

**TINTINA RESOURCES, INC.  
BLACK BUTTE COPPER  
PROJECT AMBIENT AIR  
MONITORING PROGRAM  
Quarterly Data Report  
Second Quarter 2015**

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## 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)*.

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## **APPENDICES**

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- Appendix A: Hourly Meteorological Data
- Appendix B: Performance Audit Reports
- Appendix C: Evaporation and Precipitation Summary

## 1.0 INTRODUCTION

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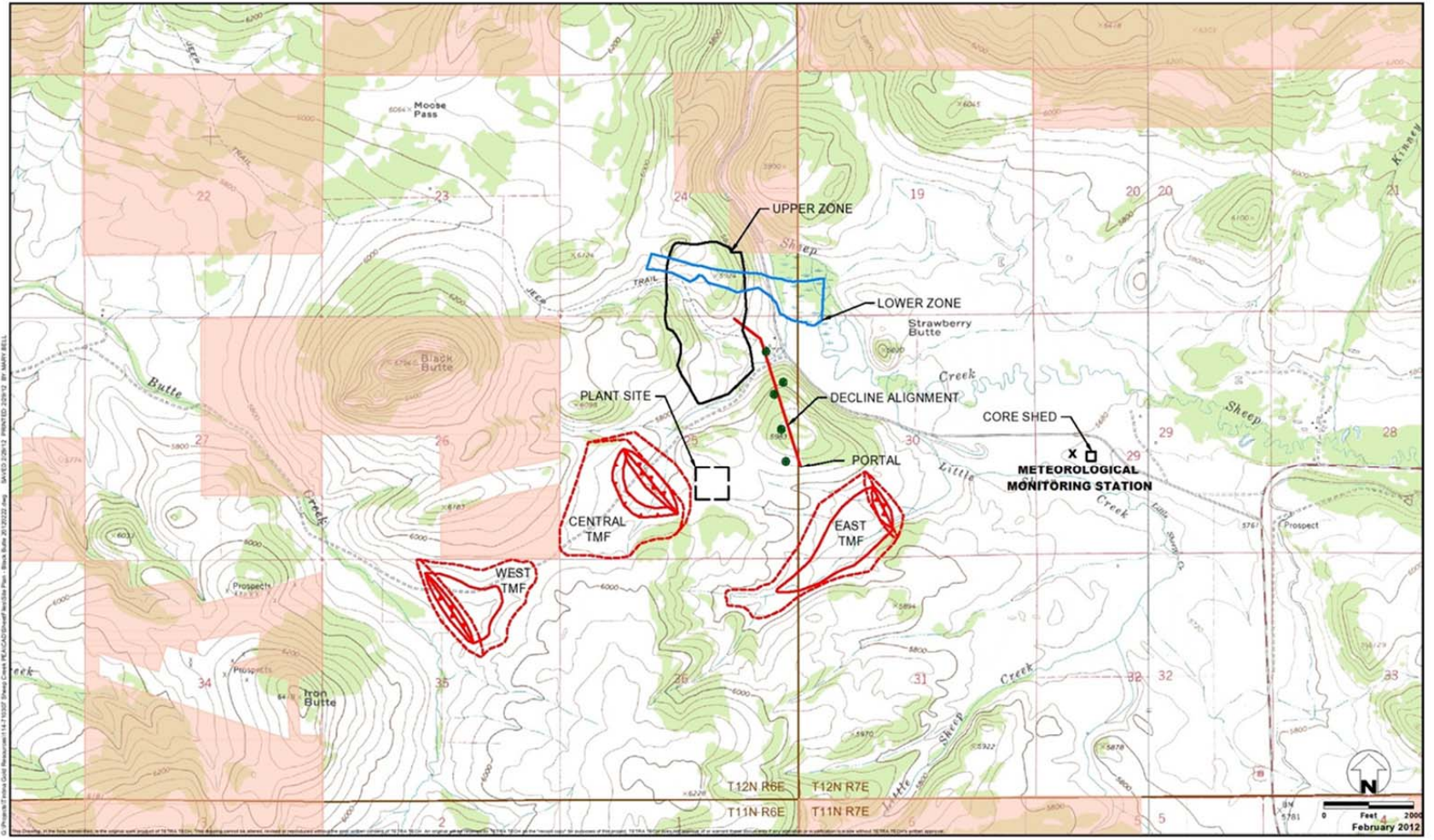
Tintina Resources, Inc. established an ambient air monitoring site to measure wind speed, wind direction, standard deviation of wind direction, temperature at 9 meters and 2 meters, delta temperature, solar radiation, barometric pressure, and precipitation. The station was established to accurately characterize 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.

This report presents the data collected during the second quarter (April through June) of 2015. 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.

**Figure 1. Monitoring Site Location**



Site Plan  
Black Butte Copper Project  
Meagher County, Montana  
FIGURE 1  
February 2012

## **2.0 MONITORING SYSTEM OPERATIONS**

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The installation of the monitoring meteorological system equipment took place in April 2012, soon after the equipment was received from the manufacturers. The installation and calibration of the equipment required about two weeks to complete. All meteorological parameters were in full operation and producing valid data by April 30, 2012. An evaporation pan and manual precipitation gauge were added to the system on June 23, 2015.

Jeff Bell of Bison conducted performance audits of the meteorological system on June 18, 2015, and made any necessary calibration adjustments to the meteorological system following the audits. Both temperature sensors were replaced and calibrated after the audits were completed. The Bison report of the audits is presented in Appendix B.

Manual measurements of evaporation and precipitation were recorded by Tintina's on-site personnel two to three times per week.

### **3.0 CALIBRATION DATA**

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As discussed in Section 4.0, the system's as-found condition was audited on June 18, 2015. Both temperature sensors were replaced and calibrated after the audits were completed. See audit form in appendix B for the results of the calibration.

Otherwise, no calibration adjustments were made to the meteorological system.

## **4.0 PERFORMANCE AUDIT DATA**

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Jeff Bell of Bison conducted performance audits of the meteorological system on June 18, 2015. Both temperature sensors were replaced and calibrated after the audits were completed. Otherwise, no calibration adjustments were made to the system. The Bison report of the audits is presented in Appendix B.



## 5.0 DATA COMPLETENESS

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The meteorological percentages of data recovery achieved during the second quarter of 2015 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 second quarter the net percentage data recovery was 99.7 percent for wind speed and 100.0 percent for all other parameters at the site. The loss of data was due to the wind speed cups being frozen in place because of weather.

**Table 1. Monthly Data Completeness**

<b>April 2015</b>					
<b>Parameter</b>	<b>Readings Possible</b>	<b>Valid Readings</b>	<b>Percentage Recovery</b>	<b>Quality Assurance Hours</b>	<b>Net Percentage Recovery</b>
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	720	714	99.2	0	99.2
Wind Direction	720	720	100.0	0	100.0
Standard Deviation	720	720	100.0	0	100.0
Temperature 9 Meters	720	720	100.0	0	100.0
Temperature 2 Meters	720	720	100.0	0	100.0
Temperature Delta T	720	720	100.0	0	100.0
Solar Radiation	720	720	100.0	0	100.0
Barometric Pressure	720	720	100.0	0	100.0
Relative Humidity	720	720	100.0	0	100.0
Precipitation	720	720	100.0	0	100.0
<b>Total</b>	<b>7,200</b>	<b>7,194</b>	<b>99.9</b>	<b>0</b>	<b>99.9</b>

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

<b>May 2015</b>					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	744	744	100.0	0	100.0
Wind Direction	744	744	100.0	0	100.0
Standard Deviation	744	744	100.0	0	100.0
Temperature 9 Meters	744	744	100.0	0	100.0
Temperature 2 Meters	744	744	100.0	0	100.0
Temperature Delta T	744	744	100.0	0	100.0
Solar Radiation	744	744	100.0	0	100.0
Barometric Pressure	744	744	100.0	0	100.0
Relative Humidity	744	744	100.0	0	100.0
Precipitation	744	744	100.0	0	100.0
<b>Total</b>	<b>7,440</b>	<b>7,440</b>	<b>100.0</b>	<b>0</b>	<b>100.0</b>

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

<b>June 2015</b>					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	720	716	99.4	4	100.0
Wind Direction	720	716	99.4	4	100.0
Standard Deviation	720	716	99.4	4	100.0
Temperature 9 Meters	720	716	99.4	4	100.0
Temperature 2 Meters	720	716	99.4	4	100.0
Temperature Delta T	720	716	99.4	4	100.0
Solar Radiation	720	716	99.4	4	100.0
Barometric Pressure	720	716	99.4	4	100.0
Relative Humidity	720	716	99.4	4	100.0
Precipitation	720	716	99.4	4	100.0
<b>Total</b>	<b>7,200</b>	<b>7,160</b>	<b>99.4</b>	<b>40</b>	<b>100.0</b>

**Table 2. Quarterly Data Completeness**

<b>Second Quarter 2015</b>					
Parameter	Readings Possible	Valid Readings	Percentage Recovery	Quality Assurance Hours	Net Percentage Recovery
<b>Black Butte Copper Project Met Tower</b>					
Wind Speed	2,184	2,174	99.5	4	99.7
Wind Direction	2,184	2,180	99.8	4	100.0
Standard Deviation	2,184	2,180	99.8	4	100.0
Temperature 9 Meters	2,184	2,180	99.8	4	100.0
Temperature 2 Meters	2,184	2,180	99.8	4	100.0
Temperature Delta T	2,184	2,180	99.8	4	100.0
Solar Radiation	2,184	2,180	99.8	4	100.0
Barometric Pressure	2,184	2,180	99.8	4	100.0
Relative Humidity	2,184	2,180	99.8	4	100.0
Precipitation	2,184	2,180	99.8	4	100.0
<b>Total</b>	<b>21,840</b>	<b>21,794</b>	<b>99.8</b>	<b>40</b>	<b>100.0</b>

**Table 3. Periods of Missing Data**

<b>First Quarter 2015</b>						
Starting Date/Hour	Ending Date/Hour	Site	Parameter	Total Hours	Percent of Month	Circumstance
Apr 25/3	Apr 25/8	Met Tower	Wind Speed	6	0.27	Missing data: Cups frozen in place.

## 6.0 MONITORING DATA

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The hourly data values collected at the monitoring sites 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 4.

Monthly and quarterly wind rose distributions from the monitoring site are presented in Tables 5 through 8. 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.

A separate compilation of data collected from the evaporation pan and manual rain gauge is presented in Appendix C. For comparison purposes, the precipitation amounts reported by the automatic rain gauge over the same time periods are provided. Overall, the precipitation amounts obtained from the manual gauge were very similar to those reported by the automated gauge.

**Table 4. Missing Data Codes**

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

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

April 2015																		
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	1.4	1.9	1.7	2.6	1.3	0.8	0.6	0.4	0.3	0.4	0.8	2.2	1.5	18.9
	1.1 - 2.0	0.6	0.6	0.6	1.8	2.9	4.2	3.3	1.8	0.6	0.3	0.4	0.4	1.1	1.3	2.1	0.1	21.9
	2.1 - 3.0	0.1	0.1	0.4	0.6	2.8	2.1	0.1	0.7	0.6	0.0	0.4	0.7	1.4	2.5	1.8	0.3	14.6
	3.1 - 4.0	0.0	0.4	0.4	1.0	0.6	0.0	0.4	0.6	0.4	0.3	0.6	2.4	3.3	1.9	1.1	0.4	13.8
	4.1 - 5.0	0.3	0.1	0.0	0.3	0.4	0.0	0.0	1.0	0.7	0.4	0.1	1.4	2.2	2.1	1.1	0.4	10.6
	5.1 - 6.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.3	0.6	0.8	1.5	1.5	0.8	0.1	7.4
	6.1 - 7.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	1.0	1.5	1.3	0.0	0.3	4.9
	7.1 - 8.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.1	1.5	0.4	0.3	0.1	3.2
	8.1 - 9.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	1.1	0.1	0.3	0.0	2.2
	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	1.1	0.1	0.0	0.0	1.3
	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	0.1	1.0	0.1	0.0	0.0	1.3
	11.1 - 12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
	12.1 - 13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	13.1 - 14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	14.1 - 15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15.1 - 16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	16.1 - 17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	17.1 - 18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	18.1 - 19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	19.1 - 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
> 20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Calm																		0.0
Total	2.1	2.9	2.6	5.0	8.6	7.9	6.5	6.7	3.2	2.2	3.1	7.5	16.4	12.2	9.7	3.3	100.0	
Average Speed	2.8	2.7	1.7	2.0	1.9	1.6	1.3	3.0	2.6	3.6	3.9	4.4	5.5	4.0	2.8	2.8	3.2	



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

May 2015																		
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	0.4	0.7	0.7	0.8	1.6	1.3	0.9	0.7	0.4	1.2	0.1	0.1	0.1	0.4	0.4	1.3	11.3
	1.1 - 2.0	0.4	0.4	2.0	1.9	3.0	3.6	3.4	1.9	0.9	0.8	0.3	0.9	0.8	1.3	0.7	0.8	23.1
	2.1 - 3.0	0.3	0.1	0.3	1.3	2.2	2.8	1.1	1.6	0.7	0.3	0.4	0.1	1.2	0.7	0.5	0.5	14.1
	3.1 - 4.0	0.9	0.3	0.3	2.0	1.5	1.2	2.8	2.8	0.7	0.3	0.5	0.4	0.5	0.4	1.6	1.5	17.7
	4.1 - 5.0	0.8	0.3	0.4	1.1	1.2	0.5	3.0	2.6	0.5	0.1	0.1	1.1	0.7	0.8	0.9	1.2	15.3
	5.1 - 6.0	0.3	0.1	0.0	1.1	0.5	0.5	1.2	2.3	0.0	0.0	0.1	0.0	0.5	0.3	0.4	0.5	7.9
	6.1 - 7.0	0.0	0.1	0.0	0.1	0.1	0.0	1.1	2.0	0.0	0.1	0.0	0.3	0.4	0.4	0.0	0.1	4.8
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.8	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.6
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.5	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	3.1
	9.1 - 10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.7
	10.1 - 11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	11.1 - 12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	2.0	3.6	8.3	10.1	10.1	15.3	16.7	3.2	2.8	1.6	3.4	4.7	4.4	4.6	6.0	100.0	
Average Speed	3.2	2.5	1.9	3.1	2.5	2.3	4.0	4.7	2.6	1.8	3.0	3.9	4.0	3.3	3.3	3.0	3.4	

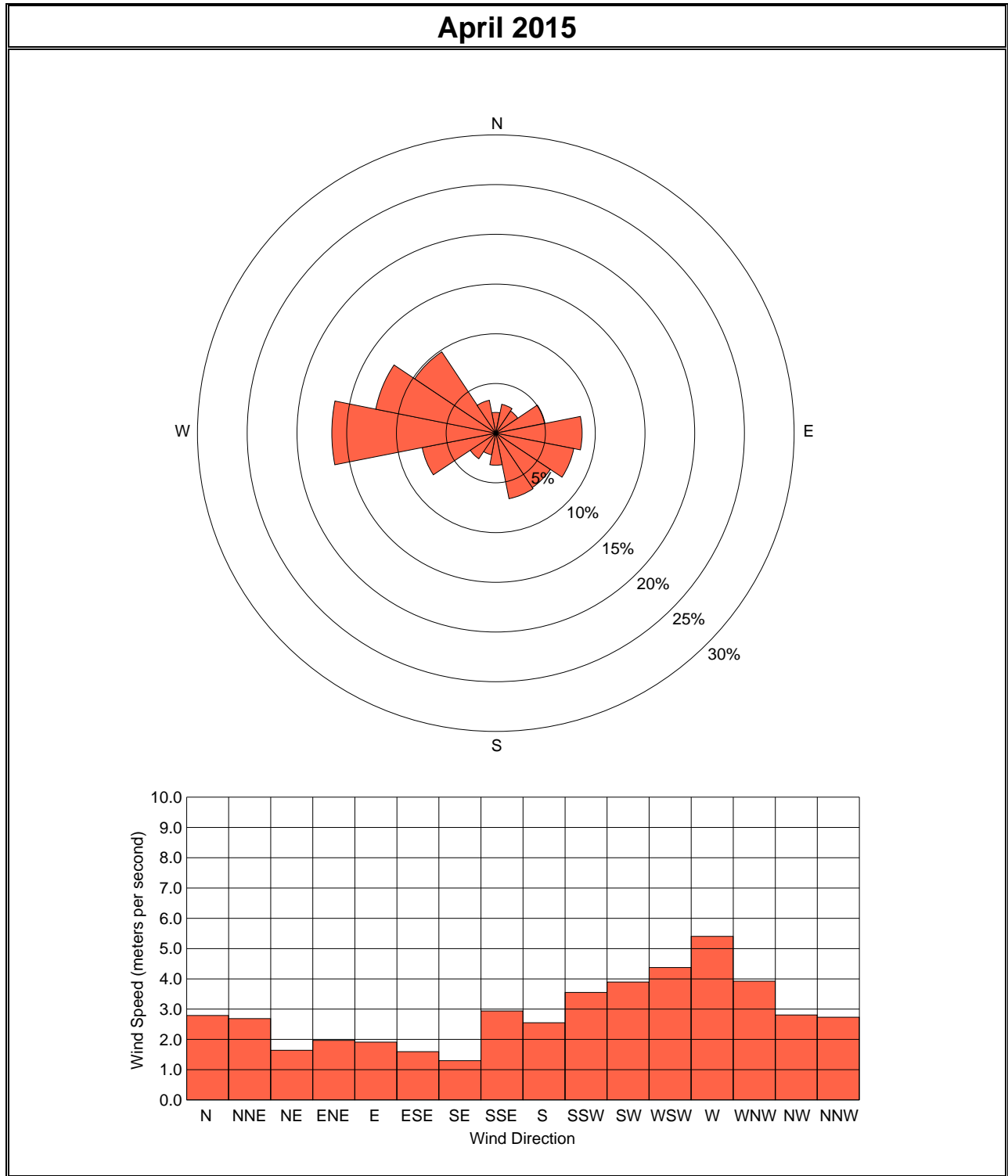
**Table 7. Monthly Wind Rose Summary, Black Butte Copper Project Met Tower**

June 2015																		
Direction>>>	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total	
0.1 - 1.0	1.5	1.0	1.0	0.3	1.4	1.5	1.0	0.3	0.4	0.6	0.1	0.4	0.3	0.4	1.0	0.8	12.0	
1.1 - 2.0	2.1	1.1	2.8	3.9	4.8	4.3	3.4	1.4	0.3	0.8	0.6	0.4	0.6	0.7	0.8	1.4	29.4	
2.1 - 3.0	0.6	0.3	1.5	3.2	4.9	1.7	0.8	1.1	0.4	0.4	0.3	0.8	1.5	2.1	2.1	1.3	23.1	
3.1 - 4.0	0.3	0.3	0.4	1.4	1.3	0.3	0.4	0.7	0.4	0.1	0.8	1.8	2.7	2.5	1.5	0.3	15.2	
4.1 - 5.0	0.0	0.3	0.4	0.0	0.1	0.3	0.3	0.3	0.1	0.0	0.3	2.0	1.7	1.8	1.5	0.6	9.7	
5.1 - 6.0	0.0	0.3	0.0	0.1	0.3	0.1	0.6	0.1	0.0	0.3	0.0	0.8	1.1	0.3	1.0	0.4	5.5	
6.1 - 7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.1	0.6	0.0	0.3	0.0	1.7	
7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.1	0.0	0.6	0.4	0.3	0.0	2.1	
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	0.7	0.0	0.1	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	0.0	0.1	0.1	0.3	0.0	0.6	
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	4.5	3.2	6.2	9.0	12.7	8.3	7.3	4.5	1.7	2.2	2.2	6.4	9.8	8.4	9.0	4.8	100.0	
Average Speed	1.4	2.1	1.9	2.2	2.2	1.8	2.7	3.0	2.4	2.0	3.0	3.7	4.4	3.5	3.7	2.6	2.8	

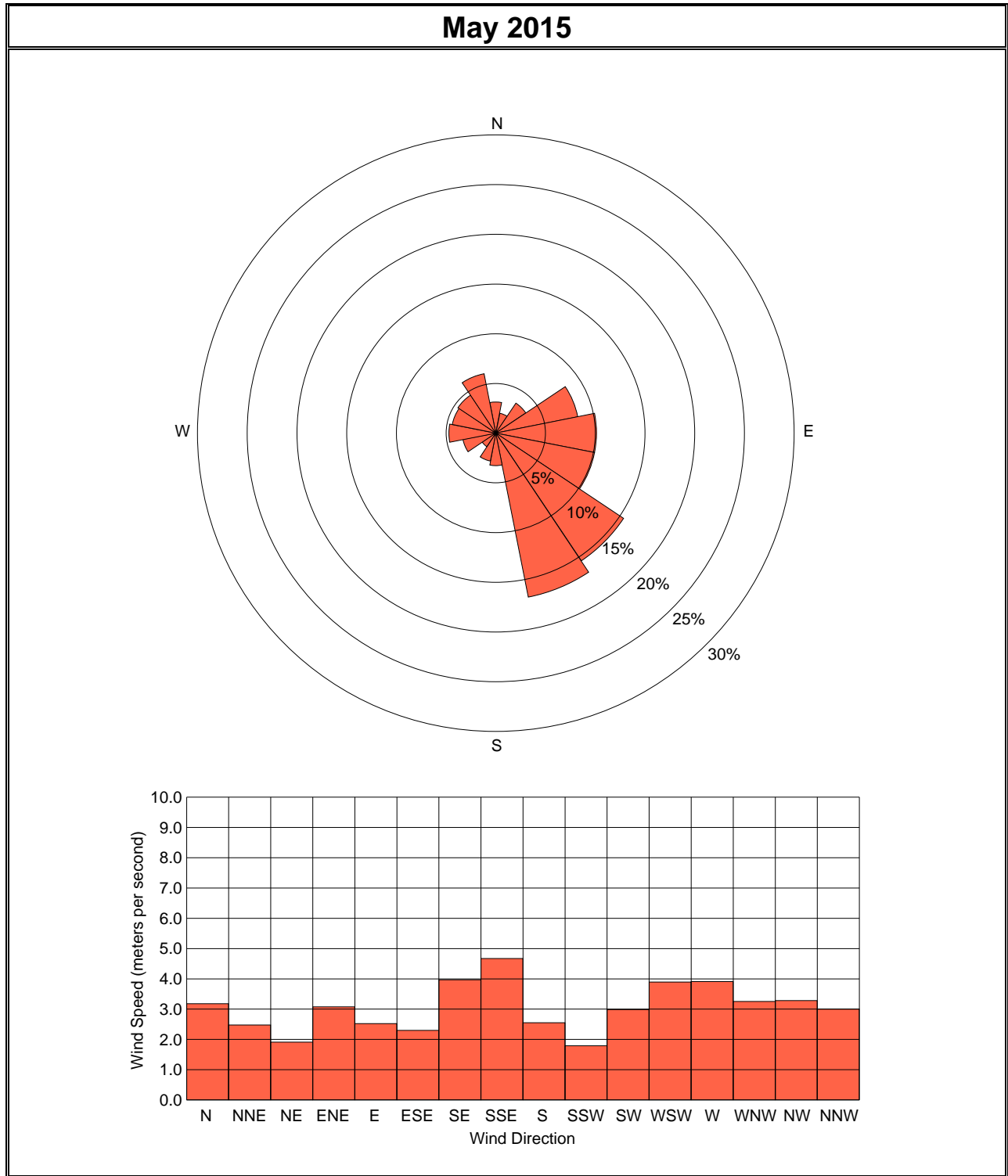
**Table 8. Quarterly Wind Rose Summary, Black Butte Copper Project Met Tower**

Second Quarter 2015																		
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	0.9	1.0	0.8	1.7	1.5	1.5	0.7	0.6	0.8	0.2	0.3	0.3	0.6	1.2	1.2	14.0
	1.1 - 2.0	1.0	0.7	1.8	2.5	3.5	4.0	3.4	1.7	0.6	0.6	0.4	0.6	0.8	1.1	1.2	0.8	24.8
	2.1 - 3.0	0.3	0.2	0.7	1.7	3.3	2.2	0.7	1.1	0.6	0.2	0.4	0.6	1.4	1.7	1.5	0.7	17.2
	3.1 - 4.0	0.4	0.3	0.4	1.5	1.1	0.5	1.2	1.4	0.5	0.2	0.6	1.5	2.2	1.6	1.4	0.7	15.6
	4.1 - 5.0	0.4	0.2	0.3	0.5	0.6	0.3	1.1	1.3	0.5	0.2	0.2	1.5	1.5	1.6	1.2	0.7	11.9
	5.1 - 6.0	0.2	0.1	0.0	0.4	0.3	0.2	0.6	1.2	0.0	0.2	0.2	0.6	1.1	0.7	0.7	0.4	6.9
	6.1 - 7.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.9	0.0	0.1	0.0	0.5	0.8	0.6	0.1	0.1	3.8
	7.1 - 8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.1	0.1	0.1	0.7	0.3	0.2	0.0	2.3
	8.1 - 9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.1	0.2	0.7	0.0	0.1	0.0	2.1
	9.1 - 10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.1	0.1	0.0	0.8
	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	0.3	0.0	0.0	0.0	0.5
	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	3.2	2.7	4.1	7.4	10.5	8.8	9.8	9.4	2.7	2.4	2.3	5.7	10.2	8.3	7.7	4.7	100.0	
Average Speed	2.3	2.4	1.9	2.5	2.2	2.0	3.1	4.0	2.5	2.4	3.4	4.1	4.9	3.7	3.3	2.8	3.1	

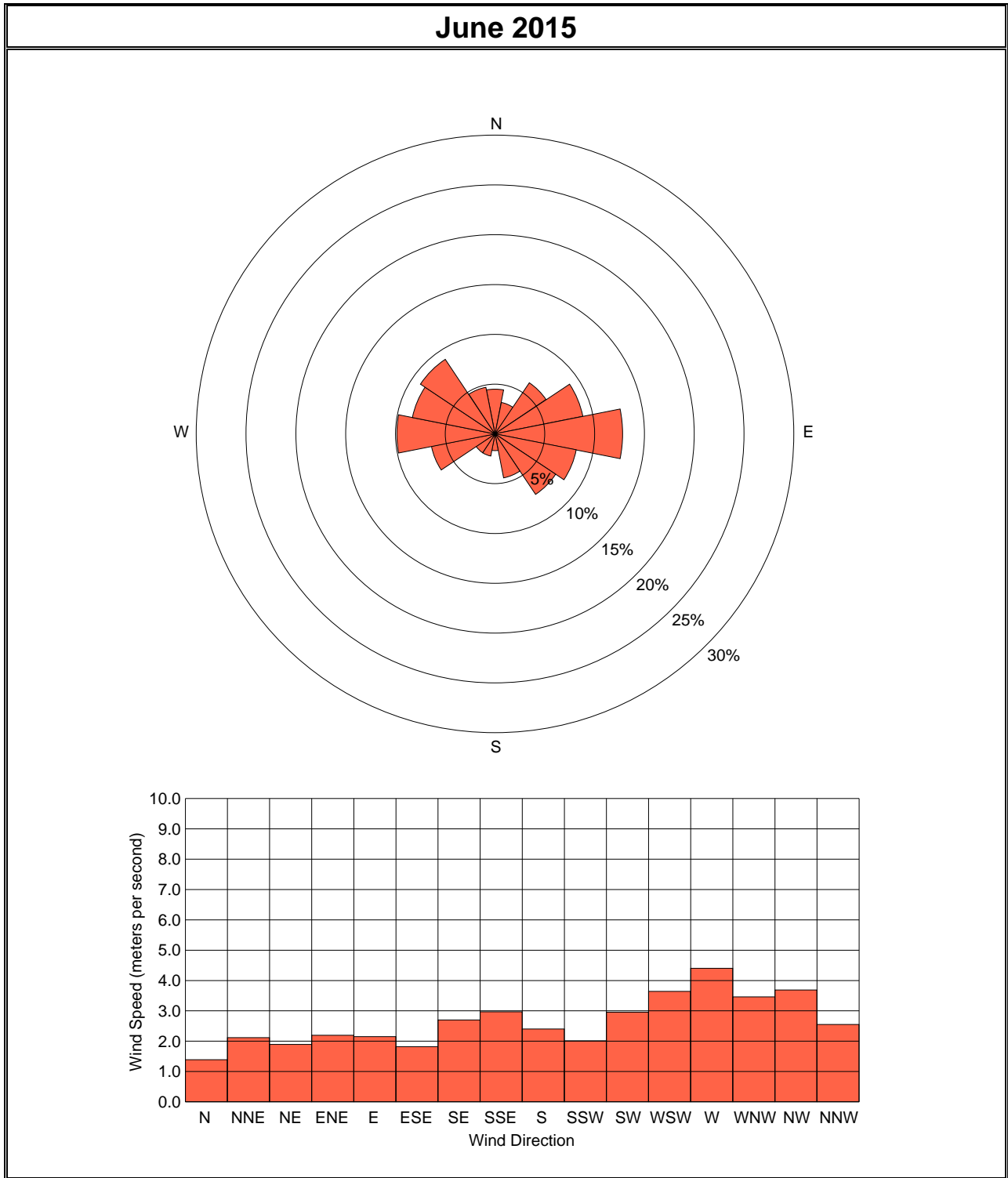
**Figure 2. Monthly Wind Rose, Black Butte Copper Project Met Tower**



**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**

