State of Ohio Environmental Protection Agency
Division of Air Pollution Control

Ohio's 2008 Revised Lead Standard State Implementation Plan for Cuyahoga County Partial Nonattainment Area

Prepared by:
The Ohio Environmental Protection Agency
Division of Air Pollution Control

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Section One

Background

The United States Environmental Protection Agency (U.S. EPA) revised the National Ambient Air Quality Standard (NAAQS) for lead on November 12, 2008 (73 FR 66964) with an effective January 12, 2009. It replaced the existing lead standard of 1.5 ug/m^3 with a lower standard of 0.15 ug/m^3 as a rolling three-month average.

On November 22, 2010 (75 FR 71033), effective December 31, 2010, U.S. EPA promulgated the initial lead nonattainment areas for the revised lead standard across the country. The CAA Amendments requires states with lead nonattainment areas to submit a plan within eighteen months of the effective date of the designations (June 30, 2012) detailing how the lead standard will be attained by December 31, 2015.

This document is the Lead State Implementation Plan (SIP) for the partial Cuyahoga County nonattainment area in the State of Ohio. This partial nonattainment area encompasses emissions from the Ferro Corporation Cleveland Frit Plant (herein referred to as "Ferro"). Ferro (Ohio EPA facility identification # 1318170235) is located at 4150 East 56th Street, Cleveland, Ohio, 44101. Figure 1 shows this lead nonattainment area's boundary, the facility location, and the monitoring network within.

Section Two

State Implementation Plan Approval and Clean Air Act Requirements

Section 110 of the CAA delineates general SIP requirements and Part D contains requirements applicable to Subpart 1 nonattainment areas. Section 110 requirements were addressed under Ohio EPA's October 12, 2011 Ohio Lead Infrastructure SIP[1] submittal. This document addresses Part D requirements for the partial Cuyahoga County nonattainment area.

The general Part D nonattainment plan requirements are set forth in Section 172 of the CAA[2]. Section 172(c) specifies that SIPs submitted to meet the Part D requirements must, among other things, include Reasonably Available Control Measures (RACM) (which includes Reasonably Available Control Technology (RACT)), provide for Reasonable Further Progress (RFP), include an emissions inventory, require permits for the construction and operation of major new or modified stationary sources, contain contingency measures, and meet the applicable provisions of Section 110(a)(2)[3] of the CAA related to the general implementation of a new or revised NAAQS. The following sections of this document address the Section 172(c) requirements, as specified:

Section Three (monitoring and ambient air quality data)
- Addresses Section 110(a)(2)(B) monitoring

Section Four (emissions inventory)
- Addresses Section 172(c)(3) inventory
- Addresses Section 110(a)(2)(D) interstate transport

Section Five (transportation conformity)

Section Six (attainment demonstration strategy)
- Addresses Section 172(c)(1) RACM/RACT
- Addresses Section 172(c)(6) and Section 110(a)(2)(A) enforceable emission limitations, control measures along with schedules and timetables for compliance

Section Seven (reasonable further progress requirements)
- Addresses Section 172(c)(2) reasonable further progress

Section Eight (contingency measures)
- Section 172(c)(9) contingency measures

Section Nine (public participation)

[1] http://www.epa.ohio.gov/dapc/SIP/infrastructure.aspx

[2] Additional specific plan requirements for lead nonattainment areas are outlined in 40 CFR 51.117.

[3] The requirements of Section 172(c)(7) (compliance with Section 110(a)(2)) were addressed as part of Ohio's October 12, 2011 Ohio Lead Infrastructure SIP submittal although some sections are again addressed in this submittal.

In addition to the above, Section 172(c)(4) requires the SIP to expressly identify and quantify the emissions, if any, of any such pollutant or pollutants which will be allowed, in accordance with Section 173(a)(1)(B), from the construction and operation of major new or modified stationary sources in each such area. The plan must demonstrate that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the lead standard by the applicable attainment date. Section 172(c)(5) requires permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with Section 173.

Ohio administers a New Source Review (NSR) permitting program for major and modified sources of lead in nonattainment areas under Ohio's permit program. Permits to install cannot be issued unless the applicant can demonstrate that increased emissions from the new or modified source will not result in a violation of the NAAQS.

Ohio has SIP approved regulations regarding particulate emissions from stationary sources and regarding emissions of fugitive dust. These programs assist in reducing the potential impact on lead concentrations:

- Ohio Administrative Code (OAC) rule 3745-17-08: Restriction of emission of fugitive dust[4].

  This rule was developed to address reasonably available control measures (RACM) requirements as part of Ohio's plan for attaining the total suspended particulate (TSP) standard. This rule prohibits fugitive dust sources from being operated; or any materials handled, transported, or stored; or a building (or its appurtenances) or road to be used, constructed, altered, repaired, or demolished without taking measures or installing RACM to prevent fugitive dust from becoming airborne. The requirements only apply to fugitive dust sources located within specific geographical areas of Ohio[5] that encompass all or a portion of 44 of the 88 Ohio counties (unless the director of Ohio EPA invokes his/her authority to require submittal, and implementation, of a control program which will bring the fugitive dust source into compliance with the requirements). These 44 areas were selected based upon Ohio EPA modeling results indicating boundaries in which the TSP standard was not being met.

- Ohio Administrative Code (OAC) rule 3745-17-07: Control of visible particulate emissions from stationary sources[6].

  This rule was developed to address reasonably available control technology/reasonably available control measures (RACT/RACM) requirements as part of Ohio's plan for attaining the TSP and PM10 standards. Among other

[4] http://www.epa.state.oh.us/dapc/regs/3745-17/17-08.pdf
[5] http://www.epa.state.oh.us/dapc/regs/3745-17/3745-17-08App1.pdf
[6] http://www.epa.state.oh.us/dapc/regs/3745-17/17-07.pdf

requirements, this rule sets visible emissions (VE) limits for stacks and fugitive dust sources (paved roadways or parking areas, unpaved roadways or parking areas, and material storage piles, material handling operations, coke oven batteries, etc.). More stringent RACT/RACM requirements are required for sources in Cuyahoga County.

- Ohio Administrative Code (OAC) rule 3745-17-11: Restrictions on particulate emissions from industrial processes[7].

  This rule addresses particulate emissions from various point sources throughout Ohio by limiting the allowable mass rate of emission of particulate matter.

As mentioned above, Ohio EPA has a SIP-approved major and minor NSR program. All new or modified sources must meet Ohio's NSR requirements. The RACM requirements for fugitive dust discussed above are often incorporated into NSR permits for both major and minor sources and also frequently for sources beyond the boundaries of the 44 areas discussed above.

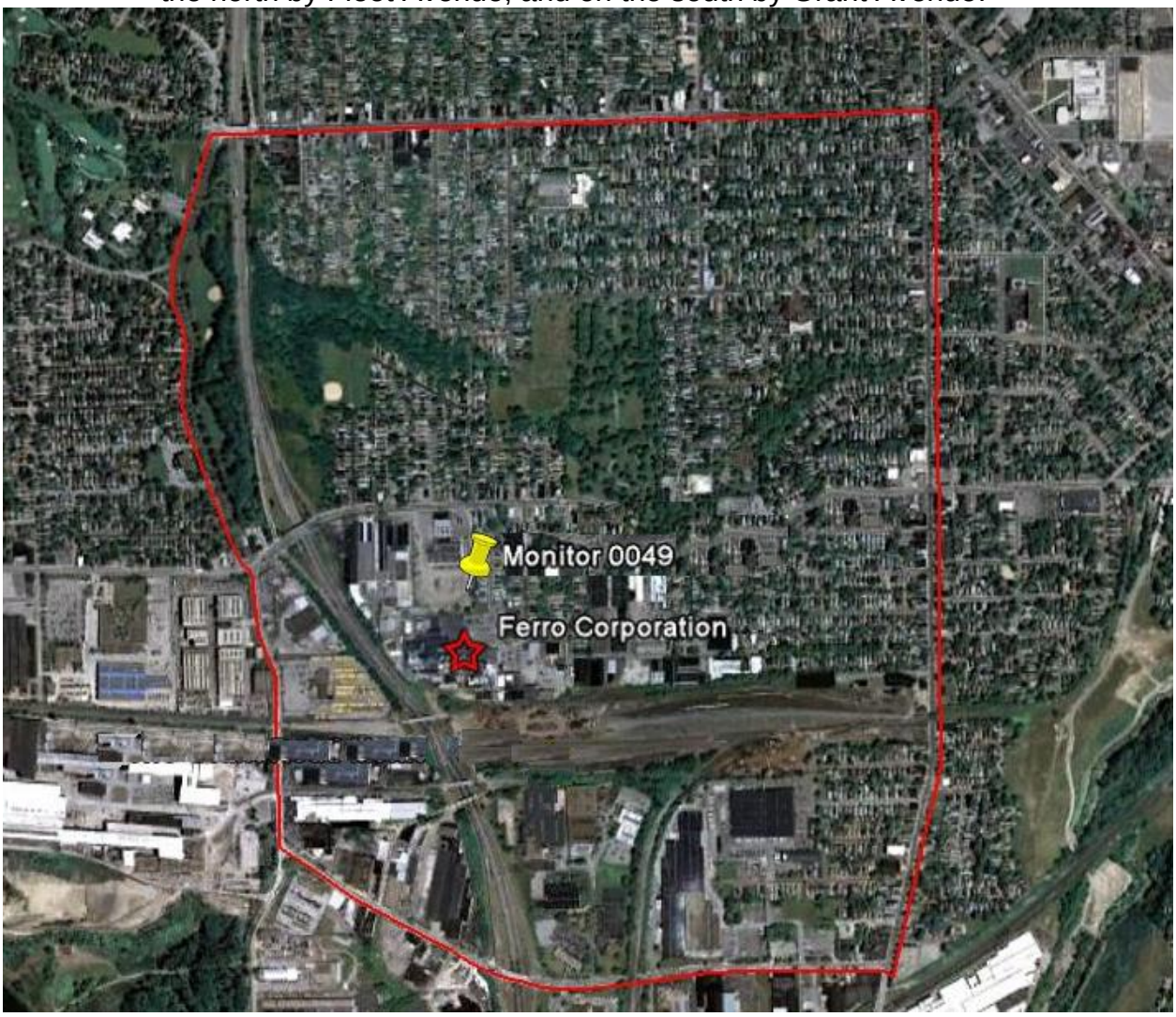
[7] http://www.epa.state.oh.us/dapc/regs/3745-17/17-11.pdf

Section Three

Monitoring and Ambient Air Quality Data

Section 110(a)(2)(B) of the federal CAA requires a monitoring strategy for measuring, characterizing, and reporting lead. The Ohio EPA maintains a comprehensive network of lead air quality monitors throughout Ohio with the primary objective being to determine compliance with the lead NAAQS. Figure 1 shows Cuyahoga County's partial nonattainment area and the location of the designated lead monitor.

Figure 1: Cuyahoga County Partial Lead Nonattainment Area and Monitoring Network: The area enclosed on the west by Washington Park Boulevard/Crete Avenue/East 49th Street, on the east by East 71st Street, on the north by Fleet Avenue, and on the south by Grant Avenue.



In accordance with the CAA Amendments, three complete years of monitoring data are required to demonstrate attainment at a monitoring site. 40 CFR Part 50, Appendix R provides the computation methods for the lead standard. This regulation requires individual samples be analyzed and a monthly mean computed. Compliance with the lead standard is determined over a three-calendar year period. Any one exceedance of a three-month average during this period indicates an exceedance of the lead standard. When this occurs, the area is said to be in attainment.

Table 1 provides a summary of the annual average lead monitoring data for 2006 through 2011 for this area's lead monitoring site. The nonattainment areas' air quality has remained stable and under the standard as can be seen by Figure 2; however, in 2010, air quality declined. These data were retrieved from the U.S. EPA Air Quality System (AQS) database (Appendix A). The AQS contains ambient air pollution data collected by U.S. EPA, state, local and tribal air pollution control agencies from thousands of monitoring stations. Data from the AQS is used to assess air quality, assist in attainment/nonattainment designations, evaluate state implementation plans for nonattainment areas, perform modeling for permit review analysis, and manage other air quality management functions.

The AQS database is updated monthly by states and local environmental agencies that operate the monitoring stations. States provide the monitoring data to U.S. EPA as required by the CAA Amendments.

Table 1. Three-Month Rolling Average Lead Data (2006 – 2011) in the Cuyahoga County Partial Nonattainment Area.

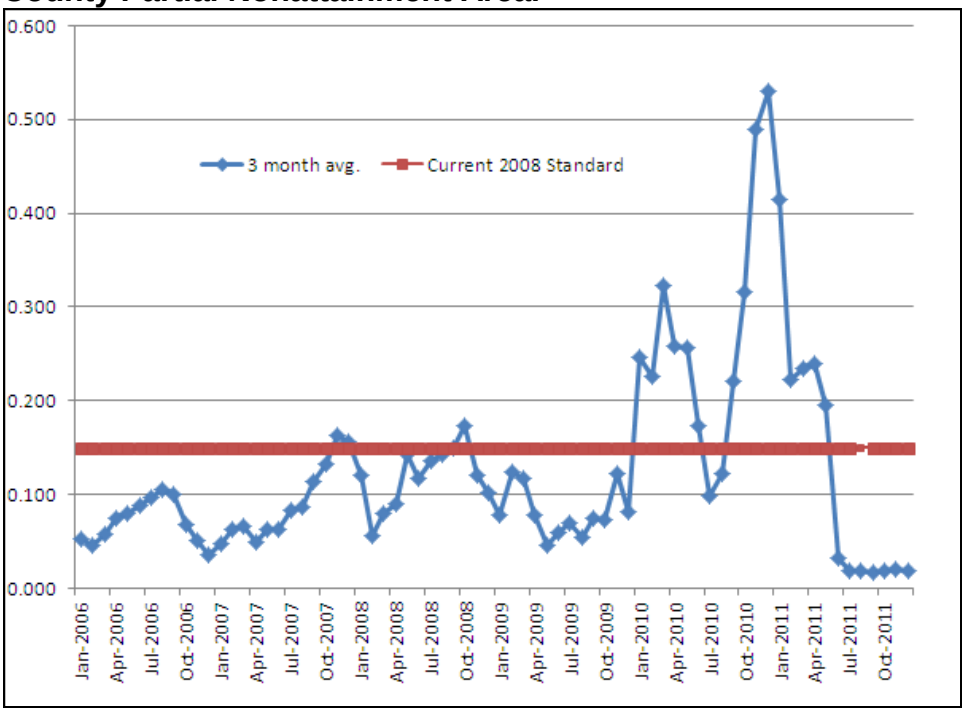
= Exceeds standard

Site Location City	3-month period	Three-month rolling average (ug/m^3)					
		2006	2007	2008	2009	2010	2011
39-035-0049 E. 56th St. Cleveland	Nov -Jan	0.053	0.047	0.120	0.078	0.247	0.414
	Dec -Feb	0.046	0.063	0.057	0.125	0.226	0.223
	Jan -Mar	0.058	0.067	0.080	0.117	0.323	0.235
	Feb-Apr	0.075	0.050	0.090	0.079	0.258	0.239
	Mar-May	0.079	0.063	0.143	0.047	0.256	0.196
	Apr-Jun	0.088	0.063	0.117	0.060	0.173	0.0323
	May-July	0.098	0.083	0.137	0.069	0.098	0.0183
	Jun-Aug	0.105	0.087	0.143	0.055	0.122	0.0188
	July-Sept	0.100	0.113	0.150	0.075	0.220	0.0172
	Aug-Oct	0.068	0.133	0.173	0.073	0.317	0.0191
	Sept-Nov	0.051	0.163	0.120	0.123	0.489	0.0203
	Oct-Dec	0.036	0.157	0.102	0.082	0.531	0.0187

Sites with one or months of a composite analysis missing in any three-month period.

Data source: U.S. EPA Air Quality System (AQS). http://www.epa.gov/ttn/airs/airsaqs/index.htm

Figure 2. Three-Month Rolling Average Lead Data (2006 – 2011) in the Cuyahoga County Partial Nonattainment Area.



Section Four

Emissions Inventory

Section 172(c)(3) requires a comprehensive, accurate, current inventory of actual emissions from all sources of lead in the nonattainment area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met. Rule 40 CFR 51.117 requires lead emissions to be part of the state's emission inventory for the SIP.

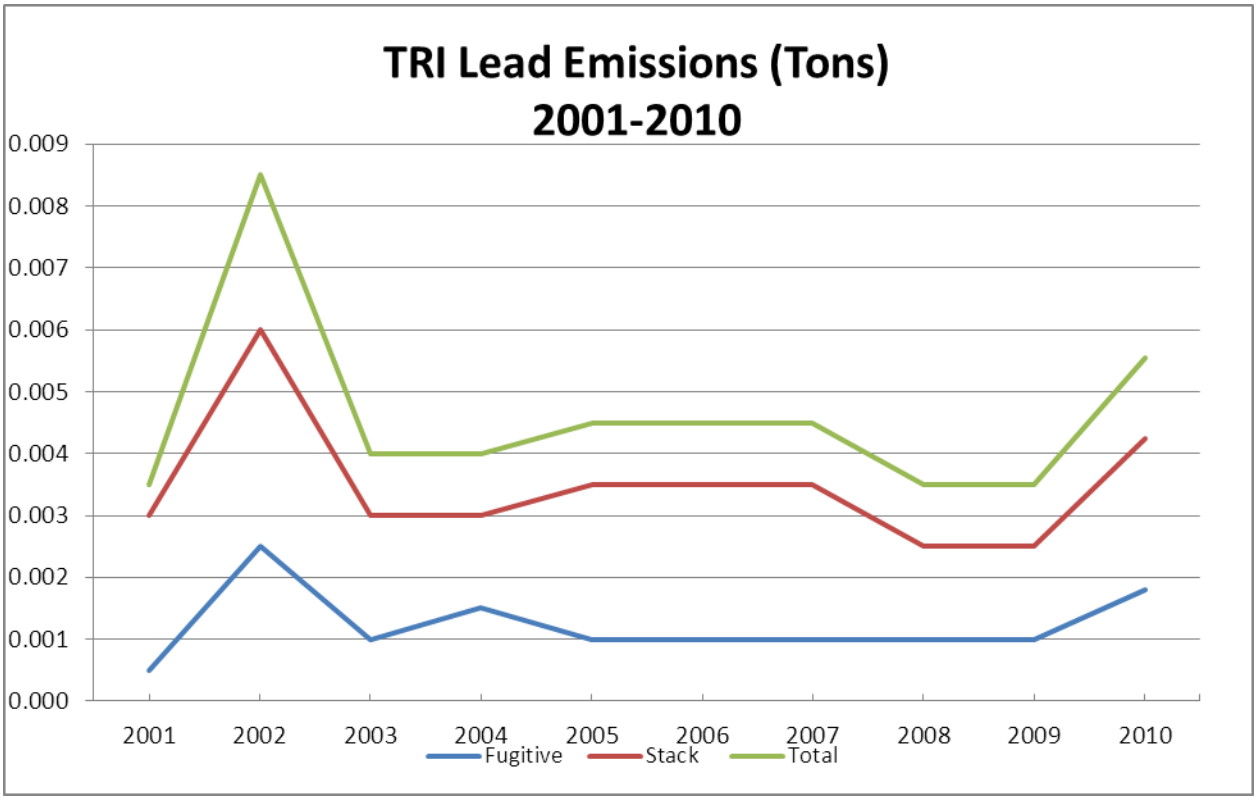
U.S. EPA guidance (2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers, July 8, 2011 (herein referred to as "Q&A Guidance")) recognizes the discrepancy between the 0.5 tpy lead threshold for the Lead Monitoring Rule and the National Emissions Inventory (NEI) reporting threshold of 5 tpy. To resolve this inconsistency, U.S. EPA is considering proposing changes to align the thresholds by changing the Air Emissions Reporting Rule (AERR) in the future. However, given the discrepancy in the rules that currently exists, states are encouraged to voluntarily collect data on smaller lead sources and report the data to EPA for the 2011 NEI. The Q&A Guidance also reiterates that 40 CFR 51.117(e) states: "The point source inventory on which the summary of the baseline for Lead emission inventory is based must contain all sources that emit 0.5 or more tons of lead per year." Ohio must also submit any additional emission inventory information needed to support an attainment demonstration and a Reasonable Further Progress (RFP) plan necessary to ensure expeditious attainment of the NAAQS. Appendix B contains Ohio's complete statewide 2005 through 2008 lead emissions inventory for sources at or above the 0.5 tpy threshold. There are no sources, including Ferro, within this nonattainment area reporting emissions at this level.

Ferro is below NEI reporting thresholds and reports lead emission data through the Toxics Release Inventory (TRI). The following table summarizes historical lead emissions for Ferro reported under the TRI program:

Table 2. Ferro TRI Data (2001 – 2010).

	LEAD COMPOUNDS (TPY)		
	Fugitive	**Stack**	**Total**
2001	0.001	0.003	0.0035
2002	0.003	0.006	0.0085
2003	0.001	0.003	0.004
2004	0.002	0.003	0.004
2005	0.001	0.0035	0.0045
2006	0.001	0.0035	0.0045
2007	0.001	0.0035	0.0045
2008	0.001	0.0025	0.0035
2009	0.001	0.0025	0.0035
2010	0.0018	0.00425	0.00555

Figure 3. Ferro TRI Data (2001 – 2010) Trends in Tons Per Year.



Ohio EPA's October 12, 2011 Ohio Lead Infrastructure SIP[8] submittal discusses sources of lead emissions in relation to potential interstate transport (Section 110(a)(2)(D)). U.S. EPA has stated that lead emissions do not generally transport over long distances. Ohio EPA found that there are no significant sources of lead emissions in close proximity to Ohio's borders that could contribute to nonattainment in another state.

As part of the review for the new lead standard, U.S. EPA analyzed sources of lead across the country, primarily based upon the 2002 National NEI9. Point source emissions account for about 66% of the national lead emissions in the 2002 NEI. The point source emissions are roughly split between combustion and industrial processes, while mobile and nonroad sources (emissions associated with general aviation aircraft leaded fuel) account for 29%. While lead is not added to jet fuel that is used in commercial aircraft, military aircraft, or other turbine engine aircraft, currently lead is still added to aviation gasoline used in most piston-engine aircraft and some types of race cars (which use alkyl-lead additives to boost octane). Currently, there are two main types of leaded aviation gasoline that differ in lead content (1.12 grams lead per liter (g Pb/L) vs. 0.56 g Pb/L) with the majority used being comprised of the lower lead content aviation gasoline. In 2002 approximately 280 million gallons of aviation gasoline were supplied nationwide contributing an estimated 491 tons of lead to the air and comprising 29% of the national lead inventory.

Only point sources emissions, specifically from Ferro are addressed as a part of this submittal. This nonattainment area does not contain any additional sources of lead emissions that warrant inclusion in this analysis.

In Ohio, major point sources in all counties are required to submit air emissions information annually, in accordance with U.S. EPA's AERR. Ohio EPA prepares a new periodic inventory for lead every three years. These lead inventories will be prepared for future years as necessary to comply with the inventory reporting requirements established in the CFR.

9 U.S. EPA's "Review of the National Ambient Air Quality Standard for Lead: Policy Assessment of Scientific and Technical Information," November 2007.

Section Five

Transportation Conformity

Transportation conformity is required under CAA Section 176(c) (42 U.S.C. 7506(c)) to ensure that federally supported highway and transit project activities are consistent with (‘‘conform to’’) the purpose of the SIP. Transportation conformity applies to areas that are designated nonattainment, and those areas redesignated to attainment after 1990 (‘‘maintenance areas’’ with plans developed under CAA section 175A) for transportation-related criteria pollutants. In light of the elimination of Pb additives from gasoline, transportation conformity does not apply to the lead NAAQS (73 FR 67043).

Section Six

Reasonably Available Control Measures

Section 172(c)(1) requires plan provisions provide for implementation of Reasonably Available Control Measures (RACM) as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of Reasonably Available Control Technology (RACT)) and provide for attainment of the national primary ambient air quality standards. In March 2012, U.S. EPA issued guidance entitled "Implementation of the 2008 Lead National Ambient Air Quality Standards: Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions" (herein referred to as "RACM Guidance"). The RACM Guidance states that "most sources that will be required to implement RACM will be in the source categories focused on by this document – Secondary Lead Smelting, Lead Acid Battery Manufacturing, Iron and Steel Foundries, and Iron and Steel Mills. However, there might be some sources in other source categories that will be required to implement RACM for controlling lead emissions." The RACM Guidance provides basics steps that States can use in determining what constitutes RACM. Ohio EPA has performed a RACM analysis (Appendix C) for Ferro and has determined that existing controls and practices constitutes RACM, and that those existing controls and practices along with voluntary upgraded secondary controls and practices being implemented by Ferro to address the 2010 and early 2011 exceedances will ensure ongoing attainment of the 2008 lead standard. These measures are discussed in greater detail under the Control Measures, Means or Techniques heading of the Attainment Demonstration Strategy portion of this section.

Section 172(c)(6) requires plan provisions include enforceable emission limitations, and such other control measures, means or techniques, as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment by the applicable attainment date (December 31, 2015). U.S. EPA's Q&A Guidance states:

> *Control measures for the 2008 NAAQS need to be in place as expeditiously as practicable. In order for control measures to result in three years of monitored clean data by the attainment date, areas designated in the first round of designations (effective December 31, 2010, and requiring attainment demonstrations that show that the area will attain the standard as expeditiously as practicable, but no later than December 31, 2015) would need to have all necessary controls in place no later than November 1, 2012. EPA will consider on a case-by-case basis the approvability of attainment demonstration SIPs where control measures are scheduled to be operational after November 1, 2012.*

Section 172(c)(6) requirements are discussed in greater detail under the Attainment Demonstration Strategy portion of this section.

Attainment Demonstration Strategy

Background

Ferro primarily produces frits which are vitreous compounds, not soluble in water, obtained by glass heating and then rapidly cooling carefully controlled blends of raw materials. The frit production process allows the use of soluble raw materials consisting of metal oxides and carbonates. The majority of production consists of end product powders. These are manufactured from intermediate cullet that that is melted and quenched. Production of "cullet" intermediates of non-lead bearing materials is also processed. The cullet is defined by the quench methodology. Frit by definition is a water quenched product yielding a material with a sand-like appearance. Flake is a water cooled roll quenched (splat quenched) material with, as the name implies, a flake or ribbon appearance. A variety of micron particle sized wend products are produced. The median particle sizes of these materials vary from 1 to 30 microns. Production methodology entails in all instances the utilization of ball or pebble mills. The use of dry or medium (water, alcohol) mills is governed by the desired particle size and permissible contaminants. Ferro manufactures glass cullet in two of these principle groups: pure vitreous glass and glass ceramics. Primary lead bearing production includes modified Lead- Boro-Silicates or modified Lead- Alumino-Silicates. The lead raw material is 98% lead oxide.

As seen under Table 1 and Figure 2 above, monitored values remained stable between 2006 and 2009. In 2010, three-month rolling averages began to increase consistently through the first part of 2011. In 2010, Ohio EPA began working with Ferro staff to determine if Ferro was causing or contributing to exceedances of the new more stringent standard. Ohio EPA also analyzed data with respect to several other potential lead sources in the vicinity of, but excluded from, the nonattainment area. However, a combination of meteorological data, monitoring data and data obtained from Ferro indicate they were the likely source of the exceedances.

Two meteorological stations were used to analyze monitoring data trends: Cleveland Burke Lakefront Airport located north of Ferro and Cleveland Hopkins International Airport located to the southwest (Figure 4).

Figure 4. Meteorological Station Locations.

Daily monitor values were plotted against daily wind direction counts for both meteorological stations as depicted in Figures 5 through 8 below.

Figure 5. Burke Lakefront Airport Daily Wind Counts vs. the 2008 Standard.

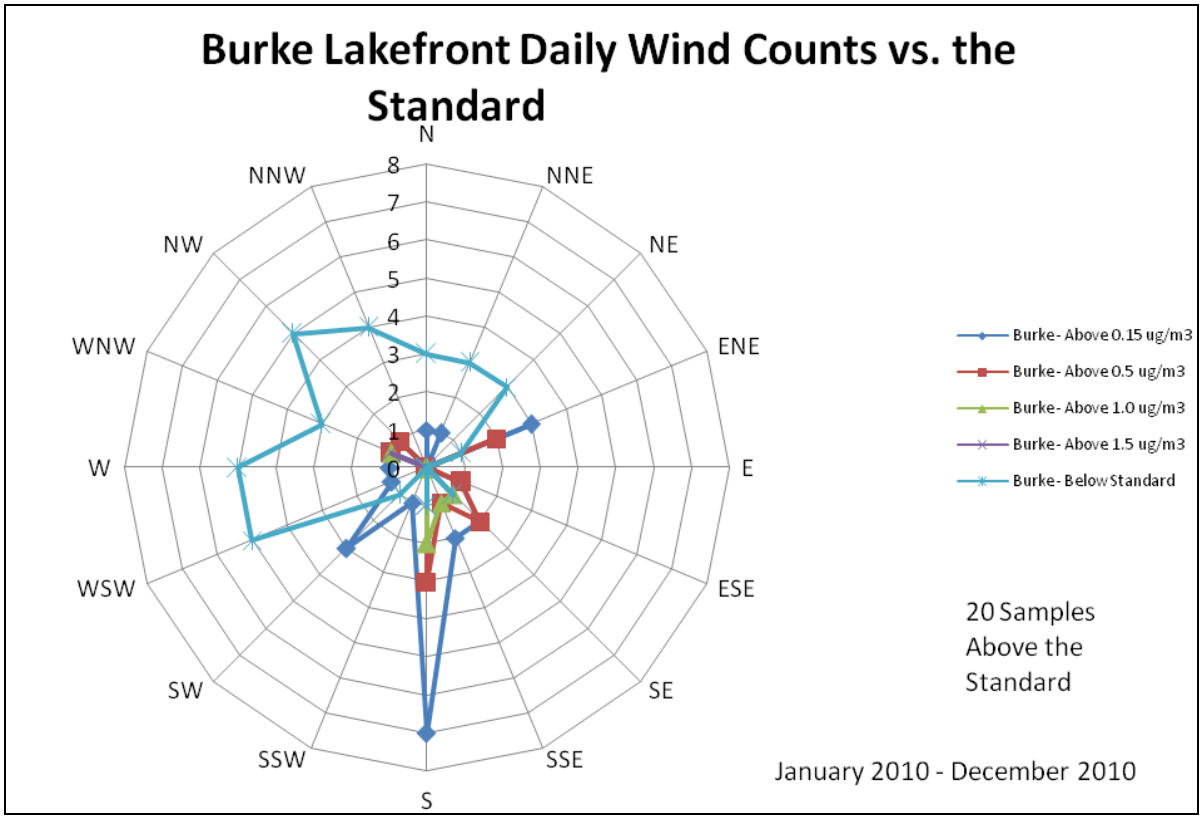


Figure 6. Burke Lakefront Airport Daily Wind Counts vs. the 2008 Standard – Overlaid on Monitor 0049.

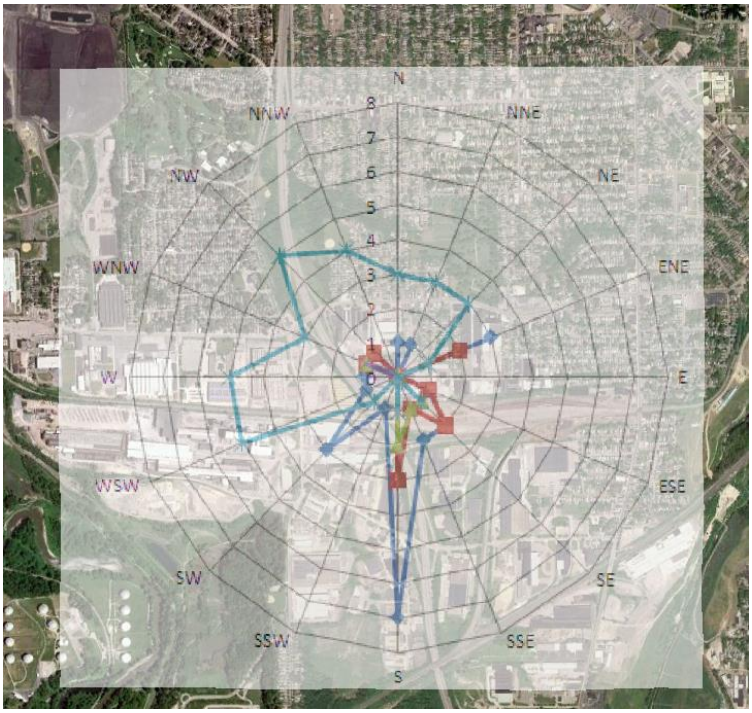


Figure 7. Cleveland Hopkins International Airport Daily Wind Counts vs. the 2008 Standard.

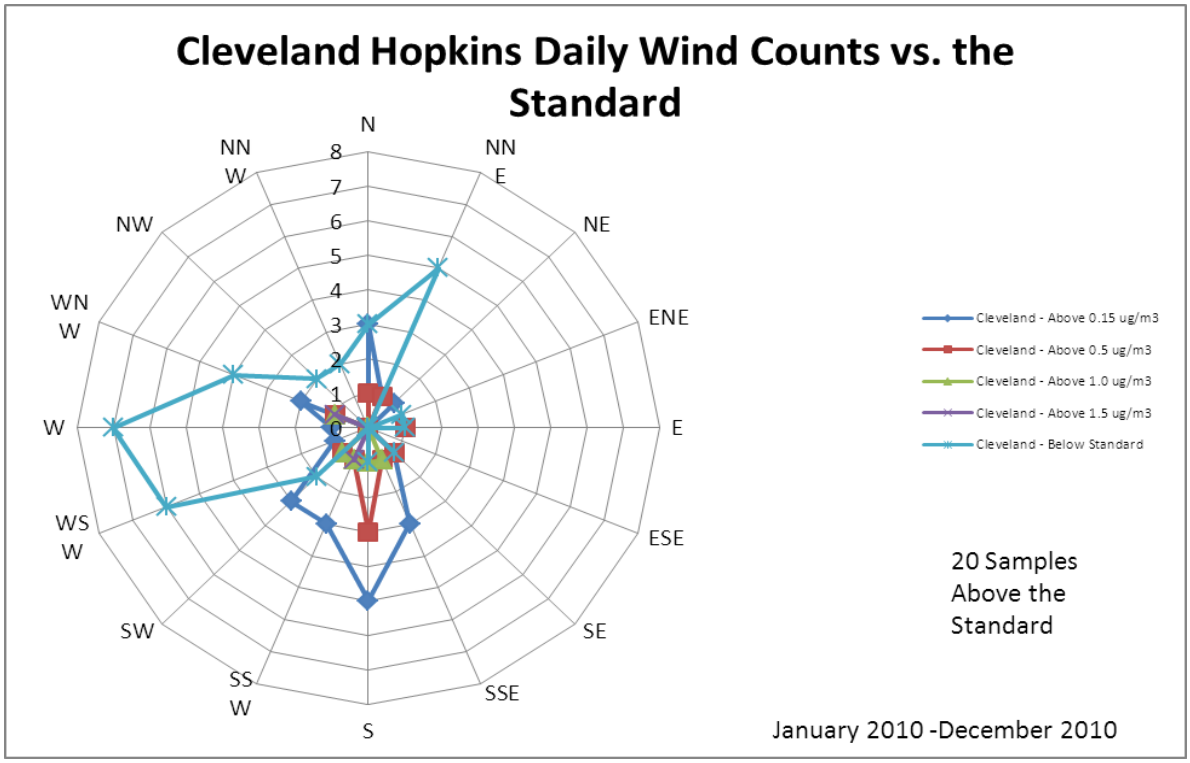
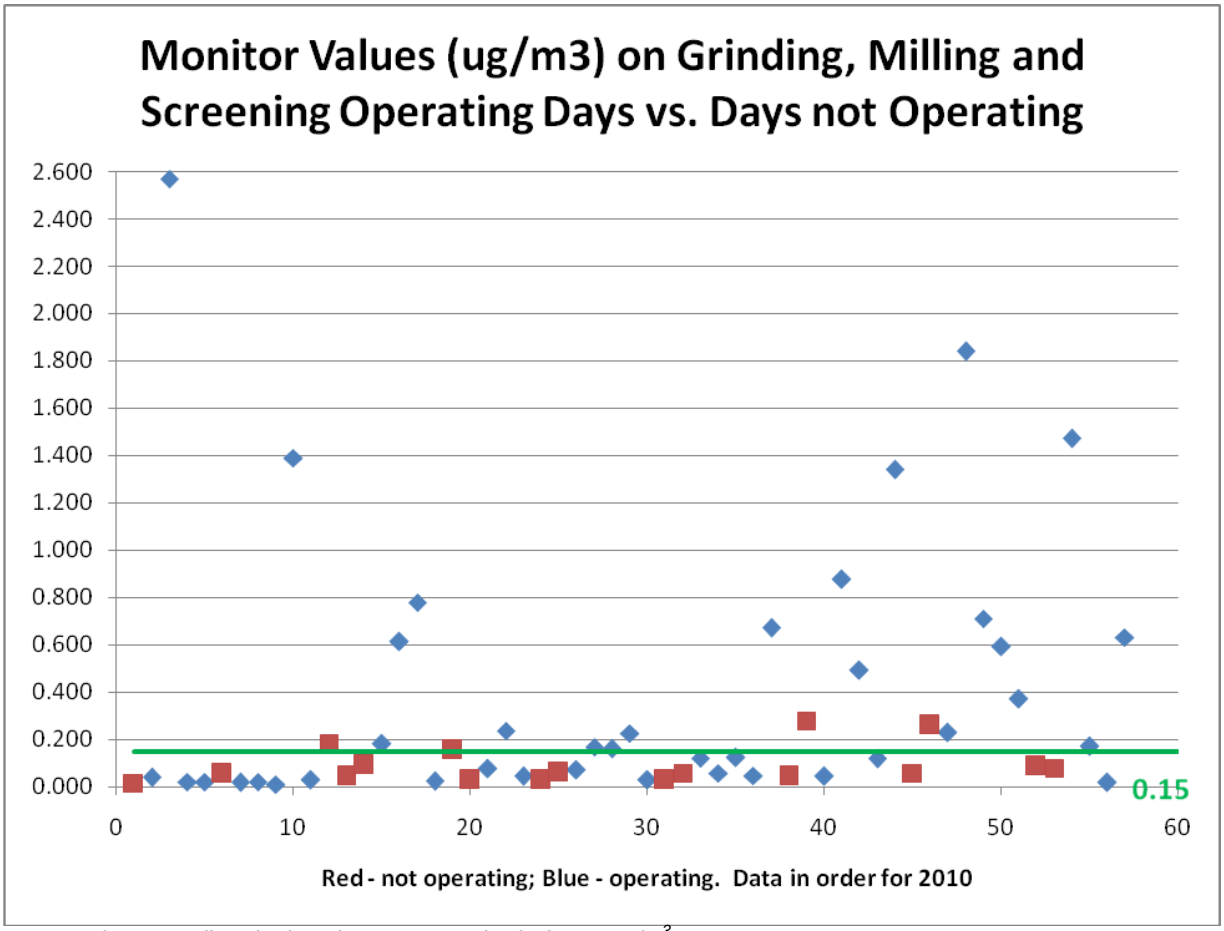


Figure 8. Cleveland Hopkins International Airport Daily Wind Counts vs. the 2008 Standard – Overlaid on Monitor 0049.

The monitor is located directly north of Ferro as seen in Figure 1. As depicted in Figures 5 through 8, higher monitored days are predominantly associated with winds coming out of the south where winds pass by Ferro before reaching the monitor.

Ferro production records were also compared to daily monitor values. Figure 9 depicts monitor values on days when grinding, milling and screening operations were occurring compared to days when these operations were not occurring. Higher monitor value days are associated with these operations running.

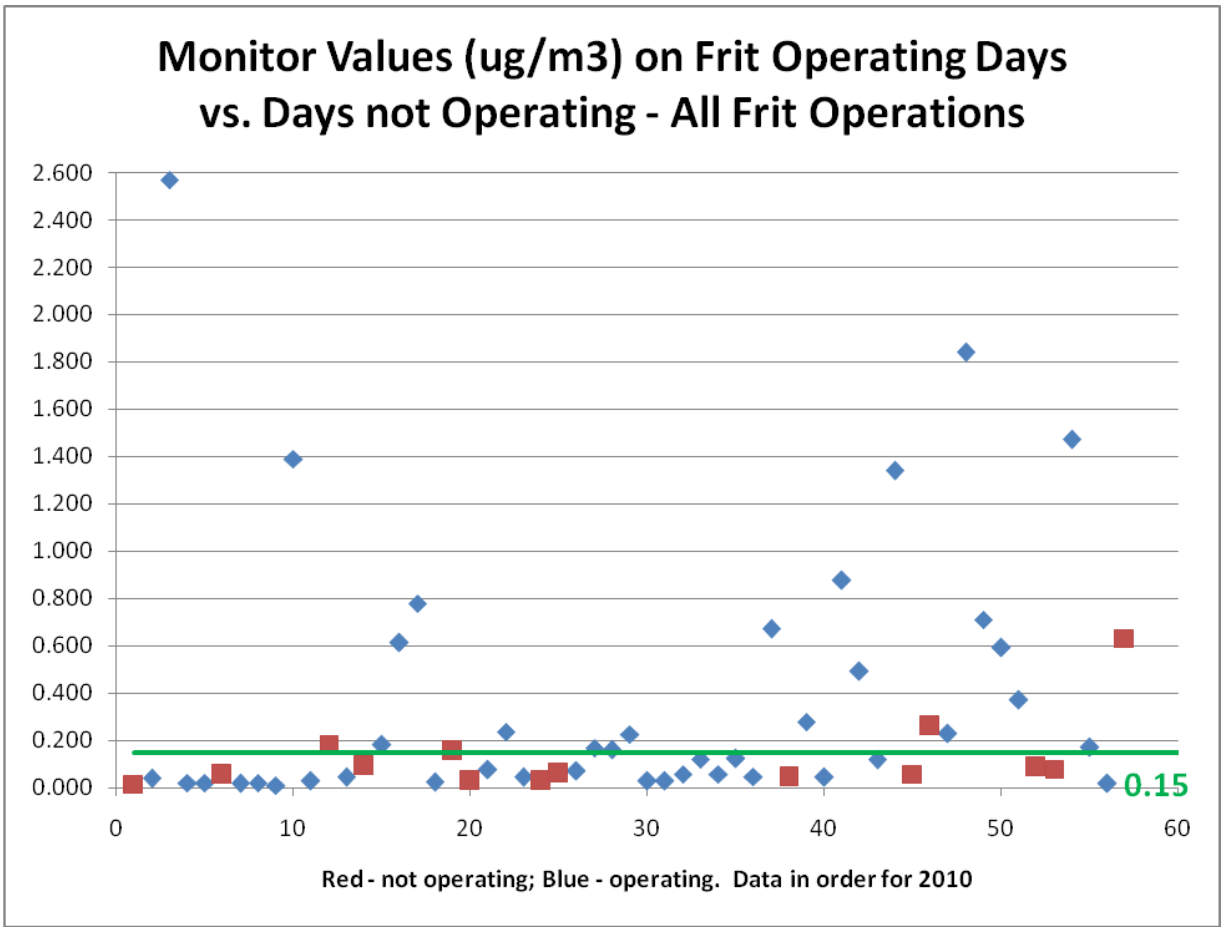
Figure 9. Monitor Values on Grinding, Milling, and Screening Operating Days vs. Days not Operating.



**the green line depicts the 2008 standard of 0.15 ug/m^3*

Figure 10 depicts monitor values on days when frit[10] operations were occurring compared to days when these operations were not occurring. Similarly, higher monitor value days are associated with these operations running.

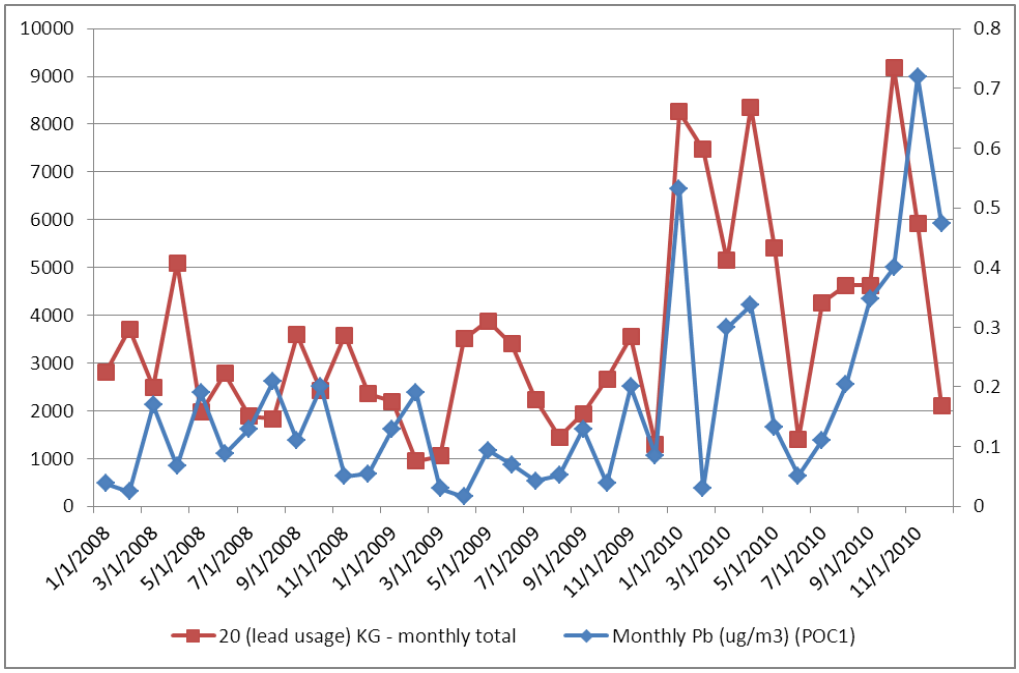
Figure 10. Monitor Values on Frit Operating Days vs. Days not Operating – All Frit Operations11.



10 This includes both lead bearing and non-lead bearing frit operations.
11 All Frit operations refers to the EGCM operations only.

Figure 11 depicts monthly monitor values compared to the lead raw material usage[12] for that month (in kilograms).

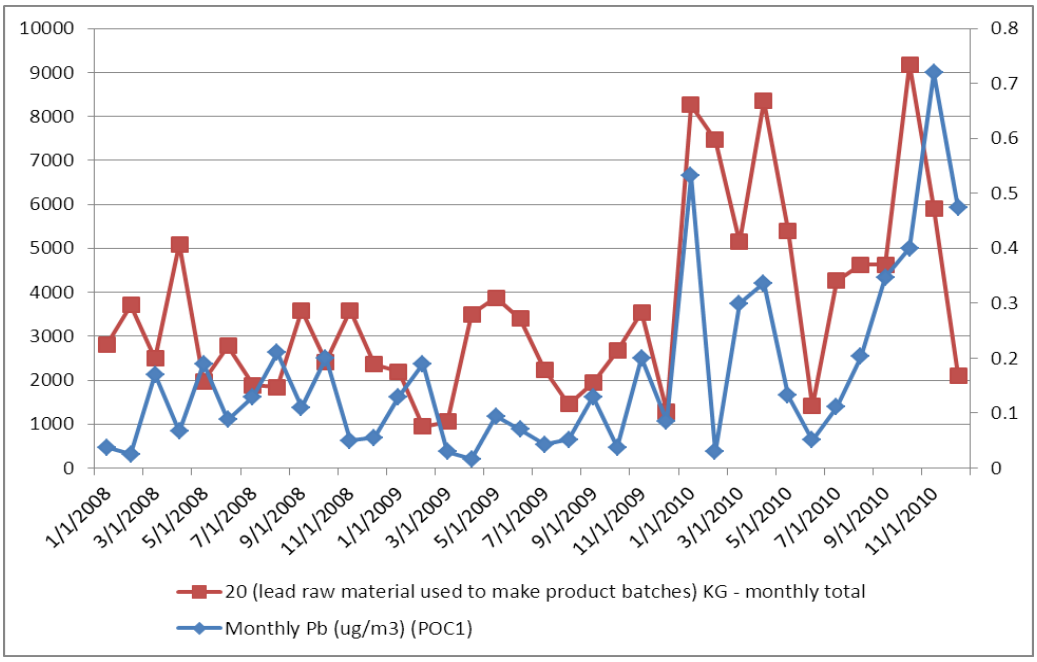
Figure 11. Monthly Lead Usage vs. Monthly Monitor Values.



12 This is when lead oxide is removed from inventory (the powder removed from the drum) prior to mixing. Generally mixing occurs within 24 hours.

Figure 12 depicts monthly monitor values compared to the production schedule[13] for lead for that month (in kilograms).

Figure 12. Monthly Lead-Based Glass Production Schedule vs. Monthly Monitor Values.



13 This is when batches are mixed but not necessarily when they are subjected to the melt process. Melting generally occurs within 24-48 hours of mix.

Figure 13 depicts monthly monitor values compared to total lead products produced in the same month (in kilograms).

Figure 13. Monthly Lead-Based Glass Produced vs. Monthly Monitor Values.

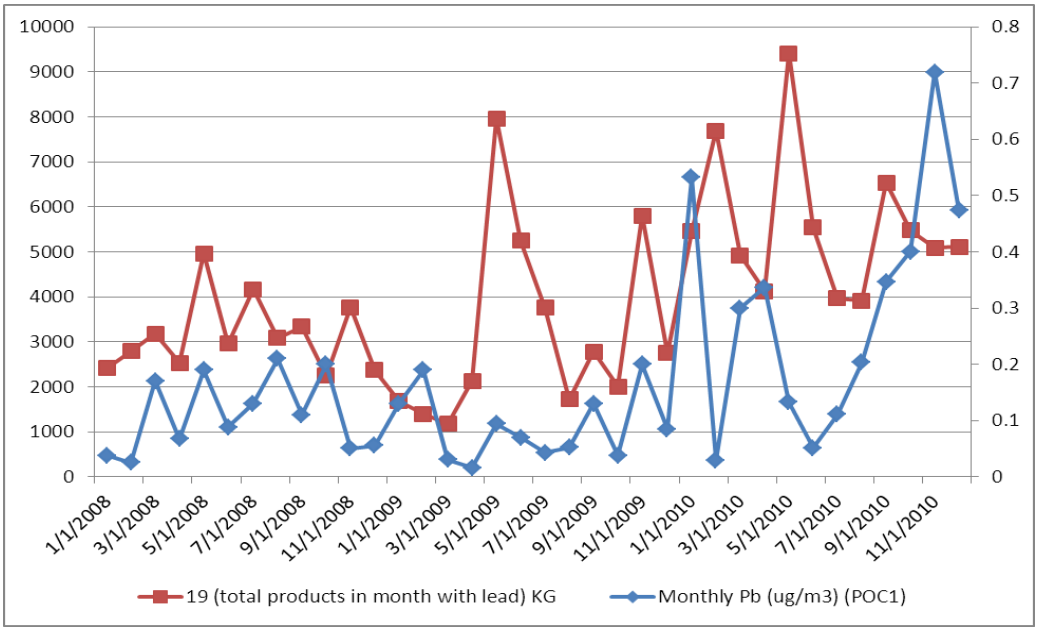
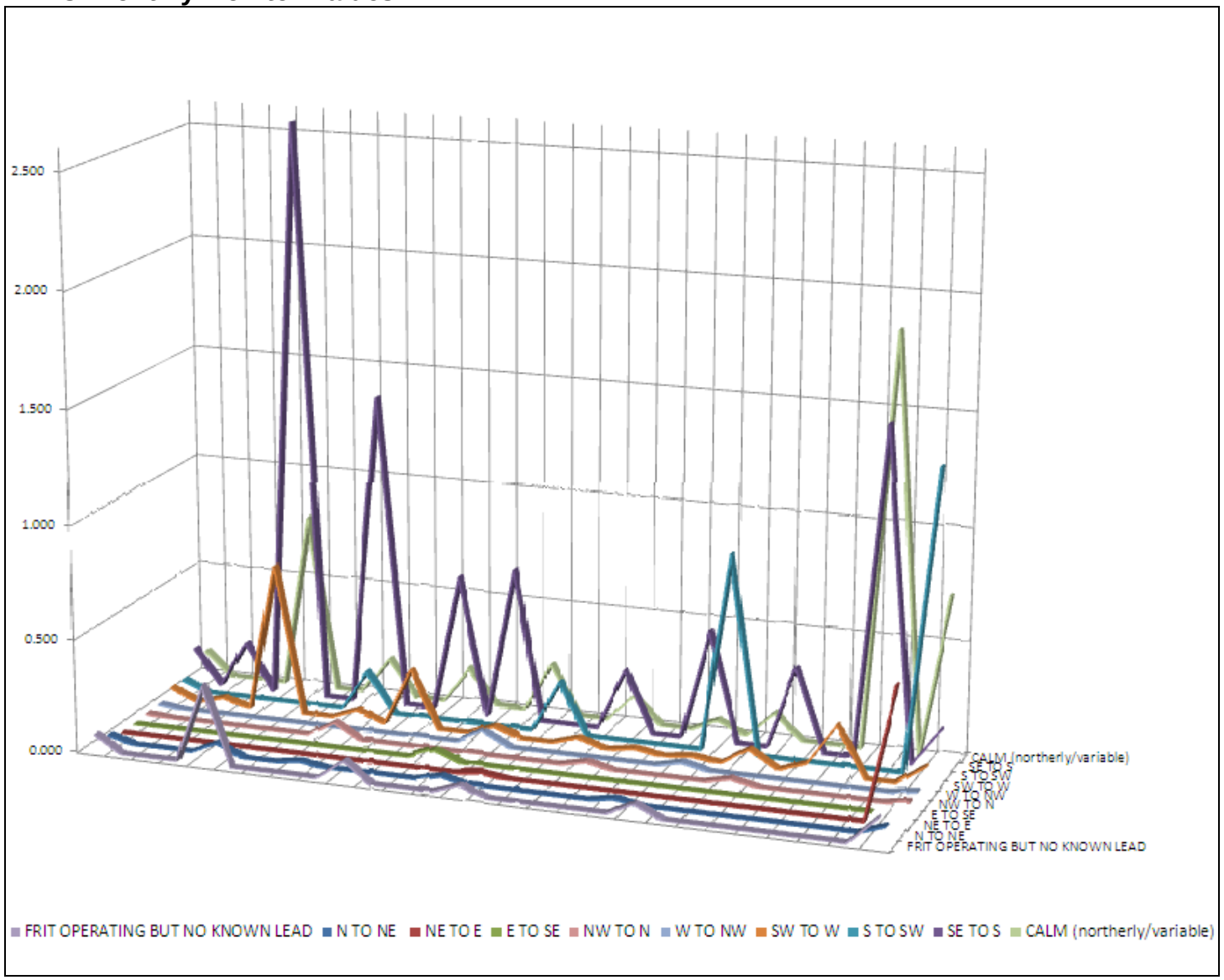


Figure 14 depicts daily monitor values categorized by wind direction for days when it was known that lead products were produced. The figure also depicts daily monitor values on days when frit was being produced but there was no lead in the production process that day (most forward line of image). The three furthest lines of the image show (in order from forward to back) daily monitor values when winds are predominantly from the south to southwest, south to southeast, or calm. This would be as winds pass over Ferro towards the monitor.

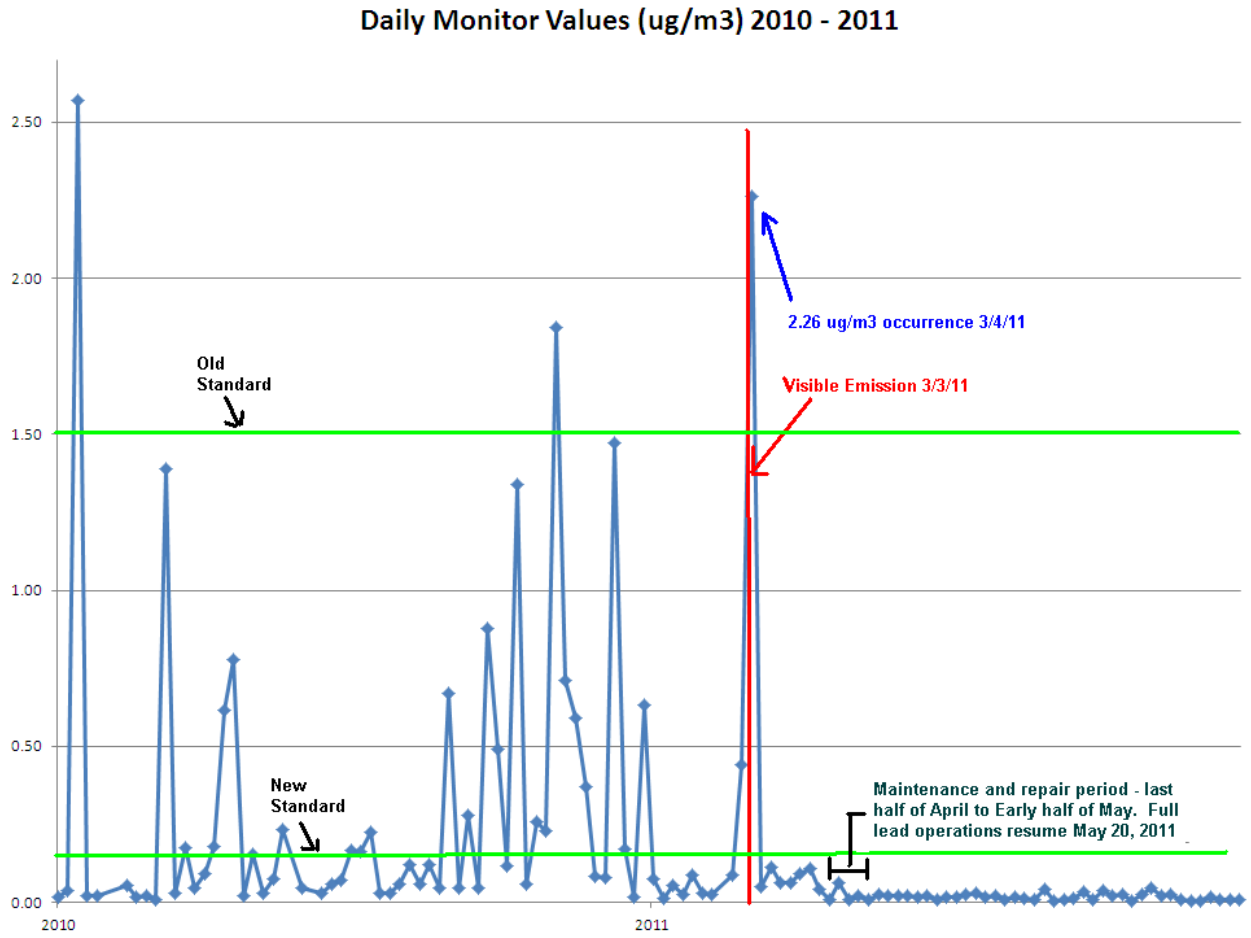
Figure 14. Lead-Based Glass Production Days by Wind Direction and Non-Lead-Based Glass Production Days vs. Monthly Monitor Values.



In 2011, exceedances periodically continued. Ohio EPA continued to work with Ferro while investigating other potential sources. Then on March 3, 2011 Ferro observed a visible emission from lead processing on one of their baghouses. Subsequently, on March 4, 2011, the monitor's 24-hour value was 2.26 ug/m^3. The source equipment and control units were shut down and the unit was inspected. The cause of visible emissions was determined to be a failed retaining clamp on a filter and a repair was immediately made and the unit was placed back into service on March 7, 2011. Ferro commenced a program to evaluate the condition of all baghouses. This occurred throughout the last half of April and early half of May 2011. Several small cracks in the canisters and damage to hopper dump slide gates on several baghouses were identified and operations were immediately shutdown until repairs were completed. Additionally, all air pulse jets, solenoids and timer boards were evaluated and replaced as necessary. During this time, Ferro also changed all filter cartridges and all pulse air supply regulators. Full production resumed on May 9, 2011 and full lead-based glass production resumed on May 20, 2011. In addition to these activities, Ferro identified four baghouses they deemed ready for replacement in the near future and is upgrading these and including new secondary control technologies. Additional discussion about new and replacement equipment is under the Control Measures, Means or Techniques section below. Appendix D contains a response letter from Ferro dated January 23, 2012. This document contains a more thorough discussion of these events.

It is Ohio EPA's belief that Ferro's equipment degradation and maintenance issues contributed to the periodic exceedances through 2010 and the early months of 2011. As can be seen in Table 1, nonattainment of the 2008 standard last occurred during the March-May 2011 period and 3-month rolling averages have sharply declined and been well below the standard since. This is consistent with when Ferro completed repairs and resumed full production of lead-based glass processes (May 20, 2011). Also, as can be seen in Figure15, daily monitor values have taken a sharp decline since the visible emission event and continued to decline and remain steady after the series of repairs were completed and operations were fully resumed.

Figure 15. Ferro Events and Daily Monitor Values (ug/m^3) from 2010 -2011.



Modeling

Per U.S. EPA's Q&A Guidance, "modeling for attainment demonstrations is used to show that a nonattainment area will be in attainment by the attainment date. The modeling is used to show the effectiveness of control measures on the sources. For attainment modeling, maximum allowable or federally enforceable permit limits should be the basis of the model input emissions, as described in Section 8.1 and Table 8-1 of Appendix W and the Guideline for Air Quality Models."

Two dispersion modeling analyses were performed for this SIP analysis. One was an analysis relevant to the 2010 and early 2011 period, prior to equipment repairs (base case). Ohio EPA's analysis demonstrates the level of lead emissions that had to have occurred during a representative period when the equipment was not functioning properly. The second analysis demonstrates when the equipment is functioning properly and maintained properly, Ferro's federally enforceable permit limits will provide for attainment of the standard (future case).

The base case analysis evaluated a reasonable estimate of maximum actual emissions to determine the sources identified at Ferro with control equipment degradation that may have contributed most to the highest monitored concentrations. For this analysis, Ohio EPA selected the 3-month period of October to December 2010, when the highest three-month rolling average of 0.531 ug/m^3 occurred.

The future case analysis evaluated the existing and planned controls which are considered within Ferro's federally enforceable permit limits. Dispersion modeling was used to validate that the control strategies and permit limits will provide for attainment of the standard. Several conservative assumptions were made as a part of the modeling analysis and a weight-of-evidence approach was used to demonstrate attainment of the standard. In addition, as can be seen from Table 1 above, monitoring shows that since the violations occurred and the degraded equipment that caused excess emissions was repaired, 3-month rolling averages are well below the standard. This trend has also continued through the early part of 2012.

This dispersion modeling analysis was performed using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) modeling system.

Appendix E contains the full modeling analyses and documentation.

Enforceable Emission Limitations

Ferro was issued a renewal Title V permit effective September 20, 2011 (Appendix F). Table 3 identifies lead sources (emissions units), corresponding control devices and federal enforceable permit limits for lead. Note that Ohio EPA will be revising the Title V permit to adjust the emissions limitations for Emissions Unit P915. This emissions unit has been a non-lead source for several years (prior to the 2010 and 2011 exceedances) and will not be a part of lead production in the future. Therefore, it will be revised to 0.0 lb/hr and 0.0 tpy limitations.

Control Measures, Means or Techniques

All lead processes (melting and milling) at Ferro are contained operations that are controlled by a series of dust collectors (bag houses) with design efficiencies of 99.97%. Because of equipment degradation and maintenance issues, Ferro made several repairs (as discussed above). Table 3 below provides a summary of the control device upgrades while Appendix D contains a detailed summary of the repairs and voluntary upgrades. In addition, Ferro will be implementing a comprehensive Preventative Maintenance Plan (Appendix G) to ensure adequate operation of all dust collectors. Ferro's Title V permit will require a Preventative Maintenance Plan and that Ohio EPA is notified of any changes to such Preventative Maintenance Plan.

Ohio EPA has performed a RACM analysis (Appendix C) for Ferro and has determined that existing controls and practices constitutes RACM. In addition, Ferro is voluntarily

implementing additional controls and monitoring to ensure the 2010 and early 2011 exceedances are addressed. These include secondary HEPA filtration and bag leak detection devices on all control devices emitting lead.

Table 3. Ferro Sources of Lead, Base Case Control Devices, Control Device Upgrades and Federally Enforceable Permit Limits.

Emission Unit	Description of Source Emissions	Base Case Control Device	Voluntary Control Device Upgrade	Permit Limits	
				pound/ hour	ton/year
P065	220 lbs product/cycle electric, glass melter (large melter K or MELTER 2)	FEM 8	Replace existing dust collector with new 304 stainless steel dust collector and 316 stainless steel blower. New HEPA filter and broken bag detection device.	n/a[14]	0.30 combined limit
P064	220 lbs product/cycle electric, glass melter (large melter J or MELTER 1)				
P066	220 lbs product/cycle electric, glass melter (large melter G or MELTER 3)	FEM 9	New carbon steel blower, secondary HEPA filter and broken bag detection device		
P067	220 lbs product/cycle electric, glass melter (large melter L or MELTER 5)				
P068	220 lbs product/cycle electric, glass melter (small melter C or MELTER 9)	FEM 10	New carbon steel blower, secondary HEPA filter and broken bag detection device		
P069	220 lbs product/cycle electric, glass melter (small melter D or MELTER 10)				

[14] Compliance with Ferro's 0.01 pounds per hour particulate emissions limitation for each of these emissions units ensures compliance with the combined ton per year lead limitation and ensures attainment of the standard.

Emission Unit	Description of Source Emissions	Base Case Control Device	Voluntary Control Device Upgrade	Permit Limits	
				pound/ hour	ton/year
P071	Twelve (12) Mills (eleven wet mills and one dry mill) and seven (7) Friction Dryers for drying methyl and isopropyl alcohol from fine particle specialty glass equipped with a packed bed scrubber for control of VOC emissions and a baghouse for control of particulate emissions.	FEM 12, Scrubber	New carbon steel blower, secondary HEPA filter and broken bag detection device	0.002	0.009
P915	EMS gas/O2 continuous melter, 1 electric batch melter with a maximum process weight rate of 220 lbs/hr	CERC 4		0.64, will be revised to 0	2.81, will be revised to 0
P101	22 lb/cycle melters (drop bottom melters 1, 2, 3, 4, 5 & 6)	FEM 10 (#4), FEM 11 (#1,5), and FEM 14 (#2,3,6)	FEM 14: New carbon steel blower, secondary HEPA filter and broken bag detection device	de mimimus	
P001	8 Ball Mills, 2 Screeners, 1 Cone Blender, 2 Scales	FEM1	New carbon steel blower, secondary HEPA filter and broken bag detection device	de mimimus	
P100	Packaging for Shipment (per process flow)	FEM 5	New carbon steel blower, secondary HEPA filter and broken bag detection device	de mimimus	

**FEM's are all dust collectors with HEPA filters*

Schedules and Timetables for Compliance

The schedule contained in Appendix I applies to Ferro's control upgrades.

In accordance with U.S. EPA's Q&A Guidance, all upgrades are scheduled for completion by November 1, 2012. U.S. EPA's Q&A Guidance states:

> *Control measures for the 2008 NAAQS need to be in place as expeditiously as practicable. In order for control measures to result in three years of monitored clean data by the attainment date, areas designated in the first round of designations (effective December 31, 2010, and requiring attainment demonstrations that show that the area will attain the standard as expeditiously as practicable, but no later than December 31, 2015) would need to have all necessary controls in place no later than November 1, 2012…..*

Section Seven

Reasonable Further Progress

Section 172(c)(2) requires plan provisions require reasonable further progress (RFP). U.S. EPA's Q&A Guidance states:

> *Demonstrating reasonable further progress requires adherence to an ambitious compliance schedule. The schedule is expected to provide for periodic yields in significant emissions reductions or linear progress when appropriate. The U. S. Environmental Protection Agency (EPA) recommends that SIPs for Lead nonattainment areas provide a detailed schedule for compliance of reasonably available control measures (RACM), including reasonably available control technology (RACT), and accurately indicate the corresponding annual emission reductions to be achieved. Expeditious implementation of RACM and RACT by the sources in the nonattainment areas helps to ensure attainment of the standard by the attainment date.*

As identified in Table 4 above, Ferro's voluntary equipment upgrades and implementation of the Preventative Maintenance Plan will be completed by November 1, 2012.

Section Eight

Contingency Measures

Section 172(c)(9) requires plan provisions provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator. U.S. EPA's Q&A Guidance states:

> *EPA thinks a reasonable guide to the amount of emissions reduction that a single measure or group of measures should achieve for contingency purposes would be equal to the amount represented by annual average RFP in the attainment plan. For example, if the attainment plan provides for 1 tpy of Lead reductions over a 5-year attainment horizon, the recommended target for contingency measures would be at least 0.2 tpy.*

Additional controls or reductions in permitted lead emissions were not necessary in this area in order to attain the lead standard or show RFP. Rather, exceedances were associated with equipment degradation. However, Ohio will consider necessary contingency measures from a list of measures deemed appropriate and effective at the time the selection is made. The selection of measures will be based on cost-effectiveness, emission reduction potential, economic and social considerations or other factors that Ohio EPA deems appropriate

Ohio EPA will solicit input from all interested and affected persons in the maintenance area prior to selecting appropriate contingency measures. Because it is not possible at this time to determine what measures will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not comprehensive. Some of the contingency measures that were evaluated and would be considered are as follows:

- Additional lead reduction control devices on melting operations
- Additional lead reduction control devices on milling operations
- Improvements to the Preventative Maintenance Plan
- Additional upgrades to existing control devices
- Limitations on hours of operation

No contingency measure will be implemented without providing the opportunity for public participation during which the relative costs and benefits of individual measures, at the time they are under consideration, can be evaluated.

Section Nine

Public Participation

Ohio published notification for a public hearing and solicitation for public comment concerning the draft SIP in a widely distributed county publication on May 14, 2012.

The public hearing to receive comments on the SIP was held on June 13, 2012, at the Cuyahoga County Public Library, Parma-Ridge Branch, 5850 Ridge Road, Parma, Ohio 44129-3199. The public comment period closed on June 13, 2012. Appendix H includes a copy of the public notice, the transcript from the public hearing, and the response to comments.