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TSP and Metals Air Concentration Summary
For March 9, 2018 to March 8, 2019
At the Dance Studio Monitoring Station
Colorado Smelter Superfund Site in Pueblo, Colorado

September 2019
MMA Project Number 2724-15

by: McVehil-Monnett Associates, Inc.

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1.0 Introduction

McVehil-Monnett Associates (MMA) conducted a total suspended particulate (TSP) and metals air quality sampling program on behalf of Pacific Western Technologies, Ltd. (PWT) and the United States Environmental Protection Agency (EPA) in Pueblo, Colorado. The air sampling was part of a Remedial Investigation being administered by the EPA for the OU2 Colorado Smelter Superfund Site. The sampling was designed to document air quality impacts that are expected to occur during the remedial investigation phase of the project.

This report describes the operations conducted during the monitoring year from March 9, 2018 to March 8, 2019 as well as the sampling results. The remainder of this report is presented as follows: Section 2.0 describes the monitoring program; Section 3.0 presents the sampling results along with a meteorological summary; Section 4.0 details the selected maximum concentration sampling days; and Section 5.0 provides a summary of the sampling program. Appendix A contains the calibration and audit forms, Appendix B provides the TSP and metal concentrations for each sampling day by month, and Appendix C lists the hourly meteorology for selected high TSP concentration sampling days.

2.0 Sampling Description

2.1 Sampler Location

The TSP and metals sampler was located on the roof of Jeannie's Dance Studio in Pueblo, Colorado, roughly downwind of the Colorado Smelter. Figure 1 provides a general location map, showing the Dance Studio position in south central Pueblo, Colorado. Also shown on this map are the locations of the EVRAZ and Pueblo Memorial Airport meteorological stations, data from which are used in support of the sampling analyses. Figure 2 exhibits an aerial photo indicating the Dance Studio station location as well as the approximate area for the former Colorado Smelter. Also visible on Figure 2 is the slag heap on the western side of the Colorado Smelter property. The location of the EVRAZ meteorological monitoring station is also shown.

2.2 Monitoring Description and Methodology

Following 40 Code of Federal Regulations (CFR) Part 50, Appendix B, TSP and metals air concentration monitoring was performed with a TE-2670DV TSP hi-volume sampler on the EPA one-in-six day schedule from March 9, 2018 to March 8, 2019, representing a complete monitoring year. A total of 59 out of a possible 61 samples were collected for a recovery rate of 97%. Two invalid samples falling on consecutive days, July 13 and July 19, 2018, were due to a motor failure. The motor failure occurred as a result of the filter cartridge cover being left on inadvertently for the July 13 sample, causing the motor to overheat and burn-out.

For each sampling day, PWT installed and removed filters on the sampler and downloaded sampler run data. PWT emailed sampler data and the completed sample data forms to MMA. The exposed filters were shipped in batches by PWT to the laboratory Chester LabNET (Chester) for analysis. Chester analyzed the exposed filters using gravimetry for the TSP mass and Inductively Coupled Plasma (ICP) methodology for the metals mass. The 22 metals analyzed were aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc. Chester emailed the TSP and metal mass weights for each exposed filter to PWT, and PWT forwarded these results to MMA. With each laboratory report, Chester provided information on the filter sample condition (i.e., any noted filter damage), as well as the laboratory's quality assurance / quality control (QA/QC) analyses with a sample media blank and a method blank; calibration information was also provided.

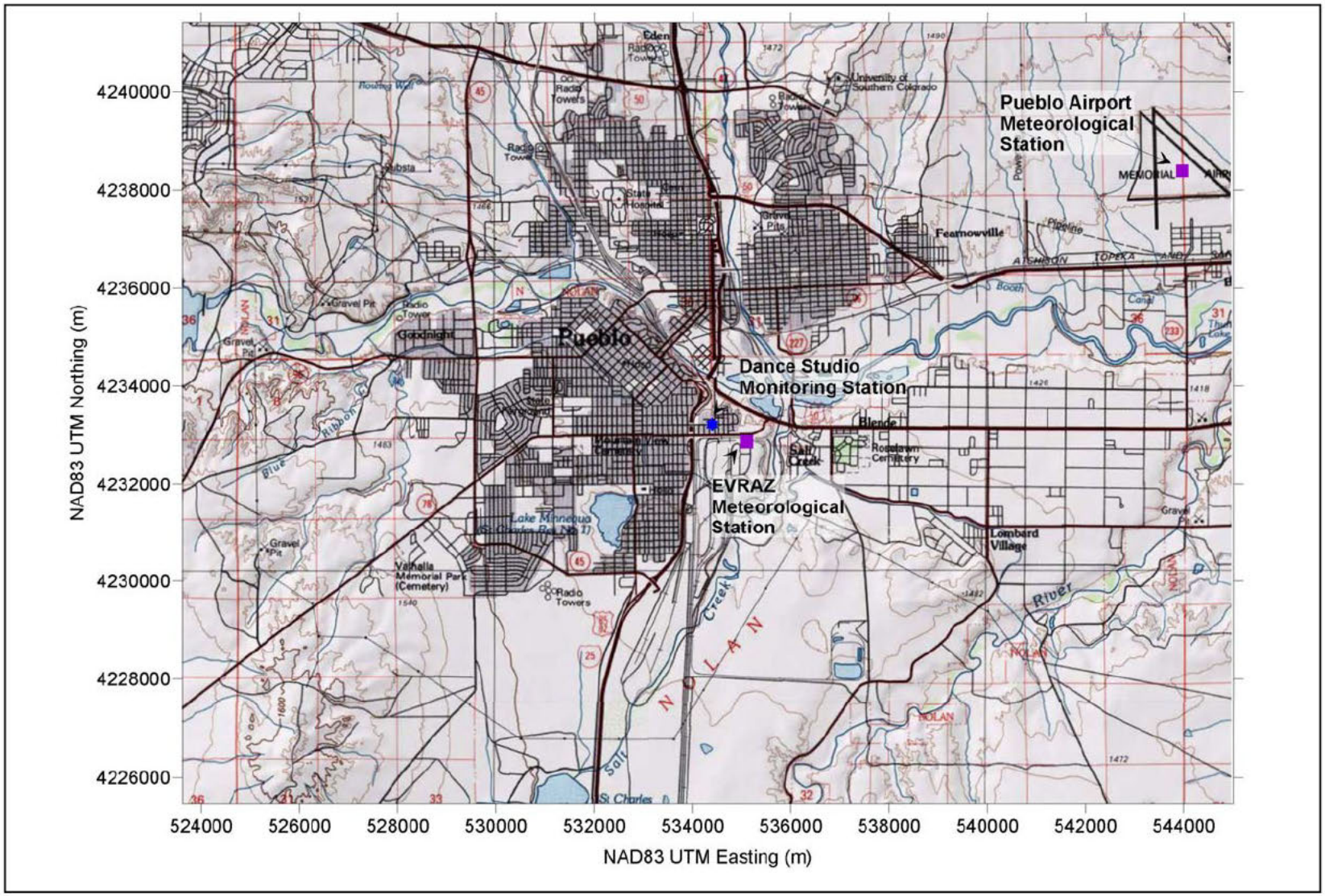


Figure 1 General Location Map for the Dance Studio Monitoring Station

Figure 2 Dance Studio Monitoring Station and the Area of the Former Colorado Smelter

Field blanks were employed to QA/QC the sample collection activities. Per EPA requirements, the field blank experiences the same ambient conditions that the corresponding sample filter is exposed to, except no air is drawn through it. The purpose of the field blank is to detect potential contamination or other problems that may occur during the process of filter handling, setup, installation, retrieval, storage location, shipment, or any other part of the sample collection process.

Field blanks were collected by PWT on a selected sampling day every other month during the monitoring year for a total of six field blanks. The selected sample days for the field blanks were April 20, June 13, August 12, October 17, and December 22, 2018 and February 20, 2019. Each field blank was placed in a cartridge at the same time and location as the sample day filter, it accompanied the sample filter out to the sampling site in the same vehicle, it was left on site in the monitor housing for the same length of time as the sample filter, it was collected at the same time as the sample filter, and then it was transported back to the office in the same vehicle as the sample filter. The field blank and sample day filters were kept in the same location before shipment to the laboratory. The sample filters and the corresponding field blanks were shipped in the same box to Chester for analysis. Chester analyzed the blanks and sample filters in the same batch.

2.3 Calibration and Audits

2.3.1 Calibrations

Over the monitoring year, the sampler was calibrated quarterly, as well as after the burned-out motor was replaced. The standard quarterly calibrations consisted of a "before" and "after", except for the first calibration and the calibration for the motor replacement. The "before" calibration represents how the sampler was found, while the "after" calibration represents the sampler after maintenance was performed, normally replacing motor brushes. The "after" calibration was used in the calculation of sample volumes. The sampler calibrations occurred on the following dates:

- March 7, 2018 (initial calibration);
- June 5, 2018 (quarterly calibration);
- July 23, 2018 (motor replacement calibration);
- October 25, 2018 (quarterly calibration); and
- January 30, 2019 (quarterly calibration).

All calibration sheets for the monitoring year are present in Appendix A. No issues were found during the calibrations.

2.3.2 Audits

Over the monitoring year, the sampler was audited by a separate technician than who performed the calibration using different equipment. One audit is required for each sampling quarter, and within 30 days of sampler shutdown. The audits were performed on the following dates: March 29, 2018; June 21, 2018; November 27, 2018; and February 21, 2019. The audit sheets are presented in Appendix A. No issues were found by the auditor.

2.4 Data Processing

MMA processed the sampler data sent by PWT to obtain the actual volumes of air collected for each sample day. The actual sample volume was calculated from the mean actual ambient atmospheric pressure, mean sampler pressure differential (pdiff), mean ambient temperature, and the slope and intercept values from the most recent calibration to the date of the sampling day. The standard volume was calculated from the actual volume using the same mean ambient temperature, mean actual atmospheric pressure, standard atmospheric pressure (760 mm mercury), and standard temperature (298.15K (25ºC)). The TSP and metal mass weights from Chester for each exposed filter were divided by the respective sample volumes to obtain ambient concentrations. TSP is reported in both standard and actual concentrations, and metals are reported in actual concentrations. Results for the monitoring year are presented in Section 3.0.

2.5 Meteorological Data

Colorado Air Pollution Control Division (APCD) provided the EVRAZ meteorological data, per the request of PWT. These data were in the form of calendar quarter reports for 2018, as well as the hourly data for this same time period. Five years of hourly data from 2013 to 2017 were also furnished.

MMA downloaded Pueblo Memorial Airport data from the National Climatic Data Center[1] in Integrated Surface Hourly Data (ISHD) format along with corresponding Pueblo Memorial Airport low wind speed data[2] for the period January 1, 2018 to March 31, 2019. MMA processed these data with EPA programs AERMET and AERMINUTE, which combine ISHD and low wind speed data into a single file.

[1] Website: https://www.ncdc noaa.gov/data-access
[2] ftp://ftp.ncdc noaa.gov/pub/data/asos-onemin/, ftp://ftp ncdc.noaa.gov/pub/data/asos-fivemin/

3.0 TSP and Metals Sampling Results

The TSP and metals sampling results for the monitoring year are presented on a quarterly basis along with corresponding meteorological data from both the EVRAZ Steel Mill and the Pueblo Memorial Airport.

3.1 First Monitoring Quarter – March to May 2018

The first monitoring quarter ran from March 9 to May 31, 2018, with 14 out of a possible 14 samples collected for a recovery rate of 100%. Tables B-1, B-2 and B-3 in Appendix B list the TSP and metals concentrations for each sampling day for March, April and May, respectively. One field blank was collected with the April 20, 2018 sample.

Figure 3 presents a summary of the first monitoring quarter sampling results. Figure 3 (top) shows each sample day concentration results broken into three categories: "TSP", "metals TSP" and "non-metals TSP". TSP is the calculated concentration (actual), the metals TSP category is the sum of the concentrations of the 22 analyzed metals, and the non-metals TSP is the difference between the TSP concentration and the metals concentration sum. Figure 3 shows that the analyzed metals are only a small portion (approximately a 15 percent average) of the TSP concentration, with non-metals representing the majority of the TSP concentration. Figure 3 (bottom) exhibits a mean quarterly breakdown of the individual metals in percent of total metals mass. Calcium and iron represent the largest portions of the metals, followed by magnesium, aluminum and sodium. Collectively, these five metals represent over 90 percent of the metals mass.

Table 1 summarizes the monitoring quarter results, listing mean, maximum and minimum concentrations. The highest TSP concentration for the monitoring quarter was 141 µg/act.m^3 (161 µg/std.m^3), occurring on April 20, while the mean for the period was 53.2 µg/act.m^3 (61.0 µg/std.m^3). The metal with the highest concentration was calcium at 11.3 µg/act.m^3, followed by iron at 7.26 µg/act.m^3 and magnesium at 2.25 µg/act.m^3. These concentrations also occurred on April 20. The metals arsenic, selenium and thallium were below their respective detection limits for all samples analyzed in the period. Silver was detected in only one sample.

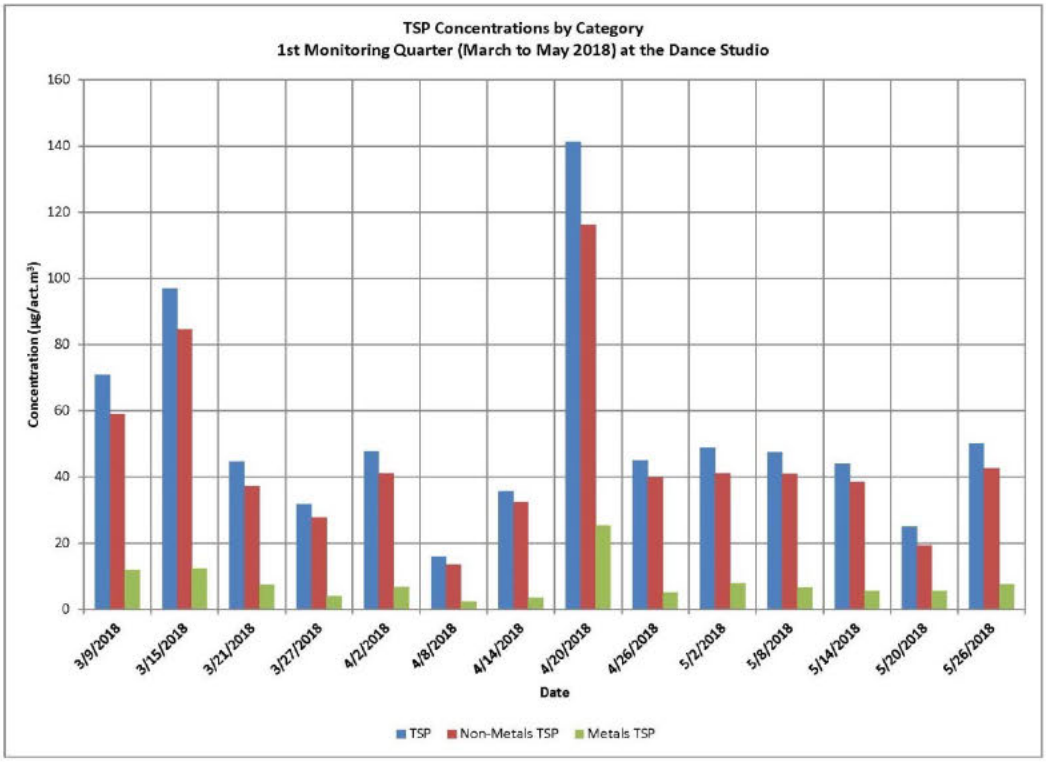
Table 2 presents the field blank results collected during the April 20 sample day, as well the detection limits for the metals. The concentrations were calculated by dividing the measured mass by this sample day volume. The blank showed a TSP concentration of 1.3 µg/act.m^3 (1.5 µg/std.m^3). Of the 22 metals, 12 were measured above their respective detection limits. The metal with the highest detection was

calcium at 499 µg (or 0.297 µg/act.m^3), followed by sodium at 488 µg (or 0.290 µg/act.m^3). The site technician noted extreme high winds on April 17 and stated that the wind blew the field blank outside the sampler. In addition, the lid was blown off one of the ballast-weight sand buckets next to the sampler. From the EVRAZ meteorological station, the average wind speed was 4.4 m/s (9.9 mph) for the time period when the field blank was on site, April 16 at ~1400 MST to April 23 at ~0800 MST; the maximum hourly wind speed at 13.1 m/s (29.3 mph), occurring on April 19 hour 20. A total of 22 hours had mean wind speeds greater than 9 m/s (20 mph).

The laboratory analyzed the filters for the monitoring quarter in three batches, with a sample media blank and method blank included with each analysis batch. For the first analysis batch which contained the samples March 9 to April 2, the sample media blank measured sodium at 475 µg/L and calcium at 131 µg/L; eight other metals were also detected. The method blank detected four metals: aluminum, calcium, potassium and sodium. For the second analysis batch which contained samples from April 8 to May 9, the sample media blank measured the metals sodium and calcium at 459 µg/L and 129 µg/L, respectively; eight other metals were also detected. The method blank did not detect any metals. For the third analysis batch which contained samples from May 14 to May 26, the metals sodium and calcium were measured on the sample media blank at 514 µg/L and 107 µg/L, respectively; nine other metals were also detected. The method blank showed two metals: aluminum and potassium. In general, the laboratory reported that the metals have been found in blank sample filter matrix in sporadic amounts. Results were not blank corrected for any of the batches.

The measured mass of TSP and potentially the metals on the field blank may be due to the exposure of the blank to the ambient environment with relatively high wind conditions for 48 hours out of 186 total hours of exposure. The metals found in the field blank also may also a result of the sporadic metals mass found in the filter media, as noted by the laboratory. No process or procedural errors are suspected for the sampling quarter.

Two wind roses are presented: one for the EVRAZ Steel Mill and one for the Pueblo Memorial Airport. The EVRAZ wind rose (Figure 4) is for the time period January to March 2018, while the Pueblo Airport rose (Figure 5) is for March to May 2018. For EVRAZ, the predominant winds are from the west-northwest at about 15% of the time, while for Pueblo Airport the predominant winds are from the east-southeast at just over 12% of the time.



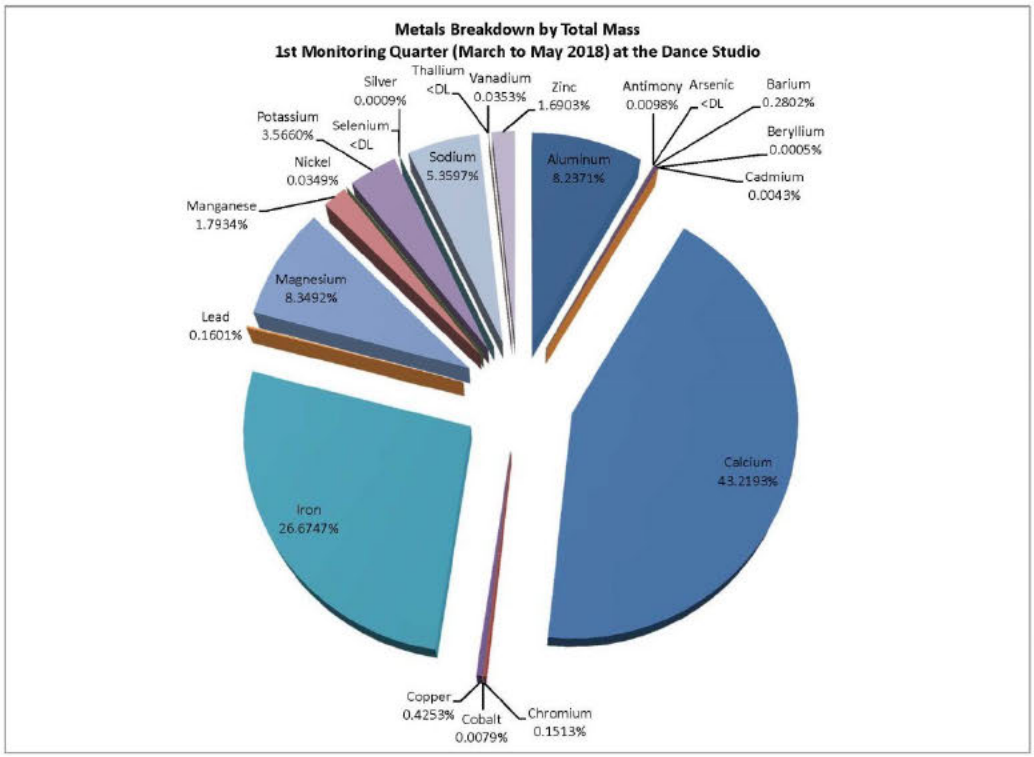


Figure 3 First Monitoring Quarter (March to May 2018) TSP and Metal Results. (top) Sample day results for TSP, metals and non-metals. (bottom) Quarterly mean mass percent for each metal.

Table 1
Statistical Summary of TSP and Metals Concentration for the First Monitoring Quarter
March to May 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

Pollutant/Metal	Mean (µg/actual m^3)	Maximum (µg/actual m^3)	Minimum (µg/actual m^3)	Number of Samples	Number of Non-detects
TSP[1]	61.0	161	18.2	14	0
TSP	53.2	141	15.7	14	0
Aluminum	6.52E-01	1.77E+00	1.85E-01	14	0
Antimony	1.36E-03	2.20E-03	7.89E-04	14	6
Arsenic	NA	NA	NA	14	14
Barium	2.22E-02	4.39E-02	6.33E-03	14	0
Beryllium	5.78E-05	1.02E-04	3.56E-05	14	5
Cadmium	3.99E-04	1.14E-03	7.35E-05	14	2
Calcium	3.42E+00	1.13E+01	8.16E-01	14	0
Chromium	1.20E-02	4.13E-02	3.16E-03	14	0
Cobalt	6.26E-04	1.57E-03	2.60E-04	14	0
Copper	3.37E-02	5.88E-02	1.16E-02	14	0
Iron	2.11E+00	7.26E+00	4.66E-01	14	0
Lead	1.27E-02	4.62E-02	3.00E-03	14	0
Magnesium	6.62E-01	2.25E+00	2.06E-01	14	0
Manganese	1.42E-01	4.49E-01	2.02E-02	14	0
Nickel	2.77E-03	9.46E-03	5.35E-04	14	0
Potassium	2.83E-01	6.19E-01	8.99E-02	14	0
Selenium	NA	NA	NA	14	14
Silver	1.01E-03	1.01E-03	1.01E-03	14	13
Sodium	4.24E-01	5.60E-01	3.14E-01	14	0
Thallium	NA	NA	NA	14	14
Vanadium	2.80E-03	8.15E-03	6.86E-04	14	0
Zinc	1.34E-01	9.22E-01	2.35E-02	14	0

1. Units in µg/std. m^3

Table 2
First Monitoring Quarter Field Blank Analysis Results
Dance Studio Sampler for Colorado Smelter Superfund Site
Pueblo, Colorado

	April 20, 2018 Field Blank[2]	
TSP/Metal	Field Blank (µg/actual m^3)	Detection Limit (µg/actual m^3)
TSP[1]	1.49	--
TSP	1.31	--
Aluminum	3.63E-02	7.26E-04
Antimony	< DL	7.26E-04
Arsenic	< DL	1.02E-03
Barium	1.87E-03	7.26E-05
Beryllium	< DL	2.91E-05
Cadmium	< DL	5.83E-05
Calcium	2.97E-01	1.46E-03
Chromium	2.27E-03	1.17E-04
Cobalt	< DL	7.26E-05
Copper	7.49E-04	7.26E-04
Iron	1.58E-01	1.02E-03
Lead	1.19E-03	7.26E-04
Magnesium	6.78E-02	2.91E-04
Manganese	9.10E-03	4.34E-05
Nickel	< DL	4.37E-04
Potassium	1.35E-02	7.26E-04
Selenium	< DL	2.18E-03
Silver	< DL	2.91E-04
Sodium	2.90E-01	8.74E-04
Thallium	< DL	1.46E-03
Vanadium	< DL	1.46E-04
Zinc	8.98E-03	4.37E-04

1. Units in µg/std. m^3
2. Concentrations based on the April 20 sample volume.

DL=Detection Limit

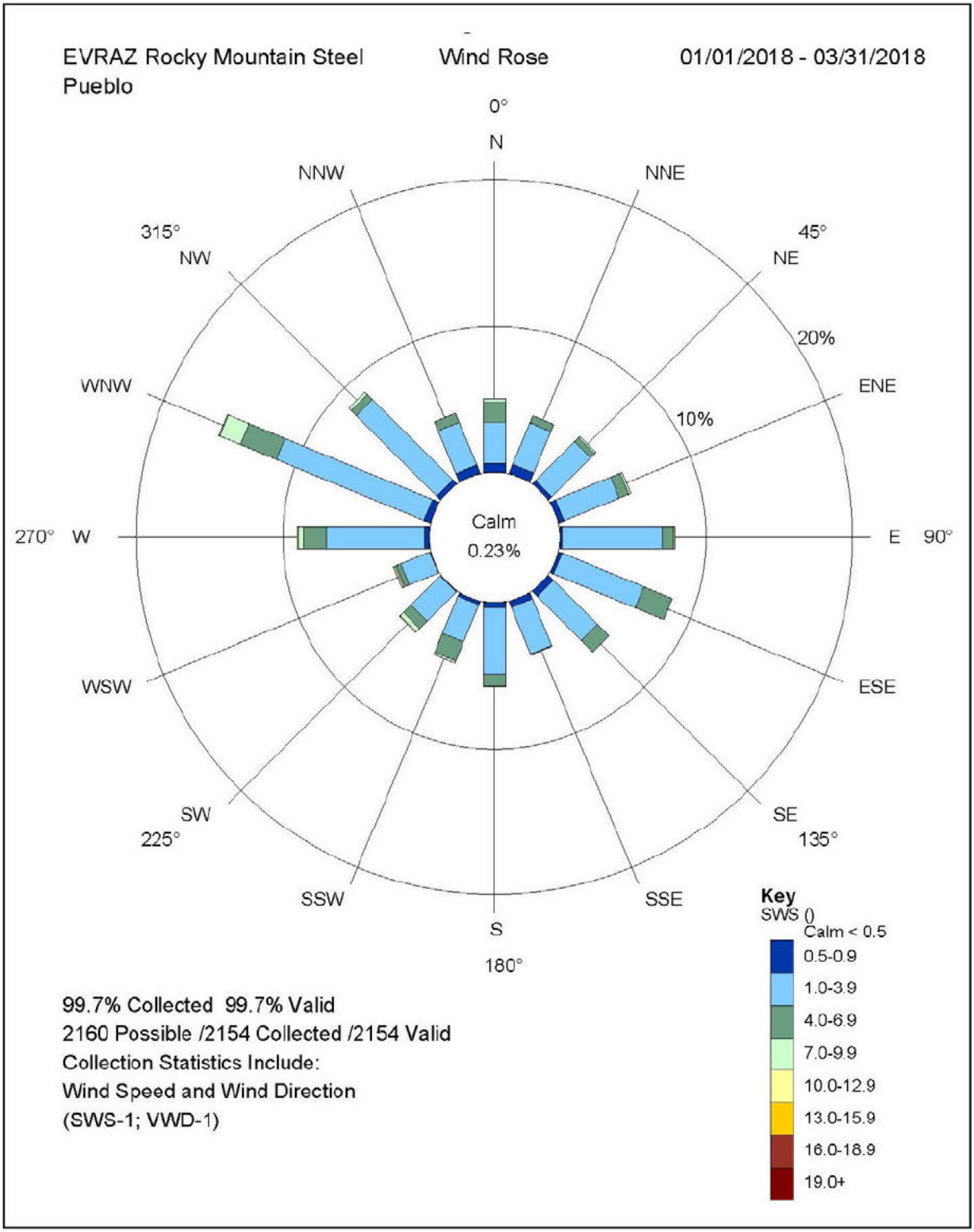


Figure 4 EVRAZ Rocky Mountain Steel Mill Wind Rose for January to March 2018

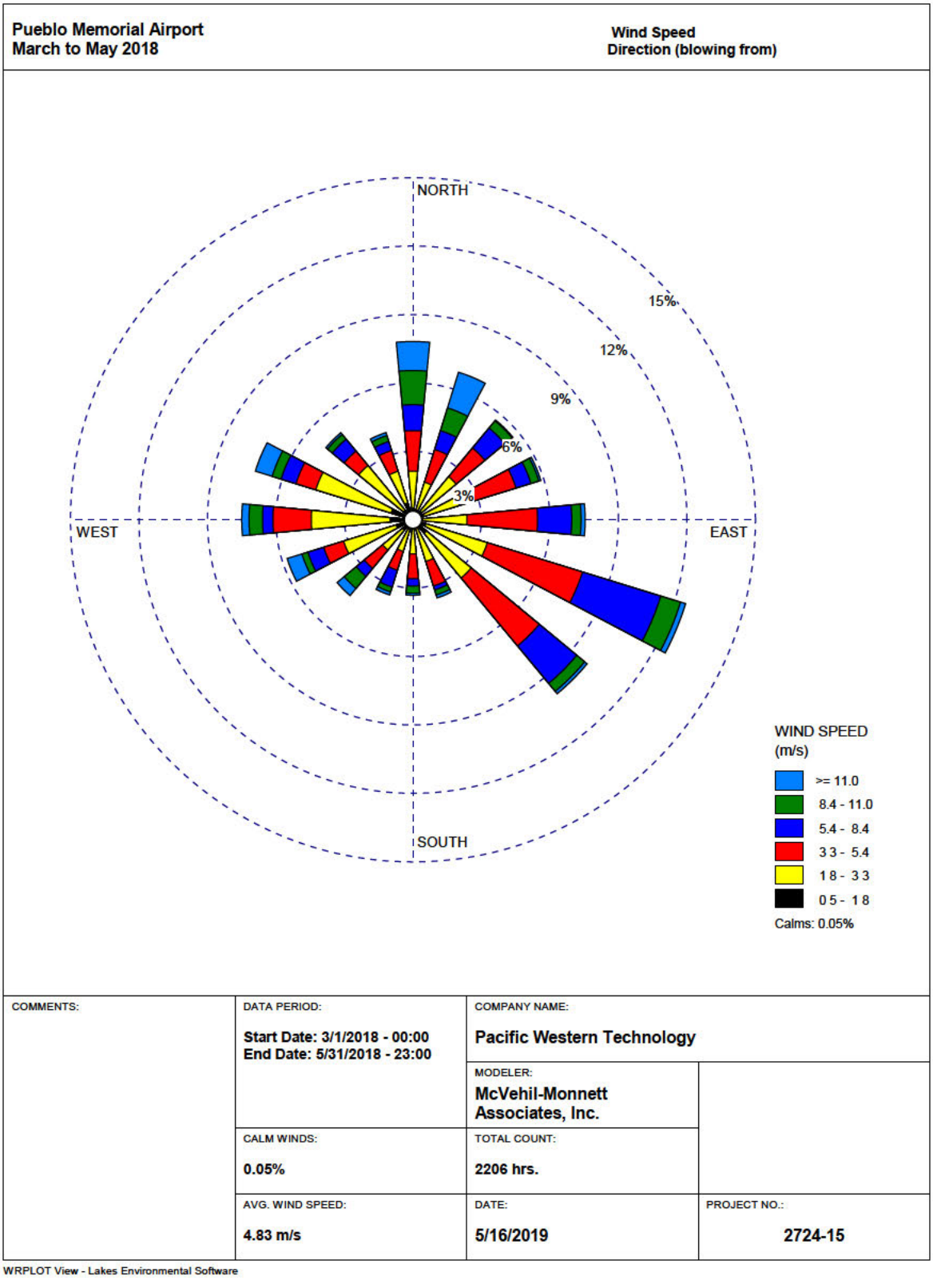


Figure 5 Pueblo Memorial Airport Wind Rose for March to May 2018

3.2 Second Monitoring Quarter – June to August 2018

The second monitoring quarter ran from June 1 to August 31, with 14 out of a possible 16 samples collected for a recovery rate of 87.5%. On the July 13 sample day, the cartridge cover for the filter sample was inadvertently left on, damaging the motor. As a result, no sample was collected for this day as well as the following sampling day of July 19. MMA installed a replacement motor and recalibrated the sampler on July 23. Tables B-4, B-5 and B-6 in Appendix B list the TSP and metals concentrations for each sampling day in June, July and August, respectively. Two field blanks were collected: one during the June 13 sampling event and the other during the August 12 sampling event.

Figure 6 summarizes the second monitoring quarter sampling results. Figure 6 (top) shows the sample day concentration results broken into the three categories: TSP, metals TSP and non-metals TSP. The analyzed metals are only a small portion (an approximate mean of 15%) of the TSP concentration, with non-metals representing the majority of TSP. Figure 6 (bottom) exhibits a mean quarterly breakdown of the individual metals as a percent of the total mass. Calcium and iron represent the largest portions, followed by aluminum, magnesium, and sodium. Collectively, these five metals represent over 90 percent of the metals mass.

Table 3 summarizes the monitoring quarter results, listing mean, maximum and minimum concentrations. The highest TSP concentration was 157 μg/act.m^3 (190 μg/std.m^3), occurring on June 13, while the mean for the period was 62.0 μg/act.m^3 (74.4 μg/std.m^3). The metal with the highest concentration was calcium at 11.1 μg/act.m^3, followed by iron at 6.35 μg/act.m^3 and magnesium at 2.46 μg/act.m^3. The maximum concentrations for calcium and magnesium also occurred on June 13, while the maximum iron concentration occurred on July 1. The metals arsenic and thallium were below their respective detection limits for all samples analyzed in the period. Silver was detected in only one sample.

Table 4 presents the June 13 and August 12 field blank results, cataloging the concentrations as well the detection limits for the metals. The TSP and metal concentrations were calculated by dividing the measured mass by the respective sample day volume. The field blank collected on June 13 measured TSP and metals. The TSP mass on the blank was 300 μg, which equates to a concentration of 0.18 μg/act.m^3 (0.21 μg/std.m^3), assuming the same volume as the June 13 sample. Of the 22 metals, 12 were measured above their respective detection limits. The metal with the highest detection was sodium at 538 μg (or 0.316 μg/act.m^3), followed by calcium at 185 μg (or 0.109 μg/act.m^3). The site technician did not note any special situation with this sample day. From the EVRAZ meteorological station, the average wind

speed was 3.5 m/s (7.9 mph) for the time period the field blank was on site, June 8 at ~800 MST to June 15 at ~800 MST; the maximum hourly wind speed was 11.2 m/s (25.0 mph), occurring on June 13 hour 17. A total of 4 hours had mean wind speeds greater than 9 m/s (20 mph).

The field blank collected on August 12 measured higher mass of TSP but lower mass of metals than the blank collected on June 13. The blank for August 12 showed a TSP mass of 2200 µg, which equates to a concentration of 1.3 µg/act.m^3 (1.5 µg/std.m^3), assuming the same volume as the August 12 sample. Of the 22 metals, 11 were measured above their respective detection limits. The metal with the highest mass was sodium at 396 µg (or 0.23 µg/act.m^3), followed by calcium at 138 µg (0.08 µg/act.m^3). The site technician noted smoke from the regional fires during the removal of the samples on August 16. From the EVRAZ meteorological station, the average wind speed for the time period the field blank was on site, August 8 at ~800 MST to August 16 at ~1100 MST, was 2.4 m/s (5.5 mph) and the maximum hourly wind speed was 6.2 m/s (13.9 mph), occurring on August 15 hour 16. No hourly mean wind speeds were greater than 9 m/s (20 mph).

The laboratory analyzed the filters for the monitoring quarter in two batches, and a sample media blank and method blank were included in each analysis batch. For the first analysis batch which contained the June 1 to June 19 samples, the metals sodium and calcium on the sample media blank measured at 514 µg/L and 107 µg/L, respectively; nine other metals were also detected. The method blank showed two metals: aluminum and potassium. For the second analysis batch which contained the June 25 to August 30 samples, the sample media blank measured the metals sodium at 449 µg/L and calcium at 104 µg/L; eight other metals were also detected. The method blank showed one metal: sodium. In general, the laboratory reported that the metals have been found in blank sample filter matrix in sporadic amounts. Results were not blank corrected for any of the analysis batches.

The measured mass of TSP, and potentially metals, on the field blank may be due to the exposure of the blank to the ambient environment with some potential high-wind conditions. The metals found in the field blank also may also a result of the sporadic metals mass found in the filter media, as noted by the laboratory. No process or procedural errors are suspected.

Two wind roses are presented: one for the EVRAZ Steel Mill (Figure 7) and one for the Pueblo Memorial Airport (Figure 8). The EVRAZ wind rose is for the time period April to June 2018, while the Pueblo Airport rose is for June to August 2018. For EVRAZ, the predominant winds are from the east-southeast and east at just over 10% each, while for Pueblo Airport, the predominant winds are from the southeast and east-southeast at 15% and 13%, respectively.

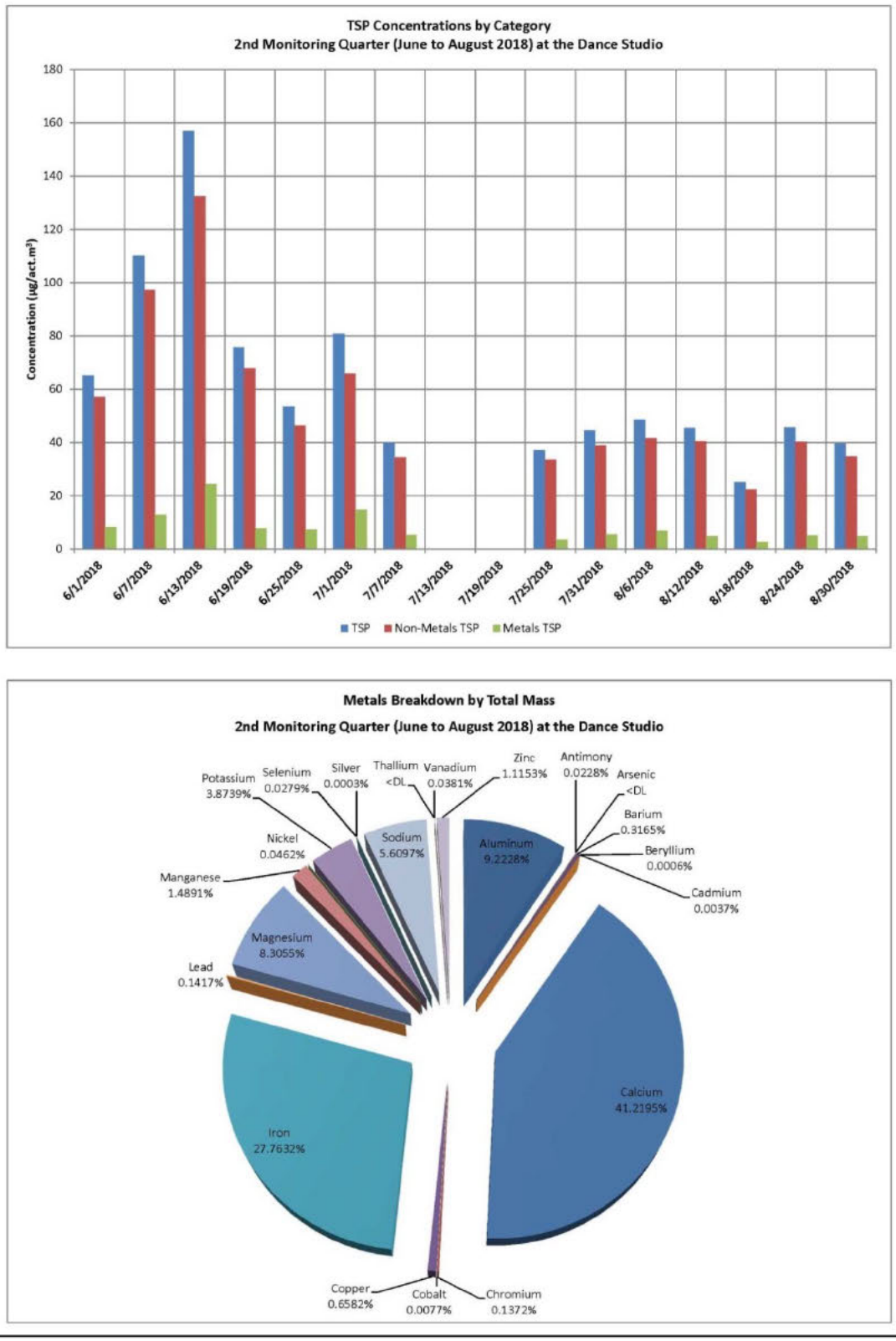


Figure 6 Second Monitoring Quarter (June to August 2018) TSP and Metal Results. (top) Sample day results for TSP, metals and non-metals. (bottom) Quarterly mean mass percent for each metal

Table 3
Statistical Summary of TSP and Metals Concentration for the Second Monitoring Quarter
June to August 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

Pollutant/Metal	Mean (µg/actual m^3)	Maximum (µg/actual m^3)	Minimum (µg/actual m^3)	Number of Valid Samples	Number of Non-detects
TSP[1]	74.4	190	29.7	14	0
TSP	62.0	157	25.1	14	0
Aluminum	7.56E-01	2.27E+00	2.00E-01	14	0
Antimony	2.60E-03	1.16E-02	1.02E-03	14	4
Arsenic	NA	NA	NA	14	14
Barium	2.59E-02	5.06E-02	1.08E-02	14	0
Beryllium	5.93E-05	1.16E-04	2.90E-05	14	3
Cadmium	3.31E-04	1.24E-03	8.25E-05	14	1
Calcium	3.38E+00	1.11E+01	9.29E-01	14	0
Chromium	1.12E-02	4.24E-02	3.21E-03	14	0
Cobalt	6.28E-04	1.44E-03	2.00E-04	14	0
Copper	5.37E-02	9.64E-02	2.24E-02	14	0
Iron	2.28E+00	6.35E+00	7.33E-01	14	0
Lead	1.16E-02	2.90E-02	2.92E-03	14	0
Magnesium	6.81E-01	2.46E+00	2.08E-01	14	0
Manganese	1.22E-01	4.69E-01	2.97E-02	14	0
Nickel	3.79E-03	1.90E-02	1.16E-03	14	0
Potassium	3.17E-01	6.87E-01	1.30E-01	14	0
Selenium	3.98E-03	5.91E-03	2.63E-03	14	6
Silver	3.33E-04	3.33E-04	3.33E-04	14	13
Sodium	4.59E-01	8.63E-01	3.05E-01	14	0
Thallium	NA	NA	NA	14	14
Vanadium	3.12E-03	1.01E-02	9.06E-04	14	0
Zinc	9.14E-02	2.43E-01	3.15E-02	14	0

1. Units in µg/std. m^3

DL=Detection Limit

Table 4
Second Monitoring Quarter Field Blank Analysis Results
Dance Studio Sampler for Colorado Smelter Superfund Site
Pueblo, Colorado

	June 13, 2018 Sample Day[2]		August 12, 2018 Sample Day[3]	
TSP/Metal	Field Blank (µg/actual m^3)	Detection Limit (µg/actual m^3)	Field Blank (µg/actual m^3)	Detection Limit (µg/actual m^3)
TSP[1]	0.21	--	1.5	--
TSP	0.18	--	1.3	--
Aluminum	1.64E-02	7.16E-04	7.43E-03	7.08E-04
Antimony	< DL	7.16E-04	< DL	7.08E-04
Arsenic	< DL	1.00E-03	< DL	9.92E-04
Barium	1.46E-03	7.16E-05	7.83E-04	7.08E-05
Beryllium	< DL	2.88E-05	< DL	2.84E-05
Cadmium	< DL	5.75E-05	< DL	5.69E-05
Calcium	1.09E-01	1.44E-03	8.01E-02	1.42E-03
Chromium	1.57E-03	1.15E-04	1.32E-03	1.14E-04
Cobalt	1.69E-04	7.16E-05	< DL	7.08E-05
Copper	< DL	7.16E-04	1.13E-03	7.08E-04
Iron	3.41E-02	1.00E-03	3.57E-02	9.92E-04
Lead	< DL	7.16E-04	< DL	7.08E-04
Magnesium	2.61E-02	2.87E-04	2.01E-02	2.84E-04
Manganese	2.19E-03	4.28E-05	8.93E-04	4.24E-05
Nickel	5.82E-04	4.31E-04	< DL	4.26E-04
Potassium	6.92E-03	7.16E-04	4.55E-03	7.08E-04
Selenium	< DL	2.15E-03	< DL	2.13E-03
Silver	< DL	2.87E-04	< DL	2.84E-04
Sodium	3.16E-01	8.63E-04	2.30E-01	8.53E-04
Thallium	< DL	1.44E-03	< DL	1.42E-03
Vanadium	< DL	1.44E-04	< DL	1.42E-04
Zinc	1.06E-03	4.31E-04	9.17E-04	4.26E-04

1. Units in µg/std. m^3
2. Concentration based on the June 13, 2018 sample volume.
3. Concentrations based on the August 12, 2018 sample volume.

DL=Detection Limit

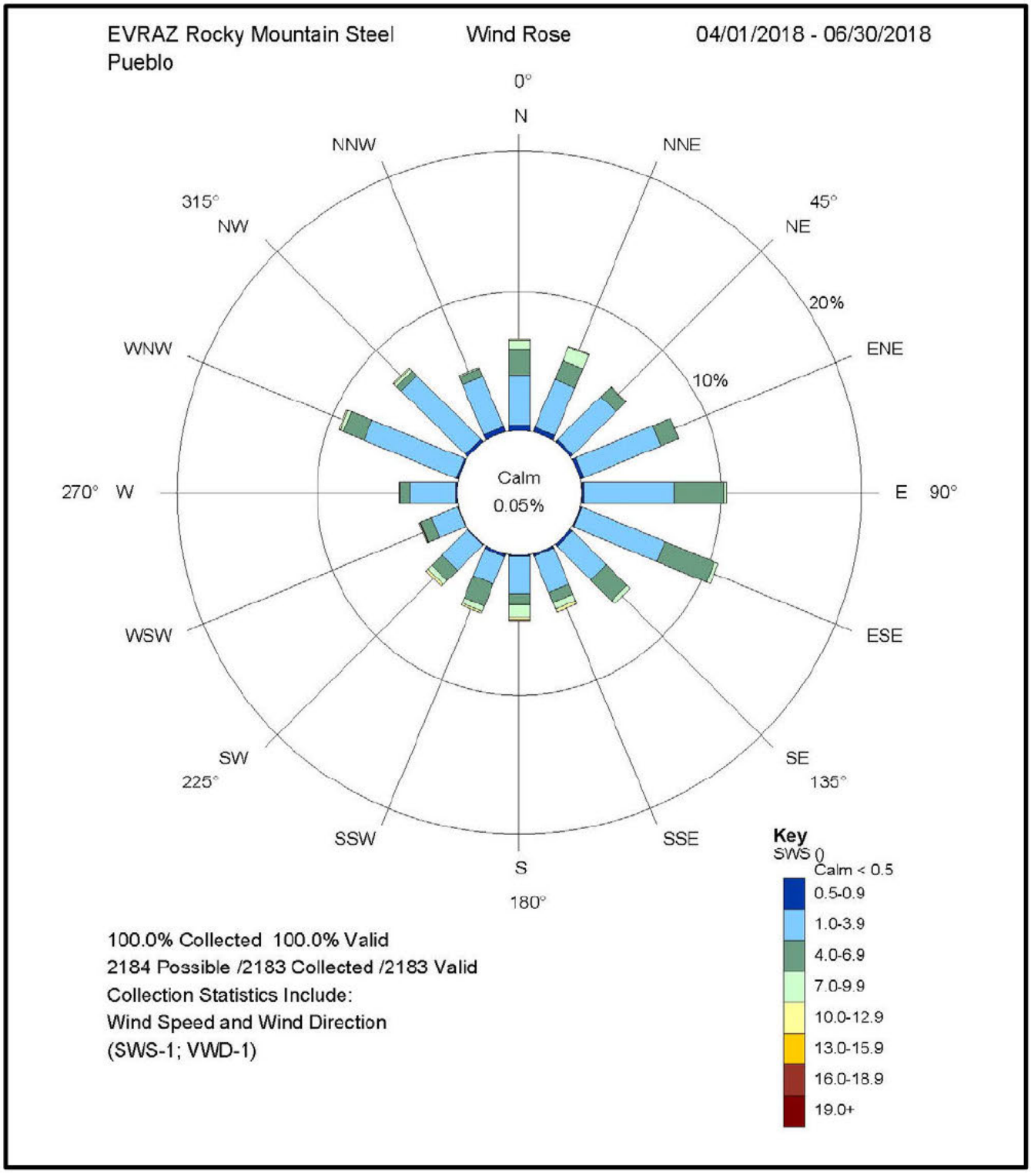


Figure 7 EVRAZ Rocky Mountain Steel Mill Wind Rose for April to June 2018

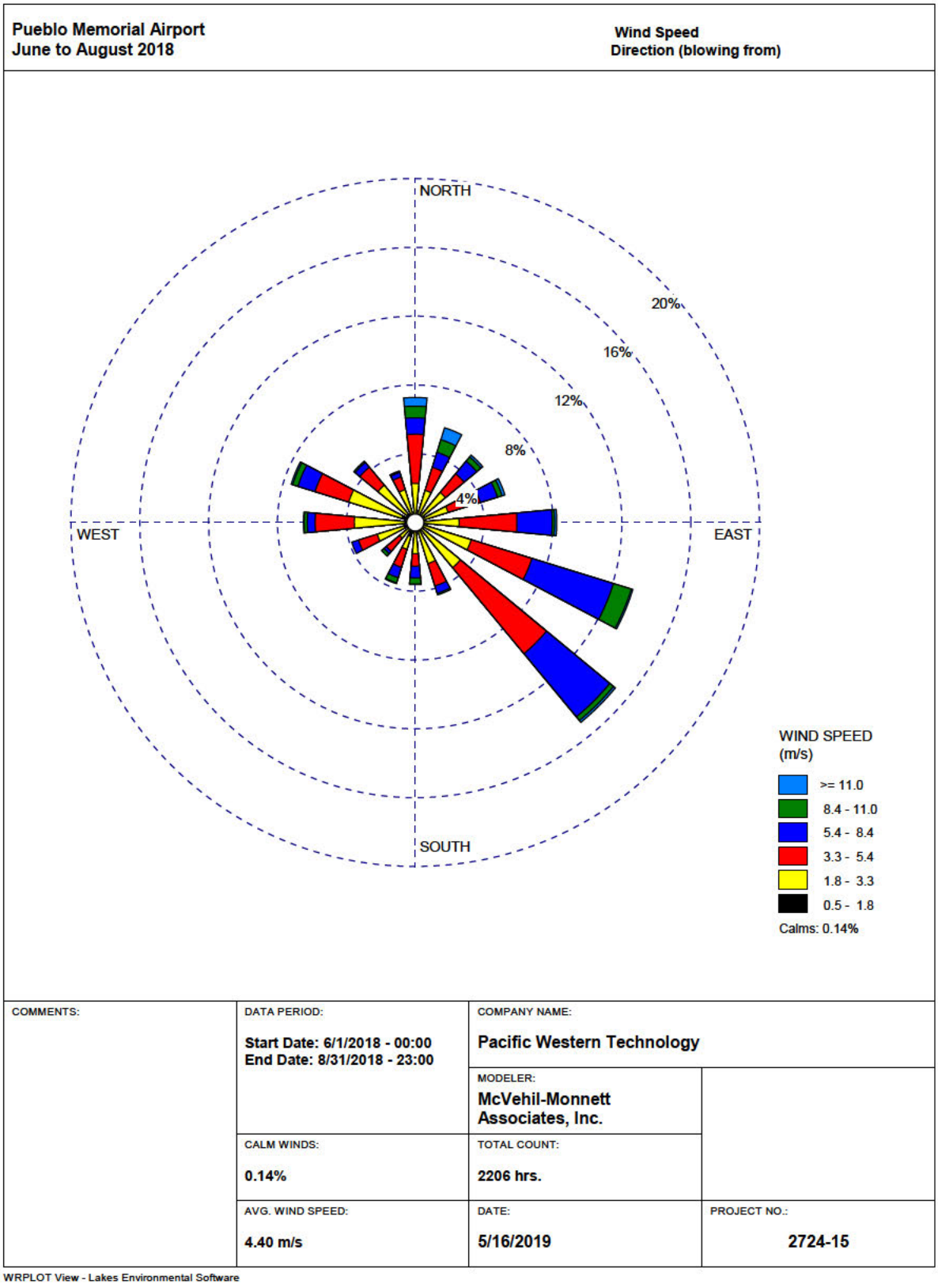


Figure 8 Pueblo Memorial Airport Wind Rose for June to August 2018

3.3 Third Monitoring Quarter – September to November 2018

The third monitoring quarter ran from September 1 to November 30, with 15 out of a possible 15 samples collected for a recovery rate of 100%. Tables B-7, B-8 and B-9 in Appendix B list the TSP and metals concentrations for each sampling day in September, October and November, respectively. One field blank was collected with the October 17, 2018 sample.

Figure 9 exhibits the third monitoring quarter sampling results. Figure 9 (top) displays the sample day concentrations broken into the three categories: TSP, metals TSP and non-metals TSP. The analyzed metals are only a small portion (an approximate mean of 15 percent) of the TSP concentration, with non-metals representing the majority of TSP. Figure 9 (bottom) depicts a mean quarterly breakdown of the individual metals as a percent of the total mass. Calcium and iron represented the largest portions of the metals, followed by aluminum, magnesium and sodium. Collectively, these five metals represent over 90% of the metals mass.

Table 5 summarizes the monitoring quarter results, listing mean, maximum and minimum concentrations. The highest TSP concentration was 100 μg/act.m^3 (117 μg/std.m^3), occurring on October 5, while the mean for the period was 43.1 μg/act.m^3 (50.0 μg/std.m^3). The metal with the highest concentration was calcium at 4.14 μg/act.m^3, followed by iron at 2.34 μg/act.m^3 and aluminum at 1.02 μg/act.m^3. The maximum concentrations for calcium and aluminum occurred on October 5, while iron occurred on November 16. The metals arsenic, silver and thallium were below their respective detection limits for all 15 samples analyzed in the quarter. Selenium was detected in only one sample.

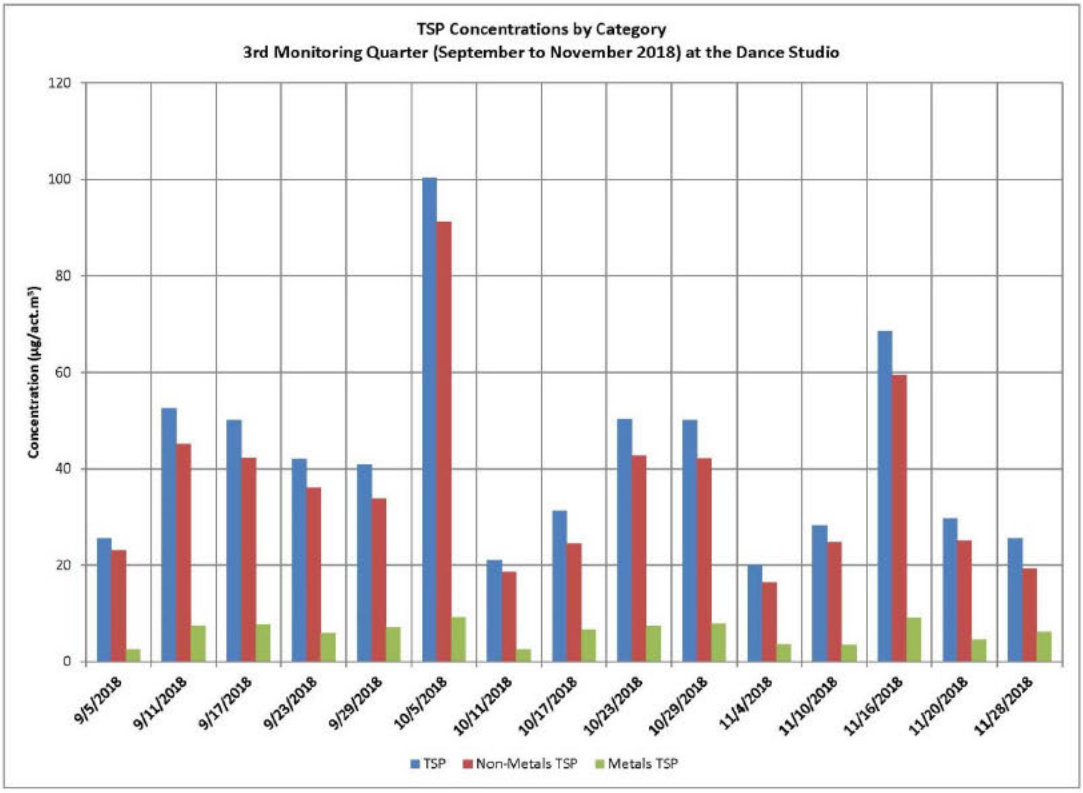
Table 6 presents the results for the October 17 field blank. This field blank measured a negative mass for TSP, but did measure metals. The TSP mass was -700 μg, which equates to a concentration of -0.41 μg/act.m^3 (-0.46 μg/std.m^3), assuming the October 17 sample volume. Of the 22 metals, 11 were measured above their respective detection limits. The metal with the highest detection was sodium at 425 μg (or 0.251 μg/act.m^3), followed by calcium at 130 μg (or 0.077 μg/act.m^3). The site technician did not note any special situation with this sample day. From the EVRAZ meteorological station, the average wind speed, was 2.0 m/s (4.5 mph) for the time period the field blank was on site, October 16 at ~800 MST to October 19 at ~0800 MST; the maximum hourly wind speed was 4.5 m/s (10.1 mph), occurring on October 17 hour 15. No hourly mean wind speeds were greater than 9 m/s (20 mph).

Chester analyzed the filters for the monitoring quarter in three batches, and a sample media blank and method blank were included with each analysis batch. For the first analysis batch which contained the

September 5 sample, the metals sodium at 449 µg/L and calcium at 104 µg/L were measured in the sample media blank; eight other metals were also detected. The method blank showed one metal: sodium. For the second analysis batch which consisted of the September 11 to November 22 samples, the metals sodium and calcium were measured in the sample media blank at 481 µg/L and 121 µg/L, respectively; nine other metals were also detected. The method blank showed one metal: calcium. For the third analysis batch which contained the November 28 sample, the metals sodium at 383 µg/L and calcium at 97.2 µg/L were measured in the sample media blank; eight other metals were also detected. The method blank showed one metal: sodium. In general, the laboratory reported that the metals have been found in blank sample filter matrix in sporadic amounts. Results were not blank corrected for any of the batches.

For the field blank, the measured negative TSP mass may be due to filter media loss from handling. The metals found on the field blank may be due to the exposure of the blank to the ambient environment. The detected metals may also a result of the sporadic metals mass found in the filter media. No process or procedural errors are suspected.

Two wind roses are presented: one for the EVRAZ Steel Mill (Figure 10) and one for the Pueblo Memorial Airport (Figure 11). The EVRAZ wind rose is for the time period July to September 2018, while the Pueblo Airport rose is for September to November 2018. For EVRAZ, the predominant winds are from the east-southeast and east at just over 12% each, while for Pueblo Airport, the predominant winds are from the west, east-southeast and southeast at about 12%, 11.5% and 11.5%, respectively.



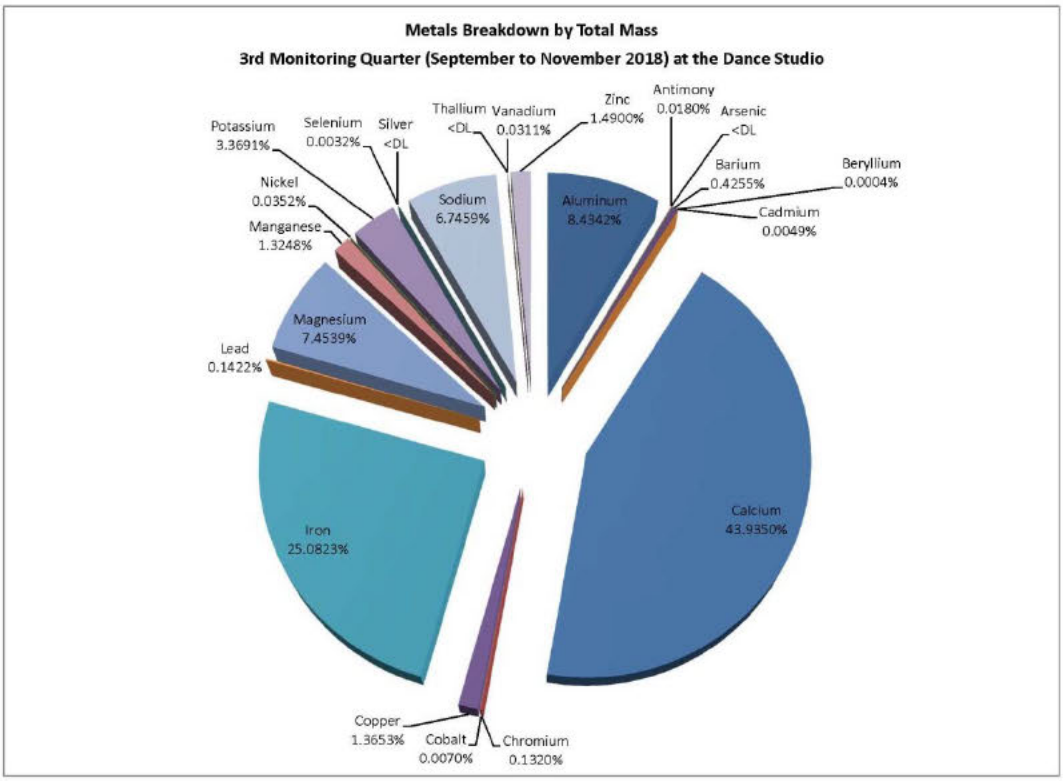


Figure 9 Third Monitoring Quarter (September to November 2018) TSP and Metal Results. (top) Sample day concentrations for TSP, metals and non-metals; and (bottom) quarterly mean percentage breakdown for each metal.

Table 5
Statistical Summary of TSP and Metals Concentration for the Third Monitoring Quarter
September to November 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

Pollutant/Metal	Mean (µg/actual m^3)	Maximum (µg/actual m^3)	Minimum (µg/actual m^3)	Number of Valid Samples	Number of Non-detects
TSP[1]	50.0	117	22.7	15	0
TSP	43.1	100	20.1	15	0
Aluminum	5.15E-01	1.02E+00	2.02E-01	15	0
Antimony	1.27E-03	3.12E-03	7.47E-04	15	2
Arsenic	NA	NA	NA	15	15
Barium	2.60E-02	5.72E-02	1.28E-02	15	0
Beryllium	4.28E-05	6.67E-05	3.11E-05	15	6
Cadmium	3.23E-04	5.37E-04	1.35E-04	15	1
Calcium	2.68E+00	4.14E+00	9.31E-01	15	0
Chromium	8.06E-03	1.33E-02	3.51E-03	15	0
Cobalt	4.27E-04	8.26E-04	2.08E-04	15	0
Copper	8.35E-02	1.37E-01	4.65E-02	15	0
Iron	1.53E+00	2.34E+00	5.82E-01	15	0
Lead	8.68E-03	1.66E-02	3.23E-03	15	0
Magnesium	4.55E-01	6.79E-01	1.74E-01	15	0
Manganese	8.09E-02	1.26E-01	2.95E-02	15	0
Nickel	2.15E-03	3.29E-03	1.05E-03	15	0
Potassium	2.06E-01	3.96E-01	7.71E-02	15	0
Selenium	2.96E-03	2.96E-03	2.96E-03	15	14
Silver	NA	NA	NA	15	15
Sodium	4.12E-01	6.91E-01	2.95E-01	15	0
Thallium	NA	NA	NA	15	15
Vanadium	1.90E-03	3.19E-03	7.53E-04	15	0
Zinc	9.09E-02	2.34E-01	2.35E-02	15	0

1. Units in µg/std. m^3

DL=Detection Limit

Table 6
Third Monitoring Quarter Field Blank Analysis Results
Dance Studio Sampler for Colorado Smelter Superfund Site
Pueblo, Colorado

	October 17, 2018 Sample Day[2]	
TSP/Metal	Field Blank (µg/actual m^3)	Detection Limit (µg/actual m^3)
TSP[1]	-0.46	--
TSP	-0.41	--
Aluminum	7.54E-03	7.19E-04
Antimony	< DL	7.19E-04
Arsenic	< DL	1.01E-03
Barium	5.64E-04	7.19E-05
Beryllium	< DL	2.89E-05
Cadmium	< DL	5.78E-05
Calcium	7.66E-02	1.44E-03
Chromium	1.36E-03	1.16E-04
Cobalt	< DL	7.19E-05
Copper	1.94E-03	7.19E-04
Iron	1.76E-02	1.01E-03
Lead	< DL	7.19E-04
Magnesium	2.00E-02	2.88E-04
Manganese	7.90E-04	4.30E-05
Nickel	< DL	4.33E-04
Potassium	4.37E-03	7.19E-04
Selenium	< DL	2.16E-03
Silver	< DL	2.88E-04
Sodium	2.51E-01	8.66E-04
Thallium	< DL	1.44E-03
Vanadium	< DL	1.44E-04
Zinc	7.84E-04	4.33E-04

1. Units in µg/std. m^3
2. Concentrations based on the October 17, 2018 sample volume.

DL=Detection Limit

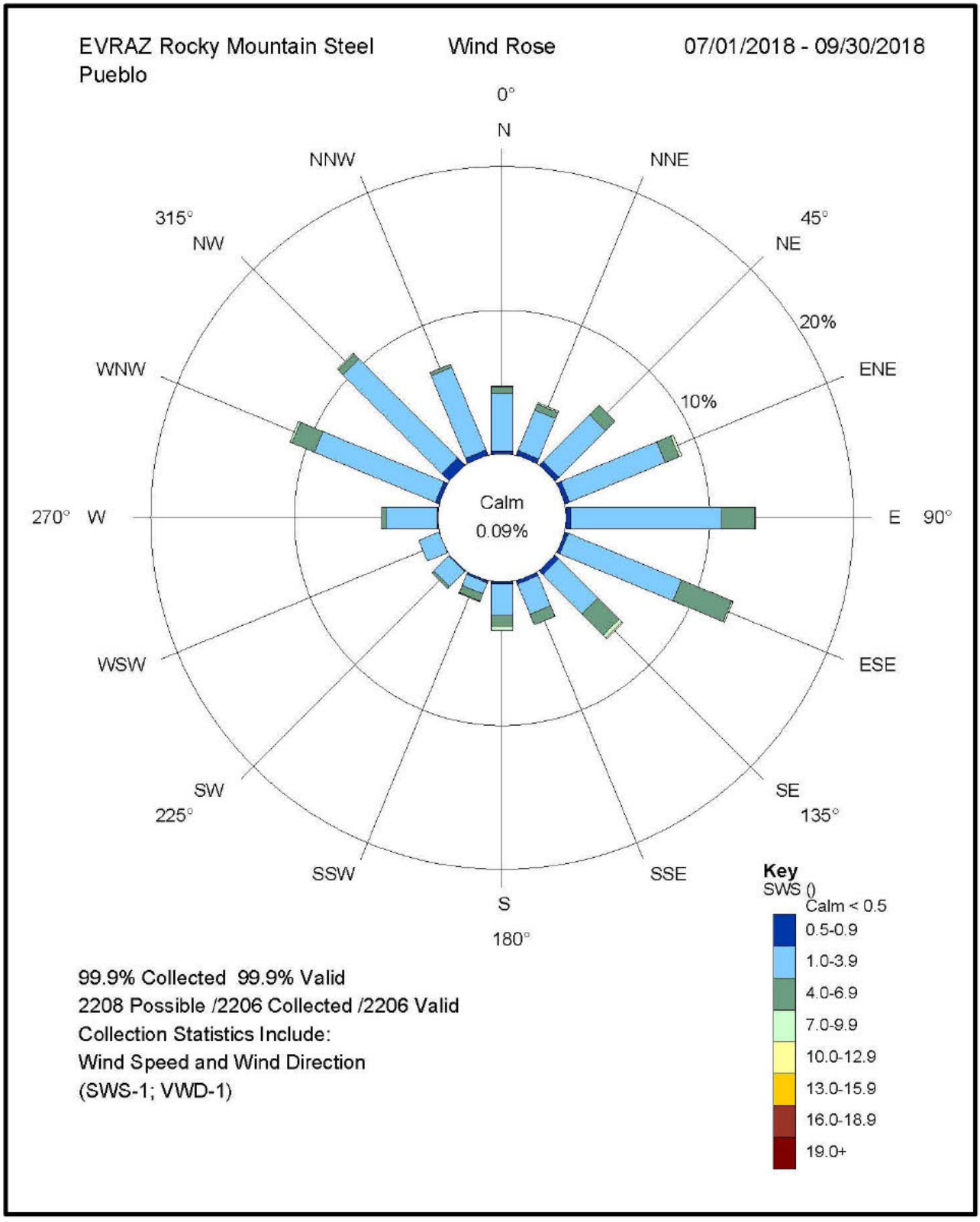


Figure 10 EVRAZ Rocky Mountain Steel Mill Wind Rose for July to September 2018

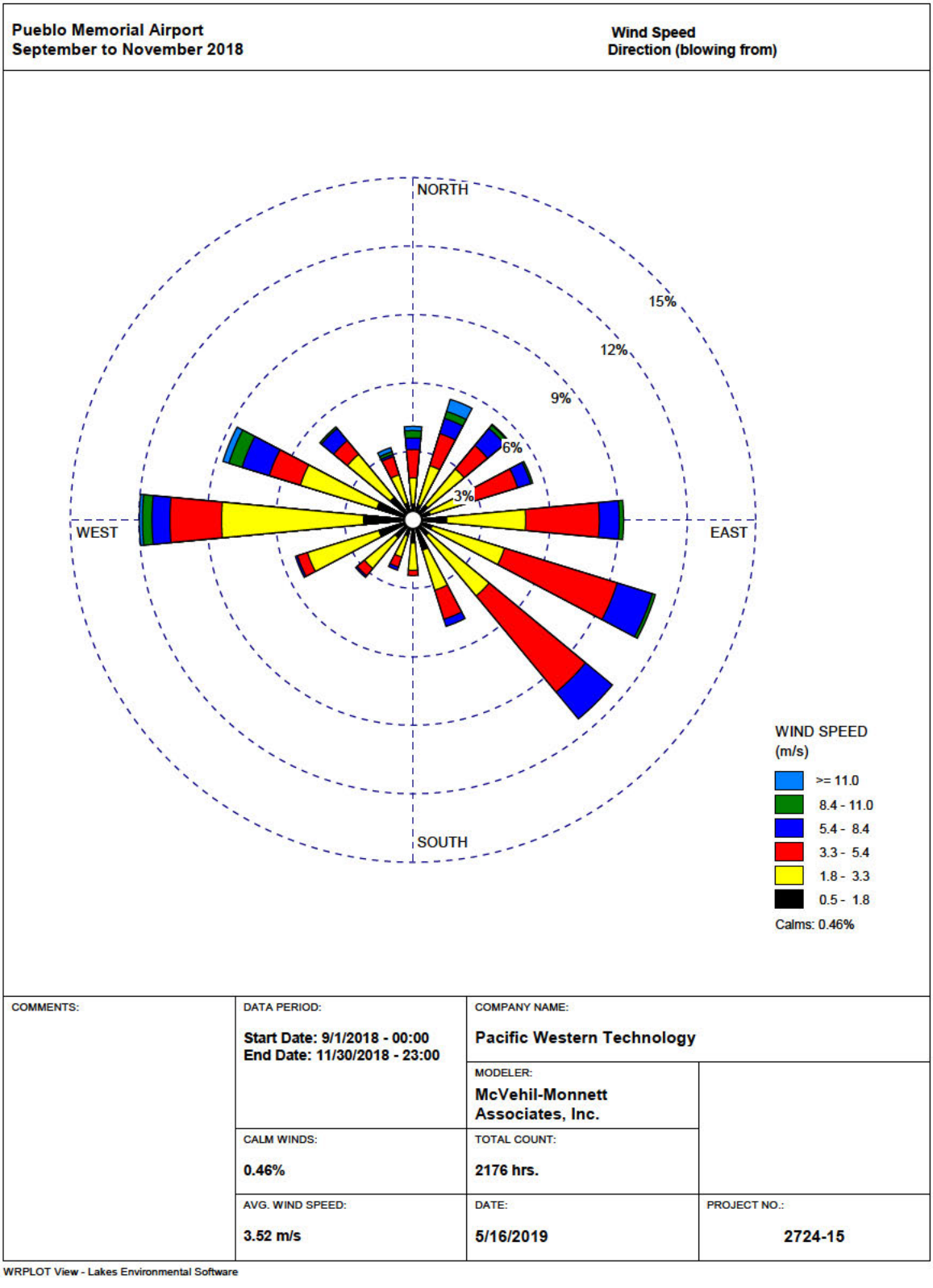


Figure 11 Pueblo Memorial Airport Wind Rose for September to November 2018

3.4 Fourth Monitoring Quarter – December 2018 to March 8, 2019

The fourth monitoring quarter ran from December 1, 2018 to March 8, 2019 with 16 out of a possible 16 samples collected for a recovery rate of 100%. Tables B-10, B-11 and B-12 in Appendix B list the TSP and metals concentrations for each sampling day in December 2018, January 2019 and February 2019 (plus March 4, 2019). Two field blanks were collected: one during the December 22 sampling event and the other during the February 20 sampling event.

Figure 12 displays the fourth monitoring quarter sampling results. Figure 12 (top) depicts the sample day concentrations broken into the three categories: TSP, metals TSP and non-metals TSP. The analyzed metals are only a small portion (a mean of approximately 15 percent) of the TSP concentration, with the non-metals representing the majority of TSP. Figure 12 (bottom) exhibits a mean quarterly breakdown of the individual metals as a percentage of the total mass. Calcium and iron represented the largest portions of the metals, followed by sodium, aluminum and magnesium. Collectively, these five metals represent over 90 percent of the metals mass.

Table 7 summarizes the monitoring quarter results, listing mean, maximum and minimum concentrations. The highest TSP concentration was 60.2 µg/act.m^3 (65.6 µg/std.m^3), occurring on December 10, while the mean for the period was 36.6 µg/act.m^3 (40.4 µg/std.m^3). The metal with the highest concentration was calcium at 3.96 µg/act.m^3, followed by iron at 2.85 µg/act.m^3 and sodium at 1.42 µg/act.m^3. The maximum concentration for calcium occurred on December 10, 2018, for iron on December 28, 2018, and for sodium on March 4, 2019. The metals arsenic, selenium and thallium were below their respective detection limits for all 16 samples analyzed in the monitoring quarter. Silver was detected on only one sample.

Table 8 lists the field blank results for December 22, 2018 and February 20, 2019. The December 20 field blank measured a negative mass for TSP, but did measure metals. The blank TSP mass was -2200 µg, which equates to a concentration of -1.3 µg/act.m^3 (-1.4 µg/std.m^3), assuming the December 20 sample volume. Of the 22 metals, 11 were measured above their respective detection limits. The metal with the highest detection was sodium at 533 µg (or 0.315 µg/act.m^3), followed by calcium at 224 µg (or 0.133 µg/act.m^3). The site technician did not note any special situation with this sample day. From the EVRAZ meteorological station, the average wind speed was 2.3 m/s (5.2 mph) for the time period the field blank was on site, December 20 at ~1400 MST to December 26 at ~1100 MST; the maximum hourly wind speed was 8.6 m/s (19.2 mph), occurring on December 21 hour 13. No hourly mean wind speeds were greater than 9 m/s (20 mph).

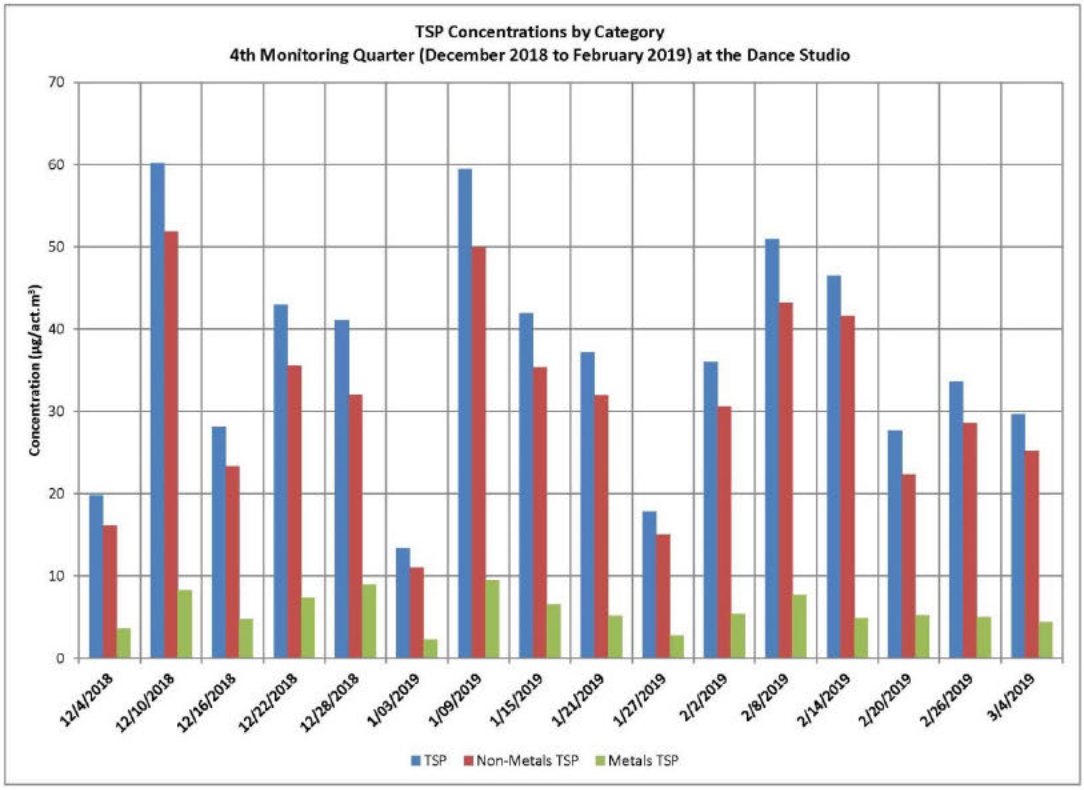
The February 20 field blank measured a negative mass for TSP, but did measure metals. The blank TSP mass was -2700 µg, which equates to a concentration of -1.7 µg/act.m^3 (-1.8 µg/std.m^3), assuming the February 20 sample volume. The laboratory noted that a filter corner piece was missing. Of the 22 metals, 11 were measured above their respective detection limits. The metal with the highest detection was sodium at 419 µg (or 0.259 µg/act.m^3), followed by calcium at 153 µg (or 0.0945 µg/act.m^3). The site technician did not note any special situation with this sample day. From the Pueblo Memorial Airport meteorological station (EVRAZ data are not available as of the writing of this document), the average wind speed was 2.4 m/s (5.4 mph) for the period when the field blank was on site (February 19 at ~1200 MST to February 21 at ~1100 MST); the maximum hourly wind speed was 4.7 m/s (10.5 mph), occurring on February 19 hour ending 18. No hourly mean wind speeds were greater than 9 m/s (20 mph).

Chester analyzed the filters for the monitoring quarter in three batches, and a sample media blank and a method blank were included with each analysis batch. For the first analysis batch which contained the December 4 and 10 samples, the metals sodium and calcium were measured in the sample media blank at 383 µg/L and 97.2 µg/L, respectively; eight other metals were also detected. The method blank showed one metal: sodium. For the second analysis batch which consisted of the December 16 to February 8 samples, the metals sodium and calcium were measured in the sample media blank at 483 µg/L and 128 µg/L, respectively; eight other metals were also detected. The method blank showed three metals: aluminum, calcium and sodium. For the third analysis batch which contained the February 14 to March 4 samples, the metals sodium and calcium were measured in the sample media blank at 483 µg/L and 96.8 µg/L, respectively; eight other metals were also detected. The method blank showed three metals: aluminum, calcium and sodium. In general, the laboratory reported that the metals have been found in blank sample filter matrix in sporadic amounts. Results were not blank corrected.

For the December 22 field blank, the measured negative TSP mass may be due to filter media loss from handling, while for the February 22 field blank the negative TSP mass is caused by a corner piece missing from the filter. The metals found on both field blanks may be due to the exposure of the blank to the ambient environment. The detected metals may also a result of the sporadic metals mass found in the filter media. No process or procedural errors are suspected.

Two wind roses are presented: one for the EVRAZ Steel Mill (Figure 13) and one for the Pueblo Memorial Airport (Figure 14). The EVRAZ wind rose is for the time period October to December 2018, while the Pueblo Airport rose is for December 2018 to March 4, 2019. For EVRAZ, the predominant winds are from the west-northwest at about 17% and northwest at about 11%, while for Pueblo Airport,

the predominant winds are from the west at just above 12%, west-northwest at about 11% and east-southeast at about 11%.



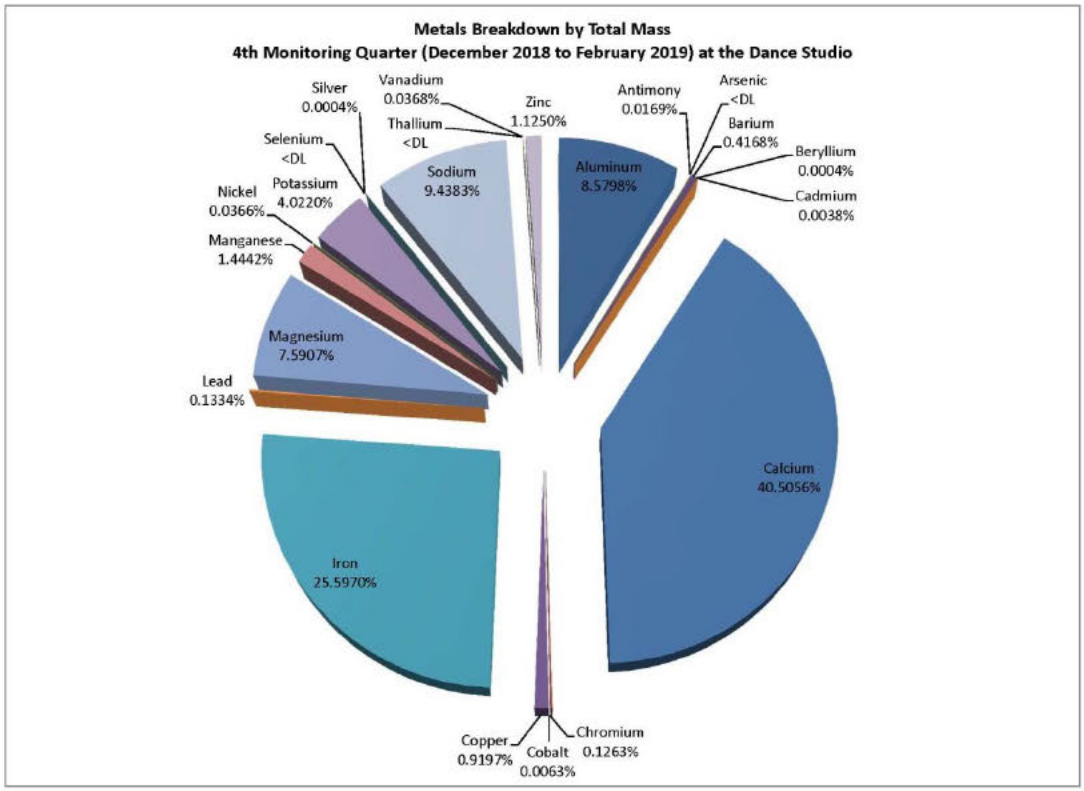


Figure 12 Fourth Monitoring Quarter (December 2018 to February 2019) TSP and Metal Results. (top) Sample day concentrations for TSP, metals and non-metals; and (bottom) quarterly mean percentage breakdown for each metal.

Table 7
Statistical Summary of TSP and Metals Concentration for the Fourth Monitoring Quarter
December 2018 to February 2019 (Plus March 4, 2019)
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

Pollutant/Metal	Mean (µg/actual m^3)	Maximum (µg/actual m^3)	Minimum (µg/actual m^3)	Number of Valid Samples	Number of Non-detects
TSP[1]	40.4	65.6	14.6	16	0
TSP	36.6	60.2	13.4	16	0
Aluminum	4.94E-01	1.02E+00	1.70E-01	16	0
Antimony	1.95E-03	4.36E-03	7.75E-04	16	8
Arsenic	NA	NA	NA	16	16
Barium	2.40E-02	4.85E-02	1.11E-02	16	0
Beryllium	4.05E-05	5.70E-05	3.22E-05	16	6
Cadmium	2.22E-04	8.01E-04	8.46E-05	16	0
Calcium	2.34E+00	3.96E+00	7.56E-01	16	0
Chromium	7.30E-03	1.88E-02	2.22E-03	16	0
Cobalt	3.64E-04	6.29E-04	1.36E-04	16	0
Copper	5.30E-02	9.56E-02	1.80E-02	16	0
Iron	1.48E+00	2.85E+00	4.91E-01	16	0
Lead	7.71E-03	1.45E-02	1.92E-03	16	0
Magnesium	4.38E-01	9.21E-01	1.51E-01	16	0
Manganese	8.34E-02	2.21E-01	1.41E-02	16	0
Nickel	2.11E-03	4.15E-03	9.17E-04	16	0
Potassium	2.32E-01	4.47E-01	8.52E-02	16	0
Selenium	NA	NA	NA	16	16
Silver	3.78E-04	3.78E-04	3.78E-04	16	15
Sodium	5.47E-01	1.42E+00	3.75E-01	16	0
Thallium	NA	NA	NA	16	16
Vanadium	2.12E-03	3.76E-03	6.19E-04	16	0
Zinc	6.50E-02	1.23E-01	1.54E-02	16	0

1. Units in µg/std. m^3

DL=Detection Limit

Table 8
Fourth Monitoring Quarter Field Blank Analysis Results
Dance Studio Sampler for Colorado Smelter Superfund Site
Pueblo, Colorado

	December 22, 2018 Sample Day[2]		February 20, 2019 Sample Day[3]	
TSP/Metal	Field Blank (µg/actual m^3)	Detection Limit (µg/actual m^3)	Field Blank (µg/actual m^3)	Detection Limit (µg/actual m^3)
TSP[1]	-1.4	--	-1.8	--
TSP	-1.3	--	-1.7	--
Aluminum	2.61E-02	2.17E-03	1.70E-02	2.266E-03
Antimony	< DL	7.22E-04	< DL	7.533E-04
Arsenic	< DL	1.01E-03	< DL	1.056E-03
Barium	7.58E-04	7.22E-05	8.27E-04	7.533E-05
Beryllium	< DL	2.90E-05	< DL	3.025E-05
Cadmium	< DL	5.80E-05	< DL	6.051E-05
Calcium	1.33E-01	1.45E-03	9.45E-02	1.513E-03
Chromium	1.44E-03	1.16E-04	1.20E-03	1.210E-04
Cobalt	< DL	7.22E-05	< DL	7.533E-05
Copper	3.74E-03	7.22E-04	2.54E-03	7.533E-04
Iron	4.39E-02	1.01E-03	1.62E-02	1.056E-03
Lead	< DL	7.22E-04	< DL	7.533E-04
Magnesium	2.83E-02	2.89E-04	1.84E-02	3.019E-04
Manganese	1.73E-03	4.32E-05	6.30E-04	4.507E-05
Nickel	< DL	4.34E-04	< DL	4.532E-04
Potassium	1.30E-02	7.22E-04	6.24E-03	7.533E-04
Selenium	< DL	2.17E-03	< DL	2.266E-03
Silver	< DL	2.89E-04	< DL	3.019E-04
Sodium	3.15E-01	8.70E-04	2.59E-01	9.076E-04
Thallium	< DL	1.45E-03	< DL	1.513E-03
Vanadium	< DL	1.45E-04	< DL	1.513E-04
Zinc	1.76E-03	4.34E-04	1.34E-03	4.532E-04

1. Units in µg/std. m^3
2. Concentration based on the December 22, 2018 sample volume.
3. Concentration based on the February 20, 20119 sample volume.

DL=Detection Limit

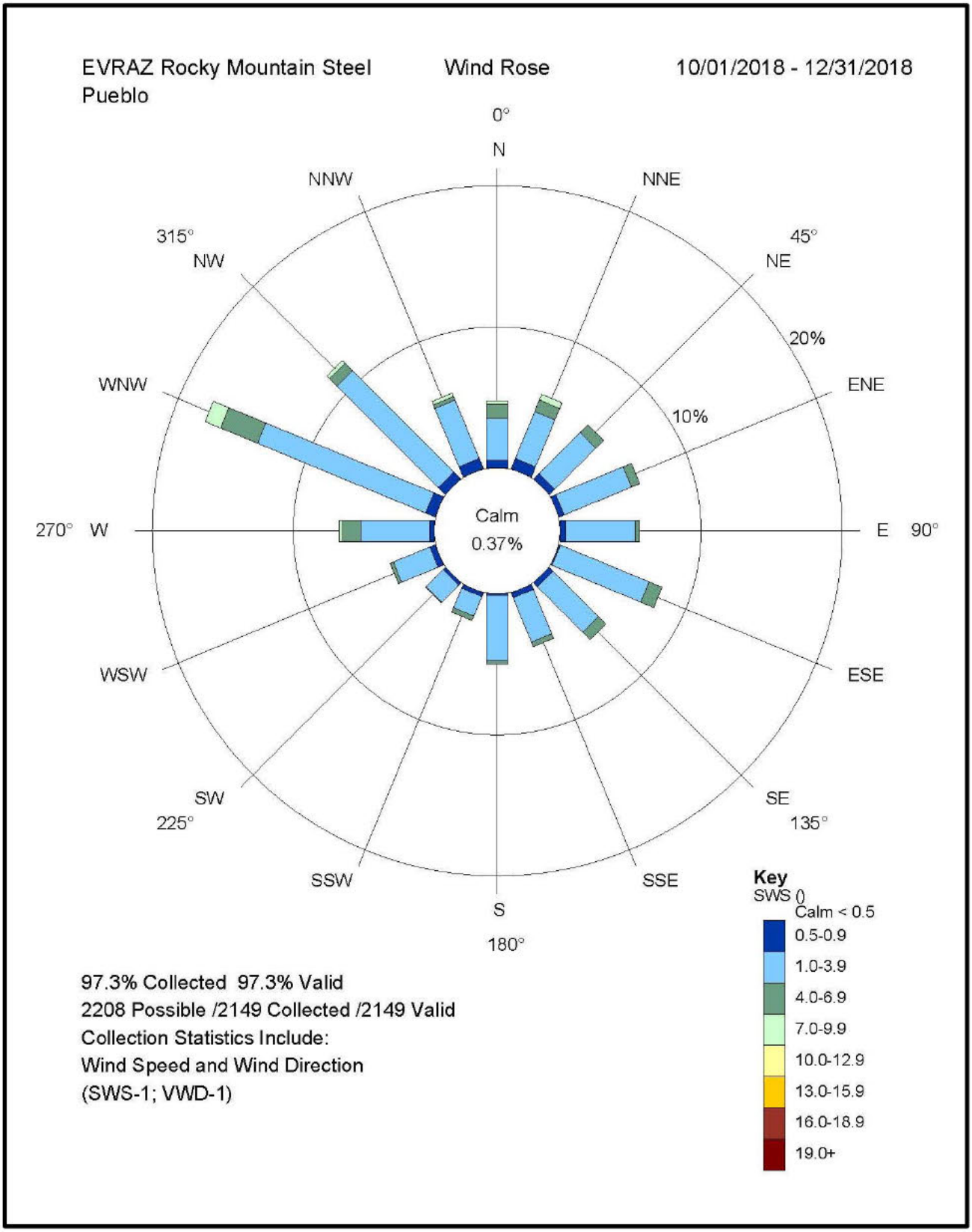


Figure 13 EVRAZ Rocky Mountain Steel Mill Wind Rose for October to December 2018

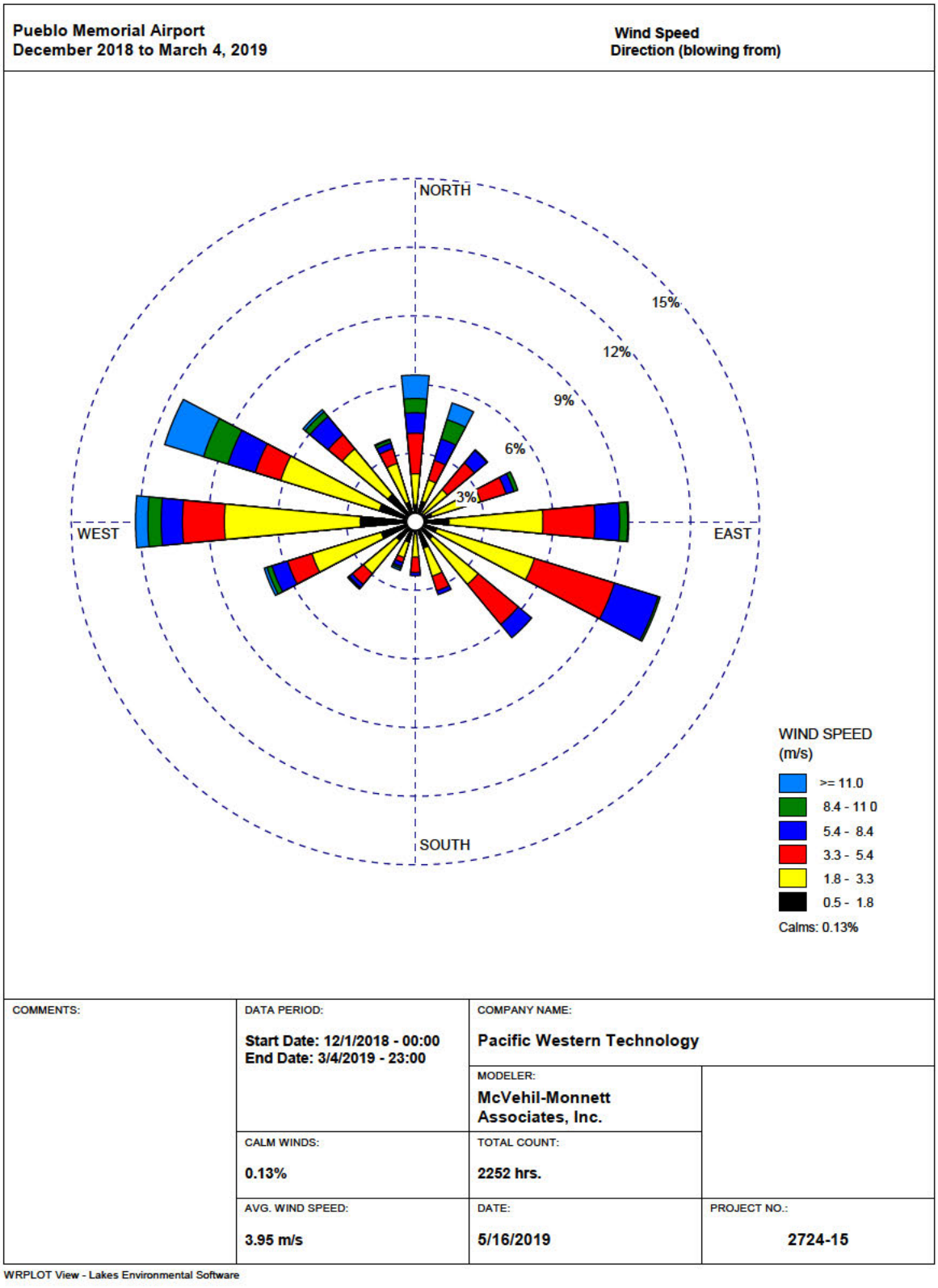


Figure 14 Pueblo Memorial Airport Wind Rose for December 2018 to March 4, 2019

4.0 Maximum TSP Concentration Sampling Day Analysis

This section provides a detailed analysis for the top five TSP concentration days over the monitoring year, looking at both the meteorology on the sampling day as well as excavation activities, if any.

The EVRAZ meteorology on the sampling day is compared to the five-year data set (2013 to 2017) collected at the steel mill. Figure 15 displays the five-year wind rose. The predominant winds were from the west-northwest at nearly 16% and the mean wind speed was 2.69 m/s (6.0 mph).

4.1 Top Five TSP Concentration Sampling Days

Over the monitoring year, five days measured TSP concentrations greater than 100 µg/std-m^3: March 15, April 20, June 7, June 13 and October 5, 2018. Table 9 lists TSP and metals concentrations for these sampling days. The metals distribution for these five sample days is consistent with the quarterly distributions discussed previously, with the largest percentage of metals being calcium, followed by iron, aluminum and magnesium.

Excavation occurred at surrounding properties throughout the sampling period, with specific data available only from February through June 2018, as provided by PWT. Table 10 lists the activities that occurred for sampling days March 15, April 20 and June 13. No excavation activities occurred during the June 7 sampling day, and no information is available for activities that occurred on the October 15 sample day.

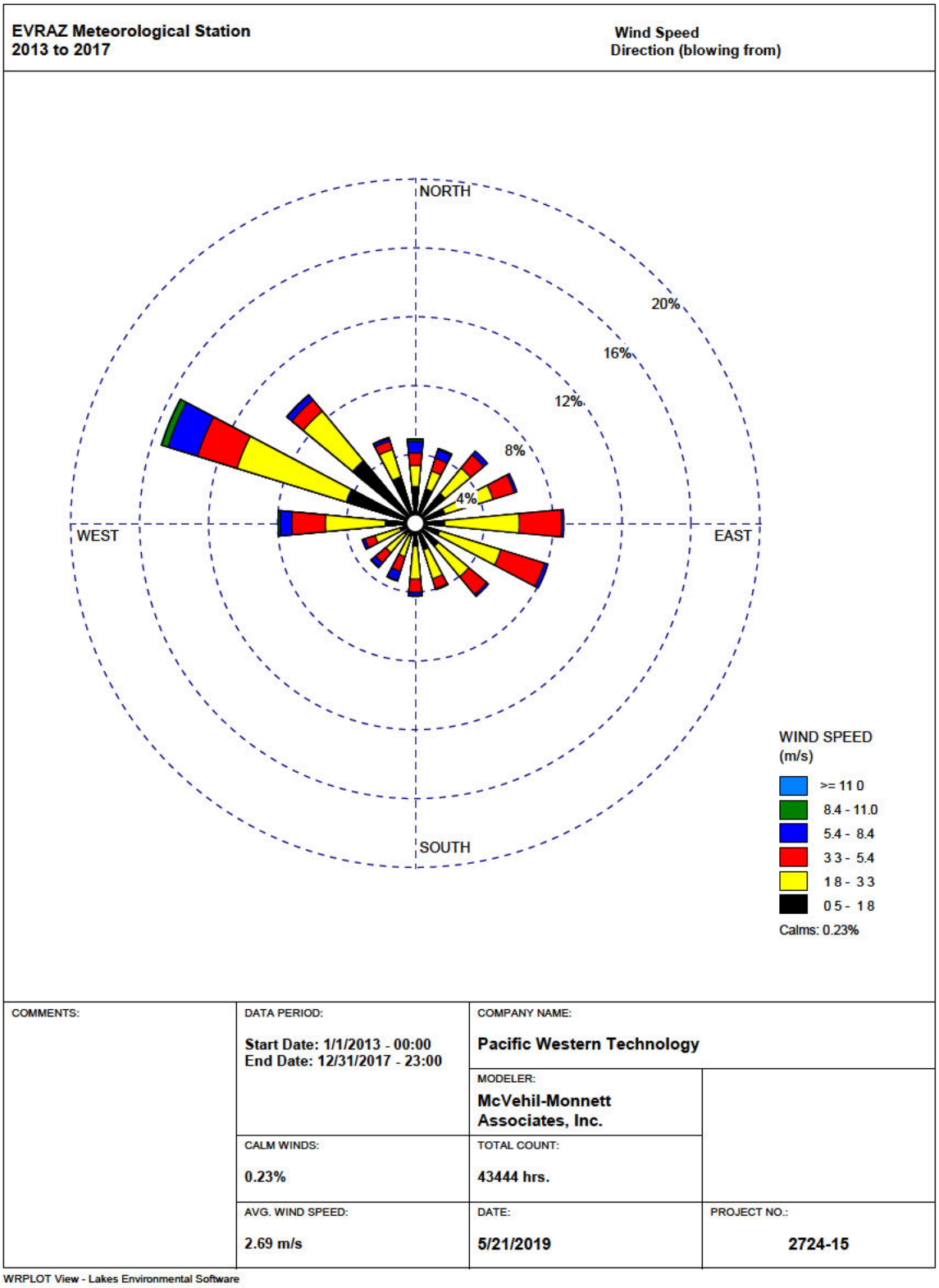


Figure 15 Wind Rose for EVRAZ Steel Mill for 2013 to 2017

Table 9
Five Maximum TSP Concentration Days for the Monitoring Year
March 5, 2018 to March 4, 2019
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/m^3)					
Sample Date	3/15/2018	4/20/2018	6/7/2018	6/13/2018	10/5/2018	
Filter Number	18-Q24	18-Q30	18-Q38	18-Q39	18-Q495	Average
TSP[1]	112	161	132	190	117	142.5
TSP	96.8	141	110	157	100	121.2
Aluminum	1.09E+00	1.77E+00	1.56E+00	2.27E+00	1.02E+00	1.54E+00
Antimony	2.20E-03	1.79E-03	< DL	< DL	1.53E-03	1.84E-03
Arsenic	< DL	< DL	< DL	< DL	< DL	NA
Barium	3.88E-02	4.39E-02	4.02E-02	5.06E-02	3.43E-02	4.16E-02
Beryllium	9.19E-05	1.02E-04	7.98E-05	0.000108	6.67E-05	8.97E-05
Cadmium	6.76E-04	1.14E-03	6.75E-04	1.24E-03	4.43E-04	8.36E-04
Calcium	5.66E+00	1.13E+01	5.28E+00	1.11E+01	4.14E+00	7.50E+00
Chromium	1.49E-02	4.13E-02	1.41E-02	4.24E-02	7.55E-03	2.40E-02
Cobalt	9.25E-04	1.57E-03	1.04E-03	1.44E-03	6.91E-04	1.13E-03
Copper	3.27E-02	5.66E-02	4.14E-02	5.80E-02	8.02E-02	5.38E-02
Iron	3.16E+00	7.26E+00	3.22E+00	6.22E+00	2.22E+00	4.42E+00
Lead	1.97E-02	4.62E-02	2.02E-02	2.90E-02	1.66E-02	2.63E-02
Magnesium	9.84E-01	2.25E+00	1.07E+00	2.46E+00	6.79E-01	1.49E+00
Manganese	1.50E-01	4.49E-01	1.68E-01	4.69E-01	9.95E-02	2.67E-01
Nickel	3.84E-03	9.46E-03	4.19E-03	6.75E-03	2.78E-03	5.40E-03
Potassium	5.87E-01	6.19E-01	5.43E-01	6.87E-01	3.96E-01	5.66E-01
Selenium	< DL	< DL	< DL	< DL	< DL	NA
Silver	< DL	1.01E-03	< DL	< DL	< DL	1.01E-03
Sodium	4.41E-01	4.85E-01	7.04E-01	8.63E-01	3.80E-01	5.75E-01
Thallium	< DL	< DL	< DL	< DL	< DL	NA
Vanadium	4.63E-03	8.15E-03	5.41E-03	1.01E-02	3.19E-03	6.29E-03
Zinc	8.12E-02	9.22E-01	1.57E-01	2.43E-01	9.25E-02	2.99E-01

1. Units in µg/std. m^3

DL=Detection Limit

Table 10
Excavation Activities during High Concentration Sampling Days

Property ID	Address	Excavation Depth	Excavation		Corresponding Sample Date
			Started	Complete	
PC1555	[redacted]	12"	3/15/2018	3/19/2018	3/15/2018
PC1578	[redacted]	18"	3/15/2018	3/27/2018	
PC0337	[redacted]	18"	4/20/2018	4/23/2018	4/20/2018
PC1220	[redacted]	12"	4/18/2018	4/23/2018	
PC1566	[redacted]	12" & Interior	6/11/2018	6/13/2018	6/13/2018
PC2016	[redacted]	12"	6/11/2018	6/13/2018	
PC2017	[redacted]	12"	6/11/2018	6/13/2018	

4.1.1 March 15 Sampling Day

The TSP concentration measured on March 15 was 112 µg-std/m^3 (96.8 µg-act/m^3). This is the fifth highest concentration that occurred for the monitoring year.

The hourly meteorology for the March 15 sampling day is listed in Appendix C, Table C-1, and the wind rose for this day is depicted in Figure 16. The predominant winds on that day were from the northwest and west-northwest. The mean wind speed for the day was 3.8 m/s (8.5 mph), which is higher than the five-year mean wind speed of 2.7 m/s (6.0 mph). The maximum hourly wind speed was 9.5 m/s (21.2 mph) from the south-southwest, with several hours having mean wind speeds above 4.5 m/s (10 mph). No precipitation fell during the sampling day, and the day with the most recent precipitation was February 24. The site technician reported high winds had occurred during the week.

The two excavation areas were active during the sampling day, Property ID 1555 (1226 Taylor) and PC1578 (1231 Eilers Avenue). Figure 17 depicts the locations of these areas in relation to the Dance Studio sampling location, being approximately 0.32 km (0.2 miles) west-southwest and 0.16 km (0.1 miles) south-southwest, respectively.

For the majority of the day, the sampler was downwind of the Colorado Smelter superfund site, however for six hours the winds were blowing from the south-southwest through west-southwest sectors where the excavation activities were occurring. Most of these winds also had relatively higher speeds of greater than 4.5 m/s (10 mph).

The high TSP concentration for this sampling day is likely due to the higher than normal wind speeds. Potential sources that contributed to the high concentration may include the excavation activities, the Colorado Smelter superfund site, as well as other sources in the area including I-25 and nearby manufacturing facilities, such as the EVRAZ Steel Mill.

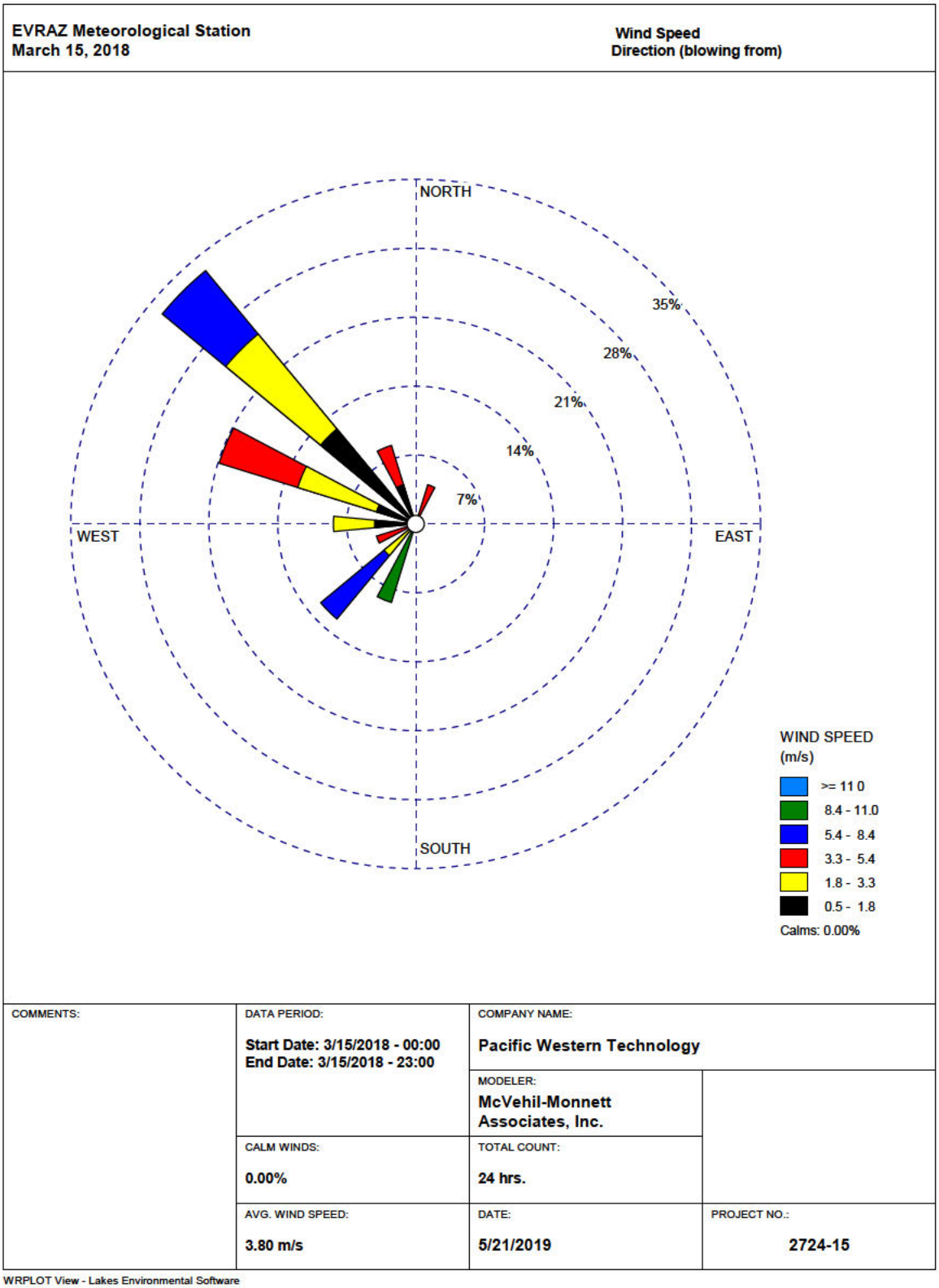


Figure 16 EVRAZ Steel Mill Daily Wind Rose for March 15, 2018

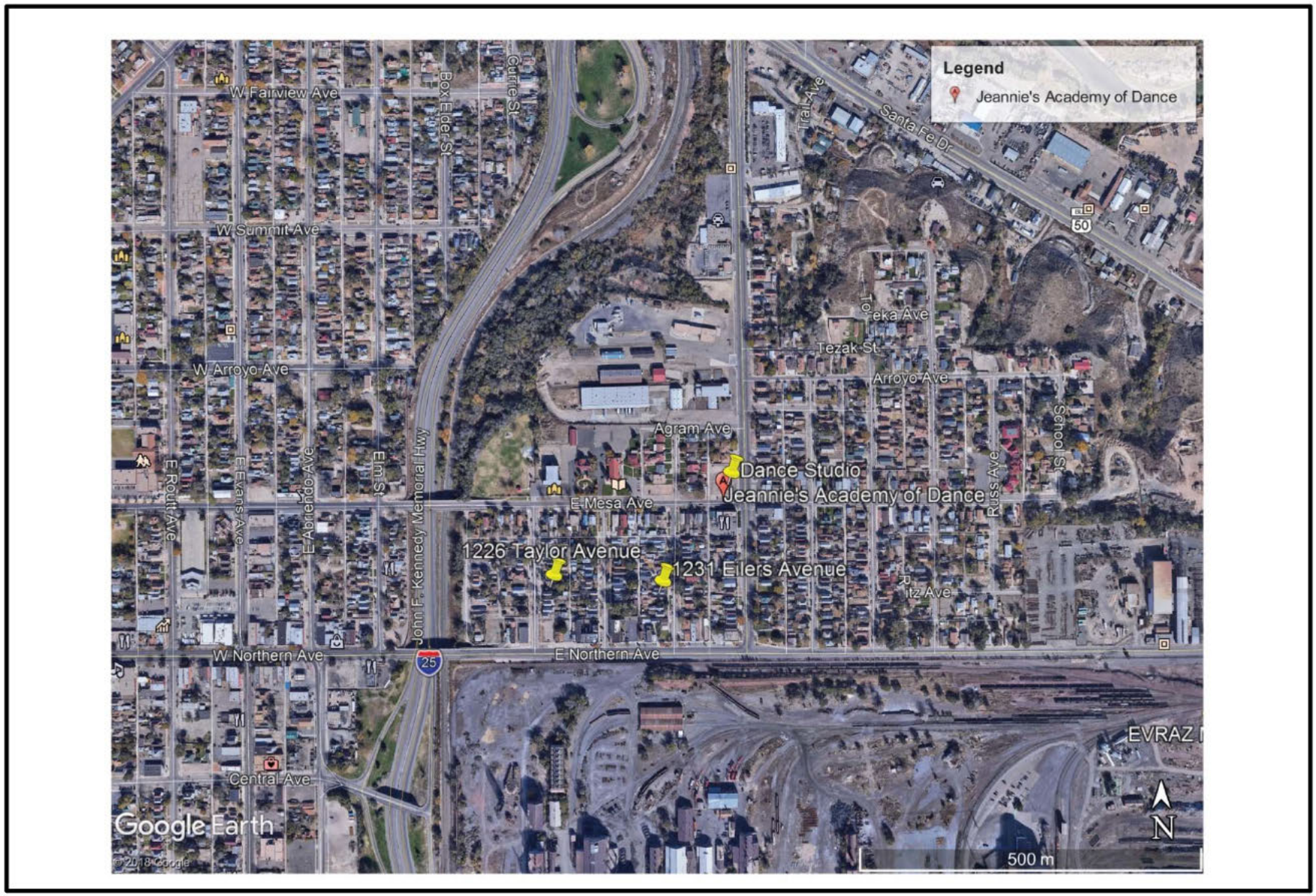


Figure 17 Dance Studio and March 15, 2018 Excavation Activity Locations

4.1.2 April 20 Sampling Day

The TSP concentration monitored on April 20 was 161 µg-std/m^3 (141 µg-act/m^3). This is the second highest concentration that occurred for the monitoring year.

The hourly meteorology for the April 20 sampling day is presented in Appendix C, Table C-2 and the wind rose for this day is depicted in Figure 18. The predominant winds on that day were from the east through south-southeast for most of the day. The mean wind speed was 7.5 m/s (16.7 mph), which is much higher than the five-year mean wind speed of 2.7 m/s (6.0 mph). The maximum hourly wind speed was 10.8 m/s (24.1 mph) from the south-southeast, and the majority of the hours experienced mean wind speeds above 4.5 m/s (10 mph). No precipitation fell during the sampling day, and the day with the most recent precipitation was April 9. The site technician reported extremely high winds had occurred on April 17.

Two excavation areas were active during the sampling day: Property ID PC0337 (1211 Bohmen Avenue) and PC1220 (1028 East Evans Avenue). Figure 19 depicts the location of these areas in relation to the Dance Studio sampling location, being approximately 0.16 km (0.1 miles) southeast and 0.64 km (0.4 miles) west-northwest, respectively.

For the majority of the day, the sampler was downwind of the EVRAZ Steel Mill and one of the excavation activity areas; the sampler was never downwind of the excavation area to the west-northwest. The high TSP concentration for this sampling day is likely due to the higher than normal wind speeds. Potential sources that contributed to the high concentration may include the EVRAZ Steel Mill, the excavation area to the southeast, as well as other sources in the area including I-25 and nearby manufacturing facilities, such as the EVRAZ Steel Mill.

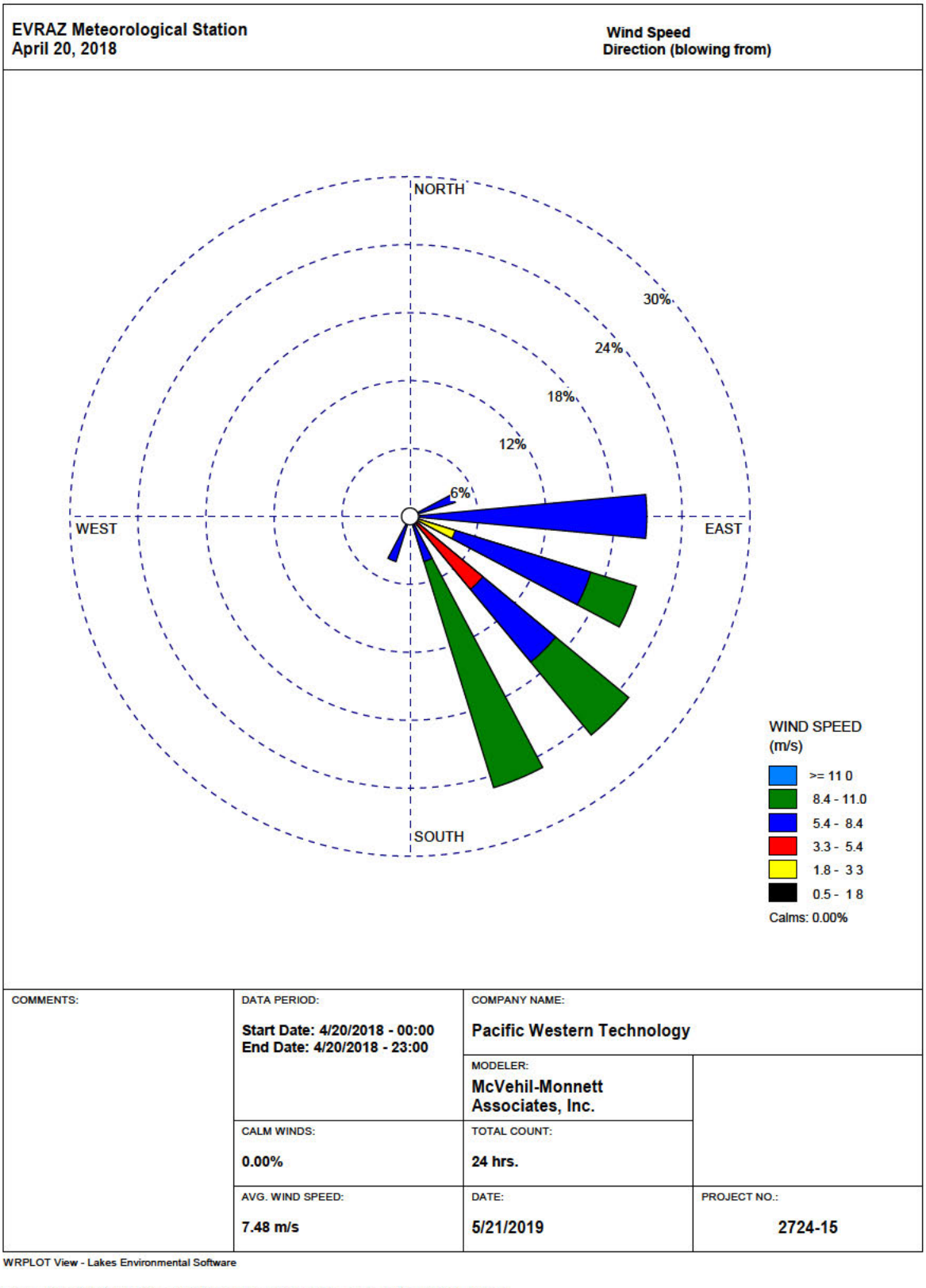


Figure 18 EVRAZ Steel Mill Daily Wind Rose for April 20, 2018

Figure 19 Dance Studio and the April 20, 2018 Excavation Activity Locations

4.1.3 June 7 Sampling Day

The TSP concentration measured on June 7 was 132 μg-std/m^3 (110 μg-act/m^3). This is the third highest concentration that occurred for the monitoring year.

The hourly meteorology for the June 7 sampling day is presented in Appendix C, Table C-3, and the wind rose for this day is depicted in Figure 20. The predominant winds on that day were from the north and east-southeast. The mean wind speed was 3.7 m/s (8.2 mph), which is higher than the five-year mean wind speed of 2.8 m/s (6.3 mph). The maximum hourly wind speed was 7.4 m/s (16.5 mph) from the east-southeast, with several hours having a mean wind speed above 4.5 m/s (10 mph). No precipitation fell during the sampling day, and the day with the most recent precipitation was June 3.

No excavation areas were active during the sampling day.

For portions of the day, the sampler was downwind of the EVRAZ Steel Mill as well as portions of the Colorado Smelter. The high TSP concentration for this sampling day is likely due to the higher than normal wind speeds. Potential sources that contributed to the high concentration may include the EVRAZ Steel Mill, portions of the Colorado Smelter, as well as other sources in the area including I-25 and nearby manufacturing facilities, such as the EVRAZ Steel Mill.

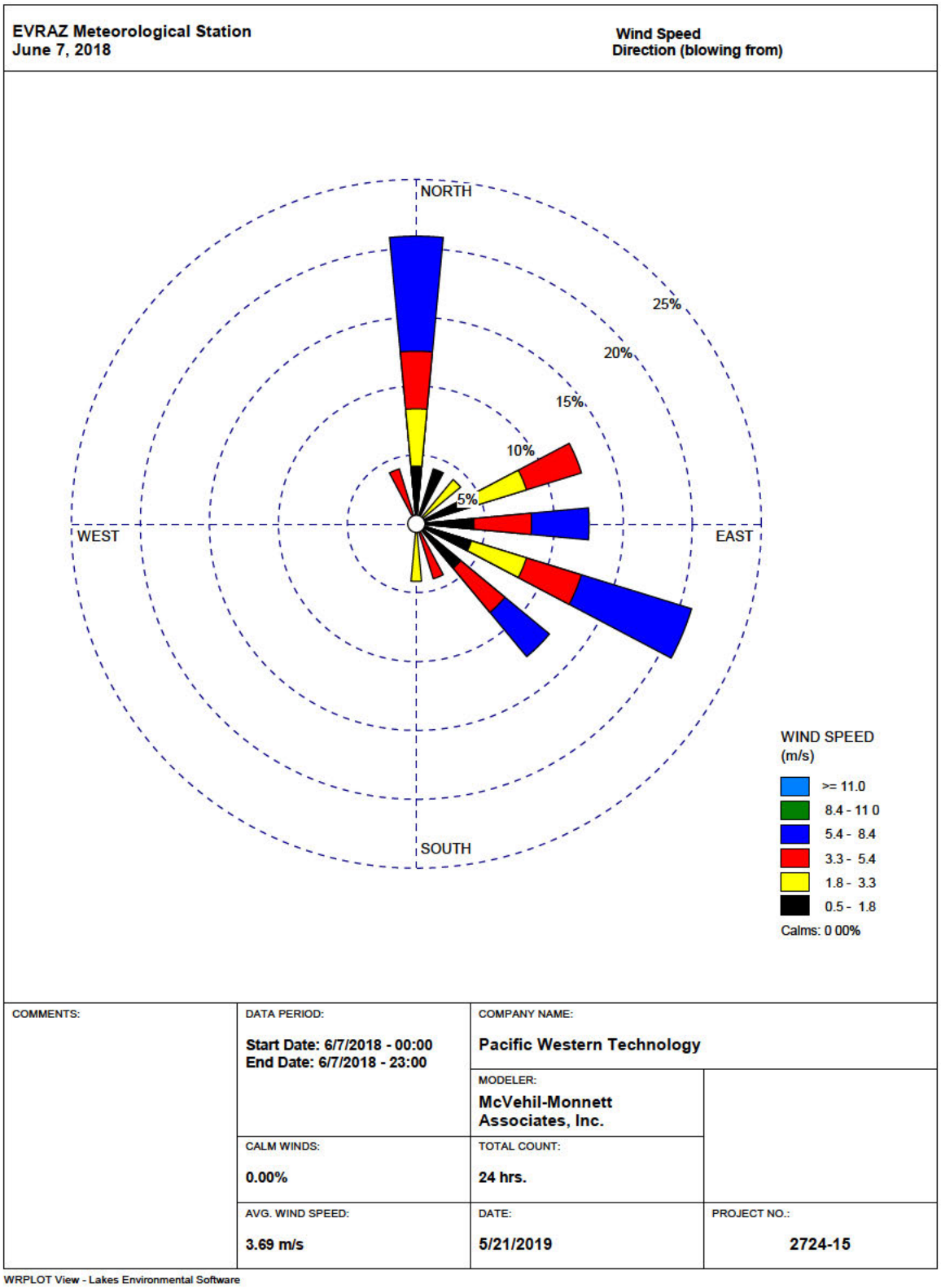


Figure 20 EVRAZ Steel Mill Daily Wind Rose for June 7, 2018

4.1.4 June 13 Sampling Day

The TSP concentration monitored on June 13 was 190 µg-std/m^3 (157 µg-act/m^3). This is the highest concentration measured for the monitoring year.

The hourly meteorology for the June 13 sampling day is presented in Appendix C, Table C-4 and the wind rose for this day is displayed in Figure 21. The predominant winds on that day were from the south and south-southeast. The mean wind speed for the day was 4.5 m/s (10.0 mph), which is higher than the five-year mean wind speed of 2.7 m/s (6.0 mph). The maximum hourly wind speed was 11.2 m/s (25.0 mph) from the south, with several hours having mean wind speeds above 4.5 m/s (10 mph). No precipitation fell during the sampling day, and the day with the most recent precipitation was June 3. The site technician did not note any unusual conditions.

Three excavation areas were active during the sampling day: Property ID PC1566 (310 East Mesa Avenue) and PC2016/PC2017 (314 East Mesa Avenue). Figure 22 depicts the location of the areas in relation to the Dance Studio monitoring station, all three being approximately 0.16 km (0.1 miles) west-southwest of the Dance Studio station.

For the majority of the day, the sampler was downwind of the EVRAZ Steel Mill. For a small portion of the day, the sampler was downwind of the excavation areas to the west-southwest. The high TSP concentration for this sampling day is likely due to the higher than normal wind speeds. Potential sources that contributed to the high concentration may include the EVRAZ Steel Mill, the excavation areas to the west-southwest, as well as other sources in the area including I-25 and nearby manufacturing facilities, such as the EVRAZ Steel Mill.

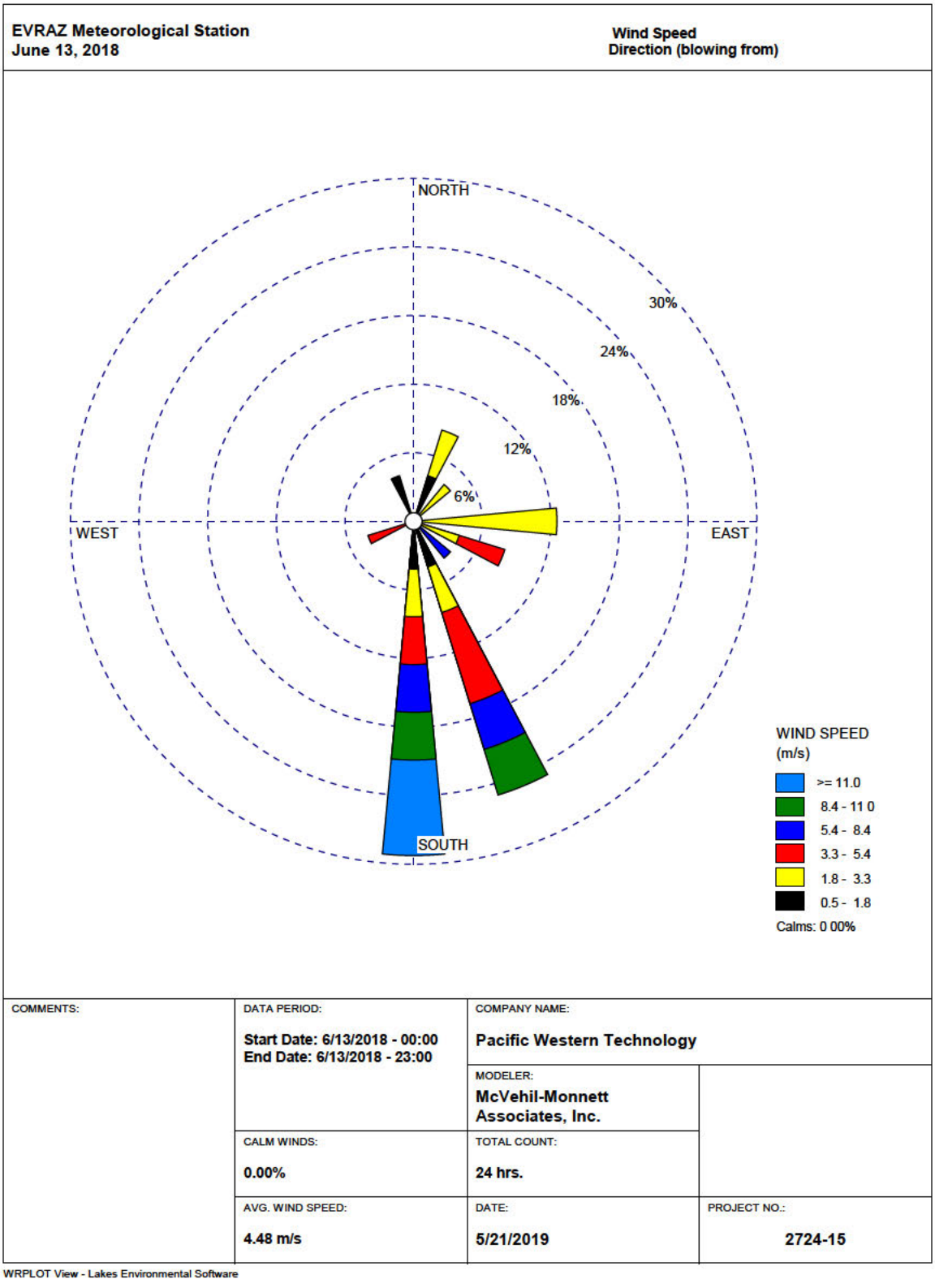


Figure 21 EVRAZ Steel Mill Daily Wind Rose for June 13, 2018

Figure 22 Dance Studio and the June 13, 2018 Excavation Activity Locations

4.1.5 October 5 Sampling Day

The TSP concentration measured for October 5 was 117 µg-std/m^3 (100 µg-act/m^3). This is the fourth highest concentration that occurred for the monitoring year.

The hourly meteorology for the October 5 sampling day is presented in Appendix C, Table C-5 and the wind rose for this day is displayed in Figure 23. The predominant winds on that day were from the northwest, north-northeast and northeast. The mean wind speed was 2.8 m/s (6.3 mph), which is close to the five-year mean. The maximum hourly wind speed was 9.1 m/s (16.5 mph) from the north-northeast. The winds during the day were mostly less than 2.5 m/s (5.6 mph), until after 1600 when the wind speed increased to above 4.5 m/s (10 mph). These winds were from the north-northeast to east-southeast sectors. No precipitation fell during the sampling day, and the day with the most recent precipitation was September 20.

No data are available on excavation activities for this sampling day.

For portions of the day, the sampler was downwind of the Colorado Smelter. The high TSP concentration for this sampling day is likely due to the higher than normal wind speeds for parts of the day. Potential sources that contributed to the high concentration may include the Colorado Smelter as well as other sources in the area including I-25 and nearby manufacturing facilities, such as the EVRAZ Steel Mill.

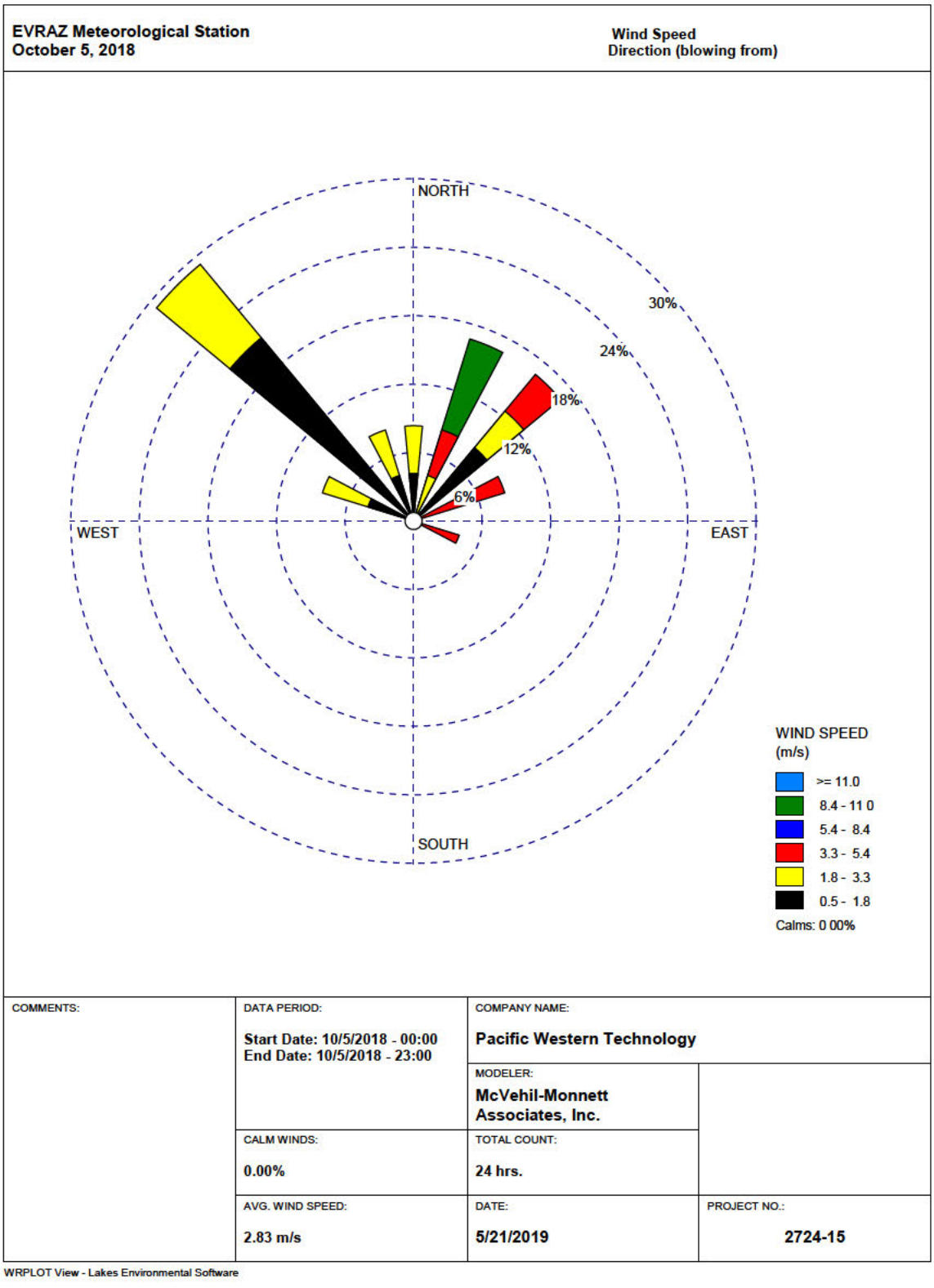


Figure 23 EVRAZ Steel Mill Daily Wind Rose for October 5, 2018

5.0 Summary

Monitoring for TSP and the 22 metals of aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc were performed on an EPA one-in-six day sampling schedule from March 9, 2018 to March 8, 2019 on the roof of Jeannie's Dance Studio in Pueblo, Colorado. The Dance Studio is roughly downwind of the Colorado Smelter Superfund site. A total of 59 out of 61 possible samples were collected for a recovery rate of 97 percent.

The measured TSP mean concentrations were higher for the first and second monitoring quarters than for the third and fourth monitoring quarters. Specifically, the mean TSP concentration for the first monitoring quarter (March to May 2018) was 61.0 μg/std-m^3 (53.2 μg/act-m^3); the mean for the second monitoring quarter (June to August 2018) was 74.4 μg/std-m^3 (62.0 μg/act-m^3); the mean for the third monitoring quarter (September to November 2018) was 50.0 μg/std-m^3 (43.1 μg/act-m^3); and the mean for the fourth monitoring quarter (December 2018 to March 4, 2019) was 40.4 (36.6 μg/act-m^3).

The maximum TSP concentration for the monitoring year was 190 μg/std-m^3 (157 μg/act-m^3), occurring on June 13, 2018, while the second highest concentration was 161 μg/std-m^3 (141 μg/act-m^3), occurring on April 20. Three other sampling days measured concentrations greater than 100 μg/std-m^3: June 7, 2018 at 132 μg/std-m^3 (110 μg/act-m^3); October 5, 2018 at 117 μg/std-m^3 (100 μg/act-m^3); and March 15, 2018 at 112 μg/std-m^3 (96.8 μg/act-m^3). Three out of these five sampling days had known concurrent excavation activities, with no activity occurring on June 7 and no information being available for the October 5 sampling day. Based on the EVRAZ meteorological data, four out of five of these days had higher to much higher than average wind speeds compared to the five-year mean. All of these sampling days experienced several to numerous hours with relatively high mean hourly wind speeds of greater than 4.5 m/s (10 mph). Depending on the day, the sampler may have been downwind of excavation activities, the Colorado Smelter Superfund site, EVRAZ Steel Mill, or other sources in the area.

The combined total concentration of the 22 analyzed metals represented a small portion (approximately 15 percent) of the total TSP concentration. Of the individual metals analyzed, the most prominent were calcium, iron, sodium, aluminum, and magnesium, collectively representing over 90% of the total metals mass. The maximum metal concentration for the monitoring year was calcium at 11.3 μg/act.m^3, followed by iron at 7.26 μg/act.m^3 and magnesium at 2.46 μg/act.m^3. The two former concentrations occurred on April 20, 2018, while the latter occurred on June 13, 2018. The metals thallium and arsenic

were never detected, and the metals silver and selenium were detected less than 10 times each during the monitoring year.

The field blank checks did not reveal any procedural problems for the sampling program. The laboratory and sample media blanks and method blanks did not show any problems with the laboratory analysis.

In summary, the sampling program for the monitoring year measured relatively low TSP and metal concentrations, indicating that the remedial investigation is not generating large impacts in the surrounding region.

Appendix A

Calibration and Audit Forms

Project/Site Location	Pueblo OU2			Site Elevation (f	4767		
Date	3/7/2018	\		Baro. Press. (P_a)	(mb)	857 (mmHg)	642.75
Calibrated by	Jim Kuenning			Barometer	Druck	7400968	
Sampler No./ID	Number 8			Temp. (T_a):	(°C)	13.0 (K)	286.0
Motor Housing S/N				Thermometer	Digisense	421734	
Critical Flow Device S/N	P8233			Orifice Certification Date		5/15/2017	
Orifice S/N	0156			Orifice Cal. Relationship:	m=	0.97722	b= -0.00368

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2$	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{efd} (filter pressure(Pdif)) (in H_2O)	ΔH_{efd} (mm Hg)	P1= P_a-ΔH_{efd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.40	1.230	1.262	0.0746	5.7	10.65	632.10	0.983	
" " "	3.27	1.206	1.238	0.0732	9.6	17.93	624.82	0.972	
" " "	3.20	1.193	1.225	0.0724	11.8	22.04	620.71	0.966	
" " "	3.02	1.159	1.190	0.0704	17.6	32.87	609.88	0.949	
" " "	2.86	1.128	1.158	0.0685	24.20	45.20	597.55	0.930	
" " "	2.73	1.102	1.132	0.0669	29.00	54.16	588.59	0.916	
" " "	2.62	1.080	1.109	0.0656	34.90	65.18	577.57	0.899	
Design(Operating) Condtion with Filter					20.10	37.54	605.21	0.942	1.182

m = 9.2169 b= 0.2976 r= 0.9978

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246}$ X 100= -5.2

ok GAK 4/17/18

HIGH VOLUME SAMPLER AUDIT WORKSHEET
(For Volumetric-Flow Controlled Samplers)

Project/Site Location Pueblo OUZ Dance Studio
Date/Time 3/29/18 10:15 MDT
Auditor G. Garman
Observer N/A
Sampler No./ID Number 8
Critical Flow Device S/N P8233
Sampler Type (circle one): (Hi-Vol) PM_{10}
Sampler's Last Calibration: Date 3/7/18
m_s= 9.2169 ✓, b_s= 0.2976 ✓

Site Elevation 4767 ft
Baro. Pres. (P_a) (mm Hg) 640.20 ✓
Barometer DPI 740013S6
Temp. (T_a): (°C) 6.8 ✓ **(K)** 280.0 ✓
Thermometer Oakton Temp 340 787420
Manometer Omega HHP-2001 470312323
Audit Orifice Serial No. 148N ✓
Audit Orifice Certification Date 5/15/17 ✓
m= 0.98723 ✓, b= 0.00417 ✓

Setup	ΔH Pressure Drop Across Orifice (in H_2O)	$Q_{a\text{-}int}$ From Orifice Calibration $Q_{a\text{-}int} = [(\Delta H)(T_a/P_a)]^{1/2}$	Q_a(audit) = (1/m){$Q_{a\text{-}int}$ – b}	ΔH_{cfd} Pressure Drop as Configured (Pdif) (in H_2O)	(mmHg)	$P_1 = P_a - \Delta H_{cfd}$ (mm Hg)	P_1/P_a	Q_a sampler = $[(P_1/P_a - b_s)T_a^{1/2}](1/m_s)$ (act m^3/min)
Audit Orifice With Filter	2.92	1.130 ✓	1.140 ✓	24.7	46.13 ✓	594.07 ✓	0.9279 ✓	1.144 ✓
Design Condition Without Orifice				23.0	42.96 ✓	597.24 ✓	0.9329 ✓	1.153 ✓

Audit Flow Rate Percentage Difference [2] 0.35 ✓ %
Q_a (corrected Sampler) [3] 1.149 ✓ m^3/min
Design Flow Rate Percentage Difference [4] −7.8 ✓ %

[2] Audit % Difference = [(Q_a(sampler) – Q_a(audit))/ Q_a(audit)] *100 where Q_a(sampler) is measured with the orifice installed

[3] Q_a(corrected sampler) = Q_a(sampler) * [(100 – Audit % Difference)/100] where Q_a(sampler) is measured without the orifice installed

[4] Design Flow Rate % difference = [(Q_a (corrected sampler)* - 1.246)/1.246] x 100 (Design Flow = 44 ft^3/min = 1.246 m^3/min)

PM_{10} SAMPLER CALIBRATION WORKSHEET
(For Volumetric-Flow-Controlled Samplers)

Project/Site Location	Pueblo OU2			Site Elevation (f	4767		
Date	6/5/2018	(before brush change)	\	Baro. Press. (P_a)	(mb)	852 (mmHg)	639.00
Calibrated by	Jim Kuenning			Barometer	Druck	7400968	
Sampler No./ID	Number 8			Temp. (T_a):	(°C)	28.8 (K)	301.8
Motor Housing S/N				Thermometer	Digisense	421734	
Critical Flow Device S/N	P8233			Orifice Certification Date		4/19/2018	
Orifice S/N	0156			Orifice Cal. Relationship:	m=	0.97529	b= 0.00108

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2$	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{efd} (filter pressure(Pdif)) (in H_2O)	ΔH_{efd} (mm Hg)	P1= P_a-ΔH_{efd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.22	1.233	1.263	0.0727	6.0	11.21	627.79	0.982	
" " "	3.16	1.222	1.252	0.0720	8.0	14.94	624.06	0.977	
" " "	3.02	1.194	1.223	0.0704	12.1	22.60	616.40	0.965	
" " "	2.84	1.158	1.186	0.0683	17.0	31.75	607.25	0.950	
" " "	2.74	1.138	1.165	0.0671	20.80	38.85	600.15	0.939	
" " "	2.66	1.121	1.148	0.0661	24.10	45.01	593.99	0.930	
" " "	2.50	1.087	1.113	0.0641	29.90	55.84	583.16	0.913	
Design(Operating) Condtion with Filter					23.30	43.52	595.48	0.932	1.152

m = 7.9658 b= 0.4037 r= 0.9985

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246} \times 100 =$ -7.6

PM_{10} SAMPLER CALIBRATION WORKSHEET
(For Volumetric-Flow-Controlled Samplers)

Project/Site Location	Pueblo OU2		Site Elevation (f	4767			
Date	6/5/2018 (after brush change) \		Baro. Press. (P_a)	(mb)	851	(mmHg)	638.25
Calibrated by	Jim Kuenning		Barometer	Druck	7400968		
Sampler No./ID	Number 8		Temp. (T_a):	(°C)	33.8	(K)	306.8
Motor Housing S/N			Thermometer	Digisense		421734	
Critical Flow Device S/N	P8233		Orifice Certification Date		4/19/2018		
Orifice S/N	0156		Orifice Cal. Relationship:	m=	0.97529	b=	0.00108

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2$)	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{efd} (filter pressure(Pdif)) (in H_2O)	ΔH_{efd} (mm Hg)	P1= P_a-ΔH_{efd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.33	1.265	1.296	0.0740	6.1	11.39	626.86	0.982	
" " "	3.24	1.248	1.278	0.0730	9.6	17.93	620.32	0.972	
" " "	3.14	1.229	1.259	0.0719	12.9	24.09	614.16	0.962	
" " "	2.99	1.199	1.228	0.0701	19.3	36.04	602.21	0.944	
" " "	2.89	1.179	1.207	0.0689	22.80	42.58	595.67	0.933	
" " "	2.77	1.154	1.182	0.0675	26.30	49.12	589.13	0.923	
" " "	2.66	1.131	1.158	0.0661	31.40	58.64	579.61	0.908	
Design(Operating) Condtion with Filter					23.30	43.52	594.73	0.932	1.203

m = 9.2924 b= 0.2939 r= 0.9988

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246} \times 100$ = -3.5

✓ TCN 6/21/2018

Form No. F1014.2
Revision No. Original
Date 02/18
Page 1 of 1

HIGH VOLUME SAMPLER AUDIT WORKSHEET
(For Volumetric-Flow Controlled Samplers)

Project/Site Location Pueblo OU2 Dance Studio
Date/Time 6/21/18 0830 MDT
Auditor G. Gorman
Observer NA
Sampler No./ID Number 8
Critical Flow Device S/N P8233
Sampler Type (circle one): (Hi-Vol) PM_{10}
Sampler's Last Calibration: Date 6/5/18
m_s= 9.2924, b_s= 0.2939

Site Elevation 4767 ft
Baro. Pres. (P_a) (mm Hg) 642.90
Barometer DPI 74001356
Temp. (T_a): (°C) 22.4 **(K)** 295.6
Thermometer Oakton Temp 340 787420
Manometer Omega HHP-200 / 4703127323
Audit Orifice Serial No. 148N
Audit Orifice Certification Date 4/19/18
m= 0.99212, b= 0.00003

Setup	ΔH Pressure Drop Across Orifice (in H_2O)	$Q_{a\text{-}int}$ From Orifice Calibration $Q_{a\text{-}int} = [(\Delta H)(T_a/P_a)]^{1/2}$	Q_a(audit) = (1/m){$Q_{a\text{-}int}$ – b}	ΔH_{cfd} Pressure Drop as Configured (Pdif) (in H_2O)	(mmHg)	$P_1 = P_a - \Delta H_{cfd}$ (mm Hg)	P_1/P_a	Q_a sampler = $[(P_1/P_a - b_s)T_a^{1/2}](1/m_s)$ (act m^3/min)
Audit Orifice With Filter	3.05	1.184	1.193	26.8	50.05	592.85	0.9221	1.162
Design Condition Without Orifice				21.5	40.15	602.75	0.9375	1.191

Audit Flow Rate Percentage Difference [2] −2.6 %
Q_a (corrected Sampler) [3] 1.222 m^3/min
Design Flow Rate Percentage Difference [4] −1.9 %

[2] Audit % Difference = [(Q_a(sampler) – Q_a(audit))/ Q_a(audit)] *100 where Q_a(sampler) is measured with the orifice installed

[3] Q_a(corrected sampler) = Q_a(sampler) * [(100 – Audit % Difference)/100] where Q_a(sampler) is measured without the orifice installed

[4] Design Flow Rate % difference = [(Q_a (corrected sampler)* - 1.246)/1.246] x 100 (Design Flow = 44 ft^3/min = 1.246 m^3/min)

PM_{10} SAMPLER CALIBRATION WORKSHEET

(For Volumetric-Flow-Controlled Samplers)

Project/Site Location	Pueblo OU2			Site Elevation (f	4767		
Date	7/23/2018	(after motor replacement)	\	Baro. Press. (P_a)	(mb)	861.27 (mmHg)	646.00
Calibrated by	Gary Garman			Barometer	Druck	7400968	
Sampler No./ID	Number 8			Temp. (T_a):	(°C)	28.7 (K)	301.9
Motor Housing S/N				Thermometer	Digisense	421734	
Critical Flow Device S/N	P8233			Orifice Certification Date		4/19/2018	
Orifice S/N	0156			Orifice Cal. Relationship:	m=	0.97529	b= 0.00108

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2$)	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{efd} (filter pressure(Pdif)) (in H_2O)	ΔH_{efd} (mm Hg)	P1= P_a-ΔH_{efd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.45	1.270	1.301	0.0749	6.1	11.39	634.61	0.982	
" " "	3.35	1.251	1.282	0.0738	10.7	19.98	626.02	0.969	
" " "	3.22	1.227	1.257	0.0724	14.8	27.64	618.36	0.957	
" " "	3.11	1.205	1.234	0.0710	20.9	39.03	606.97	0.940	
" " "	3.00	1.184	1.213	0.0698	25.70	48.00	598.00	0.926	
" " "	2.83	1.150	1.178	0.0678	30.50	56.96	589.04	0.912	
" " "	2.72	1.127	1.154	0.0664	32.40	60.51	585.49	0.906	
Design(Operating) Condtion with Filter					22.30	41.65	604.35	0.936	1.220

m = 9.2344 b= 0.2873 r= 0.9914

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246}$ X 100= -2.1

PM_{10} SAMPLER CALIBRATION WORKSHEET
(For Volumetric-Flow-Controlled Samplers)

Project/Site Location	Pueblo OU2			Site Elevation (f	4767		
Date	10/25/2018	(before brush change)	\	Baro. Press. (P_a)	(mb)	(mmHg)	640.00
Calibrated by	Jim Kuenning			Barometer	Druck 7400968		
Sampler No./ID	Number 8			Temp. (T_a):	(°C) 18.3	(K)	291.3
Motor Housing S/N				Thermometer	Digisense 421734		
Critical Flow Device S/N	P8233			Orifice Certification Date	4/19/2018		
Orifice S/N	0156			Orifice Cal. Relationship:	m= 0.97529	b=	0.00108

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2$)	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{efd} (filter pressure(Pdif)) (in H_2O)	ΔH_{efd} (mm Hg)	P1= P_a-ΔH_{efd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.36	1.237	1.267	0.0742	5.9	11.02	628.98	0.983	
" " "	3.28	1.222	1.252	0.0733	10.4	19.42	620.58	0.970	
" " "	3.19	1.205	1.234	0.0723	15.1	28.20	611.80	0.956	
" " "	3.14	1.195	1.225	0.0718	17.3	32.31	607.69	0.950	
" " "	3.08	1.184	1.213	0.0711	20.50	38.29	601.71	0.940	
" " "	3.03	1.174	1.203	0.0705	22.90	42.77	597.23	0.933	
" " "	2.94	1.157	1.185	0.0694	27.30	50.99	589.01	0.920	
Design(Operating) Condtion with Filter					21.60	40.34	599.66	0.937	1.208

m = 12.9444 b= 0.0208 r= 0.9994

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246} \times 100 =$ -3.0

PM_{10} SAMPLER CALIBRATION WORKSHEET

(For Volumetric-Flow-Controlled Samplers)

Project/Site Location	Pueblo OU2		Site Elevation (f	4767	
Date	10/25/2018 (after brush change)		Baro. Press. (P_a)	(mb)	(mmHg) 640.00
Calibrated by	Jim Kuenning		Barometer	Druck 7400968	
Sampler No./ID	Number 8		Temp. (T_a):	(°C) 23.3	(K) 296.3
Motor Housing S/N			Thermometer	Digisense 421734	
Critical Flow Device S/N	P8233		Orifice Certification Date	4/19/2018	
Orifice S/N	0156		Orifice Cal. Relationship:	m= 0.97529	b= 0.00108

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2)$	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{cfd} (filter pressure(Pdif)) (in H_2O)	ΔH_{cfd} (mm Hg)	P1= P_a-ΔH_{cfd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.41	1.256	1.287	0.0748	5.9	11.02	628.98	0.983	
" " "	3.33	1.242	1.272	0.0739	9.0	16.81	623.19	0.974	
" " "	3.23	1.223	1.253	0.0728	14.2	26.52	613.48	0.959	
" " "	3.17	1.211	1.241	0.0721	16.5	30.82	609.18	0.952	
" " "	3.10	1.198	1.227	0.0713	19.50	36.42	603.58	0.943	
" " "	3.00	1.179	1.207	0.0701	24.40	45.57	594.43	0.929	
" " "	2.95	1.169	1.197	0.0695	27.20	50.80	589.20	0.921	
Design(Operating) Condtion with Filter					21.80	40.71	599.29	0.936	1.219

m = 11.8240 b= 0.0991 r= 0.9993

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246} \times 100 =$ -2.2

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HIGH VOLUME SAMPLER AUDIT WORKSHEET
(For Volumetric-Flow Controlled Samplers)

Project/Site Location Pueblo OU2 Dance Studio
Date/Time 11/27/18 0855 MST
Auditor G. Garman
Observer NA
Sampler No./ID Number 8
Critical Flow Device S/N P8233
Sampler Type (circle one): ~~Hi-Vol~~ PM_{10}
Sampler's Last Calibration: **Date** 10/25/18
m_s= 11.8240 ✓, b_s= 0.0991 ✓

Site Elevation 4767 ft
Baro. Pres. (P_a) (mm Hg) 640.07
Barometer DPI 74001356
Temp. (T_a): (°C) 4.7 **(K)** 277.85
Thermometer Oakton Temp 340 787420
Manometer Omega HHP-2001 4703127323
Audit Orifice Serial No. 148 N
Audit Orifice Certification Date 4/19/18
m= 0.99212 ✓, b= 0.00003 ✓

Setup	ΔH Pressure Drop Across Orifice (in H_2O)	$Q_{a\text{-int}}$ From Orifice Calibration $Q_{a\text{-int}} = [(\Delta H)(T_a/P_a)]^{1/2}$	Q_a(audit) = (1/m){$Q_{a\text{-int}}$ – b}	ΔH_{cfd} Pressure Drop as Configured (Pdif) (in H_2O)	(mmHg)	$P_1 = P_a - \Delta H_{cfd}$ (mm Hg)	P_1/P_a	Q_a sampler = $[(P_1/P_a - b_s)T_a^{1/2}](1/m_s)$ (act m^3/min)
Audit Orifice With Filter	3.06	1.153	1.162 ✓	26.2	48.93	591.14	0.9236	1.162 ✓
Design Condition Without Orifice				21.1	39.41	600.66	0.9384	1.183 ✓

Audit Flow Rate Percentage Difference [2] 0.0 ✓ %
Q_a (corrected Sampler) [3] 1.183 ✓ m^3/min
Design Flow Rate Percentage Difference [4] -5.1 ✓ %

[2] Audit % Difference = [(Q_a(sampler) – Q_a(audit))/ Q_a(audit)] *100 where Q_a(sampler) is measured with the orifice installed

[3] Q_a(corrected sampler) = Q_a(sampler) * [(100 – Audit % Difference)/100] where Q_a(sampler) is measured without the orifice installed

[4] Design Flow Rate % difference = [(Q_a (corrected sampler)* - 1.246)/1.246] x 100 (Design Flow = 44 ft^3/min = 1.246 m^3/min)

PM_{10} SAMPLER CALIBRATION WORKSHEET
(For Volumetric-Flow-Controlled Samplers)

Project/Site Location	Pueblo OU2		Site Elevation (f	4767			
Date	1/30/2019 (before brush change)		Baro. Press. (P_a)	(mb)		(mmHg)	637.00
Calibrated by	Jim Kuenning		Barometer	Druck	7400968		
Sampler No./ID	Number 8		Temp. (T_a):	(°C)	3.8	(K)	276.8
Motor Housing S/N			Thermometer	Digisense		421734	
Critical Flow Device S/N	P8233		Orifice Certification Date		4/19/2018		
Orifice S/N	0156		Orifice Cal. Relationship:	m=	0.97529	b=	0.00108

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2$	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{efd} (filter pressure(Pdif)) (in H_2O)	ΔH_{efd} (mm Hg)	P1= P_a-ΔH_{efd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.33	1.203	1.232	0.0741	6.8	12.70	624.30	0.980	
" " "	3.25	1.188	1.217	0.0732	10.3	19.24	617.76	0.970	
" " "	3.12	1.164	1.193	0.0717	14.5	27.08	609.92	0.957	
" " "	3.04	1.149	1.177	0.0708	17.9	33.43	603.57	0.948	
" " "	2.97	1.136	1.164	0.0699	21.10	39.41	597.59	0.938	
" " "	2.81	1.105	1.132	0.0680	27.20	50.80	586.20	0.920	
" " "	2.60	1.063	1.089	0.0654	35.40	66.11	570.89	0.896	
Design(Operating) Condtion with Filter					20.60	38.47	598.53	0.940	1.164

m = 9.7188 b= 0.2596 r= 0.9995

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246} \times 100 =$ -6.6

PM_{10} SAMPLER CALIBRATION WORKSHEET
(For Volumetric-Flow-Controlled Samplers)

Project/Site Location	Pueblo OU2			Site Elevation (f	4767		
Date	1/30/2019	(after brush change)	\	Baro. Press. (P_a)	(mb)	(mmHg)	636.60
Calibrated by	Jim Kuenning			Barometer	Druck	7400968	
Sampler No./ID	Number 8			Temp. (T_a):	(°C)	10.5	(K) 283.5
Motor Housing S/N				Thermometer	Digisense	421734	
Critical Flow Device S/N	P8233			Orifice Certification Date		4/19/2018	
Orifice S/N	0156			Orifice Cal. Relationship:	m=	0.97529	b= 0.00108

Setup	ΔH Pressure Drop Across Cal Orifice (in H_2O)	$Q_{a\text{-int}}$ = $[(\Delta H)(Ta/Pa)]1/2$	Q_a(orifice) = (1/m){$Q_{a\text{-int}}$ – b} From Orifice Calibration (act m3/min)	Qa(orifice) Ta 1/2 (x)	ΔH_{efd} (filter pressure(Pdif)) (in H_2O)	ΔH_{efd} (mm Hg)	P1= P_a-ΔH_{efd} (mm Hg)	P_1/P_a (y)	Q_a (sampler)= $\frac{(P_1/P_a-b)*T_a^{1/2}}{m}$ (act m^3/min)
Orifice w/out filter	3.41	1.232	1.262	0.0750	5.4	10.09	626.51	0.984	
" " "	3.25	1.203	1.232	0.0732	9.7	18.12	618.48	0.972	
" " "	3.16	1.186	1.215	0.0722	11.8	22.04	614.56	0.965	
" " "	3.02	1.160	1.188	0.0706	15.5	28.95	607.65	0.955	
" " "	2.92	1.140	1.168	0.0694	18.60	34.74	601.86	0.945	
" " "	2.73	1.103	1.129	0.0671	25.00	46.69	589.91	0.927	
" " "	2.55	1.066	1.092	0.0648	30.70	57.34	579.26	0.910	
Design(Operating) Condtion with Filter					20.00	37.35	599.25	0.941	1.161

m = 7.3417 b= 0.4349 r= 0.9990

Design Flow (VCF) 44 Cubic Feet 1.246

Design Flow Rate % Difference = $\frac{\text{Qa (corr. Sampler)} - 1.246}{1.246} \times 100 =$ -6.8

HIGH VOLUME SAMPLER AUDIT WORKSHEET
(For Volumetric-Flow Controlled Samplers)

2/21/19 ch

Project/Site Location Pueblo OU2 Dance Studio
Date/Time 2/21/19 0900
Auditor G. Garman
Observer NA
Sampler No./ID Number 8
Critical Flow Device S/N ~~B~~ P8233
Sampler Type (circle one): (Hi-Vol) PM_{10}
Sampler's Last Calibration: Date 1/30/19
m_s= 7.3417 ✓, b_s= 0.4349 ✓

Site Elevation 4767 ft.
Baro. Pres. (P_a) (mm Hg) 633.97
Barometer DPI 740013S6
Temp. (T_a): (°C) -3.8 **(K)** 269.35
Thermometer Oakton Temp 340 787420
Manometer Omega HHP-2001 470312732 3
Audit Orifice Serial No. 148 N
Audit Orifice Certification Date 4/19/18
m= 0.99212 ✓, b= 0.00003 ✓

Setup	ΔH Pressure Drop Across Orifice (in H_2O)	$Q_{a\text{-}int}$ From Orifice Calibration $Q_{a\text{-}int} = [(\Delta H)(T_a/P_a)]^{1/2}$	Q_a(audit) = (1/m){$Q_{a\text{-}int}$ – b}	ΔH_{cfd} Pressure Drop as Configured (Pdif) (in H_2O)	(mmHg)	$P_1 = P_a - \Delta H_{cfd}$ (mm Hg)	P_1/P_a	Q_a sampler = $[(P_1/P_a - b_s)T_a^{1/2}](1/m_s)$ (act m^3/min)
Audit Orifice With Filter	2.80 ✓	1.091 ✓	1.100 ✓	23.7 ✓	44.26 ✓	589.71 ✓	0.9302 ✓	1.107 ✓
Design Condition Without Orifice				19.5 ✓	36.42 ✓	597.55 ✓	0.9426 ✓	1.135 ✓

Audit Flow Rate Percentage Difference [2] 0.64 ✓ %
Q_a (corrected Sampler) [3] 1.128 ✓ m^3/min
Design Flow Rate Percentage Difference [4] -9.5 ✓ %

[2] Audit % Difference = [(Q_a(sampler) – Q_a(audit))/ Q_a(audit)] *100 where Q_a(sampler) is measured with the orifice installed

[3] Q_a(corrected sampler) = Q_a(sampler) * [(100 – Audit % Difference)/100] where Q_a(sampler) is measured without the orifice installed

[4] Design Flow Rate % difference = [(Q_a (corrected sampler)* - 1.246)/1.246] x 100 (Design Flow = 44 ft^3/min = 1.246 m^3/min)

Appendix B

TSP and Metals Sampling Results

Table B-1
TSP and Metals Concentration for March 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)			
Sample Date	3/09/2018	3/15/2018	3/21/2018	3/27/2018
Filter Number	18-Q23	18-Q24	18-Q25	18-Q26
TSP[1]	80.8	112	50.0	35.0
TSP	70.9	96.8	44.6	31.6
Aluminum	7.85E-01	1.09E+00	6.02E-01	3.21E-01
Antimony	2.03E-03	2.20E-03	9.77E-04	8.72E-04
Arsenic	< DL	< DL	< DL	< DL
Barium	3.81E-02	3.88E-02	2.73E-02	1.33E-02
Beryllium	6.06E-05	9.19E-05	4.89E-05	< DL
Cadmium	6.96E-04	6.76E-04	3.91E-04	2.17E-04
Calcium	5.17E+00	5.66E+00	3.56E+00	1.45E+00
Chromium	2.10E-02	1.49E-02	8.16E-03	6.45E-03
Cobalt	7.31E-04	9.25E-04	5.05E-04	3.20E-04
Copper	4.57E-02	3.27E-02	3.10E-02	2.32E-02
Iron	3.58E+00	3.16E+00	1.57E+00	1.20E+00
Lead	1.72E-02	1.97E-02	1.60E-02	5.93E-03
Magnesium	9.75E-01	9.84E-01	6.79E-01	3.00E-01
Manganese	1.91E-01	1.50E-01	9.23E-02	5.11E-02
Nickel	4.75E-03	3.84E-03	2.01E-03	1.90E-03
Potassium	4.96E-01	5.87E-01	3.22E-01	1.20E-01
Selenium	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL
Sodium	4.28E-01	4.41E-01	3.59E-01	3.14E-01
Thallium	< DL	< DL	< DL	< DL
Vanadium	3.90E-03	4.63E-03	2.53E-03	1.13E-03
Zinc	1.31E-01	8.12E-02	9.89E-02	4.48E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-2
TSP and Metals Concentration for April 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	4/02/2018	4/08/2018	4/14/2018	4/20/2018	4/26/2018
Filter Number	18-Q27	18-Q28	18-Q29	18-Q30	18-Q31
TSP[1]	55.4	18.2	39.9	161	50.8
TSP	47.8	15.7	35.7	141	44.9
Aluminum	7.05E-01	1.85E-01	3.50E-01	1.77E+00	5.07E-01
Antimony	< DL	< DL	< DL	1.79E-03	8.89E-04
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	2.32E-02	6.33E-03	1.43E-02	4.39E-02	1.71E-02
Beryllium	3.68E-05	< DL	< DL	1.02E-04	6.16E-05
Cadmium	3.59E-04	< DL	< DL	1.14E-03	7.35E-05
Calcium	3.09E+00	8.16E-01	1.32E+00	1.13E+01	2.11E+00
Chromium	8.59E-03	3.16E-03	3.63E-03	4.13E-02	5.68E-03
Cobalt	5.03E-04	2.60E-04	1.11E-03	1.57E-03	4.10E-04
Copper	2.38E-02	1.16E-02	2.14E-02	5.66E-02	2.45E-02
Iron	1.52E+00	4.66E-01	7.91E-01	7.26E+00	1.32E+00
Lead	1.07E-02	3.00E-03	4.47E-03	4.62E-02	6.82E-03
Magnesium	5.06E-01	2.06E-01	2.80E-01	2.25E+00	4.20E-01
Manganese	7.41E-02	2.02E-02	3.33E-02	4.49E-01	4.61E-02
Nickel	2.04E-03	5.35E-04	9.64E-04	9.46E-03	1.84E-03
Potassium	2.99E-01	8.99E-02	1.31E-01	6.19E-01	2.10E-01
Selenium	< DL	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	1.01E-03	< DL
Sodium	3.22E-01	3.47E-01	3.73E-01	4.85E-01	4.11E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	2.32E-03	6.86E-04	1.19E-03	8.15E-03	2.00E-03
Zinc	8.59E-02	2.35E-02	3.66E-02	9.22E-01	3.56E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-3
TSP and Metals Concentration for May 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	5/2/2018	5/8/2018	5/14/2018	5/20/2018	5/26/2018
Filter Number	18-Q32	18-Q33	18-Q34	18-Q35	18-Q36
TSP[1]	56.2	55.9	51.1	28.2	59.8
TSP	48.9	47.4	44.0	24.9	50.1
Aluminum	5.65E-01	5.90E-01	5.74E-01	3.62E-01	7.23E-01
Antimony	1.36E-03	7.89E-04	< DL	< DL	< DL
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	1.76E-02	2.07E-02	1.63E-02	1.32E-02	2.03E-02
Beryllium	3.96E-05	3.56E-05	< DL	< DL	4.26E-05
Cadmium	1.39E-04	9.58E-05	2.95E-04	3.28E-04	3.70E-04
Calcium	3.21E+00	2.85E+00	2.11E+00	2.04E+00	3.27E+00
Chromium	1.51E-02	7.30E-03	6.17E-03	1.32E-02	1.32E-02
Cobalt	4.38E-04	4.21E-04	5.02E-04	5.08E-04	5.71E-04
Copper	4.20E-02	2.84E-02	3.66E-02	5.88E-02	3.50E-02
Iron	2.08E+00	1.63E+00	1.44E+00	1.73E+00	1.85E+00
Lead	1.06E-02	9.58E-03	9.75E-03	8.98E-03	8.86E-03
Magnesium	6.62E-01	5.24E-01	4.12E-01	4.79E-01	5.83E-01
Manganese	4.46E-01	7.60E-02	9.22E-02	1.47E-01	1.20E-01
Nickel	2.45E-03	1.67E-03	2.21E-03	2.52E-03	2.53E-03
Potassium	2.35E-01	2.51E-01	2.11E-01	1.26E-01	2.58E-01
Selenium	< DL	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL	< DL
Sodium	4.62E-01	4.34E-01	5.40E-01	4.61E-01	5.60E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	3.23E-03	2.37E-03	1.97E-03	2.00E-03	3.07E-03
Zinc	1.07E-01	6.95E-02	7.63E-02	1.03E-01	6.18E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-4
TSP and Metals Concentration for June 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	6/1/2018	6/7/2018	6/13/2018	6/19/2018	6/25/2018
Filter Number	18-Q37	18-Q38	18-Q39	18-Q40	18-Q41
TSP[1]	78.2	132	190	90.9	63.7
TSP	65.3	110	157	75.7	53.5
Aluminum	9.32E-01	1.56E+00	2.27E+00	9.27E-01	6.06E-01
Antimony	< DL	< DL	< DL	< DL	1.28E-03
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	2.73E-02	4.02E-02	5.06E-02	2.32E-02	2.93E-02
Beryllium	4.951E-05	7.983E-05	1.08E-4	3.932E-05	6.65E-05
Cadmium	4.67E-04	6.75E-04	1.24E-03	4.33E-04	2.07E-04
Calcium	3.34E+00	5.28E+00	1.11E+01	3.29E+00	3.21E+00
Chromium	7.92E-03	1.41E-02	4.24E-02	9.63E-03	8.53E-03
Cobalt	8.04E-04	1.04E-03	1.44E-03	6.46E-04	5.42E-04
Copper	3.79E-02	4.14E-02	5.80E-02	2.24E-02	2.99E-02
Iron	2.22E+00	3.22E+00	6.22E+00	1.93E+00	1.98E+00
Lead	1.18E-02	2.02E-02	2.90E-02	1.33E-02	1.29E-02
Magnesium	5.59E-01	1.07E+00	2.46E+00	6.28E-01	5.34E-01
Manganese	7.69E-02	1.68E-01	4.69E-01	1.07E-01	9.06E-02
Nickel	3.26E-03	4.19E-03	6.75E-03	2.55E-03	2.52E-03
Potassium	3.11E-01	5.43E-01	6.87E-01	3.14E-01	2.46E-01
Selenium	< DL	< DL	< DL	< DL	3.62E-03
Silver	< DL	< DL	< DL	< DL	< DL
Sodium	5.28E-01	7.04E-01	8.63E-01	5.43E-01	3.88E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	3.10E-03	5.41E-03	1.01E-02	3.42E-03	2.74E-03
Zinc	5.24E-02	1.57E-01	2.43E-01	6.98E-02	8.41E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-5
TSP and Metals Concentration for July 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)					
Date	7/1/2018	7/7/2018	7/13/2018	7/19/2018	7/25/2018	7/31/2018
Filter Number	18-Q42	18-Q43	18-Q44	18-Q45	18-Q482	18-Q483
TSP[1]	97.2	48.0	Invalid	Invalid	44.4	52.8
TSP	80.9	39.9	Invalid	Invalid	37.1	44.6
Aluminum	9.34E-01	4.89E-01	Invalid	Invalid	3.40E-01	4.59E-01
Antimony	2.85E-03	1.81E-03	Invalid	Invalid	1.19E-03	1.78E-03
Arsenic	< DL	< DL	Invalid	Invalid	< DL	< DL
Barium	3.46E-02	2.15E-02	Invalid	Invalid	1.66E-02	2.41E-02
Beryllium	1.16E-04	5.67E-05	Invalid	Invalid	< DL	2.90E-05
Cadmium	2.42E-04	1.44E-04	Invalid	Invalid	8.25E-05	1.95E-04
Calcium	4.92E+00	2.22E+00	Invalid	Invalid	1.56E+00	2.31E+00
Chromium	1.94E-02	7.78E-03	Invalid	Invalid	3.21E-03	1.07E-02
Cobalt	1.42E-03	3.87E-04	Invalid	Invalid	3.09E-04	3.90E-04
Copper	9.64E-02	2.64E-02	Invalid	Invalid	6.29E-02	9.45E-02
Iron	6.35E+00	1.32E+00	Invalid	Invalid	7.33E-01	1.55E+00
Lead	1.76E-02	8.48E-03	Invalid	Invalid	4.25E-03	9.28E-03
Magnesium	1.09E+00	4.94E-01	Invalid	Invalid	2.56E-01	4.12E-01
Manganese	2.10E-01	8.60E-02	Invalid	Invalid	2.97E-02	8.23E-02
Nickel	1.90E-02	1.61E-03	Invalid	Invalid	1.16E-03	2.33E-03
Potassium	5.42E-01	2.39E-01	Invalid	Invalid	1.64E-01	1.95E-01
Selenium	< DL	3.15E-03	Invalid	Invalid	4.03E-03	5.91E-03
Silver	3.33E-04	< DL	Invalid	Invalid	< DL	< DL
Sodium	4.34E-01	4.05E-01	Invalid	Invalid	3.47E-01	3.80E-01
Thallium	< DL	< DL	Invalid	Invalid	< DL	< DL
Vanadium	4.08E-03	2.21E-03	Invalid	Invalid	1.32E-03	2.20E-03
Zinc	1.29E-01	1.09E-01	Invalid	Invalid	3.15E-02	8.23E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-6
TSP and Metals Concentration for August 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	8/6/2018	8/12/2018	8/18/2018	8/24/2018	8/30/2018
Filter Number	18-Q484	18-Q485	18-Q486	18-Q487	18-Q488
TSP[1]	57.8	54.0	29.7	54.9	47.8
TSP	48.6	45.4	25.1	45.6	39.7
Aluminum	5.42E-01	4.30E-01	2.00E-01	4.18E-01	4.83E-01
Antimony	1.57E-03	1.02E-03	1.31E-03	1.16E-02	1.55E-03
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	2.34E-02	2.04E-02	1.08E-02	1.91E-02	2.16E-02
Beryllium	4.28E-05	3.37E-05	< DL	< DL	3.12E-05
Cadmium	2.70E-04	1.25E-04	< DL	1.27E-04	9.24E-05
Calcium	2.66E+00	2.02E+00	9.29E-01	2.18E+00	2.26E+00
Chromium	1.21E-02	6.15E-03	4.20E-03	7.30E-03	4.03E-03
Cobalt	5.79E-04	3.21E-04	2.00E-04	3.24E-04	3.98E-04
Copper	6.25E-02	5.63E-02	5.54E-02	5.66E-02	5.17E-02
Iron	2.20E+00	1.11E+00	8.42E-01	1.21E+00	9.93E-01
Lead	1.36E-02	5.98E-03	2.92E-03	7.41E-03	5.77E-03
Magnesium	5.33E-01	4.58E-01	2.08E-01	4.54E-01	3.64E-01
Manganese	1.05E-01	7.60E-02	4.23E-02	1.18E-01	4.69E-02
Nickel	3.60E-03	1.53E-03	1.32E-03	1.79E-03	1.43E-03
Potassium	2.86E-01	3.03E-01	1.30E-01	2.62E-01	2.19E-01
Selenium	< DL	3.97E-03	5.56E-03	2.63E-03	2.99E-03
Silver	< DL	< DL	< DL	< DL	< DL
Sodium	3.86E-01	3.70E-01	3.05E-01	3.93E-01	3.81E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	2.84E-03	1.67E-03	9.06E-04	1.82E-03	1.86E-03
Zinc	1.30E-01	4.54E-02	4.20E-02	6.66E-02	3.56E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-7
TSP and Metals Concentration for September 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	9/5/2018	9/11/2018	9/17/2018	9/23/2018	9/29/2018
Filter Number	18-Q489	18-Q490	18-Q491	18-Q493	18-Q494
TSP[1]	29.9	63.2	60.5	50.1	47.9
TSP	25.6	52.5	50.1	42.0	40.9
Aluminum	2.29E-01	6.72E-01	6.59E-01	4.82E-01	5.70E-01
Antimony	8.38E-04	1.12E-03	1.12E-03	9.81E-04	< DL
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	1.28E-02	3.68E-02	2.93E-02	2.39E-02	2.15E-02
Beryllium	< DL	5.16E-05	4.05E-05	3.66E-05	3.11E-05
Cadmium	< DL	3.66E-04	3.97E-04	2.95E-04	4.12E-04
Calcium	9.78E-01	3.24E+00	3.46E+00	2.66E+00	3.10E+00
Chromium	3.51E-03	9.27E-03	9.71E-03	8.71E-03	1.10E-02
Cobalt	2.22E-04	5.46E-04	5.20E-04	4.17E-04	4.54E-04
Copper	5.10E-02	7.07E-02	6.82E-02	7.84E-02	6.68E-02
Iron	5.82E-01	1.89E+00	1.71E+00	1.51E+00	1.85E+00
Lead	3.71E-03	1.08E-02	1.54E-02	8.42E-03	1.13E-02
Magnesium	1.99E-01	5.46E-01	6.65E-01	4.74E-01	5.17E-01
Manganese	2.95E-02	9.33E-02	1.02E-01	9.05E-02	1.26E-01
Nickel	1.05E-03	2.68E-03	2.45E-03	1.96E-03	1.97E-03
Potassium	1.09E-01	2.79E-01	3.13E-01	1.94E-01	2.45E-01
Selenium	2.96E-03	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL	< DL
Sodium	2.95E-01	4.67E-01	4.83E-01	4.26E-01	3.83E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	8.91E-04	2.35E-03	2.39E-03	1.75E-03	2.24E-03
Zinc	2.35E-02	8.28E-02	2.09E-01	6.85E-02	2.34E-01

1. Units in µg/std. m^3

DL=Detection Limit

Table B-8
TSP and Metals Concentration for October 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	10/5/2018	10/11/2018	10/17/2018	10/23/2018	10/29/2018
Filter Number	18-Q495	18-Q496	18-Q497	18-Q498	18-Q499
TSP[1]	117	23.8	35.0	57.8	58.1
TSP	100	21.1	31.2	50.3	50.1
Aluminum	1.02E+00	2.02E-01	4.52E-01	6.52E-01	6.23E-01
Antimony	1.53E-03	7.47E-04	1.06E-03	9.46E-04	1.75E-03
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	3.43E-02	1.46E-02	2.49E-02	2.89E-02	3.34E-02
Beryllium	6.67E-05	< DL	< DL	3.29E-05	3.55E-05
Cadmium	4.43E-04	1.35E-04	3.24E-04	3.78E-04	3.31E-04
Calcium	4.14E+00	9.31E-01	2.91E+00	3.39E+00	3.66E+00
Chromium	7.55E-03	3.66E-03	1.14E-02	9.22E-03	1.33E-02
Cobalt	6.91E-04	2.08E-04	3.56E-04	5.22E-04	4.29E-04
Copper	8.02E-02	9.54E-02	7.60E-02	1.16E-01	1.37E-01
Iron	2.22E+00	6.52E-01	1.81E+00	1.90E+00	1.98E+00
Lead	1.66E-02	4.41E-03	9.90E-03	1.11E-02	7.68E-03
Magnesium	6.79E-01	1.74E-01	6.07E-01	4.73E-01	5.73E-01
Manganese	9.95E-02	2.97E-02	1.22E-01	8.28E-02	1.14E-01
Nickel	2.78E-03	1.12E-03	2.23E-03	2.77E-03	2.67E-03
Potassium	3.96E-01	7.71E-02	1.20E-01	2.59E-01	2.23E-01
Selenium	< DL	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL	< DL
Sodium	3.80E-01	3.17E-01	4.14E-01	4.12E-01	4.24E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	3.19E-03	7.53E-04	1.87E-03	2.35E-03	2.58E-03
Zinc	9.25E-02	4.41E-02	9.02E-02	9.75E-02	7.68E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-9
TSP and Metals Concentration for November 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	11/4/2018	11/10/2018	11/16/2018	11/22/2018	11/28/2018
Filter Number	18-Q500	18-Q501	18-Q502	18-Q503	18-Q504
TSP[1]	22.7	31.6	76.8	33.4	41.6
TSP	20.1	28.3	68.5	29.6	36.1
Aluminum	2.09E-01	3.01E-01	8.97E-01	3.37E-01	4.14E-01
Antimony	7.53E-04	< DL	3.12E-03	9.66E-04	1.58E-03
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	1.44E-02	1.56E-02	5.72E-02	1.90E-02	2.32E-02
Beryllium	< DL	< DL	5.08E-05	< DL	3.98E-05
Cadmium	1.44E-04	1.98E-04	5.37E-04	1.93E-04	3.68E-04
Calcium	1.67E+00	1.47E+00	3.80E+00	1.95E+00	2.87E+00
Chromium	5.05E-03	5.05E-03	7.08E-03	7.30E-03	8.96E-03
Cobalt	2.13E-04	2.99E-04	8.26E-04	2.57E-04	4.38E-04
Copper	7.30E-02	1.37E-01	9.74E-02	4.65E-02	5.91E-02
Iron	8.24E-01	8.57E-01	2.34E+00	1.13E+00	1.72E+00
Lead	3.23E-03	3.77E-03	1.13E-02	4.65E-03	7.90E-03
Magnesium	2.38E-01	2.32E-01	6.38E-01	3.58E-01	4.53E-01
Manganese	5.23E-02	3.58E-02	8.09E-02	7.60E-02	7.84E-02
Nickel	1.22E-03	1.50E-03	3.29E-03	1.53E-03	2.99E-03
Potassium	8.42E-02	1.28E-01	3.46E-01	1.45E-01	1.65E-01
Selenium	< DL	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL	< DL
Sodium	3.15E-01	3.41E-01	6.91E-01	4.25E-01	4.11E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	8.18E-04	1.09E-03	2.63E-03	1.38E-03	2.17E-03
Zinc	9.06E-02	3.45E-02	1.17E-01	4.52E-02	5.84E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-10
TSP and Metals Concentration for December 2018
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	12/4/2018	12/10/2018	12/16/2018	12/22/2018	12/28/2018
Filter Number	18-Q505	18-Q765	18-Q766	18-Q767	18-Q768
TSP[1]	21.4	65.6	31.0	47.5	44.1
TSP	19.8	60.2	28.1	43.0	41.0
Aluminum	1.99E-01	7.01E-01	4.88E-01	6.69E-01	6.34E-01
Antimony	< DL	2.13E-03	2.23E-03	7.75E-04	< DL
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	1.47E-02	4.85E-02	2.39E-02	2.47E-02	2.23E-02
Beryllium	< DL	4.75E-05	3.54E-05	3.73E-05	3.65E-05
Cadmium	2.38E-04	8.01E-04	1.19E-04	1.43E-04	2.57E-04
Calcium	1.38E+00	3.96E+00	1.97E+00	3.10E+00	3.47E+00
Chromium	6.97E-03	7.72E-03	4.36E-03	9.59E-03	1.88E-02
Cobalt	2.04E-04	5.86E-04	3.25E-04	3.94E-04	5.96E-04
Copper	4.40E-02	9.56E-02	6.49E-02	8.52E-02	5.74E-02
Iron	1.08E+00	1.98E+00	1.06E+00	1.91E+00	2.85E+00
Lead	3.51E-03	1.18E-02	5.12E-03	8.05E-03	1.45E-02
Magnesium	3.21E-01	5.87E-01	3.37E-01	5.91E-01	9.21E-01
Manganese	4.80E-02	8.31E-02	5.58E-02	1.07E-01	2.21E-01
Nickel	1.71E-03	2.61E-03	1.19E-03	2.18E-03	4.15E-03
Potassium	8.52E-02	3.16E-01	2.64E-01	2.72E-01	2.47E-01
Selenium	< DL	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL	3.78E-04
Sodium	3.96E-01	4.33E-01	4.73E-01	4.88E-01	4.19E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	1.21E-03	2.93E-03	1.81E-03	2.91E-03	3.54E-03
Zinc	2.81E-02	9.97E-02	3.68E-02	7.93E-02	1.23E-01

1. Units in µg/std. m^3

DL=Detection Limit

Table B-11
TSP and Metals Concentration for January 2019
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)				
Date	1/3/2019	1/9/2019	1/15/2019	1/21/2019	1/27/2019
Filter Number	18-Q769	18-Q770	18-Q771	18-Q772	18-Q773
TSP[1]	14.6	64.7	46.4	42.6	20.0
TSP	13.4	59.5	41.9	37.2	17.8
Aluminum	1.70E-01	1.02E+00	6.86E-01	5.24E-01	2.73E-01
Antimony	< DL	4.36E-03	1.57E-03	< DL	< DL
Arsenic	< DL	< DL	< DL	< DL	< DL
Barium	1.89E-02	4.83E-02	4.06E-02	1.81E-02	1.37E-02
Beryllium	< DL	5.70E-05	3.67E-05	3.35E-05	< DL
Cadmium	8.46E-05	3.04E-04	1.71E-04	9.39E-05	1.17E-04
Calcium	7.56E-01	3.88E+00	2.54E+00	2.11E+00	9.06E-01
Chromium	2.22E-03	1.03E-02	6.03E-03	6.93E-03	3.11E-03
Cobalt	1.36E-04	6.29E-04	4.56E-04	3.39E-04	1.60E-04
Copper	4.84E-02	7.36E-02	5.59E-02	4.45E-02	4.06E-02
Iron	4.91E-01	2.38E+00	1.79E+00	1.32E+00	6.83E-01
Lead	1.92E-03	1.13E-02	9.40E-03	6.34E-03	3.28E-03
Magnesium	1.51E-01	6.53E-01	4.19E-01	3.51E-01	1.93E-01
Manganese	1.41E-02	2.10E-01	7.98E-02	6.87E-02	2.48E-02
Nickel	9.17E-04	3.09E-03	2.41E-03	2.16E-03	1.30E-03
Potassium	1.54E-01	4.47E-01	2.93E-01	2.33E-01	1.39E-01
Selenium	< DL	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL	< DL
Sodium	4.95E-01	6.41E-01	5.82E-01	4.64E-01	4.71E-01
Thallium	< DL	< DL	< DL	< DL	< DL
Vanadium	6.19E-04	3.76E-03	2.68E-03	2.18E-03	9.48E-04
Zinc	1.54E-02	1.15E-01	9.93E-02	3.97E-02	2.78E-02

1. Units in µg/std. m^3

DL=Detection Limit

Table B-12
TSP and Metals Concentration for February 2019 (and March 4, 2019)
Dance Studio Sampler for the Colorado Smelter Superfund Site
Pueblo, Colorado

	Sample Concentration (µg/actual m^3)					
Date	2/2/2019	2/8/2019	2/14/2019	2/20/2019	2/26/2019	3/4/2019
Filter Number	18-Q774	18-Q775	18-Q776	18-Q776	18-Q778	18-Q987
TSP[1]	40.9	54.6	53.6	30.3	37.5	31.2
TSP	36.0	50.9	46.5	27.7	33.6	29.7
Aluminum	5.43E-01	7.05E-01	5.16E-01	2.27E-01	3.20E-01	2.36E-01
Antimony	1.21E-03	2.23E-03	< DL	< DL	1.06E-03	< DL
Arsenic	< DL	< DL	< DL	< DL	< DL	< DL
Barium	2.11E-02	3.41E-02	1.67E-02	1.33E-02	1.42E-02	1.11E-02
Beryllium	3.22E-05	4.51E-05	4.41E-05	< DL	< DL	< DL
Cadmium	4.54E-04	2.84E-04	1.06E-04	1.76E-04	9.96E-05	1.03E-04
Calcium	2.29E+00	3.01E+00	2.28E+00	2.27E+00	2.01E+00	1.50E+00
Chromium	5.66E-03	1.11E-02	3.44E-03	9.20E-03	7.34E-03	3.97E-03
Cobalt	3.64E-04	4.95E-04	3.66E-04	2.02E-04	3.96E-04	1.78E-04
Copper	5.60E-02	5.32E-02	1.80E-02	3.60E-02	4.08E-02	3.32E-02
Iron	1.30E+00	2.12E+00	1.01E+00	1.36E+00	1.61E+00	7.02E-01
Lead	7.73E-03	1.21E-02	8.82E-03	5.64E-03	8.25E-03	5.59E-03
Magnesium	3.63E-01	5.89E-01	3.44E-01	5.15E-01	3.67E-01	3.14E-01
Manganese	5.91E-02	1.04E-01	4.16E-02	8.71E-02	8.13E-02	4.84E-02
Nickel	1.78E-03	2.71E-03	1.38E-03	2.29E-03	2.63E-03	1.30E-03
Potassium	2.65E-01	3.62E-01	2.46E-01	1.04E-01	1.52E-01	1.32E-01
Selenium	< DL	< DL	< DL	< DL	< DL	< DL
Silver	< DL	< DL	< DL	< DL	< DL	< DL
Sodium	4.99E-01	6.43E-01	3.81E-01	5.69E-01	3.75E-01	1.42E+00
Thallium	< DL	< DL	< DL	< DL	< DL	< DL
Vanadium	2.26E-03	2.95E-03	1.93E-03	1.46E-03	1.74E-03	1.00E-03
Zinc	5.05E-02	8.35E-02	3.56E-02	8.52E-02	6.30E-02	5.86E-02

1. Units in µg/std. m^3

DL=Detection Limit

Appendix C

EVRAZ Hourly Meteorology for Selected High TSP Concentration Days

Table C-1
EVRAZ Meteorological Data
March 15, 2018

Date	Time	Pressure (mmhg)	Delta Temp-erature (ºC)	Peak Wind Speed (m/s)	Relative Humidity (percent)	Precip-itation (mm/hr)	Sigma Theta of WD (Deg)	Solar Radiation (W/m^2)	Wind Speed (m/s)	Temp-erature (ºC)	Wind Direction (deg)
3/15/2018	0	632 7	0 76	4 9	40 2	0	60 2	0	1 5	6 4	280
3/15/2018	100	632 2	0 52	3 6	45 6	0	56 9	0	1 6	5 1	328
3/15/2018	200	631 9	0 28	4 9	45 4	0	25 1	0	2 4	4 5	314
3/15/2018	300	631 6	0 32	4 5	45 3	0	28 2	0	2 3	4 5	279
3/15/2018	400	631 5	0 44	3 7	50 3	0	36 9	0	1 7	3 9	304
3/15/2018	500	631 5	0 42	3 2	50 4	0	45 3	0	1 4	3 0	304
3/15/2018	600	631 5	0 48	3 9	55 1	0	42 4	29 0	1 6	2 8	324
3/15/2018	700	631 5	-0 12	3 7	49 1	0	15 1	171 8	2 0	4 1	323
3/15/2018	800	631 1	-0 32	3 2	39 0	0	18 8	371 3	1 4	8 0	299
3/15/2018	900	630 7	-0 64	4 1	27 2	0	14 7	615 6	2 2	14 2	301
3/15/2018	1000	629 9	-0 70	6 2	19 0	0	20 9	748 3	3 5	18 5	334
3/15/2018	1100	629	-0 86	5 7	17 2	0	51 7	817 4	2 2	19 8	306
3/15/2018	1200	628	-0 82	7 2	15 5	0	47 8	820 8	2 8	20 9	292
3/15/2018	1300	626 8	-0 66	14 2	12 7	0	70 3	761 1	3 2	21 8	214
3/15/2018	1400	626 2	-0 54	15 6	9 2	0	15 4	659 3	8 9	22 0	207
3/15/2018	1500	626 2	-0 36	17 5	10 2	0	17 5	484 0	9 5	20 5	213
3/15/2018	1600	626 5	-0 08	16 7	20 8	0	22 1	123 2	7 5	17 1	234
3/15/2018	1700	626 6	0 02	10 7	23 1	0	17 4	38 5	5 7	15 8	216
3/15/2018	1800	626 5	0 12	9 5	24 0	0	19 9	0	3 7	14 8	249
3/15/2018	1900	626 5	0 12	7 4	23 8	0	12 7	0	3 9	13 3	285
3/15/2018	2000	626 7	0 14	12 5	24 1	0	15 4	0	4 6	12 3	283
3/15/2018	2100	627 5	0 06	14 5	27 1	0	14 6	0	7 2	12 0	317
3/15/2018	2200	628 0	0 06	13 7	36 5	0	14 4	0	7 0	10 6	314
3/15/2018	2300	628 1	0 06	7 3	59 4	0	17 6	0	3 3	8 5	12

Table C-2
EVRAZ Meteorological Data
April 20, 2018

Date	Time	Pressure (mmhg)	Delta Temp-erature (ºC)	Peak Wind Speed (m/s)	Relative Humidity (percent)	Precip-itation (mm/hr)	Sigma Theta of WD (Deg)	Solar Radiation (W/m^2)	Wind Speed (m/s)	Temp-erature (ºC)	Wind Direction (deg)
4/20/2018	0	636 9	0 20	13 8	26 0	0	12 3	0	7 2	14 9	149
4/20/2018	100	636 1	0 16	15 3	26 4	0	9 9	0	9 0	14 0	162
4/20/2018	200	635 7	0 14	19 7	26 1	0	10 5	0	10 8	12 9	152
4/20/2018	300	635 6	0 14	15 5	28 0	0	10 9	0	9 4	11 2	135
4/20/2018	400	635 7	0 14	15 1	35 0	0	10 0	0	9 6	9 0	120
4/20/2018	500	636 1	0 12	14 6	37 9	0	14 2	15 6	6 5	8 5	99
4/20/2018	600	636 2	0 04	14 7	36 3	0	10 8	64 3	8 3	9 7	129
4/20/2018	700	636 3	-0 08	13 2	35 8	0	9 8	152 6	8 3	10 6	121
4/20/2018	800	636 1	-0 28	14 3	34 6	0	12 7	332 1	9 0	12 4	149
4/20/2018	900	635 7	-0 42	13 3	32 9	0	12 0	402 9	8 1	14 1	142
4/20/2018	1000	635 3	-0 30	13 0	32 8	0	13 7	231 1	8 4	14 7	131
4/20/2018	1100	634 5	-0 50	15 7	30 9	0	13 2	502 4	9 2	16 2	156
4/20/2018	1200	634 3	-0 52	16 2	30 7	0	11 9	352 7	9 6	16 2	162
4/20/2018	1300	635 4	-0 24	15 3	41 5	0	21 4	135 2	6 6	13 3	202
4/20/2018	1400	635 5	-0 46	9 9	40 2	0	48 1	369 4	3 6	13 4	135
4/20/2018	1500	635 5	-0 30	12 3	44 7	0	15 6	143 6	6 2	12 3	64
4/20/2018	1600	636 1	-0 18	14 5	56 7	0	14 3	159 8	7 9	10 2	90
4/20/2018	1700	636 9	-0 14	14 0	66 9	0	14 2	106 9	7 9	7 5	93
4/20/2018	1800	637 7	-0 04	12 3	73 6	0	14 2	8 4	7 4	5 8	95
4/20/2018	1900	638 9	-0 02	10 9	75 3	0	15 0	0	5 4	5 2	97
4/20/2018	2000	639 6	-0 04	11 7	76 6	0	12 2	0	6 9	4 8	108
4/20/2018	2100	639 8	-0 04	10 9	78 0	0	13 1	0	6 1	4 1	110
4/20/2018	2200	639 7	-0 04	9 4	75 2	0	12 1	0	5 1	4 5	126
4/20/2018	2300	639 6	-0 02	6 7	73 4	0	15 0	0	2 9	4 8	114

Table C-3
EVRAZ Meteorological Data
June 7, 2018

Date	Time	Pressure (mmhg)	Delta Temp-erature (ºC)	Peak Wind Speed (m/s)	Relative Humidity (percent)	Precip-itation (mm/hr)	Sigma Theta of WD (Deg)	Solar Radiation (W/m^2)	Wind Speed (m/s)	Temp-erature (ºC)	Wind Direction (deg)
6/7/2018	100	637 7	0 12	9 7	49 3	0	17 4	0	5 4	20 6	352
6/7/2018	200	638 5	0 14	11	54 5	0	16 4	0	4 9	19 5	355
6/7/2018	300	639 8	0 16	6 7	58 8	0	15 3	0	3 1	18 4	8
6/7/2018	400	640 9	0 22	3 4	62 6	0	15 2	3 3	1 6	17 6	18
6/7/2018	500	641 6	-0 1	2 8	60 3	0	26 6	141 6	1 2	18 1	6
6/7/2018	600	641 8	-0 46	3 4	56 2	0	36 8	332 5	1 4	19 4	116
6/7/2018	700	641 5	-0 68	3 9	53 9	0	44 9	457 1	1 5	20 5	84
6/7/2018	800	641 1	-0 74	3 7	51	0	51 2	676 8	1 4	21 6	127
6/7/2018	900	640 6	-0 9	4 0	46 3	0	55	837 1	1 5	23 5	61
6/7/2018	1000	640 0	-1 06	5 1	42 2	0	52 9	954 4	2 0	25	68
6/7/2018	1100	639 5	-1 28	6 4	34 5	0	46 1	1012	2 3	27 9	106
6/7/2018	1200	639	-0 88	6 2	27 9	0	19 8	492 8	3 4	29 3	98
6/7/2018	1300	638 4	-0 62	9 2	23 5	0	19 1	374 3	4 7	30 1	111
6/7/2018	1400	637 6	-1 00	9 6	17 3	0	19 6	826 4	5 5	32 8	95
6/7/2018	1500	637 3	-0 80	10 7	12 4	0	16 1	496 9	6 0	33 7	127
6/7/2018	1600	636 8	-0 26	12 8	15 6	0	12 6	126 7	7 4	31 8	121
6/7/2018	1700	638 0	-0 12	18 1	27 7	0	35 6	25 3	6 9	26 5	2
6/7/2018	1800	638 3	-0 04	9 8	25 6	0	16	85 9	5 2	26 6	77
6/7/2018	1900	638 7	0 14	10 6	22 7	0	12 3	3 4	6	26 8	113
6/7/2018	2000	639 4	0 20	9 6	25 7	0	10 7	0	4 2	25 3	134
6/7/2018	2100	639 9	0 18	6 3	41 5	0	11 3	0	3 7	23 8	148
6/7/2018	2200	639 8	0 16	5 5	54 4	0	10 9	0	3 1	22 7	171
6/7/2018	2300	639 8	0 44	3 6	57 8	0	17 5	0	1 8	21 3	41

Table C-4
EVRAZ Meteorological Data
June 13, 2018

Date	Time	Pressure (mmhg)	Delta Temp-erature (ºC)	Peak Wind Speed (m/s)	Relative Humidity (percent)	Precip-itation (mm/hr)	Sigma Theta of WD (Deg)	Solar Radiation (W/m^2)	Wind Speed (m/s)	Temp-erature (ºC)	Wind Direction (deg)
6/13/2018	0	640 5	0 18	4 7	61 4	0	18 6	0	2 0	23 0	89
6/13/2018	100	640 4	0 20	4 1	66 2	0	15 6	0	2 0	22 1	46
6/13/2018	200	640 8	0 20	5 1	69 5	0	16 3	0	2 5	21 3	79
6/13/2018	300	640 4	0 22	4 2	72 9	0	22 3	0	1 9	20 3	92
6/13/2018	400	640 2	0 20	3 2	75 3	0	19 9	1 2	1 5	19 7	345
6/13/2018	500	640 5	0 02	4 0	71 1	0	15 6	100 7	1 9	19 9	24
6/13/2018	600	640 7	-0 30	2 4	62 0	0	39 7	282 6	0 9	21 1	17
6/13/2018	700	641 1	-0 52	3 8	55 8	0	56 2	472 4	1 4	23 7	183
6/13/2018	800	641 2	-0 66	5 1	50 7	0	39 5	663 1	2 1	25 7	162
6/13/2018	900	640 6	-0 64	5 3	38 8	0	67 7	820 3	1 6	27 6	150
6/13/2018	1000	639 9	-1 02	5 6	29 8	0	58 8	928 7	2 1	30 4	121
6/13/2018	1100	638 9	-1 12	12 4	21 2	0	34 3	991 2	4 0	33 3	167
6/13/2018	1200	638	-0 96	9 6	17 1	0	32 5	722 2	4 2	34 5	178
6/13/2018	1300	637 2	-0 62	17 3	10 1	0	47 3	455 8	4 2	34 7	239
6/13/2018	1400	637 2	-0 30	16 0	19 0	0	23 0	69 1	7 8	30 8	185
6/13/2018	1500	636 9	-0 12	19 8	17 8	0	12 6	53 7	10 6	30 5	168
6/13/2018	1600	637 1	-0 12	17 2	17 3	0	10 7	112 7	11 0	29 6	174
6/13/2018	1700	637 2	-0 3	17 7	16 9	0	9 0	262	11 2	29 9	170
6/13/2018	1800	637 2	-0 12	16 7	18 2	0	8 8	100 9	9 6	28 9	173
6/13/2018	1900	637 6	0 08	12 6	20 0	0	9 6	3 4	7 3	27 7	164
6/13/2018	2000	638 4	0 20	9 8	23 0	0	27 4	0	4 5	26 2	120
6/13/2018	2100	638 6	0 20	10 3	25 9	0	11 4	0	5 8	24 7	124
6/13/2018	2200	638 6	0 14	8 4	29 8	0	13 1	0	4 3	22 9	152
6/13/2018	2300	638 2	0 18	5 8	32 6	0	17 8	0	3 1	21 2	182

Table C-5
EVRAZ Meteorological Data
October 5, 2018

Date	Time	Pressure (mmhg)	Delta Temp-erature (ºC)	Peak Wind Speed (m/s)	Relative Humidity (percent)	Precip-itation (mm/hr)	Sigma Theta of WD (Deg)	Solar Radiation (W/m^2)	Wind Speed (m/s)	Temp-erature (ºC)	Wind Direction (deg)
10/5/2018	0	637 3	0 26	3 3	69 1	0	14 4	0	2 0	9 5	290
10/5/2018	100	636 9	0 24	5 5	69 6	0	23 6	0	2 2	9 1	310
10/5/2018	200	636 6	0 22	3 1	72 0	0	21 3	0	1 6	8 3	322
10/5/2018	300	636 6	0 28	2 5	73 6	0	21 4	0	1 2	7 8	309
10/5/2018	400	636 8	0 52	1 9	76 8	0	29 9	0	1 1	7 4	303
10/5/2018	500	636 9	0 30	2 9	78 4	0	12 8	0	1 6	6 9	305
10/5/2018	600	636 9	0 02	2 8	76 2	0	27 7	92 1	1 3	7 0	305
10/5/2018	700	637	-0 28	3 5	66 0	0	22 1	282 3	1 7	9 7	329
10/5/2018	800	636 8	-0 52	3 2	53 5	0	29 7	465 3	1 5	14 0	323
10/5/2018	900	636 6	-0 52	3 0	42 2	0	47 1	599 6	0 9	18 0	46
10/5/2018	1000	636 1	-0 84	3 2	26 9	0	30 5	715 9	1 7	22 1	42
10/5/2018	1100	635 5	-1 00	4 6	18 3	0	36 6	763 5	2 0	24 1	48
10/5/2018	1200	634 8	-1 04	5 1	13 9	0	31 1	751	2 6	25 8	31
10/5/2018	1300	634 4	-0 90	6 7	11 4	0	39 6	678 5	2 3	26 7	333
10/5/2018	1400	634 2	-0 74	3 9	10 9	0	51 2	544 6	1 7	27 2	356
10/5/2018	1500	634 1	-0 54	4 9	9 8	0	37 0	362 7	2 4	27 2	314
10/5/2018	1600	634 3	-0 24	3 7	10 7	0	20 5	161 6	2 0	26 7	359
10/5/2018	1700	636 0	-0 04	18 7	35 3	0	24 6	18 8	9 1	18 3	16
10/5/2018	1800	637 7	0 02	15 4	49 5	0	16 4	0	8 4	13 7	23
10/5/2018	1900	639 8	0 08	12 1	50 9	0	20 5	0	5 3	12 3	31
10/5/2018	2000	640 9	0 04	9 7	51 9	0	21 1	0	4 3	11 3	43
10/5/2018	2100	641 8	-0 04	8 4	53 3	0	15 4	0	4 5	10 2	67
10/5/2018	2200	642 4	-0 02	8 2	53 8	0	14 9	0	3 3	9 6	73
10/5/2018	2300	642 4	-0 04	6 5	52 8	0	14 8	0	3 3	9 1	102