	-6.9	-7.2	-9.0	-13.7	-16.2	-17.8	-19.2	-20.6	-20.9	-21.5	-13.6	-6.9	-21.5
18	-22.2	-22.3	-22.2	-22.2	-22.1	-21.5	-20.5	-17.9	-15.6	-12.8	-9.6	-3.9	-1.3	-0.8	-0.8	-1.4	-3.5	-4.0	-4.5	-6.5	-6.2	-5.9	-5.2	-4.8	-10.7	-0.8	-22.3
19	-4.5	-4.2	-4.3	-5.9	-8.8	-10.3	-11.4	-12.8	-11.7	-9.2	-5.4	-2.2	1.4	2.2	2.4	2.4	-0.9	-4.4	-5.6	-6.8	-7.0	-8.3	-10.3	-10.7	-5.7	2.4	-12.8
20	-11.2	-11.9	-12.3	-12.4	-12.3	-12.8	-12.7	-13.6	-12.1	-8.5	-5.4	Au	Au	Au	7.5	5.5	0.5	-1.7	-4.9	-5.6	-7.4	-8.7	-9.7	-10.5	-7.6	7.5	-13.6
21	-11.6	-11.5	-12.4	-11.7	-11.1	-11.6	-11.7	-12.0	-10.8	-6.8	-4.2	-0.1	4.4	9.0	7.7	6.2	4.8	1.8	0.2	-1.1	-3.1	-3.2	-4.0	-4.6	-4.1	9.0	-12.4
22	-4.0	-0.9	-2.8	-5.1	-7.6	-7.6	-6.8	-5.8	-4.9	1.3	3.5	3.8	4.6	4.1	2.4	1.2	0.1	-1.4	-3.0	-4.0	-4.4	-6.4	-8.4	-9.4	-2.6	4.6	-9.4
23	-8.0	-7.6	-3.8	-1.3	-1.4	-1.2	-1.5	-1.2	-0.6	-0.5	0.0	0.7	1.1	0.9	1.4	1.6	0.6	-1.8	-3.4	-4.0	-3.7	-5.0	-4.8	-3.5	-2.0	1.6	-8.0
24	-3.5	-4.0	-3.6	-3.7	-4.2	-4.1	-2.7	-2.5	-3.5	-4.1	-3.3	-3.3	-3.4	-2.7	-3.7	-4.4	-4.6	-5.0	-5.3	-6.0	-6.8	-6.7	-7.4	-9.6	-4.5	-2.5	-9.6
25	-9.7	-9.5	-8.7	-8.2	-9.7	-11.7	-13.4	-14.9	-15.4	-13.1	-7.6	-3.7	-2.8	-2.4	-2.1	-2.2	-4.1	-6.3	-9.3	-11.4	-12.4	-12.9	-14.2	-13.8	-9.1	-2.1	-15.4
26	-14.6	-14.9	-15.7	-16.1	-16.0	-16.4	-16.4	-16.6	-15.3	-12.1	-8.3	-3.6	1.7	2.2	2.3	1.9	0.2	-1.7	-4.5	-6.5	-7.9	-8.5	-6.6	-5.4	-8.3	2.3	-16.6
27	-4.2	-3.9	-3.8	-3.3	-1.9	-1.7	-0.6	-0.3	1.3	1.5	3.1	3.7	4.6	5.5	5.3	4.9	3.9	3.9	3.4	3.1	2.8	2.6	1.4	0.8	1.3	5.5	-4.2
28	0.8	1.3	1.9	1.7	1.5	1.3	0.9	0.4	-0.9	0.9	1.9	2.1	2.1	2.1	2.0	1.8	0.4	-1.3	-1.5	-2.1	-3.0	-3.4	-5.1	-6.8	-0.0	2.1	-6.8
29	-8.1	-9.5	-10.5	-10.8	-11.3	-12.6	-12.7	-11.9	-11.6	-10.0	-8.2	-5.6	-2.0	-0.2	0.6	1.3	-2.5	-6.0	-7.9	-9.7	-10.7	-10.9	-11.6	-12.2	-8.1	1.3	-12.7
30	-12.8	-13.6	-14.5	-14.4	-13.8	-13.5	-12.8	-12.2	-12.5	-9.8	-5.9	-0.3	2.1	0.9	0.9	0.2	-1.5	-2.9	-5.0	-5.0	-4.6	-4.9	-4.9	-4.8	-6.9	2.1	-14.5
Avg	-7.6	-7.9	-8.2	-8.5	-9.0	-9.5	-9.5	-9.2	-8.5	-6.6	-4.6	-2.5	-0.8	-0.2	0.1	-0.3	-1.6	-3.2	-4.4	-5.1	-5.7	-6.5	-7.0	-7.5	-5.6	1.2	-12.4
Max	4.5	4.3	4.3	3.9	2.5	2.1	3.3	3.3	4.7	4.4	4.4	6.4	6.2	9.0	7.7	6.2	5.1	4.6	4.1	4.4	4.7	4.4	4.1	4.5	3.2	9.0	0.3
Min	-23.9	-24.9	-25.6	-26.2	-26.2	-26.5	-26.4	-26.5	-23.8	-19.5	-15.1	-9.7	-10.2	-9.5	-9.4	-10.3	-10.8	-13.7	-16.2	-17.8	-19.2	-20.6	-20.9	-22.3	-16.1	-6.9	-26.5

A-14

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 2 Meters (degrees Celsius)
December 2018

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	-4.5	-4.5	-4.3	-4.4	-4.3	-4.4	-4.5	-4.6	-4.5	-4.0	-3.6	-3.3	-3.1	-3.1	-3.0	-3.2	-6.1	-9.7	-12.4	-14.2	-15.0	-17.2	-17.9	-18.9	-7.3	-3.0	-18.9
2	-19.5	-19.3	-19.7	-19.7	-20.3	-20.7	-21.5	-21.8	-21.8	-18.3	-14.9	-10.8	-7.7	-6.1	-5.8	-6.9	-8.7	-9.8	-9.2	-8.8	-7.9	-7.9	-7.9	-7.7	-13.4	-5.8	-21.8
3	-7.4	-7.5	-7.5	-7.5	-7.7	-7.9	-8.0	-8.1	-8.1	-7.5	-7.0	-6.4	-6.3	-6.4	-6.5	-6.5	-6.8	-7.1	-7.2	-7.4	-7.2	-7.3	-7.4	-7.3	-7.3	-6.3	-8.1
4	-7.1	-7.2	-7.2	-7.3	-7.6	-8.9	-10.7	-11.7	-14.1	-9.5	-7.0	-6.2	-5.6	-5.1	-4.9	-5.1	-7.0	-9.0	-11.7	-12.9	-14.9	-16.2	-16.5	-15.4	-9.5	-4.9	-16.5
5	-13.5	-15.1	-15.6	-16.4	-16.7	-20.4	-21.2	-18.6	-14.9	-13.1	-9.5	-8.5	-9.1	-8.7	-9.7	-10.8	-13.2	-15.5	-18.0	-20.4	-21.4	-23.0	-24.0	-24.7	-15.9	-8.5	-24.7
6	-25.6	-26.3	-26.0	-26.7	-27.0	-27.0	-26.6	-26.2	-25.5	-22.2	-18.7	-14.7	-10.5	-8.2	-7.9	-8.4	-11.2	-15.7	-17.2	-18.0	-20.4	-21.1	-22.1	-22.2	-19.8	-7.9	-27.0
7	-23.1	-22.2	-21.5	-21.6	-21.1	-21.6	-21.3	-22.3	-21.6	-18.1	-12.5	-5.4	-1.7	-1.1	-0.9	-1.5	-5.5	-7.4	-11.4	-13.4	-15.3	-17.0	-18.2	-19.1	-14.4	-0.9	-23.1
8	-19.0	-19.8	-19.3	-19.6	-19.4	-19.4	-19.6	-19.1	-19.6	-16.3	-12.0	-7.0	-1.8	-1.4	-1.5	-2.1	-4.6	-7.2	-10.8	-11.3	-12.0	-13.6	-14.9	-15.7	-12.8	-1.4	-19.8
9	-16.4	-17.1	-18.4	-19.3	-19.8	-20.7	-20.8	-20.9	-20.6	-17.8	-13.8	-10.1	-5.5	-2.3	-0.2	-0.9	-4.9	-9.1	-11.5	-12.4	-12.8	-12.8	-12.2	-10.8	-13.0	-0.2	-20.9
10	-11.1	-10.6	-8.8	-10.3	-10.5	-11.7	-12.7	-13.1	-12.3	-10.8	-8.5	-4.6	-1.3	1.8	1.6	0.6	0.0	-0.1	-0.6	-1.2	-1.6	-2.2	-2.1	-2.8	-5.5	1.8	-13.1
11	-3.3	-4.7	-8.2	-10.5	-10.5	-10.8	-8.2	-6.4	-5.0	-3.8	-2.7	-1.7	-1.3	-0.4	-0.1	-0.8	-1.6	-1.7	-0.3	0.1	0.1	-0.3	-0.2	0.0	-3.4	0.1	-10.8
12	0.1	1.1	1.3	0.6	-0.5	-0.7	-1.1	-0.7	-0.9	-1.2	-1.5	-1.0	-1.1	-1.4	-1.7	-1.7	-2.6	-3.2	-4.0	-4.5	-7.5	-7.0	-5.4	-7.5	-2.2	1.3	-7.5
13	-7.3	-5.9	-5.3	-5.2	-5.0	-4.9	-4.2	-5.7	-6.6	-4.9	-3.0	-2.6	-2.1	-1.4	-1.2	-1.9	-2.2	-3.3	-2.8	-2.8	-4.2	-6.4	-6.3	-5.5	-4.2	-1.2	-7.3
14	-5.3	-5.5	-5.7	-6.7	-7.0	-7.5	-7.2	-6.9	-7.0	-5.1	-2.7	1.0	3.3	4.4	4.7	3.1	1.7	-2.4	-1.1	-0.5	-1.2	2.1	1.5	1.7	-2.0	4.7	-7.5
15	-1.6	-0.5	2.6	2.0	0.6	-0.4	-1.3	-0.7	-1.3	-1.0	-0.8	-0.6	-0.7	-0.5	-0.7	-1.3	-0.8	-2.4	-4.2	-5.9	-8.2	-9.9	-11.7	-13.0	-2.6	2.6	-13.0
16	-13.3	-13.2	-13.5	-12.7	-11.3	-11.4	-11.8	-11.1	-9.1	-4.2	1.2	3.7	5.3	5.8	7.4	7.0	4.8	3.6	-0.9	-1.9	-3.3	-0.9	-0.3	3.8	-3.2	7.4	-13.5
17	3.9	1.8	0.6	-0.7	-1.5	-2.3	-2.3	-1.6	-1.7	-0.5	1.3	2.2	3.2	4.6	4.7	4.1	2.7	2.1	1.1	0.6	0.7	-0.2	-2.6	-4.3	0.7	4.7	-4.3
18	-6.1	-6.7	-7.9	-6.4	-1.5	0.3	0.2	0.0	0.4	1.6	3.2	4.2	4.8	4.5	3.7	3.4	3.4	2.8	1.7	1.9	1.9	1.7	1.1	0.6	0.5	4.8	-7.9
19	0.6	0.5	0.4	-0.2	-0.2	-0.5	-0.3	-0.3	-0.9	-1.0	0.0	0.3	0.6	0.5	0.2	-0.4	-1.0	-1.4	-2.0	-2.6	-2.2	-2.3	-3.2	-6.1	-0.9	0.6	-6.1
20	-8.1	-9.8	-11.5	-12.0	-12.5	-13.5	-13.0	-12.4	-11.3	-7.2	-3.4	0.0	1.7	2.3	3.5	3.9	2.3	2.1	0.7	-2.0	-0.5	3.5	3.5	4.0	-3.7	4.0	-13.5
21	3.6	3.0	2.5	1.1	-0.6	-1.4	-1.9	-2.1	-2.6	-2.8	-2.7	-2.4	-2.2	-2.5	-3.0	-3.6	-5.0	-5.9	-5.5	-5.9	-6.3	-7.0	-7.8	-7.7	-2.9	3.6	-7.8
22	-8.7	-9.4	-10.3	-10.8	-10.5	-10.4	-9.6	-9.1	-9.6	-7.6	-6.3	-6.0	-6.0	-5.6	-4.6	-4.6	-5.7	-6.7	-10.2	-13.3	-15.2	-16.5	-17.7	-18.3	-9.7	-4.6	-18.3
23	-18.2	-18.2	-17.3	-16.6	-13.9	-12.8	-12.3	-10.8	-9.4	-6.5	-5.1	-3.3	-2.3	-0.9	-0.3	0.0	-0.2	-0.5	-0.9	-1.7	-2.3	-2.6	-3.3	-2.8	-6.8	0.0	-18.2
24	-2.3	-2.9	-3.2	-2.7	-2.2	-2.9	-4.0	-4.8	-5.6	-5.5	-4.6	-3.3	-2.2	-1.3	-1.0	-1.3	-3.3	-4.4	-4.4	-4.0	-6.1	-7.1	-9.7	-10.2	-4.1	-1.0	-10.2
25	-11.1	-12.4	-11.2	-10.2	-12.0	-11.5	-11.0	-11.5	-11.5	-10.0	-7.6	-4.2	-2.7	-3.1	-3.6	-3.5	-4.7	-6.3	-6.6	-7.5	-8.2	-7.8	-7.3	-7.3	-8.0	-2.7	-12.4
26	-7.6	-7.7	-8.0	-8.2	-9.0	-10.1	-11.1	-13.3	-12.5	-10.8	-9.4	-7.7	-6.5	-6.1	-6.2	-6.2	-7.2	-10.3	-11.8	-13.5	-13.8	-15.4	-16.0	-15.3	-10.2	-6.1	-16.0
27	-14.6	-14.0	-13.6	-13.0	-12.6	-12.4	-12.1	-11.9	-11.7	-10.7	-8.7	-7.0	-6.8	-6.7	-7.4	-8.4	-9.3	-9.4	-10.0	-10.3	-10.7	-11.2	-11.6	-11.5	-10.7	-6.7	-14.6
28	-13.0	-14.6	-13.7	-13.4	-13.0	-12.8	-12.7	-12.5	-12.1	-11.4	-10.5	-8.7	-8.1	-7.9	-7.5	-7.7	-8.7	-10.2	-11.2	-12.6	-14.7	-15.5	-15.3	-12.1	-11.7	-7.5	-15.5
29	-8.4	-7.9	-7.9	-8.6	-9.7	-8.7	-7.4	-5.6	-5.7	-4.7	-3.9	-2.9	-2.2	-0.9	-0.1	0.0	-1.3	-1.9	-1.6	0.5	1.3	1.7	1.6	1.4	-3.5	1.7	-9.7
30	1.3	1.1	1.2	1.0	0.8	0.4	0.6	0.6	0.0	-0.9	-2.0	-2.0	-2.7	-3.1	-6.1	-8.8	-10.2	-11.2	-12.6	-14.1	-15.2	-15.9	-16.3	-16.9	-5.5	1.3	-16.9
31	-17.5	-17.9	-18.1	-18.3	-18.3	-18.5	-18.6	-18.6	-18.7	-18.3	-17.7	-16.9	-16.5	-15.7	-15.1	-15.0	-15.2	-15.9	-16.1	-16.6	-17.8	-22.1	-25.2	-27.1	-18.2	-15.0	-27.1
Avg	-9.2	-9.5	-9.5	-9.8	-9.8	-10.2	-10.2	-10.1	-9.9	-8.2	-6.3	-4.4	-3.1	-2.5	-2.4	-2.9	-4.3	-5.7	-6.9	-7.6	-8.4	-8.9	-9.5	-9.6	-7.4	-1.5	-14.6
Max	3.9	3.0	2.6	2.0	0.8	0.4	0.6	0.6	0.4	1.6	3.2	4.2	5.3	5.8	7.4	7.0	4.8	3.6	1.7	1.9	1.9	3.5	3.5	4.0	0.7	7.4	-4.3
Min	-25.6	-26.3	-26.0	-26.7	-27.0	-27.0	-26.6	-26.2	-25.5	-22.2	-18.7	-16.9	-16.5	-15.7	-15.1	-15.0	-15.2	-15.9	-18.0	-20.4	-21.4	-23.0	-25.2	-27.1	-19.8	-15.0	-27.1

A-15

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature Delta T (degrees Celsius)
October 2018

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	0.31	0.54	0.80	0.81	1.06	1.21	0.96	0.24	-0.20	-0.44	-0.66	-0.64	-0.73	-0.53	-0.48	-0.34	0.08	0.47	0.81	0.39	0.59	0.49	0.50	1.18	0.27	1.21	-0.73
2	1.28	0.78	1.00	0.53	0.53	0.73	0.37	0.26	-0.02	-0.09	-0.04	-0.09	0.06	-0.04	-0.11	0.18	0.41	0.27	0.32	0.31	0.54	0.55	0.98	0.96	0.40	1.28	-0.11
3	0.50	0.11	0.16	0.12	0.15	0.24	0.17	-0.01	-0.22	-0.64	-0.85	-0.97	-0.91	-0.81	-0.79	-0.69	-0.26	0.18	0.29	0.55	0.51	0.47	0.59	0.29	-0.08	0.59	-0.97
4	0.38	0.33	0.61	0.92	0.74	0.68	1.01	-0.07	-0.16	-0.37	-0.33	-0.43	-0.48	-0.31	-0.22	-0.14	-0.01	0.04	0.03	0.01	0.00	0.00	0.03	0.01	0.09	1.01	-0.48
5	0.03	0.09	0.10	0.06	0.07	0.05	0.09	0.01	-0.06	-0.28	-0.54	-0.39	-0.49	-0.62	-0.70	-0.63	-0.24	0.48	0.22	0.52	0.73	0.69	0.55	0.40	0.01	0.73	-0.70
6	0.51	0.37	0.34	0.25	0.03	0.07	0.05	-0.03	-0.15	-0.13	-0.17	-0.29	-0.33	-0.22	-0.28	-0.19	-0.05	0.05	0.00	-0.02	0.05	-0.02	-0.04	-0.07	-0.01	0.51	-0.33
7	-0.06	-0.06	-0.06	-0.08	-0.05	-0.02	0.00	-0.07	-0.09	-0.05	-0.15	-0.19	-0.23	-0.17	-0.21	-0.40	-0.28	-0.07	0.17	0.24	0.35	0.30	0.24	0.02	-0.04	0.35	-0.40
8	-0.04	0.05	0.23	0.32	0.33	0.12	0.02	-0.02	-0.52	-0.65	-0.53	-0.67	-0.30	-0.42	-0.45	-0.19	-0.16	-0.09	-0.01	0.07	0.01	0.10	0.03	0.08	-0.11	0.33	-0.67
9	0.06	0.11	0.03	0.00	0.06	0.06	0.03	-0.06	-0.17	-0.31	-0.50	-0.55	-0.59	-0.45	-0.39	-0.26	-0.17	-0.06	0.02	0.00	0.00	0.02	0.01	0.01	-0.13	0.11	-0.59
10	0.05	0.10	0.06	0.02	0.00	0.02	-0.01	-0.10	-0.32	-0.50	-0.64	-0.90	-0.88	-0.65	-0.47	-0.33	-0.17	-0.10	0.00	-0.02	-0.04	-0.06	-0.08	-0.08	-0.21	0.10	-0.90
11	-0.09	-0.09	-0.10	-0.11	-0.10	-0.08	-0.05	-0.10	-0.22	-0.47	-0.57	-0.90	-0.55	-0.43	-0.39	-0.45	-0.28	0.34	1.04	0.61	1.06	1.72	1.66	1.27	0.11	1.72	-0.90
12	1.16	1.35	1.54	2.08	2.03	1.43	1.30	0.75	-0.01	-0.42	-0.59	-0.68	-0.77	-0.90	-0.70	-0.33	-0.16	0.60	0.93	0.36	0.67	0.79	0.62	0.28	0.47	2.08	-0.90
13	0.07	0.09	-0.02	-0.03	-0.05	-0.06	-0.06	-0.14	-0.21	-0.32	-0.35	-0.53	-0.53	-0.57	-0.49	-0.30	-0.18	-0.13	-0.08	0.02	0.00	-0.01	-0.03	0.02	-0.16	0.09	-0.57
14	0.02	0.02	0.02	0.00	0.01	0.08	0.01	-0.06	-0.39	-0.50	-0.43	-0.44	-0.54	-0.77	-0.85	-0.62	-0.37	0.36	1.00	1.78	1.21	0.33	0.54	0.49	0.04	1.78	-0.85
15	0.58	0.52	0.03	-0.09	0.02	0.57	0.49	0.13	-0.21	-0.27	-0.66	-0.91	-0.90	-0.86	-0.62	-0.55	-0.29	0.86	1.48	0.51	0.38	0.42	0.70	0.76	0.09	1.48	-0.91
16	0.38	0.26	0.45	0.51	0.39	0.42	0.68	0.35	-0.34	-0.73	-0.78	-0.79	-0.84	-0.85	-0.81	-0.64	-0.26	1.23	0.85	0.24	0.54	1.62	1.02	1.46	0.18	1.62	-0.85
17	1.63	1.36	1.43	1.47	1.51	1.51	1.45	1.06	-0.17	-0.76	-0.54	-0.59	-0.62	-0.68	-0.53	-0.48	-0.01	1.58	0.60	0.65	0.74	1.76	1.67	1.52	0.65	1.76	-0.76
18	1.77	1.51	1.65	1.69	1.46	1.47	1.14	1.14	-0.44	-0.54	-0.67	-0.84	-0.87	-0.87	-0.76	-0.53	-0.07	0.75	2.01	0.71	1.03	1.20	1.08	0.88	0.58	2.01	-0.87
19	1.23	0.70	0.69	0.96	0.97	1.51	1.16	0.90	-0.07	-0.70	-0.71	-0.79	-0.84	-0.88	-0.82	-0.51	0.01	1.82	1.56	0.57	1.41	1.96	1.59	1.39	0.55	1.96	-0.88
20	1.22	1.63	1.38	1.51	1.24	1.64	1.56	0.82	-0.37	-0.61	-0.48	-0.70	-0.81	-0.82	-0.73	-0.48	-0.04	1.60	1.29	1.63	1.21	1.22	1.71	2.19	0.70	2.19	-0.82
21	1.65	2.01	1.59	1.63	2.06	1.53	1.89	1.10	-0.24	-0.72	-0.60	-0.49	-0.56	-0.82	-0.45	-0.27	0.19	0.79	0.99	1.77	1.54	2.08	1.42	1.79	0.83	2.08	-0.82
22	1.72	1.66	1.71	1.95	1.70	1.58	1.62	0.97	-0.65	-0.14	-0.68	-0.85	-0.92	-0.85	-0.73	-0.45	-0.02	0.94	1.60	1.92	1.40	2.48	3.17	2.82	0.91	3.17	-0.92
23	1.56	1.44	1.62	1.48	1.52	2.10	1.79	1.14	-0.32	-0.76	-0.74	-0.69	-0.79	-0.81	-0.59	-0.34	0.97	1.34	1.62	2.50	2.30	1.71	2.16	1.70	0.91	2.50	-0.81
24	1.47	1.65	1.77	1.53	1.76	1.52	1.57	1.31	-0.15	-0.50	-0.60	-0.66	-0.87	-0.67	-0.79	-0.46	0.05	1.24	1.50	0.92	0.84	1.81	1.21	1.48	0.71	1.81	-0.87
25	1.19	1.30	0.95	0.93	1.03	1.57	2.14	1.29	0.18	-0.38	-0.66	-0.79	-0.78	-0.63	-0.50	-0.35	0.11	0.24	0.59	0.99	0.64	0.79	0.73	0.37	0.46	2.14	-0.79
26	0.30	0.33	0.38	0.96	0.43	0.43	0.58	0.40	0.00	-0.06	-0.15	-0.65	-0.30	-0.16	-0.03	0.01	0.04	0.19	0.17	0.13	0.12	0.16	0.28	0.48	0.17	0.96	-0.65
27	0.84	0.56	0.63	0.15	0.10	0.14	0.27	0.20	0.14	-0.11	-0.41	-0.68	-0.74	-0.75	-0.64	-0.44	0.03	1.07	1.47	1.02	1.57	1.17	1.54	1.57	0.36	1.57	-0.75
28	1.07	1.57	0.80	0.65	0.84	0.82	0.92	0.85	0.71	-0.04	-0.35	-0.61	-0.27	-0.14	-0.18	-0.01	0.26	0.20	0.34	0.43	0.24	0.39	0.20	0.27	0.37	1.57	-0.61
29	0.28	0.24	0.33	0.47	0.49	0.69	0.38	0.33	-0.23	-0.29	-0.48	-0.32	-0.51	-0.19	-0.22	-0.08	-0.01	0.02	0.22	0.66	0.59	1.21	0.42	0.35	0.18	1.21	-0.51
30	0.19	0.11	0.28	0.53	0.41	0.72	0.54	0.25	-0.06	-0.19	-0.29	-0.34	-0.11	-0.13	-0.13	-0.17	0.00	0.18	0.10	0.11	0.11	0.16	0.29	0.60	0.13	0.72	-0.34
31	0.99	1.29	1.27	2.31	1.20	1.09	0.71	1.07	0.06	-0.36	-0.30	-0.35	-0.33	-0.30	-0.15	-0.08	-0.05	-0.03	0.00	0.09	0.18	0.21	0.21	0.54	0.39	2.31	-0.36
Avg	0.72	0.71	0.70	0.76	0.71	0.77	0.73	0.45	-0.16	-0.40	-0.50	-0.60	-0.59	-0.56	-0.49	-0.34	-0.03	0.53	0.68	0.63	0.66	0.83	0.81	0.81	0.28	1.39	-0.70
Max	1.77	2.01	1.77	2.31	2.06	2.10	2.14	1.31	0.71	-0.04	-0.04	-0.09	0.06	-0.04	-0.03	0.18	0.97	1.82	2.01	2.50	2.30	2.48	3.17	2.82	0.91	3.17	-0.11
Min	-0.09	-0.09	-0.10	-0.11	-0.10	-0.08	-0.06	-0.14	-0.65	-0.76	-0.85	-0.97	-0.92	-0.90	-0.85	-0.69	-0.37	-0.13	-0.08	-0.02	-0.04	-0.06	-0.08	-0.08	-0.21	0.09	-0.97

A-16

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature Delta T (degrees Celsius)
November 2018

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	1.34	1.53	2.03	2.58	2.89	1.89	1.71	1.67	1.12	0.68	1.01	-0.08	-0.10	-0.04	-0.04	0.12	0.17	0.04	0.02	-0.02	0.05	0.07	0.04	0.06	0.78	2.89	-0.10
2	0.07	0.03	0.12	0.61	0.70	0.71	0.80	1.05	0.92	1.08	0.62	0.53	0.45	0.37	0.20	0.25	0.25	0.21	0.24	0.24	0.15	0.12	0.04	0.01	0.41	1.08	0.01
3	0.00	0.02	0.07	0.05	0.06	0.14	0.13	0.20	0.05	-0.01	-0.14	-0.14	-0.01	-0.01	0.02	0.01	0.10	0.12	0.14	0.34	0.21	0.16	0.14	0.17	0.08	0.34	-0.14
4	0.23	0.29	0.11	0.09	0.03	0.02	0.03	0.09	0.03	0.19	0.25	0.16	0.19	0.24	0.21	0.30	0.26	0.23	0.20	0.26	0.27	0.46	0.35	0.36	0.20	0.46	0.02
5	0.18	0.04	0.39	0.94	1.60	1.16	1.07	0.40	0.43	-0.03	-0.07	-0.11	-0.13	-0.09	-0.16	-0.16	-0.05	0.32	0.50	0.58	0.52	0.04	0.18	0.10	0.32	1.60	-0.16
6	0.04	0.00	0.00	0.06	0.01	-0.03	0.01	-0.07	-0.15	-0.17	-0.34	-0.37	-0.24	-0.26	-0.26	-0.26	-0.33	0.13	0.14	0.14	0.10	0.03	-0.10	-0.04	-0.08	0.14	-0.37
7	-0.05	0.04	0.13	-0.05	-0.07	-0.08	-0.10	-0.13	-0.26	-0.34	-0.36	-0.26	-0.21	-0.24	-0.21	-0.10	0.00	0.21	0.40	0.42	0.72	1.89	1.83	1.68	0.20	1.89	-0.36
8	2.07	1.89	1.75	1.74	2.03	1.87	1.75	1.52	0.70	-0.21	-0.47	-0.49	-0.55	-0.12	0.09	0.14	0.56	1.48	2.01	2.05	0.95	2.42	1.84	1.51	1.11	2.42	-0.55
9	1.57	2.10	2.16	1.87	2.07	1.52	1.67	1.80	0.63	-0.16	-0.05	0.09	-0.14	0.00	-0.03	0.09	0.33	0.29	0.17	0.21	0.43	0.51	0.27	0.12	0.73	2.16	-0.16
10	0.04	0.04	0.01	0.10	0.03	0.01	0.10	0.06	-0.01	-0.04	-0.10	-0.20	-0.25	-0.16	-0.09	0.00	0.08	0.22	0.76	0.95	1.12	1.35	1.12	0.89	0.25	1.35	-0.25
11	0.84	0.85	1.38	1.11	1.45	0.88	0.27	-0.01	-0.10	-0.16	-0.05	-0.15	-0.20	-0.25	-0.05	0.14	0.17	0.27	0.74	0.22	0.27	0.86	2.41	1.76	0.53	2.41	-0.25
12	1.20	1.13	1.58	1.61	1.81	1.82	1.85	1.72	0.99	-0.26	0.03	-0.15	-0.31	-0.38	-0.42	0.33	0.78	1.03	0.31	0.71	1.14	1.16	1.36	1.26	0.85	1.85	-0.42
13	1.06	1.12	1.23	1.49	1.26	1.38	1.38	1.34	1.48	0.72	0.25	0.81	-0.11	0.08	0.69	0.32	0.44	1.37	1.93	2.13	2.06	2.42	2.22	2.11	1.22	2.42	-0.11
14	1.71	1.96	1.92	2.12	1.83	1.85	1.60	1.53	1.29	0.77	0.32	1.48	0.46	0.47	0.36	0.35	0.76	1.03	1.70	0.56	0.35	0.25	0.26	0.39	1.06	2.12	0.25
15	0.43	0.38	0.32	0.32	0.39	0.78	0.51	1.19	0.48	-0.18	-0.13	-0.03	0.09	0.00	0.09	0.18	0.24	0.62	0.75	0.73	0.87	0.81	0.69	0.21	0.41	1.19	-0.18
16	0.34	0.31	0.24	0.24	0.20	0.22	0.23	0.20	0.05	0.00	-0.10	-0.25	-0.34	-0.22	-0.15	-0.15	-0.10	-0.10	-0.09	-0.14	-0.10	-0.10	-0.10	0.15	0.01	0.34	-0.34
17	0.06	-0.07	-0.03	-0.01	0.95	1.88	0.44	-0.07	-0.07	-0.04	-0.13	-0.35	-0.42	-0.43	-0.38	-0.20	0.35	1.42	1.72	1.40	1.75	1.79	2.26	1.80	0.57	2.26	-0.43
18	1.76	1.57	1.57	1.53	1.73	1.59	1.50	0.70	0.82	0.49	0.17	-0.29	-0.23	-0.18	-0.10	0.23	0.73	0.22	0.27	0.96	0.37	0.48	0.29	0.24	0.68	1.76	-0.29
19	0.16	0.19	0.23	0.93	1.14	1.19	1.25	1.44	0.63	-0.02	-0.59	0.40	-0.34	-0.32	-0.14	-0.02	1.22	0.51	0.93	0.99	1.03	1.44	1.75	1.37	0.64	1.75	-0.59
20	1.37	1.05	1.55	1.62	1.41	1.68	1.66	2.00	1.35	0.38	0.02	Au	Au	Au	-0.04	1.04	0.91	0.78	1.63	1.64	1.89	1.70	1.55	2.01	1.30	2.01	-0.04
21	1.98	2.05	2.17	1.89	1.72	2.01	2.23	2.31	1.62	0.15	0.99	-0.12	0.13	0.07	0.70	0.69	1.54	0.99	0.48	0.46	1.44	3.08	1.71	1.64	1.33	3.08	-0.12
22	2.82	2.37	2.60	2.62	2.61	2.06	1.38	1.25	1.44	1.05	0.27	0.19	0.04	0.13	0.02	0.03	0.47	0.46	0.60	0.65	0.72	1.30	1.64	1.78	1.19	2.82	0.02
23	0.75	0.82	1.09	0.62	0.57	0.23	0.35	0.31	0.18	0.03	0.02	-0.09	-0.04	0.01	-0.02	-0.03	0.44	0.74	0.77	0.87	0.50	0.83	0.71	0.41	0.42	1.09	-0.09
24	0.35	0.60	0.31	0.24	0.43	0.46	0.39	0.18	0.00	-0.13	-0.17	-0.23	-0.24	-0.37	-0.20	-0.13	-0.05	-0.05	0.00	0.31	0.42	0.25	0.69	1.00	0.17	1.00	-0.37
25	0.69	0.48	0.24	0.97	2.27	2.11	2.27	1.84	1.79	0.65	0.61	-0.18	-0.40	-0.34	-0.25	-0.11	0.72	1.14	1.17	1.11	1.37	1.29	1.24	1.02	0.90	2.27	-0.40
26	1.26	1.12	1.45	1.56	1.27	1.24	1.41	1.25	0.76	-0.06	0.01	0.11	-0.39	-0.14	0.20	0.29	0.67	1.02	1.09	1.87	1.69	0.86	0.37	0.08	0.79	1.87	-0.39
27	0.32	0.31	0.67	1.07	0.74	0.70	0.85	0.91	0.65	0.31	0.09	0.00	0.14	0.18	0.34	0.27	0.36	0.29	0.37	0.34	0.29	0.22	0.44	0.39	0.43	1.07	0.00
28	0.37	0.32	0.31	0.26	0.41	0.27	0.19	0.20	0.70	-0.10	-0.17	-0.10	-0.03	0.03	-0.07	0.09	0.43	1.24	0.44	0.43	0.74	1.29	1.36	1.45	0.42	1.45	-0.17
29	1.59	1.37	1.49	1.11	1.01	1.36	1.20	1.14	0.54	0.14	0.14	-0.36	-0.11	0.00	-0.11	-0.28	0.69	1.08	1.26	1.51	1.71	1.55	1.44	1.33	0.87	1.71	-0.36
30	1.78	1.91	2.05	1.60	1.64	1.25	1.14	0.97	1.09	0.16	-0.38	0.16	-0.19	-0.02	-0.01	0.35	0.58	0.59	1.39	0.77	0.56	0.25	0.27	0.14	0.75	2.05	-0.38
Avg	0.88	0.86	0.97	1.03	1.14	1.07	0.98	0.90	0.64	0.16	0.05	-0.00	-0.12	-0.07	0.01	0.13	0.42	0.60	0.73	0.76	0.79	0.96	0.94	0.85	0.61	1.70	-0.22
Max	2.82	2.37	2.60	2.62	2.89	2.11	2.27	2.31	1.79	1.08	1.01	1.48	0.46	0.47	0.70	1.04	1.54	1.48	2.01	2.13	2.06	3.08	2.41	2.11	1.33	3.08	0.25
Min	-0.05	-0.07	-0.03	-0.05	-0.07	-0.08	-0.10	-0.13	-0.26	-0.34	-0.59	-0.49	-0.55	-0.43	-0.42	-0.28	-0.33	-0.10	-0.09	-0.14	-0.10	-0.10	-0.10	-0.04	-0.08	0.14	-0.59

A-17

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature Delta T (degrees Celsius)
December 2018

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	0.11	0.18	0.04	0.10	0.01	0.03	0.12	0.15	0.02	-0.10	-0.21	-0.16	-0.20	-0.07	-0.04	0.04	1.57	1.55	1.64	1.68	2.13	2.36	1.67	1.61	0.59	2.36	-0.21
2	1.92	1.99	2.27	2.15	1.86	1.42	2.43	2.20	1.70	0.38	0.12	-0.26	-0.61	-0.58	-0.65	0.11	0.67	0.67	0.06	0.07	0.08	-0.03	0.08	0.08	0.76	2.43	-0.65
3	0.01	-0.05	-0.01	0.00	0.07	0.16	0.12	0.12	0.01	-0.12	-0.15	-0.28	-0.21	-0.13	-0.12	-0.06	0.07	0.11	0.13	0.12	0.08	0.05	0.09	0.06	0.00	0.16	-0.28
4	0.06	0.07	0.07	0.07	0.10	0.55	1.36	1.75	2.59	0.61	-0.08	-0.14	-0.13	-0.15	-0.05	0.03	0.84	1.13	1.96	1.47	0.88	0.94	1.61	1.74	0.72	2.59	-0.15
5	1.72	1.89	1.05	0.75	0.78	1.50	1.52	0.65	0.21	-0.06	-0.26	-0.23	-0.15	-0.35	-0.06	0.16	0.21	0.70	1.66	1.64	1.27	1.73	1.58	1.64	0.81	1.89	-0.35
6	1.27	1.61	1.57	2.05	1.69	1.69	2.02	1.72	1.21	0.11	0.12	0.06	-0.54	-0.33	-0.20	0.13	1.03	1.07	1.32	0.97	1.96	1.72	1.62	1.66	1.06	2.05	-0.54
7	1.85	1.59	1.08	1.56	1.37	1.47	1.40	1.76	1.91	1.65	0.90	0.67	-0.27	-0.25	-0.18	0.16	1.29	0.90	1.34	1.64	1.90	1.93	2.39	2.06	1.25	2.39	-0.27
8	1.66	1.86	1.74	1.75	1.91	1.57	1.85	1.42	1.49	0.16	-0.32	1.07	-0.18	-0.18	-0.08	0.12	0.93	1.52	1.07	0.39	0.51	0.83	0.95	1.16	0.97	1.91	-0.32
9	1.29	1.43	1.64	2.39	2.44	2.51	1.90	1.48	1.73	0.67	0.35	0.11	-0.15	-0.03	-0.12	0.10	1.09	1.57	2.11	1.86	2.28	1.82	1.95	1.19	1.32	2.51	-0.15
10	1.48	1.50	1.27	1.50	1.69	1.69	1.82	2.02	1.43	0.88	0.12	0.07	0.11	-0.07	0.06	0.58	0.44	0.20	0.16	0.09	0.17	0.33	0.25	0.32	0.75	2.02	-0.07
11	0.57	0.81	1.86	1.40	2.06	2.02	2.10	0.95	0.43	0.11	0.01	-0.21	-0.15	-0.19	-0.09	0.11	0.34	0.47	0.29	0.18	0.16	0.21	0.22	0.26	0.58	2.10	-0.21
12	0.31	0.28	0.22	0.15	0.05	0.15	0.16	0.09	0.11	0.15	0.15	0.05	0.08	0.12	0.19	0.19	0.28	0.29	0.41	0.57	1.31	0.85	0.40	0.91	0.31	1.31	0.05
13	0.96	0.59	0.44	0.35	0.32	0.62	0.40	0.80	0.89	0.68	0.18	0.13	0.10	0.16	0.31	0.61	0.69	1.52	1.52	0.86	1.24	1.23	1.86	1.66	0.75	1.86	0.10
14	1.77	1.19	0.91	0.77	0.84	1.19	1.58	0.63	0.63	0.44	0.57	0.51	0.09	0.08	0.21	0.97	1.21	1.56	0.94	1.53	1.53	0.55	0.57	0.63	0.87	1.77	0.08
15	1.34	1.37	0.56	0.39	0.17	0.16	0.29	0.18	0.26	0.16	0.10	0.10	0.18	0.08	0.15	0.32	0.40	1.31	1.78	1.57	1.43	0.97	1.27	1.85	0.68	1.85	0.08
16	1.90	1.90	1.79	1.84	1.24	1.75	1.81	2.54	1.68	0.37	0.63	0.32	0.23	0.25	0.08	0.34	1.10	1.33	1.23	0.80	2.05	1.54	1.08	1.18	1.21	2.54	0.08
17	0.60	1.49	1.39	1.09	0.90	1.18	0.96	0.72	0.60	0.35	0.41	0.40	0.28	0.27	0.11	0.15	0.67	0.44	0.50	0.32	0.62	0.89	1.73	1.18	0.72	1.73	0.11
18	1.47	1.48	1.87	2.29	1.31	0.51	0.61	0.64	0.61	0.24	0.06	-0.02	0.04	0.14	0.09	0.10	0.15	0.13	0.21	0.21	0.19	0.21	0.24	0.28	0.54	2.29	-0.02
19	0.27	0.27	0.28	0.27	0.20	0.33	0.35	0.20	0.16	0.10	0.00	-0.05	-0.01	0.03	0.07	0.19	0.35	0.44	0.80	0.97	0.64	0.57	0.77	1.84	0.38	1.84	-0.05
20	0.97	1.21	1.16	1.17	0.91	1.10	0.82	1.01	1.11	0.33	0.16	0.21	0.07	0.11	0.17	0.22	0.56	0.64	0.86	1.84	1.76	0.53	0.73	0.47	0.76	1.84	0.07
21	0.51	0.64	0.62	0.20	0.10	0.10	0.12	0.12	0.08	0.14	0.06	-0.16	-0.21	-0.14	-0.07	0.05	0.26	0.44	0.22	0.31	0.30	0.47	0.70	0.50	0.22	0.70	-0.21
22	0.58	0.53	0.60	1.08	0.98	0.35	0.66	0.57	0.58	0.03	-0.12	-0.15	-0.05	-0.04	-0.23	-0.10	0.44	0.65	1.35	1.15	0.92	1.22	1.24	1.24	0.56	1.35	-0.23
23	0.88	1.26	1.32	1.06	0.52	0.37	0.54	0.14	0.47	0.20	0.00	-0.12	-0.12	-0.22	-0.06	0.09	0.18	0.22	0.36	0.44	0.30	0.49	0.32	0.60	0.38	1.32	-0.22
24	0.39	0.43	0.58	0.42	0.34	0.50	0.59	0.42	0.21	0.05	-0.09	-0.18	-0.23	-0.33	-0.37	-0.14	0.57	0.80	0.59	0.37	1.01	1.11	1.02	0.97	0.38	1.11	-0.37
25	1.25	1.31	0.90	0.23	0.87	0.79	0.52	0.87	0.66	0.20	-0.14	-0.64	-0.65	-0.38	-0.14	-0.09	0.15	0.36	0.35	0.38	0.49	0.18	0.05	0.10	0.32	1.31	-0.65
26	0.40	0.40	0.35	0.28	0.68	1.02	0.82	1.20	0.32	-0.11	-0.13	-0.18	-0.31	-0.31	-0.20	-0.09	0.67	1.10	1.16	1.22	0.81	0.97	1.10	0.53	0.49	1.22	-0.31
27	0.41	0.26	0.36	0.46	0.27	0.11	0.10	0.06	0.00	-0.23	-0.69	-0.64	-0.34	-0.38	-0.26	-0.01	0.26	0.15	0.08	0.05	0.11	0.22	0.22	0.09	0.03	0.46	-0.69
28	0.54	0.96	0.25	0.10	-0.05	-0.11	-0.06	-0.04	-0.10	-0.12	-0.15	-0.25	-0.25	-0.25	-0.19	-0.02	0.28	0.95	0.91	1.56	1.62	0.63	0.24	0.28	0.28	1.62	-0.25
29	0.00	0.00	0.02	0.40	0.40	0.29	0.37	0.08	-0.01	-0.08	-0.16	-0.09	-0.04	0.02	0.06	0.17	0.53	0.63	0.68	0.33	0.26	0.21	0.28	0.27	0.19	0.68	-0.16
30	0.16	0.17	0.14	0.15	0.11	0.25	0.22	0.14	0.21	0.04	0.01	-0.02	0.06	-0.01	0.01	0.05	-0.02	-0.01	0.00	-0.02	-0.09	-0.05	-0.06	-0.10	0.06	0.25	-0.10
31	-0.10	-0.10	-0.11	-0.10	-0.10	-0.10	-0.11	-0.13	-0.14	-0.31	-0.27	-0.41	-0.29	-0.41	-0.39	-0.18	0.00	0.29	0.19	0.30	0.60	1.68	2.07	2.26	0.17	2.26	-0.41
Avg	0.86	0.92	0.85	0.85	0.78	0.81	0.88	0.79	0.68	0.22	0.04	-0.02	-0.12	-0.11	-0.06	0.14	0.56	0.75	0.83	0.80	0.92	0.85	0.91	0.92	0.58	1.67	-0.20
Max	1.92	1.99	2.27	2.39	2.44	2.51	2.43	2.54	2.59	1.65	0.90	1.07	0.28	0.27	0.31	0.97	1.57	1.57	2.11	1.86	2.28	2.36	2.39	2.26	1.32	2.59	0.11
Min	-0.10	-0.10	-0.11	-0.10	-0.10	-0.11	-0.11	-0.13	-0.14	-0.31	-0.69	-0.64	-0.65	-0.58	-0.65	-0.18	-0.02	-0.01	0.00	-0.02	-0.09	-0.05	-0.06	-0.10	0.00	0.16	-0.69

A-18

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Solar Radiation (watts m²)
October 2018

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	0	14	162	336	489	613	655	603	443	397	309	84	31	0	0	0	0	0	0	172	655	0
2	0	0	0	0	0	0	2	25	46	82	77	109	86	116	135	49	25	5	0	0	0	0	0	0	32	135	0
3	0	0	0	0	0	0	6	73	185	496	611	693	710	668	575	437	178	31	0	0	0	0	0	0	194	710	0
4	0	0	0	0	0	0	7	68	71	257	139	246	221	95	47	29	19	3	0	0	0	0	0	0	50	257	0
5	0	0	0	0	0	0	1	14	55	314	392	262	379	401	529	409	156	37	0	0	0	0	0	0	123	529	0
6	0	0	0	0	0	0	2	33	71	80	98	257	275	149	184	93	26	5	0	0	0	0	0	0	53	275	0
7	0	0	0	0	0	0	3	17	31	65	91	82	162	76	113	312	183	18	0	0	0	0	0	0	48	312	0
8	0	0	0	0	0	0	3	85	322	332	604	597	116	222	260	48	31	9	0	0	0	0	0	0	110	604	0
9	0	0	0	0	0	0	3	41	78	163	304	301	328	198	169	94	53	11	0	0	0	0	0	0	73	328	0
10	0	0	0	0	0	0	3	39	129	243	341	471	412	282	158	81	24	9	0	0	0	0	0	0	91	471	0
11	0	0	0	0	0	0	1	24	69	182	290	530	252	204	177	238	147	30	0	0	0	0	0	0	89	530	0
12	0	0	0	0	0	0	7	120	236	383	472	556	573	610	465	260	163	39	0	0	0	0	0	0	162	610	0
13	0	0	0	0	0	0	2	34	64	126	163	273	256	240	202	82	25	5	0	0	0	0	0	0	61	273	0
14	0	0	0	0	0	0	2	39	232	382	301	367	491	537	506	333	198	27	0	0	0	0	0	0	142	537	0
15	0	0	0	0	0	0	4	54	213	185	394	616	621	607	321	284	175	28	0	0	0	0	0	0	146	621	0
16	0	0	0	0	0	0	2	90	264	418	535	603	617	574	479	340	175	20	0	0	0	0	0	0	172	617	0
17	0	0	0	0	0	0	2	75	278	425	542	611	625	583	485	342	174	18	0	0	0	0	0	0	173	625	0
18	0	0	0	0	0	0	2	76	266	423	542	611	625	580	483	341	170	10	0	0	0	0	0	0	172	625	0
19	0	0	0	0	0	0	1	34	226	406	527	593	604	558	463	322	160	14	0	0	0	0	0	0	163	604	0
20	0	0	0	0	0	0	2	74	248	400	517	587	603	560	465	327	160	11	0	0	0	0	0	0	165	603	0
21	0	0	0	0	0	0	3	68	211	323	451	435	503	498	322	242	133	12	0	0	0	0	0	0	133	503	0
22	0	0	0	0	0	0	1	68	242	394	509	577	585	541	444	306	141	7	0	0	0	0	0	0	159	585	0
23	0	0	0	0	0	0	1	78	237	387	502	564	565	545	437	235	68	3	0	0	0	0	0	0	151	565	0
24	0	0	0	0	0	0	1	51	219	329	476	458	539	453	477	282	97	2	0	0	0	0	0	0	141	539	0
25	0	0	0	0	0	0	0	56	220	375	493	553	529	421	338	254	45	1	0	0	0	0	0	0	137	553	0
26	0	0	0	0	0	0	0	13	48	87	230	600	176	141	63	50	21	0	0	0	0	0	0	0	60	600	0
27	0	0	0	0	0	0	0	24	145	229	421	554	567	528	423	293	125	2	0	0	0	0	0	0	138	567	0
28	0	0	0	0	0	0	0	35	164	198	361	516	252	164	178	91	23	0	0	0	0	0	0	0	83	516	0
29	0	0	0	0	0	0	0	55	241	207	362	233	401	136	150	73	22	0	0	0	0	0	0	0	78	401	0
30	0	0	0	0	0	0	0	16	57	112	197	204	75	88	90	134	28	1	0	0	0	0	0	0	42	204	0
31	0	0	0	0	0	0	0	28	130	239	175	170	139	95	54	16	5	0	0	0	0	0	0	0	44	239	0
Avg	0	0	0	0	0	0	2	54	172	282	378	448	416	365	309	216	98	13	0	0	0	0	0	0	115	490	0
Max	0	0	0	0	0	0	14	162	336	496	613	693	710	668	575	437	198	39	0	0	0	0	0	0	194	710	0
Min	0	0	0	0	0	0	0	13	31	65	77	82	75	76	47	16	5	0	0	0	0	0	0	0	32	135	0

A-19

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Solar Radiation (watts m²)
November 2018

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	0	0	18	118	59	144	476	560	469	376	93	21	0	0	0	0	0	0	0	97	560	0
2	0	0	0	0	0	0	0	5	19	36	42	77	75	77	97	38	12	0	0	0	0	0	0	0	20	97	0
3	0	0	0	0	0	0	0	14	42	86	173	171	179	227	111	75	26	0	0	0	0	0	0	0	46	227	0
4	0	0	0	0	0	0	0	1	12	40	68	100	116	88	94	32	21	0	0	0	0	0	0	0	24	116	0
5	0	0	0	0	0	0	0	8	71	125	214	149	184	151	160	88	37	0	0	0	0	0	0	0	49	214	0
6	0	0	0	0	0	0	0	2	16	28	46	86	59	61	81	48	66	1	0	0	0	0	0	0	21	86	0
7	0	0	0	0	0	0	0	4	33	53	58	59	65	119	147	99	34	0	0	0	0	0	0	0	28	147	0
8	0	0	0	0	0	0	0	18	154	300	411	499	469	260	236	183	75	0	0	0	0	0	0	0	109	499	0
9	0	0	0	0	0	0	0	16	81	201	276	182	226	198	80	36	8	0	0	0	0	0	0	0	54	276	0
10	0	0	0	0	0	0	0	15	54	120	160	345	426	342	206	97	36	0	0	0	0	0	0	0	75	426	0
11	0	0	0	0	0	0	0	5	35	86	89	106	297	205	166	81	22	0	0	0	0	0	0	0	46	297	0
12	0	0	0	0	0	0	0	13	153	298	407	434	367	322	366	215	54	0	0	0	0	0	0	0	110	434	0
13	0	0	0	0	0	0	0	16	72	163	218	333	296	444	305	162	39	0	0	0	0	0	0	0	85	444	0
14	0	0	0	0	0	0	0	7	42	154	200	288	363	321	225	144	31	0	0	0	0	0	0	0	74	363	0
15	0	0	0	0	0	0	0	15	122	269	390	482	278	419	275	70	25	0	0	0	0	0	0	0	98	482	0
16	0	0	0	0	0	0	0	4	23	109	242	302	312	255	183	112	12	0	0	0	0	0	0	0	65	312	0
17	0	0	0	0	0	0	0	5	53	245	314	284	260	244	277	204	42	0	0	0	0	0	0	0	80	314	0
18	0	0	0	0	0	0	0	4	71	206	328	432	445	337	222	105	20	0	0	0	0	0	0	0	90	445	0
19	0	0	0	0	0	0	0	5	131	279	378	448	460	417	322	192	38	0	0	0	0	0	0	0	111	460	0
20	0	0	0	0	0	0	0	4	56	238	370	Au	Au	Au	323	192	37	0	0	0	0	0	0	0	58	370	0
21	0	0	0	0	0	0	0	3	74	257	365	480	496	423	147	111	11	0	0	0	0	0	0	0	99	496	0
22	0	0	0	0	0	0	0	3	29	65	84	96	204	89	100	53	19	0	0	0	0	0	0	0	31	204	0
23	0	0	0	0	0	0	0	1	40	130	153	183	164	74	116	96	31	0	0	0	0	0	0	0	41	183	0
24	0	0	0	0	0	0	0	1	22	96	174	158	218	321	122	38	4	0	0	0	0	0	0	0	48	321	0
25	0	0	0	0	0	0	0	2	31	152	250	270	517	423	317	198	26	0	0	0	0	0	0	0	91	517	0
26	0	0	0	0	0	0	0	3	53	241	348	417	383	191	110	56	8	0	0	0	0	0	0	0	75	417	0
27	0	0	0	0	0	0	0	1	45	109	109	181	138	146	79	26	7	0	0	0	0	0	0	0	35	181	0
28	0	0	0	0	0	0	0	2	63	258	378	293	261	113	241	86	5	0	0	0	0	0	0	0	71	378	0
29	0	0	0	0	0	0	0	1	50	125	157	298	277	147	246	167	21	0	0	0	0	0	0	0	62	298	0
30	0	0	0	0	0	0	0	1	44	199	351	419	383	180	145	49	7	0	0	0	0	0	0	0	74	419	0
Avg	0	0	0	0	0	0	0	7	60	158	230	278	292	244	196	105	27	0	0	0	0	0	0	0	66	333	0
Max	0	0	0	0	0	0	0	18	154	300	411	499	560	469	376	215	75	1	0	0	0	0	0	0	111	560	0
Min	0	0	0	0	0	0	0	1	12	28	42	59	59	61	79	26	4	0	0	0	0	0	0	0	20	86	0

A-20

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Solar Radiation (watts m²)
December 2018

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	0	0	0	12	30	55	91	114	55	50	143	24	0	0	0	0	0	0	0	24	143	0
2	0	0	0	0	0	0	0	0	21	54	98	203	384	378	290	109	8	0	0	0	0	0	0	0	64	384	0
3	0	0	0	0	0	0	0	0	10	75	206	182	163	110	98	74	7	0	0	0	0	0	0	0	39	206	0
4	0	0	0	0	0	0	0	2	71	214	320	393	422	384	293	169	17	0	0	0	0	0	0	0	95	422	0
5	0	0	0	0	0	0	0	1	28	100	225	433	270	419	223	97	22	0	0	0	0	0	0	0	76	433	0
6	0	0	0	0	0	0	0	1	64	222	320	396	420	382	293	169	18	0	0	0	0	0	0	0	95	420	0
7	0	0	0	0	0	0	0	2	61	203	329	400	420	382	293	159	15	0	0	0	0	0	0	0	94	420	0
8	0	0	0	0	0	0	0	1	43	194	312	390	411	374	286	162	16	0	0	0	0	0	0	0	91	411	0
9	0	0	0	0	0	0	0	2	51	188	298	383	400	342	267	146	12	0	0	0	0	0	0	0	87	400	0
10	0	0	0	0	0	0	0	0	33	127	247	304	334	383	214	70	7	0	0	0	0	0	0	0	72	383	0
11	0	0	0	0	0	0	0	1	59	194	296	387	296	314	199	31	3	0	0	0	0	0	0	0	74	387	0
12	0	0	0	0	0	0	0	0	14	66	162	460	295	153	164	138	18	0	0	0	0	0	0	0	61	460	0
13	0	0	0	0	0	0	0	0	24	46	84	85	91	72	52	21	7	0	0	0	0	0	0	0	20	91	0
14	0	0	0	0	0	0	0	0	21	76	155	251	245	267	238	96	18	0	0	0	0	0	0	0	57	267	0
15	0	0	0	0	0	0	0	0	24	61	84	106	103	116	72	40	17	0	0	0	0	0	0	0	26	116	0
16	0	0	0	0	0	0	0	0	40	228	138	137	236	223	286	114	17	0	0	0	0	0	0	0	59	286	0
17	0	0	0	0	0	0	0	1	9	67	92	89	121	161	204	103	8	0	0	0	0	0	0	0	36	204	0
18	0	0	0	0	0	0	0	0	29	139	214	233	205	100	83	51	5	0	0	0	0	0	0	0	44	233	0
19	0	0	0	0	0	0	0	0	19	161	304	379	401	321	220	85	5	0	0	0	0	0	0	0	79	401	0
20	0	0	0	0	0	0	0	0	46	133	134	192	129	135	120	116	9	0	0	0	0	0	0	0	42	192	0
21	0	0	0	0	0	0	0	0	13	68	218	441	424	397	291	159	9	0	0	0	0	0	0	0	84	441	0
22	0	0	0	0	0	0	0	0	14	41	163	248	158	231	295	168	21	0	0	0	0	0	0	0	56	295	0
23	0	0	0	0	0	0	0	0	6	49	119	121	119	229	113	50	11	0	0	0	0	0	0	0	34	229	0
24	0	0	0	0	0	0	0	0	12	56	100	140	170	235	245	156	10	0	0	0	0	0	0	0	47	245	0
25	0	0	0	0	0	0	0	0	16	108	194	360	347	297	159	101	14	0	0	0	0	0	0	0	67	360	0
26	0	0	0	0	0	0	0	0	13	50	113	182	191	211	125	44	21	0	0	0	0	0	0	0	40	211	0
27	0	0	0	0	0	0	0	0	18	93	234	216	190	175	101	49	11	0	0	0	0	0	0	0	45	234	0
28	0	0	0	0	0	0	0	0	5	34	68	118	142	152	146	104	31	0	0	0	0	0	0	0	33	152	0
29	0	0	0	0	0	0	0	0	8	64	119	98	54	50	41	25	2	0	0	0	0	0	0	0	19	119	0
30	0	0	0	0	0	0	0	0	6	39	85	127	155	98	79	53	8	0	0	0	0	0	0	0	27	155	0
31	0	0	0	0	0	0	0	0	14	94	202	298	231	222	163	74	14	0	0	0	0	0	0	0	55	298	0
Avg	0	0	0	0	0	0	0	0	26	106	183	253	246	238	184	99	13	0	0	0	0	0	0	0	56	290	0
Max	0	0	0	0	0	0	0	2	71	228	329	460	424	419	295	169	31	0	0	0	0	0	0	0	95	460	0
Min	0	0	0	0	0	0	0	0	5	30	55	85	54	50	41	21	2	0	0	0	0	0	0	0	19	91	0

A-21

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Barometric Pressure (InHg)
October 2018

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	24.39	24.39	24.39	24.39	24.39	24.40	24.39	24.41	24.42	24.42	24.42	24.42	24.40	24.39	24.37	24.37	24.36	24.37	24.37	24.37	24.36	24.36	24.36	24.39	24.42	24.36	
2	24.35	24.34	24.33	24.31	24.31	24.30	24.29	24.29	24.29	24.28	24.26	24.24	24.23	24.22	24.21	24.20	24.19	24.17	24.15	24.13	24.11	24.09	24.08	24.07	24.23	24.35	24.07
3	24.08	24.11	24.12	24.16	24.21	24.26	24.30	24.35	24.40	24.43	24.45	24.45	24.44	24.43	24.42	24.42	24.42	24.41	24.41	24.42	24.42	24.41	24.41	24.39	24.35	24.45	24.08
4	24.38	24.36	24.34	24.33	24.31	24.29	24.29	24.28	24.26	24.25	24.25	24.23	24.23	24.22	24.22	24.22	24.23	24.24	24.26	24.28	24.29	24.29	24.31	24.32	24.28	24.38	24.22
5	24.32	24.33	24.33	24.34	24.35	24.37	24.38	24.40	24.41	24.41	24.42	24.42	24.42	24.43	24.42	24.42	24.42	24.42	24.41	24.41	24.41	24.40	24.38	24.37	24.39	24.43	24.32
6	24.36	24.36	24.35	24.35	24.36	24.35	24.35	24.35	24.36	24.36	24.36	24.36	24.36	24.35	24.35	24.36	24.37	24.39	24.40	24.42	24.42	24.43	24.43	24.43	24.37	24.43	24.35
7	24.43	24.43	24.43	24.44	24.44	24.44	24.45	24.45	24.46	24.47	24.47	24.46	24.45	24.44	24.45	24.45	24.46	24.45	24.45	24.45	24.45	24.45	24.44	24.44	24.45	24.47	24.43
8	24.43	24.43	24.42	24.41	24.41	24.42	24.43	24.44	24.45	24.44	24.43	24.42	24.41	24.40	24.40	24.39	24.40	24.41	24.40	24.40	24.40	24.40	24.39	24.38	24.41	24.45	24.38
9	24.37	24.35	24.34	24.34	24.33	24.33	24.33	24.33	24.33	24.34	24.34	24.34	24.33	24.34	24.35	24.35	24.37	24.38	24.39	24.40	24.40	24.41	24.42	24.42	24.36	24.42	24.33
10	24.41	24.40	24.40	24.40	24.40	24.40	24.40	24.40	24.40	24.41	24.41	24.40	24.40	24.39	24.39	24.38	24.38	24.38	24.39	24.39	24.39	24.39	24.39	24.39	24.40	24.41	24.38
11	24.39	24.38	24.37	24.37	24.37	24.36	24.37	24.38	24.39	24.39	24.39	24.38	24.38	24.36	24.36	24.36	24.36	24.35	24.35	24.35	24.35	24.35	24.37	24.37	24.37	24.39	24.35
12	24.38	24.38	24.38	24.37	24.37	24.36	24.36	24.36	24.36	24.36	24.35	24.33	24.31	24.28	24.27	24.27	24.26	24.26	24.24	24.24	24.25	24.26	24.26	24.28	24.31	24.38	24.24
13	24.30	24.32	24.33	24.33	24.33	24.33	24.36	24.38	24.40	24.41	24.43	24.43	24.44	24.45	24.46	24.47	24.48	24.49	24.51	24.53	24.55	24.55	24.56	24.57	24.43	24.57	24.30
14	24.58	24.58	24.59	24.59	24.60	24.61	24.61	24.61	24.61	24.62	24.61	24.60	24.60	24.60	24.59	24.59	24.58	24.58	24.57	24.58	24.59	24.59	24.60	24.60	24.60	24.62	24.57
15	24.60	24.60	24.60	24.60	24.61	24.62	24.63	24.64	24.66	24.67	24.68	24.68	24.67	24.66	24.66	24.66	24.65	24.65	24.64	24.64	24.65	24.66	24.67	24.68	24.64	24.68	24.60
16	24.68	24.69	24.70	24.70	24.71	24.71	24.72	24.73	24.75	24.75	24.75	24.74	24.73	24.72	24.71	24.71	24.71	24.71	24.72	24.72	24.72	24.73	24.73	24.73	24.72	24.75	24.68
17	24.74	24.74	24.74	24.74	24.74	24.73	24.73	24.73	24.72	24.72	24.72	24.70	24.68	24.66	24.64	24.63	24.62	24.61	24.61	24.60	24.59	24.58	24.57	24.56	24.67	24.74	24.56
18	24.56	24.55	24.54	24.54	24.54	24.53	24.53	24.52	24.53	24.54	24.53	24.52	24.51	24.50	24.49	24.49	24.49	24.51	24.53	24.53	24.54	24.55	24.57	24.58	24.53	24.58	24.49
19	24.60	24.61	24.62	24.63	24.64	24.66	24.67	24.69	24.71	24.72	24.72	24.72	24.71	24.70	24.69	24.69	24.70	24.70	24.69	24.70	24.70	24.70	24.69	24.69	24.68	24.72	24.60
20	24.69	24.69	24.68	24.68	24.67	24.67	24.67	24.66	24.66	24.65	24.64	24.62	24.60	24.58	24.56	24.56	24.55	24.54	24.54	24.55	24.54	24.54	24.54	24.54	24.61	24.69	24.54
21	24.54	24.53	24.54	24.54	24.53	24.53	24.53	24.52	24.52	24.52	24.52	24.51	24.50	24.49	24.48	24.48	24.48	24.49	24.50	24.50	24.51	24.52	24.53	24.54	24.51	24.54	24.48
22	24.55	24.55	24.56	24.56	24.56	24.56	24.56	24.56	24.57	24.57	24.57	24.56	24.55	24.54	24.53	24.52	24.53	24.53	24.53	24.53	24.53	24.52	24.51	24.50	24.54	24.57	24.50
23	24.50	24.50	24.49	24.48	24.47	24.46	24.46	24.45	24.45	24.44	24.43	24.42	24.40	24.38	24.37	24.37	24.38	24.38	24.38	24.38	24.38	24.38	24.38	24.38	24.42	24.50	24.37
24	24.37	24.37	24.37	24.37	24.38	24.39	24.39	24.40	24.41	24.42	24.42	24.41	24.39	24.38	24.37	24.37	24.37	24.37	24.37	24.37	24.39	24.39	24.39	24.40	24.39	24.42	24.37
25	24.40	24.40	24.42	24.43	24.43	24.43	24.42	24.43	24.45	24.46	24.46	24.46	24.45	24.44	24.44	24.44	24.46	24.46	24.46	24.45	24.45	24.44	24.42	24.42	24.44	24.46	24.40
26	24.42	24.41	24.41	24.42	24.42	24.42	24.42	24.43	24.45	24.46	24.46	24.45	24.44	24.42	24.41	24.41	24.40	24.39	24.38	24.38	24.37	24.36	24.35	24.33	24.41	24.46	24.33
27	24.32	24.31	24.32	24.32	24.32	24.33	24.35	24.38	24.41	24.43	24.45	24.46	24.45	24.45	24.45	24.46	24.47	24.48	24.49	24.48	24.48	24.48	24.49	24.49	24.42	24.49	24.31
28	24.46	24.45	24.43	24.41	24.39	24.38	24.38	24.37	24.36	24.36	24.35	24.33	24.31	24.30	24.30	24.28	24.28	24.28	24.31	24.30	24.32	24.31	24.32	24.31	24.35	24.46	24.28
29	24.32	24.32	24.31	24.29	24.29	24.29	24.30	24.31	24.33	24.34	24.34	24.34	24.33	24.34	24.35	24.36	24.37	24.39	24.40	24.41	24.42	24.41	24.42	24.42	24.35	24.42	24.29
30	24.42	24.42	24.43	24.43	24.44	24.44	24.44	24.45	24.47	24.47	24.47	24.47	24.46	24.45	24.45	24.45	24.46	24.46	24.47	24.47	24.47	24.48	24.47	24.46	24.45	24.48	24.42
31	24.46	24.45	24.43	24.41	24.39	24.39	24.38	24.37	24.37	24.35	24.34	24.33	24.31	24.29	24.28	24.27	24.26	24.26	24.26	24.27	24.26	24.27	24.28	24.28	24.33	24.46	24.26
Avg	24.45	24.44	24.44	24.44	24.44	24.44	24.45	24.45	24.46	24.47	24.47	24.46	24.45	24.44	24.43	24.43	24.43	24.44	24.44	24.44	24.44	24.44	24.44	24.44	24.45	24.50	24.38
Max	24.74	24.74	24.74	24.74	24.74	24.73	24.73	24.73	24.75	24.75	24.75	24.74	24.73	24.72	24.71	24.71	24.71	24.71	24.72	24.72	24.72	24.73	24.73	24.73	24.72	24.75	24.68
Min	24.08	24.11	24.12	24.16	24.21	24.26	24.29	24.28	24.26	24.25	24.25	24.23	24.23	24.22	24.21	24.20	24.19	24.17	24.15	24.13	24.11	24.09	24.08	24.07	24.23	24.35	24.07

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Barometric Pressure (InHg)
November 2018

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	24.28	24.28	24.30	24.30	24.32	24.33	24.35	24.36	24.37	24.38	24.39	24.40	24.40	24.40	24.40	24.40	24.40	24.40	24.40	24.39	24.38	24.36	24.35	24.34	24.36	24.40	24.28
2	24.32	24.31	24.30	24.28	24.26	24.24	24.22	24.19	24.16	24.14	24.14	24.12	24.11	24.12	24.12	24.14	24.14	24.16	24.18	24.21	24.25	24.28	24.30	24.34	24.21	24.34	24.11
3	24.36	24.37	24.38	24.39	24.40	24.40	24.41	24.42	24.44	24.44	24.44	24.44	24.42	24.42	24.42	24.41	24.42	24.41	24.41	24.40	24.38	24.35	24.35	24.33	24.40	24.44	24.33
4	24.30	24.27	24.23	24.20	24.17	24.15	24.12	24.09	24.07	24.05	24.04	24.03	24.01	24.00	24.00	24.01	24.02	24.03	24.06	24.07	24.09	24.11	24.12	24.13	24.10	24.30	24.00
5	24.13	24.14	24.16	24.15	24.15	24.17	24.18	24.18	24.19	24.21	24.21	24.21	24.21	24.20	24.20	24.21	24.22	24.24	24.23	24.23	24.24	24.24	24.25	24.26	24.20	24.26	24.13
6	24.26	24.27	24.28	24.28	24.29	24.30	24.30	24.32	24.34	24.36	24.36	24.37	24.37	24.37	24.38	24.40	24.41	24.42	24.42	24.43	24.43	24.43	24.43	24.43	24.36	24.43	24.26
7	24.43	24.42	24.42	24.42	24.42	24.43	24.43	24.44	24.44	24.44	24.44	24.45	24.45	24.45	24.46	24.47	24.49	24.50	24.51	24.52	24.53	24.53	24.54	24.55	24.47	24.55	24.42
8	24.55	24.54	24.55	24.55	24.55	24.55	24.55	24.55	24.57	24.58	24.57	24.56	24.55	24.54	24.54	24.54	24.55	24.57	24.58	24.60	24.61	24.62	24.63	24.64	24.57	24.64	24.54
9	24.64	24.62	24.62	24.61	24.60	24.58	24.57	24.56	24.56	24.55	24.52	24.49	24.45	24.43	24.39	24.36	24.33	24.31	24.29	24.28	24.25	24.24	24.24	24.25	24.45	24.64	24.24
10	24.25	24.26	24.27	24.28	24.29	24.31	24.32	24.34	24.36	24.38	24.40	24.41	24.42	24.42	24.42	24.43	24.45	24.47	24.50	24.51	24.52	24.54	24.55	24.55	24.40	24.55	24.25
11	24.56	24.56	24.57	24.57	24.57	24.57	24.57	24.58	24.59	24.59	24.60	24.60	24.59	24.59	24.61	24.63	24.67	24.70	24.72	24.74	24.75	24.76	24.77	24.78	24.63	24.78	24.56
12	24.79	24.78	24.77	24.76	24.75	24.74	24.73	24.73	24.74	24.75	24.74	24.73	24.72	24.71	24.71	24.71	24.72	24.73	24.73	24.74	24.74	24.75	24.76	24.77	24.74	24.79	24.71
13	24.76	24.76	24.76	24.76	24.75	24.75	24.74	24.75	24.76	24.76	24.74	24.73	24.72	24.71	24.70	24.69	24.68	24.67	24.68	24.68	24.67	24.67	24.67	24.66	24.72	24.76	24.66
14	24.65	24.64	24.63	24.62	24.60	24.60	24.59	24.60	24.60	24.59	24.58	24.56	24.54	24.52	24.51	24.50	24.48	24.46	24.46	24.48	24.48	24.49	24.50	24.50	24.55	24.65	24.46
15	24.50	24.51	24.52	24.52	24.52	24.52	24.52	24.52	24.53	24.54	24.54	24.53	24.51	24.49	24.47	24.45	24.44	24.42	24.40	24.38	24.36	24.34	24.33	24.33	24.47	24.54	24.33
16	24.31	24.30	24.29	24.29	24.29	24.30	24.30	24.31	24.35	24.39	24.42	24.46	24.49	24.50	24.51	24.53	24.54	24.55	24.56	24.56	24.57	24.58	24.59	24.60	24.44	24.60	24.29
17	24.59	24.59	24.60	24.60	24.59	24.59	24.60	24.61	24.60	24.59	24.59	24.57	24.55	24.55	24.53	24.53	24.53	24.54	24.54	24.54	24.53	24.51	24.51	24.50	24.56	24.61	24.50
18	24.49	24.48	24.47	24.46	24.45	24.44	24.44	24.44	24.44	24.44	24.42	24.41	24.41	24.40	24.41	24.41	24.41	24.42	24.42	24.44	24.44	24.45	24.46	24.47	24.44	24.49	24.40
19	24.48	24.48	24.48	24.49	24.50	24.50	24.52	24.52	24.53	24.53	24.53	24.53	24.52	24.50	24.49	24.49	24.48	24.48	24.49	24.50	24.50	24.50	24.51	24.51	24.50	24.53	24.48
20	24.51	24.51	24.51	24.51	24.50	24.50	24.50	24.50	24.50	24.49	24.48	Au	Au	Au	24.44	24.43	24.42	24.42	24.41	24.42	24.42	24.43	24.43	24.44	24.47	24.51	24.41
21	24.44	24.43	24.43	24.43	24.42	24.42	24.42	24.42	24.41	24.40	24.39	24.38	24.38	24.36	24.35	24.34	24.33	24.32	24.31	24.31	24.29	24.28	24.27	24.26	24.37	24.44	24.26
22	24.26	24.24	24.23	24.22	24.21	24.20	24.19	24.17	24.16	24.15	24.14	24.14	24.12	24.11	24.12	24.11	24.10	24.10	24.08	24.08	24.08	24.09	24.08	24.07	24.14	24.26	24.07
23	24.07	24.05	24.05	24.05	24.05	24.07	24.08	24.10	24.11	24.13	24.13	24.13	24.10	24.08	24.06	24.06	24.05	24.03	24.02	24.00	23.98	23.97	23.95	23.94	24.05	24.13	23.94
24	23.93	23.93	23.94	23.94	23.95	23.97	24.01	24.05	24.09	24.14	24.17	24.21	24.23	24.25	24.27	24.29	24.31	24.33	24.35	24.37	24.39	24.40	24.41	24.42	24.18	24.42	23.93
25	24.43	24.43	24.44	24.44	24.45	24.46	24.46	24.47	24.47	24.47	24.46	24.47	24.47	24.47	24.47	24.48	24.48	24.49	24.50	24.52	24.51	24.52	24.53	24.53	24.48	24.53	24.43
26	24.53	24.52	24.52	24.51	24.50	24.50	24.50	24.50	24.51	24.50	24.48	24.48	24.47	24.44	24.43	24.42	24.40	24.40	24.39	24.39	24.39	24.38	24.37	24.35	24.45	24.53	24.35
27	24.34	24.32	24.31	24.29	24.27	24.25	24.24	24.22	24.20	24.19	24.18	24.15	24.12	24.10	24.10	24.11	24.10	24.10	24.11	24.11	24.11	24.11	24.11	24.11	24.18	24.34	24.10
28	24.10	24.09	24.08	24.08	24.08	24.08	24.09	24.10	24.10	24.12	24.12	24.12	24.10	24.10	24.09	24.09	24.09	24.09	24.09	24.09	24.10	24.10	24.10	24.11	24.10	24.12	24.08
29	24.11	24.11	24.11	24.11	24.11	24.10	24.10	24.11	24.11	24.11	24.11	24.08	24.07	24.06	24.05	24.06	24.05	24.05	24.06	24.06	24.06	24.05	24.04	24.04	24.08	24.11	24.04
30	24.03	24.03	24.04	24.03	24.01	24.00	24.01	24.01	24.01	24.01	24.00	24.00	24.00	24.00	24.00	24.01	24.01	24.02	24.03	24.04	24.05	24.06	24.06	24.07	24.02	24.07	24.00
Avg	24.38	24.37	24.38	24.37	24.37	24.37	24.37	24.37	24.38	24.38	24.38	24.37	24.36	24.35	24.36	24.36	24.36	24.36	24.36	24.37	24.37	24.37	24.37	24.38	24.37	24.46	24.29
Max	24.79	24.78	24.77	24.76	24.75	24.75	24.74	24.75	24.76	24.76	24.74	24.73	24.72	24.71	24.71	24.71	24.72	24.73	24.73	24.74	24.75	24.76	24.77	24.78	24.74	24.79	24.71
Min	23.93	23.93	23.94	23.94	23.95	23.97	24.01	24.01	24.01	24.01	24.00	24.00	24.00	24.00	24.00	24.01	24.01	24.02	24.02	24.00	23.98	23.97	23.95	23.94	24.02	24.07	23.93

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Barometric Pressure (InHg)
December 2018

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	24.07	24.07	24.07	24.08	24.08	24.08	24.09	24.09	24.09	24.09	24.10	24.09	24.09	24.09	24.10	24.11	24.13	24.14	24.15	24.15	24.16	24.17	24.18	24.11	24.18	24.07		
2	24.19	24.19	24.20	24.21	24.22	24.23	24.23	24.24	24.26	24.28	24.29	24.28	24.29	24.30	24.30	24.31	24.33	24.35	24.37	24.38	24.38	24.39	24.40	24.41	24.29	24.41	24.19	
3	24.42	24.42	24.43	24.43	24.43	24.44	24.45	24.46	24.47	24.47	24.46	24.46	24.45	24.46	24.46	24.46	24.47	24.48	24.48	24.49	24.49	24.49	24.49	24.49	24.46	24.49	24.42	
4	24.48	24.48	24.47	24.47	24.47	24.47	24.48	24.48	24.48	24.47	24.46	24.44	24.43	24.43	24.42	24.41	24.41	24.42	24.41	24.40	24.39	24.39	24.38	24.38	24.44	24.48	24.38	
5	24.37	24.37	24.38	24.37	24.38	24.38	24.39	24.41	24.43	24.45	24.45	24.44	24.44	24.43	24.43	24.44	24.46	24.48	24.49	24.49	24.49	24.48	24.47	24.46	24.44	24.49	24.37	
6	24.45	24.44	24.43	24.42	24.41	24.40	24.40	24.40	24.41	24.43	24.44	24.43	24.41	24.41	24.41	24.42	24.44	24.46	24.46	24.46	24.46	24.46	24.46	24.46	24.43	24.46	24.40	
7	24.45	24.45	24.45	24.45	24.46	24.46	24.47	24.46	24.45	24.46	24.46	24.44	24.42	24.41	24.41	24.41	24.42	24.43	24.44	24.45	24.45	24.45	24.46	24.46	24.44	24.47	24.41	
8	24.46	24.47	24.49	24.49	24.50	24.51	24.51	24.52	24.53	24.55	24.55	24.54	24.54	24.54	24.54	24.56	24.57	24.59	24.60	24.62	24.64	24.65	24.66	24.67	24.55	24.67	24.46	
9	24.67	24.67	24.68	24.68	24.68	24.68	24.68	24.68	24.68	24.68	24.67	24.64	24.61	24.60	24.58	24.57	24.56	24.56	24.55	24.54	24.54	24.53	24.51	24.50	24.61	24.68	24.50	
10	24.47	24.46	24.44	24.44	24.43	24.43	24.42	24.41	24.41	24.41	24.40	24.40	24.39	24.38	24.38	24.37	24.38	24.40	24.39	24.39	24.39	24.38	24.39	24.39	24.41	24.47	24.37	
11	24.40	24.40	24.41	24.41	24.40	24.39	24.38	24.37	24.35	24.34	24.32	24.31	24.28	24.25	24.22	24.20	24.18	24.17	24.14	24.12	24.10	24.08	24.05	24.02	24.26	24.41	24.02	
12	24.00	23.98	23.99	23.99	23.99	24.00	24.01	24.03	24.06	24.08	24.11	24.14	24.15	24.17	24.20	24.24	24.28	24.32	24.35	24.39	24.42	24.43	24.43	24.44	24.17	24.44	23.98	
13	24.45	24.44	24.43	24.43	24.42	24.42	24.41	24.42	24.44	24.44	24.44	24.44	24.43	24.42	24.43	24.45	24.46	24.47	24.46	24.47	24.47	24.48	24.49	24.49	24.45	24.49	24.41	
14	24.47	24.47	24.46	24.46	24.46	24.46	24.46	24.46	24.45	24.44	24.43	24.42	24.40	24.37	24.35	24.34	24.33	24.30	24.28	24.27	24.24	24.21	24.18	24.17	24.37	24.47	24.17	
15	24.15	24.14	24.15	24.16	24.19	24.19	24.21	24.23	24.25	24.27	24.31	24.33	24.33	24.35	24.36	24.36	24.38	24.41	24.42	24.43	24.45	24.46	24.47	24.48	24.31	24.48	24.14	
16	24.48	24.47	24.48	24.49	24.48	24.48	24.47	24.47	24.48	24.46	24.47	24.46	24.43	24.41	24.40	24.40	24.39	24.38	24.38	24.37	24.36	24.35	24.34	24.34	24.43	24.49	24.34	
17	24.34	24.34	24.34	24.33	24.32	24.31	24.30	24.30	24.30	24.31	24.31	24.30	24.29	24.29	24.29	24.30	24.31	24.31	24.31	24.32	24.32	24.31	24.30	24.29	24.31	24.34	24.29	
18	24.29	24.28	24.28	24.26	24.23	24.22	24.22	24.22	24.21	24.20	24.19	24.17	24.14	24.13	24.13	24.14	24.13	24.15	24.15	24.15	24.15	24.16	24.17	24.18	24.19	24.29	24.13	
19	24.20	24.22	24.23	24.24	24.23	24.25	24.28	24.30	24.32	24.35	24.38	24.38	24.38	24.40	24.42	24.44	24.46	24.48	24.49	24.49	24.50	24.51	24.51	24.51	24.37	24.51	24.20	
20	24.51	24.50	24.51	24.51	24.50	24.50	24.49	24.48	24.47	24.44	24.41	24.39	24.37	24.33	24.31	24.28	24.25	24.23	24.20	24.16	24.12	24.09	24.07	24.05	24.34	24.51	24.05	
21	24.03	24.01	24.02	24.03	24.03	24.02	24.03	24.04	24.07	24.10	24.12	24.13	24.14	24.15	24.16	24.18	24.18	24.20	24.20	24.21	24.22	24.22	24.25	24.27	24.13	24.27	24.01	
22	24.28	24.29	24.32	24.34	24.35	24.36	24.37	24.38	24.39	24.41	24.41	24.40	24.40	24.39	24.40	24.42	24.43	24.45	24.45	24.46	24.46	24.46	24.46	24.46	24.40	24.46	24.28	
23	24.46	24.45	24.44	24.42	24.39	24.37	24.35	24.34	24.33	24.33	24.32	24.31	24.29	24.29	24.28	24.28	24.28	24.28	24.28	24.27	24.27	24.27	24.26	24.26	24.33	24.46	24.26	
24	24.26	24.26	24.27	24.26	24.26	24.26	24.26	24.25	24.26	24.26	24.27	24.26	24.25	24.25	24.26	24.26	24.27	24.27	24.28	24.28	24.29	24.30	24.31	24.31	24.27	24.31	24.25	
25	24.32	24.32	24.32	24.32	24.32	24.32	24.32	24.32	24.33	24.34	24.33	24.32	24.30	24.29	24.28	24.29	24.29	24.30	24.30	24.31	24.31	24.31	24.31	24.30	24.31	24.31	24.34	24.28
26	24.30	24.30	24.31	24.31	24.30	24.31	24.32	24.34	24.35	24.35	24.34	24.31	24.29	24.27	24.27	24.28	24.28	24.28	24.28	24.28	24.27	24.27	24.27	24.27	24.30	24.35	24.27	
27	24.26	24.27	24.27	24.27	24.27	24.27	24.28	24.30	24.31	24.32	24.32	24.31	24.30	24.30	24.32	24.35	24.37	24.38	24.40	24.41	24.41	24.41	24.41	24.41	24.33	24.41	24.26	
28	24.41	24.42	24.42	24.42	24.42	24.41	24.41	24.42	24.43	24.43	24.42	24.40	24.37	24.36	24.36	24.37	24.37	24.38	24.37	24.36	24.35	24.34	24.34	24.32	24.39	24.43	24.32	
29	24.31	24.30	24.31	24.31	24.29	24.28	24.28	24.27	24.27	24.26	24.25	24.23	24.20	24.19	24.19	24.19	24.18	24.16	24.14	24.14	24.11	24.09	24.08	24.05	24.21	24.31	24.05	
30	24.04	24.02	24.02	24.01	23.98	23.97	23.95	23.95	23.96	23.96	23.97	23.96	23.97	23.99	24.04	24.10	24.17	24.21	24.26	24.30	24.32	24.34	24.37	24.39	24.09	24.39	23.95	
31	24.41	24.44	24.46	24.48	24.49	24.49	24.51	24.52	24.53	24.55	24.55	24.54	24.52	24.51	24.51	24.51	24.50	24.50	24.50	24.49	24.47	24.46	24.45	24.43	24.49	24.55	24.41	
Avg	24.34	24.33	24.34	24.34	24.33	24.33	24.34	24.34	24.35	24.35	24.35	24.34	24.33	24.33	24.33	24.34	24.34	24.35	24.35	24.36	24.35	24.35	24.35	24.35	24.34	24.44	24.25	
Max	24.67	24.67	24.68	24.68	24.68	24.68	24.68	24.68	24.68	24.68	24.67	24.64	24.61	24.60	24.58	24.57	24.57	24.59	24.60	24.62	24.64	24.65	24.66	24.67	24.61	24.68	24.50	
Min	24.00	23.98	23.99	23.99	23.98	23.97	23.95	23.95	23.96	23.96	23.97	23.96	23.97	23.99	24.04	24.10	24.11	24.13	24.14	24.12	24.10	24.08	24.05	24.02	24.09	24.18	23.95	

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Relative Humidity (% RH)
October 2018

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	89.0	89.8	90.4	90.3	90.1	90.1	89.5	84.3	75.4	64.8	59.7	49.8	43.1	42.6	40.1	38.5	38.8	41.7	55.0	65.7	69.2	74.4	76.7	72.8	67.6	90.4	38.5
2	63.4	64.8	75.8	77.7	78.5	82.0	85.0	87.9	87.6	84.7	80.1	70.1	60.6	55.0	56.0	56.3	75.7	86.1	86.9	87.0	87.9	88.1	90.4	92.8	77.5	92.8	55.0
3	92.7	90.1	89.6	85.7	79.1	75.5	79.9	78.3	78.0	70.8	63.8	57.3	48.2	40.7	38.4	35.0	36.4	57.0	67.4	71.6	77.5	80.8	81.3	83.3	69.1	92.7	35.0
4	84.0	85.2	85.0	85.9	87.7	88.6	88.2	87.0	86.0	80.2	75.7	69.8	64.6	68.2	69.1	75.5	87.6	90.4	91.3	91.7	92.2	92.6	92.7	92.7	83.8	92.7	64.6
5	92.6	92.4	91.9	91.3	88.8	88.0	87.3	86.7	85.2	81.3	76.2	71.5	64.2	56.8	50.4	44.9	47.2	58.3	80.0	84.9	87.3	88.2	88.5	87.5	78.0	92.6	44.9
6	88.8	88.8	88.9	88.8	87.1	88.2	90.1	88.9	87.3	85.1	82.2	76.6	71.6	70.7	73.3	71.3	83.3	87.1	88.4	89.3	89.9	89.8	90.8	91.2	84.9	91.2	70.7
7	91.5	91.7	91.6	91.7	91.9	92.0	91.7	91.5	90.4	91.0	90.3	89.2	89.7	86.0	85.9	82.7	77.3	83.1	89.0	90.7	91.5	91.8	92.2	92.6	89.5	92.6	77.3
8	92.8	92.8	92.7	92.9	92.8	92.9	92.8	92.9	86.3	76.3	60.3	53.1	65.1	60.2	61.4	77.0	83.5	87.7	87.6	88.7	90.1	89.9	88.4	83.7	82.6	92.9	53.1
9	82.9	81.2	84.5	85.1	82.5	76.9	75.8	76.1	75.8	74.5	70.3	74.7	72.9	68.7	75.4	78.7	72.8	75.5	71.8	70.9	76.8	71.9	68.5	68.4	75.5	85.1	68.4
10	69.6	69.3	68.4	72.4	74.3	77.6	79.3	76.5	73.6	65.2	64.2	62.2	59.9	58.6	63.8	69.3	73.4	77.1	82.7	82.1	81.8	82.0	82.7	83.9	72.9	83.9	58.6
11	84.7	84.8	84.5	84.5	84.7	85.5	85.8	86.0	82.9	76.2	67.1	59.0	59.6	54.8	53.2	42.7	46.2	53.8	67.7	70.7	79.0	83.6	86.0	86.8	72.9	86.8	42.7
12	87.1	86.3	86.3	85.2	82.8	83.2	83.8	81.3	65.8	53.2	47.9	48.0	49.2	48.6	47.2	48.6	49.8	54.3	57.7	49.0	45.9	49.9	56.0	68.1	63.1	87.1	45.9
13	74.8	68.3	68.5	69.4	64.9	65.3	66.2	66.2	67.8	70.5	66.8	65.4	63.6	64.7	63.8	65.7	71.6	76.4	80.9	81.7	75.3	74.8	78.3	69.1	70.0	81.7	63.6
14	69.1	69.3	70.8	72.3	71.4	69.9	76.4	81.1	71.4	66.7	66.6	64.6	60.1	56.9	47.3	47.2	50.6	58.1	66.7	72.8	78.5	77.8	80.5	81.2	67.8	81.2	47.2
15	81.9	83.4	83.6	84.0	82.5	83.5	82.6	79.4	70.6	59.6	50.9	45.1	41.6	39.4	37.8	37.6	39.1	45.6	56.8	69.0	71.5	74.1	75.8	76.6	64.7	84.0	37.6
16	80.4	80.8	77.9	78.2	80.1	81.1	80.0	77.3	62.5	48.0	40.5	37.2	36.6	35.8	34.1	33.9	34.9	46.6	63.9	69.3	73.8	81.6	85.7	86.4	62.8	86.4	33.9
17	87.4	87.6	87.9	87.6	87.7	87.6	87.1	85.1	72.6	61.9	39.5	30.3	26.5	22.6	23.5	24.9	26.7	42.7	58.8	64.1	69.3	75.4	78.4	80.9	62.3	87.9	22.6
18	85.5	85.2	86.5	86.4	86.2	86.7	86.8	82.7	70.2	57.2	36.4	34.0	32.0	28.7	25.3	25.4	28.7	36.6	46.3	61.9	68.5	75.2	76.7	80.2	61.2	86.8	25.3
19	82.2	82.8	80.1	82.0	82.1	85.5	85.2	84.0	71.2	46.0	33.8	30.0	31.5	30.2	25.4	22.3	22.4	30.2	47.1	53.4	63.7	71.8	74.8	79.0	58.2	85.5	22.3
20	80.3	80.6	82.2	83.7	83.9	84.8	85.0	81.4	70.0	51.1	28.5	25.9	25.5	25.2	22.7	21.0	20.3	29.1	46.0	58.4	64.8	71.3	75.6	80.1	57.4	85.0	20.3
21	80.4	81.8	84.5	85.5	84.2	82.8	83.4	80.7	72.8	58.7	41.9	30.0	25.9	25.6	24.4	23.7	27.2	36.1	43.9	52.3	54.6	67.3	69.0	72.0	57.9	85.5	23.7
22	75.1	75.1	76.4	78.2	78.5	80.2	80.6	76.2	60.6	43.0	33.2	32.7	31.5	31.0	31.5	32.8	34.8	41.9	45.3	47.2	45.9	51.2	59.6	67.3	54.6	80.6	31.0
23	72.6	76.5	79.3	81.4	83.8	85.0	85.5	83.2	68.0	55.5	38.6	29.7	30.2	29.3	25.9	28.1	37.3	54.6	60.7	72.3	78.7	81.6	85.8	87.8	63.0	87.8	25.9
24	89.2	89.8	90.3	90.0	90.1	89.8	89.8	89.4	82.9	73.4	56.4	54.0	48.6	44.4	39.5	39.9	45.4	57.5	70.2	77.4	79.1	84.1	86.8	87.7	72.7	90.3	39.5
25	88.9	88.5	88.7	86.4	55.7	61.1	71.1	72.9	58.1	42.2	39.0	35.1	33.2	35.0	35.9	36.0	41.7	45.2	52.0	59.3	65.9	70.0	76.7	77.2	59.0	88.9	33.2
26	77.2	76.4	76.5	62.8	55.4	57.7	69.7	82.4	86.6	86.0	80.9	70.5	68.4	65.4	64.8	66.3	66.9	67.6	65.1	65.5	65.7	64.0	64.4	67.3	69.7	86.6	55.4
27	74.2	80.4	75.7	63.8	69.6	71.8	80.5	83.0	76.2	66.4	57.0	43.7	41.6	36.1	35.7	33.5	33.8	42.3	58.4	68.7	76.6	81.4	82.9	85.1	63.3	85.1	33.5
28	84.7	84.3	84.2	82.1	81.3	82.9	80.7	79.2	73.4	56.2	45.0	41.5	41.8	40.4	40.2	40.4	40.0	46.6	69.4	73.1	78.5	85.8	84.2	84.3	66.7	85.8	40.0
29	85.6	85.0	85.0	83.5	78.6	76.4	73.6	77.8	64.3	63.3	58.4	54.1	50.2	52.4	55.9	57.9	64.4	78.2	80.5	82.7	81.6	80.6	81.3	82.5	72.2	85.6	50.2
30	78.5	79.1	80.1	81.6	80.4	83.4	85.2	82.8	76.4	72.8	65.8	61.2	57.4	56.1	52.8	49.4	51.8	58.6	59.4	62.6	62.9	64.1	66.1	68.9	68.2	85.2	49.4
31	73.9	78.3	76.5	78.4	79.7	78.7	71.9	72.4	61.8	53.2	51.8	56.7	79.4	88.0	88.2	89.6	90.6	91.1	91.4	91.4	91.1	91.3	90.7	90.5	79.4	91.4	51.8
Avg	82.0	82.3	82.7	82.2	80.5	81.1	82.3	81.8	74.6	65.6	57.1	52.4	50.8	49.0	48.0	48.3	51.6	59.3	67.4	71.8	74.7	77.6	79.6	80.9	69.3	87.5	43.9
Max	92.8	92.8	92.7	92.9	92.8	92.9	92.8	92.9	90.4	91.0	90.3	89.2	89.7	88.0	88.2	89.6	90.6	91.1	91.4	91.7	92.2	92.6	92.7	92.8	89.5	92.9	77.3
Min	63.4	64.8	68.4	62.8	55.4	57.7	66.2	66.2	58.1	42.2	28.5	25.9	25.5	22.6	22.7	21.0	20.3	29.1	43.9	47.2	45.9	49.9	56.0	67.3	54.6	80.6	20.3

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Relative Humidity (% RH)
November 2018

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	89.6	89.1	87.6	86.6	85.2	84.7	84.0	85.2	84.9	87.1	88.3	77.9	69.0	70.1	71.8	75.0	79.6	86.1	90.0	91.5	92.1	92.4	92.4	92.5	84.7	92.5	69.0
2	92.6	92.7	92.8	93.1	92.8	92.6	89.2	88.6	80.8	80.7	81.6	65.0	67.7	73.5	74.1	71.9	68.2	68.8	74.2	81.3	86.8	89.2	91.3	91.7	82.5	93.1	65.0
3	91.5	91.2	91.3	91.4	91.2	90.9	91.0	91.0	90.7	89.1	84.8	85.4	85.8	80.7	79.8	81.3	78.9	80.4	81.1	81.4	80.6	78.9	75.6	74.7	84.9	91.5	74.7
4	73.6	77.2	85.9	86.5	88.5	90.8	91.7	90.7	90.5	85.4	78.2	80.7	78.8	78.0	72.7	67.2	62.4	62.0	64.3	64.8	67.5	71.0	72.8	75.5	77.4	91.7	62.0
5	82.6	87.6	85.8	87.6	89.3	89.0	89.1	89.3	89.1	82.1	72.9	72.0	67.2	66.3	70.6	78.4	80.7	85.0	86.9	89.4	89.2	89.2	89.7	90.0	83.3	90.0	66.3
6	89.7	89.9	89.4	89.0	88.6	88.4	87.4	87.9	87.8	87.0	85.1	82.7	81.6	82.7	79.8	79.1	73.6	82.2	84.5	85.2	85.6	85.7	85.5	85.7	85.2	89.9	73.6
7	86.0	86.8	87.0	87.4	85.9	84.7	83.8	84.1	82.2	80.0	79.6	80.9	80.8	80.1	79.4	79.6	79.1	81.6	82.2	82.4	83.1	81.3	79.0	76.1	82.2	87.4	76.1
8	74.6	73.7	73.0	71.8	71.9	71.8	71.7	71.6	74.0	76.9	74.8	70.4	69.2	69.1	69.0	65.8	67.4	76.4	81.1	83.9	84.3	83.0	81.3	78.9	74.4	84.3	65.8
9	78.7	77.3	77.1	77.0	76.4	76.4	75.8	76.5	77.7	79.1	78.3	78.4	72.5	59.6	60.1	62.6	69.5	78.1	79.6	77.6	78.1	78.3	60.7	71.2	74.0	79.6	59.6
10	83.9	81.9	84.1	82.0	83.5	84.7	84.4	84.8	84.3	81.8	79.9	77.2	73.2	75.2	76.7	76.9	74.3	78.3	81.9	85.7	86.0	84.5	82.0	81.7	81.2	86.0	73.2
11	82.4	81.1	80.7	79.4	79.1	78.8	79.9	81.1	81.7	82.0	82.8	83.9	75.4	80.2	71.1	66.4	67.0	69.8	73.4	69.1	71.7	72.9	79.8	81.0	77.1	83.9	66.4
12	79.8	78.3	77.0	75.4	74.5	74.1	73.6	73.2	74.1	76.3	74.5	63.0	55.6	55.7	53.2	53.4	58.4	73.1	77.1	78.9	82.8	83.5	83.2	82.7	72.1	83.5	53.2
13	81.7	80.7	80.6	80.3	80.1	80.1	79.8	80.4	79.8	81.5	77.5	67.1	59.5	51.6	46.5	58.4	73.4	82.7	86.8	87.1	86.7	85.8	85.8	85.6	76.6	87.1	46.5
14	85.9	85.8	85.0	85.0	84.6	84.1	84.9	85.2	85.8	87.2	88.7	83.8	36.3	33.6	32.5	35.5	41.2	61.1	66.0	47.7	51.4	56.1	59.8	62.7	67.1	88.7	32.5
15	61.6	63.2	64.0	63.3	61.0	63.0	71.8	72.2	67.3	56.0	54.3	53.8	56.0	54.6	53.4	54.0	53.4	61.8	66.6	64.6	65.8	71.1	52.1	43.5	60.3	72.2	43.5
16	44.8	48.1	52.2	58.3	72.5	78.1	85.9	84.5	87.2	81.9	77.5	74.9	71.7	72.3	71.1	69.8	73.9	74.1	75.5	79.2	80.6	81.2	81.3	80.4	73.2	87.2	44.8
17	81.0	80.7	82.0	81.3	80.7	79.3	79.2	77.5	76.0	73.5	72.1	69.3	69.5	71.3	68.6	66.7	71.0	82.4	80.7	79.8	78.3	77.2	77.1	75.7	76.3	82.4	66.7
18	75.2	74.8	74.7	74.8	74.8	75.3	76.0	78.3	79.6	80.4	77.6	52.2	44.0	43.0	44.9	48.1	58.3	71.3	75.4	78.8	79.7	80.5	80.0	80.6	69.9	80.6	43.0
19	80.6	81.3	81.2	82.7	85.2	83.3	84.3	82.9	81.8	70.0	54.9	51.4	39.3	40.5	41.9	40.4	58.6	74.4	76.7	79.1	81.6	83.3	84.3	86.1	71.1	86.1	39.3
20	84.7	84.2	84.0	84.0	84.3	83.5	83.3	82.6	82.8	82.2	73.9	Au	Au	Au	36.4	45.4	68.4	77.6	82.5	84.7	87.3	86.9	86.1	85.5	78.6	87.3	36.4
21	85.1	84.6	83.9	84.3	84.7	84.0	83.6	83.6	84.5	86.7	80.2	62.0	43.5	23.6	23.9	28.1	32.1	47.5	58.0	60.4	62.7	57.4	56.8	61.3	64.3	86.7	23.6
22	57.0	41.7	48.4	56.9	65.3	68.0	67.4	68.9	66.6	48.6	48.8	55.3	49.9	51.8	68.1	81.2	81.7	86.1	87.3	87.7	89.1	88.5	87.8	86.4	68.3	89.1	41.7
23	87.1	86.8	87.0	83.8	86.3	84.5	81.7	72.8	62.7	65.3	61.7	56.6	52.2	55.2	52.9	51.5	56.4	65.2	71.3	74.1	74.4	78.3	79.2	74.6	70.9	87.1	51.5
24	74.1	77.8	79.4	83.6	85.1	84.6	76.3	73.2	77.1	81.1	74.1	72.5	69.1	64.6	72.7	76.5	78.3	82.8	87.1	86.8	86.7	86.8	86.4	86.2	79.3	87.1	64.6
25	85.3	84.6	85.2	85.3	85.7	84.4	83.0	81.6	80.5	80.5	74.5	66.7	62.5	61.0	60.2	60.2	65.0	70.3	78.5	81.6	84.0	82.2	82.6	82.6	77.0	85.7	60.2
26	81.4	81.2	80.4	80.1	80.4	79.5	79.9	79.3	79.5	77.8	64.8	53.5	31.2	31.9	34.2	35.4	42.7	52.7	60.6	66.9	70.4	75.5	75.1	73.6	65.3	81.4	31.2
27	70.5	73.5	74.5	73.5	69.3	71.1	67.2	67.0	60.8	59.2	57.2	58.1	57.7	57.0	59.3	59.6	62.2	63.8	65.7	69.3	72.7	71.9	77.2	80.8	66.6	80.8	57.0
28	81.7	75.9	70.6	70.8	72.1	73.4	75.6	75.4	75.0	64.3	62.3	62.1	60.8	61.5	64.1	65.3	68.4	74.7	75.5	77.6	80.8	80.7	84.5	86.0	72.5	86.0	60.8
29	86.5	87.0	84.7	84.6	84.0	82.8	82.7	83.2	83.5	84.4	84.9	80.0	71.7	63.2	55.2	47.1	64.0	76.4	79.3	83.9	84.6	84.7	83.2	84.7	78.6	87.0	47.1
30	83.0	83.6	82.5	82.4	82.8	82.3	82.4	82.5	81.8	77.2	64.0	55.2	49.7	54.0	53.7	57.7	64.3	69.2	75.6	77.3	79.2	85.2	86.3	87.9	74.2	87.9	49.7
Avg	79.7	79.4	79.7	80.1	80.9	80.9	80.9	80.5	79.7	77.5	73.7	68.7	62.1	60.8	59.9	61.3	65.7	73.2	76.8	77.9	79.5	80.1	79.3	79.5	75.0	86.1	54.8
Max	92.6	92.7	92.8	93.1	92.8	92.6	91.7	91.0	90.7	89.1	88.7	85.4	85.8	82.7	79.8	81.3	81.7	86.1	90.0	91.5	92.1	92.4	92.4	92.5	85.2	93.1	76.1
Min	44.8	41.7	48.4	56.9	61.0	63.0	67.2	67.0	60.8	48.6	48.8	51.4	31.2	23.6	23.9	28.1	32.1	47.5	58.0	47.7	51.4	56.1	52.1	43.5	60.3	72.2	23.6

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Relative Humidity (% RH)
December 2018

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	88.2	88.4	88.3	88.2	87.9	88.1	87.8	88.0	86.2	83.9	81.5	80.8	79.1	77.3	75.8	75.5	80.9	86.3	83.1	81.7	80.5	78.5	78.2	77.3	83.0	88.4	75.5
2	76.6	76.7	76.4	76.5	75.7	75.5	74.8	74.5	78.1	86.3	76.7	71.8	66.7	65.2	70.4	75.6	83.2	83.3	81.9	82.8	83.6	81.9	81.7	82.4	77.4	86.3	65.2
3	81.5	80.4	80.3	80.7	81.3	82.2	82.3	82.4	83.0	80.5	73.4	72.4	73.9	74.9	74.9	73.5	74.8	76.6	77.0	78.3	78.3	79.5	78.8	75.4	78.2	83.0	72.4
4	70.5	67.5	64.5	62.7	61.8	63.5	67.4	67.6	70.3	57.3	55.0	52.2	49.5	48.7	47.8	45.4	49.5	53.4	60.6	66.6	70.9	74.2	74.9	73.8	61.5	74.9	45.4
5	68.1	73.3	72.8	73.3	73.1	75.9	76.9	77.2	76.6	74.6	64.6	55.3	59.9	58.2	58.5	62.7	75.9	79.9	81.1	77.2	75.9	74.6	73.5	72.9	71.3	81.1	55.3
6	71.9	71.5	71.5	70.7	70.7	70.5	70.9	71.3	72.3	73.8	75.4	73.4	62.3	50.4	47.6	46.1	55.5	69.7	72.6	74.5	76.6	76.2	76.7	76.0	68.7	76.7	46.1
7	74.7	75.5	75.5	74.9	75.2	75.2	75.3	74.6	75.4	73.8	61.5	49.0	44.7	43.6	43.6	47.6	58.4	66.9	74.9	78.1	80.8	80.9	79.4	78.8	68.3	80.9	43.6
8	78.1	76.8	77.1	77.2	77.1	76.8	77.3	77.4	77.0	78.4	78.2	66.1	55.9	56.1	55.8	56.6	63.1	72.0	78.3	79.0	79.6	80.9	80.9	81.7	73.2	81.7	55.8
9	81.2	79.9	79.1	77.9	77.9	76.6	76.6	75.9	76.3	77.2	77.3	74.1	62.8	55.9	46.0	46.0	61.7	73.5	79.1	80.1	80.3	80.5	80.3	79.3	73.1	81.2	46.0
10	79.5	78.0	75.2	77.4	77.3	78.4	79.1	80.7	79.5	73.6	64.9	54.4	48.0	38.6	42.7	47.2	53.4	58.9	61.8	68.8	69.1	70.4	69.2	68.1	66.4	80.7	38.6
11	66.4	67.5	75.3	79.6	79.6	80.0	79.7	74.6	69.6	59.1	52.7	46.0	43.4	41.0	40.7	44.1	49.7	51.9	46.1	46.7	48.9	52.4	54.0	57.2	58.6	80.0	40.7
12	59.8	58.3	58.9	65.5	75.7	76.5	82.6	78.5	66.8	57.9	55.0	51.4	49.9	51.7	51.5	49.9	51.6	55.5	57.5	56.5	64.5	63.6	59.0	64.2	60.9	82.6	49.9
13	64.0	59.8	56.4	55.8	54.3	52.7	49.0	53.3	57.3	53.5	45.0	45.1	45.2	45.7	47.3	51.4	53.5	58.4	58.6	59.9	64.0	70.7	71.4	69.3	55.9	71.4	45.0
14	68.3	67.8	66.9	70.4	68.9	68.0	64.8	64.6	65.9	60.4	53.1	41.0	34.8	32.7	33.5	37.3	39.9	53.3	50.0	48.6	53.0	41.4	43.8	41.3	52.9	70.4	32.7
15	52.3	52.9	46.3	48.8	67.7	77.4	75.7	64.0	60.6	56.7	57.3	57.0	56.6	56.3	57.6	59.0	55.3	58.6	64.6	67.7	74.2	76.4	80.4	81.2	62.7	81.2	46.3
16	83.4	81.7	81.4	80.2	78.0	80.6	80.7	82.2	81.8	74.8	56.8	46.0	38.0	36.4	29.9	29.4	35.0	38.0	53.1	57.0	58.3	50.2	49.2	37.3	59.1	83.4	29.4
17	38.8	45.2	50.6	55.9	60.8	63.9	66.6	66.2	69.8	65.3	59.5	56.9	54.4	49.5	49.4	55.2	66.3	70.7	75.5	78.5	77.9	79.3	83.2	85.6	63.5	85.6	38.8
18	87.9	88.1	87.1	88.0	76.2	69.1	66.2	64.7	60.0	54.5	49.1	47.8	47.1	52.0	60.6	66.2	67.7	72.8	83.8	77.1	65.1	58.2	57.1	57.7	66.8	88.1	47.1
19	57.6	58.9	59.1	63.9	62.9	62.0	58.3	59.5	62.9	57.9	52.1	50.5	48.2	50.0	50.8	51.4	52.5	54.0	57.0	60.3	59.8	63.0	64.6	71.6	57.9	71.6	48.2
20	76.1	80.1	80.9	81.5	82.3	82.3	82.3	81.9	81.6	76.4	66.4	56.4	52.6	53.3	50.7	50.0	55.1	54.9	57.4	64.3	58.8	43.6	43.0	43.7	64.8	82.3	43.0
21	46.2	50.0	52.5	67.6	71.4	66.3	66.1	60.2	59.9	53.0	49.1	49.6	48.1	47.5	46.1	45.2	48.6	53.0	56.1	55.4	53.8	56.2	60.7	62.1	55.2	71.4	45.2
22	64.2	66.9	70.4	73.0	74.8	75.6	74.0	72.4	75.0	68.9	62.5	57.1	57.7	55.9	51.6	48.6	51.2	55.0	62.5	71.2	74.5	76.8	79.3	79.0	66.6	79.3	48.6
23	78.7	78.3	78.7	78.6	76.6	73.0	71.9	71.3	74.3	74.8	68.1	58.7	56.4	51.7	51.7	51.8	53.3	54.8	57.1	60.4	69.7	72.8	77.9	72.7	67.2	78.7	51.7
24	70.0	73.9	75.7	75.6	73.8	74.7	78.2	79.6	79.9	79.9	77.0	74.5	72.2	68.5	64.9	66.5	72.2	76.8	80.2	78.9	83.4	85.3	85.9	85.8	76.4	85.9	64.9
25	84.8	84.5	83.1	80.6	82.0	82.4	81.6	82.2	82.0	80.6	75.3	65.1	65.9	70.5	69.2	69.7	76.6	80.1	81.4	82.9	83.9	83.3	80.9	83.5	78.8	84.8	65.1
26	85.1	86.0	84.1	83.2	84.6	85.7	84.7	83.2	82.8	82.9	82.8	77.1	70.3	67.2	67.3	66.5	66.5	74.7	78.9	80.7	81.2	81.0	80.8	80.5	79.1	86.0	66.5
27	80.7	80.8	80.9	80.9	80.7	80.7	80.7	80.3	79.7	77.7	66.2	63.9	71.4	73.6	76.1	77.4	78.8	76.9	79.2	80.9	82.0	81.8	82.4	81.4	78.1	82.4	63.9
28	80.9	81.1	80.9	80.8	80.5	80.7	80.7	80.8	80.8	79.8	78.6	73.9	70.4	65.3	65.6	65.4	67.2	71.4	73.7	75.0	78.5	79.5	79.5	76.7	76.2	81.1	65.3
29	72.3	72.4	72.3	74.3	78.7	79.2	79.4	76.7	83.7	83.8	81.8	82.0	79.7	73.7	71.5	71.2	76.2	78.9	75.5	64.1	58.8	58.5	59.6	59.9	73.5	83.8	58.5
30	58.5	59.1	60.2	61.6	61.4	62.9	63.4	62.3	64.4	71.7	81.7	79.0	77.5	70.8	71.1	66.6	63.3	62.7	63.6	63.5	65.3	64.2	64.4	64.6	66.0	81.7	58.5
31	63.1	62.8	63.9	63.1	62.6	62.5	63.8	65.8	73.0	71.2	65.7	62.5	64.0	64.9	64.2	66.4	69.0	71.6	73.3	74.7	75.7	76.9	73.5	71.9	67.8	76.9	62.5
Avg	71.3	71.7	71.8	73.2	73.9	74.2	74.2	73.4	73.8	71.0	65.9	61.0	58.3	56.4	55.9	56.9	61.5	66.0	68.9	70.0	71.2	70.7	71.1	70.7	68.0	80.8	52.1
Max	88.2	88.4	88.3	88.2	87.9	88.1	87.8	88.0	86.2	86.3	82.8	82.0	79.7	77.3	76.1	77.4	83.2	86.3	83.8	82.9	83.9	85.3	85.9	85.8	83.0	88.4	75.5
Min	38.8	45.2	46.3	48.8	54.3	52.7	49.0	53.3	57.3	53.0	45.0	41.0	34.8	32.7	29.9	29.4	35.0	38.0	46.1	46.7	48.9	41.4	43.0	37.3	52.9	70.4	29.4

A-27

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Precipitation (inches)
November 2018

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	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	0.01	0.04	0.04	0.05	0.06	0.05	0.25	0.06
2	0.05	0.07	0.06	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.02	0.05	0.00	0.39	0.07
3	0.01	0.01	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	0.02	0.01
4	0.00	0.00	0.00	0.00	0.01	0.06	0.04	0.03	0.02	0.01	0.01	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.06
5	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	0.03	0.04	0.00	0.07	0.04
6	0.00	0.03	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	0.03	0.03
7	0.00	0.00	0.00	0.02	0.00	0.01	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	0.03	0.02
8	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
9	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
10	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
11	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
12	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
13	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
14	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
15	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
16	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.01	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	0.06	0.03
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
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
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	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Au	Au	Au	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
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
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
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
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
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
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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
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
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	0.00	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.06
Tot	0.06	0.11	0.06	0.09	0.04	0.08	0.05	0.04	0.02	0.01	0.01	0.02	0.01	0.02	0.07	0.01	0.00	0.00	0.02	0.05	0.07	0.10	0.15	0.05	1.14	0.00
Max	0.05	0.07	0.06	0.07	0.03	0.06	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.06	0.01	0.00	0.00	0.01	0.04	0.04	0.05	0.06	0.05	0.39	0.07

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APPENDIX B: PERFORMANCE AUDIT REPORTS
FOURTH QUARTER 2018



BISON ENGINEERING, INC.

PRELIMINARY METEOROLOGICAL AUDIT REPORT

Client : Tintina Resources
SITE : Black Butte

DATE : 11/20/18

Audit Start Time : 11:00 MST Audit End Time : 13:00 MST
AUDITOR: Steve Heck PRECEDING CALIBRATION BY: Jeff Bell

Temperature

Audit Device : Control Company Digital Thermometer
Model Number : 4000 Serial Number : 140251289
Last certified : 04/20/18
Sensor Make : Climatronics
Model Number : 100093 Serial Number Upper: P12535 Serial Number Lower: P12535

Temperature bath results as is

	9m	9m	2m	2m	9m - 2m
Audit	DAS	DAS	DAS	DAS	DAS
Value	Value	Diff.	Value	Diff.	Diff.
oC	oC	oC	oC	oC	oC
0.03	0.17	0.14	0.17	0.14	0.00
12.27	12.29	0.02	12.27	0.00	-0.02
36.50	36.70	0.20	36.70	0.20	0.00

Wind Direction

Alignment Audit Device : Nextar
Model Number : X3-T
Linearity Audit Device : Climatronics
Model Number : 101966
Sensor height : 10 Meter
Sensor Make : Climatronics
Model Number : 102083

Serial Number : 72
Serial Number : P1336C

Linearity Check from DAS (as found)

Setpoint	Clockwise	Counter-CW	Diff CW	Diff CCW
0	0.6	0.6	0.6	0.6
30	31.4	30.0	1.4	0.0
60	62.3	61.8	2.3	1.8
90	91.6	92.2	1.6	2.2
120	121.4	122.1	1.4	2.1
150	151.6	151.9	1.6	1.9
180	181.4	181.8	1.4	1.8
210	211.3	211.1	1.3	1.1
240	241.0	241.0	1.0	1.0
270	270.8	270.9	0.8	0.9
300	300.3	300.5	0.3	0.5
330	331.4	331.4	1.4	1.4
		Max Diff	2.3	2.2

Crossarm Orientation : N-S
Magnetic Declination : 12
Measured Degrees : 0.5
Sensor response aligned with crossarm (as found) : 0.0
Sensor response aligned with crossarm (as left) : 0.0

Linearity Check from DAS (as left)

Setpoint	Clockwise	Counter-CW	Diff CW	Diff CCW
0	0.2	0.1	0.2	0.1
90	91.0	90.6	1.0	0.6
180	181.0	180.0	1.0	0.0
270	271.0	270.7	1.0	0.7
		Max Diff	1.0	0.7

Wind Speed

Audit Device : RMYoung
Model Number : 18811 Serial Number : CA02929
Last certified : 4/19/18
Sensor height : 10 Meter
Sensor Make : Climatronics
Model Number : 102083 Serial Number : P1336C

Synchronous motor checks

Known	Audit	DAS	DAS
Value	Value	Station	DAS
RPM	MPS	Value	Diff.
		MPS	MPS
0	0.2	0.2	0.0
300	6.7	6.7	0.0
600	13.1	13.1	0.0
990	21.4	21.4	0.0

Relative Humidity

Audit Device : Control company Hygometer
Model Number : 4185 Serial Number : 61644981
Last certified : 4/17/18
Sensor height : 10 Meter
Sensor Make : Met One
Model Number : 083E-0-35 Serial Number : P18245

Audit	Audit	Audit
Audit RH	Station RH	Diff
%RH	%RH	%RH
41.4	43.9	2.5

Barometric Pressure

Audit Device : Delta Cal
Model Number : Delta Cal Serial Number : 999
Last certified : 05/03/18
Sensor Make : Climatronics
Model Number : 102663-G0 Serial Number : 42017

Audit	Station	Audit
Value	Value	Diff.
In Hg	In Hg	In Hg
24.39	24.47	0.08

Solar Radiation

Audit Device : Li Cor
 Model Number : LI-200
 Last certified : 05/21/15
 Sensor Make : Met One
 Model Number : 096-1

Serial Number : PY82228
 uA/m² : 98.51
 Serial Number : PY69829

Audit Value	DAS Station Value	DAS Diff.
w/m2	w/m2	%
450	458	1.8

Precipitation

Audit Device : Fisher Scientific
 Model Number : S32814A
 Last certified : NA
 Sensor Make : Climatronics
 Model Number : 100097-1-G0-H0
 Opening : 8
 Bucket Tip : 0.254
 Bucket Tip Volume : 8.24
 Level checked : OK
 Wind Screen in place : OK

Serial Number : 250 ml
 Serial Number : N3939

Known Value	Known Value	Station Value	% Diff
ML	Bucket Tips	Bucket Tips	
250.0	26	27	3.8
250.0	26	27	3.8

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: 10/16/2018

Reviewer: Steven R. Heck

Signature: 

Title: Meteorologist

Date: 10-18-2018

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APPENDICES

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

1.0 INTRODUCTION

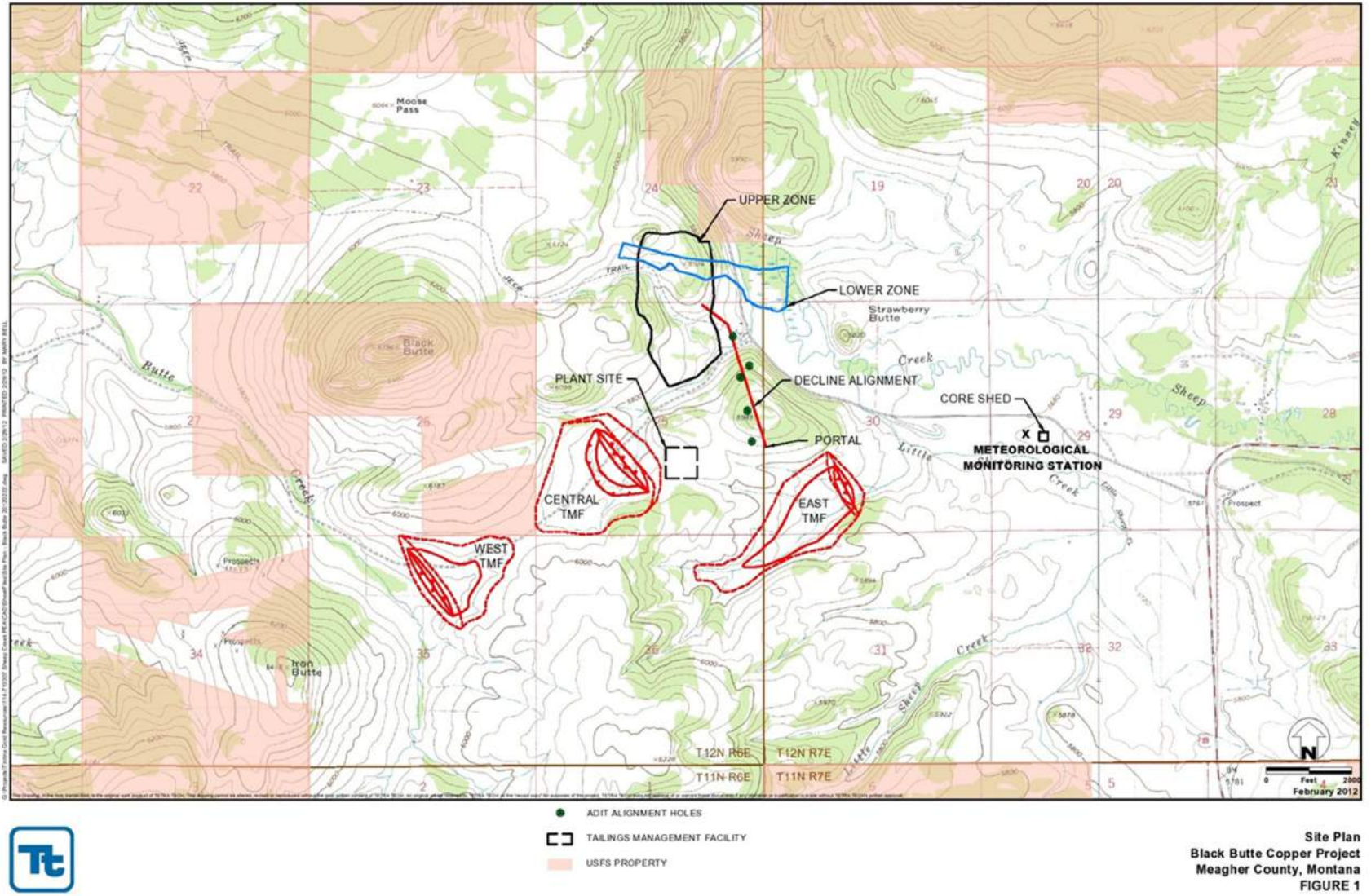
Sandfire Resources, Inc. established an ambient air monitoring site to measure wind speed, wind direction, standard deviation of wind direction, temperature at 9 meters and 2 meters, delta temperature, solar radiation, barometric pressure, and precipitation. The station was established to accurately 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 location of the monitoring site. 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 2018. 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 and manual rain gauge were not operated during the third quarter of 2018.

Figure 1. Monitoring Site Location



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.

Steve Heck of Bison conducted performance audits of the meteorological system on September 21, 2018 and made any necessary calibration adjustments to the meteorological system following the audits.

The start of the third quarter was affected by a power outage that carried over from the second quarter. The power problems were resolved on July 9, 2018, and no data collection interruptions have occurred since then.

3.0 PERFORMANCE AUDIT DATA

Steve Heck of Bison conducted performance audits of the meteorological system on September 21, 2018. All as-found audit results were satisfactory, but several equipment items were replaced following the audit. Those replacements are discussed in Section 4.0.

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

4.0 CALIBRATION DATA

Steve Heck of Bison conducted an as-found performance audit of the meteorological instruments on September 21, 2018 as discussed in Section 3.0. The audit results were acceptable and are presented in Appendix B.

Immediately following the audit, several equipment replacements were made. The new equipment was calibrated and those results are also presented in Appendix B.

Replacements included:

- The two delta temperature probes were replaced because they had begun drifting apart during the last two audits. Audit results for both the old and new sensors were acceptable, although the new sensors produced better results.
- Both aspirator fans were replaced because they had been in use for approximately 15 months. The old fans were working properly when they were removed.
- The precipitation gauge was replaced because the old gauge had an electrical problem that caused the site power to trip whenever its heater cable was plugged in. The old gauge was providing accurate data during the third quarter because the precipitation being measured was in liquid form.
- The new gauge was tested immediately following installation. It produced an acceptable number of bucket tips (70, versus a known of 68) when a known volume of water was introduced. However, the datalogger registered 78 tips. The manufacturer indicated this may have been caused by “bouncing” of the reed switch when the water was introduced at a fast rate – equivalent to approximately 3 inches of rain per hour. The gauge is believed to be working correctly during actual precipitation events. During the next audit a capacitor will be added to filter out any reed switch bouncing effects.

5.0 DATA COMPLETENESS

The meteorological percentages of data recovery achieved during the third quarter of 2018 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 90.9 percent for all parameters at the site. The data losses were due to a power failure at the start of the quarter, plus audit and equipment replacement activities conducted on September 21.

Table 1. Monthly Data Completeness

July 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
Wind Speed	744	542	72.8	0	72.8
Wind Direction	744	542	72.8	0	72.8
Standard Deviation	744	542	72.8	0	72.8
Temperature 9 Meters	744	542	72.8	0	72.8
Temperature 2 Meters	744	542	72.8	0	72.8
Temperature Delta T	744	542	72.8	0	72.8
Solar Radiation	744	542	72.8	0	72.8
Barometric Pressure	744	542	72.8	0	72.8
Relative Humidity	744	542	72.8	0	72.8
Precipitation	744	540	72.6	2	72.8
Total	7,440	5,418	72.8	2	72.8

Table 1. Monthly Data Completeness (Continued)

August 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
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	741	99.6	3	100.0
Total	7,440	7,437	100.0	3	100.0

Table 1. Monthly Data Completeness (Continued)

September 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
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	712	98.9	8	100.0
Total	7,200	7,147	99.3	53	100.0

Table 2. Quarterly Data Completeness

Third Quarter 2018					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
Black Butte Copper Project Met Tower					
Wind Speed	2,208	2,001	90.6	5	90.9
Wind Direction	2,208	2,001	90.6	5	90.9
Standard Deviation	2,208	2,001	90.6	5	90.9
Temperature 9 Meters	2,208	2,001	90.6	5	90.9
Temperature 2 Meters	2,208	2,001	90.6	5	90.9
Temperature Delta T	2,208	2,001	90.6	5	90.9
Solar Radiation	2,208	2,001	90.6	5	90.9
Barometric Pressure	2,208	2,001	90.6	5	90.9
Relative Humidity	2,208	2,001	90.6	5	90.9
Precipitation	2,208	1,993	90.3	13	90.9
Total	22,080	20,002	90.6	58	90.9

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

Mnemonic Code	Description	Equivalent EPA Null Value Reason Code
Sc	Scheduled but not collected	9972
Ti	Sample time out of limits	9973
Fi	Filter damage	9976
Op	Voided by operator	9978
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 2018																		
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	0.6	1.1	1.3	2.2	3.1	1.5	3.1	2.2	0.6	0.9	0.4	0.0	0.6	0.6	1.1	0.9	20.1
	1.1 - 2.0	1.7	1.1	3.5	5.0	3.1	5.5	3.9	1.1	0.7	0.2	0.2	0.6	1.1	0.9	1.1	1.5	31.2
	2.1 - 3.0	0.0	0.6	0.2	1.5	2.0	1.3	0.9	0.4	0.6	0.4	0.6	0.6	2.6	3.0	2.2	1.1	17.7
	3.1 - 4.0	0.4	0.6	1.1	0.4	1.5	0.2	1.3	0.6	0.0	0.2	0.6	0.7	1.8	3.5	2.6	1.1	16.4
	4.1 - 5.0	0.0	0.2	0.2	0.4	0.2	0.0	0.2	0.6	0.4	0.2	0.6	0.9	0.7	2.2	0.7	0.0	7.4
	5.1 - 6.0	0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.4	0.4	0.2	0.2	0.7	0.4	0.4	0.4	0.2	3.7
	6.1 - 7.0	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.2	0.0	0.0	0.2	0.7	0.6	0.4	0.0	3.0
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.2	0.0	0.6
	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	0.0	0.0	0.0	0.0	0.0	0.0
	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	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	3.5	6.5	9.4	10.0	8.5	10.1	5.5	2.8	2.0	2.4	3.9	7.9	11.3	8.7	4.8		100.0
Average Speed	2.0	1.9	1.9	1.7	1.8	1.5	2.0	2.4	2.9	2.2	3.1	4.0	3.2	3.4	3.1	2.3		2.4

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

August 2018																		
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	1.3	0.5	1.9	1.3	2.0	3.4	2.7	1.6	0.8	0.3	0.3	0.0	0.4	0.3	0.7	0.4	17.9
	1.1 - 2.0	0.8	0.4	1.6	3.2	4.8	6.3	3.5	1.9	0.8	0.4	0.5	1.1	0.7	0.5	1.1	1.2	28.9
	2.1 - 3.0	0.3	0.0	0.1	1.7	2.6	1.3	1.2	0.8	0.4	0.0	0.3	0.1	1.5	1.6	1.7	0.4	14.1
	3.1 - 4.0	0.3	0.0	0.1	0.9	0.4	0.5	0.9	0.7	0.3	0.0	0.1	0.7	3.2	3.9	1.3	0.4	13.8
	4.1 - 5.0	0.0	0.0	0.0	0.1	0.5	0.3	0.4	1.1	0.0	0.4	0.1	1.1	2.8	2.0	0.9	0.3	10.1
	5.1 - 6.0	0.0	0.1	0.0	0.3	0.3	0.1	0.8	0.4	0.4	0.1	0.3	0.4	1.9	0.8	0.5	0.4	6.9
	6.1 - 7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.1	0.3	0.9	2.4	0.1	0.4	0.3	5.5
	7.1 - 8.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.8	0.1	0.0	1.9
	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	0.0	0.0	0.1	0.8	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	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	1.1	3.8	7.7	10.6	12.0	9.9	7.0	2.7	1.3	2.0	4.4	13.4	10.2	7.7	3.4		100.0
Average Speed	1.7	1.6	1.2	2.0	2.0	1.6	2.2	2.8	2.2	3.1	3.4	4.2	4.4	3.9	3.7	2.9		2.8

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

September 2018																		
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	0.8	0.7	0.6	0.3	1.5	2.0	2.7	1.1	0.8	0.1	0.4	0.7	0.6	0.3	0.7	0.8	14.1
	1.1 - 2.0	1.1	1.4	1.1	2.8	5.3	5.3	5.6	2.1	1.5	0.6	0.3	0.1	1.1	1.8	1.8	1.0	33.0
	2.1 - 3.0	0.3	0.1	0.3	1.4	2.9	2.1	0.8	2.1	1.3	0.1	0.0	0.6	1.3	0.4	1.7	0.7	16.1
	3.1 - 4.0	0.1	0.6	0.1	0.4	0.7	0.6	0.3	2.4	0.4	0.6	0.3	0.4	2.0	1.7	0.8	0.7	12.0
	4.1 - 5.0	0.4	0.0	0.0	0.1	0.3	0.0	0.4	2.4	0.1	0.1	0.6	0.3	2.1	0.6	1.0	0.8	9.2
	5.1 - 6.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.7	0.3	0.4	0.6	0.6	1.7	0.6	1.4	0.3	7.8
	6.1 - 7.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	1.1	0.0	0.1	0.4	0.1	1.8	0.3	0.3	0.0	4.6
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.1	2.1
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.8
	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	0.1	0.0	0.0	0.0	0.0	0.1
	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	0.0	0.0	0.0
	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	2.9	2.1	5.0	10.8	10.1	10.8	13.8	4.5	2.1	2.8	2.9	11.5	5.7	7.7	4.5		100.0
Average Speed	1.9	1.9	1.5	2.0	1.8	1.7	2.0	3.8	2.2	3.4	4.4	3.6	4.4	3.3	3.2	2.8		2.8

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

Third Quarter 2018																		
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	0.9	0.7	1.2	1.2	2.1	2.3	2.8	1.6	0.7	0.4	0.3	0.2	0.5	0.3	0.8	0.7	17.1
	1.1 - 2.0	1.1	0.9	1.9	3.5	4.5	5.7	4.3	1.7	1.0	0.4	0.3	0.6	0.9	1.1	1.3	1.2	31.0
	2.1 - 3.0	0.2	0.2	0.2	1.5	2.5	1.6	1.0	1.1	0.7	0.1	0.2	0.4	1.7	1.5	1.8	0.7	15.8
	3.1 - 4.0	0.2	0.3	0.4	0.6	0.8	0.4	0.8	1.2	0.2	0.2	0.3	0.6	2.4	3.0	1.5	0.7	13.9
	4.1 - 5.0	0.1	0.0	0.0	0.2	0.3	0.1	0.3	1.4	0.1	0.2	0.4	0.7	2.0	1.5	0.9	0.4	9.0
	5.1 - 6.0	0.0	0.0	0.0	0.1	0.1	0.1	0.5	0.8	0.3	0.2	0.3	0.5	1.4	0.6	0.8	0.3	6.3
	6.1 - 7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.0	0.1	0.2	0.4	1.7	0.3	0.3	0.1	4.5
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.4	0.4	0.1	0.0	1.6
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.0	0.6
	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	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	2.4	3.9	7.2	10.5	10.3	10.3	9.0	3.3	1.8	2.4	3.7	11.2	8.9	7.9	4.1		100.0
Average Speed	1.8	1.8	1.6	1.9	1.9	1.6	2.1	3.3	2.4	2.9	3.8	4.0	4.2	3.6	3.4	2.7		2.7

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

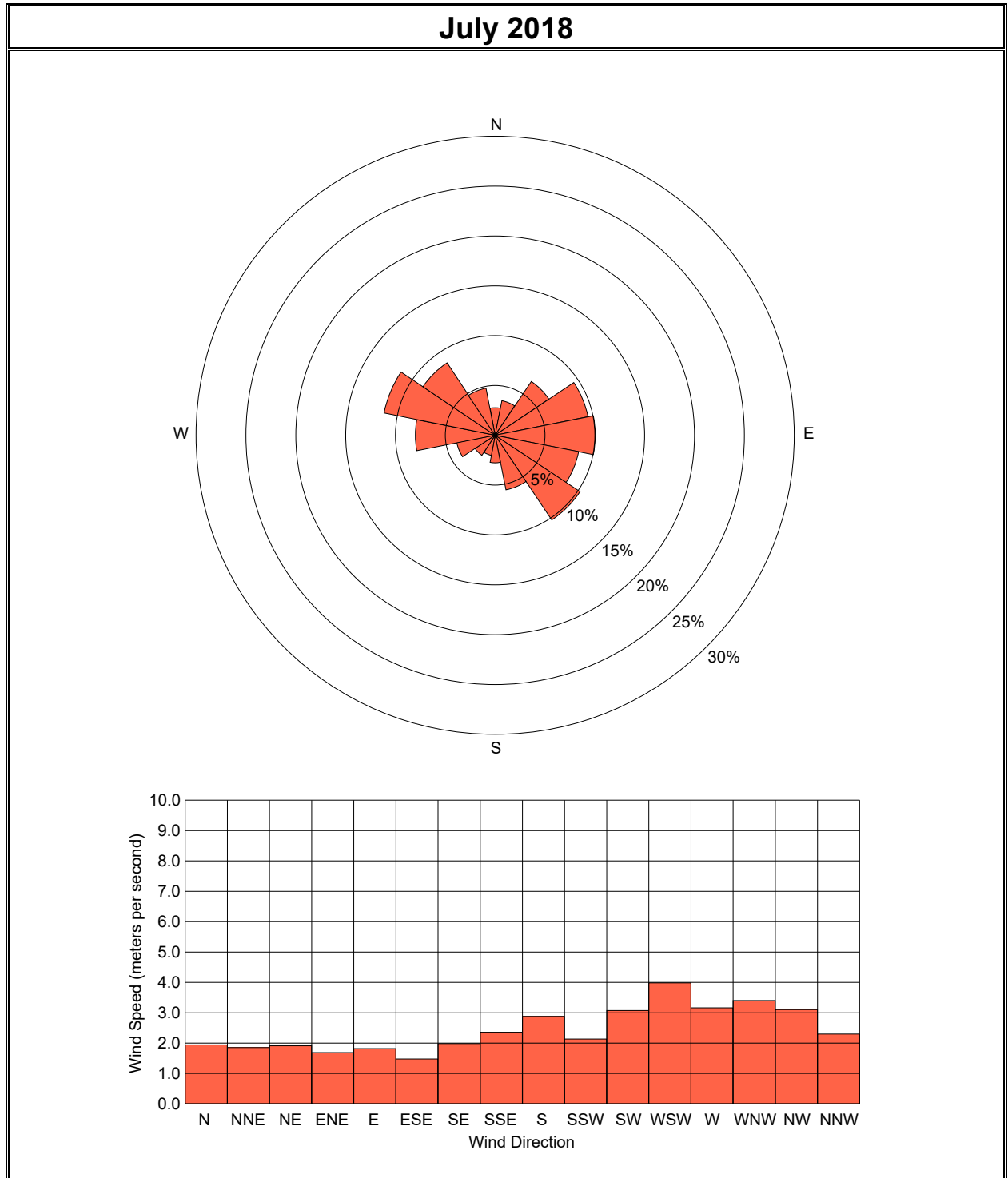


Figure 3. Monthly Wind Rose, Black Butte Copper Project Met Tower

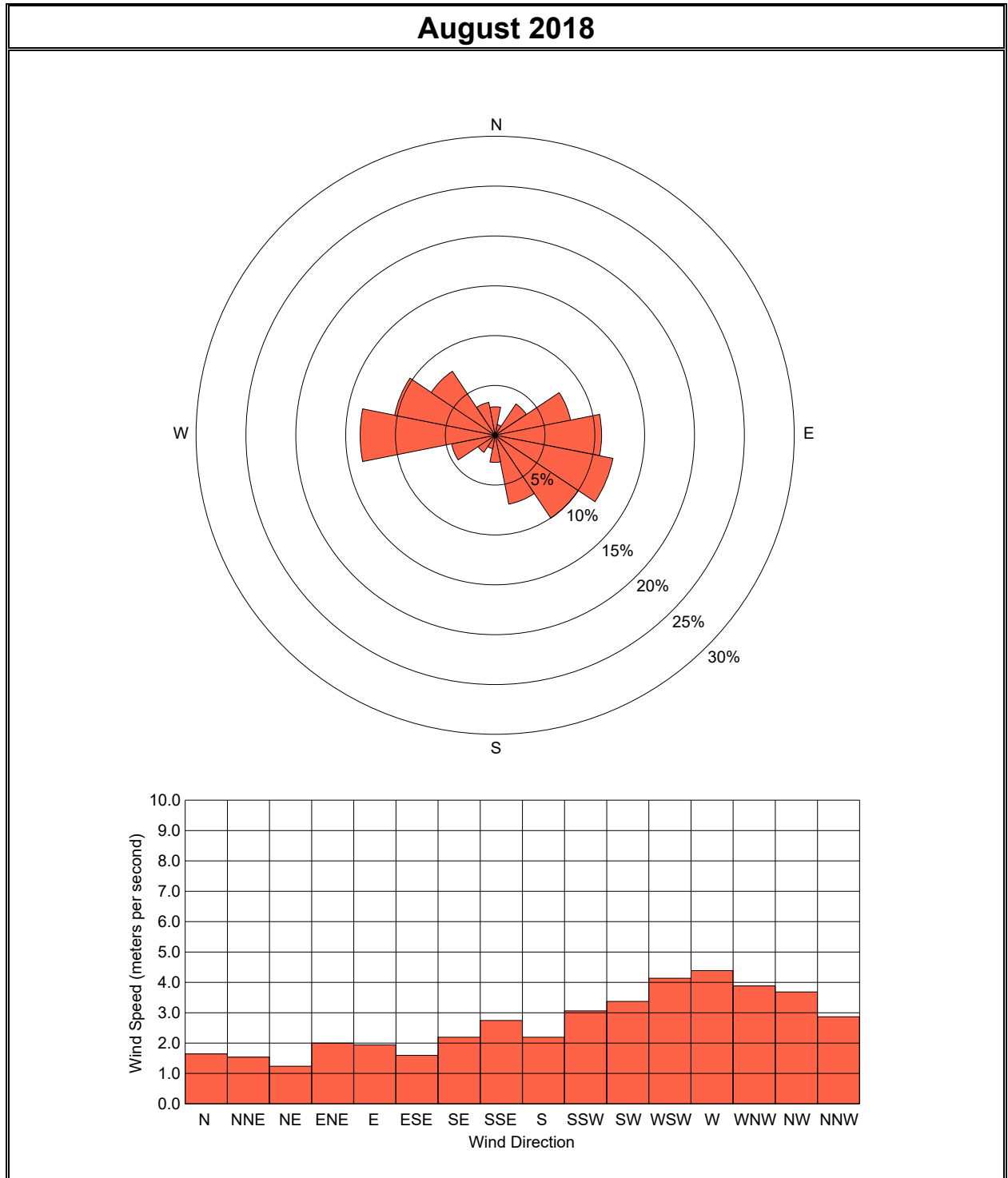


Figure 4. Monthly Wind Rose, Black Butte Copper Project Met Tower

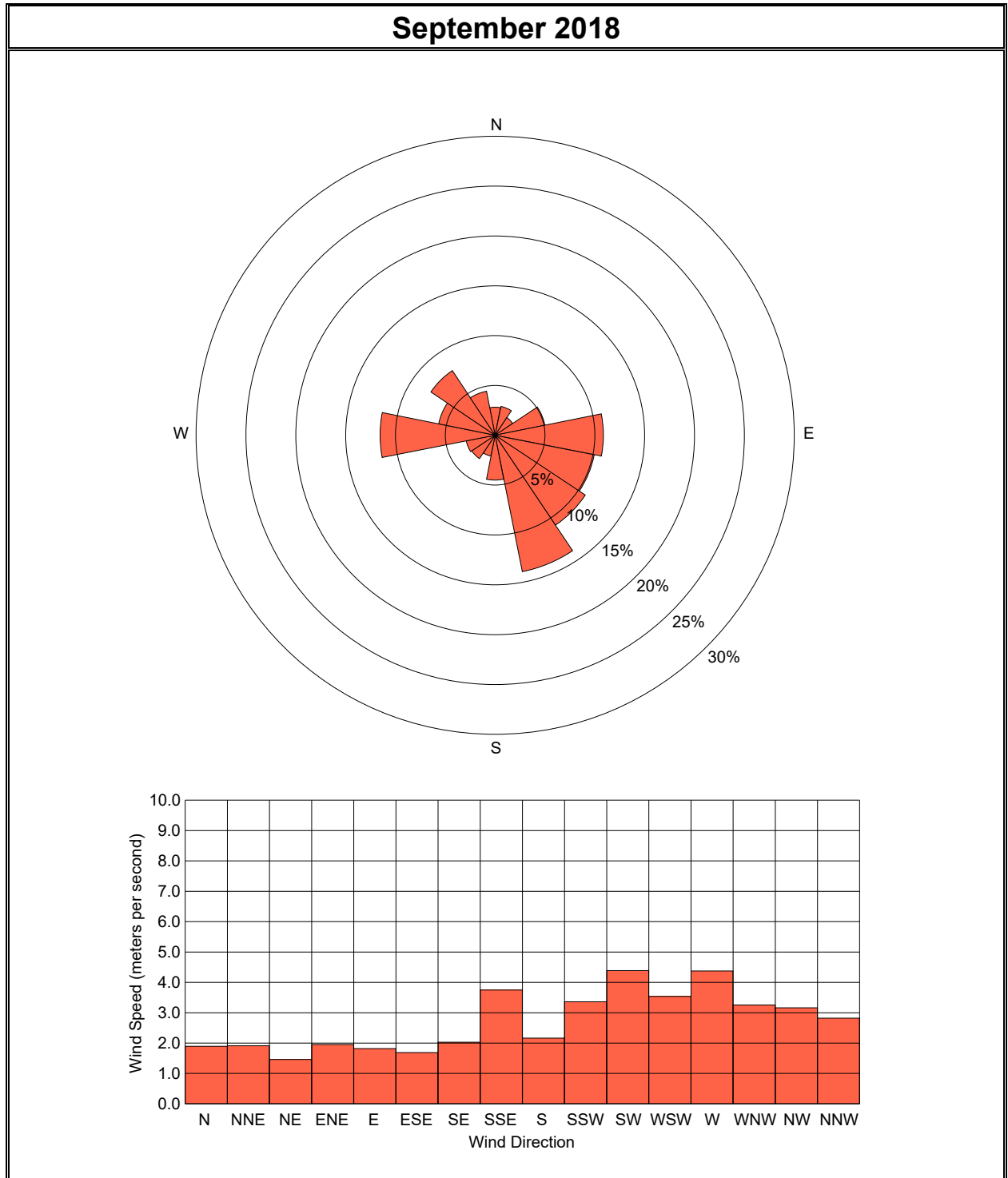
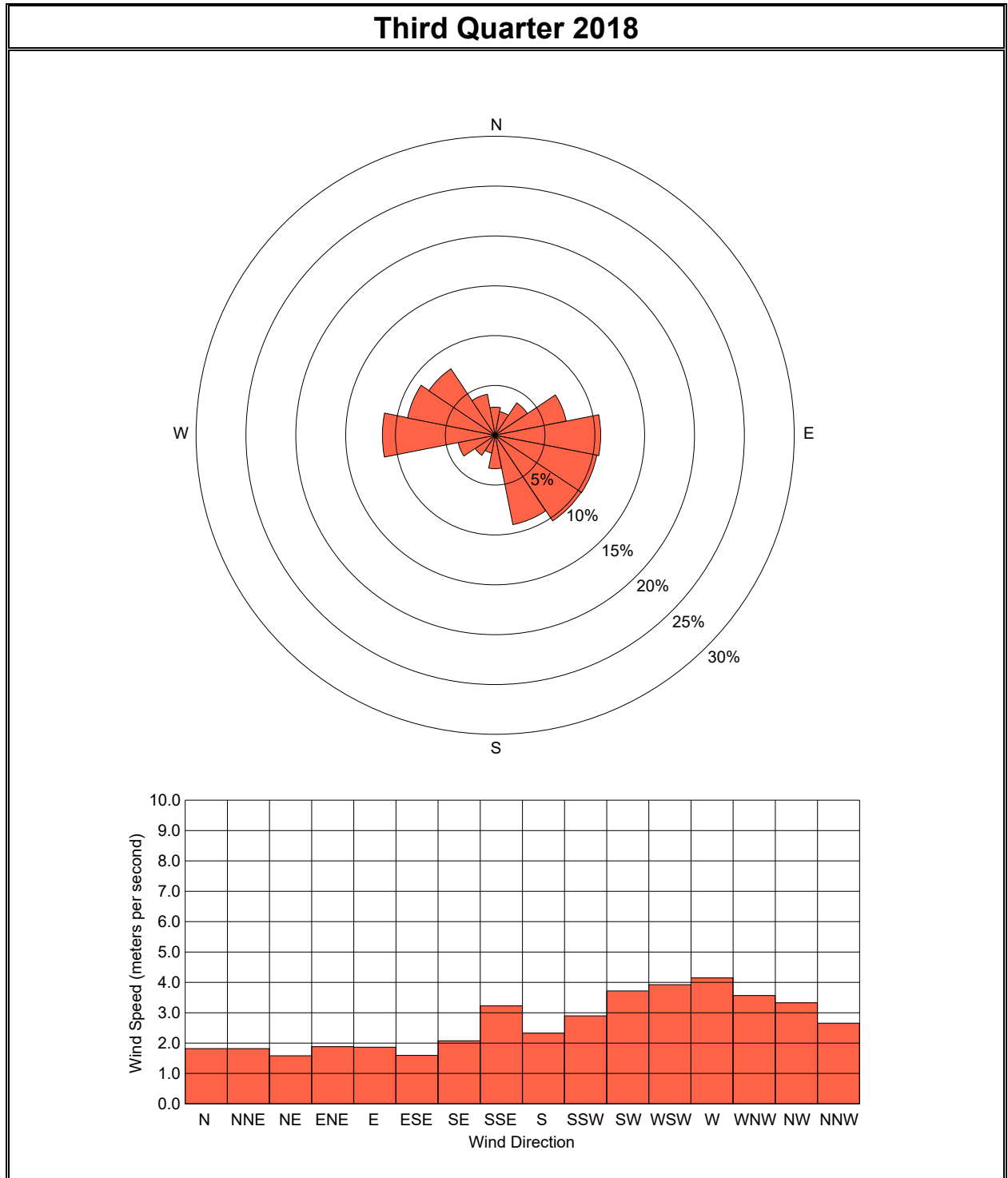


Figure 5. Quarterly Wind Rose, Black Butte Copper Project Met Tower



**APPENDIX A: HOURLY AIR QUALITY AND
METEOROLOGICAL DATA, THIRD QUARTER 2018**

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Speed (meters per second)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	1.1	Pw	2.0	1.7	1.8	3.2	4.4	3.3	4.7	7.0	4.2	2.4	2.6	1.3	2.6	3.0	7.0	1.1	
10	3.1	1.3	1.5	1.2	1.5	1.4	1.0	0.5	1.8	5.6	6.6	5.7	6.0	6.2	3.3	2.3	7.0	7.6	5.9	5.0	3.8	1.8	1.3	1.2	3.4	7.6	0.5	
11	1.2	1.0	1.1	1.5	1.5	0.8	0.6	0.8	1.9	2.4	2.9	3.5	2.8	2.8	3.0	2.9	2.3	2.4	1.9	3.6	3.4	2.8	1.4	1.3	2.1	3.6	0.6	
12	0.7	0.6	1.0	0.8	0.7	0.7	0.6	0.9	1.7	1.9	2.6	2.9	3.3	3.0	3.4	3.5	3.3	2.5	2.1	1.2	2.1	2.7	1.6	1.1	1.9	3.5	0.6	
13	0.7	0.9	0.8	1.0	1.0	1.4	0.8	0.8	0.8	1.5	1.7	4.1	4.3	5.4	4.0	4.2	4.5	4.2	3.1	1.4	1.4	2.0	1.4	1.5	2.2	5.4	0.7	
14	1.1	1.0	1.4	1.1	1.7	1.2	1.2	0.8	0.6	1.8	3.6	4.2	4.8	5.8	6.1	6.1	5.1	4.9	5.0	3.9	1.6	0.7	0.6	0.8	2.7	6.1	0.6	
15	0.8	1.2	2.0	4.9	1.5	0.9	5.2	6.3	5.7	3.5	2.6	1.8	3.8	3.9	3.8	2.5	2.1	2.6	1.0	1.8	1.4	1.3	1.1	0.6	2.6	6.3	0.6	
16	1.2	1.0	1.4	1.0	1.2	1.4	0.8	0.6	2.4	3.9	2.1	2.2	3.2	4.1	2.9	2.8	2.6	3.2	1.2	1.6	1.7	2.2	2.2	1.0	2.0	4.1	0.6	
17	1.3	1.7	1.5	1.6	1.7	1.6	1.0	0.7	3.2	4.5	6.2	3.1	3.2	3.7	1.9	1.9	3.9	4.1	4.8	1.3	1.3	1.2	1.0	1.1	2.4	6.2	0.7	
18	1.0	1.6	0.8	1.3	1.3	1.4	1.0	0.7	1.3	3.4	3.9	4.5	6.9	6.7	7.4	6.8	5.5	6.9	6.4	4.1	1.2	2.5	2.0	2.0	3.4	7.4	0.7	
19	1.3	1.1	0.9	0.9	0.8	0.9	0.7	0.8	1.9	5.0	3.8	3.3	3.0	2.9	3.8	3.3	3.4	2.6	1.4	0.9	3.0	1.6	0.8	0.8	2.0	5.0	0.7	
20	1.5	0.8	0.5	0.8	0.8	0.9	0.6	0.7	2.2	2.7	4.4	4.6	4.5	3.9	4.5	3.8	2.4	2.1	2.0	1.8	3.2	3.4	1.3	1.2	2.3	4.6	0.5	
21	1.0	1.1	0.7	0.5	0.8	0.8	1.0	0.8	0.7	1.4	3.7	4.9	5.6	5.1	7.1	5.8	5.8	5.1	4.2	2.3	1.3	1.4	1.7	1.5	2.7	7.1	0.5	
22	1.2	0.9	1.4	1.3	1.9	2.1	0.8	0.9	2.3	3.5	3.3	3.1	3.2	3.3	3.2	3.0	2.6	2.0	2.2	2.9	3.1	3.0	2.5	1.4	2.3	3.5	0.8	
23	1.0	1.0	0.7	0.9	1.0	0.8	1.1	5.2	5.6	6.5	4.0	2.6	2.5	4.1	4.3	4.1	4.9	3.9	2.5	1.0	2.3	3.2	2.0	1.9	2.8	6.5	0.7	
24	1.5	1.2	1.1	1.2	0.7	0.6	0.6	1.5	2.0	2.2	1.8	2.8	2.9	3.9	4.0	3.8	3.9	3.3	2.6	3.3	2.0	2.7	2.3	2.2	2.3	4.0	0.6	
25	1.2	1.6	0.7	1.5	1.0	0.8	0.6	1.8	6.7	5.0	3.6	3.2	2.3	3.6	4.2	3.8	3.9	4.7	3.1	2.4	3.3	2.2	3.1	3.4	2.8	6.7	0.6	
26	3.9	1.8	1.0	1.4	1.4	1.3	1.7	3.2	2.0	2.0	2.3	3.8	3.4	4.9	2.7	3.0	4.2	5.3	4.3	3.3	3.4	2.8	2.5	1.9	2.8	5.3	1.0	
27	1.7	1.3	0.9	1.1	1.7	1.2	1.0	1.3	0.9	1.3	3.0	5.9	6.7	2.9	2.0	1.7	3.5	2.8	3.0	2.0	1.8	1.5	1.6	1.4	2.2	6.7	0.9	
28	1.6	1.3	1.0	1.1	1.0	0.9	0.4	0.5	1.2	2.5	2.0	2.6	2.8	5.5	3.9	3.5	4.0	3.1	3.5	1.6	1.3	1.8	1.9	1.5	2.1	5.5	0.4	
29	1.8	1.2	2.0	1.1	1.0	0.8	0.9	0.6	0.7	2.1	3.0	3.3	2.7	3.7	4.4	4.2	3.1	3.3	4.3	2.7	1.8	2.6	2.3	1.7	2.3	4.4	0.6	
30	2.1	1.2	1.0	1.0	1.3	0.9	0.8	0.8	0.7	1.7	2.2	3.3	3.0	3.3	2.5	2.1	2.9	2.1	1.7	1.1	2.5	2.3	1.6	1.7	1.8	3.3	0.7	
31	1.3	1.2	1.0	1.4	1.1	0.8	1.1	0.9	1.5	1.7	1.6	2.4	2.6	3.7	2.7	3.4	3.4	2.7	3.0	3.4	3.4	4.0	1.1	0.9	2.1	4.0	0.8	
Avg	1.5	1.2	1.1	1.3	1.2	1.1	1.1	1.4	2.2	2.9	3.2	3.5	3.7	4.1	3.8	3.6	3.8	3.7	3.3	2.5	2.3	2.3	1.7	1.5	2.4	5.4	0.7	
Max	3.9	1.8	2.0	4.9	1.9	2.1	5.2	6.3	6.7	6.5	6.6	5.9	6.9	6.7	7.4	6.8	7.0	7.6	7.0	5.0	3.8	4.0	3.1	3.4	3.4	7.6	1.1	
Min	0.7	0.6	0.5	0.5	0.7	0.6	0.4	0.5	0.6	1.1	1.6	1.8	1.7	1.8	1.9	1.7	2.1	2.0	1.0	0.9	1.2	0.7	0.6	0.6	1.8	3.3	0.4	

A-1

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Speed (meters per second)
August 2018

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	1.3	2.4	1.5	3.1	1.7	1.6	1.0	1.0	1.5	3.1	3.2	3.5	4.8	4.4	5.6	5.6	5.3	3.4	1.7	1.5	1.4	1.3	1.6	1.8	2.6	5.6	1.0
2	1.1	1.5	0.9	1.1	1.0	0.8	0.7	0.5	1.3	3.2	3.6	4.3	4.9	4.2	4.0	5.8	6.7	4.4	3.9	4.4	6.0	3.8	3.4	2.5	3.1	6.7	0.5
3	1.4	1.2	1.5	1.9	1.6	1.5	1.2	1.0	0.9	2.8	3.1	3.5	3.3	4.6	7.4	7.1	7.8	8.1	8.2	4.0	1.8	3.0	2.2	2.0	3.4	8.2	0.9
4	2.0	1.6	1.2	0.7	1.0	1.4	0.9	0.7	1.7	3.4	3.3	4.3	4.5	3.6	4.1	3.6	3.9	3.4	3.7	5.2	1.4	1.4	1.9	0.9	2.5	5.2	0.7
5	1.6	1.2	1.1	1.3	1.6	2.0	3.3	2.7	1.2	1.5	2.3	2.2	5.2	5.8	4.9	3.5	5.6	5.2	2.2	2.5	1.6	2.3	1.8	1.2	2.7	5.8	1.1
6	1.7	1.3	1.0	0.7	1.0	1.2	0.7	0.5	0.5	2.2	3.7	3.6	3.4	4.1	3.4	3.6	3.6	3.5	3.2	1.7	3.0	2.9	2.7	2.2	2.3	4.1	0.5
7	1.7	1.2	1.2	1.0	1.1	1.0	0.6	0.8	0.6	3.0	4.5	4.6	3.8	3.5	3.6	4.4	4.6	3.3	2.8	1.3	2.2	3.1	2.5	2.1	2.4	4.6	0.6
8	1.6	1.7	1.6	1.3	1.3	1.0	1.0	0.5	0.5	1.9	4.1	3.3	3.8	2.6	3.4	3.7	4.2	2.6	2.6	1.6	3.4	2.7	2.4	1.9	2.3	4.2	0.5
9	1.4	1.0	1.1	1.1	0.9	1.2	0.7	0.6	0.6	1.5	3.1	3.6	4.1	3.5	3.5	2.5	3.6	4.1	2.9	1.0	2.4	2.4	1.8	1.5	2.1	4.1	0.6
10	1.8	1.1	0.7	0.9	1.2	0.9	0.8	0.5	0.4	0.8	1.7	2.8	3.5	3.4	4.4	1.7	2.3	2.5	1.1	1.8	2.8	2.4	2.2	1.2	1.8	4.4	0.4
11	0.6	1.2	1.0	0.6	1.2	1.3	0.9	0.6	0.6	0.9	1.6	2.4	2.8	4.4	3.7	4.5	5.5	5.4	9.0	5.0	2.5	5.3	4.2	1.9	2.8	9.0	0.6
12	1.5	1.2	0.9	1.4	1.0	1.0	1.0	0.9	1.1	3.5	4.6	4.6	4.8	5.6	5.1	5.7	4.8	4.5	4.1	5.3	2.4	2.3	3.2	1.2	3.0	5.7	0.9
13	1.1	0.8	0.9	0.9	1.1	0.6	0.6	1.3	1.6	2.3	4.3	4.5	2.0	1.8	2.9	3.1	4.5	6.2	6.6	3.7	3.1	3.0	2.5	1.0	2.5	6.6	0.6
14	1.4	0.7	1.1	0.7	0.4	0.9	0.9	0.7	0.9	1.8	3.3	4.1	3.6	3.4	3.6	3.5	4.0	4.4	3.6	2.1	2.5	1.2	1.8	1.3	2.2	4.4	0.4
15	1.0	1.1	1.2	0.9	0.7	1.1	0.7	0.5	0.7	2.5	4.5	3.5	3.6	3.9	3.9	3.4	1.6	1.2	0.8	1.9	2.3	2.6	1.9	1.6	2.0	4.5	0.5
16	1.0	1.5	1.0	1.3	0.8	0.8	1.0	0.6	0.6	0.8	2.3	2.9	3.6	3.2	3.5	3.1	3.1	2.9	2.4	2.1	1.9	2.7	1.8	1.5	1.9	3.6	0.6
17	0.8	1.5	1.1	1.0	0.9	0.9	1.1	0.5	0.6	1.7	1.1	1.8	3.5	3.0	3.7	2.2	2.2	3.3	5.7	4.3	1.3	2.4	4.6	1.8	2.1	5.7	0.5
18	1.1	1.3	1.1	1.0	2.8	1.5	3.2	2.6	1.8	2.3	2.9	1.9	1.3	0.9	1.9	6.4	7.8	5.9	4.1	4.2	6.1	2.3	1.7	1.3	2.8	7.8	0.9
19	1.7	1.7	2.0	1.4	1.4	1.4	1.3	0.7	0.6	1.4	2.8	3.0	3.4	3.2	3.6	5.5	6.8	6.1	4.9	2.8	2.4	5.5	2.0	2.4	2.8	6.8	0.6
20	2.8	2.5	4.8	2.4	1.3	1.3	1.7	4.7	4.0	5.8	5.2	6.7	5.8	2.2	1.1	1.6	0.8	1.8	3.1	2.0	2.5	2.3	2.8	3.6	3.0	6.7	0.8
21	4.8	3.8	2.2	1.3	2.7	2.7	1.6	2.0	3.6	4.9	4.1	5.8	6.0	6.0	6.5	5.4	4.9	5.0	4.4	3.5	1.8	0.8	1.4	3.4	3.7	6.5	0.8
22	3.1	2.4	2.7	2.8	3.3	3.5	3.2	3.1	2.0	1.7	1.8	4.4	4.0	5.1	6.6	4.6	5.8	4.9	1.7	1.8	2.7	3.0	1.0	1.4	3.2	6.6	1.0
23	1.0	0.8	0.9	1.5	0.7	0.9	0.8	0.7	0.8	4.1	4.6	4.2	5.3	5.7	5.5	6.5	6.2	5.6	5.0	2.6	2.4	2.7	2.4	1.4	3.0	6.5	0.7
24	1.6	1.4	1.1	1.0	0.9	0.8	1.2	0.6	0.8	1.2	3.3	5.2	4.5	4.6	7.1	7.6	5.4	5.6	5.3	4.3	2.2	2.6	1.9	1.0	3.0	7.6	0.6
25	1.3	1.5	1.3	1.0	0.8	1.1	0.9	0.7	0.8	1.2	3.5	4.8	5.3	4.5	4.7	3.8	3.2	1.7	2.1	2.3	1.7	1.5	1.3	1.4	2.2	5.3	0.7
26	1.3	1.9	1.5	1.5	1.4	1.1	0.9	1.9	3.7	5.1	6.0	6.3	6.6	6.1	5.7	6.9	6.0	5.5	4.4	2.9	1.3	2.1	1.4	1.0	3.4	6.9	0.9
27	0.5	1.1	0.5	0.4	0.8	1.2	2.3	3.2	4.9	5.5	6.4	7.4	7.7	8.1	8.4	8.3	7.8	6.6	4.9	4.1	3.9	4.2	3.5	2.9	4.4	8.4	0.4
28	2.8	1.6	0.9	1.1	0.6	0.8	1.0	0.9	1.3	3.1	3.9	6.1	7.6	6.8	6.3	6.7	6.2	6.0	5.5	2.9	1.5	1.4	2.0	2.4	3.3	7.6	0.6
29	1.5	0.9	1.2	1.1	1.2	1.0	0.9	0.6	0.7	4.9	6.3	6.7	6.4	5.7	6.1	7.2	6.7	6.1	4.4	1.0	1.5	1.6	1.1	1.4	3.2	7.2	0.6
30	1.5	0.9	1.2	1.1	1.3	1.1	1.1	0.9	1.7	6.7	6.8	6.9	7.4	7.4	7.3	8.1	6.2	4.0	1.5	1.7	2.8	2.3	2.3	6.1	3.7	8.1	0.9
31	4.8	2.6	5.2	4.4	1.1	1.6	1.7	1.5	5.6	4.8	5.6	6.9	6.7	6.1	6.8	6.5	6.6	6.7	4.6	1.9	1.6	1.9	2.2	1.6	4.1	6.9	1.1
Avg	1.7	1.5	1.5	1.4	1.3	1.3	1.3	1.2	1.5	2.9	3.8	4.4	4.6	4.4	4.8	4.9	5.0	4.5	3.9	2.8	2.5	2.5	2.2	1.9	2.8	6.2	0.7
Max	4.8	3.8	5.2	4.4	3.3	3.5	3.3	4.7	5.6	6.7	6.8	7.4	7.7	8.1	8.4	8.3	7.8	8.1	9.0	5.3	6.1	5.5	4.6	6.1	4.4	9.0	1.1
Min	0.5	0.7	0.5	0.4	0.4	0.6	0.6	0.5	0.4	0.8	1.1	1.8	1.3	0.9	1.1	1.6	0.8	1.2	0.8	1.0	1.3	0.8	1.0	0.9	1.8	3.6	0.4

A-2

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Speed (meters per second)
September 2018

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	1.7	1.2	1.5	0.9	1.5	1.4	1.5	0.9	0.9	3.8	6.7	8.5	6.4	6.1	5.4	5.2	5.6	4.4	3.2	1.6	2.9	2.4	1.7	1.2	3.2	8.5	0.9
2	1.0	0.6	1.0	1.0	1.2	1.3	1.2	0.6	0.8	2.0	4.2	5.2	5.6	5.9	6.1	5.7	6.9	5.4	3.0	1.7	2.9	2.9	2.0	1.8	2.9	6.9	0.6
3	1.2	1.3	0.7	1.1	1.1	0.8	1.4	1.0	0.7	2.8	5.9	6.4	7.1	8.4	8.0	7.7	6.8	7.5	6.5	3.1	1.5	1.0	1.5	1.6	3.5	8.4	0.7
4	1.6	3.2	1.3	1.2	0.9	0.7	1.4	4.4	6.7	7.4	6.2	5.2	5.2	3.9	4.7	5.4	6.0	7.1	5.3	2.2	1.5	2.0	2.0	2.5	3.7	7.4	0.7
5	2.1	2.6	1.7	2.3	1.2	1.6	1.2	1.5	4.9	5.2	3.6	3.1	2.7	2.8	3.6	3.9	3.5	2.5	5.2	3.3	1.8	2.5	3.3	2.5	2.9	5.2	1.2
6	2.1	2.1	1.7	1.6	1.9	1.5	1.1	0.8	1.0	1.1	3.6	2.3	3.1	3.1	4.0	5.2	5.6	2.9	4.1	5.7	3.9	1.6	1.3	1.3	2.6	5.7	0.8
7	2.2	1.6	0.9	1.1	1.7	1.1	1.0	1.0	0.7	1.8	2.2	4.0	4.3	4.1	5.0	9.5	5.2	1.9	2.9	1.4	2.5	1.3	0.9	1.2	2.5	9.5	0.7
8	4.2	2.5	1.8	1.4	1.2	2.0	1.2	1.0	1.0	1.9	4.9	5.6	6.7	8.0	7.2	6.0	5.5	4.4	4.0	2.1	2.6	1.6	1.8	1.9	3.4	8.0	1.0
9	0.7	0.9	1.6	1.4	1.2	1.2	1.2	1.0	2.1	5.8	5.5	5.6	5.1	6.1	6.2	5.2	3.8	3.1	1.9	1.6	3.0	2.2	1.6	1.0	2.9	6.2	0.7
10	1.4	2.3	2.0	1.4	1.0	1.1	1.2	0.8	0.8	2.0	5.3	4.8	6.4	6.5	5.8	6.9	5.5	3.6	5.8	3.5	4.5	3.6	4.4	4.3	3.5	6.9	0.8
11	1.3	1.6	1.4	1.2	1.3	1.5	0.6	0.9	1.1	2.1	2.5	2.7	2.1	3.0	2.3	1.3	0.8	2.6	2.1	2.4	2.3	4.5	7.8	7.2	2.4	7.8	0.6
12	2.4	2.3	1.7	1.7	3.2	2.0	1.3	1.2	0.8	1.9	2.0	3.8	4.0	3.1	4.0	4.6	2.8	2.6	3.2	2.7	2.9	2.3	2.7	3.1	2.6	4.6	0.8
13	2.2	1.7	2.1	2.3	2.4	1.3	2.7	3.1	2.7	2.8	4.6	4.5	4.5	6.7	4.0	3.7	4.1	5.2	4.0	4.1	2.8	2.1	2.0	1.5	3.2	6.7	1.3
14	2.1	1.5	1.8	1.0	1.0	1.3	1.1	0.7	0.7	1.6	2.1	2.5	3.8	3.1	3.2	4.3	5.7	6.3	5.3	2.2	2.4	3.6	4.9	4.5	2.8	6.3	0.7
15	5.1	6.0	4.7	3.5	1.9	1.3	1.1	0.7	1.4	2.5	1.6	2.2	1.7	1.7	2.2	2.4	4.5	3.8	3.9	4.8	4.9	3.9	7.6	3.5	3.2	7.6	0.7
16	1.5	1.1	1.2	0.8	1.3	1.1	1.2	1.1	1.6	2.7	3.6	5.8	7.0	9.0	8.2	6.4	4.5	3.9	3.2	1.9	1.6	1.6	2.8	2.3	3.1	9.0	0.8
17	1.0	1.3	1.5	1.4	2.3	3.4	3.4	1.7	0.9	1.3	3.1	5.0	5.4	4.3	3.7	2.4	2.7	3.0	3.5	1.1	2.3	1.1	1.4	1.3	2.4	5.4	0.9
18	0.7	1.0	1.7	1.0	1.1	0.7	0.8	0.6	1.3	4.4	3.1	3.1	4.0	3.3	3.3	4.8	4.5	3.8	2.8	1.8	2.8	2.0	1.4	1.4	2.3	4.8	0.6
19	2.8	1.2	1.1	0.8	1.0	1.5	1.4	0.9	1.2	1.2	1.9	3.2	2.3	1.6	2.0	3.4	4.1	4.1	2.6	1.4	1.9	2.4	1.5	2.0	2.0	4.1	0.8
20	2.5	1.7	2.2	2.1	1.1	1.1	1.4	2.0	2.3	4.4	5.3	5.1	6.4	6.0	3.8	4.2	3.3	1.3	1.2	2.0	1.4	2.2	1.2	1.6	2.7	6.4	1.1
21	1.5	0.8	1.3	1.1	0.7	1.5	1.0	1.1	1.5	2.7	Au	Au	Au	Au	Au	3.9	3.2	1.8	2.3	2.8	2.3	1.6	1.2	1.4	1.8	3.9	0.7
22	1.7	1.8	1.5	0.9	1.7	1.8	1.6	1.2	0.8	0.9	5.8	4.8	4.2	4.6	4.6	3.1	1.7	1.5	3.1	1.3	1.1	1.3	1.6	1.8	2.3	5.8	0.8
23	1.2	1.4	1.4	2.1	2.7	1.9	3.7	1.9	1.4	4.6	2.6	3.3	3.8	3.5	5.4	1.3	3.0	3.9	3.6	1.5	2.4	2.4	1.5	1.8	2.6	5.4	1.2
24	1.1	1.4	1.5	1.3	1.3	0.8	0.8	0.7	1.2	4.7	5.0	5.1	5.5	5.6	3.8	5.0	4.1	4.0	1.8	0.7	0.4	1.0	1.4	1.3	2.5	5.6	0.4
25	0.8	1.2	1.0	1.0	0.7	1.0	1.4	1.0	0.8	1.4	2.4	4.0	4.6	5.3	5.0	4.0	3.8	2.5	1.8	2.3	1.9	2.0	1.2	0.6	2.2	5.3	0.6
26	0.4	1.1	1.0	1.0	0.8	0.8	0.5	0.5	0.9	3.2	5.4	5.7	6.2	6.4	6.7	6.8	6.7	5.0	4.3	2.9	1.5	1.7	2.1	2.0	3.1	6.8	0.4
27	1.5	1.3	1.4	0.7	0.9	0.8	0.9	0.6	0.6	0.6	1.9	2.3	4.1	4.1	4.9	4.8	5.4	2.2	1.7	1.7	3.1	4.1	2.8	1.0	2.2	5.4	0.6
28	1.0	1.0	1.9	2.9	1.9	1.2	4.7	3.9	5.3	6.2	7.1	7.8	8.1	8.3	7.8	6.9	5.9	5.5	4.2	4.0	4.3	3.0	2.1	1.0	4.4	8.3	1.0
29	1.2	0.5	0.7	0.7	1.0	0.9	0.8	1.8	1.9	2.2	2.7	2.6	4.1	4.3	3.5	1.6	1.6	1.5	3.0	2.9	1.8	1.5	1.5	2.3	1.9	4.3	0.5
30	3.3	3.5	3.0	3.6	6.2	5.6	6.5	6.1	5.3	5.0	6.2	6.6	7.2	4.8	4.6	3.5	2.5	1.7	1.1	0.9	0.9	1.0	1.3	1.1	3.8	7.2	0.9
Avg	1.8	1.7	1.6	1.5	1.6	1.5	1.6	1.5	1.8	3.0	4.0	4.5	4.9	5.0	4.8	4.6	4.3	3.6	3.4	2.4	2.4	2.2	2.4	2.1	2.8	6.4	0.8
Max	5.1	6.0	4.7	3.6	6.2	5.6	6.5	6.1	6.7	7.4	7.1	8.5	8.1	9.0	8.2	9.5	6.9	7.5	6.5	5.7	4.9	4.5	7.8	7.2	4.4	9.5	1.3
Min	0.4	0.5	0.7	0.7	0.7	0.7	0.5	0.5	0.6	0.6	1.6	2.2	1.7	1.6	2.0	1.3	0.8	1.3	1.1	0.7	0.4	1.0	0.9	0.6	1.8	3.9	0.4

A-3

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Direction (degrees)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	351	Pw	357	276	26	247	218	221	170	146	93	115	111	121	105	134
10	118	88	151	161	110	123	127	213	155	173	181	191	211	275	271	314	297	320	323	323	347	344	119	147	180
11	126	132	99	65	54	76	145	344	263	236	291	291	265	322	331	321	293	295	283	35	68	64	360	110	356
12	204	112	178	332	27	97	205	342	128	252	268	269	275	277	272	290	282	286	269	269	116	75	64	64	272
13	86	83	62	87	111	119	135	269	33	333	302	243	254	283	289	283	258	275	287	248	128	71	9	120	320
14	119	97	68	66	105	61	64	156	277	327	298	292	294	278	275	280	300	313	300	269	215	162	186	150	279
15	119	108	120	132	108	128	142	146	149	154	149	244	311	285	286	272	272	246	226	44	132	113	58	74	145
16	46	53	42	59	63	83	168	296	137	143	135	202	310	300	261	254	302	320	259	135	113	110	104	78	93
17	92	90	78	72	92	110	144	20	156	168	240	287	47	92	276	296	278	286	267	7	76	143	104	117	95
18	132	145	314	140	90	116	166	282	345	301	284	285	263	288	296	293	304	306	314	295	42	91	51	90	312
19	143	125	124	92	134	87	325	322	315	297	280	287	287	310	258	299	272	299	345	335	77	161	217	156	291
20	137	164	174	343	21	19	128	307	145	154	191	227	245	243	251	229	230	283	135	96	95	34	297	113	184
21	40	108	101	73	91	85	147	144	58	340	217	198	238	232	239	240	250	254	164	86	53	70	49	111	123
22	190	132	119	171	89	87	78	313	329	305	303	286	294	323	320	282	317	358	332	83	80	73	77	82	12
23	146	126	151	50	76	47	192	153	144	149	146	140	28	275	279	291	288	294	288	167	90	91	77	75	124
24	92	37	94	29	153	52	5	350	310	305	286	301	329	336	312	323	332	327	331	207	110	91	21	41	358
25	1	67	38	131	61	88	27	332	149	152	145	134	124	282	303	317	309	34	48	74	82	123	127	51	70
26	57	40	355	142	128	136	104	146	183	188	315	306	272	236	208	184	60	53	59	101	129	86	99	68	110
27	27	142	80	36	112	39	142	162	321	2	290	340	355	321	56	98	313	313	301	56	88	113	121	61	43
28	77	13	11	70	117	90	114	157	34	174	144	169	335	274	349	15	13	360	44	56	58	75	91	68	61
29	63	32	56	49	124	87	116	116	271	295	305	294	314	342	321	324	337	22	31	23	134	92	57	48	27
30	94	71	63	46	124	81	132	196	283	340	272	263	312	251	242	278	267	289	279	320	83	68	59	102	341
31	12	90	58	123	111	100	105	79	326	315	324	227	264	275	266	323	304	296	264	164	81	79	128	208	16
Prev	96	94	85	80	97	87	127	244	254	267	257	260	291	290	282	288	293	308	303	52	93	91	82	94	59

A-4

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Direction (degrees)
August 2018

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	146	132	125	99	134	123	148	108	148	139	257	281	263	266	260	254	266	274	243	228	99	43	77	76	168
2	75	111	82	77	63	56	136	117	354	313	287	286	262	266	266	173	164	82	76	83	81	92	60	69	79
3	81	43	39	99	60	88	55	335	34	309	296	300	266	279	281	285	297	305	320	310	322	105	85	79	353
4	45	58	130	52	71	88	170	13	335	316	300	255	293	298	285	290	276	327	348	24	155	15	101	111	360
5	99	321	121	267	161	111	46	307	232	247	137	227	75	71	84	133	160	181	281	319	242	107	118	82	139
6	68	109	101	102	152	137	143	266	272	312	296	303	283	262	264	252	261	267	276	275	94	96	75	63	252
7	51	61	104	108	118	132	132	5	332	291	273	272	298	310	282	314	280	299	291	180	109	77	78	83	6
8	83	116	115	111	113	118	154	313	321	332	285	319	249	286	296	277	270	309	295	58	80	77	91	113	17
9	100	77	98	127	122	115	134	8	13	344	297	297	245	282	311	244	251	279	298	140	74	64	84	44	43
10	84	69	85	95	136	109	167	127	307	1	57	283	305	263	239	328	349	307	306	122	79	90	72	108	62
11	74	84	85	36	128	124	116	153	359	356	120	300	226	197	261	285	291	307	317	324	90	89	92	86	68
12	91	41	111	128	104	98	144	35	329	301	311	295	278	280	273	288	303	313	316	328	354	35	113	185	341
13	200	164	162	148	161	136	110	331	334	322	164	152	237	235	155	147	143	143	134	131	103	100	108	133	148
14	149	147	136	143	136	36	62	1	353	307	294	292	268	321	276	272	286	298	339	95	79	71	50	70	7
15	47	78	127	105	64	121	104	73	1	307	265	266	261	272	282	282	348	11	355	105	71	102	103	94	51
16	53	112	108	151	116	91	132	95	151	40	331	276	276	298	281	304	282	281	321	81	77	75	73	79	65
17	9	80	80	104	81	22	123	218	137	163	255	346	300	265	288	315	294	1	338	311	131	140	76	120	39
18	107	97	139	35	146	123	1	296	265	310	330	323	203	129	9	337	357	346	330	338	334	310	89	101	5
19	84	57	103	111	70	126	123	217	326	172	150	163	165	156	144	146	147	143	134	126	142	155	131	150	136
20	153	191	122	128	282	208	155	166	170	140	107	156	145	137	188	293	211	97	134	142	123	100	113	131	149
21	106	114	123	186	174	161	136	153	155	152	140	142	140	146	160	159	156	154	148	154	139	111	109	128	144
22	117	120	76	76	76	75	77	75	88	156	131	147	178	200	201	227	191	202	156	123	95	95	154	138	130
23	108	128	39	109	44	44	84	149	123	284	268	251	256	251	264	273	264	279	268	278	135	100	108	54	191
24	99	41	124	85	21	87	125	48	335	5	265	262	256	244	263	278	281	293	311	290	269	66	246	103	316
25	126	108	162	91	69	129	118	71	184	31	281	262	235	276	245	229	247	325	337	98	95	76	73	123	122
26	104	108	315	121	46	359	100	277	301	284	259	254	277	297	282	266	295	307	303	276	117	169	143	113	283
27	134	94	142	319	285	289	289	299	303	307	308	303	301	305	310	315	322	326	320	303	293	283	286	308	304
28	271	272	184	156	184	270	213	124	325	260	271	264	258	263	261	261	265	259	271	265	181	110	83	79	243
29	89	98	108	114	151	114	107	173	179	255	255	242	243	234	241	219	223	215	209	131	119	118	97	69	165
30	109	74	77	91	123	101	121	286	115	259	269	271	262	298	301	290	308	311	245	293	297	274	278	279	284
31	280	289	277	279	223	31	78	66	270	269	277	267	264	261	246	258	275	272	275	249	10	83	91	107	277
Prev	95	93	110	107	112	102	120	50	323	301	273	269	255	262	264	267	268	294	299	246	97	89	95	98	121

A-5

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Wind Direction (degrees)
September 2018

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	74	59	132	101	78	30	76	32	295	291	281	261	293	274	287	305	314	290	310	310	99	98	80	125	356
2	137	225	110	92	127	98	134	318	358	316	264	282	260	258	276	256	260	274	295	152	71	94	74	96	226
3	57	117	108	84	115	115	109	245	41	239	260	283	263	260	262	293	315	332	26	19	25	221	304	86	340
4	178	150	191	148	143	108	56	154	152	144	151	171	182	166	160	155	152	153	150	113	79	65	179	174	148
5	162	144	156	151	138	121	93	146	160	164	164	171	181	169	251	272	268	264	163	150	131	121	109	97	157
6	80	119	118	132	132	125	69	18	144	273	300	314	298	282	283	221	194	182	157	146	118	219	150	101	155
7	115	131	178	53	108	124	144	127	315	132	262	256	271	261	269	242	233	265	150	120	62	92	31	172	163
8	93	124	116	65	94	105	272	97	141	183	264	270	260	272	277	311	318	329	327	63	98	92	19	148	78
9	123	130	87	104	81	118	116	5	325	281	269	270	271	254	267	268	217	154	133	75	74	113	84	111	125
10	118	82	86	82	81	93	128	101	335	131	208	225	226	236	229	225	223	264	312	327	337	342	322	349	237
11	342	122	121	116	107	98	89	314	15	335	261	6	60	251	274	356	53	321	268	23	311	324	132	145	17
12	155	99	121	129	81	114	19	140	286	330	337	325	280	300	296	312	335	175	93	100	125	98	109	74	76
13	109	70	132	79	117	354	93	90	99	154	164	163	169	262	335	82	82	304	37	78	112	94	109	119	101
14	92	103	64	156	45	117	101	138	332	61	175	176	173	222	209	193	143	141	123	113	122	141	156	151	135
15	154	150	145	140	131	157	118	150	169	169	212	176	353	323	196	122	135	178	149	323	268	275	278	15	167
16	12	77	136	122	34	121	140	141	144	135	159	196	195	234	236	262	266	271	194	294	289	241	269	245	200
17	271	174	59	53	72	74	78	136	81	56	256	244	266	309	278	239	339	343	16	26	35	3	160	354	15
18	145	161	141	341	111	344	164	9	54	133	157	260	267	291	318	308	1	17	63	270	304	275	283	287	310
19	154	174	268	221	240	295	286	337	277	285	297	314	316	316	319	168	159	156	154	324	321	159	113	303	265
20	271	159	53	307	94	263	321	296	303	297	312	325	323	298	283	341	81	57	81	88	86	85	137	95	355
21	128	170	154	124	176	148	155	159	131	151	Au	Au	Au	Au	Au	196	213	197	111	89	97	125	135	122	146
22	129	120	156	108	85	105	89	125	308	360	237	251	235	224	265	276	303	333	332	360	142	21	206	126	170
23	132	59	84	114	7	167	285	3	23	217	153	147	149	149	327	12	275	282	271	38	99	77	56	92	80
24	105	115	92	100	132	121	87	257	339	298	274	316	306	285	310	312	299	305	310	120	240	251	319	66	313
25	140	346	123	312	342	142	94	120	146	359	310	273	271	275	269	292	270	272	180	113	90	80	123	126	176
26	35	78	131	59	94	63	21	8	98	269	248	275	263	264	266	267	266	271	272	283	348	137	93	102	324
27	114	71	87	92	117	350	145	153	102	193	306	323	272	273	332	354	346	334	296	122	161	160	162	24	76
28	137	268	173	154	119	108	157	154	150	155	164	147	151	154	154	159	157	156	164	162	161	160	164	171	156
29	186	130	262	187	152	140	191	300	313	311	313	318	327	341	4	135	196	101	63	72	100	82	96	85	99
30	104	107	138	154	149	154	152	144	159	157	156	157	156	159	162	158	165	167	134	141	272	152	148	217	154
Prev	121	121	125	110	106	110	109	110	55	217	242	255	255	260	272	262	253	262	129	78	86	113	121	110	141

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Standard Deviation of Wind Direction (degrees)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	58	Pw	43	67	55	58	28	25	18	14	20	36	26	53	47	39	67	14	
10	20	64	68	59	32	59	38	73	56	13	12	16	32	16	30	48	14	9	9	17	20	58	81	75	38	81	9	
11	59	72	58	45	34	54	77	80	58	41	36	27	46	63	40	43	52	40	10	44	12	10	49	57	46	80	10	
12	68	74	77	56	72	68	85	63	50	63	37	41	32	43	41	25	38	26	14	86	24	24	32	56	50	86	14	
13	70	67	61	32	38	23	33	54	78	51	62	28	26	18	27	27	18	15	13	34	81	21	46	38	40	81	13	
14	54	47	55	37	51	74	80	60	79	19	23	15	9	18	13	11	22	20	19	14	56	36	75	74	40	80	9	
15	72	70	31	10	34	32	10	7	8	18	29	77	27	29	33	32	47	26	37	64	41	40	81	47	38	81	7	
16	64	52	30	49	42	58	92	78	50	15	49	92	33	21	37	43	28	19	50	46	50	34	44	57	47	92	15	
17	53	35	34	31	28	33	67	57	25	30	12	58	63	68	26	38	20	16	9	90	83	30	54	73	43	90	9	
18	54	54	97	31	45	38	35	91	63	18	29	25	16	17	19	16	16	11	11	12	83	25	33	43	37	97	11	
19	80	46	61	71	55	73	88	82	60	12	23	44	60	61	34	50	28	29	36	68	52	86	83	74	57	88	12	
20	47	61	88	40	39	51	47	66	59	26	28	36	33	35	68	31	51	66	48	52	35	50	93	51	50	93	26	
21	37	70	67	98	90	76	52	65	63	56	41	24	31	29	19	24	16	29	46	83	82	76	48	49	53	98	16	
22	79	83	60	89	35	37	94	92	35	19	32	51	48	66	47	37	41	19	26	36	9	10	16	81	48	94	9	
23	62	95	91	75	45	73	88	11	11	10	25	32	64	39	27	40	32	19	12	68	27	13	32	53	44	95	10	
24	35	51	62	69	87	62	57	35	36	18	36	28	23	19	21	32	17	22	9	52	52	20	35	41	38	87	9	
25	80	57	81	85	75	63	65	56	10	20	25	39	77	45	53	22	29	17	12	45	8	28	62	34	45	85	8	
26	58	53	60	41	34	36	24	15	37	55	55	30	35	14	80	60	32	15	25	34	24	21	29	57	39	80	14	
27	71	63	93	67	28	85	86	76	52	42	76	20	41	62	42	54	38	18	24	34	39	35	44	48	52	93	18	
28	35	35	68	52	55	57	95	79	74	38	42	64	42	24	56	33	21	17	46	44	76	27	36	40	48	95	17	
29	45	33	27	56	51	57	35	47	52	71	37	36	48	31	26	20	46	32	17	51	38	24	18	26	39	71	17	
30	26	45	37	48	24	53	36	64	91	73	82	37	29	47	43	58	40	57	13	90	37	30	53	32	48	91	13	
31	40	100	65	27	81	57	52	70	42	41	56	68	56	26	64	26	20	17	62	23	8	13	37	64	46	100	8	
Avg	55	60	62	53	49	55	61	60	50	35	39	40	41	37	39	35	30	24	24	48	42	32	49	53	45	87	13	
Max	80	100	97	98	90	85	95	92	91	73	82	92	77	68	80	60	52	66	62	90	83	86	93	81	57	100	26	
Min	20	33	27	10	24	23	10	7	8	10	12	15	9	14	13	11	14	9	9	12	8	10	16	26	37	67	7	

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Standard Deviation of Wind Direction (degrees)
August 2018

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	49	27	18	20	38	18	30	49	47	31	38	31	21	31	23	21	22	22	49	98	67	47	48	30	36	98	18
2	40	38	60	52	70	58	72	83	59	25	25	43	26	26	36	36	29	13	8	9	9	21	17	32	37	83	8
3	36	60	41	42	33	35	58	87	59	53	32	36	40	32	24	18	15	11	10	14	58	23	46	36	37	87	10
4	57	41	54	81	80	87	71	42	43	36	47	32	59	40	54	49	28	23	38	21	55	51	43	62	50	87	21
5	98	91	99	84	89	59	72	16	65	81	50	57	27	11	11	44	12	30	84	36	76	34	68	80	57	99	11
6	36	34	36	84	33	21	54	80	85	32	21	27	41	48	46	35	30	22	23	71	17	17	19	31	39	85	17
7	25	44	55	43	30	28	73	71	75	44	25	38	35	39	48	45	30	21	18	80	30	15	16	30	40	80	15
8	37	27	28	43	41	45	23	82	94	45	42	40	33	56	49	39	40	44	21	64	17	38	25	32	42	94	17
9	38	38	43	29	40	22	23	78	74	62	23	37	29	57	53	58	22	20	26	71	37	31	34	33	41	78	20
10	31	61	45	54	45	38	58	93	77	91	37	59	42	46	54	62	32	16	23	54	28	20	22	30	47	93	16
11	72	38	50	76	23	24	35	67	89	52	53	63	45	32	30	35	10	19	10	69	77	16	13	74	45	89	10
12	63	61	60	40	63	52	84	87	40	25	32	37	35	20	20	20	14	14	7	9	68	74	93	89	46	93	7
13	43	82	74	39	35	53	72	64	26	37	32	23	83	90	34	22	13	9	10	16	10	15	15	45	39	90	9
14	12	77	43	62	59	76	43	73	40	54	29	34	40	48	52	40	37	17	26	57	28	54	31	46	45	77	12
15	50	33	31	71	59	23	36	99	67	65	29	35	38	44	40	32	46	55	45	57	33	20	52	52	46	99	20
16	72	50	83	30	47	58	27	80	58	56	43	44	38	40	52	24	25	13	26	72	49	24	30	37	45	83	13
17	50	45	53	71	65	81	36	89	46	17	101	46	29	31	26	53	32	27	40	49	65	47	24	65	50	101	17
18	48	63	59	83	74	100	54	62	26	28	12	20	74	71	85	14	15	15	18	17	12	40	71	61	47	100	12
19	55	40	20	32	36	18	31	96	52	90	19	20	31	40	29	9	7	8	14	19	16	9	50	20	32	96	7
20	12	59	65	42	60	88	85	14	8	36	72	16	18	36	72	36	47	21	24	21	32	17	14	12	38	88	8
21	13	11	30	77	9	14	18	10	13	10	21	14	11	18	9	10	11	9	7	6	21	38	76	13	20	77	6
22	16	16	10	11	9	8	8	12	41	28	41	16	30	26	19	20	11	12	15	26	35	28	50	78	24	78	8
23	70	56	69	36	70	65	47	50	95	26	20	23	28	21	24	18	18	14	14	26	43	24	24	37	38	95	14
24	54	62	66	59	48	68	37	94	36	48	32	20	22	19	19	15	16	11	11	25	75	26	70	96	43	96	11
25	33	72	82	36	73	30	71	80	89	79	28	17	31	33	27	43	33	65	15	71	63	35	64	99	53	99	15
26	81	51	89	55	50	87	30	100	16	14	18	17	24	17	19	17	15	13	14	31	87	65	61	80	44	100	13
27	53	21	76	41	16	12	10	9	9	9	10	10	13	11	12	12	11	9	9	10	12	9	11	16	17	76	9
28	11	31	73	39	74	34	36	85	74	34	26	19	17	14	16	14	12	15	12	22	50	45	40	34	34	85	11
29	35	51	53	41	83	68	67	90	96	22	18	21	29	24	24	16	15	16	11	59	22	30	46	37	41	96	11
30	97	58	44	62	28	61	55	83	97	12	17	19	23	21	14	14	17	17	68	24	15	40	20	10	38	97	10
31	15	26	20	24	74	78	39	83	19	24	30	18	23	27	21	23	19	15	13	56	59	70	34	50	36	83	13
Avg	45	47	53	50	50	49	47	68	55	41	33	30	33	34	34	29	22	20	23	41	41	33	40	47	40	90	13
Max	98	91	99	84	89	100	85	100	97	91	101	63	83	90	85	62	47	65	84	98	87	74	93	99	57	101	21
Min	11	11	10	11	9	8	8	9	8	9	10	10	11	11	9	9	7	8	7	6	9	9	11	10	17	76	6

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Standard Deviation of Wind Direction (degrees)
September 2018

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	68	80	32	72	71	65	85	85	90	66	17	13	16	20	27	20	21	16	13	68	24	25	46	65	46	90	13
2	40	99	68	69	49	47	27	59	47	76	29	21	24	23	19	21	15	26	16	78	36	33	29	36	41	99	15
3	40	35	76	54	49	44	43	93	51	63	23	19	15	15	18	23	14	26	17	35	102	55	90	86	45	102	14
4	80	9	74	84	22	67	73	50	9	11	10	17	20	27	21	16	10	7	10	38	58	76	32	13	35	84	7
5	28	12	14	18	20	21	28	79	10	10	25	31	44	58	41	29	25	37	8	14	19	14	12	19	26	79	8
6	22	26	24	26	18	41	58	95	46	94	30	71	64	45	38	20	26	18	13	13	53	50	18	34	39	95	13
7	47	53	82	51	38	56	96	53	55	54	82	38	32	38	34	13	23	28	90	44	41	46	78	94	53	96	13
8	34	47	22	48	37	82	88	69	66	63	22	23	23	22	20	21	16	14	12	56	14	51	87	26	40	88	12
9	90	26	42	46	64	37	47	78	76	18	19	21	25	22	22	25	30	22	56	59	12	37	66	73	42	90	12
10	40	45	32	25	38	52	34	97	69	86	43	34	24	24	23	21	17	21	22	9	17	28	7	19	34	97	7
11	39	32	44	35	37	25	72	91	68	55	46	43	89	32	32	66	58	25	71	65	41	13	17	15	46	91	13
12	76	65	84	77	19	38	81	39	77	40	44	33	9	21	16	24	40	61	28	15	18	20	18	30	41	84	9
13	23	26	56	61	47	95	32	22	19	19	15	15	18	43	65	21	11	24	85	15	54	76	65	28	39	95	11
14	18	45	29	24	74	37	52	65	48	58	53	26	31	34	32	17	19	11	36	59	28	42	12	10	36	74	10
15	10	9	11	12	18	27	37	65	27	24	65	51	63	77	49	80	26	25	86	34	28	23	19	58	39	86	9
16	71	76	27	26	66	37	20	55	34	20	18	25	25	15	13	24	18	47	65	27	51	56	10	32	36	76	10
17	44	84	60	15	9	6	6	48	73	79	50	25	24	32	51	55	35	22	47	72	82	64	91	50	47	91	6
18	66	64	22	52	65	96	99	74	52	14	34	50	31	33	48	20	20	10	38	34	17	47	76	62	47	99	10
19	16	28	36	80	78	40	86	51	16	48	30	10	9	17	13	45	6	7	29	44	30	29	76	57	37	86	6
20	32	46	66	25	64	63	51	12	18	12	14	12	11	17	37	58	12	53	69	18	33	22	35	25	34	69	11
21	31	25	17	85	96	21	28	26	24	22	Au	Au	Au	Au	Au	28	36	48	14	19	20	15	47	22	33	96	14
22	29	22	27	70	59	43	51	61	78	67	15	18	29	37	24	30	21	31	20	55	75	86	102	54	46	102	15
23	59	84	56	71	80	66	29	39	56	39	53	17	16	19	52	42	29	13	14	80	27	40	37	33	44	84	13
24	39	34	50	64	69	70	65	86	31	15	23	32	17	15	30	18	14	10	59	65	80	91	32	61	45	91	10
25	23	86	40	31	96	32	25	64	51	53	34	21	21	20	19	15	20	33	47	24	18	20	34	45	36	96	15
26	62	65	71	52	54	68	75	89	48	82	16	18	22	22	16	15	12	10	17	13	40	78	30	26	42	89	10
27	23	37	32	43	38	68	51	58	73	48	41	18	18	20	23	17	9	29	22	55	12	12	14	103	36	103	9
28	41	99	27	7	32	49	6	8	8	10	7	11	9	7	6	6	7	7	7	8	6	10	14	27	17	99	6
29	17	89	54	36	60	32	87	9	13	9	13	11	9	15	21	52	64	84	16	22	21	30	32	12	34	89	9
30	11	18	25	10	7	8	9	11	10	9	9	7	6	7	8	11	12	24	57	90	61	31	54	75	24	90	6
Avg	41	49	43	46	49	48	51	58	45	42	30	25	26	27	28	28	22	26	36	41	37	41	43	43	39	90	11
Max	90	99	84	85	96	96	99	97	90	94	82	71	89	77	65	80	64	84	90	90	102	91	102	103	53	103	15
Min	10	9	11	7	7	6	6	8	8	9	7	7	6	7	6	6	6	7	7	8	6	10	7	10	17	69	6

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 2 Meters (degrees Celsius)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	24.3	Pw	26.6	27.5	28.0	28.8	28.8	28.3	25.5	24.1	22.1	19.9	18.0	16.3	15.6	23.8	28.8	15.6
10	13.8	11.8	11.7	10.9	10.5	11.4	14.5	18.0	23.6	26.5	27.7	27.7	28.2	25.6	22.6	25.3	26.2	24.5	22.8	20.8	16.8	14.5	11.5	9.6	19.0	28.2	9.6	
11	7.8	6.4	4.8	4.5	4.0	3.9	7.5	12.3	14.9	16.2	17.8	18.8	19.8	20.7	21.7	22.3	22.4	22.2	21.7	18.7	16.0	14.8	11.6	9.5	14.2	22.4	3.9	
12	8.6	7.7	6.6	6.6	6.5	6.7	9.7	15.5	18.5	19.8	20.5	20.9	22.2	23.0	23.9	24.2	24.3	24.3	23.3	20.7	14.9	12.1	10.2	8.0	15.8	24.3	6.5	
13	7.6	7.0	6.6	6.2	5.4	5.6	9.9	15.5	20.1	22.5	23.7	25.0	25.9	26.6	27.3	27.5	27.5	27.2	26.2	23.3	17.4	14.3	12.7	11.2	17.6	27.5	5.4	
14	9.8	8.4	7.6	6.2	4.6	5.4	7.4	10.5	14.6	19.9	20.6	20.0	20.2	19.9	19.2	18.4	18.9	17.8	15.6	13.1	10.6	9.1	7.2	6.2	13.0	20.6	4.6	
15	5.0	7.4	11.6	11.8	10.9	10.3	12.4	13.9	15.3	16.8	18.5	20.4	21.9	22.9	23.6	24.1	24.4	24.3	24.1	20.9	16.9	13.8	12.3	11.4	16.5	24.4	5.0	
16	9.9	9.2	8.5	7.2	6.5	6.9	9.8	15.0	20.1	22.2	23.5	24.6	25.3	25.0	25.0	25.5	25.5	23.5	25.1	20.7	18.3	15.5	14.7	12.6	17.5	25.5	6.5	
17	11.0	10.5	9.8	9.2	8.0	7.9	12.0	16.9	21.3	22.1	21.1	18.3	16.4	16.6	19.3	22.4	22.3	21.4	20.2	18.4	15.4	12.3	10.5	9.0	15.5	22.4	7.9	
18	7.8	6.6	5.9	5.4	5.0	4.6	8.1	13.3	18.5	21.3	23.1	24.6	25.6	26.6	26.9	27.0	26.3	25.8	24.3	22.1	17.4	11.7	9.1	6.5	16.4	27.0	4.6	
19	5.3	3.4	3.4	2.8	2.2	2.7	6.4	11.6	17.2	19.3	20.3	21.3	22.1	23.3	24.0	24.6	24.7	24.8	23.8	20.2	16.0	12.4	10.2	9.7	14.7	24.8	2.2	
20	9.1	8.2	7.4	6.3	6.0	5.6	8.9	14.9	20.0	22.1	23.5	24.3	25.5	26.2	26.5	26.6	26.8	26.8	25.3	21.9	16.8	15.2	11.1	9.3	17.3	26.8	5.6	
21	8.0	7.1	6.8	5.9	4.5	4.1	7.8	13.6	19.3	22.4	24.0	25.2	26.1	27.2	28.1	27.8	27.7	27.0	23.7	19.7	16.4	14.1	13.1	11.9	17.1	28.1	4.1	
22	11.6	11.2	10.1	7.2	4.4	3.5	6.3	11.6	15.9	17.3	18.5	19.6	20.7	21.4	22.1	22.6	22.8	22.6	21.3	18.4	15.1	13.6	13.2	8.4	15.0	22.8	3.5	
23	6.9	6.5	5.3	5.2	5.6	4.9	9.7	14.7	16.5	18.0	19.1	20.6	22.1	23.6	24.3	24.6	25.3	25.0	24.1	20.1	14.1	10.5	6.4	6.0	15.0	25.3	4.9	
24	4.2	3.6	3.5	3.4	2.6	2.6	7.0	11.3	14.1	17.0	17.9	18.8	20.5	22.1	23.2	24.4	24.7	24.3	23.1	20.2	17.2	14.2	11.1	10.1	14.2	24.7	2.6	
25	8.7	7.8	6.4	5.4	4.8	4.2	7.5	12.3	15.7	17.1	18.3	19.9	20.6	22.5	23.1	23.3	23.7	22.8	22.2	19.2	17.5	15.6	14.7	14.5	15.3	23.7	4.2	
26	12.7	11.1	10.0	8.9	10.5	9.1	12.2	15.0	16.8	18.5	19.9	21.0	22.0	21.3	22.5	19.4	20.0	19.6	17.6	15.7	13.4	12.0	9.9	8.5	15.3	22.5	8.5	
27	8.8	8.8	7.1	6.2	4.6	4.4	6.6	11.0	13.6	15.5	16.7	14.1	12.3	12.1	14.3	17.0	18.0	16.6	15.6	14.2	11.5	8.5	7.4	6.3	11.3	18.0	4.4	
28	5.0	4.1	3.7	2.2	1.6	1.3	4.4	9.6	15.0	17.4	18.6	19.6	20.1	16.9	16.1	19.5	19.8	18.4	16.9	15.1	11.5	9.5	8.6	8.1	11.8	20.1	1.3	
29	7.2	5.7	6.0	3.7	1.7	2.1	4.4	10.0	16.1	18.8	19.8	20.4	21.1	21.1	21.9	21.8	21.4	21.2	20.1	17.3	12.3	9.3	8.8	6.4	13.3	21.9	1.7	
30	4.6	2.9	2.5	2.2	1.0	0.8	3.9	10.4	16.8	19.7	21.1	22.2	23.3	24.0	24.9	25.5	25.8	25.6	24.9	20.1	14.5	11.4	9.0	6.4	14.3	25.8	0.8	
31	6.5	6.3	4.5	3.1	3.5	3.7	6.5	12.0	16.7	19.0	21.7	24.5	24.8	25.8	26.7	26.8	26.7	25.6	23.2	21.5	19.2	17.9	15.0	12.5	16.4	26.8	3.1	
Avg	8.2	7.4	6.8	5.9	5.2	5.1	8.3	13.1	17.3	19.7	20.7	21.7	22.4	22.7	23.3	23.9	24.1	23.3	22.1	19.3	15.6	13.1	11.1	9.5	15.5	24.5	5.1	
Max	13.8	11.8	11.7	11.8	10.9	11.4	14.5	18.0	23.6	26.5	27.7	27.7	28.2	28.0	28.8	28.8	28.3	27.2	26.2	23.3	19.9	18.0	16.3	15.6	23.8	28.8	15.6	
Min	4.2	2.9	2.5	2.2	1.0	0.8	3.9	9.6	13.6	15.5	16.7	14.1	12.3	12.1	14.3	17.0	18.0	16.6	15.6	13.1	10.6	8.5	6.4	6.0	11.3	18.0	0.8	

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 2 Meters (degrees Celsius)
August 2018

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	15.4	15.8	14.1	11.5	8.7	6.9	8.4	13.2	19.2	23.5	25.3	26.6	27.2	27.6	28.5	28.7	28.7	28.0	25.7	22.0	20.0	15.9	12.9	10.8	19.4	28.7	6.9
2	9.2	7.6	7.1	6.7	6.2	5.8	8.1	12.9	19.7	22.8	24.1	25.4	26.6	27.5	27.2	23.2	20.9	21.6	20.4	17.6	14.6	12.3	12.0	10.0	16.2	27.5	5.8
3	7.7	7.0	6.7	6.4	6.3	4.5	5.3	10.3	16.8	20.2	21.3	22.2	23.0	23.2	24.0	24.1	23.8	23.0	21.4	18.5	15.3	10.1	6.0	3.9	14.6	24.1	3.9
4	2.5	1.3	0.2	-0.4	-1.2	-1.3	1.6	8.5	14.1	15.9	17.0	18.1	18.8	19.1	20.4	20.9	21.2	20.6	19.3	16.5	13.9	10.9	8.8	6.5	11.4	21.2	-1.3
5	5.6	5.9	6.9	5.9	5.6	7.3	10.0	11.0	12.6	15.5	17.7	18.1	15.3	13.4	14.2	16.4	15.5	13.9	11.7	10.0	8.3	7.7	6.0	5.3	10.8	18.1	5.3
6	4.7	2.6	1.6	1.2	0.6	-0.3	1.9	7.1	12.4	16.4	18.3	19.7	21.0	22.0	22.5	22.8	23.0	23.0	21.6	19.0	14.3	10.3	8.1	7.1	12.5	23.0	-0.3
7	5.0	3.3	2.2	1.5	1.1	0.9	4.0	10.0	16.6	20.4	21.5	22.5	22.8	24.0	24.1	25.0	25.3	24.7	23.4	19.1	15.7	13.9	11.3	8.5	14.5	25.3	0.9
8	6.1	4.5	3.9	3.0	3.1	2.5	4.1	10.3	16.8	22.2	23.8	24.8	25.7	26.8	27.6	28.0	28.1	27.9	26.1	20.8	16.3	12.9	10.5	7.4	16.0	28.1	2.5
9	6.4	5.4	4.3	3.8	3.6	3.3	6.2	12.2	18.5	24.3	26.4	27.5	28.0	29.0	29.7	30.0	30.1	29.9	27.5	23.0	18.0	16.1	11.3	9.9	17.7	30.1	3.3
10	7.0	6.5	5.9	4.9	3.9	3.5	6.6	13.1	20.2	26.3	29.2	30.5	31.1	32.1	32.3	32.5	32.5	31.7	29.9	23.1	18.5	14.6	12.4	9.7	19.1	32.5	3.5
11	8.7	7.7	7.2	6.8	6.0	5.1	7.3	13.2	19.1	25.2	29.9	31.6	32.2	33.3	34.0	34.0	32.1	28.5	26.5	23.5	21.9	22.8	21.7	15.0	20.6	34.0	5.1
12	12.2	10.9	9.7	8.2	7.4	8.4	10.1	14.2	20.2	23.5	23.7	25.5	26.4	27.7	27.6	27.9	27.5	26.3	23.8	21.0	19.2	18.0	16.8	13.1	18.7	27.9	7.4
13	10.4	9.6	6.9	4.5	3.0	1.7	2.8	8.6	13.6	16.3	18.7	19.7	19.4	19.6	19.7	21.2	21.1	19.9	18.2	15.8	14.7	12.4	11.5	10.2	13.3	21.2	1.7
14	8.9	6.7	5.9	4.0	3.0	2.2	3.2	8.9	14.6	17.6	19.3	20.6	21.4	22.5	23.2	23.7	24.1	23.7	21.4	17.3	12.1	9.1	7.3	5.5	13.6	24.1	2.2
15	5.4	5.0	4.8	3.7	2.7	1.5	3.4	9.4	16.2	20.6	21.8	22.8	24.2	25.1	25.3	24.9	25.8	26.1	24.5	17.9	14.7	8.8	7.5	5.8	14.5	26.1	1.5
16	5.5	4.4	4.3	2.8	2.0	1.2	3.2	9.7	16.3	22.2	25.3	26.4	27.4	27.9	28.1	27.6	27.9	26.8	24.8	21.7	17.4	14.5	12.8	11.1	16.3	28.1	1.2
17	9.8	8.4	7.4	7.2	6.4	5.4	6.4	9.5	14.3	18.8	22.8	26.0	26.6	27.2	27.7	27.9	26.6	25.2	23.1	19.1	18.0	17.0	16.6	15.7	17.2	27.9	5.4
18	13.6	11.9	11.1	10.9	12.4	11.6	11.5	12.2	13.6	14.5	13.2	13.2	14.4	15.9	18.1	20.0	19.0	18.2	17.1	15.8	14.7	12.2	9.2	6.9	13.8	20.0	6.9
19	5.0	4.8	2.8	2.4	1.7	1.3	2.0	4.6	8.5	14.1	16.9	18.5	20.3	21.2	20.8	20.6	20.0	18.4	17.0	15.9	14.3	13.3	12.4	11.0	12.0	21.2	1.3
20	10.7	10.5	10.4	9.6	8.1	6.3	7.8	8.3	8.0	7.8	8.9	9.2	8.2	8.3	7.7	7.6	7.7	7.6	7.0	6.4	6.3	6.5	6.4	6.4	8.0	10.7	6.3
21	6.5	6.4	6.6	6.1	6.2	6.1	6.5	7.1	8.5	9.4	10.4	11.1	11.3	11.5	11.7	11.4	11.9	11.6	10.3	7.9	6.5	5.0	5.4	8.3	8.5	11.9	5.0
22	8.4	8.2	7.9	7.7	7.2	6.5	6.1	7.0	8.7	11.3	14.9	18.1	19.8	20.6	21.6	21.8	20.7	19.4	17.6	14.7	11.7	9.7	8.5	7.8	12.7	21.8	6.1
23	8.2	7.9	8.1	7.9	7.6	7.6	7.2	9.1	13.2	15.9	17.4	18.9	20.6	21.7	22.7	23.2	23.1	22.6	20.9	17.1	12.3	9.9	6.7	5.0	13.9	23.2	5.0
24	3.5	2.8	2.1	1.3	1.5	1.2	1.5	4.8	9.5	16.2	19.2	19.8	20.1	20.6	22.4	21.8	21.0	20.4	18.8	16.5	12.3	9.9	9.0	7.0	11.8	22.4	1.2
25	6.0	5.3	3.9	2.4	1.6	0.3	0.5	4.2	10.1	13.9	16.3	17.8	18.8	19.6	20.3	20.5	20.3	19.5	16.6	13.9	13.6	13.9	13.4	10.5	11.8	20.5	0.3
26	9.1	8.6	7.7	7.6	7.6	7.2	7.2	9.0	10.2	10.6	11.7	13.4	14.6	14.2	14.4	14.8	14.9	13.0	11.8	10.2	8.9	8.6	7.8	7.2	10.4	14.9	7.2
27	6.8	6.8	6.6	6.4	6.3	6.4	6.6	6.7	6.6	6.1	6.2	7.3	7.9	8.0	7.5	7.2	6.8	5.2	4.5	3.9	3.5	3.2	3.1	3.0	5.9	8.0	3.0
28	2.3	1.3	-0.8	-1.2	-0.3	0.0	0.0	1.1	5.0	7.6	9.4	11.0	12.9	12.1	12.8	13.7	13.8	14.0	13.5	10.3	6.6	5.4	2.6	1.9	6.5	14.0	-1.2
29	0.2	-0.8	-1.8	-2.3	-3.0	-3.2	-2.0	2.8	9.6	14.8	16.5	17.8	19.1	20.0	20.6	21.2	21.4	21.2	19.3	13.4	10.1	5.8	4.4	2.6	9.5	21.4	-3.2
30	2.3	1.3	0.6	0.4	-0.6	-0.5	0.3	5.9	14.2	18.3	18.8	19.7	20.7	21.7	20.8	20.9	19.1	17.1	16.1	15.0	14.5	14.2	13.3	14.2	12.0	21.7	-0.6
31	13.4	11.8	11.5	9.9	6.6	4.3	3.5	8.9	12.6	13.9	15.5	16.2	16.7	17.2	18.3	18.9	19.1	18.3	16.4	11.8	8.6	5.2	3.2	0.7	11.8	19.1	0.7
Avg	7.3	6.4	5.7	4.9	4.2	3.7	4.9	8.8	13.5	17.0	18.8	20.0	20.7	21.3	21.8	22.0	21.7	20.9	19.2	16.1	13.4	11.3	9.6	8.0	13.4	22.5	3.0
Max	15.4	15.8	14.1	11.5	12.4	11.6	11.5	14.2	20.2	26.3	29.9	31.6	32.2	33.3	34.0	34.0	32.5	31.7	29.9	23.5	21.9	22.8	21.7	15.7	20.6	34.0	7.4
Min	0.2	-0.8	-1.8	-2.3	-3.0	-3.2	-2.0	1.1	5.0	6.1	6.2	7.3	7.9	8.0	7.5	7.2	6.8	5.2	4.5	3.9	3.5	3.2	2.6	0.7	5.9	8.0	-3.2

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 2 Meters (degrees Celsius)
September 2018

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	-0.4	-1.3	-2.1	-2.8	-2.9	-3.1	-1.3	2.0	6.0	12.6	15.0	16.0	16.1	17.5	18.2	18.5	18.3	17.7	15.2	11.0	8.1	4.8	1.5	0.3	7.7	18.5	-3.1
2	-1.3	-1.3	-2.0	-3.3	-3.7	-3.5	-2.6	3.1	10.2	14.9	16.7	17.9	18.8	20.1	20.7	20.9	21.0	20.5	17.9	12.1	8.2	5.3	4.0	1.2	9.0	21.0	-3.7
3	0.1	-0.8	-1.5	-1.6	-2.3	-2.8	-2.2	4.0	11.9	17.3	19.1	20.2	21.2	21.8	22.2	22.5	21.7	19.7	14.4	11.4	9.0	7.0	5.3	4.4	10.1	22.5	-2.8
4	2.8	2.8	3.3	2.8	3.6	2.3	1.9	6.1	8.5	9.8	11.3	12.6	13.9	15.0	15.7	16.0	15.6	14.5	12.1	10.3	9.7	8.8	7.9	7.2	8.9	16.0	1.9
5	6.8	5.9	4.7	4.2	3.4	1.4	0.8	6.3	11.5	13.5	15.0	16.8	19.1	20.9	22.1	22.7	22.6	22.2	17.7	14.6	13.5	10.9	9.6	6.2	12.2	22.7	0.8
6	6.3	4.5	5.0	3.9	2.8	2.7	3.8	8.3	15.3	21.3	23.8	24.6	25.4	25.6	26.5	25.1	24.9	22.8	20.5	19.1	18.3	16.6	13.1	9.6	15.4	26.5	2.7
7	8.2	10.3	7.9	6.5	5.6	7.1	7.2	9.1	13.8	21.4	23.8	25.2	26.0	26.3	26.3	23.6	23.2	22.7	20.5	20.1	17.0	11.8	9.9	11.3	16.0	26.3	5.6
8	14.0	15.2	12.1	9.1	9.3	9.1	9.6	10.3	15.7	20.7	22.3	23.0	23.7	24.2	24.0	23.0	22.1	20.6	17.6	14.8	12.8	12.0	10.5	8.9	16.0	24.2	8.9
9	8.3	7.8	6.8	5.0	3.6	2.6	1.7	6.2	13.5	15.9	16.1	16.9	18.5	19.5	20.3	20.2	19.5	18.1	15.8	12.9	11.8	8.6	7.4	6.3	11.8	20.3	1.7
10	4.2	4.3	2.2	1.2	0.4	-0.4	-0.3	4.4	11.6	17.6	20.1	21.1	21.9	22.3	22.8	23.1	22.8	22.6	20.1	17.8	16.9	14.4	11.6	11.6	13.1	23.1	-0.4
11	9.5	4.9	2.9	1.5	-0.7	-1.5	-1.8	3.1	9.7	13.1	14.5	15.6	16.7	17.0	16.8	16.9	17.0	15.2	13.3	10.4	9.3	8.9	9.0	8.7	9.6	17.0	-1.8
12	8.5	7.9	8.7	8.3	8.2	7.5	7.0	7.9	9.8	11.6	12.6	13.1	12.2	12.7	13.2	12.7	11.8	9.8	7.9	7.7	7.5	6.7	4.5	4.0	9.2	13.2	4.0
13	3.5	3.2	3.1	4.4	4.5	4.6	4.8	5.1	5.8	7.5	9.3	10.5	12.2	11.7	7.4	7.9	8.9	7.9	5.7	5.3	4.9	4.7	4.3	3.7	6.3	12.2	3.1
14	2.5	1.1	0.3	0.0	-1.4	-1.9	-2.0	-0.6	2.2	8.9	11.5	12.1	13.6	14.4	14.9	15.1	14.4	13.4	12.0	10.7	9.7	8.0	7.6	7.4	7.2	15.1	-2.0
15	7.1	7.7	8.2	8.3	8.0	7.6	5.0	8.4	12.1	14.2	16.6	18.7	19.3	20.4	20.1	19.4	19.1	15.9	15.6	14.2	11.0	9.1	8.1	7.1	12.6	20.4	5.0
16	5.4	3.3	1.8	1.7	0.8	0.5	0.2	2.1	7.3	11.8	14.4	16.7	17.6	18.8	19.0	19.8	19.7	18.4	15.0	11.3	9.5	8.9	8.3	8.2	10.0	19.8	0.2
17	7.7	7.7	7.6	7.1	6.1	4.2	3.4	5.3	7.4	11.0	13.6	15.1	15.7	16.2	16.9	17.0	17.1	16.4	12.6	10.5	8.4	7.0	3.8	2.8	10.0	17.1	2.8
18	2.6	2.0	4.5	3.0	2.1	1.0	0.2	3.3	8.7	12.3	13.8	15.2	16.3	17.0	17.5	17.1	15.4	13.8	12.0	9.9	9.1	8.2	7.6	7.5	9.2	17.5	0.2
19	5.2	5.5	6.1	6.1	6.3	6.1	6.1	6.5	7.1	7.8	7.9	7.0	7.0	7.4	7.6	7.8	7.6	7.8	6.9	5.6	5.6	5.9	5.7	5.5	6.6	7.9	5.2
20	5.3	4.5	4.1	4.0	4.0	4.5	4.7	5.0	5.3	6.5	7.7	8.6	9.4	9.6	8.0	4.8	5.0	5.7	4.6	3.6	2.1	1.1	-0.1	-0.6	4.9	9.6	-0.6
21	-0.3	0.3	0.5	0.0	-0.5	-0.6	-0.4	1.6	6.3	9.8	Au	Au	Au	Au	Au	16.5	16.8	15.4	10.1	7.9	4.8	4.1	3.8	2.7	5.2	16.8	-0.6
22	1.2	0.3	0.2	-0.1	0.1	0.9	1.0	1.9	6.6	13.7	18.3	18.3	18.2	19.8	19.5	18.4	17.1	15.2	14.0	11.8	8.5	8.2	7.6	7.3	9.5	19.8	-0.1
23	6.2	6.2	6.3	6.6	7.6	7.5	8.1	6.8	7.1	7.2	7.1	6.6	6.8	9.0	7.4	8.9	10.0	10.1	7.4	4.6	2.2	1.4	1.3	0.3	6.4	10.1	0.3
24	-1.1	-0.8	-2.2	-2.9	-3.7	-4.4	-3.3	-1.8	0.7	6.5	6.2	5.0	6.6	4.0	4.0	3.8	3.9	3.8	1.7	1.5	1.5	1.4	1.6	0.6	1.4	6.6	-4.4
25	-0.4	-1.1	-0.4	0.3	0.5	-0.1	-0.4	0.4	1.3	4.2	5.9	7.2	8.1	9.1	9.4	9.5	9.8	9.4	4.9	1.6	-0.2	-1.5	-3.4	-4.0	2.9	9.8	-4.0
26	-4.1	-4.9	-5.0	-5.4	-5.3	-5.3	-5.1	-4.4	-0.7	7.0	9.7	11.0	11.8	12.8	13.4	13.8	13.8	12.5	10.7	10.6	9.4	7.6	6.4	5.8	4.8	13.8	-5.4
27	5.4	5.1	4.6	3.7	3.6	3.6	3.7	4.1	5.5	6.8	7.4	7.8	7.8	7.9	6.9	5.5	4.1	3.4	2.6	2.7	1.3	0.7	0.2	-0.1	4.3	7.9	-0.1
28	-0.2	-0.2	-0.3	-0.3	-0.4	-0.8	-0.4	0.3	1.1	2.3	2.8	3.1	3.4	3.3	3.2	3.2	2.8	1.6	1.2	1.1	1.1	1.3	1.4	1.6	1.3	3.4	-0.8
29	1.6	1.7	1.6	1.3	1.4	1.3	1.2	1.2	1.3	1.4	1.8	2.5	3.3	2.9	2.7	2.1	1.7	1.8	1.3	1.2	1.0	0.7	0.5	0.3	1.6	3.3	0.3
30	0.2	0.0	-0.5	-0.8	-1.0	-1.5	-2.1	-2.7	-2.7	-1.9	-1.3	-1.1	-1.4	-1.3	-1.0	-0.7	-0.3	-0.1	-0.2	0.0	-0.2	-0.2	0.0	0.1	-0.9	0.2	-2.7
Avg	3.8	3.4	2.9	2.4	2.0	1.6	1.6	3.8	7.3	10.9	12.5	13.4	14.1	14.7	14.7	14.5	14.2	13.3	11.0	9.2	7.7	6.4	5.3	4.5	8.1	15.4	0.3
Max	14.0	15.2	12.1	9.1	9.3	9.1	9.6	10.3	15.7	21.4	23.8	25.2	26.0	26.3	26.5	25.1	24.9	22.8	20.5	20.1	18.3	16.6	13.1	11.6	16.0	26.5	8.9
Min	-4.1	-4.9	-5.0	-5.4	-5.3	-5.3	-5.1	-4.4	-2.7	-1.9	-1.3	-1.1	-1.4	-1.3	-1.0	-0.7	-0.3	-0.1	-0.2	0.0	-0.2	-1.5	-3.4	-4.0	-0.9	0.2	-5.4

A-12

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 9 Meters (degrees Celsius)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	23.4	Pw	25.8	26.8	27.3	28.1	28.6	28.7	26.4	24.7	22.5	20.9	19.3	17.5	16.4	24.0	28.7	16.4
10	14.9	13.1	12.9	11.9	12.1	12.4	14.4	17.6	23.3	26.3	27.4	27.6	28.2	25.9	22.8	24.6	26.0	24.4	23.0	21.5	19.4	15.6	13.3	11.3	19.6	28.2	11.3	
11	9.2	8.0	6.3	5.5	5.1	4.4	7.0	11.7	14.3	15.6	16.9	17.9	18.9	19.8	20.7	21.3	21.7	21.6	21.3	18.9	16.4	15.5	12.9	10.7	14.2	21.7	4.4	
12	9.8	8.9	7.8	7.7	7.6	7.6	9.3	14.7	18.0	19.1	19.8	20.3	21.3	22.1	23.0	23.3	23.6	23.7	23.4	21.4	15.7	13.0	11.4	9.3	15.9	23.7	7.6	
13	9.1	8.3	7.9	7.6	6.9	6.8	9.8	14.8	19.3	21.5	22.9	24.3	25.1	25.7	26.4	26.8	27.1	27.0	26.3	24.3	18.4	15.3	13.7	12.1	17.8	27.1	6.8	
14	11.1	9.8	8.9	7.8	6.1	6.9	7.5	10.3	14.0	18.9	19.5	18.7	18.8	18.7	18.0	17.3	17.9	16.9	15.0	13.0	11.0	9.8	8.1	7.2	13.0	19.5	6.1	
15	6.0	8.4	11.8	12.0	11.4	11.0	12.3	13.5	14.6	16.0	17.7	19.6	20.9	21.8	22.4	23.1	23.6	23.8	23.8	21.7	18.1	15.3	13.5	12.6	16.5	23.8	6.0	
16	11.0	10.1	9.6	8.4	8.0	7.9	9.7	14.3	19.5	21.5	22.8	23.8	24.4	24.4	24.6	24.9	24.9	24.1	24.8	21.8	19.3	16.2	15.5	13.8	17.7	24.9	7.9	
17	12.2	11.7	10.8	10.5	9.6	8.8	11.7	16.2	20.9	21.6	20.8	18.3	16.4	16.4	18.6	21.2	21.7	21.1	20.1	18.7	16.3	13.0	11.6	10.1	15.8	21.7	8.8	
18	9.0	7.8	7.1	6.7	6.2	5.7	8.0	12.7	17.8	20.5	22.2	23.6	24.8	25.8	26.1	26.3	25.9	25.6	24.5	23.2	19.1	12.9	9.9	8.5	16.7	26.3	5.7	
19	7.0	5.3	5.1	4.4	4.0	3.7	6.0	10.9	16.4	18.4	19.4	20.3	21.1	22.3	23.0	23.6	23.9	24.1	23.6	21.0	16.5	13.8	11.7	11.3	14.9	24.1	3.7	
20	11.3	10.1	9.0	7.8	7.6	6.8	9.0	14.2	19.3	21.4	22.8	23.6	24.6	25.3	25.6	25.8	26.1	26.2	25.6	23.1	17.5	15.8	12.4	11.5	17.6	26.2	6.8	
21	9.3	8.7	8.3	7.6	6.1	5.6	7.8	13.2	18.5	21.5	23.3	24.4	25.3	26.5	27.3	27.4	27.6	27.3	24.4	21.3	17.7	15.2	14.0	13.1	17.6	27.6	5.6	
22	13.8	13.3	11.7	9.3	6.3	4.6	5.9	10.9	15.0	16.4	17.5	18.6	19.7	20.4	21.0	21.5	21.8	21.9	21.0	18.6	15.6	13.9	13.7	10.3	15.1	21.9	4.6	
23	9.1	8.8	7.4	7.4	8.5	7.0	10.5	14.4	15.9	17.2	18.2	19.6	21.1	22.5	23.2	23.6	24.5	24.4	24.0	21.3	14.9	12.1	8.7	7.8	15.5	24.5	7.0	
24	6.2	5.3	5.4	4.7	4.4	3.9	6.6	10.7	13.3	16.0	17.2	18.0	19.3	21.3	22.3	23.4	23.8	23.6	23.1	20.8	18.1	15.3	12.5	11.2	14.4	23.8	3.9	
25	10.2	8.8	7.6	6.8	6.2	5.2	7.1	11.6	15.1	16.2	17.4	18.8	19.8	21.4	22.1	22.3	22.7	22.1	21.8	19.8	17.7	16.4	15.5	15.1	15.3	22.7	5.2	
26	12.9	11.5	10.8	10.0	11.3	10.2	12.3	14.5	16.2	17.8	18.9	20.0	21.0	20.8	21.8	19.4	19.4	19.1	17.6	16.2	14.3	12.9	10.7	8.9	15.4	21.8	8.9	
27	9.1	9.2	7.9	6.9	5.6	5.3	6.6	10.5	13.0	14.8	16.1	14.0	12.4	11.9	13.7	16.3	17.3	16.4	15.7	14.6	12.2	9.4	8.4	7.2	11.4	17.3	5.3	
28	6.0	5.0	4.6	3.9	2.9	2.6	4.6	9.1	14.3	16.7	17.9	18.7	19.2	17.1	15.3	18.5	19.0	18.1	16.8	15.6	12.6	10.3	9.2	8.7	11.9	19.2	2.6	
29	8.0	6.6	6.7	5.0	3.2	3.3	4.6	9.5	15.4	18.1	18.8	19.4	20.0	20.2	20.9	20.9	20.7	20.8	20.1	18.2	13.7	10.3	9.7	7.7	13.4	20.9	3.2	
30	6.1	4.5	4.2	3.6	2.6	2.0	4.1	10.0	16.1	18.9	20.2	21.2	22.1	23.0	23.9	24.5	24.9	24.9	24.6	21.1	15.6	12.9	10.5	8.7	14.6	24.9	2.0	
31	7.8	8.1	6.1	5.2	5.3	5.5	6.4	11.5	15.8	18.2	20.8	23.6	24.1	24.8	25.6	25.9	25.9	25.5	23.5	22.5	20.0	18.4	16.1	14.6	16.7	25.9	5.2	
Avg	9.5	8.7	8.1	7.3	6.7	6.2	8.2	12.6	16.6	19.0	19.9	20.9	21.5	22.0	22.5	23.1	23.4	23.0	22.1	20.0	16.6	14.0	12.2	10.8	15.7	23.8	6.3	
Max	14.9	13.3	12.9	12.0	12.1	12.4	14.4	17.6	23.3	26.3	27.4	27.6	28.2	27.3	28.1	28.6	28.7	27.3	26.3	24.3	20.9	19.3	17.5	16.4	24.0	28.7	16.4	
Min	6.0	4.5	4.2	3.6	2.6	2.0	4.1	9.1	13.0	14.8	16.1	14.0	12.4	11.9	13.7	16.3	17.3	16.4	15.0	13.0	11.0	9.4	8.1	7.2	11.4	17.3	2.0	

A-13

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 9 Meters (degrees Celsius)
August 2018

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	17.3	16.9	15.6	12.5	9.7	8.6	9.0	12.9	18.7	22.8	24.5	25.6	26.2	26.7	27.5	28.0	28.1	27.7	26.4	23.1	21.3	17.3	14.4	12.5	19.7	28.1	8.6
2	10.8	9.5	8.6	8.2	7.8	7.3	8.4	12.3	18.9	21.9	23.1	24.4	25.7	26.4	26.5	23.1	21.1	21.4	20.5	18.1	14.8	12.7	12.2	10.7	16.4	26.5	7.3
3	8.8	8.3	7.9	7.3	6.9	5.7	5.6	9.8	16.1	19.4	20.5	21.2	22.1	22.5	23.0	23.1	23.0	22.6	21.3	19.4	16.8	11.1	7.4	5.3	14.8	23.1	5.3
4	4.1	2.9	1.8	1.0	0.3	0.0	1.6	7.8	13.2	14.9	16.0	17.0	17.8	18.1	19.2	19.8	20.3	19.9	19.0	16.8	15.1	12.5	9.9	7.6	11.5	20.3	0.0
5	6.9	6.6	7.6	6.9	6.7	7.7	10.0	10.8	12.4	14.9	16.8	17.5	14.8	12.6	13.6	15.7	15.2	13.7	11.8	10.2	8.9	8.0	6.9	6.0	10.9	17.5	6.0
6	5.4	4.0	2.5	1.9	1.5	0.3	2.1	6.6	11.6	15.5	17.1	18.5	19.9	20.8	21.4	21.9	22.2	22.4	21.8	19.7	15.0	11.4	9.5	8.4	12.6	22.4	0.3
7	6.5	5.2	3.4	3.2	2.6	2.2	4.0	9.3	15.9	19.5	20.5	21.4	21.9	22.8	23.2	23.9	24.2	24.0	23.4	20.3	16.4	14.1	12.1	9.9	14.6	24.2	2.2
8	7.9	6.7	5.6	4.7	4.6	4.2	4.7	9.7	16.2	21.4	23.0	23.8	24.7	25.6	26.4	26.9	27.3	27.1	26.4	22.0	16.7	14.0	11.8	9.8	16.3	27.3	4.2
9	8.5	7.5	6.6	5.7	5.4	5.4	6.7	11.5	17.8	23.5	25.3	26.4	27.0	28.0	28.7	29.1	29.4	29.4	28.1	24.4	19.0	17.0	13.6	11.9	18.2	29.4	5.4
10	10.2	8.4	8.3	6.6	5.9	5.5	7.2	12.6	19.5	25.6	28.3	29.4	30.0	31.0	31.3	31.6	31.6	31.2	30.1	24.2	19.0	16.1	14.4	12.0	19.6	31.6	5.5
11	10.6	10.2	9.3	8.7	8.3	7.3	8.2	12.9	18.5	24.5	29.2	30.7	31.4	32.5	33.0	33.0	31.7	28.9	26.6	24.1	22.8	23.0	22.1	16.8	21.0	33.0	7.3
12	14.2	12.7	11.6	10.0	8.9	10.2	10.6	14.0	19.5	22.6	22.7	24.4	25.4	26.5	26.7	26.8	26.6	25.9	24.3	21.9	19.9	18.4	17.5	14.5	19.0	26.8	8.9
13	12.5	10.9	8.6	6.8	5.0	3.2	3.5	8.0	12.7	15.4	17.7	18.6	18.8	19.1	19.3	20.2	20.3	19.5	18.2	16.5	15.3	13.4	12.9	11.6	13.7	20.3	3.2
14	10.5	8.6	7.6	5.8	4.3	3.4	4.0	8.2	13.7	16.7	18.2	19.5	20.2	21.3	22.1	22.7	23.2	23.1	21.8	18.3	13.2	9.9	8.7	7.1	13.8	23.2	3.4
15	6.4	6.4	6.3	5.1	4.4	3.2	4.1	8.9	15.3	19.7	20.8	21.8	23.0	24.0	24.4	24.3	25.0	25.5	24.8	19.2	15.5	11.1	9.7	7.9	14.9	25.5	3.2
16	7.9	6.7	6.0	4.5	3.5	2.9	4.1	9.3	15.9	21.4	24.3	25.4	26.2	26.8	27.2	27.0	27.3	26.9	25.7	22.9	18.5	15.6	14.2	12.9	16.8	27.3	2.9
17	11.6	10.4	9.0	8.5	8.4	6.9	7.3	9.8	14.0	18.5	22.1	25.0	25.7	26.3	26.7	27.0	26.5	25.6	23.5	19.8	19.0	17.4	17.1	16.3	17.6	27.0	6.9
18	14.4	12.6	11.8	11.5	13.0	11.9	11.7	12.3	13.4	14.4	13.1	13.0	14.0	15.4	17.4	19.4	18.8	18.2	17.4	16.4	15.1	13.0	10.5	7.6	14.0	19.4	7.6
19	5.9	5.8	4.2	4.0	3.1	2.7	2.8	4.5	8.0	13.5	16.2	17.8	19.5	20.4	20.4	20.3	19.6	18.3	17.0	16.3	14.9	13.7	12.9	11.6	12.2	20.4	2.7
20	11.1	10.8	10.5	9.9	9.0	7.3	7.9	8.2	8.0	7.8	8.8	8.7	8.0	8.1	7.6	7.5	7.5	7.5	6.9	6.3	6.2	6.5	6.6	6.5	8.0	11.1	6.2
21	6.5	6.6	6.7	6.0	6.2	6.0	6.3	6.8	8.1	8.9	9.8	10.4	10.7	10.7	11.1	10.9	11.3	11.1	10.3	8.5	7.3	5.9	6.0	8.4	8.4	11.3	5.9
22	8.3	8.1	7.8	7.6	7.1	6.3	5.9	6.8	8.2	10.8	14.2	17.2	18.9	19.8	20.9	21.1	20.4	19.4	18.1	15.5	12.0	10.4	9.3	8.9	12.6	21.1	5.9
23	9.1	8.6	8.8	8.5	8.0	8.1	7.7	8.9	12.9	15.3	16.5	18.1	19.5	20.7	21.6	22.4	22.6	22.4	21.2	18.4	13.8	11.1	8.1	6.6	14.1	22.6	6.6
24	5.3	4.2	3.5	2.5	2.6	2.4	2.5	4.5	9.0	15.5	18.4	19.0	19.3	20.1	21.6	21.2	20.6	20.3	19.0	17.4	13.7	10.7	10.0	8.2	12.1	21.6	2.4
25	7.4	6.4	5.3	3.9	2.5	1.5	1.3	3.8	9.5	13.2	15.3	16.7	17.8	18.5	19.2	19.6	19.7	19.3	17.5	15.0	14.5	14.3	13.8	11.5	12.0	19.7	1.3
26	10.2	9.0	8.3	8.3	7.9	7.7	7.4	9.0	10.2	10.4	11.2	12.6	13.5	13.5	13.8	14.2	14.1	12.8	11.8	11.0	9.5	8.9	8.0	7.2	10.4	14.2	7.2
27	6.6	6.7	6.5	6.3	6.3	6.3	6.5	6.6	6.3	5.8	5.6	6.4	6.9	6.8	6.6	6.3	5.9	4.8	4.3	3.8	3.4	3.1	2.9	3.0	5.6	6.9	2.9
28	2.3	1.6	-0.1	-1.0	-0.4	-0.1	-0.1	0.7	4.4	6.9	8.5	10.1	11.7	11.5	12.2	13.2	13.4	13.8	13.5	11.2	8.3	7.6	3.4	2.7	6.5	13.8	-1.0
29	1.1	0.3	-0.3	-1.3	-1.4	-1.8	-1.1	2.4	9.0	14.1	15.5	16.7	18.1	19.0	19.6	20.3	20.8	20.8	20.1	15.0	11.4	8.3	5.9	4.3	9.9	20.8	-1.8
30	4.1	3.1	2.0	1.8	0.9	1.1	1.4	5.6	13.7	17.8	18.1	18.9	19.7	20.5	20.0	20.2	19.0	17.3	16.5	15.6	15.4	14.9	14.0	14.5	12.3	20.5	0.9
31	13.7	12.5	12.1	10.7	7.9	5.8	3.9	8.5	12.0	13.1	14.4	15.1	15.6	16.2	17.3	18.0	18.3	17.9	16.7	13.2	10.1	6.6	4.3	2.6	11.9	18.3	2.6
Avg	8.6	7.7	6.9	6.0	5.4	4.8	5.3	8.5	13.0	16.3	17.9	19.1	19.8	20.4	21.0	21.2	21.1	20.6	19.5	16.9	14.3	12.2	10.6	9.2	13.6	21.8	4.2
Max	17.3	16.9	15.6	12.5	13.0	11.9	11.7	14.0	19.5	25.6	29.2	30.7	31.4	32.5	33.0	33.0	31.7	31.2	30.1	24.4	22.8	23.0	22.1	16.8	21.0	33.0	8.9
Min	1.1	0.3	-0.3	-1.3	-1.4	-1.8	-1.1	0.7	4.4	5.8	5.6	6.4	6.9	6.8	6.6	6.3	5.9	4.8	4.3	3.8	3.4	3.1	2.9	2.6	5.6	6.9	-1.8

A-14

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature 9 Meters (degrees Celsius)
September 2018

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	1.2	0.1	-0.3	-1.1	-1.6	-1.7	-0.5	1.9	5.6	12.0	14.0	14.9	14.9	16.2	17.0	17.4	17.4	17.0	15.7	12.7	9.1	6.1	3.1	1.9	8.0	17.4	-1.7
2	0.9	0.2	-0.3	-1.2	-1.7	-1.7	-1.8	2.3	9.3	14.1	15.7	16.7	17.7	18.8	19.5	19.9	20.2	20.0	18.5	13.7	9.4	7.1	5.2	3.0	9.4	20.2	-1.8
3	1.9	1.1	0.1	0.0	-0.4	-1.2	-1.0	3.6	11.1	16.5	18.1	19.0	20.0	20.6	21.2	21.5	20.9	19.2	14.5	11.8	9.5	7.7	6.3	5.4	10.3	21.5	-1.2
4	3.7	3.5	3.8	3.3	3.9	2.9	2.5	5.8	7.7	8.7	10.2	11.5	12.8	13.8	14.5	14.8	14.8	14.0	12.2	10.9	10.0	9.5	8.7	8.2	8.8	14.8	2.5
5	7.5	6.4	5.9	5.9	5.4	3.0	1.4	6.0	10.9	12.6	14.1	15.8	18.1	19.9	21.0	21.6	21.8	21.7	18.1	15.4	14.8	13.5	11.5	8.1	12.5	21.8	1.4
6	7.3	6.1	6.1	5.6	4.7	4.5	4.7	7.9	14.9	20.6	22.8	23.6	24.4	24.8	25.5	24.8	24.6	23.6	21.4	19.8	18.9	17.7	14.8	11.2	15.8	25.5	4.5
7	9.4	11.0	9.6	8.1	7.1	8.0	8.1	9.2	13.2	20.7	23.1	24.2	24.9	25.3	25.5	23.2	23.2	23.2	21.2	20.8	17.8	13.5	11.5	12.7	16.4	25.5	7.1
8	14.6	15.7	13.0	10.6	10.4	9.6	10.4	10.6	15.3	20.1	21.4	21.9	22.7	23.2	23.0	22.3	21.7	20.6	18.9	16.1	13.6	12.5	11.5	10.2	16.2	23.2	9.6
9	9.5	8.9	7.8	6.3	4.8	3.8	3.1	5.8	12.8	15.1	15.2	16.1	17.4	18.3	19.2	19.1	18.8	18.2	16.5	13.2	12.1	9.7	9.0	8.1	12.0	19.2	3.1
10	6.2	5.5	4.2	3.1	2.2	1.2	1.0	4.1	10.8	16.9	19.2	20.1	20.9	21.3	21.9	22.4	22.5	22.5	20.4	18.7	17.8	15.5	13.7	12.6	13.5	22.5	1.0
11	10.4	7.0	4.0	2.8	0.8	0.0	-0.6	2.6	9.0	12.3	13.6	14.7	15.9	16.4	16.3	16.5	16.7	15.3	13.7	10.7	9.5	9.0	9.4	8.9	9.8	16.7	-0.6
12	8.9	8.5	9.0	8.7	8.5	7.6	7.1	7.7	9.4	10.8	11.9	12.4	11.8	12.2	12.6	12.3	11.7	10.0	8.0	7.9	7.8	7.0	4.9	4.2	9.2	12.6	4.2
13	3.7	3.4	3.4	4.5	4.5	4.8	4.9	5.0	5.6	7.2	8.7	10.0	11.5	11.3	7.3	7.6	8.6	7.9	5.7	5.3	4.9	4.7	4.4	4.0	6.2	11.5	3.4
14	2.8	1.4	0.4	-0.2	-1.3	-1.7	-1.7	-0.7	1.8	8.5	10.9	11.6	12.8	13.7	14.3	14.8	14.2	13.4	12.1	10.9	10.0	8.5	8.0	7.9	7.2	14.8	-1.7
15	7.5	7.9	8.3	8.8	9.1	8.7	6.1	8.3	11.7	13.8	16.1	18.2	18.8	19.8	20.0	19.5	19.1	16.0	15.8	14.4	11.2	9.0	8.1	7.1	12.6	20.0	6.1
16	5.8	3.9	2.5	2.0	1.1	0.6	0.1	1.8	7.1	11.4	13.7	15.9	16.9	18.0	18.3	19.1	19.2	18.2	15.6	12.0	10.2	9.2	8.5	8.3	10.0	19.2	0.1
17	7.7	7.7	7.5	6.9	5.9	4.0	3.3	5.1	7.1	10.3	12.9	14.3	14.7	15.1	15.8	16.3	16.4	16.3	13.6	11.1	9.4	8.1	5.3	4.2	10.0	16.4	3.3
18	4.1	3.8	6.4	4.8	4.0	2.7	1.3	3.0	8.2	11.5	13.0	14.4	15.3	15.9	16.5	16.4	15.1	13.8	12.1	10.0	9.2	8.4	7.6	7.7	9.4	16.5	1.3
19	5.9	5.5	6.0	6.3	6.3	6.1	6.0	6.3	6.9	7.5	7.6	6.7	6.6	7.1	7.3	7.6	7.5	7.7	6.9	5.6	5.6	6.0	5.6	5.5	6.5	7.7	5.5
20	5.3	4.5	4.1	4.0	3.9	4.4	4.6	4.9	5.2	6.2	7.2	8.0	9.0	9.2	7.9	4.8	4.6	5.4	4.8	3.7	2.5	1.4	0.0	-0.1	4.8	9.2	-0.1
21	-0.1	0.4	0.7	0.3	-0.1	0.0	0.0	1.5	5.9	9.3	Au	Au	Au	Au	Au	15.9	16.4	15.6	10.8	8.3	6.0	4.8	4.7	3.8	5.5	16.4	-0.1
22	2.8	1.8	1.6	1.0	1.1	1.9	1.9	2.5	6.1	13.1	17.7	17.9	17.8	19.1	19.2	18.6	17.5	15.9	14.8	12.8	10.1	8.9	8.7	8.0	10.0	19.2	1.0
23	7.1	6.9	6.9	6.9	8.0	8.0	8.5	7.0	7.0	7.3	7.1	6.6	6.7	8.4	7.1	8.3	9.9	10.1	8.4	5.9	2.9	1.7	1.6	1.0	6.6	10.1	1.0
24	-0.2	-0.3	-1.4	-1.9	-2.5	-3.4	-3.1	-1.9	0.4	5.7	5.6	4.5	6.0	3.8	3.7	3.6	3.7	3.7	2.3	1.9	1.8	1.6	1.9	1.0	1.5	6.0	-3.4
25	0.0	-0.5	0.0	0.4	0.6	0.4	-0.2	0.3	1.1	3.6	5.3	6.7	7.6	8.4	8.9	9.1	9.6	9.4	6.1	2.2	0.5	-0.7	-2.2	-2.9	3.1	9.6	-2.9
26	-3.1	-3.7	-4.2	-4.1	-4.1	-4.2	-4.2	-3.7	-0.8	6.6	9.0	10.1	11.0	12.0	12.6	13.2	13.6	12.8	11.5	11.4	10.0	8.3	7.4	6.0	5.1	13.6	-4.2
27	5.6	5.3	5.0	4.3	4.1	4.1	4.1	4.3	5.5	6.7	7.3	7.5	7.4	7.6	6.8	5.2	4.0	3.4	2.6	2.7	1.4	0.7	0.2	-0.1	4.4	7.6	-0.1
28	-0.2	-0.2	-0.3	-0.3	-0.4	-0.5	-0.3	0.2	0.8	1.6	2.0	2.2	2.6	2.6	2.5	2.7	2.4	1.4	1.1	1.0	1.1	1.3	1.3	1.5	1.1	2.7	-0.5
29	1.5	1.6	1.6	1.3	1.3	1.3	1.2	1.0	1.1	1.2	1.6	2.1	2.8	2.5	2.4	1.9	1.6	1.7	1.4	1.2	1.0	0.6	0.5	0.2	1.4	2.8	0.2
30	0.1	0.0	-0.6	-0.8	-1.0	-1.6	-2.2	-2.8	-2.8	-2.1	-1.7	-1.4	-1.6	-1.5	-1.2	-0.9	-0.5	-0.2	-0.2	0.0	-0.1	-0.2	0.0	0.2	-1.0	0.2	-2.8
Avg	4.6	4.1	3.7	3.2	2.8	2.4	2.2	3.7	6.9	10.3	11.8	12.6	13.4	13.9	14.0	14.0	13.9	13.3	11.5	9.7	8.3	7.0	6.0	5.3	8.2	14.8	1.1
Max	14.6	15.7	13.0	10.6	10.4	9.6	10.4	10.6	15.3	20.7	23.1	24.2	24.9	25.3	25.5	24.8	24.6	23.6	21.4	20.8	18.9	17.7	14.8	12.7	16.4	25.5	9.6
Min	-3.1	-3.7	-4.2	-4.1	-4.1	-4.2	-4.2	-3.7	-2.8	-2.1	-1.7	-1.4	-1.6	-1.5	-1.2	-0.9	-0.5	-0.2	-0.2	0.0	-0.1	-0.7	-2.2	-2.9	-1.0	0.2	-4.2

A-15

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature Delta T (degrees Celsius)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	-0.83	Pw	-0.75	-0.77	-0.74	-0.65	-0.18	0.35	0.88	0.56	0.35	0.96	1.27	1.20	0.83	0.18	1.27	-0.83	
10	1.11	1.35	1.18	1.09	1.59	0.95	-0.07	-0.39	-0.30	-0.14	-0.25	-0.08	0.02	0.32	0.14	-0.69	-0.14	-0.05	0.13	0.62	2.60	1.09	1.73	1.69	0.56	2.60	-0.69	
11	1.45	1.58	1.47	0.93	1.06	0.49	-0.46	-0.68	-0.63	-0.61	-0.86	-0.92	-0.88	-0.85	-0.99	-0.97	-0.77	-0.58	-0.35	0.24	0.31	0.78	1.33	1.18	0.05	1.58	-0.99	
12	1.19	1.23	1.19	1.08	1.08	0.82	-0.33	-0.79	-0.53	-0.72	-0.72	-0.59	-0.92	-0.90	-0.90	-0.93	-0.69	-0.55	0.05	0.64	0.76	0.90	1.25	1.30	0.12	1.30	-0.93	
13	1.52	1.36	1.23	1.41	1.51	1.15	-0.13	-0.65	-0.84	-0.95	-0.79	-0.71	-0.81	-0.86	-0.93	-0.76	-0.39	-0.21	0.18	1.00	0.95	1.04	0.93	0.92	0.22	1.52	-0.95	
14	1.24	1.39	1.35	1.56	1.56	1.45	0.09	-0.16	-0.56	-1.00	-1.14	-1.27	-1.32	-1.22	-1.17	-1.08	-1.04	-0.89	-0.55	-0.10	0.41	0.67	0.91	0.98	0.00	1.56	-1.32	
15	1.05	0.95	0.20	0.26	0.48	0.73	-0.06	-0.44	-0.68	-0.78	-0.77	-0.75	-1.04	-1.10	-1.10	-0.94	-0.87	-0.44	-0.23	0.80	1.17	1.41	1.19	1.23	0.01	1.41	-1.10	
16	1.13	0.95	1.12	1.22	1.45	1.00	-0.17	-0.70	-0.57	-0.68	-0.69	-0.75	-0.90	-0.60	-0.41	-0.60	-0.50	0.53	-0.27	1.04	0.96	0.73	0.75	1.20	0.22	1.45	-0.90	
17	1.20	1.16	1.08	1.26	1.62	0.91	-0.28	-0.78	-0.42	-0.48	-0.31	0.00	-0.04	-0.23	-0.71	-1.22	-0.65	-0.28	-0.05	0.26	0.82	0.72	1.15	1.16	0.25	1.62	-1.22	
18	1.20	1.18	1.12	1.35	1.21	1.13	-0.03	-0.64	-0.79	-0.87	-0.90	-0.92	-0.85	-0.86	-0.77	-0.74	-0.44	-0.18	0.21	1.12	1.74	1.17	0.86	2.05	0.26	2.05	-0.92	
19	1.61	1.86	1.71	1.54	1.76	1.05	-0.41	-0.64	-0.87	-0.91	-0.86	-0.99	-0.98	-1.04	-0.96	-0.99	-0.79	-0.71	-0.14	0.79	0.50	1.37	1.48	1.58	0.21	1.86	-1.04	
20	2.13	1.87	1.59	1.43	1.65	1.22	0.03	-0.70	-0.61	-0.67	-0.68	-0.77	-0.90	-0.90	-0.93	-0.78	-0.63	-0.63	0.30	1.18	0.75	0.62	1.26	2.16	0.33	2.16	-0.93	
21	1.32	1.56	1.57	1.72	1.59	1.46	-0.07	-0.41	-0.77	-0.92	-0.72	-0.73	-0.74	-0.78	-0.73	-0.37	-0.11	0.33	0.76	1.61	1.24	1.15	0.99	1.18	0.42	1.72	-0.92	
22	2.18	2.11	1.63	2.07	1.90	1.12	-0.33	-0.62	-0.86	-0.91	-0.97	-0.96	-0.98	-1.03	-1.12	-1.12	-1.06	-0.72	-0.34	0.16	0.53	0.38	0.52	1.97	0.15	2.18	-1.12	
23	2.28	2.37	2.06	2.23	2.89	2.13	0.82	-0.28	-0.62	-0.79	-0.96	-0.95	-0.99	-1.17	-1.15	-0.99	-0.82	-0.67	-0.13	1.24	0.84	1.57	2.27	1.77	0.54	2.89	-1.17	
24	2.02	1.64	1.86	1.31	1.74	1.33	-0.36	-0.62	-0.82	-1.04	-0.71	-0.82	-1.15	-0.82	-0.93	-0.99	-0.91	-0.68	-0.03	0.61	0.88	1.08	1.36	1.18	0.21	2.02	-1.15	
25	1.52	0.99	1.15	1.39	1.41	1.06	-0.36	-0.70	-0.65	-0.88	-0.97	-1.03	-0.81	-1.18	-1.05	-0.99	-0.97	-0.70	-0.36	0.61	0.23	0.74	0.83	0.56	-0.01	1.52	-1.18	
26	0.24	0.38	0.79	1.14	0.77	1.05	0.08	-0.46	-0.59	-0.72	-0.99	-1.00	-0.96	-0.50	-0.75	0.08	-0.65	-0.50	-0.03	0.46	0.88	0.82	0.82	0.39	0.03	1.14	-1.00	
27	0.27	0.46	0.80	0.68	1.03	0.83	0.03	-0.48	-0.54	-0.62	-0.52	-0.16	0.08	-0.27	-0.61	-0.62	-0.69	-0.21	0.15	0.34	0.62	0.96	0.97	0.87	0.14	1.03	-0.69	
28	1.01	0.85	0.89	1.69	1.31	1.28	0.15	-0.49	-0.68	-0.66	-0.70	-0.86	-0.90	0.19	-0.77	-0.99	-0.74	-0.28	-0.06	0.53	1.09	0.79	0.60	0.56	0.16	1.69	-0.99	
29	0.77	0.98	0.71	1.23	1.41	1.26	0.17	-0.43	-0.69	-0.77	-0.99	-0.97	-1.02	-0.87	-1.07	-0.87	-0.63	-0.41	-0.07	0.96	1.43	1.00	0.90	1.29	0.14	1.43	-1.07	
30	1.50	1.62	1.64	1.33	1.64	1.16	0.23	-0.42	-0.69	-0.80	-0.87	-1.01	-1.19	-1.09	-0.97	-0.99	-0.89	-0.62	-0.33	1.05	1.14	1.50	1.51	2.34	0.28	2.34	-1.19	
31	1.29	1.83	1.61	2.01	1.81	1.87	-0.04	-0.47	-0.93	-0.89	-0.93	-0.85	-0.73	-0.91	-1.07	-0.91	-0.80	-0.10	0.36	1.08	0.80	0.46	1.05	2.06	0.32	2.06	-1.07	
Avg	1.33	1.35	1.27	1.36	1.48	1.16	-0.07	-0.54	-0.67	-0.77	-0.79	-0.78	-0.82	-0.76	-0.85	-0.81	-0.64	-0.33	-0.01	0.72	0.94	0.97	1.12	1.32	0.21	1.76	-1.02	
Max	2.28	2.37	2.06	2.23	2.89	2.13	0.82	-0.16	-0.30	-0.14	-0.25	0.00	0.08	0.32	0.14	0.08	0.35	0.88	0.76	1.61	2.60	1.57	2.27	2.34	0.56	2.89	-0.69	
Min	0.24	0.38	0.20	0.26	0.48	0.49	-0.46	-0.79	-0.93	-1.04	-1.14	-1.27	-1.32	-1.22	-1.17	-1.22	-1.06	-0.89	-0.55	-0.10	0.23	0.38	0.52	0.39	-0.01	1.03	-1.32	

A-16

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature Delta T (degrees Celsius)
August 2018

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	1.89	1.19	1.56	0.96	0.99	1.75	0.65	-0.31	-0.45	-0.73	-0.79	-1.03	-1.02	-0.97	-0.93	-0.74	-0.58	-0.22	0.64	1.14	1.38	1.42	1.50	1.69	0.37	1.89	-1.03
2	1.57	1.87	1.44	1.49	1.68	1.52	0.32	-0.51	-0.76	-0.83	-1.00	-1.01	-0.98	-1.03	-0.66	-0.12	0.18	-0.24	0.02	0.41	0.23	0.35	0.23	0.61	0.20	1.87	-1.03
3	1.09	1.26	1.15	0.87	0.60	1.14	0.31	-0.56	-0.71	-0.81	-0.86	-1.01	-0.83	-0.74	-1.00	-0.96	-0.75	-0.47	-0.07	0.93	1.50	0.97	1.34	1.34	0.16	1.50	-1.01
4	1.55	1.55	1.61	1.41	1.62	1.38	-0.01	-0.69	-0.85	-0.97	-0.99	-1.04	-1.08	-0.92	-1.22	-1.13	-0.98	-0.66	-0.23	0.37	1.19	1.62	1.10	1.16	0.16	1.62	-1.22
5	1.29	0.75	0.80	0.94	1.14	0.41	0.06	-0.15	-0.22	-0.64	-0.86	-0.62	-0.49	-0.83	-0.63	-0.73	-0.31	-0.18	0.03	0.17	0.62	0.28	0.90	0.76	0.10	1.29	-0.86
6	0.75	1.37	0.92	0.66	0.90	0.60	0.16	-0.50	-0.86	-0.90	-1.11	-1.18	-1.10	-1.21	-1.16	-0.91	-0.81	-0.63	0.19	0.75	0.75	1.06	1.40	1.27	0.02	1.40	-1.21
7	1.49	1.91	1.25	1.78	1.43	1.24	0.00	-0.71	-0.71	-0.93	-1.02	-1.05	-0.90	-1.27	-0.88	-1.13	-1.06	-0.76	0.00	1.25	0.79	0.26	0.86	1.42	0.14	1.91	-1.27
8	1.80	2.23	1.70	1.70	1.52	1.68	0.62	-0.53	-0.57	-0.87	-0.81	-1.05	-1.04	-1.17	-1.15	-1.08	-0.86	-0.72	0.32	1.23	0.36	1.04	1.34	2.36	0.34	2.36	-1.17
9	2.07	2.07	2.27	1.82	1.81	2.06	0.58	-0.64	-0.69	-0.83	-1.09	-1.03	-1.01	-1.07	-1.05	-0.91	-0.72	-0.46	0.64	1.42	0.98	0.84	2.27	2.03	0.47	2.27	-1.09
10	3.15	1.90	2.44	1.72	1.95	2.00	0.54	-0.43	-0.68	-0.75	-0.90	-1.02	-1.12	-1.11	-1.04	-0.86	-0.84	-0.51	0.24	1.03	0.50	1.46	2.01	2.27	0.50	3.15	-1.12
11	1.86	2.51	2.07	1.99	2.31	2.17	0.92	-0.28	-0.66	-0.68	-0.72	-0.88	-0.80	-0.85	-1.02	-1.00	-0.42	0.46	0.17	0.57	0.82	0.20	0.39	1.84	0.46	2.51	-1.02
12	1.95	1.79	1.88	1.81	1.51	1.76	0.44	-0.16	-0.73	-0.87	-0.98	-1.04	-1.01	-1.13	-0.93	-1.06	-0.91	-0.48	0.48	0.95	0.67	0.37	0.72	1.47	0.27	1.95	-1.13
13	2.12	1.31	1.74	2.28	2.01	1.49	0.74	-0.65	-0.91	-0.91	-1.00	-1.13	-0.62	-0.44	-0.45	-0.93	-0.75	-0.40	0.03	0.65	0.58	1.01	1.47	1.34	0.36	2.28	-1.13
14	1.65	1.82	1.66	1.82	1.29	1.29	0.74	-0.64	-0.88	-0.90	-1.07	-1.13	-1.16	-1.15	-1.13	-1.02	-0.86	-0.66	0.38	0.96	1.08	0.83	1.37	1.64	0.25	1.82	-1.16
15	1.03	1.41	1.45	1.41	1.70	1.62	0.64	-0.51	-0.86	-0.90	-0.99	-0.97	-1.15	-1.11	-0.87	-0.61	-0.73	-0.59	0.33	1.30	0.82	2.31	2.21	2.10	0.38	2.31	-1.15
16	2.34	2.27	1.65	1.64	1.49	1.77	0.85	-0.37	-0.42	-0.79	-0.97	-1.01	-1.18	-1.16	-0.93	-0.60	-0.62	0.04	0.97	1.12	1.12	1.12	1.46	1.83	0.48	2.34	-1.18
17	1.71	1.98	1.58	1.26	1.93	1.56	0.87	0.29	-0.27	-0.27	-0.68	-1.00	-0.85	-0.89	-1.00	-0.89	-0.13	0.39	0.40	0.70	0.95	0.46	0.52	0.61	0.38	1.98	-1.00
18	0.75	0.68	0.73	0.58	0.63	0.27	0.15	0.07	-0.19	-0.12	-0.08	-0.12	-0.38	-0.51	-0.67	-0.64	-0.27	0.00	0.25	0.52	0.46	0.86	1.31	0.75	0.21	1.31	-0.67
19	0.97	0.99	1.46	1.59	1.39	1.45	0.77	-0.10	-0.48	-0.57	-0.68	-0.76	-0.84	-0.83	-0.38	-0.28	-0.35	-0.12	0.07	0.47	0.60	0.38	0.55	0.63	0.25	1.59	-0.84
20	0.39	0.32	0.14	0.32	0.95	0.94	0.05	-0.13	-0.05	0.00	-0.15	-0.45	-0.18	-0.18	-0.15	-0.16	-0.16	-0.08	-0.07	-0.02	-0.03	0.04	0.15	0.09	0.07	0.95	-0.45
21	0.00	0.19	0.07	-0.05	-0.02	-0.08	-0.17	-0.27	-0.40	-0.47	-0.53	-0.69	-0.64	-0.77	-0.58	-0.54	-0.60	-0.47	-0.07	0.65	0.75	0.86	0.63	0.07	-0.13	0.86	-0.77
22	-0.04	-0.08	-0.11	-0.12	-0.14	-0.17	-0.20	-0.27	-0.52	-0.54	-0.69	-0.92	-0.88	-0.79	-0.75	-0.71	-0.38	0.03	0.50	0.82	0.32	0.67	0.83	1.07	-0.13	1.07	-0.92
23	0.92	0.67	0.75	0.62	0.42	0.49	0.49	-0.21	-0.33	-0.59	-0.83	-0.84	-1.05	-1.07	-1.05	-0.86	-0.53	-0.18	0.35	1.31	1.47	1.13	1.45	1.64	0.17	1.64	-1.07
24	1.77	1.43	1.47	1.17	1.12	1.23	0.97	-0.28	-0.59	-0.69	-0.79	-0.75	-0.76	-0.46	-0.82	-0.58	-0.40	-0.09	0.22	0.96	1.41	0.85	1.00	1.24	0.36	1.77	-0.82
25	1.37	1.09	1.38	1.48	0.90	1.22	0.80	-0.39	-0.58	-0.77	-1.00	-1.04	-1.03	-1.11	-1.07	-0.90	-0.58	-0.20	0.92	1.06	0.82	0.37	0.41	1.07	0.18	1.48	-1.11
26	1.13	0.44	0.66	0.64	0.27	0.53	0.24	0.05	0.06	-0.24	-0.52	-0.86	-1.07	-0.70	-0.55	-0.57	-0.78	-0.21	0.07	0.78	0.60	0.31	0.20	-0.01	0.02	1.13	-1.07
27	-0.11	-0.06	-0.08	-0.07	-0.03	-0.04	-0.10	-0.13	-0.24	-0.33	-0.62	-0.85	-0.95	-1.14	-0.98	-0.92	-0.89	-0.41	-0.20	-0.07	-0.09	-0.13	-0.14	0.00	-0.36	0.00	-1.14
28	0.09	0.34	0.70	0.23	-0.11	-0.18	-0.23	-0.38	-0.61	-0.70	-0.85	-0.88	-1.23	-0.62	-0.57	-0.59	-0.36	-0.23	0.04	0.86	1.72	2.19	0.78	0.79	0.01	2.19	-1.23
29	0.93	1.12	1.43	1.07	1.56	1.36	0.87	-0.39	-0.51	-0.73	-0.93	-1.02	-1.06	-1.01	-1.04	-0.85	-0.66	-0.31	0.73	1.58	1.32	2.49	1.51	1.76	0.38	2.49	-1.06
30	1.78	1.80	1.38	1.48	1.51	1.62	1.09	-0.34	-0.54	-0.49	-0.71	-0.76	-0.96	-1.24	-0.83	-0.68	-0.11	0.19	0.41	0.64	0.88	0.62	0.72	0.28	0.32	1.80	-1.24
31	0.33	0.69	0.59	0.79	1.28	1.53	0.44	-0.41	-0.65	-0.78	-1.06	-1.06	-1.10	-1.05	-1.00	-0.89	-0.80	-0.40	0.35	1.37	1.46	1.38	1.12	1.85	0.17	1.85	-1.10
Avg	1.28	1.25	1.22	1.14	1.15	1.15	0.44	-0.34	-0.54	-0.66	-0.82	-0.91	-0.92	-0.92	-0.85	-0.77	-0.58	-0.28	0.26	0.83	0.84	0.89	1.02	1.19	0.21	1.76	-1.04
Max	3.15	2.51	2.44	2.28	2.31	2.17	1.09	0.29	0.06	0.00	-0.08	-0.12	-0.18	-0.18	-0.15	-0.12	0.18	0.46	0.97	1.58	1.72	2.49	2.27	2.36	0.50	3.15	-0.45
Min	-0.11	-0.08	-0.11	-0.12	-0.14	-0.18	-0.23	-0.71	-0.91	-0.97	-1.11	-1.18	-1.23	-1.27	-1.22	-1.13	-1.06	-0.76	-0.23	-0.07	-0.09	-0.13	-0.14	-0.01	-0.36	0.00	-1.27

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Temperature Delta T (degrees Celsius)
September 2018

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	1.62	1.47	1.77	1.68	1.28	1.33	0.87	-0.03	-0.43	-0.55	-0.98	-1.10	-1.21	-1.34	-1.24	-1.05	-0.92	-0.62	0.54	1.70	1.01	1.34	1.58	1.60	0.35	1.77	-1.34
2	2.20	1.64	1.63	2.09	1.99	1.82	0.86	-0.73	-0.85	-0.82	-0.99	-1.20	-1.12	-1.24	-1.22	-0.94	-0.73	-0.43	0.60	1.55	1.17	1.82	1.14	1.77	0.42	2.20	-1.24
3	1.77	1.96	1.62	1.71	1.92	1.57	1.28	-0.49	-0.84	-0.73	-0.98	-1.21	-1.17	-1.21	-1.03	-0.98	-0.81	-0.42	0.07	0.37	0.51	0.75	0.96	1.05	0.24	1.96	-1.21
4	0.92	0.69	0.51	0.45	0.29	0.62	0.65	-0.30	-0.74	-1.06	-1.19	-1.11	-1.15	-1.11	-1.19	-1.14	-0.83	-0.45	0.16	0.56	0.38	0.70	0.80	1.07	-0.10	1.07	-1.19
5	0.71	0.51	1.20	1.69	2.01	1.61	0.64	-0.28	-0.62	-0.87	-0.90	-0.98	-0.94	-0.99	-1.02	-1.11	-0.85	-0.54	0.41	0.79	1.28	2.58	1.85	1.89	0.34	2.58	-1.11
6	1.00	1.59	1.12	1.71	1.97	1.76	0.94	-0.40	-0.41	-0.65	-1.03	-1.02	-0.98	-0.83	-1.02	-0.28	-0.30	0.77	0.88	0.69	0.60	1.09	1.62	1.57	0.43	1.97	-1.03
7	1.25	0.67	1.68	1.62	1.46	0.89	0.88	0.07	-0.58	-0.69	-0.70	-0.99	-1.08	-0.95	-0.79	-0.33	-0.03	0.50	0.67	0.74	0.84	1.73	1.62	1.43	0.41	1.73	-1.08
8	0.59	0.48	0.84	1.50	1.12	0.55	0.84	0.29	-0.45	-0.59	-0.85	-1.02	-1.01	-0.99	-0.91	-0.62	-0.44	0.00	1.26	1.30	0.80	0.46	1.02	1.32	0.23	1.50	-1.02
9	1.20	1.15	1.02	1.32	1.15	1.21	1.33	-0.39	-0.67	-0.84	-0.91	-0.86	-1.07	-1.18	-1.16	-1.08	-0.62	0.07	0.74	0.30	0.29	1.10	1.53	1.83	0.23	1.83	-1.18
10	1.96	1.22	2.05	1.84	1.81	1.69	1.27	-0.35	-0.72	-0.71	-0.85	-0.99	-0.97	-1.01	-0.88	-0.76	-0.24	-0.01	0.36	0.89	0.90	1.15	2.15	0.97	0.45	2.15	-1.01
11	0.89	2.08	1.08	1.37	1.54	1.49	1.16	-0.47	-0.73	-0.83	-0.90	-0.98	-0.82	-0.58	-0.45	-0.40	-0.28	0.14	0.42	0.32	0.20	0.11	0.37	0.26	0.21	2.08	-0.98
12	0.44	0.52	0.38	0.39	0.31	0.09	0.07	-0.18	-0.36	-0.78	-0.72	-0.69	-0.39	-0.42	-0.54	-0.37	-0.07	0.27	0.10	0.19	0.31	0.28	0.46	0.18	-0.02	0.52	-0.78
13	0.23	0.15	0.24	0.10	0.04	0.23	0.06	-0.07	-0.17	-0.29	-0.54	-0.50	-0.72	-0.43	-0.15	-0.26	-0.28	0.01	0.03	-0.02	-0.01	-0.01	0.10	0.29	-0.08	0.29	-0.72
14	0.30	0.24	0.11	-0.14	0.02	0.22	0.29	-0.01	-0.31	-0.38	-0.59	-0.53	-0.71	-0.64	-0.56	-0.29	-0.21	0.03	0.11	0.28	0.32	0.46	0.39	0.47	-0.05	0.47	-0.71
15	0.37	0.13	0.18	0.49	1.10	1.07	1.17	-0.05	-0.34	-0.43	-0.52	-0.50	-0.56	-0.58	-0.05	0.12	-0.06	0.12	0.21	0.19	0.17	-0.01	-0.04	0.09	0.09	1.17	-0.58
16	0.31	0.63	0.72	0.25	0.30	0.12	-0.08	-0.29	-0.19	-0.43	-0.68	-0.79	-0.74	-0.76	-0.72	-0.69	-0.56	-0.23	0.62	0.64	0.72	0.38	0.16	0.06	-0.05	0.72	-0.79
17	-0.02	-0.02	-0.13	-0.16	-0.19	-0.15	-0.11	-0.24	-0.36	-0.69	-0.74	-0.87	-0.94	-1.05	-1.08	-0.61	-0.64	-0.05	0.93	0.59	0.95	1.08	1.45	1.41	-0.07	1.45	-1.08
18	1.50	1.78	1.91	1.80	1.81	1.69	1.16	-0.32	-0.52	-0.81	-0.81	-0.78	-1.00	-1.11	-0.94	-0.70	-0.32	0.03	0.08	0.17	0.10	0.15	0.02	0.16	0.21	1.91	-1.11
19	0.70	0.03	-0.01	0.15	-0.02	-0.07	-0.09	-0.15	-0.22	-0.29	-0.28	-0.32	-0.36	-0.29	-0.31	-0.25	-0.19	-0.11	0.07	0.04	-0.02	0.02	-0.07	0.01	-0.08	0.70	-0.36
20	-0.01	-0.01	0.00	-0.04	-0.14	-0.04	-0.10	-0.10	-0.12	-0.30	-0.50	-0.65	-0.41	-0.38	-0.12	-0.01	-0.35	-0.28	0.18	0.08	0.41	0.31	0.20	0.54	-0.08	0.54	-0.65
21	0.20	0.06	0.24	0.30	0.46	0.55	0.48	-0.10	-0.35	-0.48	Au	Au	Au	Au	Au	-0.60	-0.39	0.18	0.72	0.35	1.19	0.69	0.88	1.12	0.29	1.19	-0.60
22	1.57	1.48	1.38	1.18	0.96	1.00	0.95	0.66	-0.50	-0.56	-0.57	-0.46	-0.42	-0.69	-0.25	0.22	0.49	0.67	0.79	1.09	1.59	0.68	1.09	0.69	0.54	1.59	-0.69
23	0.86	0.77	0.55	0.30	0.37	0.58	0.48	0.12	-0.06	0.08	0.04	-0.05	-0.18	-0.60	-0.29	-0.58	-0.12	0.05	1.02	1.34	0.77	0.30	0.30	0.68	0.28	1.34	-0.60
24	0.86	0.52	0.78	1.00	1.18	1.01	0.27	-0.03	-0.23	-0.77	-0.60	-0.49	-0.55	-0.12	-0.26	-0.14	-0.27	-0.02	0.60	0.40	0.33	0.25	0.32	0.45	0.19	1.18	-0.77
25	0.44	0.60	0.37	0.10	0.15	0.55	0.19	-0.09	-0.24	-0.60	-0.60	-0.55	-0.51	-0.74	-0.54	-0.35	-0.27	-0.04	1.16	0.66	0.67	0.76	1.15	1.09	0.14	1.16	-0.74
26	1.03	1.14	0.85	1.31	1.22	1.19	0.93	0.73	-0.19	-0.49	-0.70	-0.85	-0.84	-0.82	-0.70	-0.56	-0.23	0.33	0.80	0.81	0.59	0.67	0.98	0.25	0.31	1.31	-0.85
27	0.27	0.20	0.44	0.63	0.52	0.52	0.43	0.23	0.00	-0.12	-0.13	-0.25	-0.36	-0.31	-0.16	-0.28	-0.09	-0.04	-0.01	0.01	0.08	0.02	-0.02	0.00	0.07	0.63	-0.36
28	0.02	-0.02	0.07	0.00	0.03	0.22	0.10	-0.02	-0.30	-0.76	-0.78	-0.90	-0.81	-0.73	-0.65	-0.50	-0.40	-0.20	-0.12	-0.10	-0.08	-0.07	-0.08	-0.07	-0.26	0.22	-0.90
29	-0.07	-0.07	-0.05	-0.02	-0.05	-0.06	-0.05	-0.12	-0.20	-0.23	-0.26	-0.41	-0.42	-0.33	-0.21	-0.21	-0.11	-0.04	0.03	0.03	0.00	-0.01	-0.02	-0.03	-0.12	0.03	-0.42
30	-0.02	-0.03	-0.06	0.00	-0.06	-0.07	-0.10	-0.13	-0.17	-0.22	-0.34	-0.30	-0.24	-0.25	-0.18	-0.19	-0.17	-0.08	-0.03	-0.07	0.12	0.01	0.03	0.15	-0.10	0.15	-0.34
Avg	0.77	0.72	0.75	0.82	0.82	0.77	0.56	-0.11	-0.40	-0.56	-0.68	-0.74	-0.75	-0.75	-0.64	-0.50	-0.34	-0.01	0.45	0.53	0.54	0.63	0.73	0.74	0.15	1.25	-0.85
Max	2.20	2.08	2.05	2.09	2.01	1.82	1.33	0.73	0.00	0.08	0.04	-0.05	-0.18	-0.12	-0.05	0.22	0.49	0.77	1.26	1.70	1.59	2.58	2.15	1.89	0.54	2.58	-0.34
Min	-0.07	-0.07	-0.13	-0.16	-0.19	-0.15	-0.11	-0.73	-0.85	-1.06	-1.19	-1.21	-1.21	-1.34	-1.24	-1.14	-0.92	-0.62	-0.12	-0.10	-0.08	-0.07	-0.08	-0.07	-0.26	0.03	-1.34

A-18

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Solar Radiation (watts m²)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	790	Pw	925	945	915	843	590	363	164	150	63	3	0	0	0	411	945	0	
10	0	0	0	0	5	65	195	322	549	720	849	595	597	249	450	719	563	394	227	69	3	0	0	274	849	0		
11	0	0	0	0	3	77	242	419	596	751	872	950	975	942	872	749	592	415	234	70	2	0	0	365	975	0		
12	0	0	0	0	3	72	228	401	557	743	708	655	991	946	904	715	593	419	236	72	3	0	0	344	991	0		
13	0	0	0	0	3	81	237	406	584	735	851	927	962	938	864	732	559	404	228	72	2	0	0	358	962	0		
14	0	0	0	0	1	36	118	206	392	743	924	956	967	930	854	692	566	395	218	68	2	0	0	336	967	0		
15	0	0	0	0	2	68	227	401	576	732	857	888	972	937	860	729	579	405	232	54	2	0	0	355	972	0		
16	0	0	0	0	2	61	216	399	572	721	846	816	799	586	480	576	440	257	229	44	3	0	0	294	846	0		
17	0	0	0	0	2	60	221	388	523	618	421	133	118	309	633	736	483	267	189	36	1	0	0	214	736	0		
18	0	0	0	0	1	54	222	398	574	721	841	921	960	893	781	684	455	362	219	62	2	0	0	340	960	0		
19	0	0	0	0	1	59	218	393	573	730	857	932	948	929	858	729	578	399	215	58	2	0	0	353	948	0		
20	0	0	0	0	1	61	212	385	566	721	847	937	962	933	863	736	580	408	210	54	1	0	0	353	962	0		
21	0	0	0	0	2	59	233	406	572	715	832	910	854	895	874	568	440	223	76	24	1	0	0	320	910	0		
22	0	0	0	0	1	59	224	402	583	741	860	937	963	933	860	733	579	401	217	56	1	0	0	356	963	0		
23	0	0	0	0	1	53	210	386	561	717	843	924	934	942	856	670	585	398	216	56	1	0	0	348	942	0		
24	0	0	0	0	1	55	190	304	515	533	437	546	814	671	582	720	549	379	200	53	1	0	0	273	814	0		
25	0	0	0	0	1	48	198	371	548	710	804	878	656	921	832	560	560	419	212	34	0	0	0	323	921	0		
26	0	0	0	0	0	36	202	357	547	681	789	702	785	489	595	238	549	366	74	23	0	0	0	268	789	0		
27	0	0	0	0	0	25	139	320	244	361	327	231	97	266	563	606	451	159	79	26	0	0	0	162	606	0		
28	0	0	0	0	0	42	176	358	505	633	716	779	647	34	716	728	470	174	74	30	0	0	0	253	779	0		
29	0	0	0	0	0	43	186	358	547	710	870	736	805	703	719	580	388	284	191	40	0	0	0	298	870	0		
30	0	0	0	0	0	44	199	375	562	720	845	933	960	928	856	730	564	379	197	37	0	0	0	347	960	0		
31	0	0	0	0	0	35	175	329	548	652	799	805	515	647	858	546	460	225	63	12	0	0	0	278	858	0		
Avg	0	0	0	0	1	54	203	367	536	691	773	783	792	736	764	655	519	335	182	48	1	0	0	312	892	0		
Max	0	0	0	0	5	81	242	419	596	790	924	956	991	946	904	749	593	419	236	72	3	0	0	411	991	0		
Min	0	0	0	0	0	25	118	206	244	361	327	133	97	34	450	238	363	159	63	12	0	0	0	162	606	0		

A-19

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Solar Radiation (watts m²)
August 2018

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	24	115	315	494	649	764	845	834	757	760	645	489	289	78	23	0	0	0	0	295	845	0
2	0	0	0	0	1	28	155	319	507	665	788	872	864	803	490	201	274	296	106	33	0	0	0	0	267	872	0
3	0	0	0	0	0	23	154	333	509	639	646	710	723	575	729	666	533	364	183	33	0	0	0	0	284	729	0
4	0	0	0	0	0	31	184	358	531	692	741	862	840	626	896	688	556	332	155	23	0	0	0	0	313	896	0
5	0	0	0	0	0	12	75	103	169	611	719	605	216	727	420	442	201	91	25	14	0	0	0	0	185	727	0
6	0	0	0	0	0	26	168	331	515	671	795	878	909	856	825	648	471	368	146	39	0	0	0	0	319	909	0
7	0	0	0	0	0	26	163	336	524	680	807	899	601	922	612	747	565	316	135	19	0	0	0	0	306	922	0
8	0	0	0	0	0	12	137	318	498	651	773	870	910	875	799	673	517	336	151	18	0	0	0	0	314	910	0
9	0	0	0	0	0	18	146	322	503	665	789	858	893	863	789	661	500	322	139	16	0	0	0	0	312	893	0
10	0	0	0	0	0	22	149	320	502	662	787	870	890	866	791	657	487	294	137	13	0	0	0	0	310	890	0
11	0	0	0	0	0	16	116	275	413	566	705	834	748	868	774	674	352	89	23	3	0	0	0	0	269	868	0
12	0	0	0	0	0	17	98	214	449	522	714	780	814	779	636	635	458	277	128	21	0	0	0	0	273	814	0
13	0	0	0	0	0	10	114	302	486	636	765	844	274	195	314	619	390	242	92	17	0	0	0	0	221	844	0
14	0	0	0	0	0	13	119	286	469	631	767	857	899	855	775	636	492	314	124	12	0	0	0	0	302	899	0
15	0	0	0	0	0	14	129	302	490	648	762	825	877	837	558	363	449	302	106	11	0	0	0	0	278	877	0
16	0	0	0	0	0	12	121	294	471	621	758	844	874	833	654	324	346	153	58	8	0	0	0	0	265	874	0
17	0	0	0	0	0	9	50	144	282	244	691	783	459	665	620	501	172	97	21	2	0	0	0	0	198	783	0
18	0	0	0	0	0	1	14	81	189	127	87	124	360	470	504	496	266	128	78	6	0	0	0	0	122	504	0
19	0	0	0	0	0	5	45	147	292	456	564	673	708	642	228	264	287	152	52	5	0	0	0	0	188	708	0
20	0	0	0	0	0	7	80	86	19	10	177	353	85	64	32	36	20	18	6	0	0	0	0	0	41	353	0
21	0	0	0	0	0	1	33	98	192	256	299	375	284	428	281	269	292	215	73	5	0	0	0	0	129	428	0
22	0	0	0	0	0	4	25	86	337	540	673	713	768	714	653	532	342	183	65	3	0	0	0	0	235	768	0
23	0	0	0	0	0	2	41	164	272	446	653	765	837	791	705	565	386	206	67	2	0	0	0	0	246	837	0
24	0	0	0	0	0	5	62	199	344	540	644	600	569	396	641	411	286	159	51	2	0	0	0	0	205	644	0
25	0	0	0	0	0	6	85	233	457	620	749	835	862	747	744	565	333	122	45	1	0	0	0	0	267	862	0
26	0	0	0	0	0	1	25	69	83	147	356	645	646	299	272	351	348	103	28	0	0	0	0	0	141	646	0
27	0	0	0	0	0	1	28	73	121	165	323	451	551	640	510	449	393	113	25	1	0	0	0	0	160	640	0
28	0	0	0	0	0	2	32	207	284	514	554	559	864	318	291	343	192	138	68	2	0	0	0	0	182	864	0
29	0	0	0	0	0	5	105	276	454	615	742	825	845	809	720	594	426	246	68	1	0	0	0	0	280	845	0
30	0	0	0	0	0	4	105	249	481	413	541	532	710	759	475	417	105	21	7	1	0	0	0	0	201	759	0
31	0	0	0	0	0	3	95	276	454	541	784	710	756	670	646	593	419	237	61	1	0	0	0	0	260	784	0
Avg	0	0	0	0	0	12	96	230	380	511	642	716	693	666	585	505	366	210	81	11	0	0	0	0	238	780	0
Max	0	0	0	0	1	31	184	358	531	692	807	899	910	922	896	747	565	368	183	39	0	0	0	0	319	922	0
Min	0	0	0	0	0	1	14	69	19	10	87	124	85	64	32	36	20	18	6	0	0	0	0	0	41	353	0

A-20

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Solar Radiation (watts m²)
September 2018

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	5	74	132	254	381	661	760	798	847	727	503	416	234	57	1	0	0	0	0	244	847	0
2	0	0	0	0	0	2	107	275	452	614	743	824	845	803	714	584	416	232	54	0	0	0	0	0	278	845	0
3	0	0	0	0	0	2	87	273	452	617	740	815	838	770	647	563	405	216	46	0	0	0	0	0	270	838	0
4	0	0	0	0	0	2	71	251	431	590	726	802	815	775	690	558	345	212	42	0	0	0	0	0	263	815	0
5	0	0	0	0	0	2	76	256	428	589	715	794	817	774	692	558	390	209	37	0	0	0	0	0	264	817	0
6	0	0	0	0	0	1	44	237	409	558	634	790	706	500	585	226	291	98	18	0	0	0	0	0	212	790	0
7	0	0	0	0	0	1	41	136	313	576	628	778	724	637	442	262	127	72	5	0	0	0	0	0	198	778	0
8	0	0	0	0	0	0	27	140	387	521	626	705	743	668	583	331	257	108	15	0	0	0	0	0	213	743	0
9	0	0	0	0	0	0	31	283	369	551	531	627	785	792	699	527	319	107	26	0	0	0	0	0	235	792	0
10	0	0	0	0	0	1	64	241	415	579	700	779	773	727	624	506	206	125	21	0	0	0	0	0	240	779	0
11	0	0	0	0	0	1	65	238	411	574	705	557	508	285	185	181	112	31	1	0	0	0	0	0	161	705	0
12	0	0	0	0	0	0	23	141	236	487	484	356	158	186	248	180	55	17	5	0	0	0	0	0	107	487	0
13	0	0	0	0	0	0	4	28	88	224	385	398	594	276	54	223	197	13	1	0	0	0	0	0	104	594	0
14	0	0	0	0	0	0	27	144	328	556	651	498	624	607	456	231	140	44	7	0	0	0	0	0	180	651	0
15	0	0	0	0	0	0	58	189	289	335	584	439	391	410	133	109	121	21	2	0	0	0	0	0	128	584	0
16	0	0	0	0	0	0	34	217	394	562	682	754	692	735	637	499	340	165	14	0	0	0	0	0	239	754	0
17	0	0	0	0	0	0	25	116	247	569	662	754	702	681	648	413	298	147	10	0	0	0	0	0	220	754	0
18	0	0	0	0	0	0	66	180	327	566	665	629	764	692	587	340	171	53	4	0	0	0	0	0	210	764	0
19	0	0	0	0	0	0	4	33	70	91	61	65	65	60	64	68	42	26	2	0	0	0	0	0	27	91	0
20	0	0	0	0	0	0	7	23	35	209	345	427	254	270	99	51	249	86	3	0	0	0	0	0	86	427	0
21	0	0	0	0	0	0	41	200	400	454	Au	Au	Au	Au	Au	479	312	84	4	0	0	0	0	0	104	479	0
22	0	0	0	0	0	0	16	114	333	504	692	510	462	702	317	130	91	31	2	0	0	0	0	0	163	702	0
23	0	0	0	0	0	0	4	28	52	55	48	61	159	523	243	410	127	115	4	0	0	0	0	0	76	523	0
24	0	0	0	0	0	0	8	60	152	501	310	304	272	107	181	91	165	73	2	0	0	0	0	0	93	501	0
25	0	0	0	0	0	0	21	36	200	411	393	395	366	473	357	201	198	123	2	0	0	0	0	0	132	473	0
26	0	0	0	0	0	0	15	54	264	517	612	664	658	645	524	410	248	66	2	0	0	0	0	0	195	664	0
27	0	0	0	0	0	0	3	20	55	77	72	109	180	144	54	103	18	8	0	0	0	0	0	0	35	180	0
28	0	0	0	0	0	0	11	62	234	532	547	534	405	398	285	201	146	27	0	0	0	0	0	0	141	547	0
29	0	0	0	0	0	0	3	17	27	67	88	161	195	141	86	61	35	9	0	0	0	0	0	0	37	195	0
30	0	0	0	0	0	0	2	14	39	81	142	130	115	131	75	63	59	31	0	0	0	0	0	0	37	142	0
Avg	0	0	0	0	0	1	35	138	270	432	511	532	531	509	401	302	210	93	13	0	0	0	0	0	163	609	0
Max	0	0	0	0	0	5	107	283	452	617	743	824	845	847	727	584	416	234	57	1	0	0	0	0	278	847	0
Min	0	0	0	0	0	0	2	14	27	55	48	61	65	60	54	51	18	8	0	0	0	0	0	0	27	91	0

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Barometric Pressure (InHg)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	24.63	Pw	24.61	24.60	24.60	24.58	24.58	24.57	24.56	24.56	24.56	24.56	24.57	24.57	24.57	24.56	24.58	24.63	24.56
10	24.54	24.54	24.54	24.53	24.52	24.52	24.52	24.52	24.49	24.47	24.46	24.46	24.45	24.46	24.46	24.45	24.45	24.46	24.48	24.50	24.52	24.53	24.54	24.55	24.50	24.55	24.45	
11	24.56	24.56	24.56	24.57	24.58	24.59	24.61	24.60	24.60	24.59	24.58	24.58	24.57	24.56	24.55	24.54	24.53	24.52	24.52	24.54	24.56	24.58	24.58	24.58	24.57	24.61	24.52	
12	24.58	24.57	24.56	24.56	24.57	24.58	24.59	24.59	24.59	24.59	24.59	24.59	24.58	24.58	24.57	24.57	24.57	24.57	24.56	24.56	24.58	24.61	24.61	24.61	24.58	24.61	24.56	
13	24.61	24.61	24.61	24.61	24.61	24.61	24.62	24.61	24.61	24.61	24.60	24.59	24.58	24.57	24.56	24.55	24.53	24.52	24.52	24.52	24.53	24.55	24.55	24.55	24.58	24.62	24.52	
14	24.55	24.54	24.54	24.55	24.55	24.56	24.58	24.59	24.59	24.60	24.61	24.61	24.61	24.61	24.61	24.61	24.62	24.62	24.62	24.63	24.66	24.68	24.69	24.68	24.68	24.61	24.69	24.54
15	24.68	24.68	24.67	24.67	24.67	24.66	24.66	24.65	24.65	24.64	24.63	24.62	24.61	24.60	24.59	24.58	24.57	24.56	24.56	24.56	24.58	24.60	24.60	24.61	24.62	24.68	24.56	
16	24.61	24.61	24.61	24.60	24.60	24.61	24.62	24.62	24.62	24.61	24.60	24.60	24.59	24.59	24.59	24.58	24.57	24.56	24.56	24.57	24.58	24.58	24.59	24.59	24.59	24.62	24.56	
17	24.59	24.59	24.58	24.59	24.59	24.59	24.59	24.59	24.58	24.58	24.59	24.62	24.63	24.61	24.60	24.57	24.55	24.56	24.56	24.56	24.56	24.58	24.58	24.57	24.58	24.63	24.55	
18	24.57	24.57	24.57	24.57	24.57	24.56	24.57	24.57	24.57	24.56	24.55	24.54	24.52	24.51	24.50	24.49	24.48	24.49	24.49	24.49	24.51	24.53	24.53	24.53	24.53	24.57	24.48	
19	24.53	24.54	24.55	24.55	24.56	24.56	24.58	24.59	24.59	24.58	24.58	24.57	24.56	24.55	24.53	24.52	24.51	24.50	24.49	24.49	24.50	24.52	24.52	24.52	24.54	24.59	24.49	
20	24.51	24.51	24.51	24.52	24.52	24.53	24.54	24.54	24.53	24.52	24.51	24.50	24.50	24.50	24.49	24.48	24.48	24.47	24.46	24.45	24.45	24.46	24.47	24.48	24.48	24.50	24.45	
21	24.47	24.47	24.49	24.50	24.51	24.51	24.52	24.52	24.52	24.51	24.50	24.49	24.48	24.46	24.45	24.44	24.42	24.42	24.44	24.46	24.48	24.51	24.52	24.54	24.48	24.54	24.42	
22	24.55	24.57	24.59	24.61	24.62	24.63	24.66	24.67	24.67	24.68	24.68	24.69	24.68	24.69	24.69	24.69	24.68	24.68	24.68	24.70	24.72	24.72	24.73	24.73	24.67	24.73	24.55	
23	24.72	24.72	24.72	24.72	24.72	24.72	24.73	24.73	24.72	24.71	24.70	24.69	24.68	24.67	24.66	24.64	24.63	24.63	24.63	24.63	24.63	24.64	24.65	24.65	24.65	24.68	24.73	24.63
24	24.65	24.65	24.64	24.65	24.66	24.66	24.67	24.68	24.69	24.68	24.67	24.67	24.66	24.65	24.64	24.62	24.61	24.61	24.61	24.62	24.64	24.66	24.67	24.67	24.65	24.69	24.61	
25	24.68	24.68	24.69	24.70	24.71	24.72	24.74	24.73	24.73	24.72	24.72	24.71	24.70	24.69	24.68	24.67	24.66	24.66	24.66	24.66	24.66	24.68	24.70	24.70	24.71	24.70	24.74	24.66
26	24.70	24.71	24.71	24.70	24.70	24.70	24.70	24.69	24.69	24.68	24.67	24.66	24.65	24.64	24.62	24.63	24.63	24.62	24.62	24.64	24.65	24.66	24.67	24.67	24.66	24.67	24.71	24.62
27	24.65	24.65	24.64	24.63	24.62	24.62	24.63	24.64	24.64	24.63	24.63	24.64	24.66	24.67	24.66	24.63	24.62	24.62	24.63	24.62	24.62	24.62	24.62	24.62	24.63	24.67	24.62	
28	24.62	24.62	24.61	24.60	24.59	24.59	24.61	24.61	24.61	24.60	24.60	24.58	24.58	24.59	24.60	24.59	24.60	24.60	24.62	24.62	24.64	24.65	24.65	24.66	24.61	24.66	24.58	
29	24.65	24.65	24.65	24.65	24.64	24.65	24.67	24.68	24.68	24.67	24.67	24.67	24.67	24.68	24.68	24.69	24.69	24.69	24.69	24.70	24.72	24.73	24.73	24.73	24.68	24.73	24.64	
30	24.73	24.72	24.72	24.71	24.71	24.71	24.72	24.72	24.71	24.70	24.69	24.68	24.68	24.67	24.65	24.64	24.63	24.62	24.62	24.61	24.63	24.63	24.64	24.63	24.67	24.73	24.61	
31	24.63	24.64	24.64	24.64	24.65	24.66	24.67	24.68	24.68	24.67	24.65	24.64	24.64	24.63	24.61	24.60	24.60	24.59	24.59	24.60	24.61	24.61	24.60	24.60	24.63	24.68	24.59	
Avg	24.61	24.61	24.61	24.61	24.61	24.62	24.63	24.63	24.63	24.62	24.61	24.61	24.60	24.60	24.59	24.58	24.57	24.57	24.57	24.58	24.59	24.61	24.61	24.61	24.60	24.65	24.56	
Max	24.73	24.72	24.72	24.72	24.72	24.72	24.74	24.73	24.73	24.72	24.72	24.71	24.70	24.69	24.69	24.69	24.69	24.69	24.69	24.70	24.72	24.73	24.73	24.73	24.70	24.74	24.66	
Min	24.47	24.47	24.49	24.50	24.51	24.51	24.52	24.52	24.49	24.47	24.46	24.46	24.45	24.46	24.45	24.44	24.42	24.42	24.44	24.45	24.46	24.47	24.48	24.48	24.48	24.54	24.42	

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Barometric Pressure (InHg)
August 2018

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	24.60	24.59	24.59	24.58	24.57	24.57	24.56	24.56	24.55	24.53	24.52	24.52	24.50	24.49	24.48	24.46	24.45	24.43	24.42	24.43	24.44	24.45	24.45	24.46	24.51	24.60	24.42
2	24.47	24.47	24.47	24.47	24.47	24.47	24.48	24.48	24.48	24.47	24.46	24.45	24.44	24.42	24.41	24.40	24.41	24.38	24.38	24.40	24.40	24.41	24.42	24.43	24.44	24.48	24.38
3	24.42	24.42	24.43	24.44	24.43	24.44	24.45	24.45	24.44	24.42	24.41	24.40	24.39	24.38	24.38	24.38	24.37	24.37	24.38	24.40	24.41	24.44	24.45	24.45	24.41	24.45	24.37
4	24.45	24.45	24.45	24.46	24.46	24.46	24.48	24.48	24.48	24.47	24.48	24.48	24.47	24.48	24.46	24.46	24.46	24.45	24.45	24.46	24.48	24.50	24.51	24.52	24.47	24.52	24.45
5	24.53	24.53	24.53	24.53	24.52	24.54	24.54	24.55	24.56	24.55	24.55	24.55	24.55	24.57	24.57	24.57	24.58	24.61	24.63	24.63	24.65	24.64	24.63	24.63	24.57	24.65	24.52
6	24.63	24.63	24.63	24.63	24.64	24.64	24.65	24.66	24.67	24.66	24.66	24.65	24.64	24.62	24.61	24.60	24.60	24.58	24.58	24.59	24.60	24.61	24.61	24.60	24.62	24.67	24.58
7	24.60	24.59	24.59	24.59	24.58	24.59	24.60	24.60	24.60	24.59	24.58	24.57	24.56	24.55	24.54	24.54	24.54	24.53	24.53	24.55	24.57	24.58	24.59	24.59	24.57	24.60	24.53
8	24.59	24.58	24.58	24.58	24.59	24.59	24.60	24.62	24.62	24.62	24.62	24.61	24.60	24.59	24.59	24.58	24.57	24.57	24.57	24.58	24.60	24.61	24.62	24.62	24.60	24.62	24.57
9	24.62	24.62	24.62	24.63	24.63	24.64	24.66	24.67	24.67	24.66	24.66	24.66	24.65	24.65	24.64	24.63	24.62	24.62	24.62	24.63	24.66	24.67	24.67	24.66	24.64	24.67	24.62
10	24.65	24.65	24.65	24.65	24.65	24.65	24.66	24.66	24.65	24.64	24.63	24.62	24.60	24.59	24.57	24.57	24.56	24.55	24.54	24.55	24.56	24.57	24.57	24.56	24.61	24.66	24.54
11	24.55	24.54	24.54	24.54	24.54	24.53	24.54	24.54	24.53	24.52	24.51	24.50	24.49	24.47	24.46	24.45	24.44	24.45	24.48	24.51	24.53	24.49	24.48	24.48	24.50	24.55	24.44
12	24.47	24.47	24.47	24.46	24.46	24.47	24.48	24.49	24.49	24.49	24.50	24.49	24.48	24.47	24.46	24.46	24.46	24.46	24.47	24.49	24.51	24.54	24.54	24.56	24.48	24.56	24.46
13	24.57	24.57	24.58	24.58	24.58	24.58	24.59	24.60	24.60	24.59	24.58	24.57	24.57	24.56	24.55	24.54	24.54	24.53	24.54	24.55	24.56	24.57	24.56	24.56	24.57	24.60	24.53
14	24.55	24.54	24.54	24.53	24.52	24.52	24.53	24.53	24.53	24.53	24.52	24.52	24.50	24.49	24.48	24.47	24.46	24.46	24.47	24.47	24.48	24.48	24.48	24.49	24.50	24.55	24.46
15	24.49	24.49	24.49	24.49	24.49	24.49	24.51	24.52	24.52	24.51	24.51	24.51	24.50	24.50	24.49	24.49	24.49	24.48	24.49	24.50	24.52	24.53	24.54	24.54	24.50	24.54	24.48
16	24.55	24.56	24.56	24.57	24.58	24.59	24.60	24.62	24.62	24.61	24.61	24.60	24.60	24.59	24.59	24.58	24.58	24.57	24.58	24.58	24.61	24.62	24.62	24.61	24.59	24.62	24.55
17	24.62	24.61	24.61	24.61	24.62	24.62	24.63	24.64	24.64	24.63	24.63	24.62	24.61	24.61	24.60	24.59	24.58	24.57	24.59	24.62	24.63	24.65	24.63	24.62	24.62	24.65	24.57
18	24.62	24.61	24.60	24.60	24.64	24.65	24.64	24.62	24.63	24.64	24.66	24.66	24.66	24.65	24.65	24.64	24.63	24.63	24.65	24.66	24.68	24.69	24.70	24.70	24.65	24.70	24.60
19	24.70	24.70	24.69	24.69	24.68	24.69	24.70	24.70	24.69	24.69	24.68	24.66	24.64	24.62	24.61	24.60	24.58	24.58	24.58	24.60	24.61	24.61	24.60	24.60	24.65	24.70	24.58
20	24.59	24.59	24.61	24.59	24.57	24.58	24.61	24.62	24.65	24.66	24.61	24.63	24.64	24.64	24.65	24.65	24.66	24.66	24.66	24.68	24.69	24.69	24.68	24.68	24.64	24.69	24.57
21	24.66	24.66	24.66	24.67	24.67	24.67	24.67	24.67	24.67	24.67	24.67	24.67	24.68	24.68	24.67	24.67	24.67	24.67	24.67	24.67	24.66	24.66	24.65	24.65	24.67	24.68	24.65
22	24.64	24.64	24.62	24.61	24.60	24.59	24.59	24.59	24.58	24.57	24.54	24.53	24.51	24.50	24.47	24.46	24.45	24.45	24.45	24.44	24.44	24.44	24.43	24.43	24.52	24.64	24.43
23	24.42	24.41	24.40	24.40	24.39	24.40	24.41	24.42	24.41	24.41	24.41	24.41	24.40	24.39	24.39	24.38	24.37	24.37	24.37	24.37	24.39	24.39	24.40	24.39	24.40	24.42	24.37
24	24.39	24.38	24.38	24.37	24.37	24.38	24.39	24.40	24.39	24.39	24.38	24.37	24.36	24.35	24.33	24.33	24.34	24.34	24.36	24.39	24.41	24.42	24.43	24.44	24.38	24.44	24.33
25	24.45	24.45	24.46	24.46	24.45	24.45	24.46	24.47	24.47	24.46	24.45	24.44	24.43	24.42	24.40	24.39	24.38	24.37	24.36	24.36	24.38	24.39	24.37	24.37	24.42	24.47	24.36
26	24.37	24.36	24.35	24.35	24.33	24.33	24.34	24.35	24.35	24.36	24.35	24.34	24.33	24.33	24.33	24.32	24.31	24.30	24.30	24.29	24.29	24.29	24.29	24.28	24.33	24.37	24.28
27	24.28	24.27	24.26	24.26	24.26	24.27	24.28	24.29	24.31	24.33	24.35	24.37	24.39	24.41	24.43	24.44	24.46	24.47	24.49	24.51	24.53	24.54	24.54	24.54	24.39	24.54	24.26
28	24.53	24.53	24.51	24.52	24.53	24.53	24.54	24.54	24.55	24.54	24.54	24.53	24.52	24.52	24.51	24.50	24.50	24.49	24.50	24.51	24.51	24.51	24.50	24.50	24.52	24.55	24.49
29	24.50	24.48	24.47	24.47	24.47	24.46	24.46	24.48	24.47	24.47	24.46	24.44	24.42	24.41	24.39	24.38	24.37	24.37	24.36	24.37	24.38	24.38	24.38	24.38	24.43	24.50	24.36
30	24.38	24.38	24.37	24.37	24.36	24.37	24.39	24.39	24.39	24.39	24.39	24.38	24.37	24.36	24.35	24.35	24.36	24.37	24.37	24.39	24.40	24.41	24.41	24.41	24.38	24.41	24.35
31	24.41	24.41	24.42	24.43	24.43	24.43	24.45	24.47	24.47	24.46	24.45	24.45	24.44	24.43	24.42	24.41	24.40	24.41	24.41	24.42	24.43	24.43	24.42	24.42	24.43	24.47	24.40
Avg	24.53	24.52	24.52	24.52	24.52	24.52	24.53	24.54	24.54	24.53	24.53	24.52	24.51	24.51	24.50	24.49	24.49	24.49	24.49	24.50	24.52	24.52	24.52	24.52	24.52	24.57	24.47
Max	24.70	24.70	24.69	24.69	24.68	24.69	24.70	24.70	24.69	24.69	24.68	24.67	24.68	24.68	24.67	24.67	24.67	24.67	24.67	24.68	24.69	24.70	24.70	24.70	24.67	24.70	24.65
Min	24.28	24.27	24.26	24.26	24.26	24.27	24.28	24.29	24.31	24.33	24.35	24.34	24.33	24.33	24.33	24.32	24.31	24.30	24.30	24.29	24.29	24.29	24.28	24.33	24.37	24.26	

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Barometric Pressure (InHg)
September 2018

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	24.42	24.41	24.41	24.40	24.39	24.38	24.40	24.42	24.43	24.43	24.43	24.43	24.44	24.43	24.42	24.41	24.41	24.42	24.42	24.44	24.46	24.48	24.48	24.49	24.43	24.49	24.38		
2	24.50	24.49	24.50	24.50	24.49	24.49	24.49	24.51	24.50	24.49	24.48	24.48	24.47	24.46	24.45	24.45	24.44	24.44	24.45	24.46	24.49	24.52	24.55	24.55	24.56	24.56	24.48	24.51	24.44
3	24.47	24.46	24.46	24.45	24.45	24.45	24.46	24.47	24.47	24.47	24.46	24.46	24.45	24.45	24.44	24.44	24.45	24.46	24.49	24.52	24.55	24.55	24.56	24.56	24.48	24.56	24.44		
4	24.58	24.58	24.58	24.59	24.59	24.59	24.61	24.63	24.63	24.64	24.64	24.63	24.61	24.60	24.59	24.59	24.59	24.59	24.60	24.62	24.63	24.64	24.64	24.64	24.61	24.64	24.58		
5	24.64	24.63	24.63	24.63	24.62	24.62	24.63	24.64	24.64	24.64	24.63	24.63	24.61	24.60	24.60	24.59	24.60	24.59	24.60	24.62	24.63	24.64	24.65	24.65	24.62	24.65	24.59		
6	24.65	24.65	24.64	24.64	24.63	24.64	24.65	24.67	24.66	24.65	24.66	24.65	24.63	24.62	24.61	24.61	24.60	24.60	24.60	24.62	24.64	24.64	24.65	24.65	24.66	24.64	24.67	24.60	
7	24.66	24.65	24.64	24.63	24.62	24.63	24.63	24.64	24.63	24.62	24.61	24.60	24.58	24.57	24.56	24.56	24.55	24.54	24.54	24.54	24.53	24.52	24.51	24.51	24.59	24.66	24.51		
8	24.51	24.47	24.45	24.45	24.45	24.46	24.45	24.45	24.44	24.43	24.43	24.41	24.40	24.40	24.39	24.38	24.38	24.39	24.40	24.42	24.43	24.44	24.44	24.45	24.43	24.51	24.38		
9	24.45	24.45	24.44	24.45	24.45	24.46	24.47	24.49	24.49	24.49	24.49	24.48	24.47	24.46	24.44	24.43	24.43	24.44	24.44	24.45	24.46	24.47	24.47	24.46	24.46	24.49	24.43		
10	24.45	24.45	24.44	24.43	24.43	24.42	24.42	24.43	24.43	24.41	24.39	24.37	24.34	24.32	24.30	24.28	24.27	24.27	24.28	24.30	24.32	24.33	24.33	24.35	24.37	24.45	24.27		
11	24.36	24.36	24.36	24.36	24.36	24.36	24.37	24.39	24.39	24.38	24.37	24.35	24.33	24.33	24.32	24.31	24.30	24.30	24.32	24.34	24.35	24.37	24.36	24.32	24.35	24.39	24.30		
12	24.32	24.31	24.30	24.31	24.31	24.30	24.31	24.31	24.30	24.30	24.30	24.29	24.30	24.30	24.31	24.30	24.31	24.35	24.35	24.36	24.37	24.36	24.36	24.35	24.32	24.37	24.29		
13	24.36	24.36	24.37	24.38	24.37	24.38	24.39	24.38	24.39	24.40	24.39	24.38	24.37	24.38	24.42	24.41	24.41	24.45	24.47	24.46	24.49	24.50	24.49	24.50	24.41	24.50	24.36		
14	24.50	24.50	24.51	24.52	24.51	24.51	24.51	24.52	24.53	24.53	24.52	24.52	24.50	24.49	24.48	24.47	24.47	24.47	24.47	24.48	24.49	24.48	24.48	24.47	24.50	24.53	24.47		
15	24.45	24.44	24.44	24.44	24.44	24.43	24.43	24.42	24.41	24.41	24.40	24.38	24.37	24.34	24.33	24.31	24.29	24.31	24.31	24.32	24.35	24.38	24.42	24.44	24.39	24.45	24.29		
16	24.40	24.40	24.40	24.41	24.41	24.41	24.42	24.43	24.43	24.42	24.40	24.39	24.38	24.37	24.37	24.35	24.35	24.35	24.37	24.39	24.42	24.43	24.45	24.46	24.40	24.46	24.35		
17	24.46	24.47	24.47	24.47	24.48	24.48	24.48	24.50	24.50	24.50	24.49	24.48	24.47	24.47	24.45	24.45	24.45	24.45	24.45	24.47	24.49	24.49	24.49	24.47	24.47	24.50	24.45		
18	24.46	24.45	24.45	24.44	24.44	24.44	24.44	24.45	24.45	24.43	24.42	24.41	24.40	24.40	24.39	24.40	24.40	24.41	24.44	24.46	24.48	24.48	24.48	24.46	24.44	24.48	24.39		
19	24.45	24.46	24.46	24.46	24.46	24.46	24.47	24.47	24.48	24.48	24.48	24.47	24.46	24.45	24.44	24.43	24.44	24.44	24.44	24.43	24.43	24.43	24.41	24.40	24.45	24.48	24.40		
20	24.39	24.38	24.35	24.36	24.37	24.37	24.38	24.39	24.41	24.42	24.43	24.43	24.43	24.43	24.46	24.49	24.50	24.50	24.51	24.53	24.55	24.55	24.55	24.55	24.45	24.55	24.35		
21	24.55	24.55	24.54	24.53	24.53	24.54	24.54	24.55	24.55	24.55	24.55	24.54	24.52	24.52	24.50	24.50	24.49	24.49	24.49	24.50	24.49	24.48	24.46	24.45	24.52	24.55	24.45		
22	24.43	24.43	24.42	24.42	24.41	24.42	24.41	24.42	24.42	24.41	24.40	24.40	24.40	24.38	24.37	24.37	24.37	24.37	24.39	24.39	24.41	24.41	24.41	24.41	24.40	24.43	24.37		
23	24.40	24.40	24.41	24.40	24.40	24.40	24.42	24.42	24.42	24.42	24.41	24.41	24.39	24.38	24.38	24.38	24.37	24.38	24.38	24.38	24.39	24.40	24.40	24.40	24.40	24.42	24.37		
24	24.39	24.39	24.39	24.39	24.39	24.40	24.40	24.41	24.42	24.42	24.42	24.43	24.43	24.44	24.45	24.47	24.49	24.51	24.51	24.53	24.55	24.56	24.56	24.57	24.45	24.57	24.39		
25	24.56	24.58	24.58	24.60	24.61	24.61	24.62	24.63	24.63	24.63	24.64	24.63	24.63	24.62	24.61	24.61	24.61	24.60	24.60	24.60	24.60	24.59	24.59	24.58	24.58	24.61	24.64	24.56	
26	24.58	24.58	24.57	24.57	24.57	24.58	24.58	24.58	24.59	24.59	24.59	24.57	24.55	24.53	24.52	24.51	24.50	24.50	24.51	24.52	24.52	24.52	24.51	24.51	24.55	24.59	24.50		
27	24.50	24.50	24.49	24.48	24.48	24.48	24.48	24.49	24.49	24.49	24.50	24.49	24.49	24.50	24.50	24.52	24.53	24.54	24.55	24.56	24.57	24.57	24.59	24.60	24.52	24.60	24.48		
28	24.60	24.61	24.59	24.59	24.59	24.58	24.57	24.57	24.56	24.55	24.53	24.51	24.49	24.46	24.44	24.43	24.42	24.41	24.41	24.41	24.40	24.40	24.39	24.39	24.50	24.61	24.39		
29	24.38	24.38	24.39	24.39	24.39	24.40	24.40	24.41	24.43	24.44	24.44	24.44	24.44	24.44	24.45	24.47	24.48	24.49	24.51	24.52	24.53	24.53	24.54	24.53	24.45	24.54	24.38		
30	24.53	24.53	24.52	24.49	24.48	24.47	24.46	24.47	24.47	24.46	24.44	24.42	24.41	24.40	24.39	24.39	24.39	24.39	24.39	24.41	24.40	24.40	24.41	24.40	24.44	24.53	24.39		
Avg	24.48	24.48	24.47	24.47	24.47	24.47	24.48	24.49	24.49	24.48	24.48	24.47	24.46	24.45	24.45	24.44	24.44	24.45	24.46	24.47	24.48	24.48	24.48	24.48	24.47	24.53	24.42		
Max	24.66	24.65	24.64	24.64	24.63	24.64	24.65	24.67	24.66	24.65	24.66	24.65	24.63	24.62	24.61	24.61	24.61	24.60	24.60	24.62	24.64	24.65	24.65	24.66	24.64	24.67	24.60		
Min	24.32	24.31	24.30	24.31	24.31	24.30	24.31	24.31	24.30	24.30	24.30	24.29	24.30	24.30	24.30	24.28	24.27	24.27	24.28	24.30	24.32	24.33	24.33	24.32	24.32	24.37	24.27		

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Relative Humidity (% RH)
July 2018

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	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw				
2	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
3	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
4	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
5	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
6	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
7	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
8	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw			
9	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	Pw	38.8	Pw	30.0	33.2	32.0	29.2	27.0	28.1	44.1	48.0	51.7	57.8	59.5	62.5	66.9	43.5	66.9	27.0	
10	73.2	80.0	81.5	84.3	84.9	82.2	75.3	62.1	47.7	35.8	31.6	32.7	32.5	36.3	57.1	51.8	32.3	31.0	30.1	29.2	39.6	45.1	58.8	65.9	53.4	84.9	29.2	
11	75.5	77.5	83.2	84.8	85.1	83.5	71.9	59.4	45.9	41.5	39.2	36.7	33.8	30.9	28.4	25.8	26.7	28.0	31.7	46.6	57.5	61.5	74.5	82.0	54.6	85.1	25.8	
12	85.1	86.9	89.0	90.7	90.4	88.5	79.8	65.0	48.6	44.0	45.7	48.1	44.0	39.1	33.1	32.5	26.3	23.0	27.5	38.0	55.1	64.0	72.0	81.7	58.3	90.7	23.0	
13	83.3	88.4	90.0	91.4	93.3	93.9	85.0	67.2	50.1	40.7	38.2	34.4	32.0	29.3	27.1	28.1	28.8	29.5	34.1	40.7	59.7	68.0	74.3	76.2	57.7	93.9	27.1	
14	81.8	84.2	84.5	86.3	88.0	87.5	83.5	75.0	65.9	46.1	50.6	57.3	57.6	57.9	60.0	60.9	57.5	59.5	65.5	74.4	82.8	86.4	89.5	91.4	72.3	91.4	46.1	
15	91.8	92.5	80.9	75.1	76.4	75.5	70.5	67.6	64.6	60.2	54.1	46.5	38.9	34.0	32.8	30.4	27.7	27.5	27.1	44.3	56.6	69.1	78.2	81.2	58.5	92.5	27.1	
16	85.0	87.1	89.1	90.4	92.2	92.3	83.2	66.7	53.5	45.2	36.3	34.8	32.7	33.0	31.6	31.4	30.4	38.4	28.3	47.8	59.2	69.8	70.4	77.8	58.6	92.3	28.3	
17	81.5	82.4	84.8	85.9	89.2	90.0	78.4	66.6	48.3	44.2	46.9	57.4	70.0	61.5	51.1	37.3	36.2	39.6	49.7	56.6	68.5	76.5	82.6	86.4	65.5	90.0	36.2	
18	89.6	91.1	91.9	92.6	93.1	93.6	86.1	68.0	49.0	39.5	35.2	27.4	25.1	19.3	18.7	19.8	22.0	19.3	18.0	17.8	28.5	46.6	58.7	66.1	50.7	93.6	17.8	
19	70.3	75.9	77.0	78.1	79.5	79.2	70.8	57.5	46.5	41.4	32.3	30.7	29.9	25.1	20.4	20.1	18.9	18.9	26.9	40.3	45.7	59.6	69.3	74.8	49.5	79.5	18.9	
20	80.5	82.9	86.0	88.6	89.4	89.3	79.8	65.3	46.5	33.1	28.8	25.5	21.5	17.2	17.5	19.1	17.6	19.0	25.6	34.2	44.2	46.9	63.0	66.9	49.5	89.4	17.2	
21	75.9	78.6	80.8	83.5	86.7	86.7	76.2	55.7	32.9	21.4	22.7	20.5	18.3	16.8	15.6	16.1	16.8	19.3	27.4	41.8	53.1	62.9	67.1	70.8	47.8	86.7	15.6	
22	63.8	54.3	57.2	68.9	70.8	72.5	67.7	50.1	35.4	26.8	24.6	23.6	22.6	19.7	18.5	17.1	17.4	18.9	28.0	33.8	41.3	45.5	45.5	63.1	41.1	72.5	17.1	
23	69.1	70.3	74.8	75.7	73.0	74.9	65.0	49.7	45.3	40.8	37.3	33.9	29.9	22.4	21.9	18.1	13.1	14.8	18.0	29.9	43.8	52.6	67.3	65.4	46.1	75.7	13.1	
24	73.4	77.3	77.9	78.4	81.2	81.6	72.5	62.3	57.0	49.6	47.5	48.4	42.4	28.1	30.2	28.9	27.4	26.4	30.9	44.1	56.7	58.4	66.7	69.0	54.8	81.6	26.4	
25	76.4	78.2	83.6	86.0	87.1	88.0	78.5	68.7	61.0	56.1	51.5	47.0	43.7	35.5	29.0	27.8	24.2	32.7	32.8	42.7	56.1	62.2	64.7	64.5	57.4	88.0	24.2	
26	71.0	77.8	81.0	85.0	80.5	82.0	70.7	60.9	51.3	46.3	46.8	43.6	37.6	39.8	32.5	53.2	49.7	45.5	50.1	59.5	71.8	76.8	80.0	83.8	61.5	85.0	32.5	
27	83.7	83.0	86.6	88.5	89.9	90.7	87.1	69.1	63.2	58.2	50.2	69.7	67.9	74.8	64.7	49.8	44.9	54.5	60.8	64.4	71.8	83.0	85.2	86.8	72.0	90.7	44.9	
28	89.7	91.5	91.6	91.7	93.2	93.7	90.5	72.9	59.5	45.5	40.1	40.1	40.9	51.8	63.2	40.8	41.0	48.9	51.6	61.6	73.2	77.5	81.0	82.8	67.3	93.7	40.1	
29	82.5	87.6	84.3	88.9	92.0	92.5	86.2	66.9	44.5	29.6	27.6	27.9	26.2	27.5	25.7	25.4	26.5	28.3	31.7	37.1	53.7	64.6	63.3	71.9	53.9	92.5	25.4	
30	78.8	84.2	86.7	88.0	90.1	89.9	83.2	65.1	44.9	29.2	25.4	20.9	18.6	18.1	14.8	11.2	13.5	13.9	17.1	29.9	42.8	52.9	62.9	72.5	48.1	90.1	11.2	
31	75.0	73.4	79.2	83.7	83.1	81.1	75.3	57.9	52.1	49.8	43.3	27.3	28.2	25.0	19.7	19.1	20.6	26.1	39.7	38.3	43.2	48.1	55.9	64.6	50.4	83.7	19.1	
Avg	79.0	81.1	82.8	84.8	85.9	85.9	78.1	63.6	50.6	41.9	38.9	37.6	36.0	33.7	32.3	30.1	28.2	30.7	34.8	43.7	54.9	62.5	69.3	74.5	55.5	86.5	25.8	
Max	91.8	92.5	91.9	92.6	93.3	93.9	90.5	75.0	65.9	60.2	54.1	69.7	70.0	74.8	64.7	60.9	57.5	59.5	65.5	74.4	82.8	86.4	89.5	91.4	72.3	93.9	46.1	
Min	63.8	54.3	57.2	68.9	70.8	72.5	65.0	49.7	32.9	21.4	22.7	20.5	18.3	16.8	14.8	11.2	13.1	13.9	17.1	17.8	28.5	45.1	45.5	63.1	41.1	66.9	11.2	

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Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Relative Humidity (% RH)
August 2018

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	55.5	57.8	64.8	71.4	81.4	86.6	83.7	67.0	44.7	32.8	27.7	25.5	24.9	24.3	22.0	21.4	19.8	21.4	26.8	42.0	41.6	53.4	62.5	69.8	47.0	86.6	19.8
2	74.9	79.0	81.4	83.2	84.7	84.9	77.8	60.3	38.3	25.5	25.2	21.1	16.1	18.0	21.3	36.6	47.6	46.2	52.2	64.4	74.3	77.6	73.9	77.2	55.9	84.9	16.1
3	87.1	88.0	88.2	88.2	85.9	86.3	86.2	69.7	38.3	21.5	21.2	21.1	21.7	21.8	20.7	17.7	14.8	13.8	15.3	19.5	26.0	40.0	53.2	60.7	46.1	88.2	13.8
4	65.2	68.4	73.6	76.1	79.3	79.2	69.3	53.8	40.7	39.6	37.3	32.3	30.3	29.5	25.1	21.0	18.3	23.2	27.5	37.2	45.2	55.4	62.1	72.3	48.4	79.3	18.3
5	78.0	78.4	76.0	79.8	82.5	78.8	70.5	67.6	63.0	50.2	40.8	40.3	49.6	62.7	61.2	48.9	50.7	58.1	73.7	86.1	89.5	88.8	91.2	92.8	69.1	92.8	40.3
6	91.4	92.9	93.4	93.7	93.7	93.8	94.6	88.1	58.2	46.4	42.1	36.5	32.5	30.3	27.8	25.7	22.6	22.9	25.0	31.9	49.4	62.3	68.6	70.9	58.1	94.6	22.6
7	78.4	83.4	86.7	86.5	87.3	87.5	76.8	60.7	41.8	30.9	29.4	26.9	26.2	23.7	23.1	21.6	20.4	22.1	25.1	36.7	47.6	53.3	60.0	68.1	50.2	87.5	20.4
8	77.0	80.9	82.4	83.2	82.7	84.5	79.5	60.2	41.1	27.5	22.8	18.8	15.7	15.6	15.4	13.2	12.6	12.8	16.7	28.5	39.0	47.8	56.6	64.6	45.0	84.5	12.6
9	68.9	73.1	76.6	77.9	78.6	80.1	70.0	52.8	37.8	23.1	20.3	17.5	15.9	15.5	14.9	14.1	14.0	13.0	17.2	26.0	38.6	42.8	57.6	62.4	42.0	80.1	13.0
10	71.7	73.7	74.3	77.2	78.3	80.3	72.1	51.9	35.8	22.1	17.1	13.0	11.2	8.8	9.7	7.6	8.9	11.4	16.8	31.5	38.3	46.6	51.5	60.0	40.4	80.3	7.6
11	64.1	66.9	67.3	70.2	71.8	74.5	68.6	51.3	37.2	28.7	14.6	12.7	10.0	8.4	7.8	7.5	10.0	14.9	22.9	31.8	36.0	31.5	32.6	48.6	37.1	74.5	7.5
12	57.8	62.3	65.3	70.7	73.0	72.6	69.9	56.2	39.4	30.0	32.1	28.0	25.4	20.2	20.1	18.1	18.2	19.7	23.0	23.6	24.6	26.3	27.8	36.8	39.2	73.5	18.1
13	44.6	48.8	59.0	67.2	73.0	77.3	74.5	58.7	46.2	42.3	36.8	37.6	37.9	39.6	42.0	38.2	39.2	42.1	44.6	52.1	60.5	67.1	67.7	70.5	52.8	77.3	36.8
14	74.2	78.6	83.2	86.3	87.5	89.9	86.7	70.1	52.3	44.4	39.4	29.9	25.2	23.1	21.4	19.4	14.1	12.6	18.5	24.8	37.9	47.2	52.0	60.3	49.1	89.9	12.6
15	62.9	65.4	69.5	75.3	79.7	84.8	77.9	58.1	39.9	25.9	22.9	21.0	18.5	15.0	14.8	15.1	12.7	12.7	18.6	35.9	38.9	55.5	57.6	63.9	43.4	84.8	12.7
16	64.6	69.4	69.1	73.6	75.9	80.2	71.6	49.9	33.3	24.5	17.7	13.6	10.1	9.2	10.8	13.9	13.2	15.3	21.4	27.8	37.5	45.2	52.7	57.8	39.9	80.2	9.2
17	62.9	67.5	70.0	72.0	73.6	76.3	74.6	69.2	48.3	39.7	27.5	20.6	19.3	17.1	16.3	16.3	20.0	24.4	25.6	39.9	42.4	47.2	53.6	54.8	45.0	76.3	16.3
18	65.8	72.8	75.0	78.4	75.8	83.0	86.2	82.5	74.8	70.7	82.8	82.3	72.5	65.6	58.0	43.1	44.6	47.6	50.2	50.8	51.6	59.3	70.5	78.2	67.6	86.2	43.1
19	85.4	85.8	89.2	90.5	91.5	91.8	91.9	88.7	78.2	60.3	48.6	42.2	35.5	32.7	36.2	37.9	41.5	46.6	50.8	53.3	60.1	66.2	69.1	73.9	64.5	91.9	32.7
20	75.3	75.5	77.5	83.8	86.5	90.6	89.5	87.9	84.7	86.7	82.6	80.7	83.2	81.9	86.6	87.8	86.8	83.4	86.4	89.0	88.4	86.9	83.4	84.6	84.6	90.6	75.3
21	84.7	82.5	80.9	86.7	86.8	88.8	88.4	85.5	81.1	77.7	73.6	70.1	71.1	71.7	69.7	71.8	70.8	72.1	76.5	84.6	88.3	89.0	91.7	84.1	80.3	91.7	69.7
22	83.1	84.2	84.4	84.7	85.3	87.7	89.4	87.0	80.0	68.2	55.1	47.1	38.9	35.8	31.2	28.5	31.7	35.9	45.0	54.9	67.4	73.8	77.2	83.3	64.2	89.4	28.5
23	82.6	84.1	84.1	84.1	86.1	85.9	87.6	82.5	62.7	47.4	41.6	37.3	33.8	31.2	28.3	26.6	26.8	26.5	29.8	36.6	54.3	64.6	74.3	80.0	57.4	87.6	26.5
24	85.6	86.7	87.8	88.6	88.8	88.4	87.7	81.0	67.2	41.9	30.0	28.9	29.0	27.3	22.1	24.0	25.4	25.8	29.0	29.1	37.8	49.6	58.3	69.8	53.7	88.8	22.1
25	78.1	82.2	86.4	88.6	88.7	91.5	91.3	81.5	60.3	42.1	34.1	30.8	27.7	25.7	23.8	23.2	24.9	29.6	38.3	50.3	55.1	57.5	59.9	69.5	55.9	91.5	23.2
26	75.5	77.4	80.6	81.8	83.7	85.8	84.7	75.2	59.4	56.0	51.7	44.3	39.6	38.9	40.3	39.1	39.4	45.4	50.7	55.9	62.7	67.5	77.1	85.0	62.4	85.8	38.9
27	89.0	90.8	90.6	91.6	92.0	91.0	89.8	87.1	86.2	82.9	81.4	75.2	70.5	69.4	69.8	68.4	68.0	74.7	75.3	77.4	80.0	82.8	84.8	84.0	81.4	92.0	68.0
28	87.4	89.1	89.6	90.8	91.4	91.9	92.4	90.9	73.4	63.1	57.8	51.6	44.9	46.3	44.4	41.1	41.5	40.4	40.7	51.1	64.1	70.1	79.6	83.2	67.4	92.4	40.4
29	86.1	88.8	90.3	90.6	90.8	91.0	88.8	75.1	58.2	37.3	29.8	26.3	26.2	29.1	28.3	25.3	24.1	24.1	27.3	41.8	53.4	67.4	72.4	79.5	56.3	91.0	24.1
30	81.9	83.4	85.9	85.5	88.0	87.4	84.9	72.5	45.6	28.6	28.4	26.6	25.4	24.2	24.8	23.5	25.6	28.7	31.6	35.3	37.8	38.3	41.2	34.4	48.7	88.0	23.5
31	35.3	39.9	44.5	50.7	61.1	70.4	71.4	56.7	46.4	38.9	31.5	31.4	33.0	32.2	27.9	25.9	23.6	23.4	28.0	38.4	49.0	61.6	69.3	75.6	44.4	75.6	23.4
Avg	73.4	76.1	78.3	80.9	82.8	84.6	81.6	70.3	54.7	43.8	38.8	35.2	33.0	32.1	31.2	29.8	30.1	32.0	36.5	44.8	52.0	58.8	64.2	69.6	54.8	85.7	27.0
Max	91.4	92.9	93.4	93.7	93.7	93.8	94.6	90.9	86.2	86.7	82.8	82.3	83.2	81.9	86.6	87.8	86.8	83.4	86.4	89.0	89.5	89.0	91.7	92.8	84.6	94.6	75.3
Min	35.3	39.9	44.5	50.7	61.1	70.4	68.6	49.9	33.3	21.5	14.6	12.7	10.0	8.4	7.8	7.5	8.9	11.4	15.3	19.5	24.6	26.3	27.8	34.4	37.1	73.5	7.5

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Relative Humidity (% RH)
September 2018

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	80.1	82.4	84.7	85.3	86.3	86.5	84.0	79.9	71.8	42.8	33.1	31.0	31.9	28.9	27.5	27.1	27.8	27.7	32.7	42.0	53.6	63.6	71.3	76.7	56.6	86.5	27.1
2	79.7	80.9	82.9	84.3	87.4	89.2	85.4	67.8	49.0	33.8	29.1	22.8	19.6	18.5	17.4	16.5	15.6	16.3	21.0	32.1	45.5	53.4	57.0	66.1	48.8	89.2	15.6
3	70.3	73.8	76.9	76.6	79.2	80.5	79.4	61.8	39.9	24.5	20.4	19.2	18.5	19.1	19.7	19.5	21.6	27.2	46.8	56.4	65.0	72.5	76.6	79.8	51.1	80.5	18.5
4	84.7	86.0	83.2	86.2	83.3	85.4	85.3	71.5	62.5	57.9	52.2	46.3	41.7	39.0	37.8	37.5	38.4	39.8	44.5	49.1	51.0	54.6	60.0	62.3	60.0	86.2	37.5
5	65.0	68.2	71.1	71.6	73.7	79.6	78.3	60.8	48.6	43.5	39.0	36.3	32.5	30.0	25.4	22.4	21.7	22.7	40.4	48.4	50.9	58.4	62.1	74.1	51.0	79.6	21.7
6	73.7	80.9	80.0	82.5	85.1	85.5	83.2	64.7	41.6	25.1	21.6	18.8	18.6	17.8	15.4	17.4	15.7	19.7	30.6	36.4	38.3	43.6	53.4	63.6	46.4	85.5	15.4
7	71.4	63.0	70.9	75.0	79.1	75.4	75.2	68.0	52.8	30.4	23.3	20.4	16.8	14.7	14.1	20.4	19.5	19.9	27.7	27.1	34.1	47.6	53.7	51.3	43.8	79.1	14.1
8	48.5	45.4	55.9	66.4	67.2	69.1	67.8	66.0	43.9	27.9	23.8	21.1	19.5	17.4	18.4	20.0	20.8	24.6	29.0	34.5	41.6	45.6	50.7	53.4	40.8	69.1	17.4
9	58.3	59.8	65.3	69.4	74.1	77.0	78.4	64.3	38.2	28.7	30.9	28.3	22.6	18.3	19.0	21.7	24.8	30.5	36.1	45.2	48.3	57.7	61.9	64.3	46.8	78.4	18.3
10	68.7	70.6	78.0	80.7	84.1	86.7	83.5	69.4	48.3	32.9	26.1	21.9	19.4	17.7	17.2	16.5	15.8	15.8	22.8	29.4	29.4	33.8	41.1	42.8	43.9	86.7	15.8
11	49.1	63.1	69.8	74.3	79.6	82.6	79.8	64.9	46.3	35.7	34.8	34.4	32.1	31.3	31.5	31.1	31.3	37.6	47.6	77.4	86.0	88.7	78.0	77.9	56.9	88.7	31.1
12	76.4	78.0	73.1	75.1	77.0	81.4	85.5	82.6	69.6	59.7	52.7	49.7	52.5	47.7	43.3	45.2	47.5	60.8	78.2	77.3	72.6	74.6	83.9	86.2	67.9	86.2	43.3
13	86.3	86.7	87.6	84.6	83.4	84.4	86.4	88.1	86.2	82.0	72.7	66.2	55.0	48.4	72.5	78.3	70.2	75.4	85.7	86.0	87.8	90.1	90.0	91.5	80.2	91.5	48.4
14	91.1	91.7	92.7	93.1	93.1	93.0	92.7	92.7	92.1	66.2	40.8	44.0	37.9	32.0	30.8	27.6	37.3	45.4	54.2	59.1	63.7	72.7	78.8	78.9	66.7	93.1	27.6
15	81.2	81.3	82.7	82.4	80.9	82.2	87.7	76.9	64.6	54.4	42.4	31.1	34.4	26.8	25.5	29.2	36.5	57.9	55.9	60.5	77.2	88.6	89.4	87.6	63.2	89.4	25.5
16	88.4	90.9	92.8	93.4	93.3	93.6	93.9	93.5	86.7	62.4	51.1	38.2	36.0	23.7	21.8	21.0	22.0	29.0	49.8	71.7	81.0	85.0	89.4	90.9	66.6	93.9	21.0
17	92.0	92.0	92.2	92.8	93.3	93.3	91.0	88.8	87.4	63.1	46.3	30.8	28.9	30.5	29.0	26.7	27.7	30.3	43.3	49.8	60.8	66.0	77.0	81.6	63.1	93.3	26.7
18	83.3	85.5	85.0	86.8	90.1	90.3	90.3	81.8	74.3	59.7	53.3	45.6	39.3	34.7	31.2	31.2	47.9	52.7	61.1	72.4	78.0	81.4	84.8	85.0	67.7	90.3	31.2
19	89.2	90.6	89.2	88.3	88.1	90.8	91.0	90.3	86.6	83.0	83.7	89.3	89.2	88.0	87.1	82.9	81.9	78.3	81.5	89.3	91.8	88.5	90.1	90.8	87.5	91.8	78.3
20	91.3	89.8	89.5	89.3	91.6	91.7	91.0	90.7	89.1	84.4	76.9	71.6	61.0	53.9	54.3	77.6	80.7	78.3	84.0	88.1	89.9	89.2	91.8	92.4	82.8	92.4	53.9
21	92.1	92.2	92.0	91.9	92.0	92.2	92.1	87.3	70.8	57.0	Au	Au	Au	Au	Au	32.8	32.1	36.3	62.6	72.8	79.8	85.6	83.8	87.7	75.4	92.2	32.1
22	89.0	89.3	90.4	89.7	89.4	87.9	86.0	84.5	71.3	45.5	21.5	22.3	23.0	19.8	21.5	24.2	32.8	42.9	42.2	49.4	64.0	68.5	73.0	74.0	58.4	90.4	19.8
23	78.1	80.5	80.2	80.3	74.3	75.2	72.2	82.6	83.5	79.0	79.8	84.1	84.4	72.1	80.2	73.5	61.5	53.8	63.3	72.0	83.3	86.6	88.2	88.5	77.4	88.5	53.8
24	90.0	91.0	90.5	90.6	90.5	90.1	90.3	90.1	88.7	63.2	64.8	76.7	64.0	79.4	85.9	84.8	81.1	75.7	83.5	86.9	88.5	89.7	88.1	89.6	83.9	91.0	63.2
25	90.6	91.8	92.1	92.5	92.4	92.3	92.6	92.8	91.1	76.7	71.1	62.5	55.8	49.5	47.3	46.2	44.1	43.3	62.0	80.2	84.7	87.7	88.8	89.6	75.7	92.8	43.3
26	90.0	89.6	89.5	89.1	88.6	88.8	88.5	87.7	85.4	61.5	50.2	44.3	41.9	38.6	36.8	35.1	32.1	33.6	37.9	38.7	44.5	56.2	65.7	69.7	61.8	90.0	32.1
27	72.3	75.3	77.3	82.2	82.7	84.5	84.0	84.8	78.9	69.6	68.5	68.8	72.9	72.0	70.2	68.8	70.7	75.6	80.2	79.6	83.4	86.3	87.8	89.9	77.8	89.9	68.5
28	91.0	91.4	91.2	89.5	89.4	90.0	86.3	82.4	79.3	75.6	73.6	72.1	70.2	72.3	73.4	73.6	77.2	84.1	86.6	87.3	86.5	84.8	84.8	84.0	82.4	91.4	70.2
29	83.8	83.6	84.8	87.5	89.1	90.5	90.6	90.6	89.9	90.6	88.8	85.7	78.2	77.1	75.4	80.3	83.8	81.5	75.0	73.8	74.9	74.2	73.3	74.2	82.4	90.6	73.3
30	73.7	74.8	79.6	82.2	83.4	85.6	86.0	86.7	85.4	82.7	81.0	80.6	82.7	84.9	81.1	81.3	81.2	81.7	85.0	85.2	86.9	88.2	88.8	88.0	83.2	88.8	73.7
Avg	79.3	80.7	82.4	83.8	84.7	85.8	85.3	79.8	70.1	56.6	50.1	47.0	44.2	41.5	41.7	42.3	43.4	46.6	55.0	61.9	67.4	72.1	75.4	77.7	64.9	87.9	37.3
Max	92.1	92.2	92.8	93.4	93.3	93.6	93.9	93.5	92.1	90.6	88.8	89.3	89.2	88.0	87.1	84.8	83.8	84.1	86.6	89.3	91.8	90.1	91.8	92.4	87.5	93.9	78.3
Min	48.5	45.4	55.9	66.4	67.2	69.1	67.8	60.8	38.2	24.5	20.4	18.8	16.8	14.7	14.1	16.5	15.6	15.8	21.0	27.1	29.4	33.8	41.1	42.8	40.8	69.1	14.1

A-27

Sandfire Resources America Inc.
Black Butte Copper Project Met Tower Air Monitoring Summary
Precipitation (inches)
September 2018

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	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	
2	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
3	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
4	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
5	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
6	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
7	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
8	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
9	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
10	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
11	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	0.01	0.01	0.02	0.09	0.14	0.05	0.01	0.32	0.14
12	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	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.01
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.12
14	0.00	0.00	0.01	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	0.01	0.01
15	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	0.12	0.19	0.09	0.40	0.19	
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	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	0.01	0.01	
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	0.04	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	0.05	0.13	0.06	0.28	0.13		
20	0.11	0.15	0.02	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.15	
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Au	Au	Au	Au	Au	Au	Au	Au	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	0.04	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.04	
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	0.04	0.03	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.09	0.04		
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	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.01	
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	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	
Tot	0.11	0.15	0.03	0.00	0.05	0.00	0.02	0.03	0.04	0.01	0.01	0.00	0.00	0.06	0.05	0.11	0.00	0.04	0.14	0.02	0.10	0.32	0.39	0.17	1.85	0.00		
Max	0.11	0.15	0.02	0.00	0.04	0.00	0.02	0.01	0.04	0.01	0.01	0.00	0.00	0.04	0.03	0.08	0.00	0.03	0.12	0.02	0.09	0.14	0.19	0.09	0.40	0.19		

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APPENDIX B: PERFORMANCE AUDIT REPORTS
THIRD QUARTER 2018



BISON ENGINEERING, INC.

Bison Engineering

Preliminary Meteorological Parameters Audit Form

Audit Dates: 09/21/2018 Tower Lowered : 10:20 MST Tower Back Up : 14:50 MST
 Client: Tintina Resources
 Site: Black Butte
 AUDITOR: Steve Heck PRECEDING CALIBRATION BY: Jeff Bell

Temperature (existing sensors as-found)

Audit Device: Control Company - digital thermometer Model 4000
 Meter S/N: 91255639 Temperature Sensor: Climatronics 100093
 Last certified: Sep 2017 S/N P12535 (Upper), S/N P12535 (Lower) - Matched Set

<u>Temperature bath results</u>					
	9m	9m	2m	2m	9m - 2m
Audit	DAS	DAS	DAS	DAS	DAS
Value	Value	Diff.	Value	Diff.	Diff.
°C	°C	°C	°C	°C	°C
0.21	0.28	0.07	0.36	0.15	-0.08
16.80	16.72	-0.08	16.79	-0.01	-0.07
37.64	37.80	0.16	37.85	0.21	-0.05

Temperature (replacement sensors as-left)

Audit Device: Control Company - digital thermometer Model 4000
 Meter S/N: 91255639 Temperature Sensor: Climatronics 100093
 Last certified: Sep 2017 S/N X17929 (Upper), S/N X17927 (Lower) - Matched Set

<u>Temperature bath results</u>					
	9m	9m	2m	2m	9m - 2m
Audit	DAS	DAS	DAS	DAS	DAS
Value	Value	Diff.	Value	Diff.	Diff.
°C	°C	°C	°C	°C	°C
0.10	0.25	0.15	0.25	0.15	0.00
17.99	17.95	-0.04	17.95	-0.04	0.00
34.31	34.50	0.19	34.47	0.16	0.03

Wind Direction

		Linearity Check from DAS				
Sensor height:	9 Meter	Setpoint	Clockwise	Counter-CW	Diff CW	Diff CCW
Sensor (Make/model number):	Climatronics/ 102083	0	0.1	0.2	0.1	0.2
Serial Number :	P1336C	30	30.4	29.9	0.4	-0.1
Crossarm orientation (from Garmin GPS):	0.0 / 180.0	60	60.0	61.1	0.0	1.1
GPS location at sensor:		90	91.4	91.4	1.4	1.4
N 46 deg 46.352 min, W 110 deg 52.949 min		120	121.0	119.6	1.0	-0.4
GPS location at sighting point:		150	150.4	149.6	0.4	-0.4
N 46 deg 46.312 min, W 110 deg 52.949 min		180	179.4	180.0	-0.6	0.0
Sensor response aligned with crossarm (as found):	181.0	210	210.4	209.0	0.4	-1.0
Sensor response aligned with crossarm (as left):	180.6	240	238.7	239.9	-1.3	-0.1
		270	269.9	269.9	-0.1	-0.1
Linearity Audit Device: Climatronics 101966, SN 70		300	298.6	298.4	-1.4	-1.6
		330	330.2	329.7	0.2	-0.3
Threshold Torque: 0.08 oz.-in.				Max Diff	1.4	-1.6
(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	13.10	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 October 2017)

Time (MST)	CTS Value (W/m2)	Site Value (W/m2)	Diff. (%)	Diff. (% FS)
1439	527	535	1.5	0.6
1442	583	619	6.2	2.8
1451	540	572	5.9	2.5
1458	519	538	3.7	1.5

Relative Humidity

Site Sensor: Met One 083E-0-35
Sensor Height: 2 meters
Reference Std: Assmann Psychrometer, thermometer calibrations checked July 2018

Ref Dry-Bulb: 17.7 deg C BP = 24.45 in. Hg
Ref Wet-Bulb 8.9 deg C
Ref RH: 32.9 %RH
Station RH: 31.7 %RH
Diff: -1.2 %RH

Barometric Pressure

Audit Device: Wallace & Tiernan Model FA185260, S/N LL03297.
Checked against Bison Mercury barometer (Butte) July 2018

Audit Value: 24.45 in Hg
Station Value: 24.49 in Hg
Diff: 0.04 in Hg

Precipitation (existing gauge as-found)

Rain Gauge = Met One Model 375
Level checked OK
Wind Screen in place
8" opening Precip audit performed during hour ending at 1100 MST

559 ml water added
Calibration is 8.24 ml per tip
Known audit value is 559 / 8.24 = 67.8 tips (so 67 full tips expected)

Unit registered 70 tips
% difference from expected = 4.5%

Precipitation (new gauge as-left)

Rain Gauge = Met One Model 375D, Serial No. X15682
Level checked OK
Wind Screen in place
8" opening Precip audit performed during hour ending at 1600 MST

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 70 tips mechanically but CR1000 counted 78 tips. See discussion in Section 4.0 of report.
% difference from expected = 2.9% / 14.9%

Signature Site Operator : _____

Signature Auditor : _____