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TECHNICAL MEMORANDUM

RESPONSE TO COMMENT ON THE RESOLUTION COPPER PROJECT DEIS: ACTION ITEM AQ2 – 2017 AIR QUALITY DATA POTENTIAL TO INFLUENCE DEIS METEOROLOGICAL DATA AND BACKGROUND AIR QUALITY DATA

PREPARED FOR:	Mary Rasmussen, Project Manager, USDA Forest Service – Tonto National Forest
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PROJECT NO.:	262-37
COPIES:	Resolution Copper
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1.0 Introduction

In the comments to the Resolution Copper Project's (Resolution) Draft Environmental Impact Statement (DEIS), the following comment #278-5 was provided by the Arizona Department of Environmental Quality (ADEQ):

> *Draft EIS Pg. 281 Background Concentrations*
>
> *The most recent 3 years of [air quality] monitoring data show that the concentration levels in Year 2017 were higher than previous years. However, the NEPA Air Quality Impacts Analyses does not consider the 2017 monitoring data for the background concentrations determination. Would it be a concern?*

The background values used in the DEIS were derived from data collected during 2015-2016 at monitoring stations located at the four functional areas of the Project: East Plant Site (EPS), West Plant Site (WPS), near the base of the proposed Alternative 2 tailings storage facility (Hewitt Station), and the Filter Plant Loadout Facility (FPLF). The monitoring stations were installed and operated by Air Sciences Inc. per criteria and procedures stipulated in a Resolution Copper Mine Monitoring Plan – Revision 3 (Air Sciences, 2016) approved by Pinal County Air Quality Control District (PCAQCD). The background values derived from the monitoring sites were submitted as part of Resolution's Final Air Quality Impacts Analysis Modeling Plan (Air

Sciences, 2018) (Modeling Plan). PCAQCD reviewed and approved the Modeling Plan, including the background values, in 2018. The background values for all pollutants, except CO, were developed from data monitored at the EPS and WPS locations. The two years of site-specific meteorological data and ambient pollution levels are considered representative of the range of conditions for the site. The lengths of the data periods meet or exceed the recommendations as described in the Environmental Protection Agency's (EPA) Guideline on Air Quality Models. The DEIS background values and their forms are presented in Table 1.

Table 1. Resolution DEIS Background Values

Pollutant	DEIS Background	Unit	Form of the Background Concentration
CO 1-hour	3.1	ppm[3]	Highest from 3 years (2014-2016)
CO 8-hour	2.2	ppm[3]	Highest from 3 years (2014-2016)
NO_2 1-hour	Profile	-	3-year average highest monthly and hour-of-day (2012/4 - 2015/3)
NO_2 annual	1.6	ppb[4]	Highest from 3 years (2012/4 - 2015/3)
$PM_{2.5}$ 24-hour	Profile[1,2]	-	24-hour averages paired with modeled impacts (2015-2016)
$PM_{2.5}$ annual	Profile[1,2]	-	24-hour averages paired with modeled impacts (2015-2016)
PM_{10} 24-hour	Profile[1,2]	-	24-hour averages paired with modeled impacts (2015-2016)
PM_{10} annual	Profile[1,2]	-	24-hour averages paired with modeled impacts (2015-2016)
SO_2 1-hour	9.3	ppb[4]	3-year average 99th percentile of daily maximum 1-hour values (2013, 2015, 2016)
SO_2 3-hour	11.7	ppb[4]	3-year maximum 3-hour average (2013, 2015, 2016)
SO_2 24-hour	4.2	ppb[4]	3-year maximum 24-hour average (2013, 2015, 2016)
SO_2 annual	0.8	ppb[4]	3-year maximum annual average (2013, 2015, 2016)

[1] Concentrations monitored at two locations, East Plant and West Plant, and combined with modeled impacts via a paired-sums approach.

[2] At the direction of Pinal County Air Quality Control Division, and after review of the background concentrations and meteorology, some limited exceptional events were removed from the data period.

[3] ppm = parts per million.

[4] ppb = parts per billion.

In order to investigate if increased levels of ambient pollution in 2017 would be a concern, monitored concentrations from 2017 for applicable Ambient Air Quality Standards (AAQS) have been compared to the monitored concentrations from 2015-2016 and evaluated to determine if and how the 2017 concentrations could potentially affect model results presented in the DEIS and whether the potential changes to model results would have changed the conclusions in the DEIS. Table 2 summarizes the evaluation methods and findings for all the pollutants and averaging periods disclosed in the DEIS.

The details and results of these analyses are provided in the following sections. While the evaluation indicated occurrences of increased pollutant concentrations in 2017 (including elevated concentrations that could have been influenced by exceptional events), the analyses indicate that accounting for the increased concentrations in 2017 would not result in modeled plus background concentrations greater than the AAQS for any pollutant. The background values and meteorological periods used in the DEIS sufficiently represent the range of representative conditions for the Project area, including the conditions in 2017 that were evaluated to respond to this comment.

Table 2 - Summary of Methods to Evaluate 2017 Data Affecting 2015-2016 Meteorological and Background Data Period

	Polllutant	Averaging Period	Section in Memo	Evaluaton Method	Summary of Results	Notes
	Ozone	8-hour	1.0	No additional evaluation.	N/A	Not utilized in MERP analysis.
2017 Value Is LESS than DEIS Background	CO	1-hour	2.1	Compared 2017 value to DEIS background.	2017 value < DEIS Background	
	CO	8-hour	2.1	Compared 2017 value to DEIS background.	2017 value < DEIS Background	
	NO2	Annual	2.1	Compared 2017 value to DEIS background.	2017 value < DEIS Background	
	SO2	3-hour	2.1	Compared 2017 value to DEIS background.	2017 value < DEIS Background	
	SO2	24-hour	2.1	Compared 2017 value to DEIS background.	2017 value < DEIS Background	
2017 Data Indicatee Increased Concentrations Relative to DEIS Background	Ozone	1-hour	3.1	Statistical comparision of quarterly 1-hr ozone data for 2015-2017.	Range of 1-hr ozone in 2015-16 representative of range of 1-hr ozone in 2017 data	1-hr ozone paired in time with met data for NO2 1-hr and annual AERMOD modeling (OLM).
	NO2	1-hour	3.1	Comparison of NO_2 Profiles and added 2017 increase to DEIS results.	Increase does not result in concentrations >= AAQS. No change in findings presented in DEIS.	Time varying profiles were used for background.
	PM2.5	Annual	2.2.2	Modeled impact + background + increase with inclusion of 2017 data.	Increase does not result in concentrations >= AAQS. No change in findings presented in DEIS.	
	PM10	Annual	2.2.2	Modeled impact + background + increase with inclusion of 2017 data.	Increase does not result in concentrations >= AAQS. No change in findings presented in DEIS.	
	SO2	Annual	2.2.1	Modeled impact + background + increase with inclusion of 2017 data.	Increase does not result in concentrations >= AAQS. No change in findings presented in DEIS.	
	SO2	1-hour	2.2.1	Modeled impact + background + increase with inclusion of 2017 data.	Increase does not result in concentrations >= AAQS. No change in findings presented in DEIS.	
	PM2.5	24-hour	3.2	Compared the range of 2015-16 data to the range of 2017 data.	Increase does not result in concentrations >= AAQS. No change in findings presented in DEIS.	Paired sums approach was used.
	PM10	24-hour	3.2	compared the range of 2015-16 data to the range of 2017 data..	Increase does not result in concentrations >= AAQS. No change in findings presented in DEIS.	Paired sums approach was used.

2.0 Pollutants/Averaging Periods for Which Basic Analysis Reveals 2017 Monitoring Data Present No Concern to DEIS Background

2.1 – 2017 Value is Less than DEIS Background

For CO 1-hour and 8-hour, NO_2 annual, and SO_2 3-hour and 24-hour, the 2017 data indicated reduced levels relative to the DEIS background. Therefore, inclusion of the 2017 data would not alter the conclusions of the DEIS for these pollutants. No further evaluations were performed and the data comparisons for these pollutants and averaging periods are shown in Table 3.

Table 3. Comparison of DEIS Background Values with 2017 Concentrations

Pollutant	DEIS Background	2017 Value	Unit
CO 1-hour	3.1	2.4	ppm
CO 8-hour	2.2	1.8	ppm
NO_2 annual	1.6	0.8	ppb
SO_2 3-hour	11.7	10.5	ppb
SO_2 24-hour	4.2	3.31	ppb

2.2 Adding Potential Increase due to 2017 Data to DEIS Modeled Impact + Background is Less than Ambient Air Quality Standard

2.2.1 SO2 1-hour and Annual

For the SO_2 1-hour and annual AAQS, the 2017 values are 5.4 ppb and 0.1 ppb higher than the DEIS backgrounds, respectively. By adding these increases to the appropriate total concentrations (modeled project impacts + background) for the worst-case alterative as from the DEIS, 2017-included total concentrations (modeled project impacts + background + increase) are compared to the AAQS. The DEIS total concentrations, increases, and 2017-included total concentrations are presented in Table 4.

Table 4. 2017-Included SO_2 1-Hour and Annual Concentrations

	DEIS Total	2017 Increase	2017-Included Total	AAQS	Unit
SO_2 1-hour	44.7	5.4	50.1	74.8	ppb
SO_2 annual	1.1	0.1	1.2	30.5	ppb

The 2017-included total concentrations are less than the AAQS. Therefore, consideration of the 2017 data would not change the conclusions of the DEIS for the SO_2 1-hour and SO_2 annual standards.

2.2.2 PM2.5 Annual and PM10 Annual

The modeled $PM_{2.5}$ and PM_{10} annual impacts in the DEIS were combined in a paired-sums approach with daily background concentrations from the 2015-2016 monitoring period. Even though the 2015-2016 data excluded some limited exceptional events (as determined by PCAQCD), the 2017 period did not exclude any exceptional events and all 2017 data and total concentrations were included. $PM_{2.5}$ and PM_{10} were monitored at two locations: East Plant and West Plant. The 2017 increases were calculated for changes from both locations and combined with the worst-case total concentrations from the DEIS. For the estimate of the PM_{10} annual 2017-included concentration, the maximum annual concentration from 2015 and 2016 was compared to the maximum annual concentration of 2015, 2016, and 2017. For the estimate of the $PM_{2.5}$ annual 2017-included concentration, the average annual concentration from 2015 and 2016 was compared to the average annual concentration of 2015, 2016, and 2017. The comparisons of the annual backgrounds are presented in Table 5.

Table 5. $PM_{2.5}$ and PM_{10} Annual Concentrations for the 2015-2016 and 2015-2017 Periods

Pollutant	Monitor Site	2015	2016	2017	Background (2015-2016)	Background (2015-2017)	Unit
$PM_{2.5}$ annual	East Plant	3.3	4.0	4.2	3.65	3.83	$\mu g/m^3$
$PM_{2.5}$ annual	West Plant	4.2	4.7	4.5	4.45	4.47	$\mu g/m^3$
PM_{10} annual	East Plant	12.5	15.7	18.0	15.7	18.0	$\mu g/m^3$
PM_{10} annual	West Plant	12.6	18.7	18.1	18.7	18.7	$\mu g/m^3$

The DEIS total concentrations, 2017-included total concentrations, and comparisons to the AAQS are presented in Table 6.

Table 6. 2017 Included $PM_{2.5}$ and PM_{10} Annual Concentrations

Pollutant	Monitor Site	DEIS Total Concentration	2017 Increase	Included Total Concentration	AAQS	Unit
$PM_{2.5}$ annual	East Plant	6.0	0.18	6.18	12	$\mu g/m^3$
$PM_{2.5}$ annual	West Plant	6.0	0.02	6.0	12	$\mu g/m^3$
PM_{10} annual	East Plant	24.5	2.3	26.8	50	$\mu g/m^3$
PM_{10} annual	West Plant	24.5	0.0	24.5	50	$\mu g/m^3$

The 2017-included total concentrations are less than the applicable AAQS. Therefore, inclusion of the 2017 data would not change the conclusions of the DEIS regarding the $PM_{2.5}$ and PM_{10} annual standards.

3.0 Pollutants/Averaging Periods for Which Detailed Analysis Reveals 2017 Data Present No Concern to DEIS Background

3.1 NO_2 1-hour Profiles and Hourly Ozone Data (Used for OLM)

For the NO_2 1-hour modeling, a three-year average background profile of the maximum hourly concentrations by month and hour-of-day (MHOD) was included in the near-field AERMOD modeling. The period of the data included was April 2012 through March 2015. The profile from the AQIA used for the DEIS modeling is presented in Table 7.

Table 7. DEIS NO_2 1-Hour Background Profile

Month	Hours	Hourly NO2 Concentration (ppb)							
January	1 - 8	4.4	2.5	2.9	3.6	3.0	3.0	4.4	8.1
	9 - 16	8.6	5.4	4.5	5.1	5.0	3.7	3.5	4.2
	17 - 24	3.9	5.3	10.5	8.0	4.0	4.0	3.6	4.8
February	1 - 8	3.4	3.0	4.2	4.4	4.2	3.9	4.0	7.7
	9 - 16	7.1	8.4	4.7	4.0	4.4	3.9	2.4	2.3
	17 - 24	2.5	3.0	4.7	4.4	4.7	3.7	3.7	4.3
March	1 - 8	2.4	3.2	2.3	2.2	2.1	3.2	2.6	3.3
	9 - 16	5.8	2.5	5.6	1.7	1.5	1.2	1.1	2.0
	17 - 24	1.2	1.0	1.3	1.5	1.6	2.5	3.7	3.2
April	1 - 8	7.8	6.3	9.1	7.1	5.9	9.1	6.6	9.3
	9 - 16	4.5	3.3	2.4	1.3	2.1	1.6	2.2	1.5
	17 - 24	2.1	2.0	1.7	3.0	5.2	5.8	10.5	7.9
May	1 - 8	6.8	6.3	9.9	10.6	5.5	6.2	8.8	12.2
	9 - 16	4.5	4.3	3.6	2.0	1.2	1.3	1.1	0.8
	17 - 24	0.8	1.7	2.4	1.3	1.8	2.7	3.5	5.9
June	1 - 8	4.1	4.8	5.7	5.3	6.6	8.7	6.9	5.0
	9 - 16	3.0	2.7	2.5	2.0	1.0	1.3	0.9	1.0
	17 - 24	0.5	0.4	0.3	0.4	1.4	3.3	7.6	5.1
July	1 - 8	4.1	4.0	4.4	3.7	7.2	5.8	4.4	3.7
	9 - 16	2.3	3.8	0.8	1.2	0.9	0.8	0.9	0.6
	17 - 24	0.6	1.9	3.3	2.5	2.6	3.7	3.0	4.9
August	1 - 8	6.9	6.2	7.0	5.2	4.6	5.8	11.8	6.0
	9 - 16	4.4	6.4	2.8	2.5	1.6	2.6	1.6	3.3
	17 - 24	0.5	0.4	1.3	3.7	2.7	2.5	6.6	9.0
September	1 - 8	6.0	6.6	7.9	8.0	6.3	12.6	7.0	5.2
	9 - 16	6.1	1.5	1.8	0.6	0.8	1.3	1.7	1.0
	17 - 24	0.6	1.3	9.5	2.3	3.9	5.3	6.6	9.3
October	1 - 8	7.4	8.7	12.0	7.7	7.8	10.7	6.6	7.6
	9 - 16	10.1	4.0	4.0	3.6	3.7	3.3	2.8	2.8
	17 - 24	3.0	2.2	3.8	4.9	5.6	7.9	6.7	8.0
November	1 - 8	8.4	8.8	7.1	8.6	7.4	8.4	10.3	11.4
	9 - 16	8.5	6.1	8.4	5.8	4.4	4.1	4.9	4.7
	17 - 24	4.5	6.8	6.2	5.8	6.7	6.6	7.0	9.1
December	1 - 8	10.3	9.3	12.0	12.3	7.1	8.5	7.9	8.2
	9 - 16	8.4	5.7	5.1	4.6	3.4	3.3	3.0	3.9
	17 - 24	3.7	5.3	6.2	5.0	6.0	8.5	7.2	13.1

A similar profile was constructed that incorporated the 2017 hourly NO2 data. This profile is four-year average background profile constructed by taking the weighted average of the three-year profile with the 2017 profile. The four-year background profile is presented in Table 8.

Table 8. 2017-Included NO_2 1-Hour Background Profile

Month	Hours	Hourly NO2 Concentration (ppb)							
	1 - 8	4.2	2.6	3.0	3.4	2.7	3.8	4.8	8.1
January	9 - 16	7.4	5.0	3.8	4.3	4.7	3.2	3.0	3.4
	17 - 24	3.7	4.3	8.7	6.7	3.3	4.1	3.6	4.0
	1 - 8	3.5	3.2	4.3	5.6	4.2	3.8	4.1	8.0
February	9 - 16	8.2	7.1	4.3	3.6	4.2	3.5	2.3	2.4
	17 - 24	2.4	2.8	4.3	4.2	4.5	3.9	4.0	4.5
	1 - 8	2.7	3.5	3.0	2.1	2.3	3.7	2.7	4.5
March	9 - 16	5.7	3.1	5.5	2.3	2.6	1.7	1.3	1.9
	17 - 24	1.4	1.2	1.6	2.0	1.9	2.5	3.9	3.5
	1 - 8	11.7	8.5	8.5	7.0	6.3	9.3	9.8	12.5
April	9 - 16	6.4	4.1	2.8	1.9	2.8	2.4	2.6	1.9
	17 - 24	2.6	2.6	2.1	5.6	6.6	5.5	9.7	8.4
	1 - 8	5.8	5.9	8.1	8.5	4.8	5.6	7.6	11.0
May	9 - 16	4.6	4.0	3.0	1.8	1.3	1.3	1.2	1.0
	17 - 24	1.0	1.7	2.4	1.6	2.5	3.2	3.8	5.3
	1 - 8	6.4	5.0	4.8	4.7	6.2	7.1	8.3	4.9
June	9 - 16	3.6	3.3	2.2	2.1	1.2	1.3	1.1	1.0
	17 - 24	0.7	0.6	0.6	1.9	2.6	3.5	6.5	5.0
	1 - 8	4.4	4.5	4.7	4.1	7.8	5.5	4.7	4.5
July	9 - 16	2.6	4.3	1.4	1.2	1.0	0.9	1.0	0.7
	17 - 24	0.7	1.5	3.2	3.6	3.1	4.1	3.4	5.1
	1 - 8	7.8	7.1	8.2	6.9	6.4	8.5	13.7	7.7
August	9 - 16	4.5	6.5	3.9	2.8	1.6	3.1	2.2	3.2
	17 - 24	0.8	1.0	1.2	3.6	6.6	4.7	11.0	10.9
	1 - 8	7.8	8.0	11.4	8.8	9.2	13.0	8.4	7.2
September	9 - 16	6.2	2.8	2.4	0.9	1.1	1.3	1.5	0.9
	17 - 24	0.6	1.7	7.6	2.9	4.5	6.7	10.1	9.8
	1 - 8	10.2	20.1	17.9	10.6	11.2	15.5	10.8	10.2
October	9 - 16	9.5	4.0	3.9	3.2	3.3	3.1	2.8	3.2
	17 - 24	2.8	2.2	3.6	4.3	5.2	8.9	9.1	11.3
	1 - 8	8.2	9.8	8.1	8.9	6.7	8.2	9.3	10.3
November	9 - 16	9.2	5.5	7.3	5.6	4.6	3.7	4.2	4.0
	17 - 24	4.6	7.1	6.4	6.2	6.8	7.2	7.8	8.4
	1 - 8	11.3	10.3	10.3	10.8	6.7	9.0	7.6	7.3
December	9 - 16	8.1	5.6	5.6	4.3	4.2	3.3	3.4	4.2
	17 - 24	4.6	5.2	6.1	6.1	6.0	10.7	9.1	12.0

The 2017-included profile is generally higher than the DEIS profile, especially during the morning hours of October. An estimate of total concentrations including the 2017 data in the profile was calculated by adding the maximum profile increase, 11.4 ppb for the MHOD of October at 2 a.m., to the worst-case total concentration in the EIS. The estimate of 2017-included total impacts is presented in Table 9.

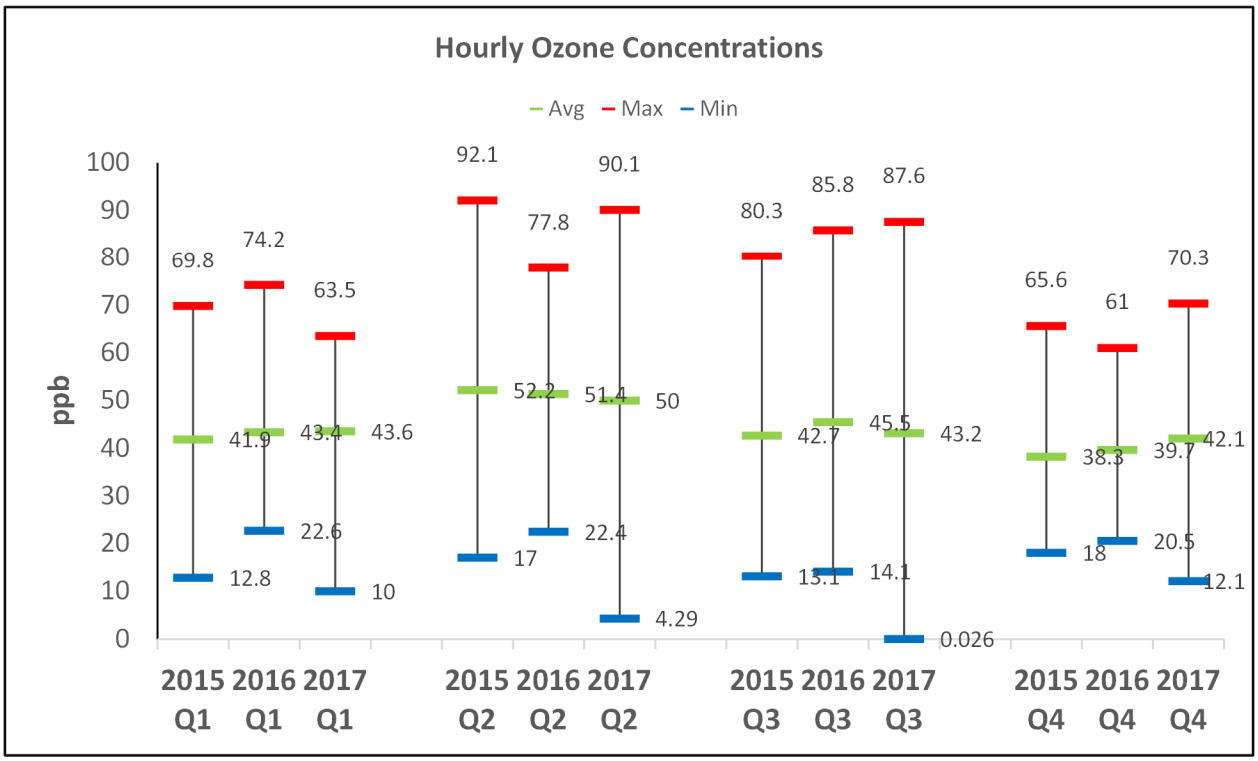
Table 9. Estimate of 2017-Included Total NO_2 1-Hour Concentrations

Pollutant	DEIS Total Concentration	2017 Increase	2017-Included Concentration	AAQS	Unit
NO_2 1-hour	79.7	11.4	91.1	100.0	ppb

The estimated NO_2 1-hour total concentration, with the maximum increase between the profiles, is less than the AAQS. Therefore, the inclusion of the 2017 monitoring data is unlikely to influence the conclusions presented in the DEIS.

Another aspect of the NO_2 modeling with AERMOD is the use of the Ozone Limiting Method (OLM). The OLM option in AERMOD requires an ozone concentration or concentration profile in order to provide estimates of NO_X conversion to NO_2. For the DEIS analysis, hourly ozone values paired in time with meteorological data (2015-2016) were used. The highest hourly concentration occurred in the second quarter of 2015, and average values are similar across the three years. The ranges and average hourly ozone concentrations from 2015, 2016, and 2017, summarized by quarter for the three years, are presented in Figure 1. An analysis of the hourly values for 2015, 2016, and 2017 indicate that the range of hourly ozone values in 2015 and 2016 sufficiently represents the range of values in the 2017 data. Incorporating the 2017 hourly ozone values in the modeling analysis using the OLM option would have had no measurable effect on NO_2 modeling and, therefore would not change the conclusions of the DEIS regarding the NO_2 standards.

Figure 1. Summary by Quarter of Hourly Ozone Data for 2015-2017



3.2 PM_{10} and $PM_{2.5}$ 24-Hour Concentrations

3.2.1 Comparison of Monitored Concentrations

PCAQCD reviewed and approved the Modeling Plan which included the paired-sums approach for incorporating background concentrations of PM_{10} 24-hour and $PM_{2.5}$ 24-hour. The paired-sums approach involves pairing calendar day-specific 24-hour monitored concentrations with modeled 24-hour impacts for the same calendar day. The paired-sums approach necessitates that the ambient monitoring data and meteorological data periods align.

As part of PCAQCD's review process for the paired-sums approach, a detailed analysis was performed to identify and remove a few limited PM concentrations determined to be influenced by exceptional events (e.g., regional dust storms) from the PM_{10} and/or $PM_{2.5}$ monitoring data sets. Elevated PM concentrations for three 24-hour periods in the 2015-2016 data sets were determined to be influenced by exceptional events and were flagged and removed from the PM_{10} and $PM_{2.5}$ background datasets used for the modeling analysis. The flagged and removed 24-hour concentrations were replaced with gap-filled data according to monthly PM_{10} and $PM_{2.5}$ profiles developed from the monitoring data and in consultation with PCAQCD.

For this evaluation of whether the 2017 $PM_{2.5}$ and PM_{10} 24-hour concentrations would cause concern about using the 2015-2016 data, it is important to note that the 2017 data have not been vetted through the exceptional events process so elevated 24-hour concentrations of PM_{10} and $PM_{2.5}$ that may been influenced by exceptional events have not been flagged and removed from the 2017 data.

Summary statistics from the 2015, 2016, and 2017 data sets are provided in Table 10. Concentrations for each station and pollutant are summarized according to the statistical form of the AAQS for each year. Additionally, the multi-year form of the standard is calculated for the two-year DEIS data period (2015-2016) as well as for the three-year period including 2015-2017.

Table 10. Summary of $PM_{2.5}$ and PM_{10} Single- and Multi-year Concentrations (2015-2017)

Pollutant	Site	Single Year Rank	2015	2016	2017	Multi-Year Form	2015-16	2015-17	Units
PM_{10} 24-hour[1]	East Plant	2nd High	44.0	54.1	110.0	N+1[2]	54.1	91.2	µg/m³
PM_{10} 24-hour[1]	West Plant	2nd High	67.1	71.2	117.0	N+1[2]	71.2	81.2	µg/m³
$PM_{2.5}$ 24-hour	East Plant	8th High	8.2	9.6	11.8	Average 8th High	8.9	9.9	µg/m³
$PM_{2.5}$ 24-hour	West Plant	8th High	12.6	9.8	14.0	Average 8th High	11.2	12.1	µg/m³

[1] The PM_{10} 24-hour standard is based on PM_{10} concentrations converted to Standard Temperature and Pressure (STP).
[2] The form of the PM_{10} 24-hour concentrations is the rank N+1 concentration, where N is the number of years of data.

It is evident from the summary values in Table 10 that the potential influence of exceptional events on the most elevated concentrations collected during the 2017 data period could have a substantial effect on 2nd high 24-hour concentrations. Time-series plots of the 24-hour values from 2015-2017 for the East Plant and West Plant monitoring stations are provided in Figure 2 and Figure 3, respectively. Several outlying high concentrations, that could, with additional investigation, prove to be influenced by exceptional events, are present in the 2017 data set. Flagging and removing one or more elevated 24-hour 2017 concentrations determined to be influenced by an exceptional event(s) would reduce the conservative 2015-17 values of the multi-year estimated background values presented in Table 10.

Figure 2. Time-series of East Plant $PM_{2.5}$ and PM_{10} 24-hour Concentrations

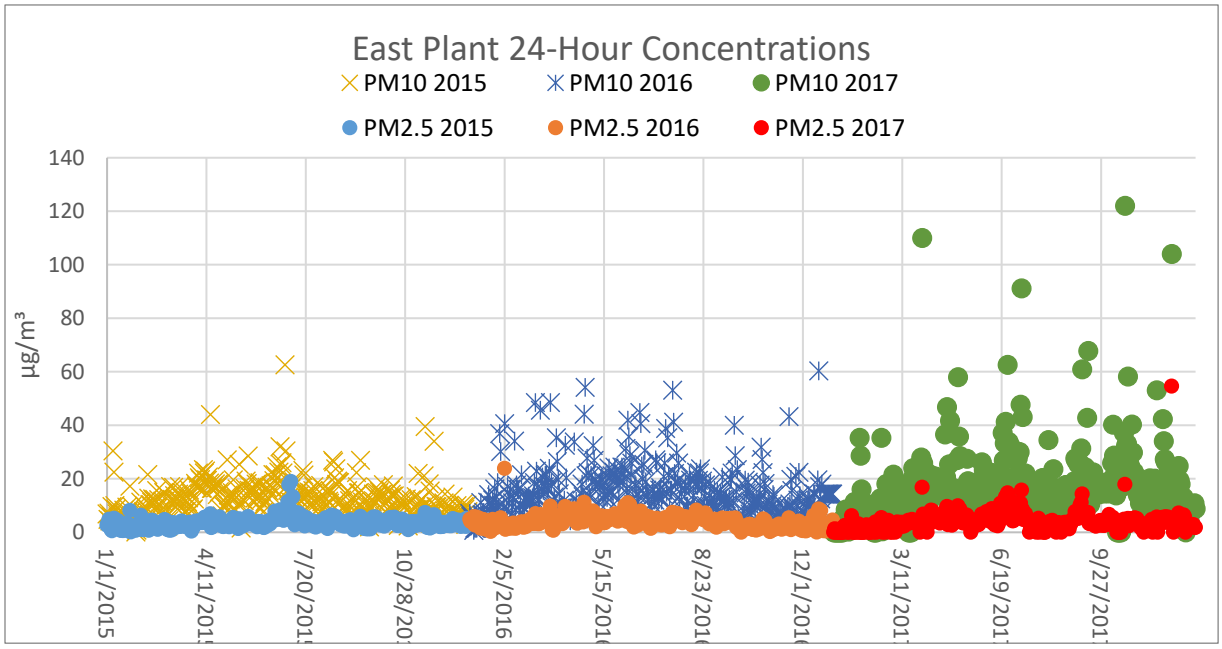
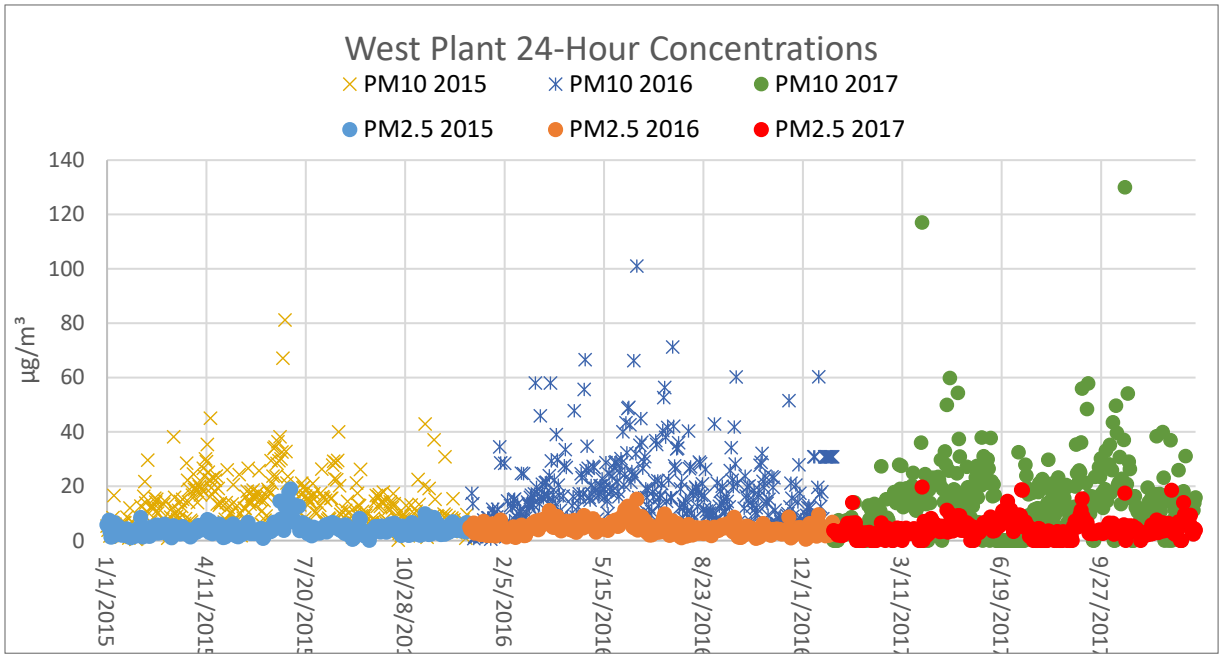


Figure 3. Time-series of West Plant $PM_{2.5}$ and PM_{10} 24-hour Concentrations



After consideration of the 2017 data, the increase of pollutant concentrations from the 2015-2016 background values to the estimated 2015-2017 background was determined to be a conservative estimate of the effect of elevated 2017 concentrations on the DEIS background PM_{10} and $PM_{2.5}$ data Estimates of $PM_{2.5}$ and PM_{10} 24-hour concentrations adjusted by the potential increases indicated by the 2017 data are provided in Table 11.

Table 11. Estimates of 2017-Included Total Concentrations for $PM_{2.5}$ and PM_{10} 24-Hour

Pollutant	Monitor Site	DEIS Total Concentration	2017 Increase	2017-Included Concentration	AAQS	Unit
PM_{10} 24-hour	East Plant	99.5	37.1	136.6	150	$\mu g/m^3$
PM_{10} 24-hour	West Plant	99.5	10.0	109.5	150	$\mu g/m^3$
$PM_{2.5}$ 24-hour	West Plant	17.8	0.92	18.72	35	$\mu g/m^3$
$PM_{2.5}$ 24-hour	West Plant	17.8	0.92	18.72	35	$\mu g/m^3$

The 2017-included total concentrations are less than the applicable AAQS. Therefore, inclusion of the 2017 data would not change the conclusions of the DEIS regarding the $PM_{2.5}$ and PM_{10} 24-hour standards.

3.2.2 Comparison of Distribution of PM Concentrations Across Wind Directions

For a paired-sums approach, the relationships between the wind data and the particulate values were evaluated to verify that the high particulate concentrations in the 2017 data set were associated with similar winds in the 2015 and 2016 data sets. Hourly particulate concentration frequencies were aggregated by wind direction for each monitoring site and pollutant. East Plant particulate concentrations were paired with East Plant winds, and West Plant particulate concentrations were paired with West Plant winds. The resultant concentration frequency diagrams of $PM_{2.5}$ and PM_{10} are provided in Figure 4 and Figure 5, respectively. These graphical representations of the distribution of PM concentrations and wind data are very similar across the three years for PM_{10} and $PM_{2.5}$. The similarity suggests that the 2015-2016 distributions of PM and wind data sufficiently capture the distributions of the 2017 data.

Figure 4. Hourly $PM_{2.5}$ Frequency Diagrams, 2015-2017

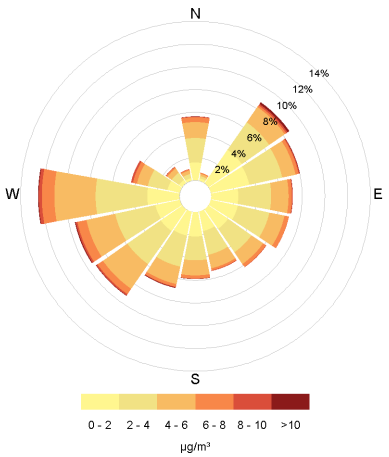
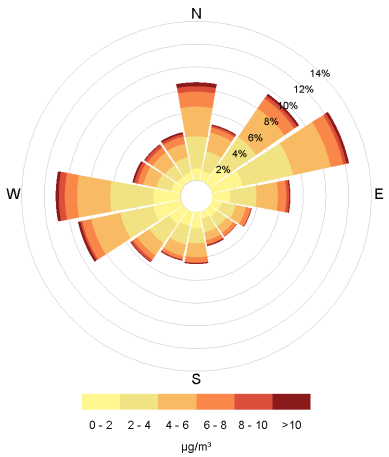
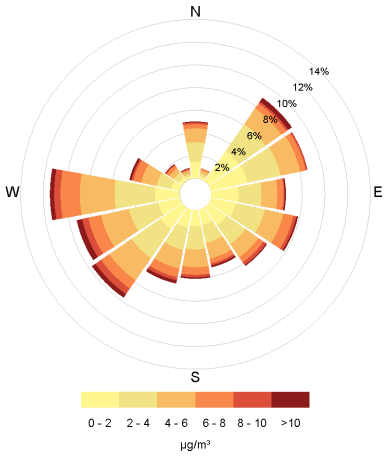
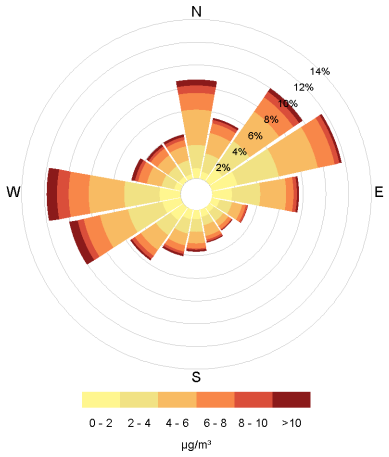
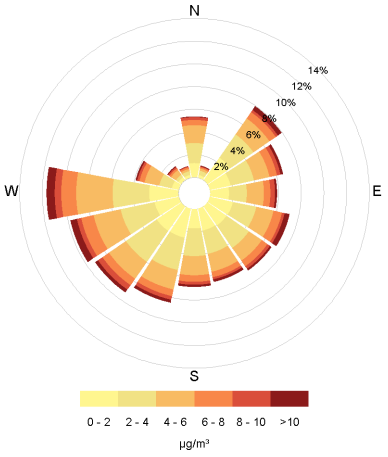
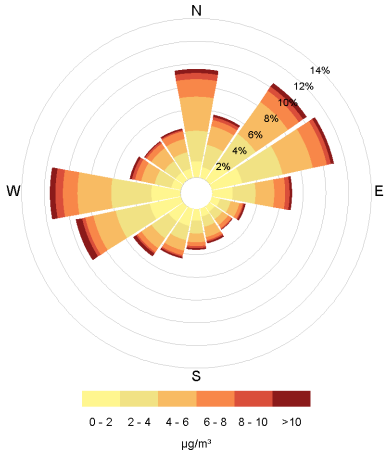
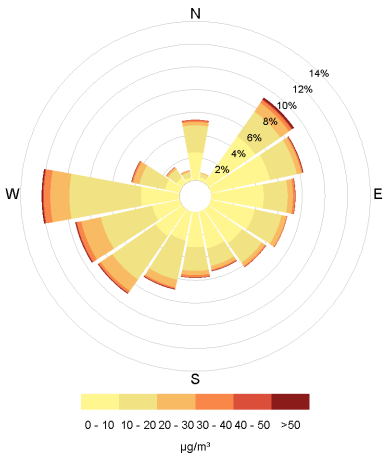
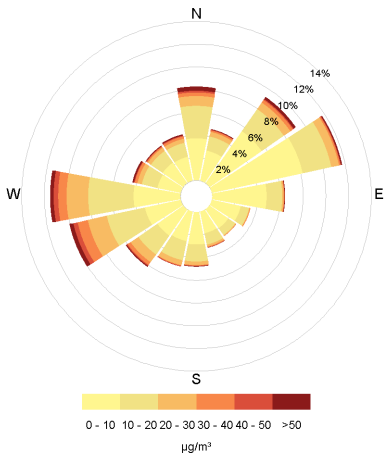
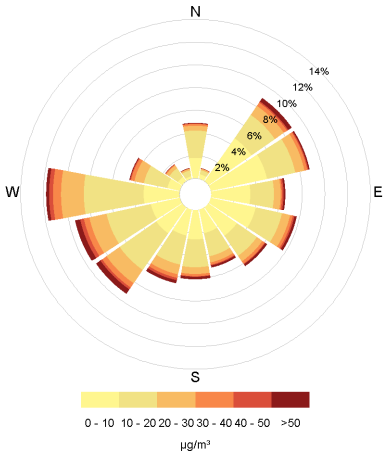
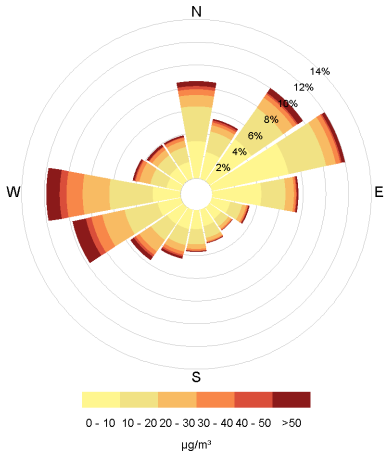
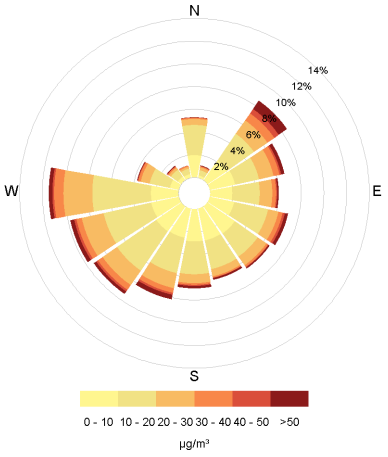
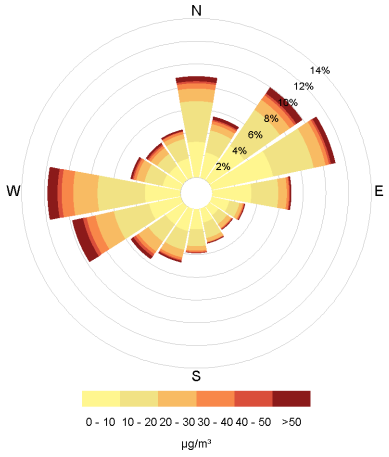
	East Plant	West Plant
2015		
2016		
2017		

Figure 5. Hourly PM_{10} Frequency Diagrams, 2015-2017

	East Plant	West Plant
2015		
2016		
2017		

3.3 Comparisons of 2015, 2016, and 2017 Meteorological Data

Comparisons are provided for the East Plant, West Plant, and Hewitt Station sites. Summary data ranges and averages by quarter for temperature and pressure are provided in Figure 6 and Figure 7, respectively. Wind frequency diagrams are provided in Figure 8. The average values are similar across the three years, and the range of 2017 conditions is reasonably represented by the 2015 and 2016 data period. The wind frequency diagrams indicate that hourly winds during 2017 were similar to winds during 2015 and 2016. These similarities across all meteorological parameters indicate that the 2015-2016 meteorological period used for the DEIS modeling analysis sufficiently captures the range of meteorological parameters measured in 2017.

Figure 6. Summary by Quarter of 2015, 2016, and 2017 Temperatures

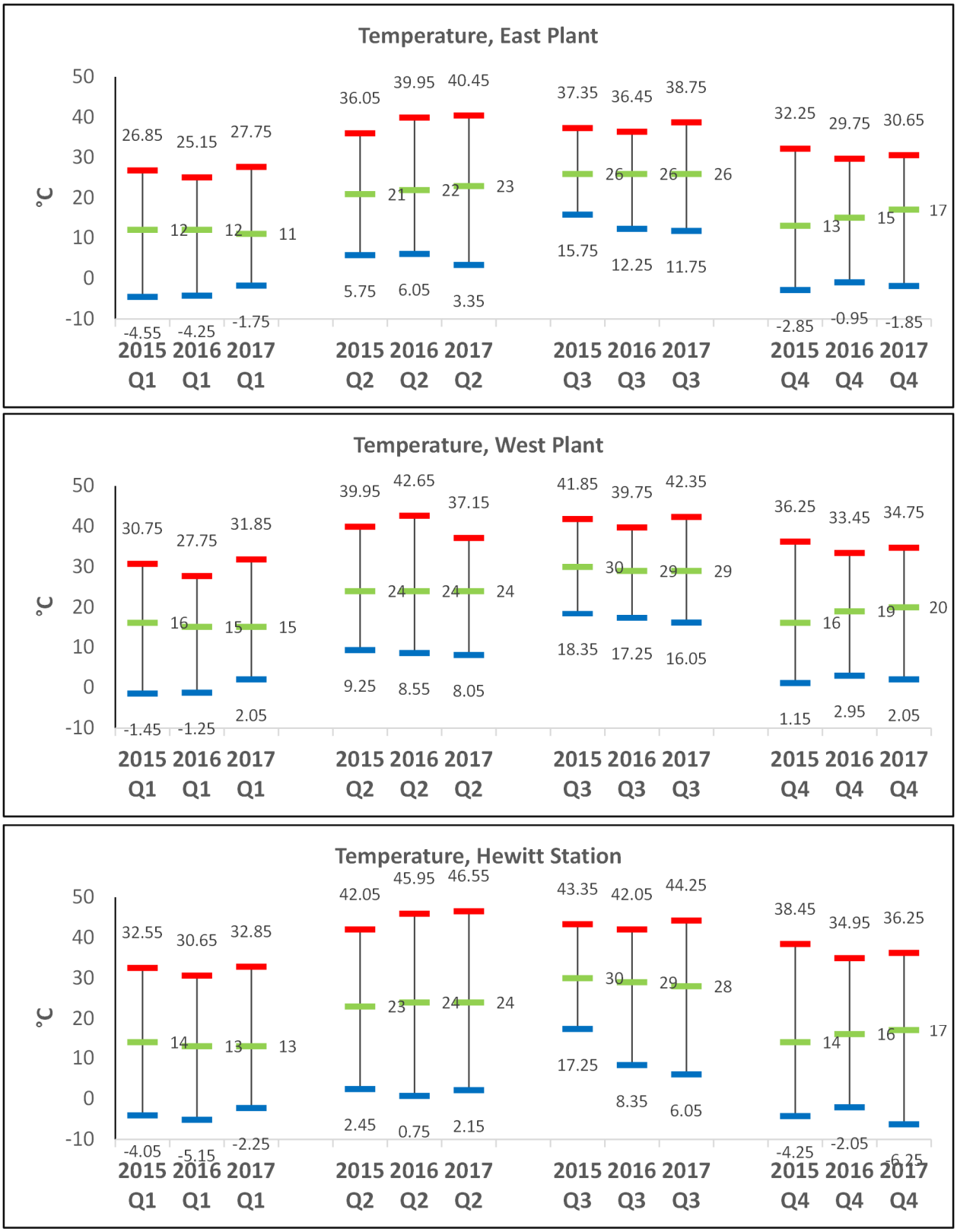


Figure 7. Summary by Quarter of 2015, 2016, and 2017 Barometric Pressures

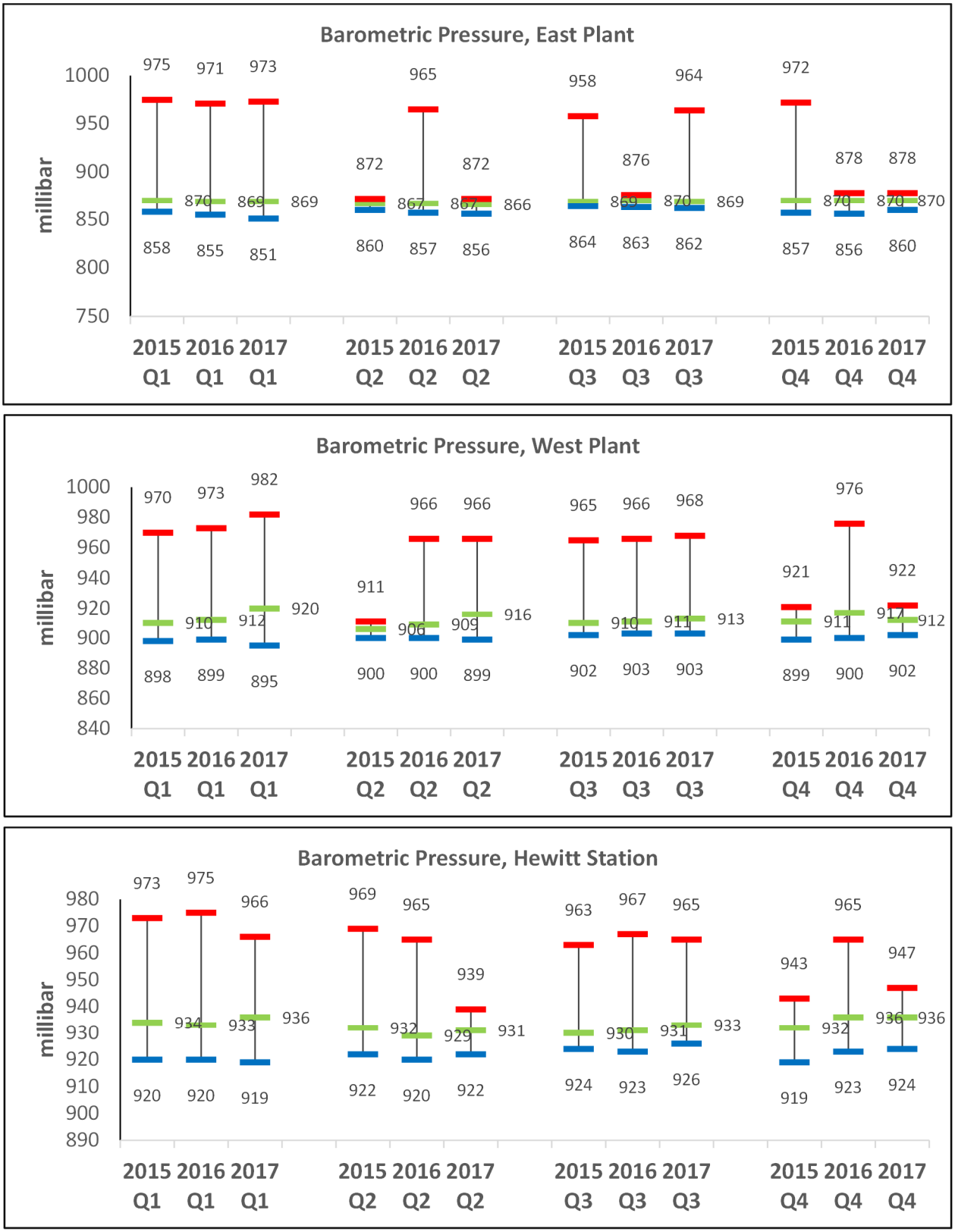
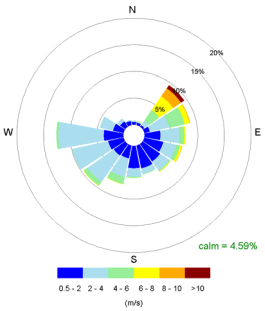
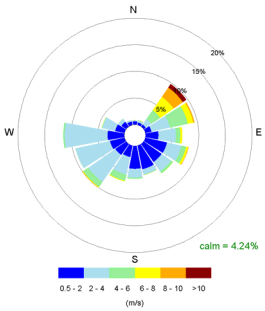
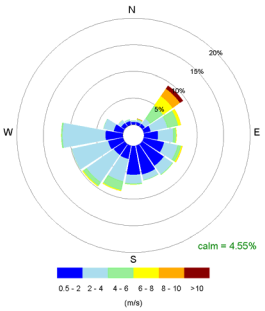
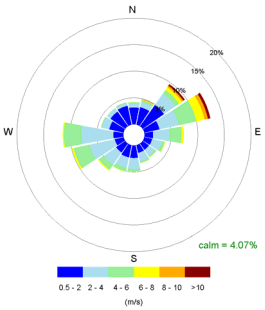
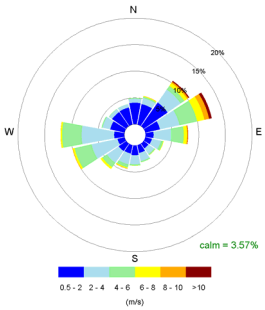
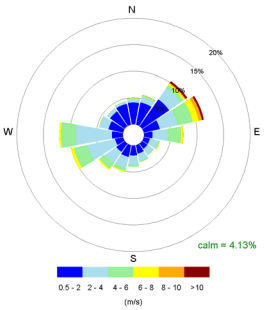


Figure 8. Wind Frequency Diagrams for 2015, 2016, and 2017

	2015	2016	2017
East Plant			
West Plant			
Hewitt Station