

Attachment 9

Air Monitoring Reports

**June 2014
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for June 2014 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: June 2014

(This revised version replaces the original report dated August 20, 2014)

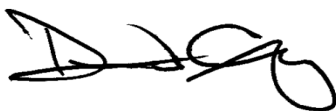
Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: June 2014

(This revised version replaces the original report dated August 20, 2014)



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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and June 30, 2014. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E-}06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|------------------------------|------------------------------|
| PM_{10} | 255 $\mu\text{g}/\text{m}^3$ | 339 $\mu\text{g}/\text{m}^3$ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and June 30, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | NA | NA | NA | NA | NA |
| 60-day² | 40 | NA | NA | NA | NA | NA |
| 90-day² | 35 | NA | NA | NA | NA | NA |
| PTD³ | | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| <p>ng/m³ – nanograms per cubic meter</p> <ol style="list-style-type: none"> Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period. | | | | | | |

Stations AMS-1 through AMS-5 started on June 11th and do not have 30 days of data available.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 15 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.40% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of June included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the June 2014 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|---|-------|-------|-------|-------|-------|
| (Baseline Sampling) Friday, June 06, 2014 | 7.5 | 7.5 | 8.0 | 8.0 | 8.5 |
| (Baseline Sampling) Saturday, June 07, 2014 | | | 8.0 | | |
| (Baseline Sampling) Sunday, June 08, 2014 | | | 8.0 | | |
| Monday, June 09, 2014 | | | | | |
| Tuesday, June 10, 2014 | | | | | |
| Wednesday, June 11, 2014 | 6.0 | 6.0 | 2.4 | 6.0 | 6.0 |
| Thursday, June 12, 2014 | 6.0 | 6.0 | 2.4 | 6.0 | 6.0 |
| Friday, June 13, 2014 | 7.0 | 7.0 | 0.7 | 7.0 | 7.0 |
| Saturday, June 14, 2014 | 8.0 | 8.0 | 0.7 | 8.0 | 8.0 |
| Sunday, June 15, 2014 | | | 0.7 | | |
| Monday, June 16, 2014 | 7.0 | 7.0 | 0.7 | 7.0 | 7.0 |
| Tuesday, June 17, 2014 | 6.5 | 6.5 | 2.3 | 6.5 | 6.5 |
| Wednesday, June 18, 2014 | 7.0 | 7.0 | 0.4 | 7.0 | 7.0 |
| Thursday, June 19, 2014 | 6.5 | 6.5 | 1.8 | 6.5 | 6.5 |
| Friday, June 20, 2014 | 7.5 | 7.5 | 0.3 | 7.5 | 7.5 |
| Saturday, June 21, 2014 | | | 0.3 | | |
| Sunday, June 22, 2014 | | | 0.3 | | |
| Monday, June 23, 2014 | 7.0 | 7.0 | 2.4 | 6.5 | 6.5 |
| Tuesday, June 24, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Wednesday, June 25, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, June 26, 2014 | 7.0 | 7.0 | 1.8 | 7.0 | 7.0 |
| Friday, June 27, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Saturday, June 28, 2014 | | | 0.8 | | |
| Sunday, June 29, 2014 | | | 0.8 | | |
| Monday, June 30, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Samples from June 6 through June 8 consist of Baseline Sampling and are not calculated into averages and totals.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|---|-------|-------|-------|-------|-------|
| (Baseline Sampling) Friday, June 06, 2014 | 36.0 | 37.5 | 38.5 | 40.0 | 41.0 |
| (Baseline Sampling) Saturday, June 07, 2014 | | | 38.5 | | |
| (Baseline Sampling) Sunday, June 08, 2014 | | | 38.5 | | |
| Monday, June 09, 2014 | | | | | |
| Tuesday, June 10, 2014 | | | | | |
| Wednesday, June 11, 2014 | 30.5 | 30.5 | 11.5 | 30.5 | 30.5 |
| Thursday, June 12, 2014 | 30.0 | 30.0 | 11.5 | 30.5 | 78.0 |
| Friday, June 13, 2014 | 34.5 | 34.5 | 7.8 | 34.5 | 34.5 |
| Saturday, June 14, 2014 | 40.0 | 40.5 | 7.8 | 40.5 | 40.5 |
| Sunday, June 15, 2014 | | | 7.8 | | |
| Monday, June 16, 2014 | 33.5 | 68.0 | 130.0 | 33.5 | 33.5 |
| Tuesday, June 17, 2014 | 32.0 | 140.0 | 11.5 | 77.0 | 67.0 |
| Wednesday, June 18, 2014 | 35.0 | 34.5 | 2.0 | 34.0 | 34.0 |
| Thursday, June 19, 2014 | 32.0 | 32.0 | 28.0 | 32.0 | 32.0 |
| Friday, June 20, 2014 | 36.5 | 36.5 | 8.8 | 83.0 | 36.5 |
| Saturday, June 21, 2014 | | | 8.8 | | |
| Sunday, June 22, 2014 | | | 8.8 | | |
| Monday, June 23, 2014 | 84.0 | 140.0 | 11.5 | 33.0 | 86.0 |
| Tuesday, June 24, 2014 | 33.0 | 33.0 | 56.0 | 33.0 | 87.0 |
| Wednesday, June 25, 2014 | 84.0 | 35.0 | 49.0 | 35.0 | 100.0 |
| Thursday, June 26, 2014 | 35.0 | 35.0 | 8.5 | 35.0 | 35.0 |
| Friday, June 27, 2014 | 32.5 | 32.5 | 16.0 | 32.5 | 89.0 |
| Saturday, June 28, 2014 | | | 16.0 | | |
| Sunday, June 29, 2014 | | | 16.0 | | |
| Monday, June 30, 2014 | 33.0 | 69.0 | 48.0 | 33.0 | 130.0 |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Samples from June 6 through June 8 consist of Baseline Sampling and are not calculated into averages and totals.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

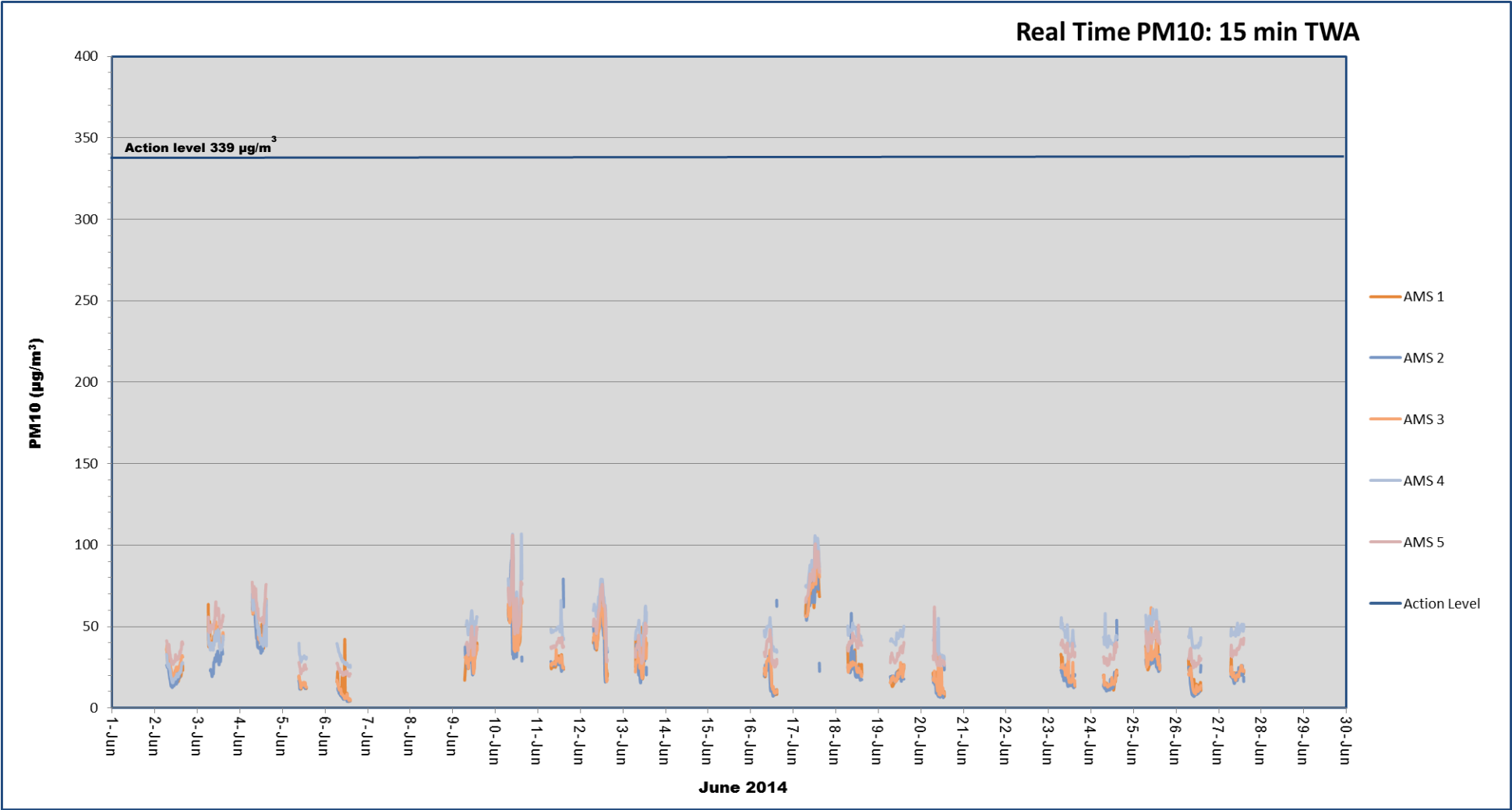


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|--------------------------|-------|---|-------------------|--------------|
| Sunday, June 01, 2014 | - | - | - | - |
| Monday, June 02, 2014 | - | - | - | - |
| Tuesday, June 03, 2014 | - | - | - | - |
| Wednesday, June 04, 2014 | - | - | - | - |
| Thursday, June 05, 2014 | - | - | - | - |
| Friday, June 06, 2014 | - | - | - | - |
| Saturday, June 07, 2014 | - | - | - | - |
| Sunday, June 08, 2014 | - | - | - | - |
| Monday, June 09, 2014 | - | - | - | - |
| Tuesday, June 10, 2014 | - | - | - | - |
| Wednesday, June 11, 2014 | 8:25 | 37.0 | 0.0 | DW Perimeter |
| Thursday, June 12, 2014 | 8:40 | 46.0 | 0.0 | DW Perimeter |
| Friday, June 13, 2014 | 11:15 | 58.0 | 0.0 | DW Perimeter |
| Saturday, June 14, 2014 | - | - | - | - |
| Sunday, June 15, 2014 | - | - | - | - |
| Monday, June 16, 2014 | 10:21 | 83.0 | 0.0 | DW Perimeter |
| Tuesday, June 17, 2014 | 10:30 | 67.0 | 0.0 | DW Perimeter |
| Wednesday, June 18, 2014 | 11:59 | 42.0 | 0.0 | DW Perimeter |
| Thursday, June 19, 2014 | 11:21 | 30.0 | 0.0 | DW Perimeter |
| Friday, June 20, 2014 | 10:50 | 43.0 | 0.0 | DW Perimeter |
| Saturday, June 21, 2014 | - | - | - | - |
| Sunday, June 22, 2014 | - | - | - | - |
| Monday, June 23, 2014 | 7:40 | 72.0 | 0.0 | DW Perimeter |
| Tuesday, June 24, 2014 | 7:00 | 180.0 | 0.0 | DW Perimeter |
| Wednesday, June 25, 2014 | 7:06 | 36.0 | 0.0 | DW Perimeter |
| Thursday, June 26, 2014 | 7:10 | 72.0 | 0.0 | DW Perimeter |
| Friday, June 27, 2014 | 7:30 | 86.0 | 0.0 | DW Perimeter |
| Saturday, June 28, 2014 | - | - | - | - |
| Sunday, June 29, 2014 | - | - | - | - |
| Monday, June 30, 2014 | 10:00 | 82.0 | 0.0 | DW Perimeter |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|-----------|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |

PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)

TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)

ng/m³ – nanograms per cubic meter

µg/m³ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

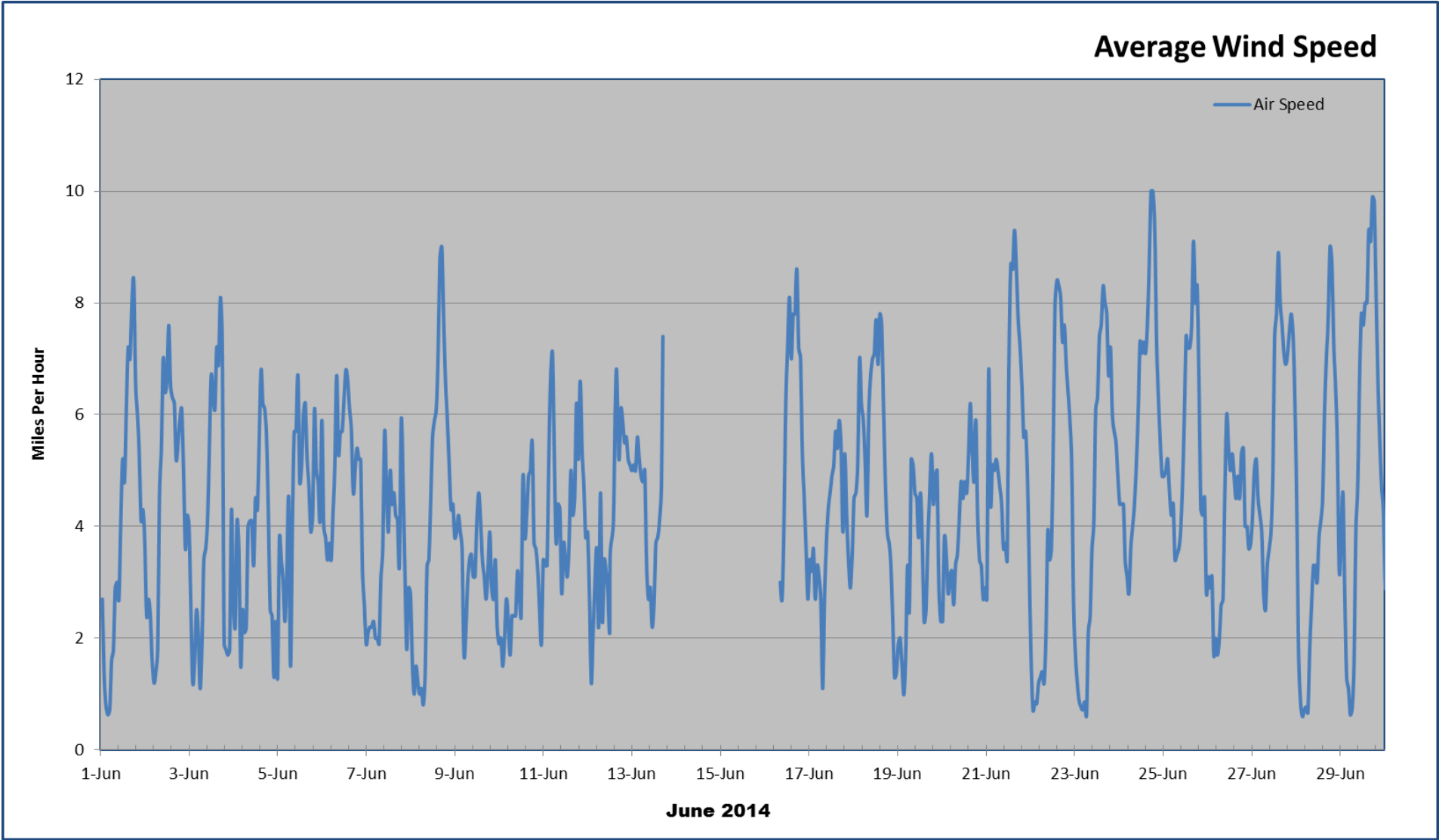


Figure A-3: Temperature

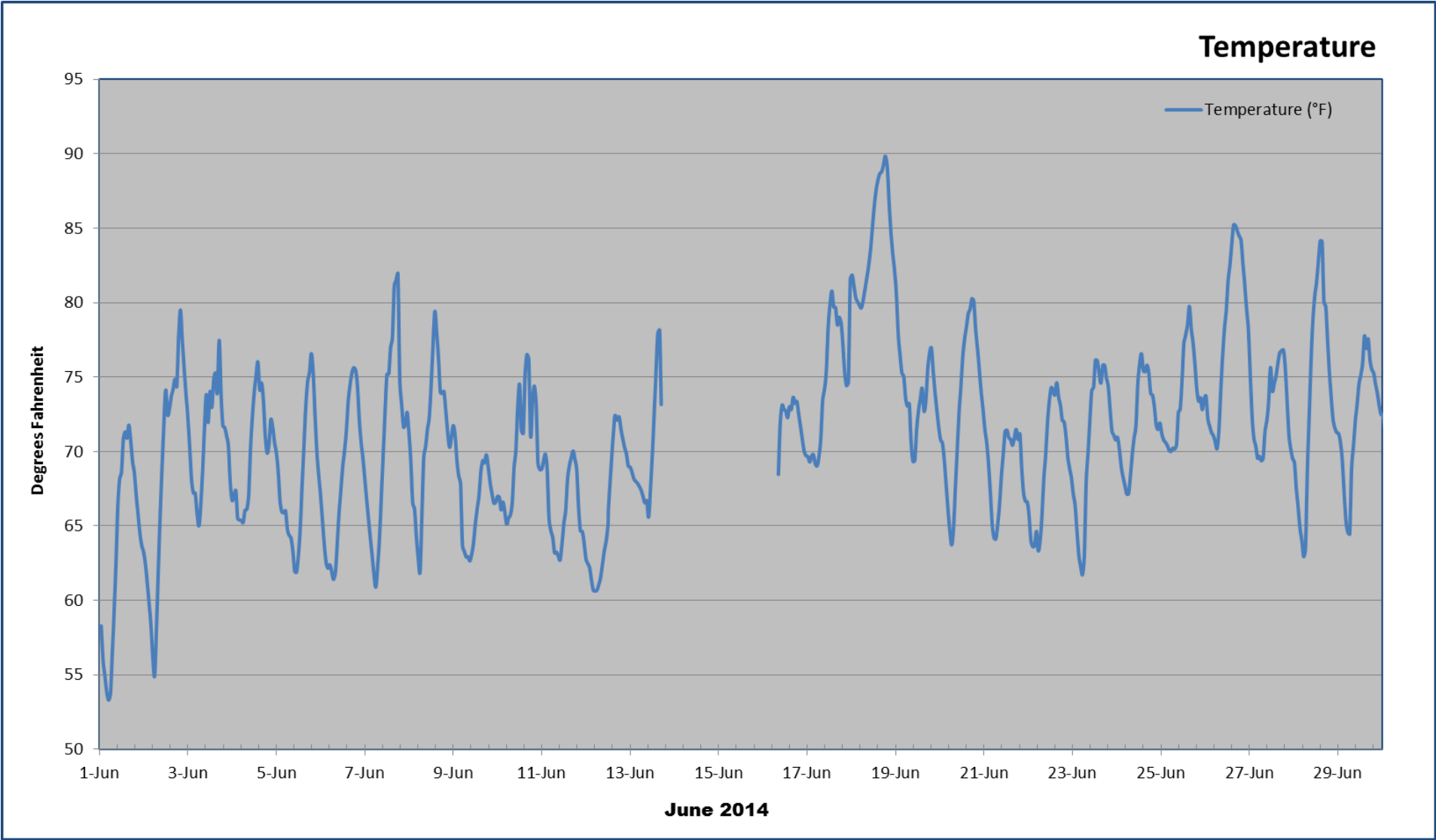


Figure A-4: Relative Humidity

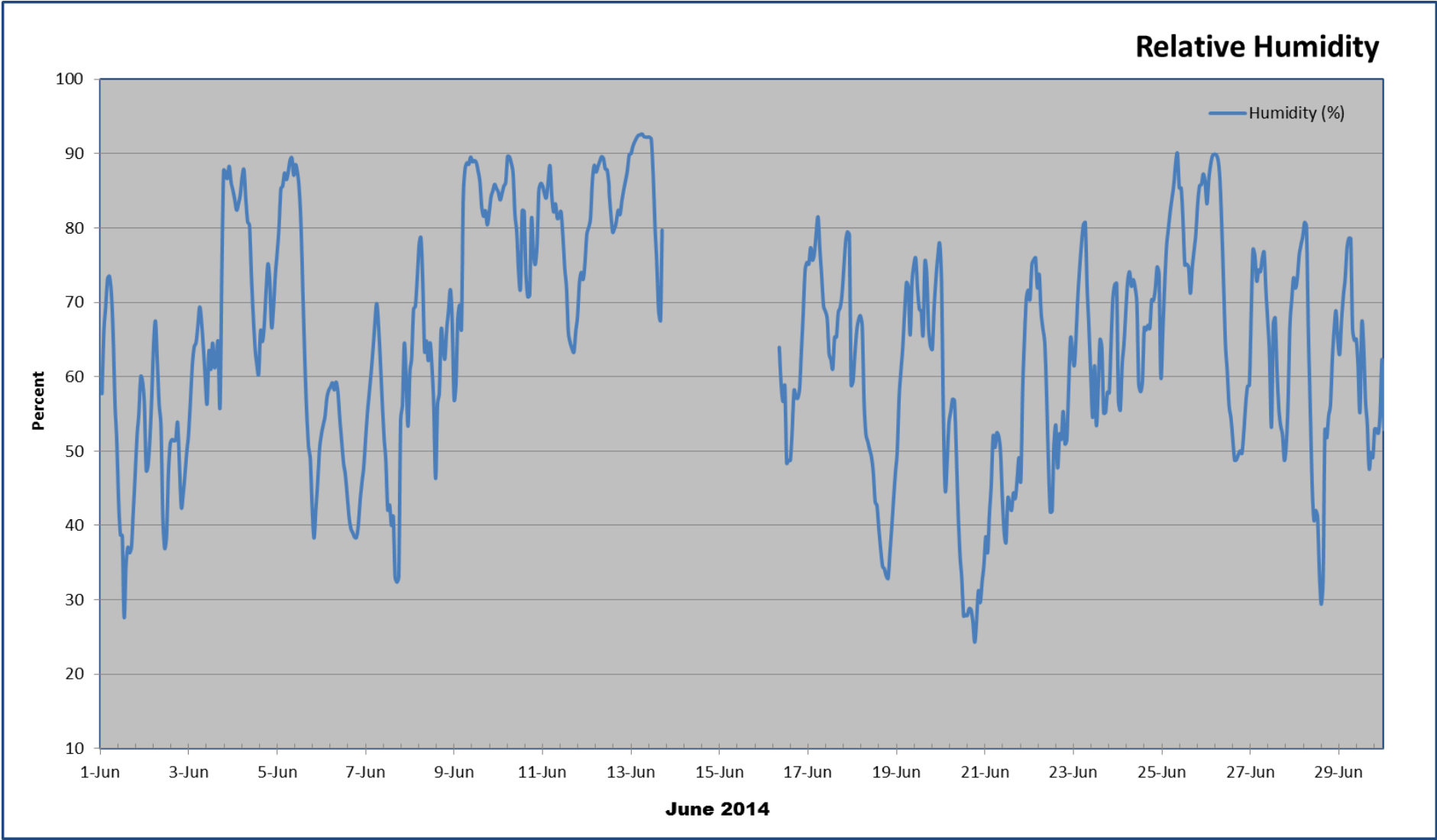


Figure A-5: Site Map Site 16 (06.11.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 15 | 15 | 15 | 15 | 15 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.018% | 0.016% | 0.010% | 0.018% | 0.013 |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.021% | 0.021% | 0.021% | 0.021% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| Program to Date | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 15 | 15 | 15 | 15 | 15 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ² | 2 | 4 | 9 | 2 | 7 |
| % Detection | 13.3% | 26.7% | 60.0% | 13.3% | 46.7% |
| Results in ng/m ³ – nanograms per cubic meter | | | | | |
| ¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc. | | | | | |
| ² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit. | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| Program to Date | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| Program to Date | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**July 2014
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for July 2014 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: July 2014

(This revised version replaces the original report dated August 20, 2014)

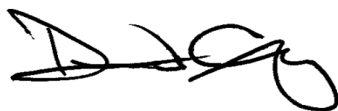
Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: July 2014

(This revised version replaces the original report dated August 20, 2014)



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
April 3, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and July 31, 2014. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E-}06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|--------------------------|---------------------------|
| PM ₁₀ | 255 µg/m ³ | 339 µg/m ³ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and July 31, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| 60-day² | 40 | NA | NA | NA | NA | NA |
| 90-day² | 35 | NA | NA | NA | NA | NA |
| PTD³ | | 6.9 | 6.9 | 1.5 | 6.9 | 6.9 |
| <p>ng/m³ – nanograms per cubic meter</p> <ol style="list-style-type: none"> Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period. | | | | | | |

Stations AMS-1 through AMS-5 started on June 11th and do not have 60 and 90 days of data available.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 37 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.42% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of July included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the July 2014 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|--------------------------|-------|-------|-------|-------|-------|
| Tuesday, July 01, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, July 02, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, July 03, 2014 | 8.0 | 8.0 | 0.6 | 8.0 | 8.0 |
| Friday, July 04, 2014 | | | 0.6 | | |
| Saturday, July 05, 2014 | | | 0.6 | | |
| Sunday, July 06, 2014 | | | 0.6 | | |
| Monday, July 07, 2014 | 6.5 | 6.5 | 0.4 | 6.5 | 6.5 |
| Tuesday, July 08, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, July 09, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Thursday, July 10, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Friday, July 11, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Saturday, July 12, 2014 | | | 0.8 | | |
| Sunday, July 13, 2014 | | | 0.8 | | |
| Monday, July 14, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Tuesday, July 15, 2014 | 7.0 | 7.0 | 1.6 | 7.0 | 7.0 |
| Wednesday, July 16, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Thursday, July 17, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Friday, July 18, 2014 | 8.0 | 8.0 | 0.8 | 8.0 | 8.0 |
| Saturday, July 19, 2014 | | | 0.8 | | |
| Sunday, July 20, 2014 | | | 0.8 | | |
| Monday, July 21, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Tuesday, July 22, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.0 |
| Wednesday, July 23, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, July 24, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Friday, July 25, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Saturday, July 26, 2014 | | | 2.4 | | |
| Sunday, July 27, 2014 | | | 2.4 | | |
| Monday, July 28, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Tuesday, July 29, 2014 | 6.5 | 6.5 | 2.4 | 7.0 | 7.0 |
| Wednesday, July 30, 2014 | 5.5 | 5.5 | 2.4 | 5.5 | 5.5 |
| Thursday, July 31, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|--------------------------|-------|-------|-------|-------|-------|
| Tuesday, July 01, 2014 | 35.0 | 35.0 | 60.0 | 75.0 | 79.0 |
| Wednesday, July 02, 2014 | 35.5 | 35.5 | 50.0 | 35.5 | 150.0 |
| Thursday, July 03, 2014 | 38.5 | 38.5 | 2.9 | 140.0 | 89.0 |
| Friday, July 04, 2014 | NA | NA | 2.9 | NA | NA |
| Saturday, July 05, 2014 | | | 2.9 | | |
| Sunday, July 06, 2014 | | | 2.9 | | |
| Monday, July 07, 2014 | 32.0 | 32.0 | 6.2 | 90.0 | 32.0 |
| Tuesday, July 08, 2014 | 33.5 | 33.5 | 37.0 | 33.5 | 33.5 |
| Wednesday, July 09, 2014 | 31.0 | 540.0 | 170.0 | 72.0 | 31.0 |
| Thursday, July 10, 2014 | 34.5 | 34.5 | 100.0 | 34.5 | 34.5 |
| Friday, July 11, 2014 | 32.0 | 32.0 | 8.1 | 32.0 | 32.0 |
| Saturday, July 12, 2014 | | | 8.1 | | |
| Sunday, July 13, 2014 | | | 8.1 | | |
| Monday, July 14, 2014 | 36.0 | 36.0 | 24.0 | 36.0 | 36.0 |
| Tuesday, July 15, 2014 | 35.5 | 35.0 | 7.5 | 35.5 | 35.0 |
| Wednesday, July 16, 2014 | 37.0 | 37.0 | 11.5 | 37.0 | 37.0 |
| Thursday, July 17, 2014 | 36.0 | 36.0 | 11.5 | 36.5 | 36.5 |
| Friday, July 18, 2014 | 39.0 | 39.0 | 3.9 | 39.0 | 39.0 |
| Saturday, July 19, 2014 | | | 3.9 | | |
| Sunday, July 20, 2014 | | | 3.9 | | |
| Monday, July 21, 2014 | 32.5 | 32.5 | 230.0 | 32.5 | 70.0 |
| Tuesday, July 22, 2014 | 34.0 | 34.0 | 11.5 | 960.0 | 270.0 |
| Wednesday, July 23, 2014 | 72.0 | 34.5 | 60.0 | 460.0 | 470.0 |
| Thursday, July 24, 2014 | 37.0 | 37.0 | 11.5 | 37.0 | 37.0 |
| Friday, July 25, 2014 | 34.0 | 34.0 | 50.0 | 34.0 | 34.0 |
| Saturday, July 26, 2014 | | | 50.0 | | |
| Sunday, July 27, 2014 | | | 50.0 | | |
| Monday, July 28, 2014 | 31.5 | 31.5 | 3.9 | 31.5 | 31.0 |
| Tuesday, July 29, 2014 | 33.0 | 32.0 | 11.5 | 34.0 | 100.0 |
| Wednesday, July 30, 2014 | 180.0 | 27.5 | 93.0 | 60.0 | 27.5 |
| Thursday, July 31, 2014 | 31.0 | 31.0 | 100.0 | 120.0 | 380.0 |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

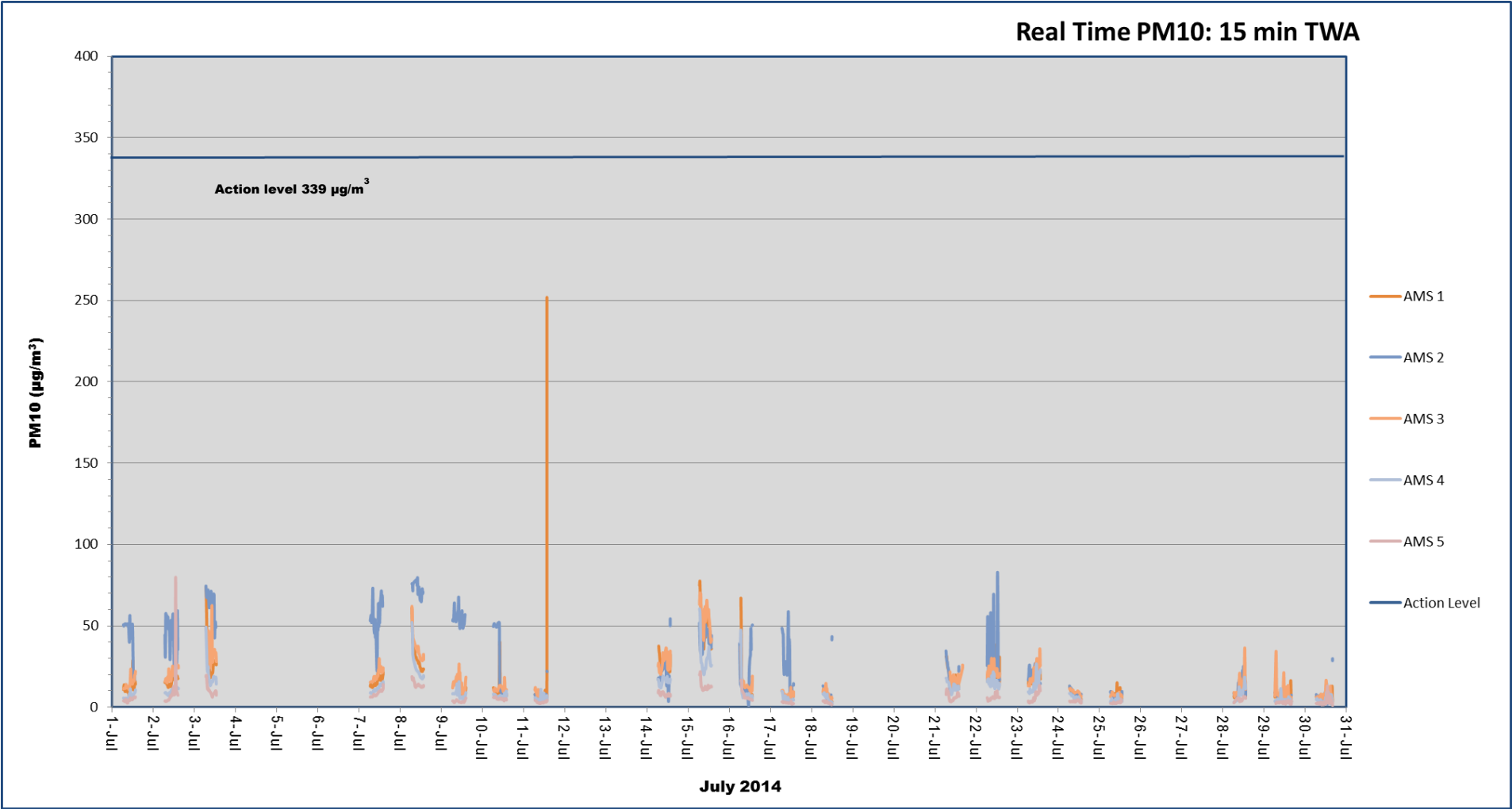


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|--------------------------|-------|---|-------------------|--------------|
| Tuesday, July 01, 2014 | 11:45 | 116.0 | 0.0 | DW Perimeter |
| Wednesday, July 02, 2014 | 8:50 | 67.0 | 0.0 | DW Perimeter |
| Thursday, July 03, 2014 | 7:45 | 51.0 | 0.0 | DW Perimeter |
| Friday, July 04, 2014 | NA | NA | NA | NA |
| Saturday, July 05, 2014 | - | - | - | - |
| Sunday, July 06, 2014 | - | - | - | - |
| Monday, July 07, 2014 | 9:28 | 91.0 | 2.1 | UW Perimeter |
| Tuesday, July 08, 2014 | 8:30 | 56.0 | 0.3 | DW Perimeter |
| Wednesday, July 09, 2014 | 11:45 | 104.0 | 0.1 | DW Perimeter |
| Thursday, July 10, 2014 | 9:00 | 60.0 | 0.3 | DW Perimeter |
| Friday, July 11, 2014 | 9:36 | 52.0 | 0.1 | DW Perimeter |
| Saturday, July 12, 2014 | - | - | - | - |
| Sunday, July 13, 2014 | - | - | - | - |
| Monday, July 14, 2014 | 10:35 | 56.0 | 0.0 | DW Perimeter |
| Tuesday, July 15, 2014 | 11:48 | 96.0 | 0.0 | DW Perimeter |
| Wednesday, July 16, 2014 | 10:55 | 114.0 | 0.0 | DW Perimeter |
| Thursday, July 17, 2014 | 11:09 | 78.0 | 0.0 | DW Perimeter |
| Friday, July 18, 2014 | 8:30 | 87.0 | 0.0 | DW Perimeter |
| Saturday, July 19, 2014 | - | - | - | - |
| Sunday, July 20, 2014 | - | - | - | - |
| Monday, July 21, 2014 | 9:27 | 63.0 | 0.0 | DW Perimeter |
| Tuesday, July 22, 2014 | 8:30 | 60.0 | 0.0 | DW Perimeter |
| Wednesday, July 23, 2014 | 8:30 | 69.0 | 0.0 | DW Perimeter |
| Thursday, July 24, 2014 | 9:00 | 86.0 | 0.0 | DW Perimeter |
| Friday, July 25, 2014 | 10:00 | 58.0 | 0.0 | DW Perimeter |
| Saturday, July 26, 2014 | - | - | - | - |
| Sunday, July 27, 2014 | - | - | - | - |
| Monday, July 28, 2014 | 10:27 | 25.0 | 0.0 | DW Perimeter |
| Tuesday, July 29, 2014 | 8:15 | 27.0 | 0.0 | DW Perimeter |
| Wednesday, July 30, 2014 | 11:00 | 43.0 | 0.0 | DW Perimeter |
| Thursday, July 31, 2014 | 9:45 | 50.0 | 0.0 | DW Perimeter |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

[illegible]

Figure A-2: Wind Speed

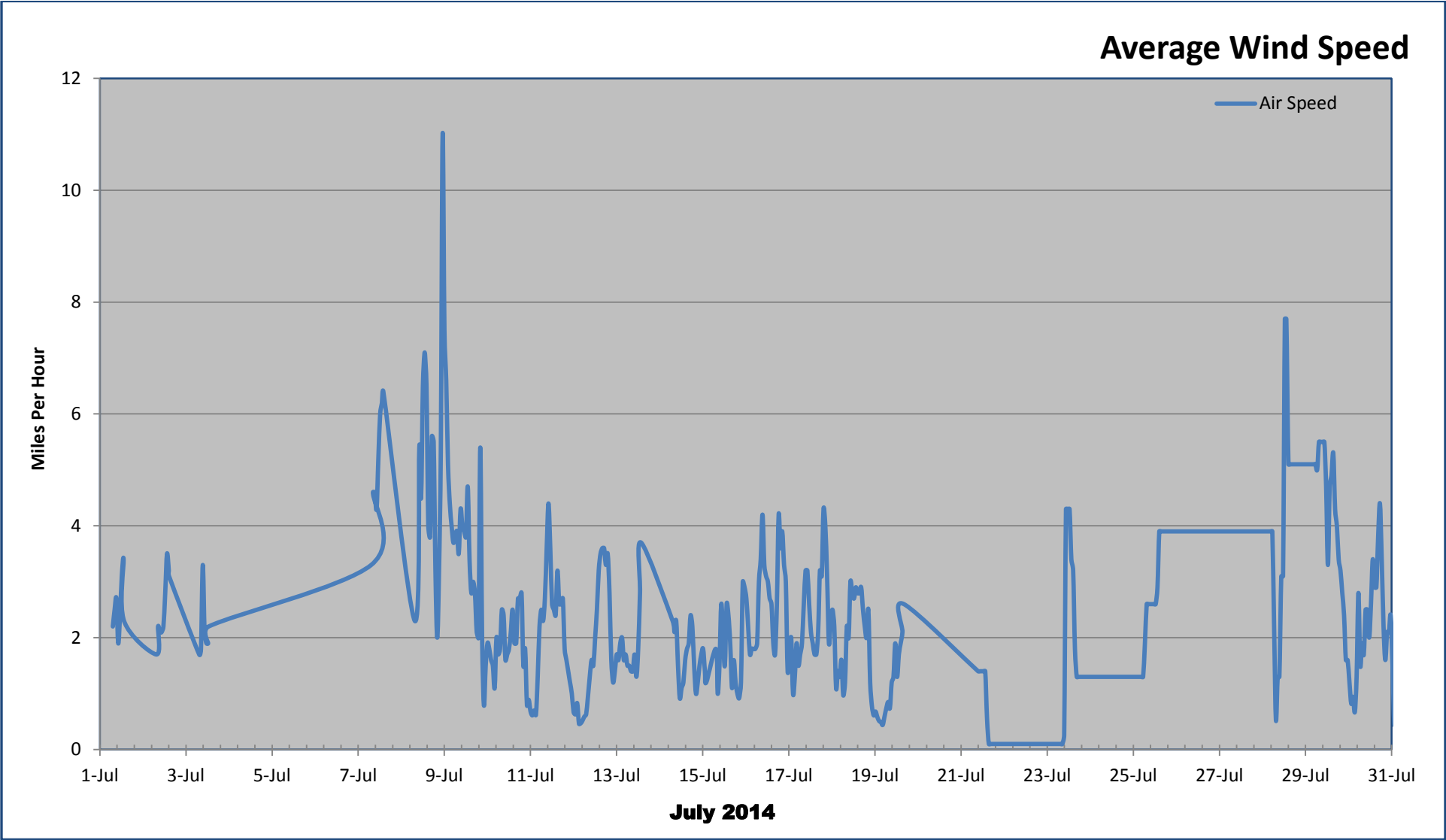


Figure A-3: Temperature

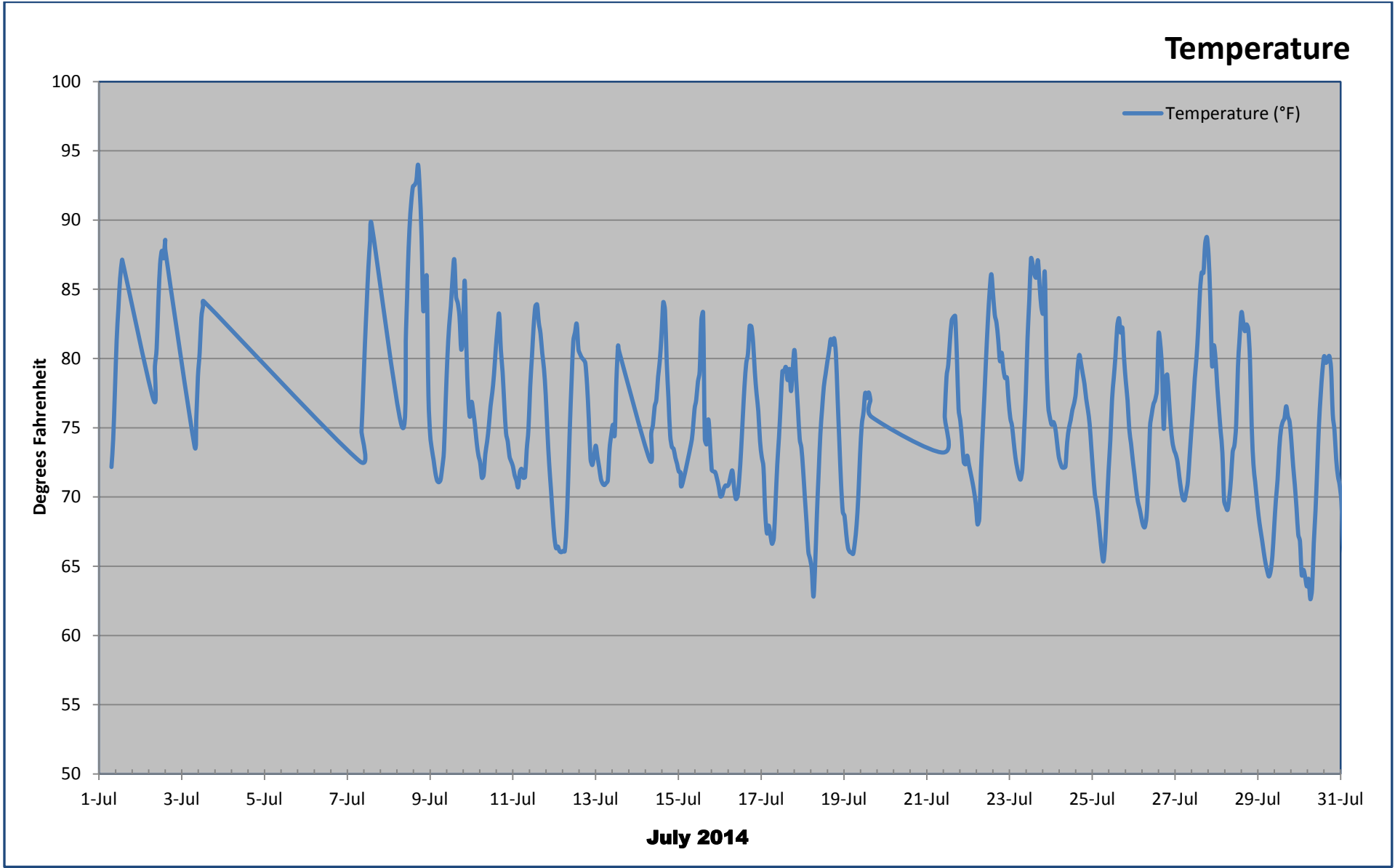


Figure A-4: Relative Humidity

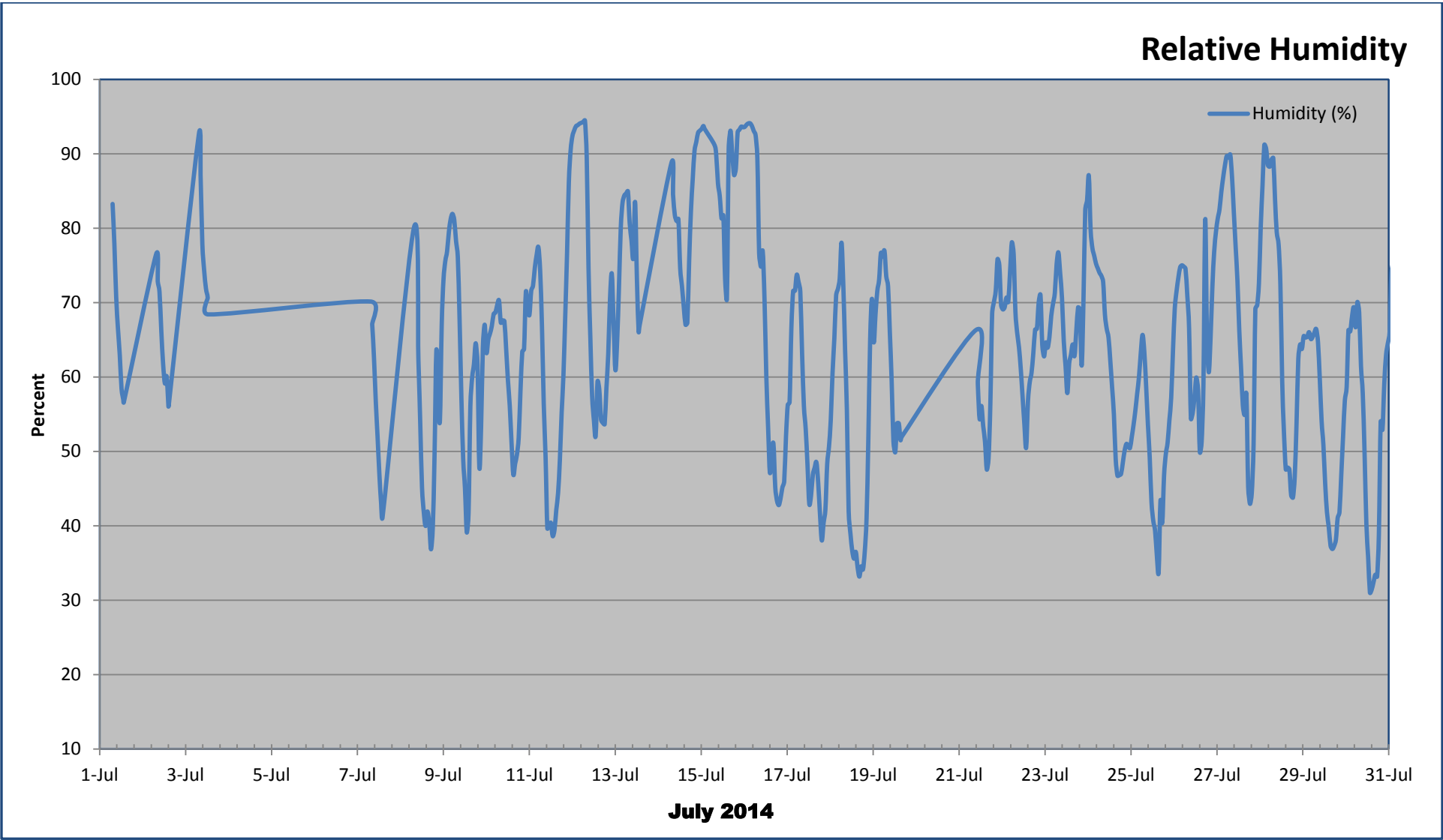


Figure A-5: Site Map Site 16 (06.11.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr^{+6} Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 37 | 37 | 37 | 37 | 37 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.020% | 0.019% | 0.013% | 0.015% | 0.015% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.021% | 0.021% | 0.021% | 0.021% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| Program to Date | 6.9 | 6.9 | 1.5 | 6.9 | 6.9 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 37 | 37 | 37 | 37 | 37 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ² | 4 | 5 | 22 | 10 | 15 |
| % Detection | 10.8% | 13.5% | 59.5% | 27.0% | 40.5% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| Program to Date | 41.8 | 55.4 | 32.6 | 82.8 | 81.0 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| Program to Date | 14.6 | 34.2 | 26.6 | 14.7 | 6.8 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**August 2014
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for August 2014 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: August 2014

(This revised version replaces the original report dated September 20, 2014)

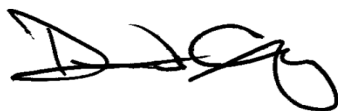
Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: August 2014

(This revised version replaces the original report dated September 20, 2014)



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
April 3, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and August 31, 2014. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of these stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through most of the reporting period. AMS1 and AMS2 were relocated on August 24, 2014 (refer to Figure A-5 for the new locations). Table 2-1 provides an overview of the air monitoring approach. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview
(6/11/14 - 8/25/14)



(8/25/14 - End of Reporting Period)



2.1.1 Integrated Cr^{+6} Sampling

The exposed Cr^{+6} filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr^{+6} analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr^{+6} air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr^{+6} sampling and analysis are also performed at one AMS. These longer duration samples show Cr^{+6} concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total

particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM_{10} readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM_{10} readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM_{10} Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E}-06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr⁺⁶ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr⁺⁶ Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|--------------------------|---------------------------|
| PM ₁₀ | 255 µg/m ³ | 339 µg/m ³ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and August 31, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| 60-day² | 40 | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| 90-day² | 35 | NA | NA | NA | NA | NA |
| PTD³ | | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |
| ng/m ³ – nanograms per cubic meter 1. Running Cr ⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr ⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr ⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success. 2. Running Cr ⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project. 3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period. | | | | | | |

Stations AMS-1 through AMS-5 started on June 11th and do not have 90 days of data available.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 58 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.42% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of August included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the August 2014 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|----------------------------|-------|-------|-------|-------|-------|
| Friday, August 01, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.0 |
| Saturday, August 02, 2014 | | | 0.8 | | |
| Sunday, August 03, 2014 | | | 0.8 | | |
| Monday, August 04, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Tuesday, August 05, 2014 | 6.0 | 6.0 | 2.4 | 6.0 | 6.0 |
| Wednesday, August 06, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Thursday, August 07, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Friday, August 08, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Saturday, August 09, 2014 | | | 0.8 | | |
| Sunday, August 10, 2014 | | | 0.8 | | |
| Monday, August 11, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Tuesday, August 12, 2014 | 6.0 | 6.0 | 2.4 | 6.0 | 6.0 |
| Wednesday, August 13, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Thursday, August 14, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Friday, August 15, 2014 | 7.5 | 7.5 | 0.8 | 7.5 | 7.5 |
| Saturday, August 16, 2014 | | | 0.8 | | |
| Sunday, August 17, 2014 | | | 0.8 | | |
| Monday, August 18, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Tuesday, August 19, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, August 20, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, August 21, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Friday, August 22, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Saturday, August 23, 2014 | | | 0.8 | | |
| Sunday, August 24, 2014 | | | 0.8 | | |
| Monday, August 25, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Tuesday, August 26, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Wednesday, August 27, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Thursday, August 28, 2014 | 8.0 | 7.5 | 2.4 | 8.0 | 8.0 |
| Friday, August 29, 2014 | 7.5 | 7.5 | 0.8 | 7.5 | 7.5 |
| Saturday, August 30, 2014 | | | 0.8 | | |
| Sunday, August 31, 2014 | | | 0.8 | | |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|----------------------------|-------|-------|-------|-------|-------|
| Friday, August 01, 2014 | 35.0 | 35.0 | 19.0 | 91.0 | 290.0 |
| Saturday, August 02, 2014 | | | 19.0 | | |
| Sunday, August 03, 2014 | | | 19.0 | | |
| Monday, August 04, 2014 | 34.5 | 35.0 | 27.0 | 35.0 | 170.0 |
| Tuesday, August 05, 2014 | 30.0 | 78.0 | 42.0 | 30.0 | 220.0 |
| Wednesday, August 06, 2014 | 32.0 | 31.5 | 11.5 | 31.5 | 110.0 |
| Thursday, August 07, 2014 | 33.0 | 32.5 | 11.5 | 33.0 | 33.0 |
| Friday, August 08, 2014 | 31.5 | 31.5 | 8.2 | 31.5 | 32.0 |
| Saturday, August 09, 2014 | | | 8.2 | | |
| Sunday, August 10, 2014 | | | 8.2 | | |
| Monday, August 11, 2014 | 34.0 | 33.5 | 46.0 | 73.0 | 160.0 |
| Tuesday, August 12, 2014 | 30.0 | 30.0 | 29.0 | 100.0 | 130.0 |
| Wednesday, August 13, 2014 | 33.0 | 33.0 | 11.5 | 33.0 | 33.0 |
| Thursday, August 14, 2014 | 35.0 | 35.0 | 24.0 | 35.0 | 75.0 |
| Friday, August 15, 2014 | 37.0 | 37.0 | 7.9 | 37.5 | 110.0 |
| Saturday, August 16, 2014 | | | 7.9 | | |
| Sunday, August 17, 2014 | | | 7.9 | | |
| Monday, August 18, 2014 | 37.0 | 37.0 | 56.0 | 37.0 | 130.0 |
| Tuesday, August 19, 2014 | 34.5 | 34.5 | 11.5 | 34.5 | 200.0 |
| Wednesday, August 20, 2014 | 34.5 | 34.5 | 42.0 | 34.5 | 35.0 |
| Thursday, August 21, 2014 | 100.0 | 34.5 | 120.0 | 160.0 | 220.0 |
| Friday, August 22, 2014 | 32.0 | 32.0 | 3.9 | 32.0 | 130.0 |
| Saturday, August 23, 2014 | | | 3.9 | | |
| Sunday, August 24, 2014 | | | 3.9 | | |
| Monday, August 25, 2014 | 35.0 | 35.0 | 92.0 | 35.0 | 180.0 |
| Tuesday, August 26, 2014 | 38.0 | 37.5 | 59.0 | 37.5 | 200.0 |
| Wednesday, August 27, 2014 | 36.0 | 140.0 | 11.5 | 110.0 | 340.0 |
| Thursday, August 28, 2014 | 38.0 | 38.0 | 11.5 | 38.0 | 38.0 |
| Friday, August 29, 2014 | 180.0 | 37.5 | 9.2 | 37.5 | 37.5 |
| Saturday, August 30, 2014 | | | 9.2 | | |
| Sunday, August 31, 2014 | | | 9.2 | | |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

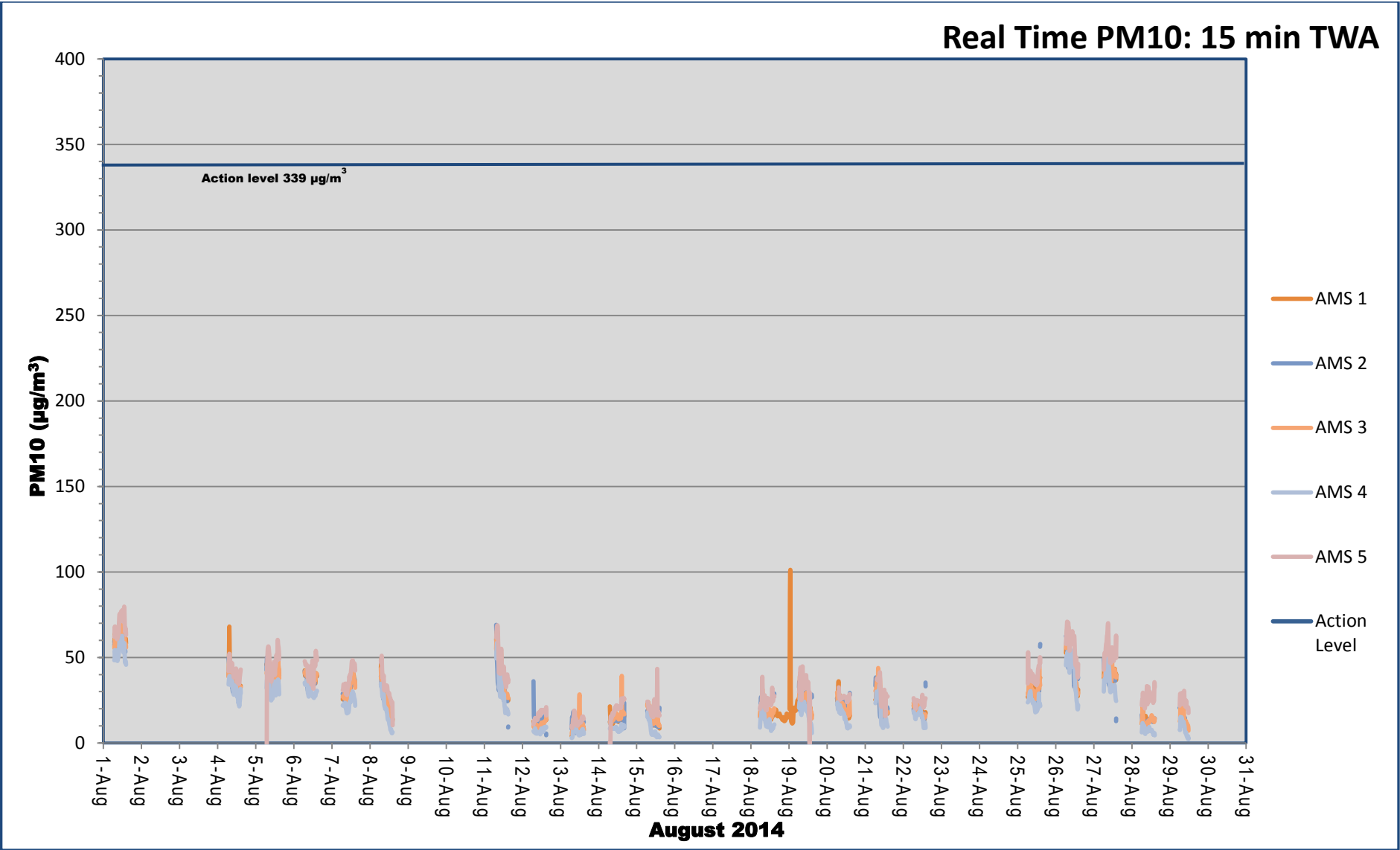


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|----------------------------|-------|---|-------------------|--------------|
| Friday, August 01, 2014 | 10:27 | 25.0 | 0.0 | DW Perimeter |
| Saturday, August 02, 2014 | - | - | - | - |
| Sunday, August 03, 2014 | - | - | - | - |
| Monday, August 04, 2014 | 13:18 | 68.0 | 0.0 | DW Perimeter |
| Tuesday, August 05, 2014 | 12:30 | 62.0 | 0.0 | DW Perimeter |
| Wednesday, August 06, 2014 | 11:09 | 68.0 | 0.0 | DW Perimeter |
| Thursday, August 07, 2014 | 7:35 | 71.0 | 0.0 | DW Perimeter |
| Friday, August 08, 2014 | 7:15 | 48.0 | 0.0 | DW Perimeter |
| Saturday, August 09, 2014 | - | - | - | - |
| Sunday, August 10, 2014 | - | - | - | - |
| Monday, August 11, 2014 | 12:40 | 64.0 | 0.0 | DW Perimeter |
| Tuesday, August 12, 2014 | 9:17 | 59.0 | 0.0 | DW Perimeter |
| Wednesday, August 13, 2014 | 7:16 | 21.0 | 0.0 | DW Perimeter |
| Thursday, August 14, 2014 | 13:09 | 28.0 | 0.0 | DW Perimeter |
| Friday, August 15, 2014 | 12:56 | 28.0 | 0.0 | DW Perimeter |
| Saturday, August 16, 2014 | - | - | - | - |
| Sunday, August 17, 2014 | - | - | - | - |
| Monday, August 18, 2014 | 7:50 | 27.0 | 0.0 | DW Perimeter |
| Tuesday, August 19, 2014 | 10:30 | 61.0 | 0.0 | DW Perimeter |
| Wednesday, August 20, 2014 | 10:13 | 78.0 | 0.0 | DW Perimeter |
| Thursday, August 21, 2014 | 11:41 | 71.0 | 0.0 | DW Perimeter |
| Friday, August 22, 2014 | 8:00 | 102.0 | 0.0 | DW Perimeter |
| Saturday, August 23, 2014 | - | - | - | - |
| Sunday, August 24, 2014 | - | - | - | - |
| Monday, August 25, 2014 | 10:15 | 104.0 | 0.0 | DW Perimeter |
| Tuesday, August 26, 2014 | 8:15 | 79 | 0.0 | DW Perimeter |
| Wednesday, August 27, 2014 | 11:12 | 81 | 0.0 | DW Perimeter |
| Thursday, August 28, 2014 | 13:10 | 71.0 | 0.0 | DW Perimeter |
| Friday, August 29, 2014 | 9:23 | 112.0 | 0.0 | DW Perimeter |
| Saturday, August 30, 2014 | - | - | - | - |
| Sunday, August 31, 2014 | - | - | - | - |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| <p>PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)</p> <p>TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)</p> <p>ng/m³ – nanograms per cubic meter</p> <p>µg/m³ – micrograms per cubic meter</p> <p>PPM – Parts per Million</p> <p>NA – Not Applicable</p> <p>ND –No Data</p> | | | | | | |

Figure A-2: Wind Speed

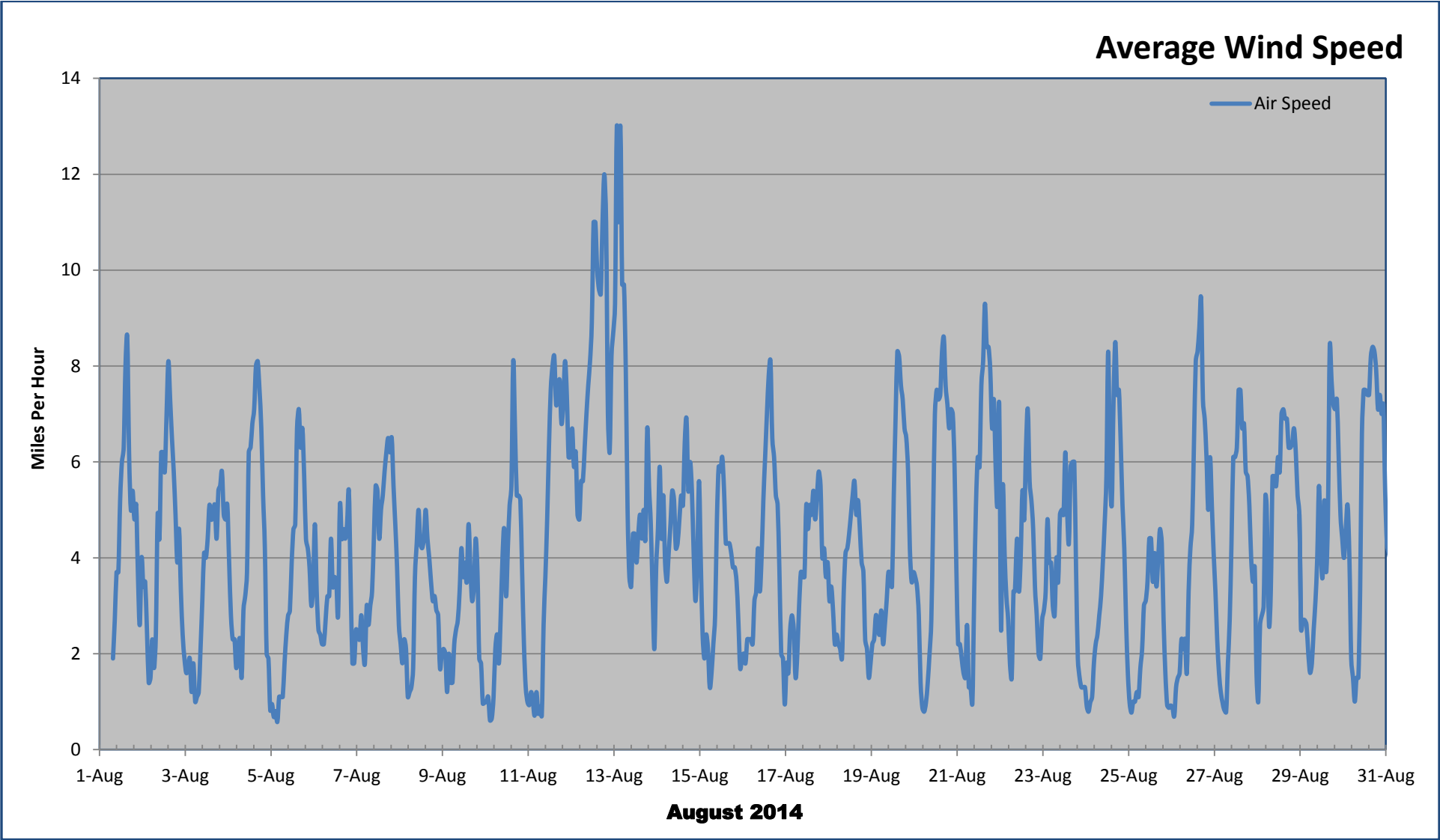


Figure A-3: Temperature

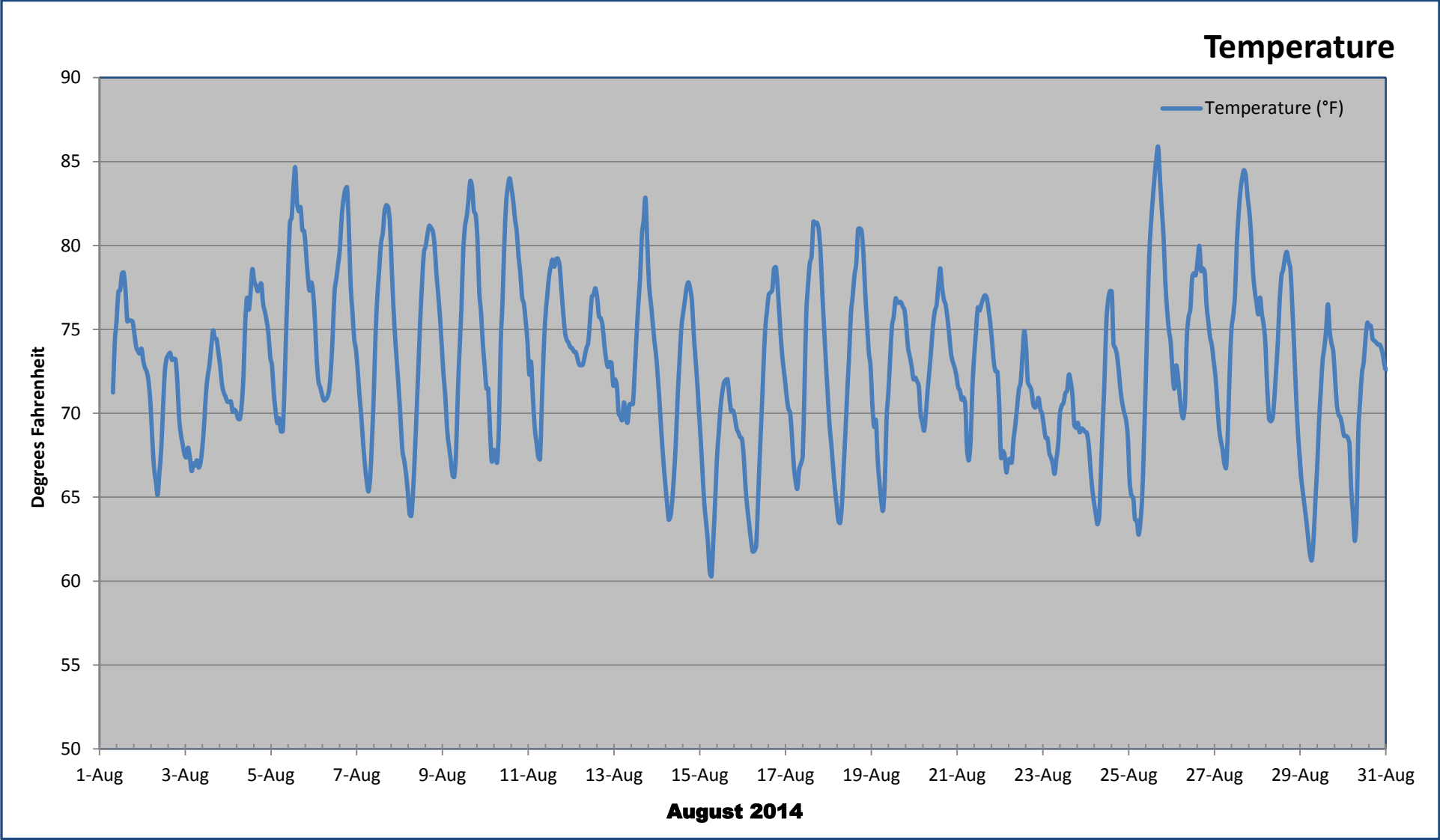


Figure A-4: Relative Humidity

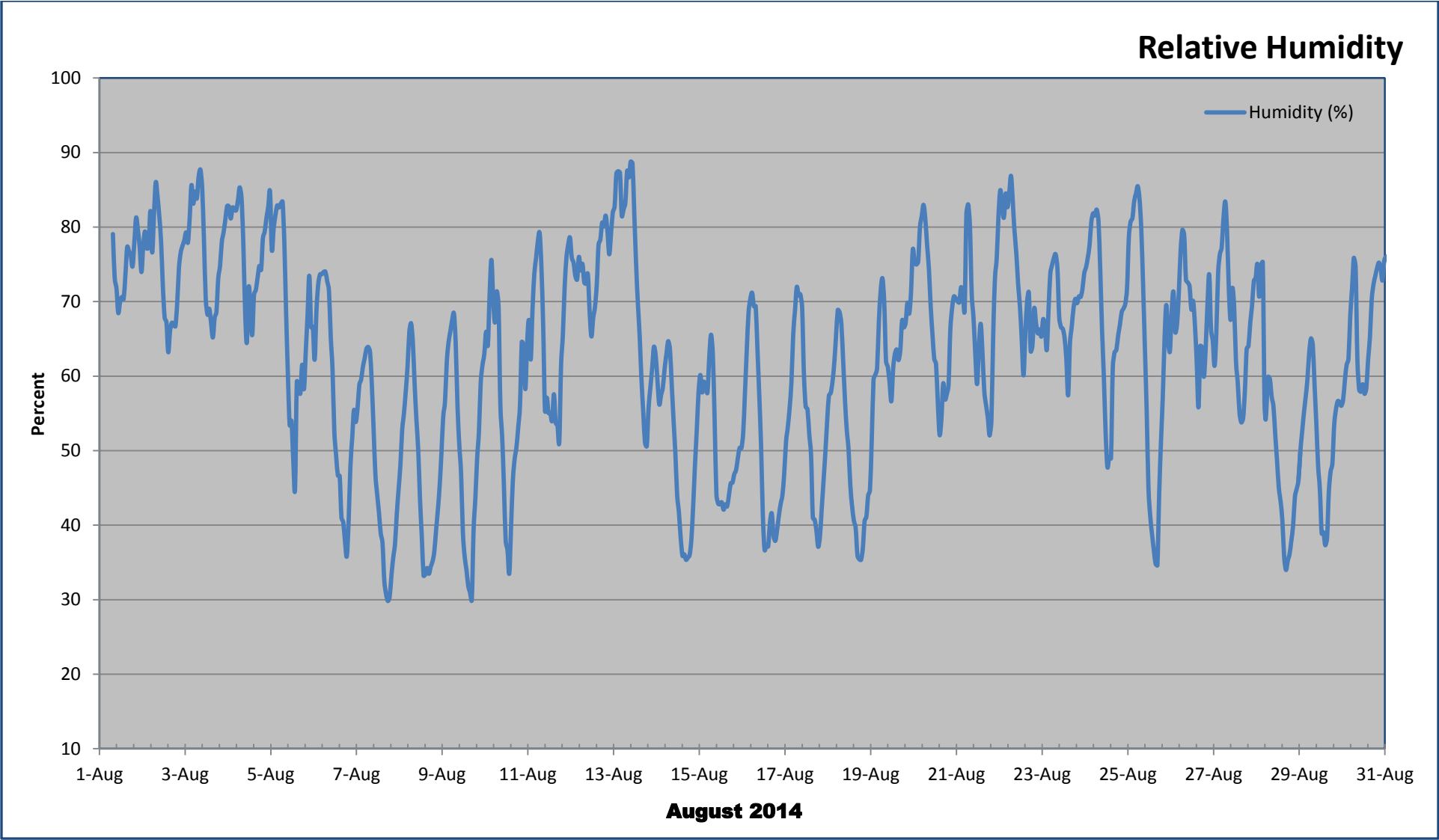


Figure A-5: Site Map Site 16 (06.11.14 – 08.25.14)



Site Map Site 16 (08.25.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 58 | 58 | 58 | 58 | 58 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.019% | 0.019% | 0.011% | 0.017% | 0.009% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.021% | 0.021% | 0.021% | 0.021% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| Program to Date | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 58 | 58 | 58 | 58 | 58 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ² | 6 | 7 | 36 | 15 | 30 |
| % Detection | 10.3% | 12.1% | 62.1% | 25.9% | 51.7% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| Program to Date | 42.7 | 50.4 | 29.4 | 71.5 | 101.2 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| Program to Date | 14.6 | 34.2 | 26.6 | 14.7 | 6.8 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**September 2014
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for September 2014 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

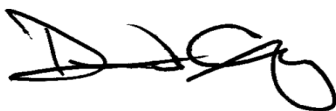
Reporting Period: September 2014

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: September 2014



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
April 3, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and September 30, 2014. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E-}06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|--------------------------|---------------------------|
| PM ₁₀ | 255 µg/m ³ | 339 µg/m ³ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and September 30, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 6.8 | 6.8 | 1.6 | 6.8 | 6.9 |
| 60-day² | 40 | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |
| 90-day² | 35 | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |
| PTD³ | | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |

ng/m³ – nanograms per cubic meter

1. Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 89 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.42% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of September included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the September 2014 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-------------------------------|-------|-------|-------|-------|-------|
| Monday, September 01, 2014 | | | 0.8 | | |
| Tuesday, September 02, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, September 03, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, September 04, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Friday, September 05, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.0 |
| Saturday, September 06, 2014 | | | 0.8 | | |
| Sunday, September 07, 2014 | | | 0.8 | | |
| Monday, September 08, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Tuesday, September 09, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Wednesday, September 10, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Thursday, September 11, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Friday, September 12, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Saturday, September 13, 2014 | | | 0.8 | | |
| Sunday, September 14, 2014 | | | 0.8 | | |
| Monday, September 15, 2014 | 6.5 | 6.5 | 2.4 | 6.5 | 6.5 |
| Tuesday, September 16, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, September 17, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.5 |
| Thursday, September 18, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.0 |
| Friday, September 19, 2014 | 7.5 | 8.0 | 0.8 | 8.0 | 8.0 |
| Saturday, September 20, 2014 | | | 0.8 | | |
| Sunday, September 21, 2014 | | | 0.8 | | |
| Monday, September 22, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Tuesday, September 23, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, September 24, 2014 | 7.0 | 6.5 | 2.4 | 7.0 | 7.0 |
| Thursday, September 25, 2014 | 7.0 | 7.0 | 2.4 | 6.5 | 6.5 |
| Friday, September 26, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Saturday, September 27, 2014 | | | 0.8 | | |
| Sunday, September 28, 2014 | | | 0.8 | | |
| Monday, September 29, 2014 | 7.0 | 7.0 | 2.4 | 6.5 | 7.0 |
| Tuesday, September 30, 2014 | 7.0 | 6.5 | 2.4 | 7.0 | 7.0 |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-------------------------------|-------|-------|-------|-------|-------|
| Monday, September 01, 2014 | | | 9.2 | | |
| Tuesday, September 02, 2014 | 34.5 | 34.5 | 11.5 | 34.5 | 200.0 |
| Wednesday, September 03, 2014 | 35.5 | 35.5 | 26.0 | 35.5 | 35.5 |
| Thursday, September 04, 2014 | 33.0 | 33.0 | 48.0 | 33.0 | 150.0 |
| Friday, September 05, 2014 | 160.0 | 33.5 | 8.8 | 33.5 | 240.0 |
| Saturday, September 06, 2014 | | | 8.8 | | |
| Sunday, September 07, 2014 | | | 8.8 | | |
| Monday, September 08, 2014 | 33.0 | 72.0 | 210.0 | 33.0 | 70.0 |
| Tuesday, September 09, 2014 | 150.0 | 32.0 | 11.5 | 32.0 | 32.0 |
| Wednesday, September 10, 2014 | 88.0 | 31.5 | 26.0 | 32.0 | 250.0 |
| Thursday, September 11, 2014 | 32.0 | 32.0 | 27.0 | 32.0 | 250.0 |
| Friday, September 12, 2014 | 130.0 | 110.0 | 8.1 | 32.5 | 32.5 |
| Saturday, September 13, 2014 | | | 8.1 | | |
| Sunday, September 14, 2014 | | | 8.1 | | |
| Monday, September 15, 2014 | 32.5 | 32.5 | 26.0 | 170.0 | 32.5 |
| Tuesday, September 16, 2014 | 33.5 | 33.5 | 11.5 | 34.0 | 34.0 |
| Wednesday, September 17, 2014 | 160.0 | 35.5 | 38.0 | 35.0 | 35.5 |
| Thursday, September 18, 2014 | 34.0 | 34.5 | 92.0 | 34.0 | 140.0 |
| Friday, September 19, 2014 | 310.0 | 38.5 | 20.0 | 38.5 | 38.5 |
| Saturday, September 20, 2014 | | | 20.0 | | |
| Sunday, September 21, 2014 | | | 20.0 | | |
| Monday, September 22, 2014 | 35.0 | 70.0 | 11.5 | 33.5 | 74.0 |
| Tuesday, September 23, 2014 | 120.0 | 33.5 | 150.0 | 82.0 | 180.0 |
| Wednesday, September 24, 2014 | 220.0 | 33.0 | 11.5 | 33.5 | 34.0 |
| Thursday, September 25, 2014 | 34.0 | 34.0 | 11.5 | 32.5 | 33.0 |
| Friday, September 26, 2014 | 33.0 | 32.5 | 3.9 | 33.0 | 33.0 |
| Saturday, September 27, 2014 | | | 3.9 | | |
| Sunday, September 28, 2014 | | | 3.9 | | |
| Monday, September 29, 2014 | 97.0 | 110.0 | 57.0 | 130.0 | 410.0 |
| Tuesday, September 30, 2014 | 35.0 | 33.0 | 11.5 | 34.0 | 160.0 |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

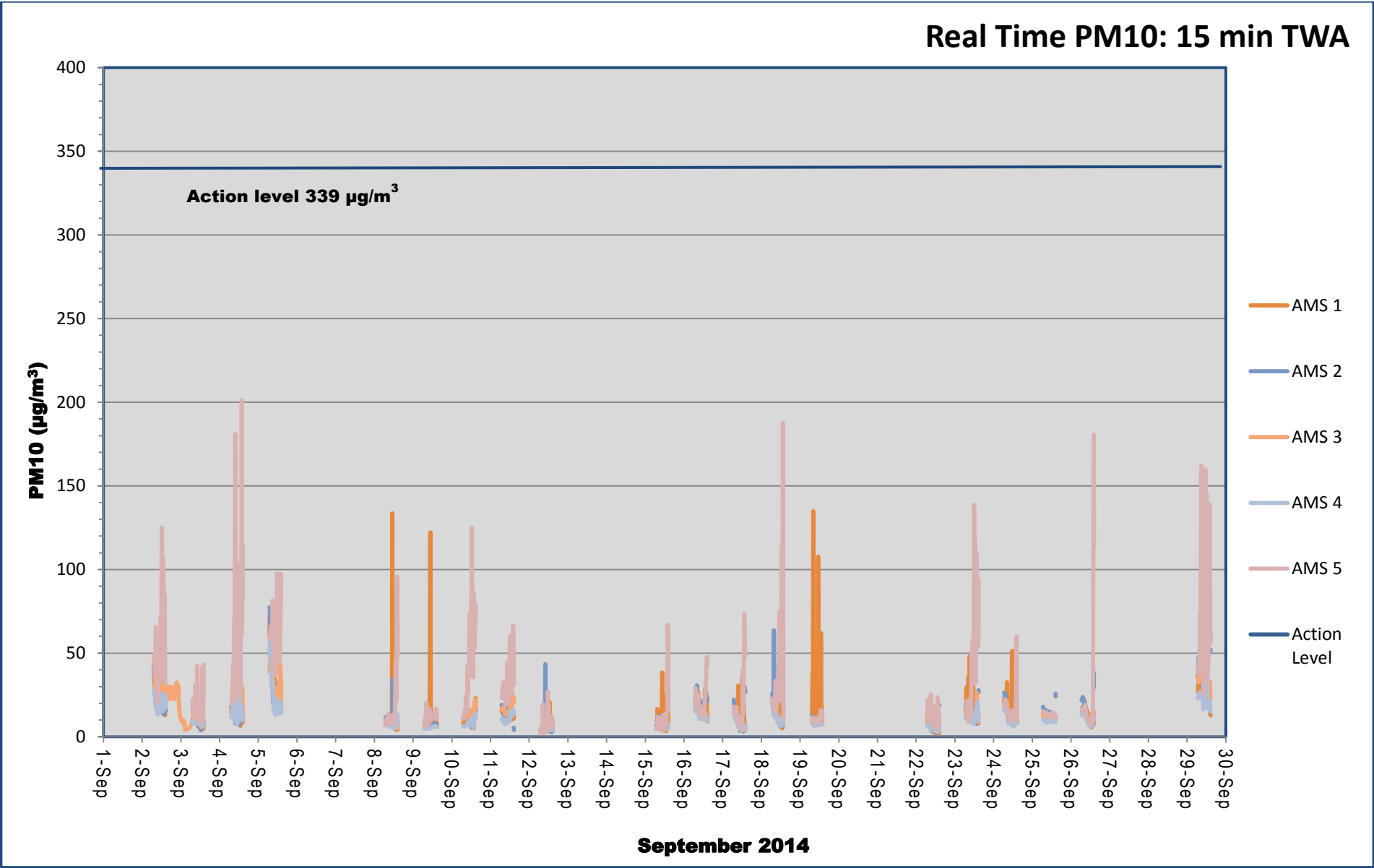


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|-------------------------------|-------|---|-------------------|--------------|
| Monday, September 01, 2014 | - | - | - | - |
| Tuesday, September 02, 2014 | 13:00 | 51.0 | 0.0 | DW Perimeter |
| Wednesday, September 03, 2014 | 11:30 | 59.0 | 0.0 | DW Perimeter |
| Thursday, September 04, 2014 | 11:30 | 79.0 | 0.0 | DW Perimeter |
| Friday, September 05, 2014 | 11:00 | 73.0 | 0.0 | DW Perimeter |
| Saturday, September 06, 2014 | - | - | - | - |
| Sunday, September 07, 2014 | - | - | - | - |
| Monday, September 08, 2014 | 7:30 | 44.0 | 0.0 | DW Perimeter |
| Tuesday, September 09, 2014 | 13:00 | 60.0 | 0.0 | DW Perimeter |
| Wednesday, September 10, 2014 | 13:00 | 59.0 | 0.0 | DW Perimeter |
| Thursday, September 11, 2014 | 13:00 | 61.0 | 0.0 | DW Perimeter |
| Friday, September 12, 2014 | 13:00 | 26.0 | 0.0 | DW Perimeter |
| Saturday, September 13, 2014 | - | - | - | - |
| Sunday, September 14, 2014 | - | - | - | - |
| Monday, September 15, 2014 | 13:00 | 42.0 | 0.0 | DW Perimeter |
| Tuesday, September 16, 2014 | 11:30 | 56.0 | 0.0 | DW Perimeter |
| Wednesday, September 17, 2014 | 11:30 | 67.0 | 0.0 | DW Perimeter |
| Thursday, September 18, 2014 | 13:00 | 58.0 | 0.0 | DW Perimeter |
| Friday, September 19, 2014 | 13:00 | 83.0 | 0.0 | DW Perimeter |
| Saturday, September 20, 2014 | - | - | - | - |
| Sunday, September 21, 2014 | - | - | - | - |
| Monday, September 22, 2014 | 7:30 | 62.0 | 0.0 | DW Perimeter |
| Tuesday, September 23, 2014 | 13:00 | 68.0 | 0.0 | DW Perimeter |
| Wednesday, September 24, 2014 | 7:30 | 83.0 | 0.0 | DW Perimeter |
| Thursday, September 25, 2014 | 7:30 | 38.0 | 0.0 | DW Perimeter |
| Friday, September 26, 2014 | 13:00 | 46.0 | 0.0 | DW Perimeter |
| Saturday, September 27, 2014 | - | - | - | - |
| Sunday, September 28, 2014 | - | - | - | - |
| Monday, September 29, 2014 | 7:30 | 41.0 | 0.0 | DW Perimeter |
| Tuesday, September 30, 2014 | 13:00 | 39.0 | 0.0 | DW Perimeter |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| <p>PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)</p> <p>TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)</p> <p>ng/m³ – nanograms per cubic meter</p> <p>µg/m³ – micrograms per cubic meter</p> <p>PPM – Parts per Million</p> <p>NA – Not Applicable</p> <p>ND –No Data</p> | | | | | | |

Figure A-2: Wind Speed

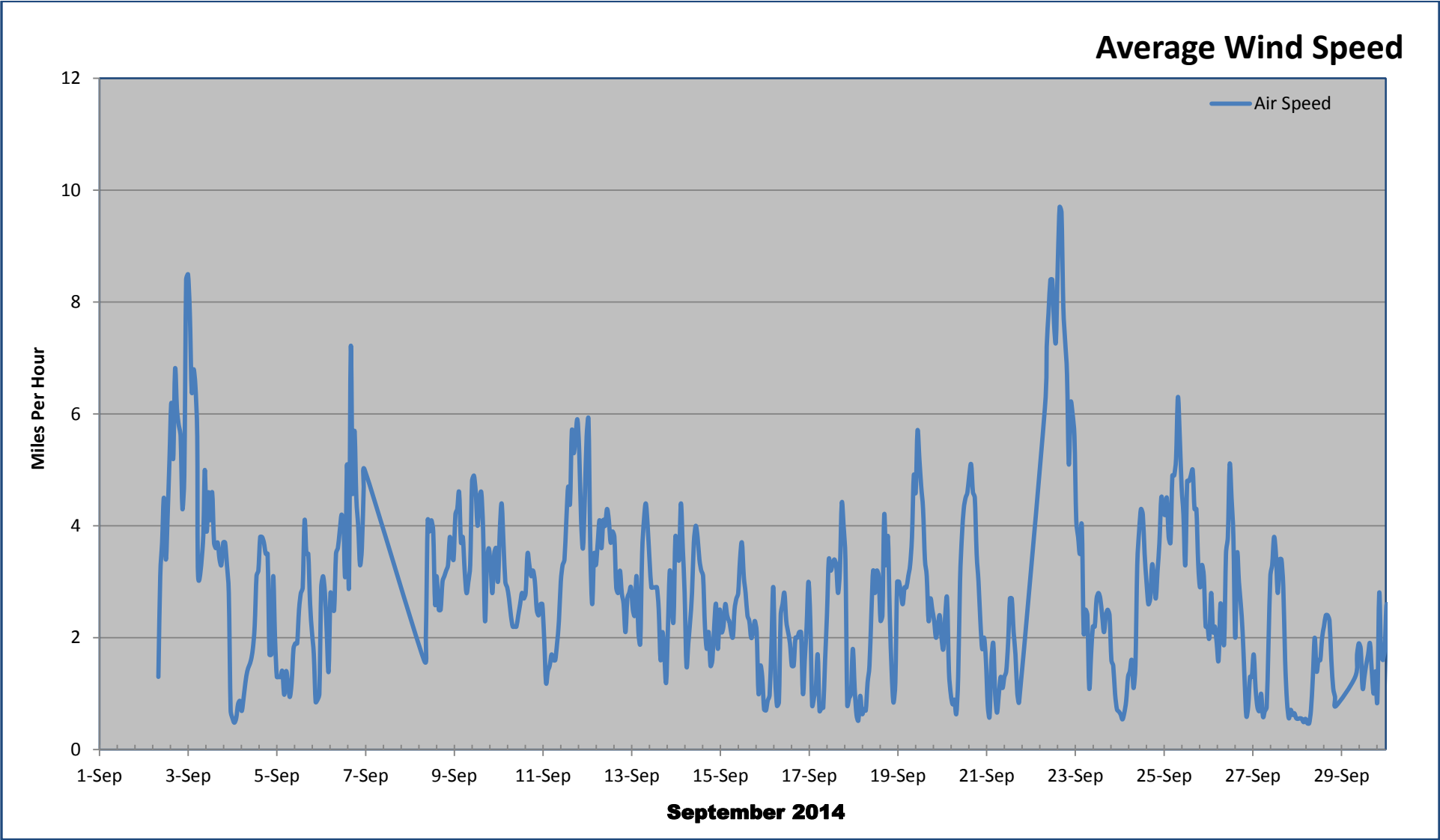


Figure A-3: Temperature

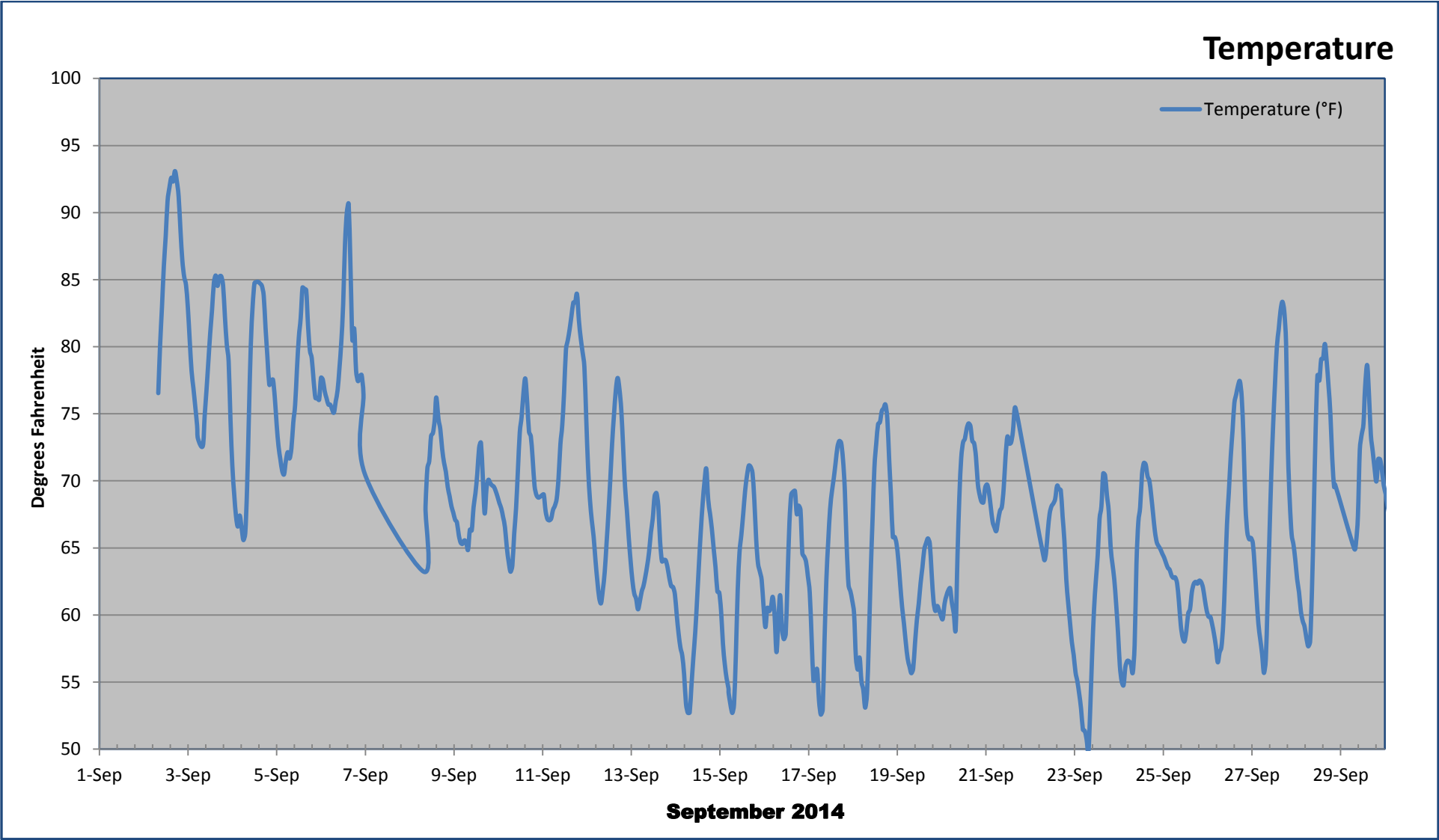


Figure A-4: Relative Humidity

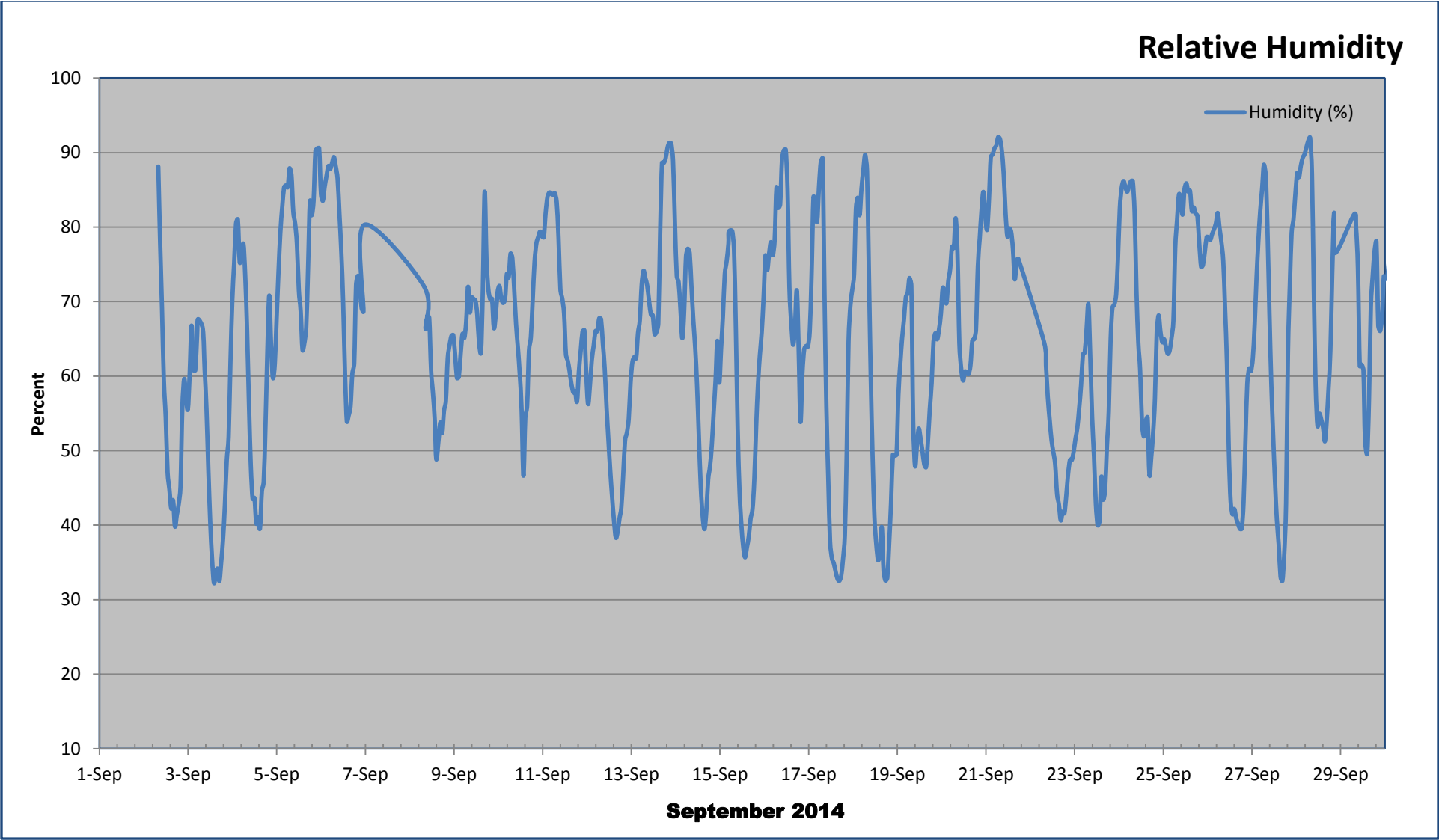


Figure A-5: Site Map Site 16 (08.25.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr^{+6} Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 89 | 89 | 89 | 89 | 89 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.014% | 0.018% | 0.011% | 0.018% | 0.012% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.021% | 0.021% | 0.021% | 0.021% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| September | 6.8 | 6.8 | 1.7 | 6.8 | 6.9 |
| Program to Date | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 89 | 89 | 89 | 89 | 89 |
| Rate of Data Collection | 100% | 100% | 100% | 100% | 100% |
| Number of Detected Samples ² | 15 | 11 | 49 | 18 | 41 |
| % Detection | 16.9% | 12.4% | 55.1% | 20.2% | 46.1% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| September | 87.6 | 44.5 | 30.4 | 47.0 | 117.4 |
| Program to Date | 54.6 | 48.8 | 29.7 | 65.0 | 105.5 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| September | 16.2 | 15.6 | 14.4 | 11.0 | 31.1 |
| Program to Date | 14.4 | 22.2 | 18.7 | 12.7 | 20.1 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**October 2014
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for October 2014 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

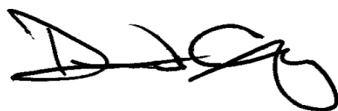
Reporting Period: October 2014

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: October 2014



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
April 6, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and October 31, 2014. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr^{+6} and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr^{+6} sampling and analysis at one station 7 days per week. | 15-minute average PM_{10} readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr^{+6} sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr^{+6} and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr^{+6} and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E-}06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|------------------------------|------------------------------|
| PM_{10} | 255 $\mu\text{g}/\text{m}^3$ | 339 $\mu\text{g}/\text{m}^3$ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and October 31, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| 60-day² | 40 | 7.0 | 6.9 | 1.7 | 6.9 | 6.9 |
| 90-day² | 35 | 7.0 | 6.9 | 1.7 | 6.9 | 6.9 |
| PTD³ | | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |

ng/m³ – nanograms per cubic meter

1. Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 112 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.43% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of October included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the October 2014 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-----------------------------|-------|-------|-------|-------|-------|
| Wednesday, October 01, 2014 | 7.0 | 6.5 | 2.4 | 7.0 | 7.0 |
| Thursday, October 02, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Friday, October 03, 2014 | 6.5 | 6.5 | 0.8 | 6.5 | 6.5 |
| Saturday, October 04, 2014 | | | 0.8 | | |
| Sunday, October 05, 2014 | | | 0.8 | | |
| Monday, October 06, 2014 | 7.0 | 7.0 | 2.4 | 6.5 | 6.5 |
| Tuesday, October 07, 2014 | 7.0 | 7.0 | 2.4 | 6.5 | 7.0 |
| Wednesday, October 08, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, October 09, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Friday, October 10, 2014 | 8.0 | 7.5 | 0.8 | 8.0 | 8.0 |
| Saturday, October 11, 2014 | | | 0.8 | | |
| Sunday, October 12, 2014 | | | 0.8 | | |
| Monday, October 13, 2014 | 7.5 | 7.0 | 2.4 | 7.0 | 7.0 |
| Tuesday, October 14, 2014 | 7.5 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, October 15, 2014 | 7.5 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, October 16, 2014 | 7.5 | 7.0 | 2.4 | 7.0 | 7.0 |
| Friday, October 17, 2014 | 7.0 | 6.5 | 0.8 | 7.0 | 7.0 |
| Saturday, October 18, 2014 | | | 0.8 | | |
| Sunday, October 19, 2014 | | | 0.8 | | |
| Monday, October 20, 2014 | 7.0 | 7.0 | 2.4 | 7.5 | 7.0 |
| Tuesday, October 21, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, October 22, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, October 23, 2014 | NA | NA | 2.4 | NA | NA |
| Friday, October 24, 2014 | 7.0 | 7.5 | 0.8 | NA | NA |
| Saturday, October 25, 2014 | | | 0.8 | | |
| Sunday, October 26, 2014 | | | 0.8 | | |
| Monday, October 27, 2014 | 7.0 | 7.0 | 2.4 | 6.5 | 7.0 |
| Tuesday, October 28, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.0 |
| Wednesday, October 29, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.0 |
| Thursday, October 30, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.0 |
| Friday, October 31, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.0 |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 10/23/14 for stations 1, 2, 4, & 5 were discarded due to insufficient run time and no intrusive activities being performed on site that day.

NOTE: Samples from 10/24/14 for stations 4 & 5 were voided by the lab due to moisture in the filter cartridge.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-----------------------------|-------|-------|-------|-------|-------|
| Wednesday, October 01, 2014 | 34.5 | 33.0 | 11.5 | 34.5 | 34.5 |
| Thursday, October 02, 2014 | 34.0 | 34.0 | 11.5 | 780.0 | 34.0 |
| Friday, October 03, 2014 | 33.0 | 33.0 | 3.9 | 31.5 | 130.0 |
| Saturday, October 04, 2014 | | | 3.9 | | |
| Sunday, October 05, 2014 | | | 3.9 | | |
| Monday, October 06, 2014 | 34.0 | 34.0 | 98.0 | 32.5 | 140.0 |
| Tuesday, October 07, 2014 | 76.0 | 35.0 | 11.5 | 33.5 | 150.0 |
| Wednesday, October 08, 2014 | 35.0 | 34.5 | 11.5 | 33.5 | 94.0 |
| Thursday, October 09, 2014 | 35.5 | 34.0 | 11.5 | 34.0 | 120.0 |
| Friday, October 10, 2014 | 40.5 | 38.0 | 8.6 | 34.0 | 34.5 |
| Saturday, October 11, 2014 | | | 8.6 | | |
| Sunday, October 12, 2014 | | | 8.6 | | |
| Monday, October 13, 2014 | 36.0 | 34.5 | 390.0 | 35.0 | 140.0 |
| Tuesday, October 14, 2014 | 36.5 | 35.0 | 37.0 | 35.0 | 220.0 |
| Wednesday, October 15, 2014 | 36.5 | 35.0 | 45.0 | 35.0 | 81.0 |
| Thursday, October 16, 2014 | 36.5 | 35.0 | 11.5 | 35.0 | 35.0 |
| Friday, October 17, 2014 | 35.0 | 33.0 | 30.0 | 34.0 | 120.0 |
| Saturday, October 18, 2014 | | | 30.0 | | |
| Sunday, October 19, 2014 | | | 30.0 | | |
| Monday, October 20, 2014 | 35.5 | 35.5 | 88.0 | 36.5 | 100.0 |
| Tuesday, October 21, 2014 | 35.5 | 34.0 | 11.5 | 34.0 | 35.5 |
| Wednesday, October 22, 2014 | 34.0 | 34.0 | 11.5 | 34.0 | 34.0 |
| Thursday, October 23, 2014 | NA | NA | 11.5 | NA | NA |
| Friday, October 24, 2014 | 36.0 | 36.0 | 24.0 | NA | NA |
| Saturday, October 25, 2014 | | | 24.0 | | |
| Sunday, October 26, 2014 | | | 24.0 | | |
| Monday, October 27, 2014 | 90.0 | 34.5 | 44.0 | 33.0 | 34.0 |
| Tuesday, October 28, 2014 | 76.0 | 34.0 | 29.0 | 94.0 | 150.0 |
| Wednesday, October 29, 2014 | 34.0 | 34.0 | 32.0 | 34.5 | 140.0 |
| Thursday, October 30, 2014 | 34.5 | 34.5 | 11.5 | 34.5 | 35.0 |
| Friday, October 31, 2014 | 34.0 | 34.0 | 3.9 | 34.5 | 35.0 |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 10/23/14 for stations 1, 2, 4, & 5 were discarded due to insufficient run time and no intrusive activities being performed on site that day.

NOTE: Samples from 10/24/14 for stations 4 & 5 were voided by the lab due to moisture in the filter cartridge.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

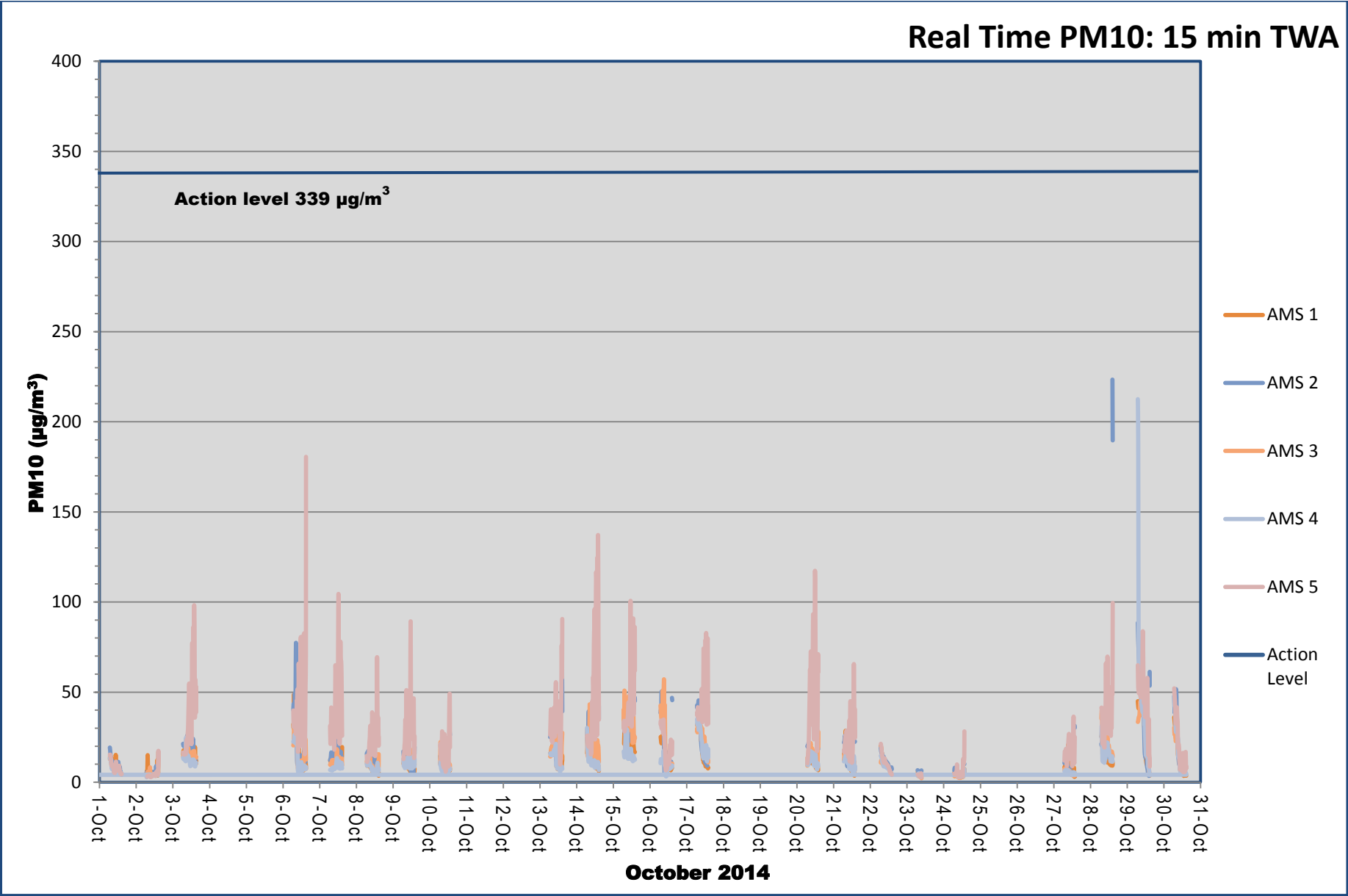


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|-----------------------------|-------|---|-------------------|--------------|
| Wednesday, October 1, 2014 | 10:00 | 51.0 | NA | DW Perimeter |
| Thursday, October 2, 2014 | 8:05 | 44.0 | NA | DW Perimeter |
| Friday, October 3, 2014 | 11:30 | 43.0 | NA | DW Perimeter |
| Saturday, October 4, 2014 | - | - | - | - |
| Sunday, October 5, 2014 | - | - | - | - |
| Monday, October 6, 2014 | 13:00 | 46.0 | NA | DW Perimeter |
| Tuesday, October 7, 2014 | 9:05 | 59.0 | NA | DW Perimeter |
| Wednesday, October 8, 2014 | 9:30 | 61.0 | NA | DW Perimeter |
| Thursday, October 9, 2014 | 11:15 | 108.0 | NA | DW Perimeter |
| Friday, October 10, 2014 | 13:10 | 66.0 | NA | DW Perimeter |
| Saturday, October 11, 2014 | - | - | - | - |
| Sunday, October 12, 2014 | - | - | - | - |
| Monday, October 13, 2014 | 8:30 | 32.0 | NA | DW Perimeter |
| Tuesday, October 14, 2014 | 11:30 | 28.0 | NA | DW Perimeter |
| Wednesday, October 15, 2014 | 10:15 | 54.0 | NA | DW Perimeter |
| Thursday, October 16, 2014 | 13:00 | 38.0 | NA | DW Perimeter |
| Friday, October 17, 2014 | 8:00 | 40.0 | NA | DW Perimeter |
| Saturday, October 18, 2014 | - | - | - | - |
| Sunday, October 19, 2014 | - | - | - | - |
| Monday, October 20, 2014 | 7:30 | 23.0 | NA | DW Perimeter |
| Tuesday, October 21, 2014 | 9:15 | 26.0 | NA | DW Perimeter |
| Wednesday, October 22, 2014 | 13:00 | 23.0 | NA | DW Perimeter |
| Thursday, October 23, 2014 | 13:30 | 11.0 | NA | DW Perimeter |
| Friday, October 24, 2014 | 11:15 | 17.0 | NA | DW Perimeter |
| Saturday, October 25, 2014 | - | - | - | - |
| Sunday, October 26, 2014 | - | - | - | - |
| Monday, October 27, 2014 | 11:45 | 22.0 | NA | DW Perimeter |
| Tuesday, October 28, 2014 | 9:00 | 33.0 | NA | DW Perimeter |
| Wednesday, October 29, 2014 | 10:15 | 37.0 | NA | DW Perimeter |
| Thursday, October 30, 2014 | 10:30 | 25.0 | NA | DW Perimeter |
| Friday, October 31, 2014 | 13:15 | 48.0 | NA | DW Perimeter |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| <p>PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)</p> <p>TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)</p> <p>ng/m³ – nanograms per cubic meter</p> <p>µg/m³ – micrograms per cubic meter</p> <p>PPM – Parts per Million</p> <p>NA – Not Applicable</p> <p>ND –No Data</p> | | | | | | |

Figure A-2: Wind Speed

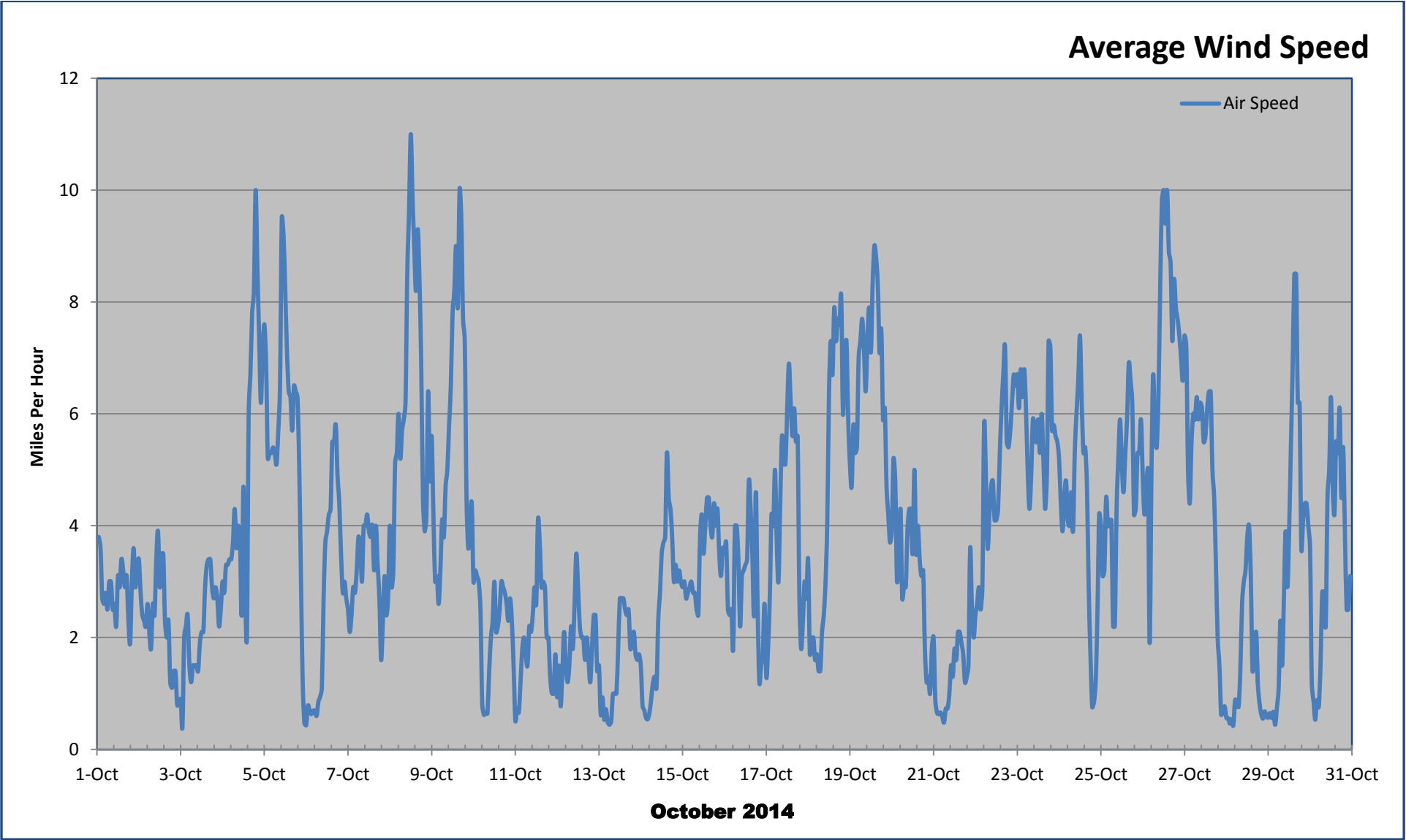


Figure A-3: Temperature

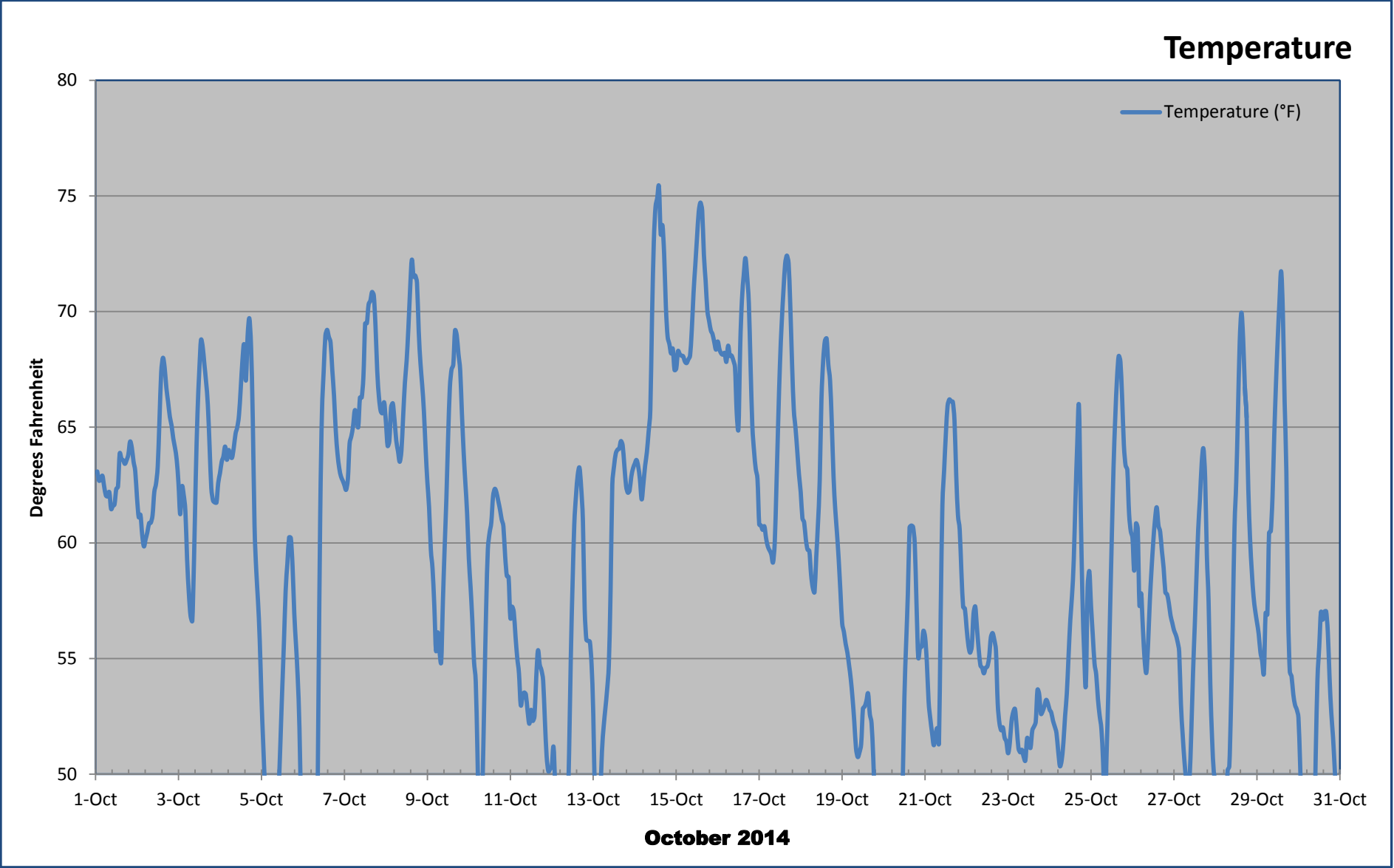


Figure A-4: Relative Humidity

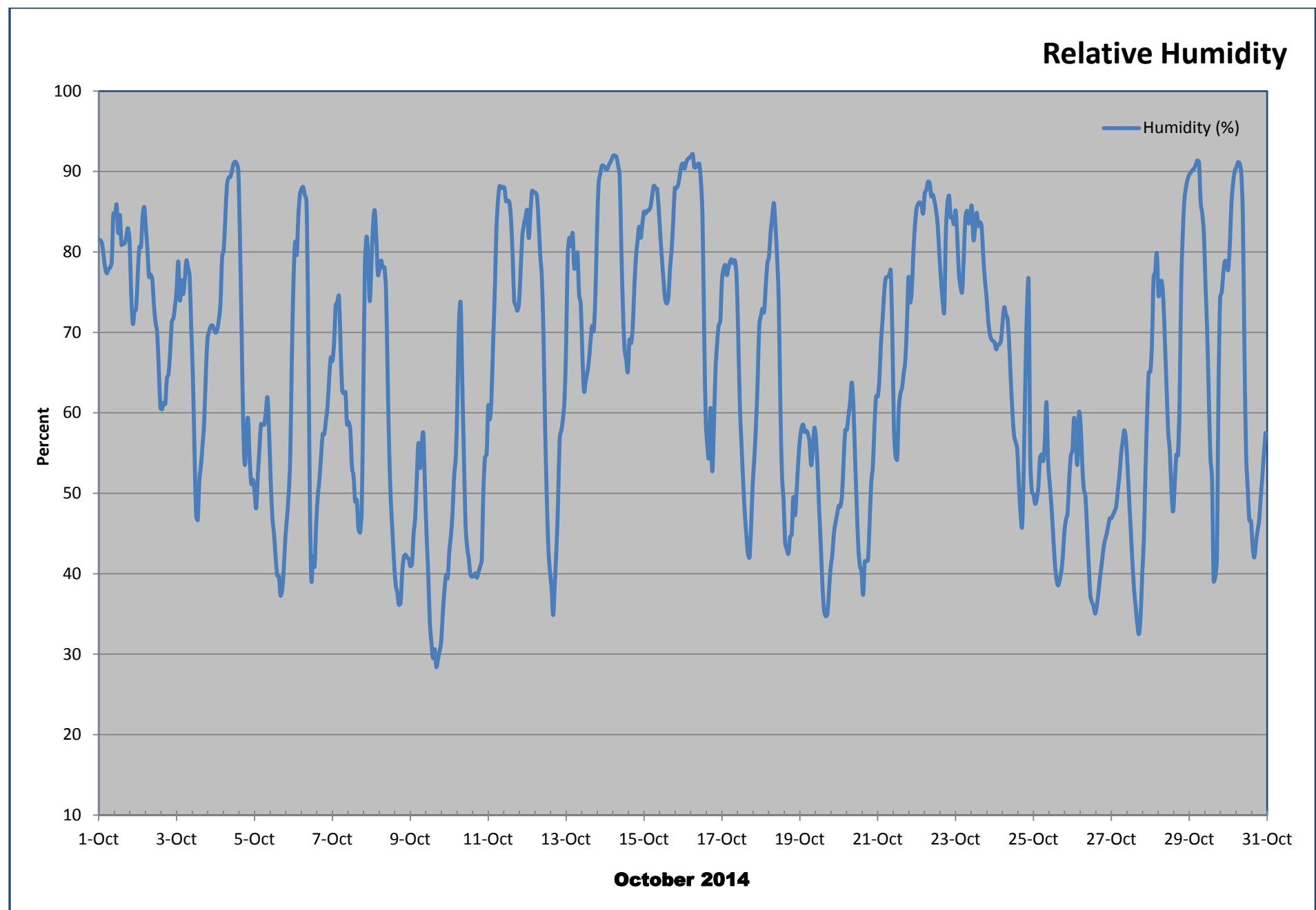


Figure A-5: Site Map Site 16 (08.25.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 111 | 111 | 112 | 110 | 110 |
| Rate of Data Collection | 99.1% | 99.1% | 100% | 98.2% | 98.2% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.019% | 0.020% | 0.012% | 0.019% | 0.012% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.021% | 0.021% | 0.024% | 0.023% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| September | 6.8 | 6.8 | 1.7 | 6.8 | 6.9 |
| October | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| Program to Date | 6.9 | 6.9 | 1.6 | 6.9 | 6.9 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 111 | 111 | 112 | 110 | 110 |
| Rate of Data Collection | 99.1% | 99.1% | 100% | 98.2% | 98.2% |
| Number of Detected Samples ² | 18 | 11 | 60 | 20 | 53 |
| % Detection | 16.2% | 10.0% | 53.6% | 18.2% | 48.2% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| September | 87.6 | 44.5 | 30.4 | 47.0 | 117.4 |
| October | 41.5 | 34.5 | 34.9 | 72.5 | 90.3 |
| Program to Date | 51.8 | 45.7 | 30.8 | 66.6 | 102.3 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| September | 16.2 | 15.6 | 14.4 | 11.0 | 31.1 |
| October | 12.9 | 18.0 | 14.6 | 12.1 | 28.9 |
| Program to Date | 14.6 | 22.6 | 19.0 | 12.7 | 19.8 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**November 2014
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for November 2014 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: November 2014

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: November 2014



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
April 6, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and November 30, 2014. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E-}06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|------------------------------|------------------------------|
| PM_{10} | 255 $\mu\text{g}/\text{m}^3$ | 339 $\mu\text{g}/\text{m}^3$ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and November 30, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 7.0 | 7.0 | 1.8 | 7.1 | 7.1 |
| 60-day² | 40 | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| 90-day² | 35 | 7.0 | 6.9 | 1.7 | 6.9 | 7.0 |
| PTD³ | | 7.0 | 6.9 | 1.6 | 6.9 | 6.9 |

ng/m³ – nanograms per cubic meter

1. Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 129 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.43% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of November included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the November 2014 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|------------------------------|-------|-------|-------|-------|-------|
| Saturday, November 01, 2014 | | | 0.8 | | |
| Sunday, November 02, 2014 | | | 0.8 | | |
| Monday, November 03, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.0 |
| Tuesday, November 04, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.0 |
| Wednesday, November 05, 2014 | 7.0 | 6.5 | 2.4 | 7.0 | 6.5 |
| Thursday, November 06, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.5 |
| Friday, November 07, 2014 | 7.5 | 7.5 | 0.8 | 7.5 | 7.5 |
| Saturday, November 08, 2014 | | | 0.8 | | |
| Sunday, November 09, 2014 | | | 0.8 | | |
| Monday, November 10, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 6.5 |
| Tuesday, November 11, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, November 12, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Thursday, November 13, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Friday, November 14, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.0 |
| Saturday, November 15, 2014 | | | 0.8 | | |
| Sunday, November 16, 2014 | | | 0.8 | | |
| Monday, November 17, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Tuesday, November 18, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Wednesday, November 19, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.0 |
| Thursday, November 20, 2014 | 7.5 | 7.5 | 2.3 | 7.5 | 8.0 |
| Friday, November 21, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.0 |
| Saturday, November 22, 2014 | | | 2.3 | | |
| Sunday, November 23, 2014 | | | 2.3 | | |
| Monday, November 24, 2014 | 7.0 | 7.0 | 2.4 | 7.0 | 7.0 |
| Tuesday, November 25, 2014 | 6.5 | 7.0 | 2.3 | 7.0 | 7.0 |
| Wednesday, November 26, 2014 | NA | NA | 2.3 | NA | NA |
| Thursday, November 27, 2014 | NA | NA | 2.3 | NA | NA |
| Friday, November 28, 2014 | NA | NA | 2.3 | NA | NA |
| Saturday, November 29, 2014 | | | 2.3 | | |
| Sunday, November 30, 2014 | | | 2.3 | | |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 11/26/14 to 11/28/14 for stations 1, 2, 4, & 5 were not collected due to site closure for holiday.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|------------------------------|-------|-------|-------|-------|-------|
| Saturday, November 01, 2014 | | | 3.9 | | |
| Sunday, November 02, 2014 | | | 3.9 | | |
| Monday, November 03, 2014 | 34.0 | 34.0 | 7.9 | 34.0 | 35.0 |
| Tuesday, November 04, 2014 | 34.0 | 34.0 | 15.0 | 71.0 | 130.0 |
| Wednesday, November 05, 2014 | 33.5 | 33.5 | 28.0 | 93.0 | 160.0 |
| Thursday, November 06, 2014 | 35.5 | 35.0 | 11.5 | 35.5 | 36.5 |
| Friday, November 07, 2014 | 36.5 | 36.0 | 3.9 | 36.5 | 37.5 |
| Saturday, November 08, 2014 | | | 3.9 | | |
| Sunday, November 09, 2014 | | | 3.9 | | |
| Monday, November 10, 2014 | 35.0 | 35.0 | 72.0 | 120.0 | 210.0 |
| Tuesday, November 11, 2014 | 33.5 | 33.5 | 28.0 | 34.0 | 90.0 |
| Wednesday, November 12, 2014 | 34.0 | 34.0 | 11.5 | 34.0 | 35.0 |
| Thursday, November 13, 2014 | 34.0 | 34.0 | 11.5 | 34.0 | 35.0 |
| Friday, November 14, 2014 | 34.0 | 34.0 | 3.9 | 34.0 | 35.0 |
| Saturday, November 15, 2014 | | | 3.9 | | |
| Sunday, November 16, 2014 | | | 3.9 | | |
| Monday, November 17, 2014 | 35.0 | 35.0 | 11.5 | 35.0 | 34.0 |
| Tuesday, November 18, 2014 | 34.0 | 34.0 | 11.5 | 34.0 | 35.0 |
| Wednesday, November 19, 2014 | 34.0 | 34.0 | 11.5 | 34.0 | 90.0 |
| Thursday, November 20, 2014 | 36.5 | 36.0 | 11.5 | 91.0 | 140.0 |
| Friday, November 21, 2014 | 35.0 | 34.5 | 41.0 | 35.0 | 36.0 |
| Saturday, November 22, 2014 | | | 41.0 | | |
| Sunday, November 23, 2014 | | | 41.0 | | |
| Monday, November 24, 2014 | 34.5 | 34.5 | 12.0 | 34.5 | 34.5 |
| Tuesday, November 25, 2014 | 33.0 | 36.0 | 11.5 | 34.5 | 34.5 |
| Wednesday, November 26, 2014 | NA | NA | 11.5 | NA | NA |
| Thursday, November 27, 2014 | NA | NA | 11.5 | NA | NA |
| Friday, November 28, 2014 | NA | NA | 11.5 | NA | NA |
| Saturday, November 29, 2014 | | | 11.5 | | |
| Sunday, November 30, 2014 | | | 11.5 | | |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 11/26/14 to 11/28/14 for stations 1, 2, 4, & 5 were not collected due to site closure for holiday.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

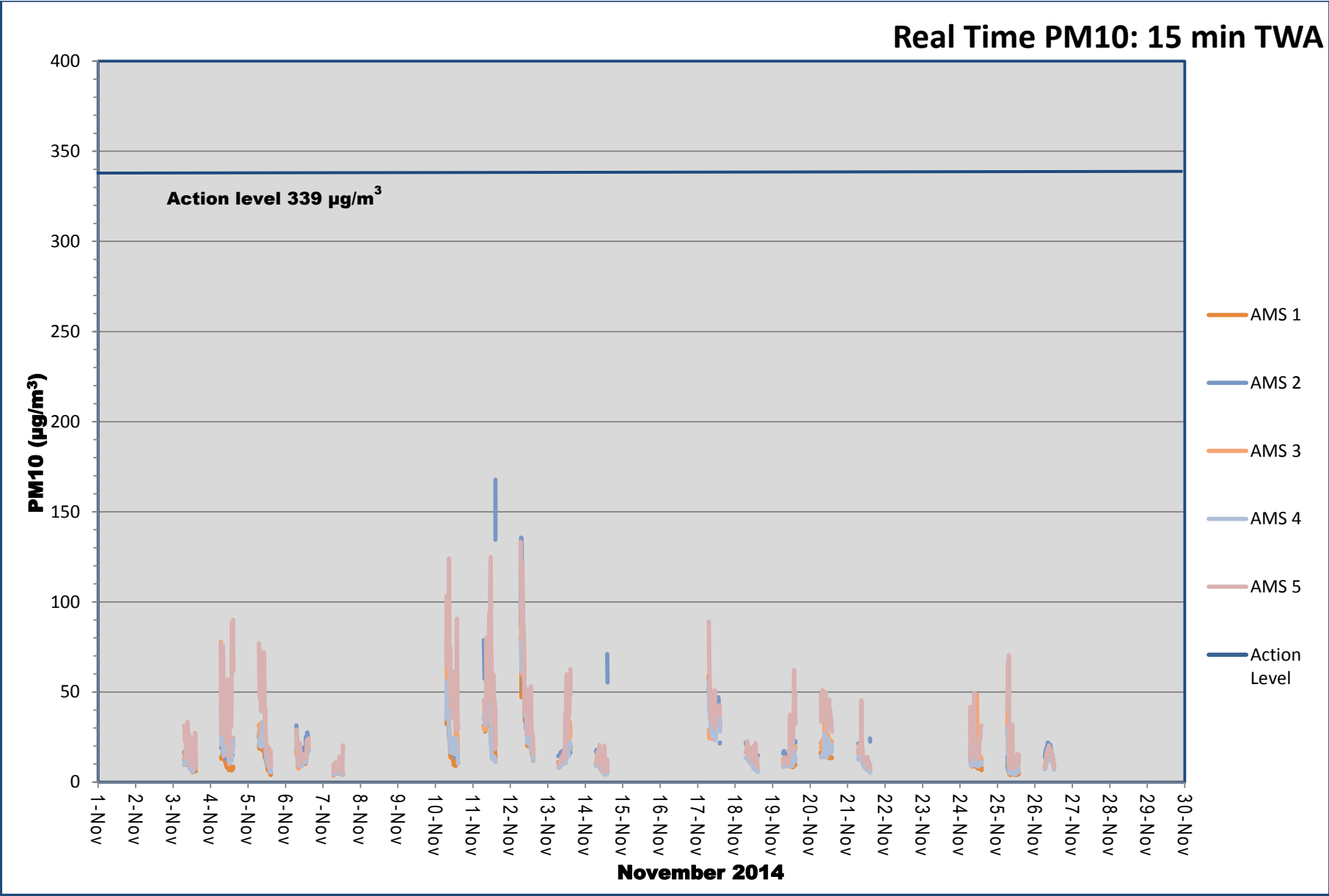


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|------------------------------|-------|---|-------------------|--------------|
| Saturday, November 1, 2014 | - | - | - | - |
| Sunday, November 2, 2014 | - | - | - | - |
| Monday, November 3, 2014 | 10:15 | 81.0 | NA | DW Perimeter |
| Tuesday, November 4, 2014 | 13:00 | 108.0 | NA | DW Perimeter |
| Wednesday, November 5, 2014 | 11:45 | 66.0 | NA | DW Perimeter |
| Thursday, November 6, 2014 | 11:00 | 16.0 | NA | DW Perimeter |
| Friday, November 7, 2014 | 8:15 | 22.0 | NA | DW Perimeter |
| Saturday, November 8, 2014 | - | - | - | - |
| Sunday, November 9, 2014 | - | - | - | - |
| Monday, November 10, 2014 | 9:30 | 57.0 | NA | DW Perimeter |
| Tuesday, November 11, 2014 | 10:15 | 70.0 | NA | DW Perimeter |
| Wednesday, November 12, 2014 | 11:00 | 85.0 | NA | DW Perimeter |
| Thursday, November 13, 2014 | 13:15 | 39.0 | NA | DW Perimeter |
| Friday, November 14, 2014 | 13:30 | 17.0 | NA | DW Perimeter |
| Saturday, November 15, 2014 | - | - | - | - |
| Sunday, November 16, 2014 | - | - | - | - |
| Monday, November 17, 2014 | 8:15 | 45.0 | NA | DW Perimeter |
| Tuesday, November 18, 2014 | 9:30 | 11.0 | NA | DW Perimeter |
| Wednesday, November 19, 2014 | 10:00 | 33.0 | NA | DW Perimeter |
| Thursday, November 20, 2014 | 11:00 | 41.0 | NA | DW Perimeter |
| Friday, November 21, 2014 | 11:15 | 29.0 | NA | DW Perimeter |
| Saturday, November 22, 2014 | - | - | - | - |
| Sunday, November 23, 2014 | - | - | - | - |
| Monday, November 24, 2014 | 8:15 | 42.0 | NA | DW Perimeter |
| Tuesday, November 25, 2014 | 9:30 | 26.0 | NA | DW Perimeter |
| Wednesday, November 26, 2014 | 10:45 | 18.0 | NA | DW Perimeter |
| Thursday, November 27, 2014 | NA | NA | NA | NA |
| Friday, November 28, 2014 | NA | NA | NA | NA |
| Saturday, November 29, 2014 | - | - | - | - |
| Sunday, November 30, 2014 | - | - | - | - |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| <p>PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)</p> <p>TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)</p> <p>ng/m³ – nanograms per cubic meter</p> <p>µg/m³ – micrograms per cubic meter</p> <p>PPM – Parts per Million</p> <p>NA – Not Applicable</p> <p>ND –No Data</p> | | | | | | |

Figure A-2: Wind Speed

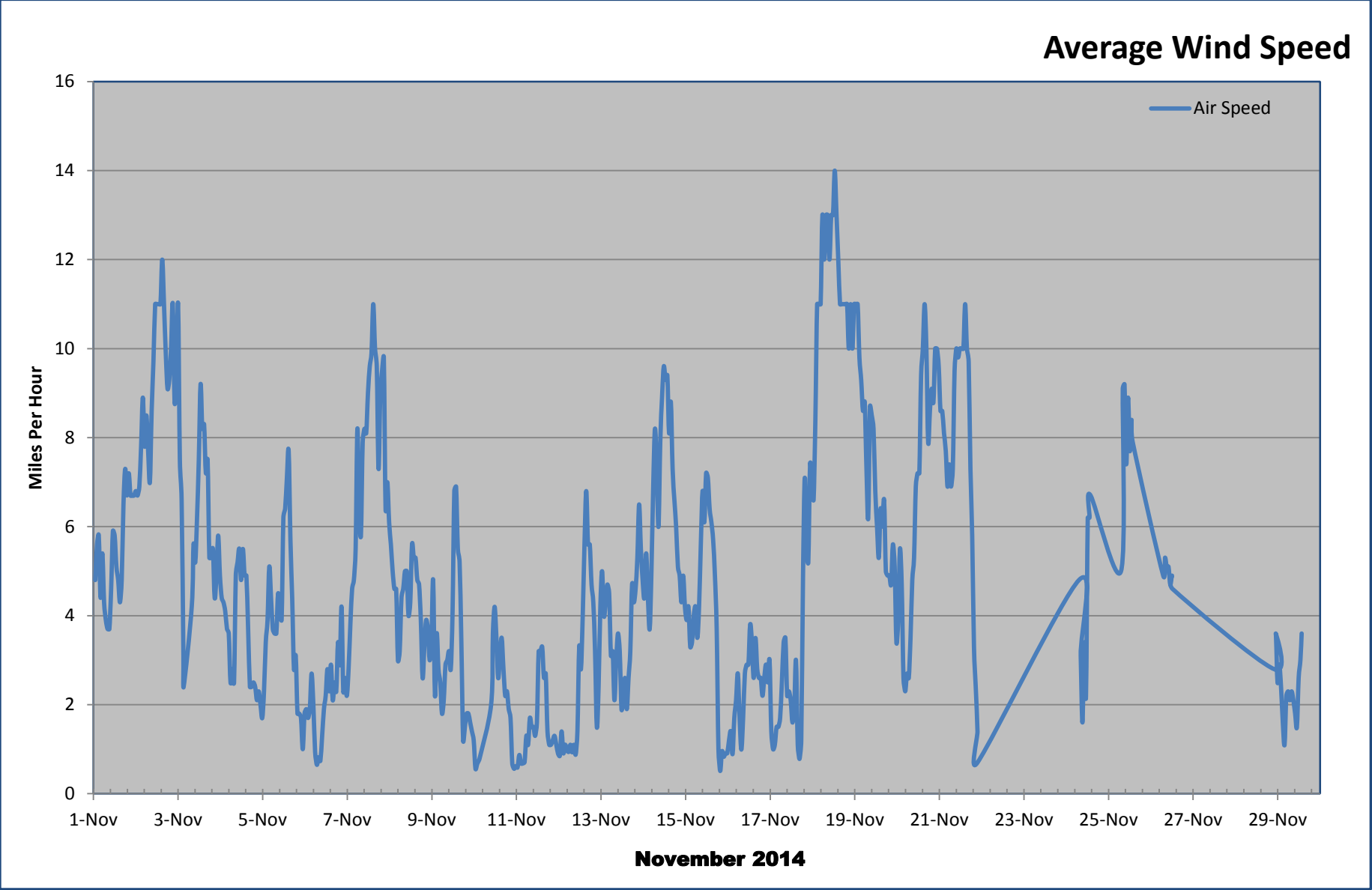


Figure A-3: Temperature

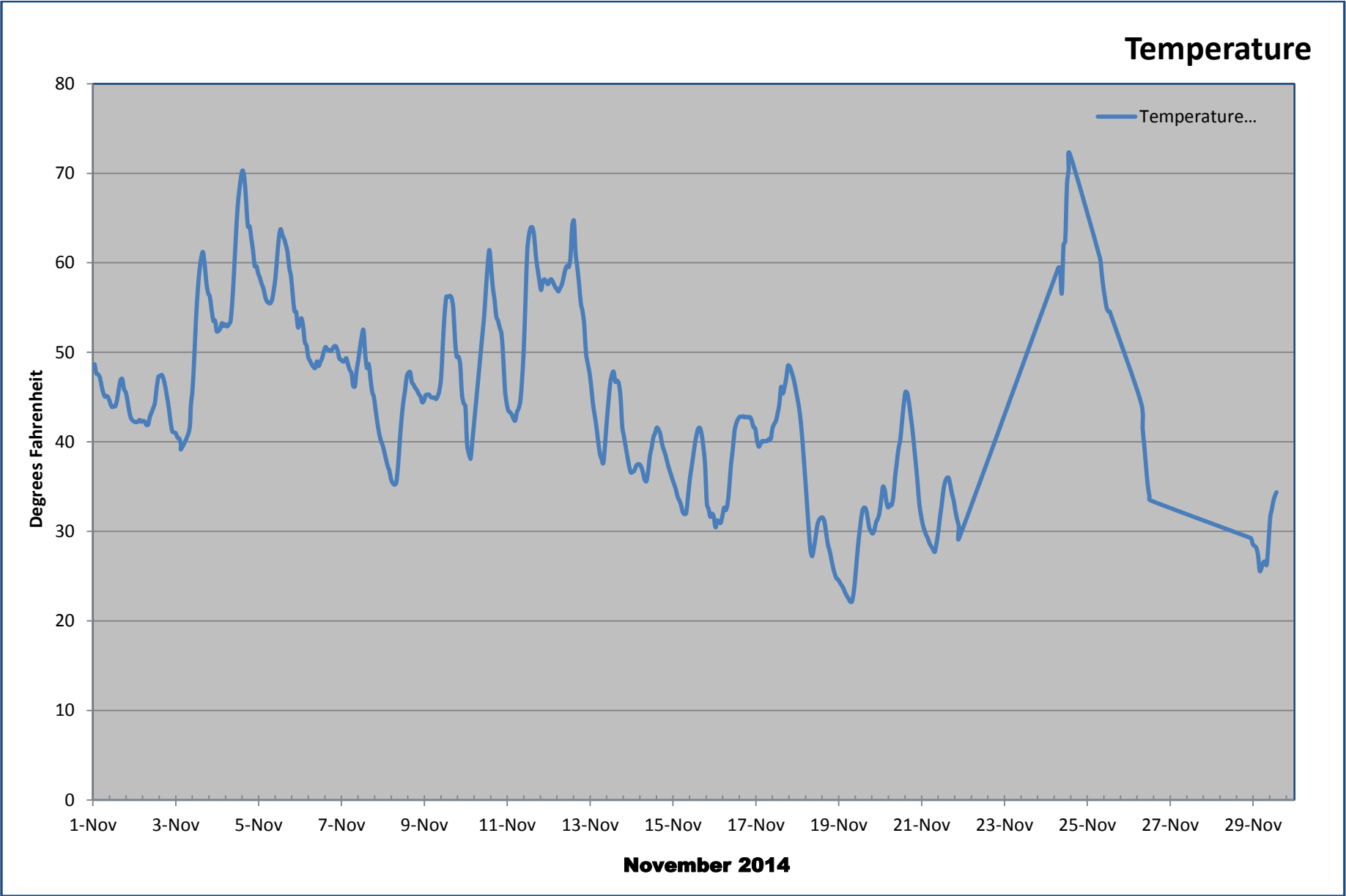


Figure A-4: Relative Humidity

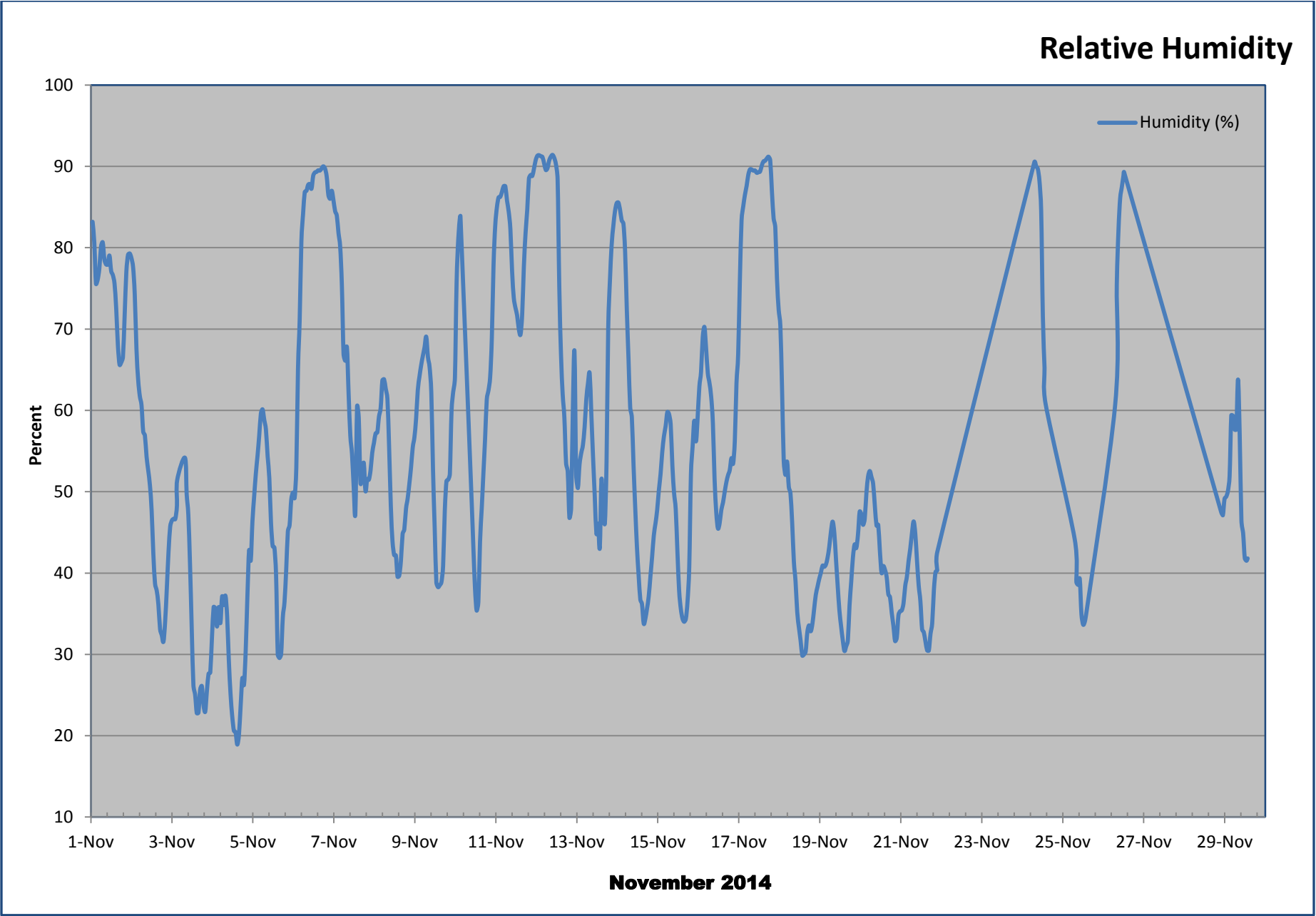


Figure A-5: Site Map Site 16 (08.25.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 128 | 128 | 129 | 127 | 127 |
| Rate of Data Collection | 99.2% | 99.2% | 100% | 98.4% | 98.4% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.020% | 0.020% | 0.017% | 0.017% | 0.015% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.021% | 0.021% | 0.021% | 0.021% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| September | 6.8 | 6.8 | 1.7 | 6.8 | 6.9 |
| October | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| November | 7.0 | 7.0 | 1.8 | 7.1 | 7.1 |
| Program to Date | 7.0 | 6.9 | 1.6 | 6.9 | 6.9 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 128 | 128 | 129 | 127 | 127 |
| Rate of Data Collection | 99.2% | 99.2% | 100% | 98.4% | 98.4% |
| Number of Detected Samples ² | 18 | 11 | 66 | 24 | 59 |
| % Detection | 14.1% | 8.6% | 51.2% | 18.9% | 46.5% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| September | 87.6 | 44.5 | 30.4 | 47.0 | 117.4 |
| October | 41.5 | 34.5 | 34.9 | 72.5 | 90.3 |
| November | 34.5 | 34.5 | 15.5 | 48.5 | 71.1 |
| Program to Date | 49.3 | 44.1 | 28.2 | 64.0 | 97.8 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| September | 16.2 | 15.6 | 14.4 | 11.0 | 31.1 |
| October | 12.9 | 18.0 | 14.6 | 12.1 | 28.9 |
| November | 15.0 | 22.5 | 19.1 | 16.3 | 29.2 |
| Program to Date | 14.6 | 22.6 | 19.0 | 13.2 | 21.2 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**December 2014
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for December 2014 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

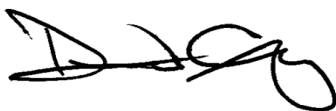
Reporting Period: December 2014

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: December 2014



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
April 6, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and December 31, 2014. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr^{+6} and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr^{+6} sampling and analysis at one station 7 days per week. | 15-minute average PM_{10} readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr^{+6} sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr^{+6} and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr^{+6} and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E}-06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|--------------------------|---------------------------|
| PM ₁₀ | 255 µg/m ³ | 339 µg/m ³ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and December 31, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 8.6 | 8.7 | 1.5 | 7.9 | 8.2 |
| 60-day² | 40 | 7.9 | 7.9 | 1.6 | 7.5 | 7.7 |
| 90-day² | 35 | 7.6 | 7.6 | 1.6 | 7.3 | 7.4 |
| PTD³ | | 7.2 | 7.2 | 1.6 | 7.1 | 7.1 |

ng/m³ – nanograms per cubic meter

1. Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 150 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.48% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of December included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the December 2014 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|------------------------------|-------|-------|-------|-------|-------|
| Monday, December 01, 2014 | 6.5 | 7.0 | 0.8 | 6.5 | 6.5 |
| Tuesday, December 02, 2014 | 7.0 | 7.5 | 2.4 | 7.0 | 7.0 |
| Wednesday, December 03, 2014 | 24.5 | 24.5 | 2.3 | 7.0 | 7.5 |
| Thursday, December 04, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.5 |
| Friday, December 05, 2014 | 7.0 | 7.0 | 0.8 | 7.5 | 7.5 |
| Saturday, December 06, 2014 | | | 0.8 | | |
| Sunday, December 07, 2014 | | | 0.8 | | |
| Monday, December 08, 2014 | 7.0 | 7.0 | 2.4 | 7.5 | 7.0 |
| Tuesday, December 09, 2014 | 12.0 | 12.0 | 2.4 | 13.5 | 13.0 |
| Wednesday, December 10, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.5 |
| Thursday, December 11, 2014 | 7.0 | 7.0 | 2.3 | 7.0 | 7.5 |
| Friday, December 12, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.5 |
| Saturday, December 13, 2014 | | | 0.8 | | |
| Sunday, December 14, 2014 | | | 0.8 | | |
| Monday, December 15, 2014 | 7.5 | 7.5 | 2.3 | 7.5 | 7.5 |
| Tuesday, December 16, 2014 | 7.5 | 7.5 | 2.3 | 7.5 | 7.5 |
| Wednesday, December 17, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 8.0 |
| Thursday, December 18, 2014 | 7.5 | 7.5 | 2.4 | 7.5 | 7.5 |
| Friday, December 19, 2014 | 7.0 | 7.0 | 0.8 | 7.0 | 7.5 |
| Saturday, December 20, 2014 | | | 0.8 | | |
| Sunday, December 21, 2014 | | | 0.8 | | |
| Monday, December 22, 2014 | 8.0 | 8.0 | 2.2 | 8.0 | 8.5 |
| Tuesday, December 23, 2014 | 7.5 | 7.5 | 2.3 | 7.5 | 8.0 |
| Wednesday, December 24, 2014 | 14.0 | 14.0 | 0.5 | 14.0 | 14.5 |
| Thursday, December 25, 2014 | NA | NA | 0.5 | NA | NA |
| Friday, December 26, 2014 | NA | NA | 0.5 | NA | NA |
| Saturday, December 27, 2014 | | | 0.5 | | |
| Sunday, December 28, 2014 | | | 0.5 | | |
| Monday, December 29, 2014 | 7.5 | 7.5 | 2.3 | 7.5 | 8.0 |
| Tuesday, December 30, 2014 | 7.5 | 7.5 | 2.3 | 7.5 | 8.0 |
| Wednesday, December 31, 2014 | 8.0 | 8.0 | 0.8 | 8.0 | 8.5 |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 12/25/14 & 12/26/14 for stations 1, 2, 4, & 5 were not collected due to site closure for holiday.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|------------------------------|-------|-------|-------|-------|-------|
| Monday, December 01, 2014 | 32.5 | 34.5 | 3.9 | 100.0 | 160.0 |
| Tuesday, December 02, 2014 | 34.0 | 36.5 | 12.0 | 36.0 | 33.5 |
| Wednesday, December 03, 2014 | 125.0 | 125.0 | 11.5 | 35.5 | 36.5 |
| Thursday, December 04, 2014 | 36.0 | 36.0 | 11.5 | 36.0 | 110.0 |
| Friday, December 05, 2014 | 36.0 | 36.0 | 3.9 | 37.0 | 37.0 |
| Saturday, December 06, 2014 | | | 3.9 | | |
| Sunday, December 07, 2014 | | | 3.9 | | |
| Monday, December 08, 2014 | 35.0 | 35.5 | 11.5 | 36.0 | 35.0 |
| Tuesday, December 09, 2014 | 60.0 | 60.0 | 12.0 | 70.0 | 65.0 |
| Wednesday, December 10, 2014 | 36.0 | 36.0 | 11.5 | 360.0 | 37.0 |
| Thursday, December 11, 2014 | 36.0 | 36.0 | 11.5 | 35.5 | 37.0 |
| Friday, December 12, 2014 | 36.0 | 35.5 | 3.9 | 35.5 | 36.5 |
| Saturday, December 13, 2014 | | | 3.9 | | |
| Sunday, December 14, 2014 | | | 3.9 | | |
| Monday, December 15, 2014 | 36.5 | 36.5 | 31.0 | 37.0 | 38.0 |
| Tuesday, December 16, 2014 | 37.0 | 37.0 | 41.0 | 37.5 | 140.0 |
| Wednesday, December 17, 2014 | 37.0 | 37.0 | 11.5 | 37.5 | 38.5 |
| Thursday, December 18, 2014 | 36.5 | 36.5 | 11.5 | 36.5 | 38.0 |
| Friday, December 19, 2014 | 35.5 | 35.5 | 3.9 | 35.0 | 36.5 |
| Saturday, December 20, 2014 | | | 3.9 | | |
| Sunday, December 21, 2014 | | | 3.9 | | |
| Monday, December 22, 2014 | 40.0 | 39.5 | 11.0 | 39.5 | 41.5 |
| Tuesday, December 23, 2014 | 38.0 | 37.5 | 11.5 | 37.5 | 39.0 |
| Wednesday, December 24, 2014 | 70.0 | 70.0 | 2.3 | 70.0 | 75.0 |
| Thursday, December 25, 2014 | NA | NA | 2.3 | NA | NA |
| Friday, December 26, 2014 | NA | NA | 2.3 | NA | NA |
| Saturday, December 27, 2014 | | | 2.3 | | |
| Sunday, December 28, 2014 | | | 2.3 | | |
| Monday, December 29, 2014 | 38.5 | 38.0 | 11.5 | 38.0 | 39.0 |
| Tuesday, December 30, 2014 | 38.5 | 38.5 | 11.5 | 38.0 | 39.0 |
| Wednesday, December 31, 2014 | 40.0 | 39.5 | 10.0 | 40.0 | 41.0 |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 12/25/14 & 12/26/14 for stations 1, 2, 4, & 5 were not collected due to site closure for holiday.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

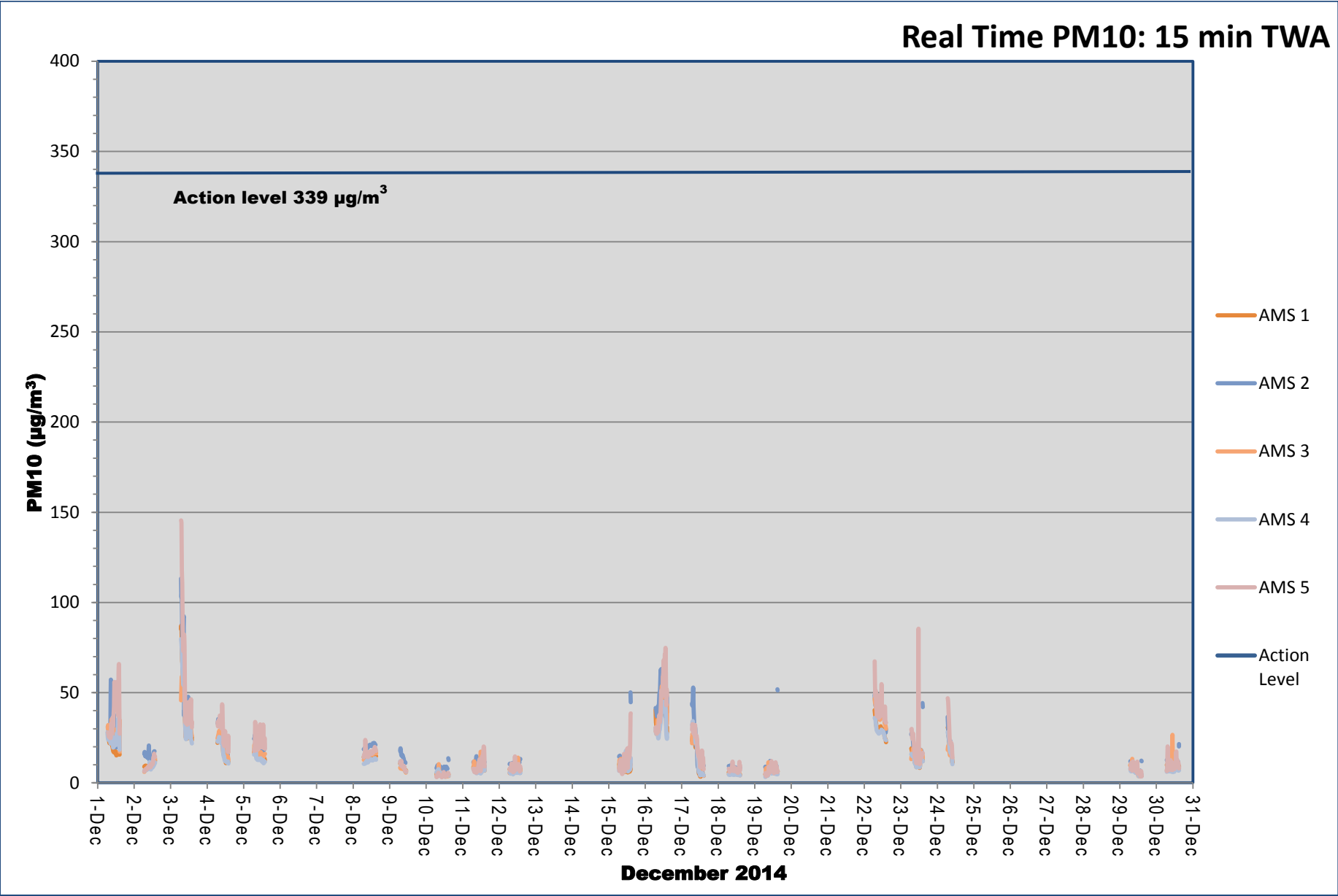


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|------------------------------|-------|---|-------------------|--------------|
| Monday, December 1, 2014 | 11:45 | 35.0 | NA | DW Perimeter |
| Tuesday, December 2, 2014 | 10:15 | 14.0 | NA | DW Perimeter |
| Wednesday, December 3, 2014 | 13:15 | 84.0 | NA | DW Perimeter |
| Thursday, December 4, 2014 | 13:45 | 29.0 | NA | DW Perimeter |
| Friday, December 5, 2014 | 8:15 | 27.0 | NA | DW Perimeter |
| Saturday, December 6, 2014 | - | - | - | - |
| Sunday, December 7, 2014 | - | - | - | - |
| Monday, December 8, 2014 | 8:45 | 18.0 | NA | DW Perimeter |
| Tuesday, December 9, 2014 | 9:15 | 13.0 | NA | DW Perimeter |
| Wednesday, December 10, 2014 | 13:15 | 7.0 | NA | DW Perimeter |
| Thursday, December 11, 2014 | 10:30 | 16.0 | NA | DW Perimeter |
| Friday, December 12, 2014 | 11:30 | 13.0 | NA | DW Perimeter |
| Saturday, December 13, 2014 | - | - | - | - |
| Sunday, December 14, 2014 | - | - | - | - |
| Monday, December 15, 2014 | 13:15 | 13.0 | NA | DW Perimeter |
| Tuesday, December 16, 2014 | 13:45 | 43.0 | NA | DW Perimeter |
| Wednesday, December 17, 2014 | 7:30 | 29.0 | NA | DW Perimeter |
| Thursday, December 18, 2014 | 7:45 | 5.0 | NA | DW Perimeter |
| Friday, December 19, 2014 | 9:00 | 12.0 | NA | DW Perimeter |
| Saturday, December 20, 2014 | - | - | - | - |
| Sunday, December 21, 2014 | - | - | - | - |
| Monday, December 22, 2014 | 9:15 | 32.0 | NA | DW Perimeter |
| Tuesday, December 23, 2014 | 10:00 | 22.0 | NA | DW Perimeter |
| Wednesday, December 24, 2014 | 11:30 | 25.0 | NA | DW Perimeter |
| Thursday, December 25, 2014 | NA | NA | NA | NA |
| Friday, December 26, 2014 | NA | NA | NA | NA |
| Saturday, December 27, 2014 | - | - | - | - |
| Sunday, December 28, 2014 | - | - | - | - |
| Monday, December 29, 2014 | 13:00 | 9.0 | NA | DW Perimeter |
| Tuesday, December 30, 2014 | 10:45 | 15.0 | NA | DW Perimeter |
| Wednesday, December 31, 2014 | 8:30 | 18.0 | NA | DW Perimeter |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| <p>PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)</p> <p>TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)</p> <p>ng/m³ – nanograms per cubic meter</p> <p>µg/m³ – micrograms per cubic meter</p> <p>PPM – Parts per Million</p> <p>NA – Not Applicable</p> <p>ND –No Data</p> | | | | | | |

Figure A-2: Wind Speed

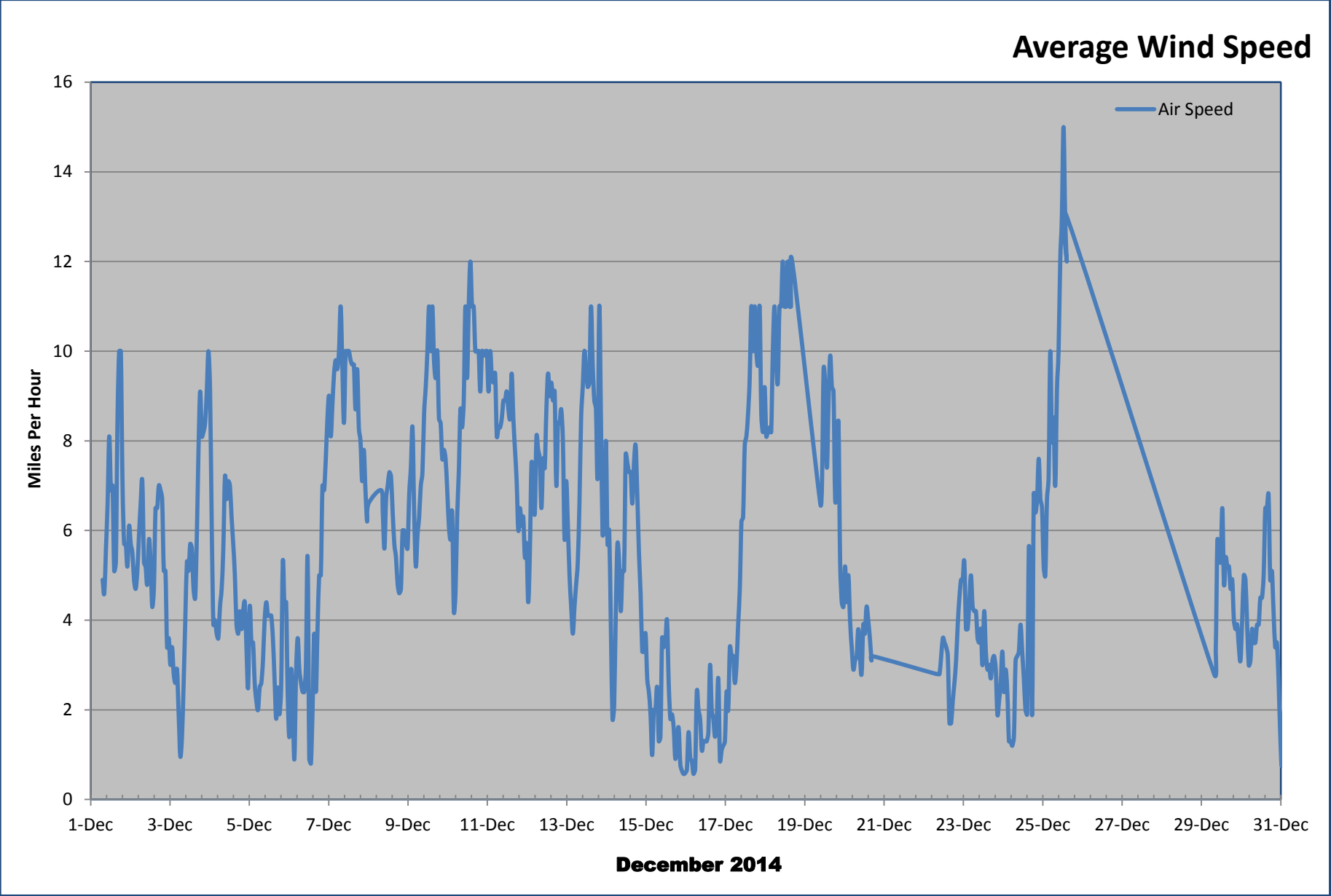


Figure A-3: Temperature

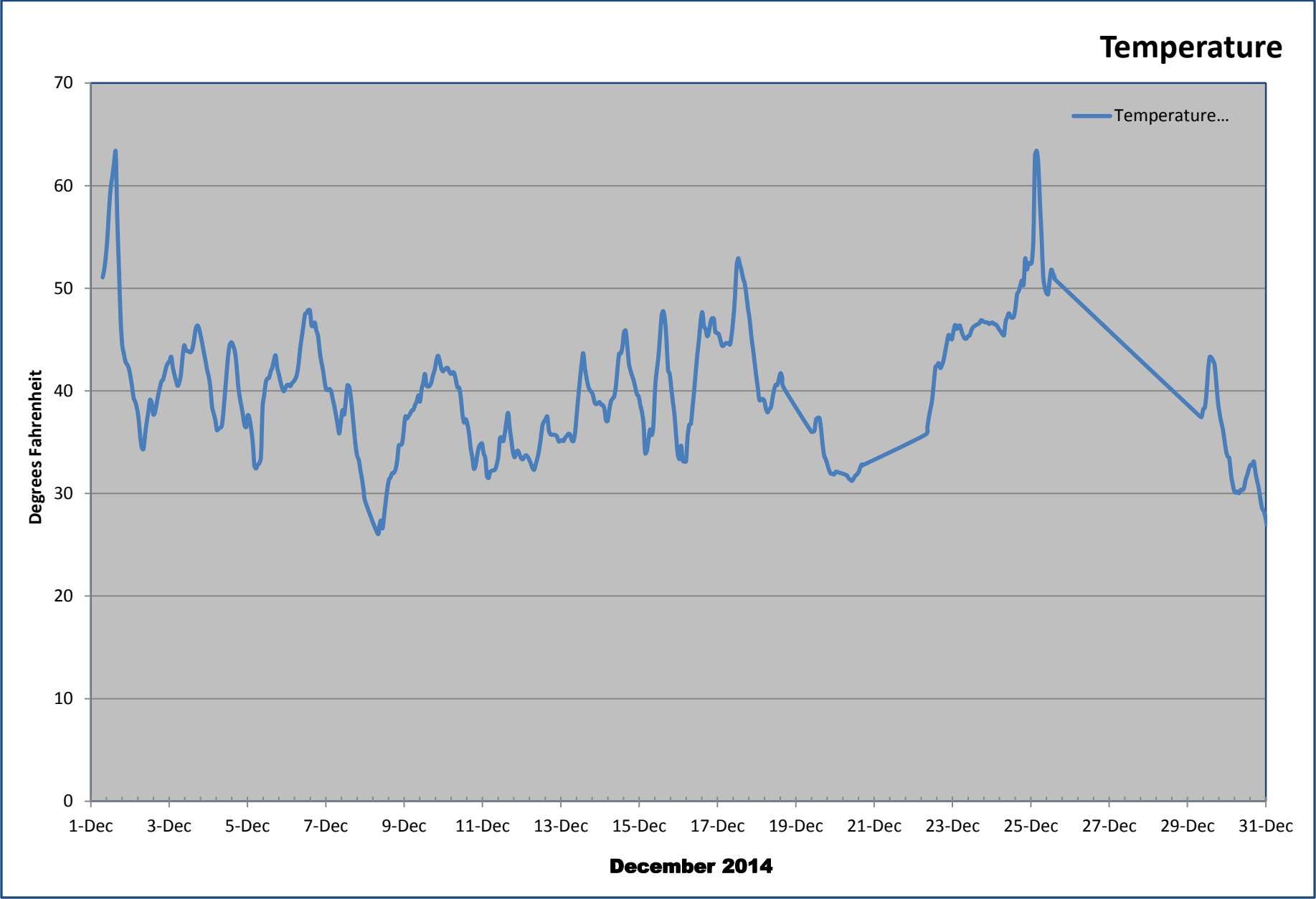


Figure A-4: Relative Humidity

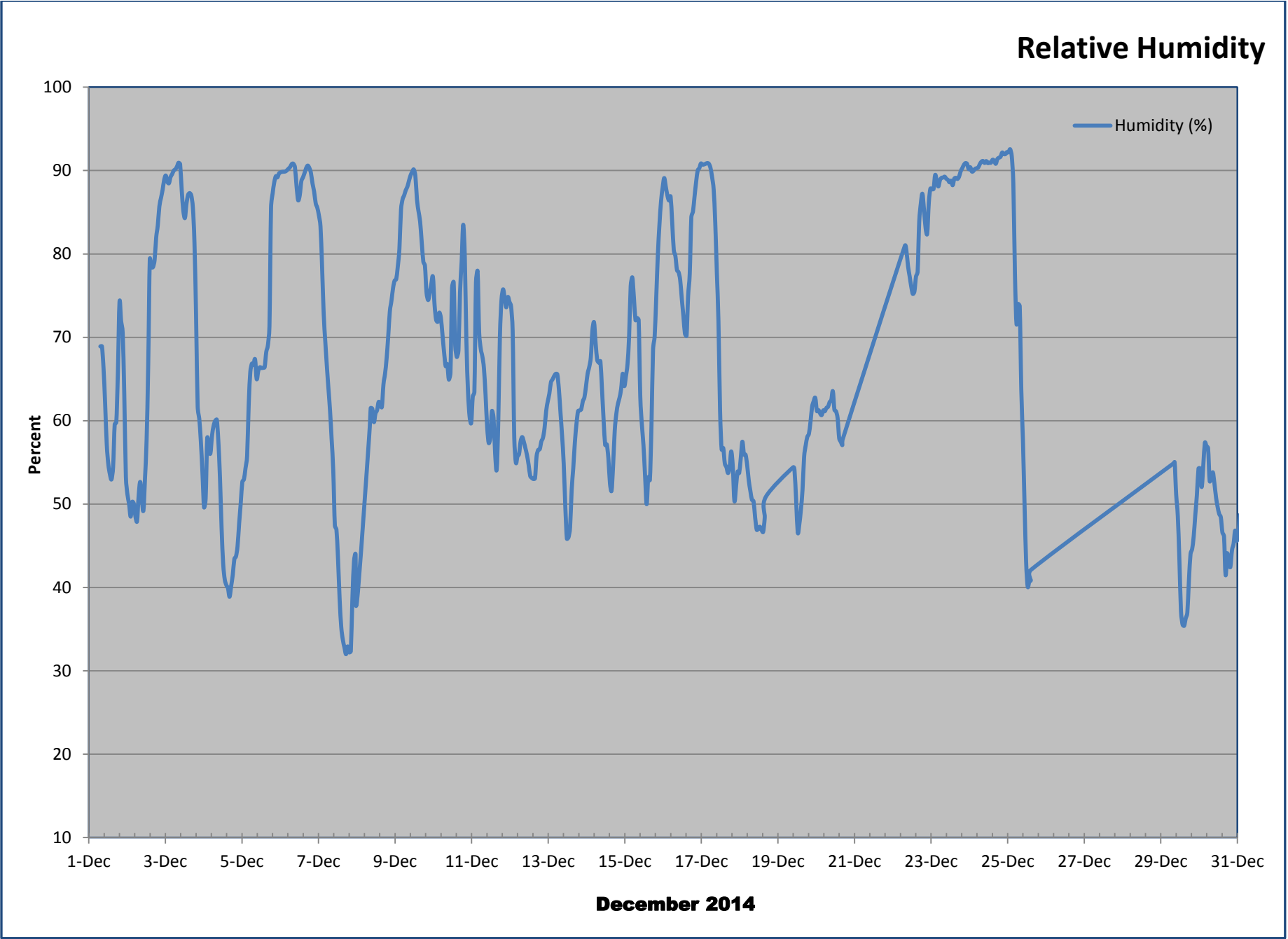


Figure A-5: Site Map Site 16 (08.25.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 149 | 149 | 150 | 148 | 148 |
| Rate of Data Collection | 99.3% | 99.3% | 100% | 98.7% | 98.7% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.020% | 0.020% | 0.019% | 0.018% | 0.018% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.021% | 0.021% | 0.021% | 0.021% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| September | 6.8 | 6.8 | 1.7 | 6.8 | 6.9 |
| October | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| November | 7.0 | 7.0 | 1.8 | 7.1 | 7.1 |
| December | 8.6 | 8.7 | 1.5 | 7.9 | 8.2 |
| Program to Date | 7.2 | 7.2 | 1.6 | 7.1 | 7.1 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 149 | 149 | 150 | 148 | 148 |
| Rate of Data Collection | 99.3% | 99.3% | 100% | 98.7% | 98.7% |
| Number of Detected Samples ² | 18 | 11 | 69 | 25 | 62 |
| % Detection | 12.1% | 7.4% | 46.0% | 16.9% | 41.9% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| September | 87.6 | 44.5 | 30.4 | 47.0 | 117.4 |
| October | 41.5 | 34.5 | 34.9 | 72.5 | 90.3 |
| November | 34.5 | 34.5 | 15.5 | 48.5 | 71.1 |
| December | 43.5 | 43.6 | 9.1 | 58.5 | 54.9 |
| Program to Date | 48.4 | 44.0 | 25.3 | 63.1 | 91.3 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| September | 16.2 | 15.6 | 14.4 | 11.0 | 31.1 |
| October | 12.9 | 18.0 | 14.6 | 12.1 | 28.9 |
| November | 15.0 | 22.5 | 19.1 | 16.3 | 29.2 |
| December | 14.4 | 20.7 | 15.9 | 13.9 | 20.0 |
| Program to Date | 14.6 | 22.3 | 18.5 | 13.3 | 21.0 |
| All readings in µg/m ³ – micrograms per cubic meter | | | | | |

**January 2015
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for January 2015 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

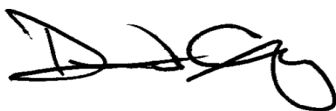
Reporting Period: January 2015

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: January 2015



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
April 6, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and January 31, 2015. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million ($1\text{E-}06$) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr⁺⁶ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr⁺⁶ Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|--------------------------|---------------------------|
| PM ₁₀ | 255 µg/m ³ | 339 µg/m ³ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and January 31, 2015 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 8.1 | 8.1 | 1.7 | 8.1 | 8.4 |
| 60-day² | 40 | 8.1 | 8.2 | 1.8 | 7.7 | 7.9 |
| 90-day² | 35 | 7.7 | 7.7 | 1.8 | 7.5 | 7.6 |
| PTD³ | | 7.2 | 7.2 | 1.7 | 7.1 | 7.2 |

ng/m³ – nanograms per cubic meter

1. Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 154 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.49% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of January included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the January 2015 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-----------------------------|-------|-------|-------|-------|-------|
| Thursday, January 01, 2015 | NA | NA | 0.8 | NA | NA |
| Friday, January 02, 2015 | NA | NA | 0.8 | NA | NA |
| Saturday, January 03, 2015 | | | 0.8 | | |
| Sunday, January 04, 2015 | | | 0.8 | | |
| Monday, January 05, 2015 | 7.5 | 7.5 | 2.3 | 7.5 | 8.0 |
| Tuesday, January 06, 2015 | | | 2.3 | | |
| Wednesday, January 07, 2015 | | | 2.3 | | |
| Thursday, January 08, 2015 | 7.0 | 7.0 | 2.3 | 7.0 | 7.5 |
| Friday, January 09, 2015 | 8.5 | 8.0 | 2.3 | 8.0 | 8.5 |
| Saturday, January 10, 2015 | | | 2.3 | | |
| Sunday, January 11, 2015 | | | 2.3 | | |
| Monday, January 12, 2015 | 9.0 | 9.0 | 10.0 | 9.5 | 8.0 |
| Tuesday, January 13, 2015 | | | | | |
| Wednesday, January 14, 2015 | | | | | |
| Thursday, January 15, 2015 | | | | | |
| Friday, January 16, 2015 | | | | | |
| Saturday, January 17, 2015 | | | | | |
| Sunday, January 18, 2015 | | | | | |
| Monday, January 19, 2015 | | | | | |
| Tuesday, January 20, 2015 | | | | | |
| Wednesday, January 21, 2015 | | | | | |
| Thursday, January 22, 2015 | | | | | |
| Friday, January 23, 2015 | | | | | |
| Saturday, January 24, 2015 | | | | | |
| Sunday, January 25, 2015 | | | | | |
| Monday, January 26, 2015 | 8.5 | 9.0 | 8.5 | 8.5 | 9.0 |
| Tuesday, January 27, 2015 | | | | | |
| Wednesday, January 28, 2015 | | | | | |
| Thursday, January 29, 2015 | | | | | |
| Friday, January 30, 2015 | | | | | |
| Saturday, January 31, 2015 | | | | | |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 1/01/15 & 1/02/15 for stations 1, 2, 4, & 5 were not collected due to site closure for holiday.

No samples taken on 1/06/15 and 1/07/ 15 due to no work conducted on site

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-----------------------------|-------|-------|-------|-------|-------|
| Thursday, January 01, 2015 | NA | NA | 10.0 | NA | NA |
| Friday, January 02, 2015 | NA | NA | 10.0 | NA | NA |
| Saturday, January 03, 2015 | | | 10.0 | | |
| Sunday, January 04, 2015 | | | 10.0 | | |
| Monday, January 05, 2015 | 38.0 | 38.0 | 11.5 | 37.5 | 39.0 |
| Tuesday, January 06, 2015 | | | 11.5 | | |
| Wednesday, January 07, 2015 | | | 11.5 | | |
| Thursday, January 08, 2015 | 36.0 | 35.5 | 11.5 | 36.0 | 37.0 |
| Friday, January 09, 2015 | 41.0 | 41.0 | 11.5 | 38.5 | 41.5 |
| Saturday, January 10, 2015 | | | 11.5 | | |
| Sunday, January 11, 2015 | | | 11.5 | | |
| Monday, January 12, 2015 | 46.0 | 45.5 | 49.5 | 46.0 | 41.0 |
| Tuesday, January 13, 2015 | | | | | |
| Wednesday, January 14, 2015 | | | | | |
| Thursday, January 15, 2015 | | | | | |
| Friday, January 16, 2015 | | | | | |
| Saturday, January 17, 2015 | | | | | |
| Sunday, January 18, 2015 | | | | | |
| Monday, January 19, 2015 | | | | | |
| Tuesday, January 20, 2015 | | | | | |
| Wednesday, January 21, 2015 | | | | | |
| Thursday, January 22, 2015 | | | | | |
| Friday, January 23, 2015 | | | | | |
| Saturday, January 24, 2015 | | | | | |
| Sunday, January 25, 2015 | | | | | |
| Monday, January 26, 2015 | 42.0 | 44.0 | 43.5 | 42.5 | 44.0 |
| Tuesday, January 27, 2015 | | | | | |
| Wednesday, January 28, 2015 | | | | | |
| Thursday, January 29, 2015 | | | | | |
| Friday, January 30, 2015 | | | | | |
| Saturday, January 31, 2015 | | | | | |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: Samples from 1/01/15 & 1/02/15 for stations 1, 2, 4, & 5 were not collected due to site closure for holiday.
No samples taken on 1/06/15 and 1/07/ 15 due to no work conducted on site.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

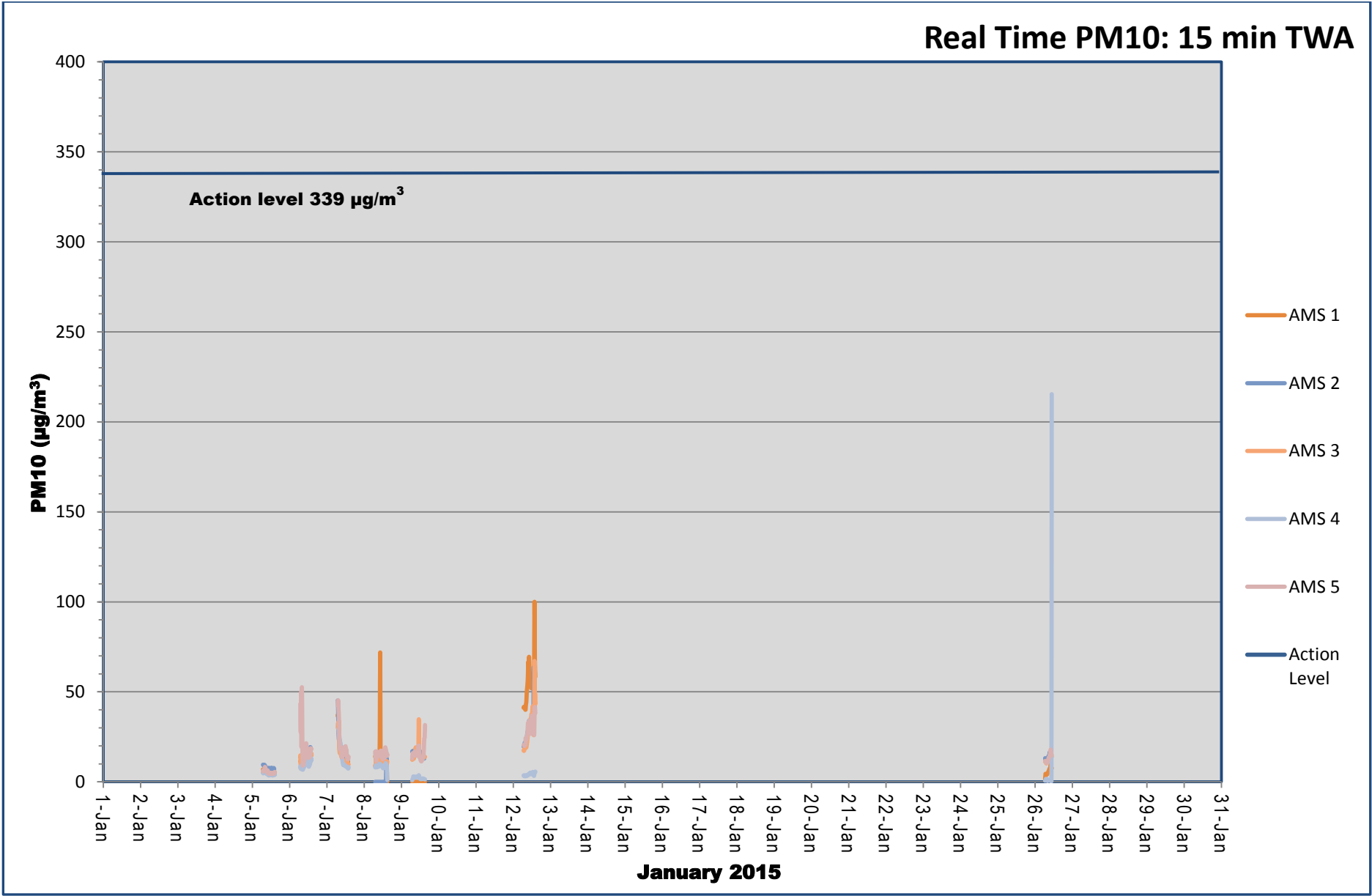


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|-----------------------------|-------|---|-------------------|--------------|
| Thursday, January 01, 2015 | NA | NA | NA | NA |
| Friday, January 02, 2015 | NA | NA | NA | NA |
| Saturday, January 03, 2015 | - | - | - | - |
| Sunday, January 04, 2015 | - | - | - | - |
| Monday, January 05, 2015 | 11:30 | 10.0 | NA | DW Perimeter |
| Tuesday, January 06, 2015 | 10:15 | 21.0 | NA | DW Perimeter |
| Wednesday, January 07, 2015 | 8:15 | 35.0 | NA | DW Perimeter |
| Thursday, January 08, 2015 | 9:45 | 22.0 | NA | DW Perimeter |
| Friday, January 09, 2015 | 13:00 | 17.0 | NA | DW Perimeter |
| Saturday, January 10, 2015 | - | - | - | - |
| Sunday, January 11, 2015 | - | - | - | - |
| Monday, January 12, 2015 | 11:00 | 55.0 | NA | DW Perimeter |
| Tuesday, January 13, 2015 | NA | NA | NA | NA |
| Wednesday, January 14, 2015 | NA | NA | NA | NA |
| Thursday, January 15, 2015 | NA | NA | NA | NA |
| Friday, January 16, 2015 | NA | NA | NA | NA |
| Saturday, January 17, 2015 | - | - | - | - |
| Sunday, January 18, 2015 | - | - | - | - |
| Monday, January 19, 2015 | NA | NA | NA | NA |
| Tuesday, January 20, 2015 | NA | NA | NA | NA |
| Wednesday, January 21, 2015 | NA | NA | NA | NA |
| Thursday, January 22, 2015 | NA | NA | NA | NA |
| Friday, January 23, 2015 | NA | NA | NA | NA |
| Saturday, January 24, 2015 | - | - | - | - |
| Sunday, January 25, 2015 | - | - | - | - |
| Monday, January 26, 2015 | 8:45 | 18.0 | NA | DW Perimeter |
| Tuesday, January 27, 2015 | NA | NA | NA | NA |
| Wednesday, January 28, 2015 | NA | NA | NA | NA |
| Thursday, January 29, 2015 | NA | NA | NA | NA |
| Friday, January 30, 2015 | NA | NA | NA | NA |
| Saturday, January 31, 2015 | - | - | - | - |

Note: Cells highlighted in green are instantaneous peaks that are values above the TVOC Alert Level (15-minute average of 1 ppm) and TVOC Action Level (15-minute average of 1.4) but were not sustained levels and did not require any corrective actions on the Site.

Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| <p>PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)</p> <p>TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)</p> <p>ng/m³ – nanograms per cubic meter</p> <p>µg/m³ – micrograms per cubic meter</p> <p>PPM – Parts per Million</p> <p>NA – Not Applicable</p> <p>ND –No Data</p> | | | | | | |

Figure A-2: Wind Speed

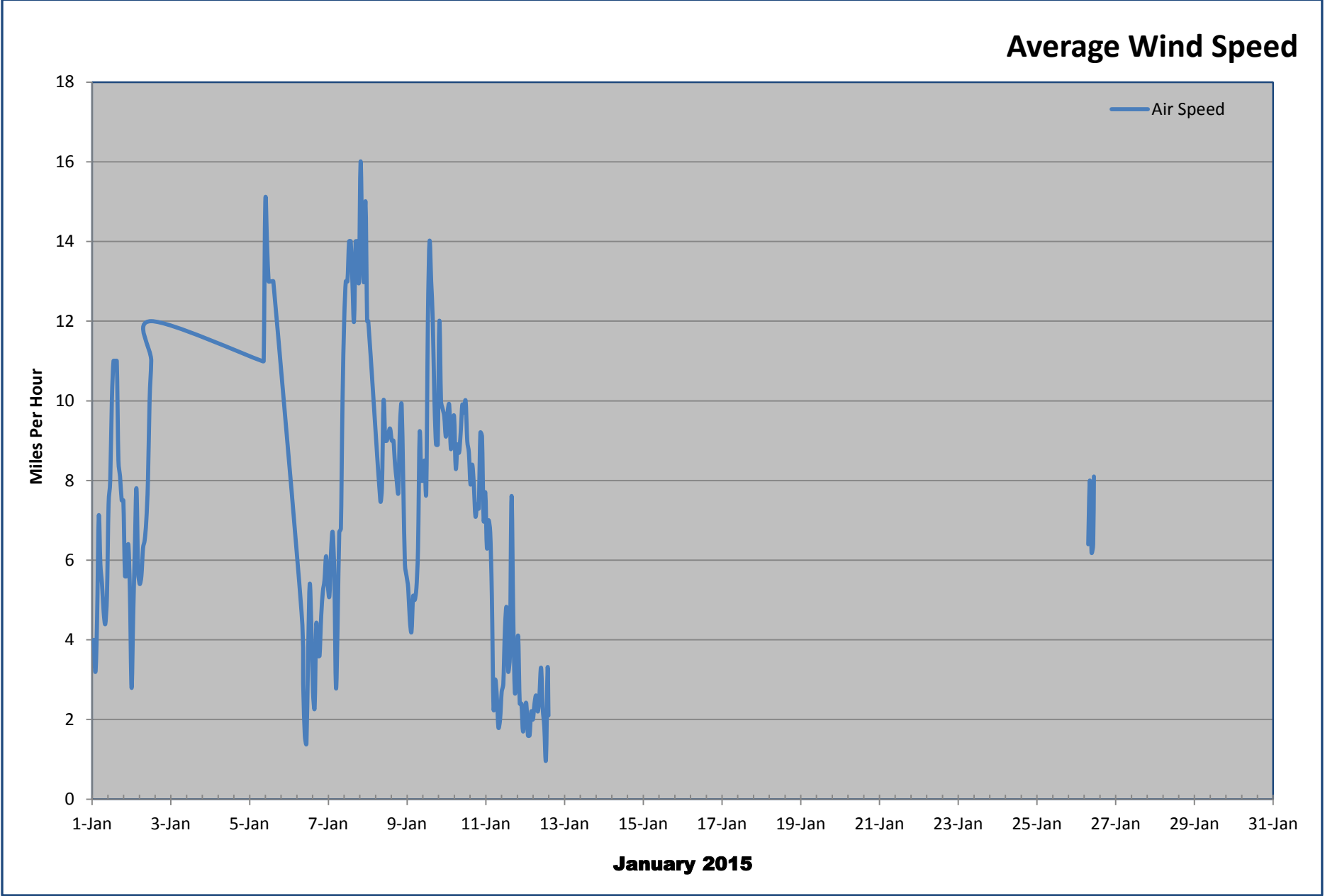


Figure A-3: Temperature

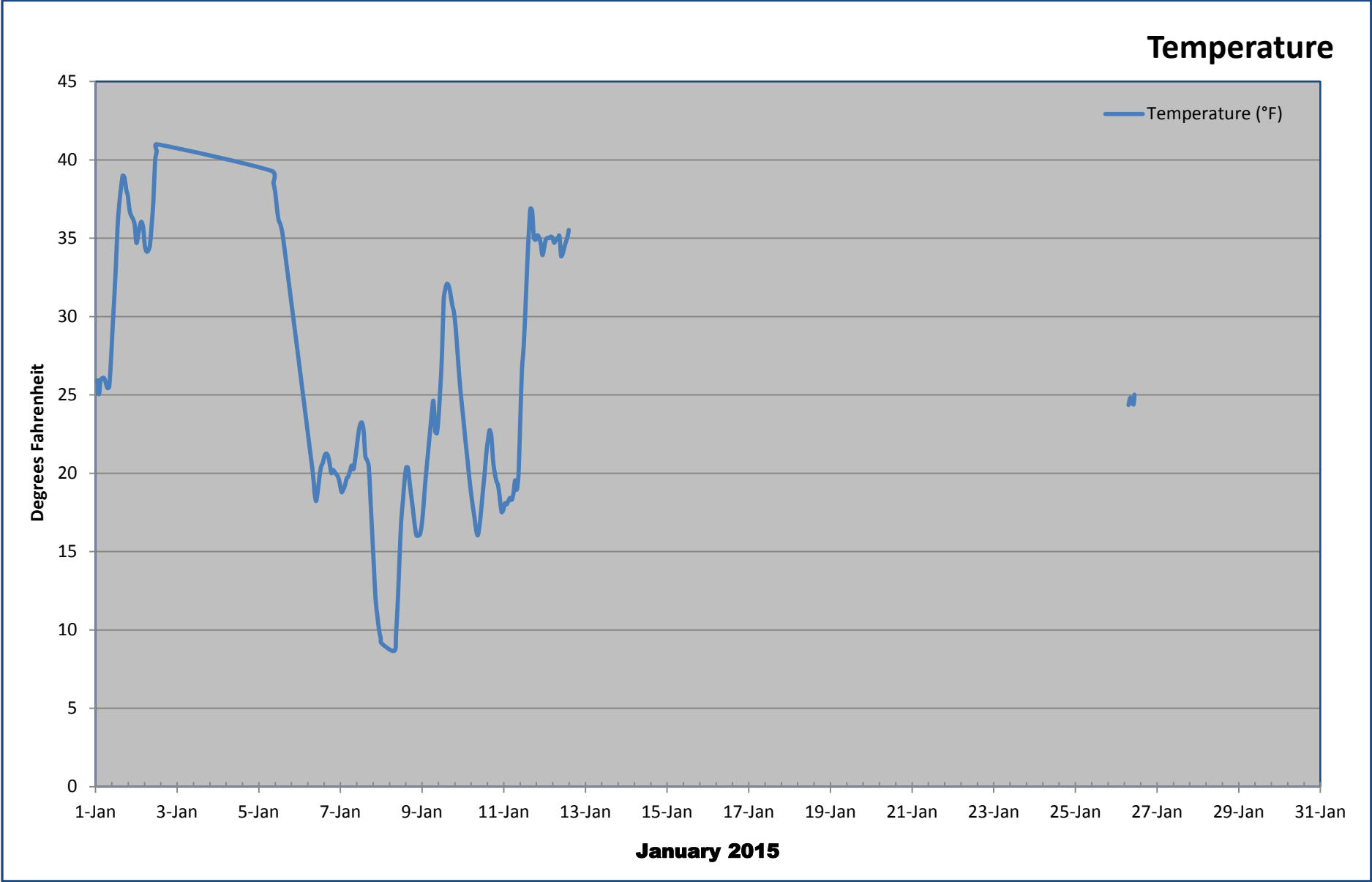


Figure A-4: Relative Humidity

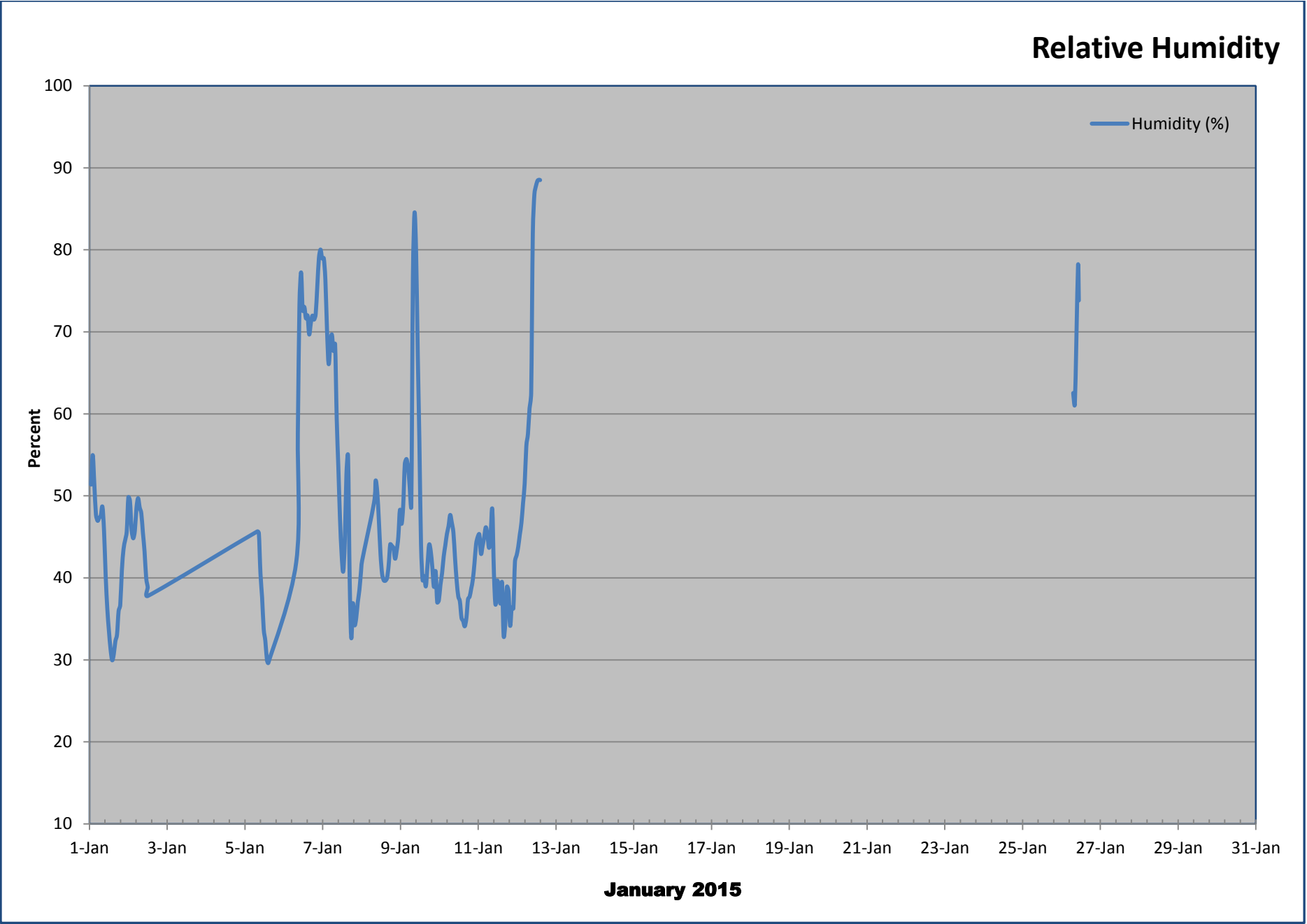


Figure A-5: Site Map Site 16 (08.25.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 153 | 153 | 154 | 152 | 152 |
| Rate of Data Collection | 99.4% | 99.4% | 100% | 98.7% | 98.7% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.020% | 0.020% | 0.016% | 0.020% | 0.020% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.020% | 0.020% | 0.021% | 0.021% |

Results in ng/m³ – nanograms per cubic meter

¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.

³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| September | 6.8 | 6.8 | 1.7 | 6.8 | 6.9 |
| October | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| November | 7.0 | 7.0 | 1.8 | 7.1 | 7.1 |
| December | 8.6 | 8.7 | 1.5 | 7.9 | 8.2 |
| January | 8.1 | 8.1 | 2.9 | 8.1 | 8.2 |
| Program to Date | 7.2 | 7.2 | 1.7 | 7.1 | 7.2 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 153 | 153 | 154 | 152 | 152 |
| Rate of Data Collection | 99.34 | 99.4% | 100% | 98.7% | 98.7% |
| Number of Detected Samples ² | 18 | 11 | 69 | 25 | 62 |
| % Detection | 11.8% | 7.2% | 44.8% | 16.4% | 40.8% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| September | 87.6 | 44.5 | 30.4 | 47.0 | 117.4 |
| October | 41.5 | 34.5 | 34.9 | 72.5 | 90.3 |
| November | 34.5 | 34.5 | 15.5 | 48.5 | 71.1 |
| December | 43.5 | 43.6 | 9.1 | 58.5 | 54.9 |
| January | 40.6 | 40.8 | 16.4 | 40.1 | 40.5 |
| Program to Date | 48.1 | 43.9 | 24.7 | 62.3 | 89.5 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| September | 16.2 | 15.6 | 14.4 | 11.0 | 31.1 |
| October | 12.9 | 18.0 | 14.6 | 12.1 | 28.9 |
| November | 15.0 | 22.5 | 19.1 | 16.3 | 29.2 |
| December | 14.4 | 20.7 | 15.9 | 13.9 | 20.0 |
| January | 16.0 | 14.9 | 14.3 | 6.5 | 17.0 |
| Program to Date | 14.7 | 22.0 | 18.3 | 13.0 | 20.9 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**May 2015
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for May 2015 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

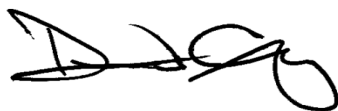
Reporting Period: May 2015

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: May 2015



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
July 6, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and May 31, 2015. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr⁺⁶ and real-time PM₁₀ concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr⁺⁶ and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr⁺⁶ concentrations and real-time PM₁₀ are outlined in the following sections.

3.1 Integrated Cr⁺⁶ Acceptable Air Concentration

A Site-specific Cr⁺⁶ AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr⁺⁶ in dust. The AAC for Cr⁺⁶ was developed to represent the maximum allowable average concentration of Cr⁺⁶ in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr⁺⁶ emanating from the Site.

The AAC of 487 ng/m³ is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m³ to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr⁺⁶ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr⁺⁶ Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|--------------------------|---------------------------|
| PM ₁₀ | 255 µg/m ³ | 339 µg/m ³ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and May 31, 2015 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 3.8 | 3.9 | 1.2 | 3.9 | 4.0 |
| 60-day² | 40 | 3.8 | 3.9 | 1.2 | 3.9 | 4.0 |
| 90-day² | 35 | 3.8 | 3.9 | 1.2 | 3.9 | 4.0 |
| PTD³ | | 7.1 | 7.1 | 1.7 | 7.0 | 7.0 |

ng/m³ – nanograms per cubic meter

1. Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 161 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.45% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of May included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the May 2015 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-------------------------|-------|-------|-------|-------|-------|
| Friday, May 01, 2015 | | | | | |
| Saturday, May 02, 2015 | | | | | |
| Sunday, May 03, 2015 | | | | | |
| Monday, May 04, 2015 | | | | | |
| Tuesday, May 05, 2015 | | | | | |
| Wednesday, May 06, 2015 | | | | | |
| Thursday, May 07, 2015 | | | | | |
| Friday, May 08, 2015 | | | | | |
| Saturday, May 09, 2015 | | | | | |
| Sunday, May 10, 2015 | | | | | |
| Monday, May 11, 2015 | | | | | |
| Tuesday, May 12, 2015 | | | | | |
| Wednesday, May 13, 2015 | | | | | |
| Thursday, May 14, 2015 | | | | | |
| Friday, May 15, 2015 | | | | | |
| Saturday, May 16, 2015 | | | | | |
| Sunday, May 17, 2015 | | | | | |
| Monday, May 18, 2015 | | | | | |
| Tuesday, May 19, 2015 | | | | | |
| Wednesday, May 20, 2015 | 3.6 | 3.7 | 1.2 | 3.7 | 3.7 |
| Thursday, May 21, 2015 | 3.6 | 3.7 | 1.2 | 3.7 | 3.7 |
| Friday, May 22, 2015 | 4.7 | 4.8 | 1.2 | 4.9 | 4.8 |
| Saturday, May 23, 2015 | | | 1.2 | | |
| Sunday, May 24, 2015 | | | 1.2 | | |
| Monday, May 25, 2015 | | | 1.2 | | |
| Tuesday, May 26, 2015 | 3.7 | 3.8 | 1.2 | 3.8 | 3.8 |
| Wednesday, May 27, 2015 | 3.7 | 3.9 | 1.2 | 3.9 | 4.3 |
| Thursday, May 28, 2015 | 3.8 | 4.0 | 1.2 | 4.0 | 3.9 |
| Friday, May 29, 2015 | 3.7 | 3.8 | 1.2 | 3.8 | 3.7 |
| Saturday, May 30, 2015 | | | 1.2 | | |
| Sunday, May 31, 2015 | | | 1.2 | | |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: No samples taken on 5/25/15 due to site closure for holiday

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|-------------------------|-------|-------|-------|-------|-------|
| Friday, May 01, 2015 | | | | | |
| Saturday, May 02, 2015 | | | | | |
| Sunday, May 03, 2015 | | | | | |
| Monday, May 04, 2015 | | | | | |
| Tuesday, May 05, 2015 | | | | | |
| Wednesday, May 06, 2015 | | | | | |
| Thursday, May 07, 2015 | | | | | |
| Friday, May 08, 2015 | | | | | |
| Saturday, May 09, 2015 | | | | | |
| Sunday, May 10, 2015 | | | | | |
| Monday, May 11, 2015 | | | | | |
| Tuesday, May 12, 2015 | | | | | |
| Wednesday, May 13, 2015 | | | | | |
| Thursday, May 14, 2015 | | | | | |
| Friday, May 15, 2015 | | | | | |
| Saturday, May 16, 2015 | | | | | |
| Sunday, May 17, 2015 | | | | | |
| Monday, May 18, 2015 | | | | | |
| Tuesday, May 19, 2015 | | | | | |
| Wednesday, May 20, 2015 | 36.0 | 37.0 | 11.5 | 37.0 | 37.0 |
| Thursday, May 21, 2015 | 35.5 | 36.5 | 11.5 | 36.5 | 36.5 |
| Friday, May 22, 2015 | 46.5 | 48.0 | 11.5 | 48.0 | 48.0 |
| Saturday, May 23, 2015 | | | 11.5 | | |
| Sunday, May 24, 2015 | | | 11.5 | | |
| Monday, May 25, 2015 | | | 11.5 | | |
| Tuesday, May 26, 2015 | 36.0 | 37.5 | 11.5 | 37.5 | 84.0 |
| Wednesday, May 27, 2015 | 37.0 | 38.0 | 35.0 | 39.0 | 450.0 |
| Thursday, May 28, 2015 | 100.0 | 39.0 | 11.5 | 39.5 | 38.5 |
| Friday, May 29, 2015 | 36.5 | 37.5 | 11.5 | 38.0 | 37.0 |
| Saturday, May 30, 2015 | | | 11.5 | | |
| Sunday, May 31, 2015 | | | 11.5 | | |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

NOTE: No samples taken on 5/25/15 due to site closure for holiday.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

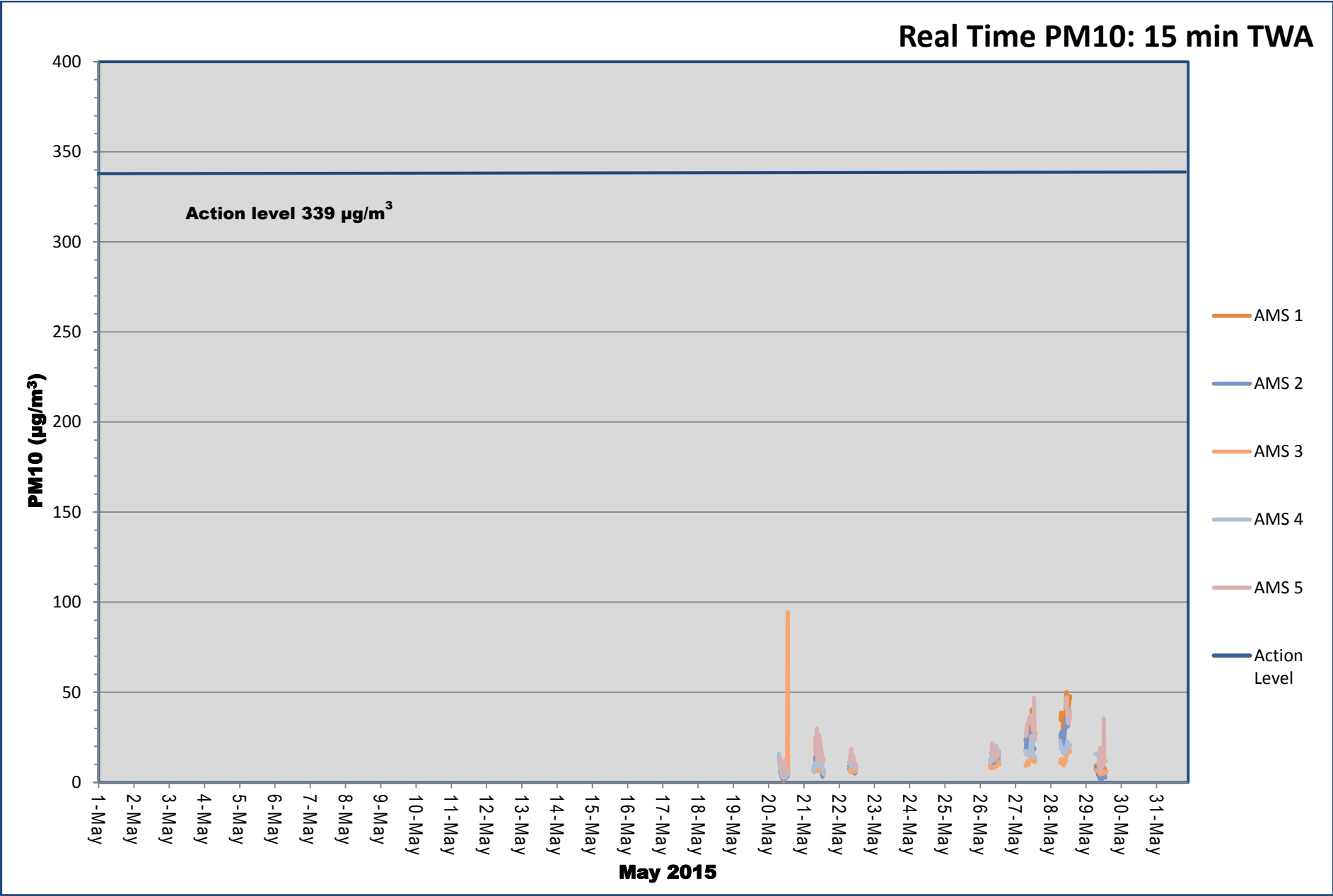


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|-------------------------|-------|---|-------------------|--------------|
| Friday, May 01, 2015 | - | - | - | - |
| Saturday, May 02, 2015 | - | - | - | - |
| Sunday, May 03, 2015 | - | - | - | - |
| Monday, May 04, 2015 | - | - | - | - |
| Tuesday, May 05, 2015 | - | - | - | - |
| Wednesday, May 06, 2015 | - | - | - | - |
| Thursday, May 07, 2015 | - | - | - | - |
| Friday, May 08, 2015 | - | - | - | - |
| Saturday, May 09, 2015 | - | - | - | - |
| Sunday, May 10, 2015 | - | - | - | - |
| Monday, May 11, 2015 | - | - | - | - |
| Tuesday, May 12, 2015 | - | - | - | - |
| Wednesday, May 13, 2015 | - | - | - | - |
| Thursday, May 14, 2015 | - | - | - | - |
| Friday, May 15, 2015 | - | - | - | - |
| Saturday, May 16, 2015 | - | - | - | - |
| Sunday, May 17, 2015 | - | - | - | - |
| Monday, May 18, 2015 | - | - | - | - |
| Tuesday, May 19, 2015 | - | - | - | - |
| Wednesday, May 20, 2015 | 10:00 | 16.0 | 0.0 | DW Perimeter |
| Thursday, May 21, 2015 | 9:45 | 20.0 | 0.0 | DW Perimeter |
| Friday, May 22, 2015 | 8:00 | 22.0 | 0.0 | DW Perimeter |
| Saturday, May 23, 2015 | - | - | - | - |
| Sunday, May 24, 2015 | - | - | - | - |
| Monday, May 25, 2015 | NA | NA | NA | NA |
| Tuesday, May 26, 2015 | 8:45 | 18.0 | 0.0 | DW Perimeter |
| Wednesday, May 27, 2015 | 7:30 | 19.0 | 0.0 | DW Perimeter |
| Thursday, May 28, 2015 | 11:00 | 12.0 | 0.0 | DW Perimeter |
| Friday, May 29, 2015 | 10:45 | 33.0 | 0.0 | DW Perimeter |
| Saturday, May 30, 2015 | - | - | - | - |
| Sunday, May 31, 2015 | - | - | - | - |

Note: Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| <p>PM₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m³)</p> <p>TVOC—Total Volatile Organic Compounds measured in parts per million (ppm)</p> <p>ng/m³ – nanograms per cubic meter</p> <p>µg/m³ – micrograms per cubic meter</p> <p>PPM – Parts per Million</p> <p>NA – Not Applicable</p> <p>ND –No Data</p> | | | | | | |

Figure A-2: Wind Speed

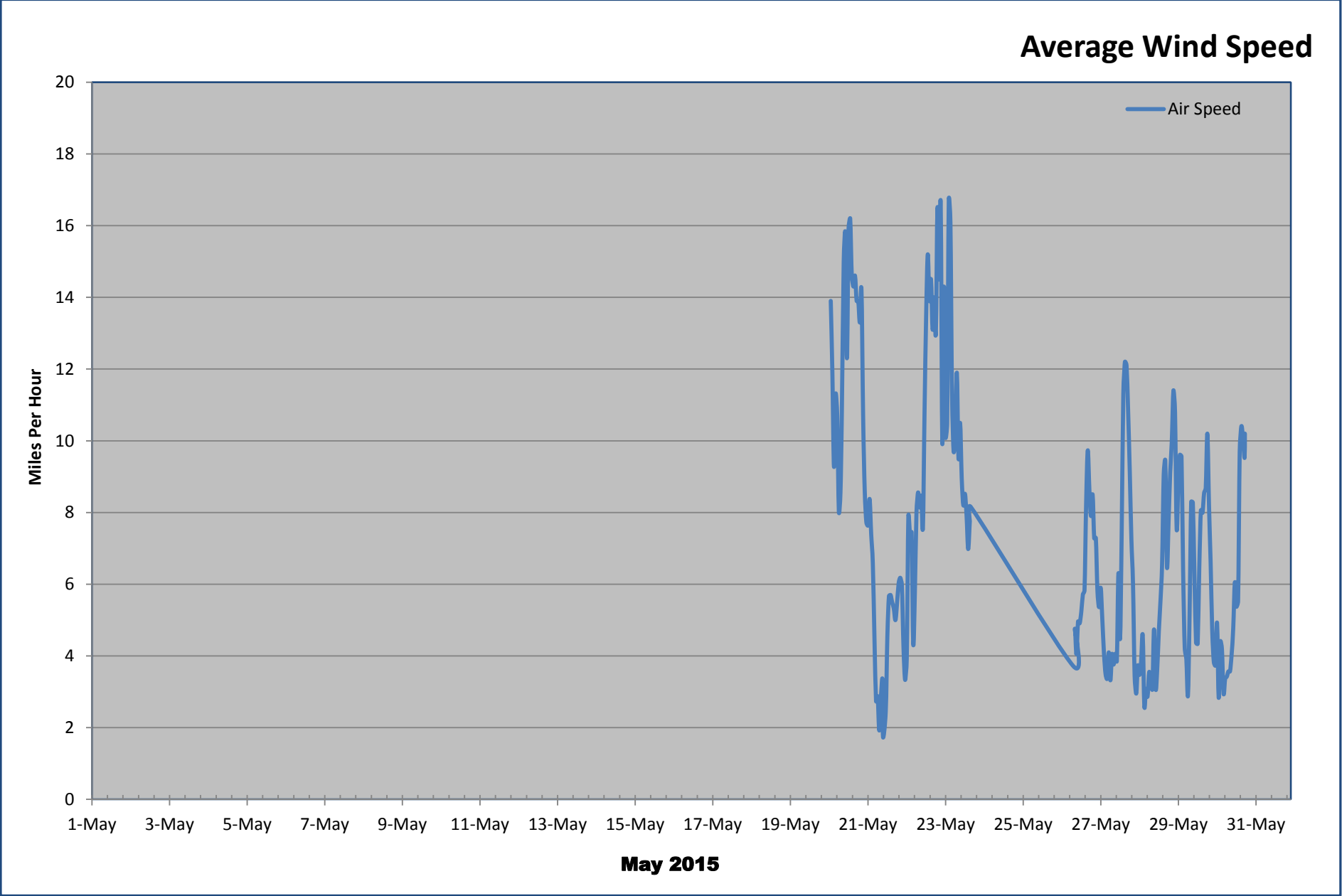


Figure A-3: Temperature

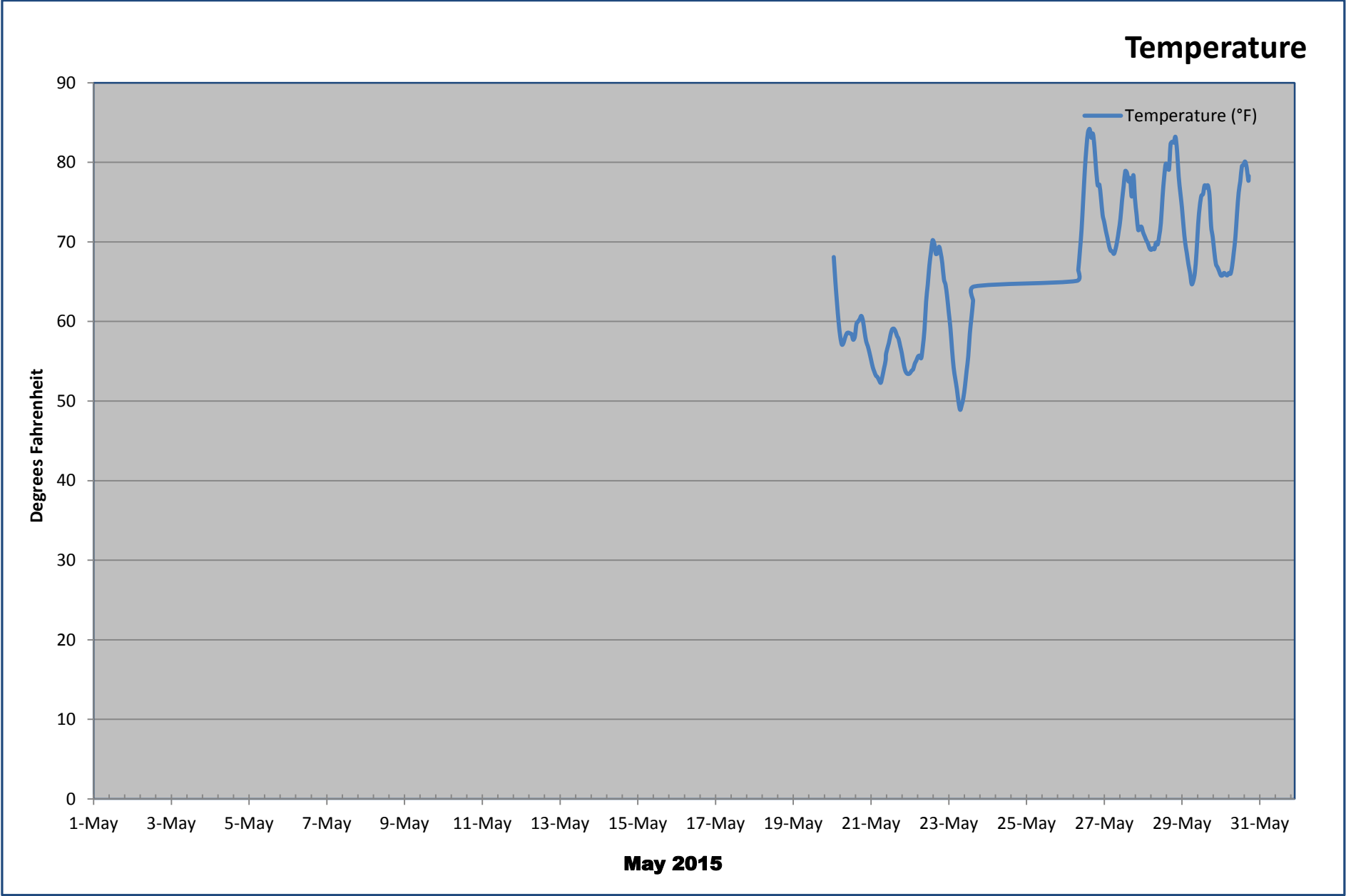


Figure A-4: Relative Humidity

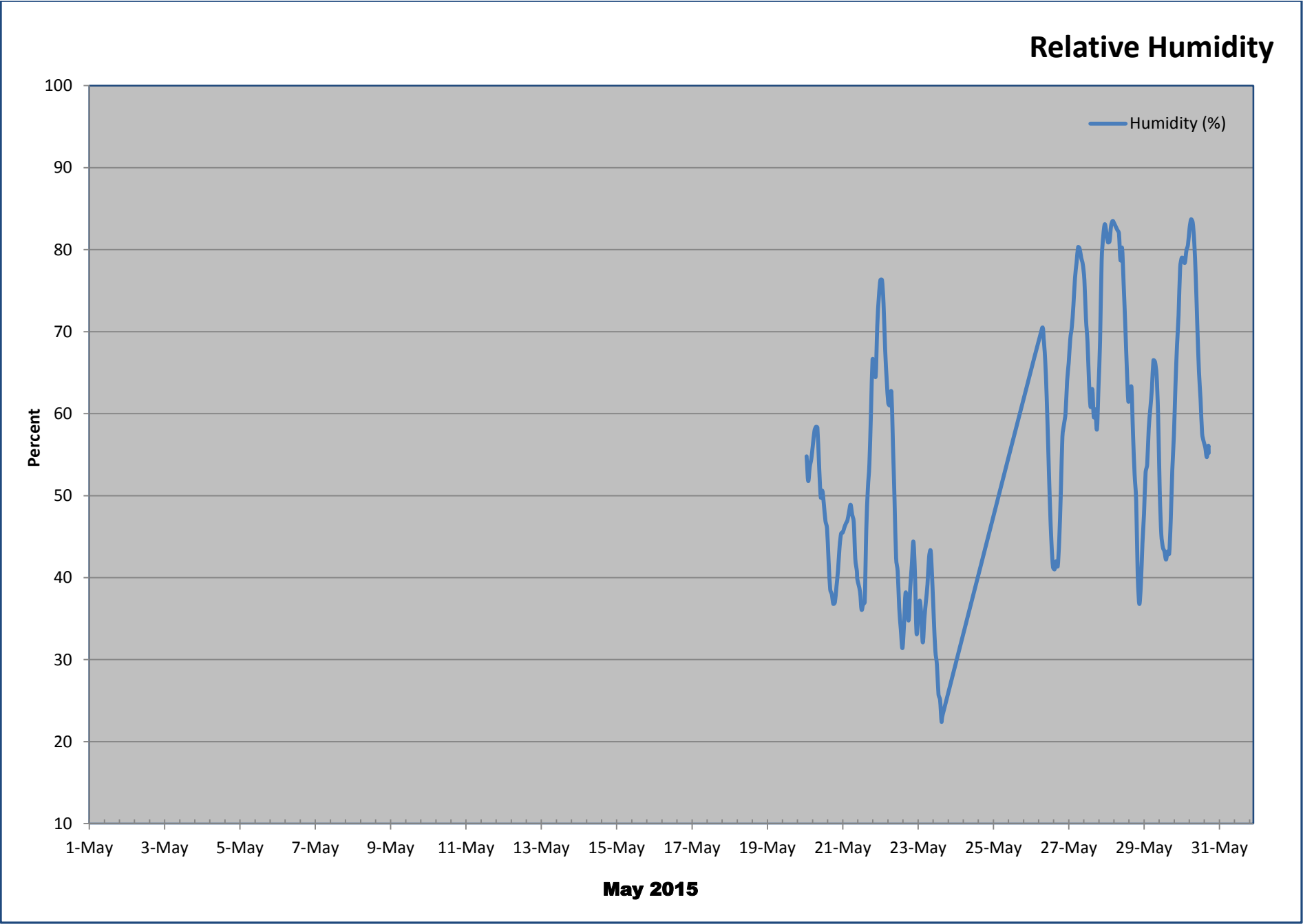


Figure A-5: Site Map Site 16 (05.20.15 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 160 | 160 | 161 | 159 | 159 |
| Rate of Data Collection | 99.4% | 99.4% | 100% | 98.8% | 98.8% |
| Number of Detected Samples ³ | 0 | 0 | 0 | 0 | 0 |
| % of Cr ⁺⁶ Samples Greater than MDL | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.009% | 0.010% | 0.009% | 0.010% | 0.008% |
| Maximum % Cr ⁺⁶ in Dust | 0.010% | 0.010% | 0.010% | 0.010% | 0.010% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| September | 6.8 | 6.8 | 1.7 | 6.8 | 6.9 |
| October | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| November | 7.0 | 7.0 | 1.8 | 7.1 | 7.1 |
| December | 8.6 | 8.7 | 1.5 | 7.9 | 8.2 |
| January | 8.1 | 8.1 | 2.9 | 8.1 | 8.2 |
| May | 3.8 | 3.9 | 1.2 | 3.9 | 4.0 |
| Program to Date | 7.1 | 7.1 | 1.7 | 7.0 | 7.0 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 160 | 160 | 161 | 159 | 159 |
| Rate of Data Collection | 99.4% | 99.4% | 100% | 98.8% | 98.8% |
| Number of Detected Samples ² | 19 | 11 | 70 | 25 | 64 |
| % Detection | 11.9% | 6.9% | 43.5% | 15.7% | 40.2% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| September | 87.6 | 44.5 | 30.4 | 47.0 | 117.4 |
| October | 41.5 | 34.5 | 34.9 | 72.5 | 90.3 |
| November | 34.5 | 34.5 | 15.5 | 48.5 | 71.1 |
| December | 43.5 | 43.6 | 9.1 | 58.5 | 54.9 |
| January | 40.6 | 40.8 | 16.4 | 40.1 | 40.5 |
| May | 46.8 | 39.1 | 13.5 | 39.4 | 104.4 |
| Program to Date | 48.1 | 43.7 | 24.1 | 61.3 | 90.2 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| September | 16.2 | 15.6 | 14.4 | 11.0 | 31.1 |
| October | 12.9 | 18.0 | 14.6 | 12.1 | 28.9 |
| November | 15.0 | 22.5 | 19.1 | 16.3 | 29.2 |
| December | 14.4 | 20.7 | 15.9 | 13.9 | 20.0 |
| January | 16.0 | 14.9 | 14.3 | 6.5 | 17.0 |
| May | 16.3 | 11.9 | 11.9 | 19.9 | 12.6 |
| Program to Date | 14.7 | 21.6 | 18.1 | 13.3 | 20.5 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

**June 2015
Air Quality Report
Site 16 - Linden Ave Site**

Attached is a technical summary of air quality data for June 2015 at the Linden Ave cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 16 (Linden Ave).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

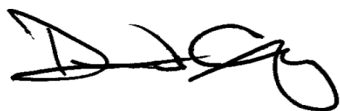
Reporting Period: June 2015

Monthly Air Monitoring Report Site 16 - Linden Ave Site Jersey City, New Jersey

Reporting Period: June 2015



Prepared By: Carey Wu



Reviewed By: Dave Tomsey
July 23, 2015

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr⁺⁶ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m³ – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM₁₀ – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m³ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Site 16 - Linden Ave Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Site 16 - Linden Ave Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 16 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM₁₀ readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between June 6 and June 8, 2014.

Remedial activities began in the northern portion of the Site on June 11, 2014. Air monitoring stations provided protection during intrusive work between June 11, 2014 and June 30, 2015. The site contains five ground-level stations which collect 8-hour integrated Cr^{+6} and total particulate samples. Additionally, at one of the stations, Cr^{+6} and total particulates are collected as 24-hour samples on weekdays and as 72-hour samples over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10} , readings measured at the perimeter.
- Hand-held readings for PM_{10} and TVOC measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

| Site | Station | Integrated Air Monitoring | Real-Time Air Monitoring |
|---------|------------------------------|--|---|
| Site 16 | AMS1, AMS2, AMS3, AMS4, AMS5 | Integrated 8-hour Cr ⁺⁶ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr ⁺⁶ sampling and analysis at one station 7 days per week. | 15-minute average PM ₁₀ readings measured during a typical work day. |

Note: 24-hour and 72-hour Cr⁺⁶ sampling was conducted at station AMS3.

2.1 Integrated Air Sampling

Integrated Cr⁺⁶ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr⁺⁶ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview

2.1.1 Integrated Cr⁺⁶ Sampling

The exposed Cr⁺⁶ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr⁺⁶ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr⁺⁶ air concentrations in nanograms per cubic meter of air (ng/m³). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr⁺⁶ sampling and analysis are also performed at one AMS. These longer duration samples show Cr⁺⁶ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air (µg/m³). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM₁₀ readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station AMS-3, 24-hours a day, seven days a week.

2.3 Hand-held Air Monitoring

Hand-held air monitoring consists of two types of monitoring: perimeter PM₁₀ readings and perimeter TVOC readings. Each type of monitoring is described in more detail in the following sections.

2.3.1 Perimeter PM₁₀ Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities and logged to be reported weekly. The readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded for comparison to adjacent perimeter stations.

2.3.2 Perimeter TVOC Hand-held Monitoring

Hand-held readings will be taken along the downwind perimeter of the Site periodically each day during remedial activities in known VOC areas. Readings will be collected as instantaneous readings and if levels are elevated, 15-minute averages will be recorded and logged to be reported weekly.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr⁺⁶ and real-time PM₁₀ concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr⁺⁶ and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr⁺⁶ concentrations and real-time PM₁₀ are outlined in the following sections.

3.1 Integrated Cr⁺⁶ Acceptable Air Concentration

A Site-specific Cr⁺⁶ AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr⁺⁶ in dust. The AAC for Cr⁺⁶ was developed to represent the maximum allowable average concentration of Cr⁺⁶ in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr⁺⁶ emanating from the Site.

The AAC of 487 ng/m³ is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m³ to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr⁺⁶ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr⁺⁶ Metrics

| Metric Observation | Response Action |
|--|--|
| 30-day ¹ Cr ⁺⁶ average concentration greater than or equal to 45 ng/m3 | External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required. |
| 60-day ¹ Cr ⁺⁶ average concentration greater than or equal to 40 ng/m3 | |
| 90-day ¹ Cr ⁺⁶ average concentration greater than or equal to 35 ng/m3 | |
| ¹ Refers to days on which samples were collected, not necessarily calendar days | |

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

| Parameter | Alert Level (15-min TWA) | Action Level (15-min TWA) |
|----------------------------------|--------------------------|---------------------------|
| PM ₁₀ | 255 µg/m ³ | 339 µg/m ³ |
| TVOC (hand-held monitoring only) | 1 ppm | 1.3 ppm |

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 11, 2014 and June 30, 2015 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels;
- Meteorological results; and
- Hand-held monitoring results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr⁺⁶ Metrics

| Running Cr ⁺⁶ Metrics ¹ | | Sites 63/65 | | | | |
|---|-----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | Metric (ng/m ³) | AMS-1 ng/m ³ | AMS-2 ng/m ³ | AMS-3 ng/m ³ | AMS-4 ng/m ³ | AMS-5 ng/m ³ |
| 30-day² | 45 | 4.5 | 4.9 | 1.2 | 5.7 | 5.1 |
| 60-day² | 40 | 4.3 | 4.6 | 1.2 | 5.3 | 4.8 |
| 90-day² | 35 | 4.3 | 4.6 | 1.2 | 5.3 | 4.8 |
| PTD³ | | 6.8 | 6.8 | 1.6 | 6.8 | 6.8 |

ng/m³ – nanograms per cubic meter

1. Running Cr⁺⁶ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr⁺⁶ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr⁺⁶ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr⁺⁶ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from June 11, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 181 sample days between June 11th and the end of the reporting period for stations AMS-1 through AMS-5. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr⁺⁶ average concentrations, based upon lab analytical results at each AMS, were less than 1.40% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM₁₀ is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM₁₀ Monitoring Results

Results of the real-time PM₁₀ sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM₁₀ averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM₁₀ averages were compared directly to the PM₁₀ Action Level (339 µg/m³) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM₁₀ averages are listed and discussed in Table A-4.

Program-to-date

Real-time monthly PM₁₀ averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are shown in Figure A-2 through Figure A-4, respectively.

4.4 Hand-held Monitoring Results

Hand-held monitoring results during the reporting period are displayed in Table A-3. Readings were compared directly to the 15-Minute TWA Action Level (1.3 ppm) and averages greater than the action level are subject to additional evaluation. If applicable, elevated TVOC averages are listed and discussed in Table A-4.

4.5 Site Activities

Activities which occurred on the site during the month of June included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.6 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the June 2015 reporting period for the Site 16 air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3 . The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr⁺⁶ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM¹⁰ Readings
- Hand-held Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr⁺⁶ Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|--------------------------|-------|-------|-------|-------|-------|
| Monday, June 01, 2015 | 3.7 | 3.8 | 1.2 | 3.8 | 3.8 |
| Tuesday, June 02, 2015 | 3.3 | 3.3 | 1.2 | 3.4 | 3.4 |
| Wednesday, June 03, 2015 | 3.4 | 3.6 | 1.2 | 3.6 | 3.6 |
| Thursday, June 04, 2015 | 3.5 | 3.6 | 1.2 | 3.6 | 3.6 |
| Friday, June 05, 2015 | 3.6 | 3.7 | 1.2 | 3.7 | 3.6 |
| Saturday, June 06, 2015 | | | 1.2 | | |
| Sunday, June 07, 2015 | | | 1.2 | | |
| Monday, June 08, 2015 | 4.1 | 4.3 | 2.2 | 4.3 | 4.2 |
| Tuesday, June 09, 2015 | 3.6 | 3.7 | 1.2 | 3.8 | 3.7 |
| Wednesday, June 10, 2015 | 3.6 | 3.7 | 1.2 | 3.7 | 3.7 |
| Thursday, June 11, 2015 | 3.5 | 3.7 | 1.2 | 3.7 | 3.6 |
| Friday, June 12, 2015 | 3.9 | 4.0 | 0.4 | 4.0 | 7.0 |
| Saturday, June 13, 2015 | | | 0.4 | | |
| Sunday, June 14, 2015 | | | 0.4 | | |
| Monday, June 15, 2015 | 3.5 | 3.7 | 1.2 | 3.7 | 3.6 |
| Tuesday, June 16, 2015 | 3.6 | 3.7 | 1.2 | 3.7 | 3.7 |
| Wednesday, June 17, 2015 | 3.6 | 3.7 | 1.2 | 3.7 | 3.6 |
| Thursday, June 18, 2015 | 3.6 | 3.7 | 1.2 | 3.7 | 3.7 |
| Friday, June 19, 2015 | 3.6 | 3.7 | 0.98 | 3.7 | 3.6 |
| Saturday, June 20, 2015 | | | 0.98 | | |
| Sunday, June 21, 2015 | | | 0.98 | | |
| Monday, June 22, 2015 | 3.7 | 3.8 | 1.2 | 3.8 | 3.8 |
| Tuesday, June 23, 2015 | 3.9 | 3.9 | 1.2 | 3.9 | 4.4 |
| Wednesday, June 24, 2015 | 4.0 | 4.0 | 1.2 | 4.0 | 3.9 |
| Thursday, June 25, 2015 | 13.0 | 21.0 | 3.8 | 43.0 | 15.0 |
| Friday, June 26, 2015 | 12.0 | 9.0 | 1.2 | 3.8 | 17.0 |
| Saturday, June 27, 2015 | | | | | |
| Sunday, June 28, 2015 | | | | | |
| Monday, June 29, 2015 | | | | | |
| Tuesday, June 30, 2015 | | | | | |

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr⁺⁶. All other values are below the laboratory method detection limit (MDL).

Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

| Date of Sample | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
|--------------------------|-------|-------|-------|-------|-------|
| Monday, June 01, 2015 | 36.5 | 38.0 | 11.5 | 38.0 | 37.5 |
| Tuesday, June 02, 2015 | 33.0 | 33.0 | 11.5 | 33.0 | 33.5 |
| Wednesday, June 03, 2015 | 34.0 | 35.5 | 11.5 | 35.5 | 35.5 |
| Thursday, June 04, 2015 | 35.0 | 36.0 | 11.5 | 36.0 | 81.0 |
| Friday, June 05, 2015 | 35.0 | 36.5 | 30.0 | 36.5 | 36.0 |
| Saturday, June 06, 2015 | | | 30.0 | | |
| Sunday, June 07, 2015 | | | 30.0 | | |
| Monday, June 08, 2015 | 41.0 | 42.5 | 38.0 | 42.5 | 41.5 |
| Tuesday, June 09, 2015 | 35.5 | 37.0 | 11.5 | 37.5 | 100.0 |
| Wednesday, June 10, 2015 | 72.0 | 37.0 | 11.5 | 150.0 | 36.5 |
| Thursday, June 11, 2015 | 35.0 | 36.0 | 44.0 | 36.0 | 100.0 |
| Friday, June 12, 2015 | 38.5 | 39.5 | 16.0 | 40.0 | 140.0 |
| Saturday, June 13, 2015 | | | 16.0 | | |
| Sunday, June 14, 2015 | | | 16.0 | | |
| Monday, June 15, 2015 | 35.0 | 36.5 | 16.5 | 36.5 | 110.0 |
| Tuesday, June 16, 2015 | 36.0 | 37.0 | 25.0 | 37.0 | 200.0 |
| Wednesday, June 17, 2015 | 35.5 | 36.5 | 31.0 | 36.5 | 36.0 |
| Thursday, June 18, 2015 | 36.0 | 110.0 | 48.0 | 37.0 | 130.0 |
| Friday, June 19, 2015 | 36.0 | 37.0 | 14.0 | 37.0 | 120.0 |
| Saturday, June 20, 2015 | | | 14.0 | | |
| Sunday, June 21, 2015 | | | 14.0 | | |
| Monday, June 22, 2015 | 37.0 | 38.0 | 25.0 | 38.0 | 100.0 |
| Tuesday, June 23, 2015 | 39.0 | 39.0 | 35.0 | 39.0 | 38.5 |
| Wednesday, June 24, 2015 | 39.5 | 39.5 | 11.5 | 40.0 | 39.0 |
| Thursday, June 25, 2015 | 37.0 | 38.0 | 11.5 | 38.0 | 37.0 |
| Friday, June 26, 2015 | 36.5 | 37.5 | 11.5 | 38.0 | 37.0 |
| Saturday, June 27, 2015 | | | | | |
| Sunday, June 28, 2015 | | | | | |
| Monday, June 29, 2015 | | | | | |
| Tuesday, June 30, 2015 | | | | | |

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 15-minute average PM₁₀ Monitoring Results

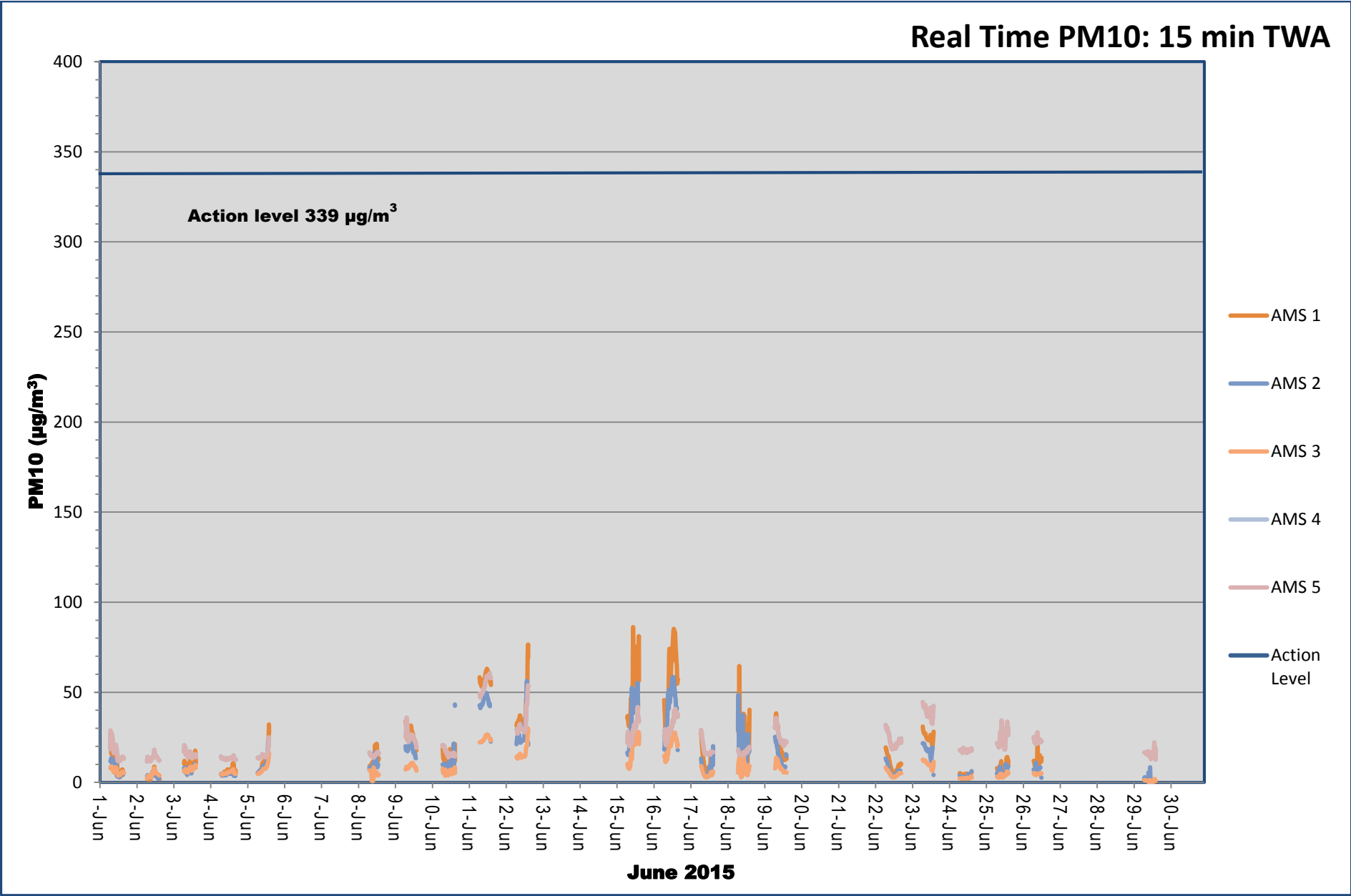


Table A-3: Daily Hand-held Monitoring Instantaneous Results

| Date | Time | Dust Reading ($\mu\text{g}/\text{m}^3$) | PID Reading (ppm) | Location |
|--------------------------|-------|---|-------------------|--------------|
| Monday, June 01, 2015 | 10:00 | 23.0 | NA | DW Perimeter |
| Tuesday, June 02, 2015 | 9:30 | 42.0 | NA | DW Perimeter |
| Wednesday, June 03, 2015 | 13:15 | 33.0 | NA | DW Perimeter |
| Thursday, June 04, 2015 | 10:15 | 37.0 | NA | DW Perimeter |
| Friday, June 05, 2015 | 11:00 | 29.0 | NA | DW Perimeter |
| Saturday, June 06, 2015 | - | - | - | - |
| Sunday, June 07, 2015 | - | - | - | - |
| Monday, June 08, 2015 | 8:30 | 18.0 | NA | DW Perimeter |
| Tuesday, June 09, 2015 | 8:45 | 12.0 | NA | DW Perimeter |
| Wednesday, June 10, 2015 | 10:30 | 19.0 | NA | DW Perimeter |
| Thursday, June 11, 2015 | 11:30 | 45.0 | NA | DW Perimeter |
| Friday, June 12, 2015 | 7:45 | 32.0 | NA | DW Perimeter |
| Saturday, June 13, 2015 | - | - | - | - |
| Sunday, June 14, 2015 | - | - | - | - |
| Monday, June 15, 2015 | 13:00 | 36.0 | NA | DW Perimeter |
| Tuesday, June 16, 2015 | 11:45 | 41.0 | NA | DW Perimeter |
| Wednesday, June 17, 2015 | 8:00 | 38.0 | NA | DW Perimeter |
| Thursday, June 18, 2015 | 9:15 | 52.0 | NA | DW Perimeter |
| Friday, June 19, 2015 | 9:45 | 14.0 | NA | DW Perimeter |
| Saturday, June 20, 2015 | - | - | - | - |
| Sunday, June 21, 2015 | - | - | - | - |
| Monday, June 22, 2015 | 9:15 | 11.0 | NA | DW Perimeter |
| Tuesday, June 23, 2015 | 10:30 | 29.0 | NA | DW Perimeter |
| Wednesday, June 24, 2015 | 8:45 | 33.0 | NA | DW Perimeter |
| Thursday, June 25, 2015 | 13:00 | 61.0 | NA | DW Perimeter |
| Friday, June 26, 2015 | 10:30 | 47.0 | NA | DW Perimeter |
| Saturday, June 27, 2015 | - | - | - | - |
| Sunday, June 28, 2015 | - | - | - | - |
| Monday, June 29, 2015 | - | - | - | - |
| Tuesday, June 30, 2015 | - | - | - | - |

Note: Blank cells or cells that read NA are days where no hand-held monitoring occurred.

DW Perimeter denotes down-wind perimeter. UW Perimeter denotes up-wind perimeter.

Table A- 4: Elevated Concentration Summary

| Parameter | Date | Time | Location | Wind Conditions | Elevated Concentration | Explanation |
|---|------|------|----------|-----------------|------------------------|-------------|
| NA | NA | NA | NA | NA | NA | NA |
| PM ₁₀ – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m ³) TVOC—Total Volatile Organic Compounds measured in parts per million (ppm) ng/m ³ – nanograms per cubic meter µg/m ³ – micrograms per cubic meter PPM – Parts per Million NA – Not Applicable ND –No Data | | | | | | |

Figure A-2: Wind Speed

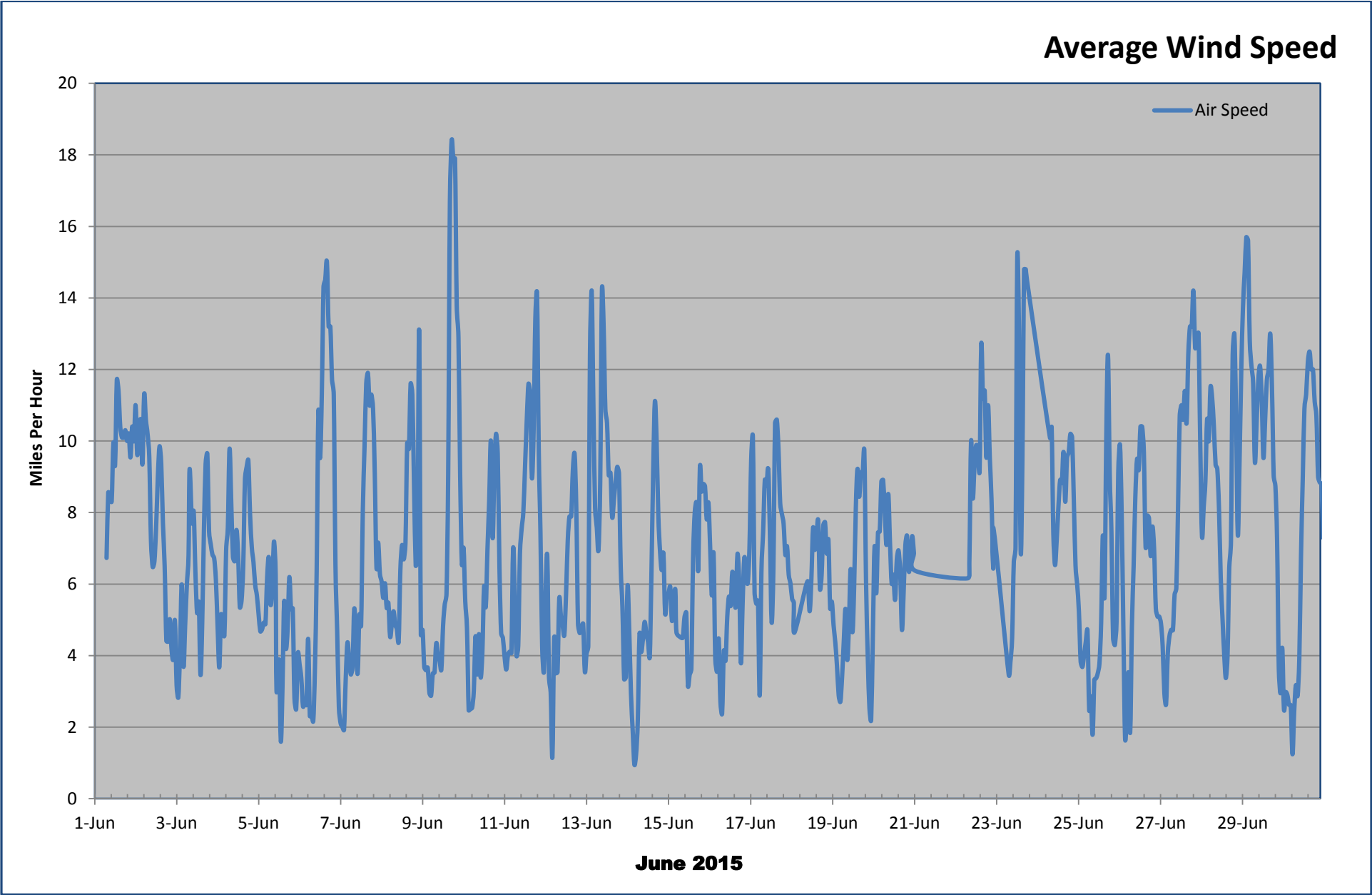


Figure A-3: Temperature

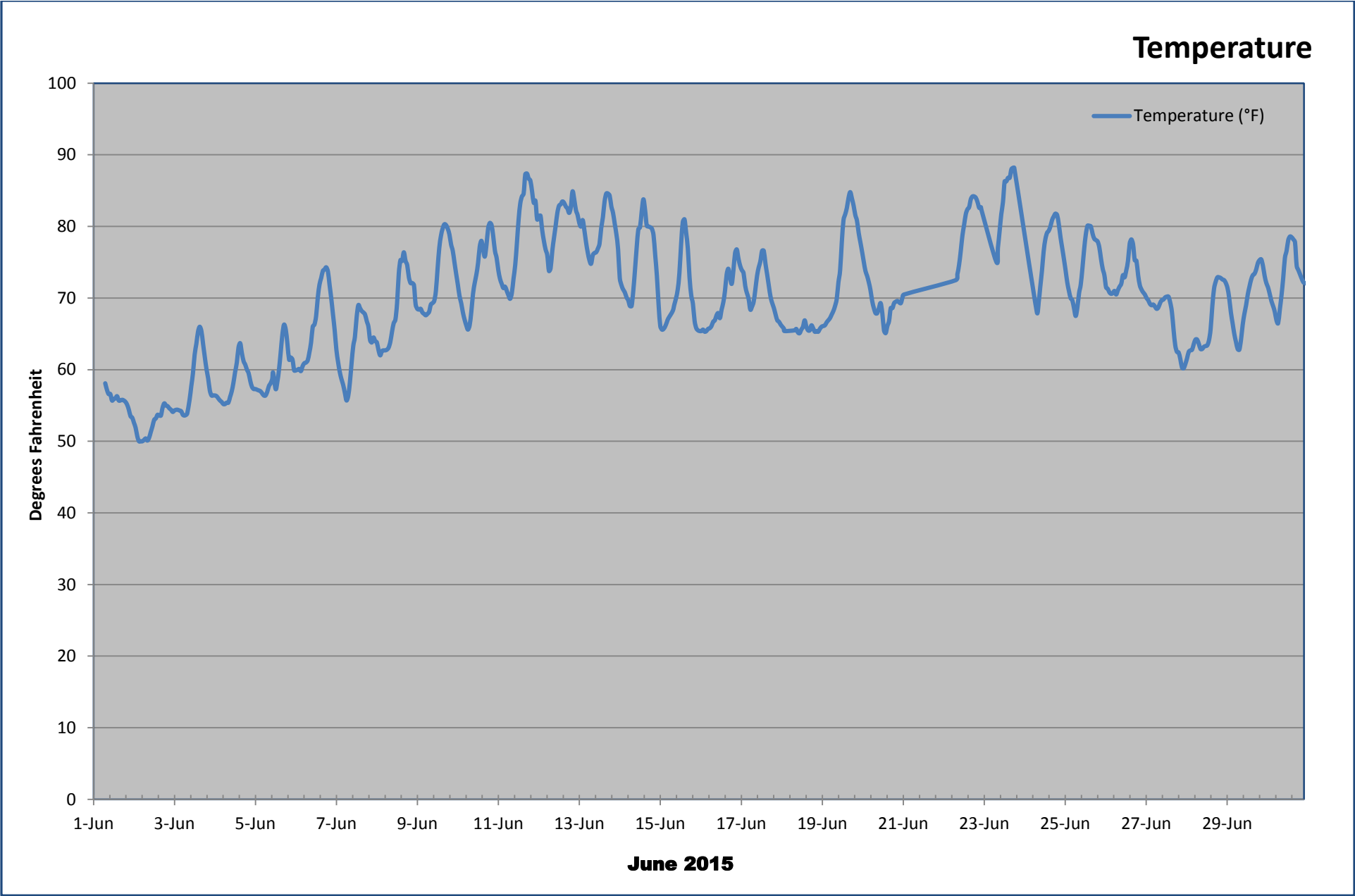


Figure A-4: Relative Humidity

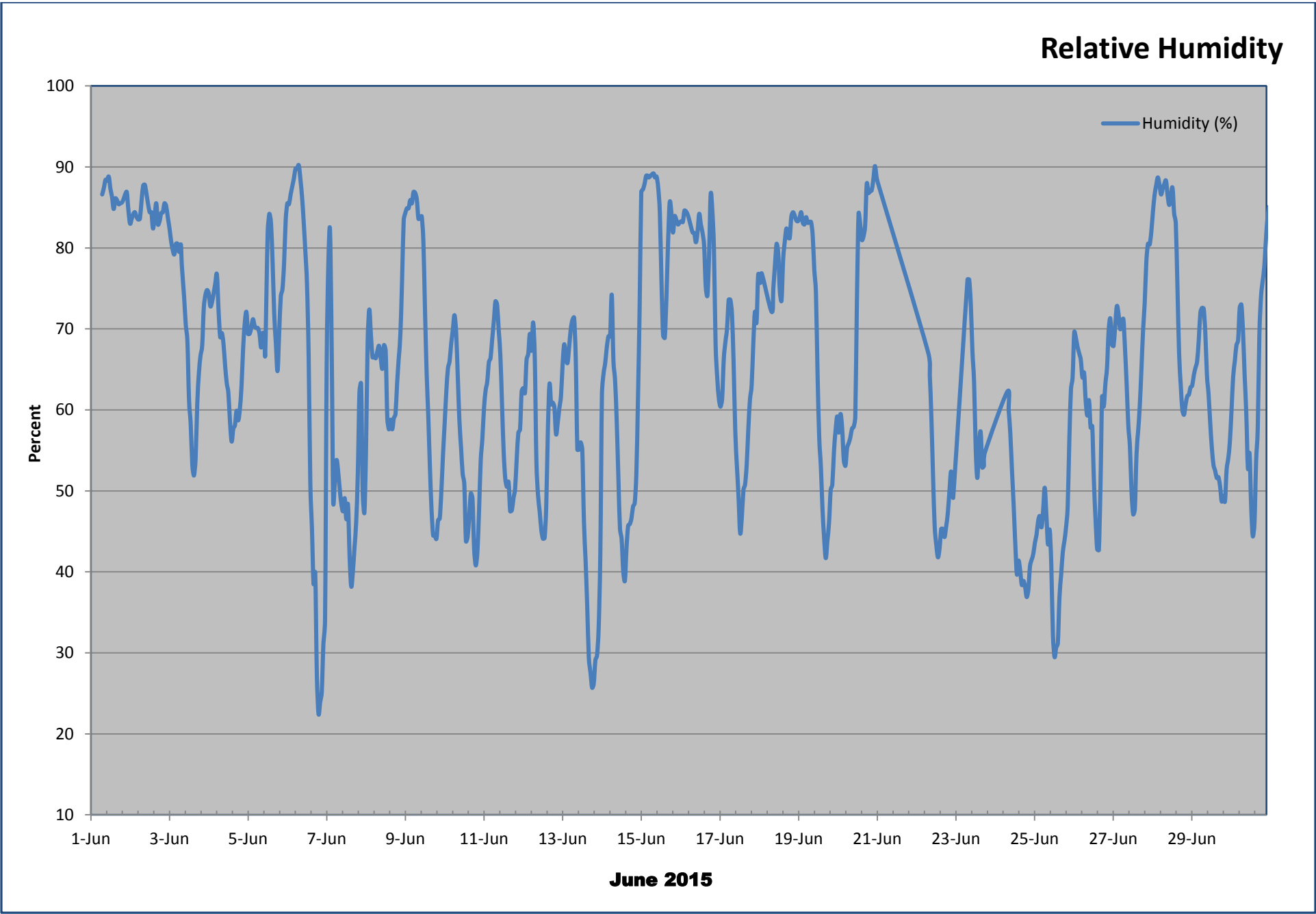


Figure A-5: Site Map Site 16 (05.20.15 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr⁺⁶ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM¹⁰ Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr⁺⁶ Sampling Results Statistics

| Statistics ¹ | Site 16 | | | | |
|--|---------|--------|--------|--------|--------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ² | 180 | 180 | 181 | 179 | 179 |
| Rate of Data Collection | 99.4% | 99.4% | 100% | 98.9% | 98.9% |
| Number of Detected Samples ³ | 2 | 2 | 2 | 1 | 2 |
| % of Cr ⁺⁶ Samples Greater than MDL | 1.1% | 1.1% | 1.1% | 0.6% | 1.1% |
| Number of Samples Above AAC | 0 | 0 | 0 | 0 | 0 |
| Average % Cr ⁺⁶ in Dust | 0.012% | 0.013% | 0.007% | 0.015% | 0.011% |
| Maximum % Cr ⁺⁶ in Dust | 0.021% | 0.020% | 0.020% | 0.021% | 0.021% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> <p>³ The program-to-date average and maximum percent Cr⁺⁶ in dust was calculated using all the integrated Total Particulate and Cr⁺⁶ sample results collected since June 11, 2014.</p> | | | | | |

Table B- 2: Monthly Average Integrated 8-hour Cr⁺⁶ Sampling Results

| Statistics | Site 16 | | | | |
|---|---------|-------|------|-------|-------|
| | AMS 1 | AMS 2 | AMS3 | AMS 4 | AMS 5 |
| June | 6.8 | 6.8 | 1.3 | 6.8 | 6.8 |
| July | 7.0 | 7.0 | 1.7 | 7.0 | 7.0 |
| August | 7.0 | 6.9 | 1.6 | 7.0 | 7.0 |
| September | 6.8 | 6.8 | 1.7 | 6.8 | 6.9 |
| October | 7.1 | 7.0 | 1.7 | 7.0 | 7.0 |
| November | 7.0 | 7.0 | 1.8 | 7.1 | 7.1 |
| December | 8.6 | 8.7 | 1.5 | 7.9 | 8.2 |
| January | 8.1 | 8.1 | 2.9 | 8.1 | 8.2 |
| May | 3.8 | 3.9 | 1.2 | 3.9 | 4.0 |
| June | 4.5 | 4.9 | 1.2 | 5.7 | 5.1 |
| Program to Date | 6.8 | 6.8 | 1.6 | 6.8 | 6.8 |
| All readings in ng/m3 – nanograms per cubic meter | | | | | |

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| Total Number of Samples ¹ | 180 | 180 | 181 | 179 | 179 |
| Rate of Data Collection | 99.4% | 99.4% | 100% | 98.9% | 98.9% |
| Number of Detected Samples ² | 20 | 12 | 81 | 26 | 73 |
| % Detection | 11.1% | 6.7% | 44.8% | 14.5% | 40.8% |
| <p>Results in ng/m³ – nanograms per cubic meter</p> <p>¹ Total number of samples collected since June 11, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.</p> <p>² Total number of sample results since June 11, 2014 reported above the laboratory reporting limit.</p> | | | | | |

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 40.4 | 52.7 | 23.3 | 39.8 | 60.9 |
| July | 42.8 | 57.2 | 38.6 | 112.1 | 94.7 |
| August | 44.3 | 41.5 | 24.2 | 51.7 | 136.8 |
| September | 87.6 | 44.5 | 30.4 | 47.0 | 117.4 |
| October | 41.5 | 34.5 | 34.9 | 72.5 | 90.3 |
| November | 34.5 | 34.5 | 15.5 | 48.5 | 71.1 |
| December | 43.5 | 43.6 | 9.1 | 58.5 | 54.9 |
| January | 40.6 | 40.8 | 16.4 | 40.1 | 40.5 |
| May | 46.8 | 39.1 | 13.5 | 39.4 | 104.4 |
| June | 38.2 | 41.0 | 21.0 | 43.1 | 74.5 |
| Program to Date | 46.9 | 43.4 | 23.8 | 59.1 | 88.3 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |

Table B- 5: Monthly Average Real-Time PM₁₀ Monitoring Results

| Statistics | Site 16 | | | | |
|--|---------|-------|-------|-------|-------|
| | AMS 1 | AMS 2 | AMS 3 | AMS 4 | AMS 5 |
| June | 13.8 | 40.2 | 31.5 | 16.9 | 6.8 |
| July | 15.4 | 28.2 | 21.6 | 12.4 | 6.7 |
| August | 14.5 | 16.8 | 17.4 | 12.3 | 20.8 |
| September | 16.2 | 15.6 | 14.4 | 11.0 | 31.1 |
| October | 12.9 | 18.0 | 14.6 | 12.1 | 28.9 |
| November | 15.0 | 22.5 | 19.1 | 16.3 | 29.2 |
| December | 14.4 | 20.7 | 15.9 | 13.9 | 20.0 |
| January | 16.0 | 14.9 | 14.3 | 6.5 | 17.0 |
| May | 16.3 | 11.9 | 11.9 | 19.9 | 12.6 |
| June | 20.0 | 14.4 | 14.4 | 22.6 | 22.7 |
| Program to Date | 15.4 | 20.7 | 17.6 | 14.5 | 20.8 |
| All readings in µg/m3 – micrograms per cubic meter | | | | | |