Proposed Indiana
2018
Ambient Air Monitoring
Network Plan
(Appendix D)
(Lead Network Amendment)

Indiana Department of Environmental Management

Office of Air Quality

August 15, 2017

Lead Monitoring Network Revision

Summary

Due to the closing of Abraham Lincoln Elementary School in East Chicago, the much improved lead concentrations in the area, the decrease in the lead emissions from the surrounding sources, and the improved modeling results, IDEM proposes that the East Chicago – E. 135th St. site be discontinued and not be replaced with another site. One site will be sufficient to meet the monitoring requirement.

Background

On October 15, 2008, U.S. EPA promulgated a new lead NAAQS in 40 CFR Part 50. The National Ambient Air Quality Standard (NAAQS) was lowered to 0.15 µg/m^3 for an arithmetic mean concentration over a 3-month period. The lead monitoring requirements in 40 CFR Part 58 Appendix D were also changed to require monitoring sites near facilities which emitted in excess of 1.0 tons per year (tpy) of lead emissions, later revised to 0.5 tpy of lead emissions. A waiver to the monitoring could be obtained if the state could demonstrate that the lead source will not contribute to a maximum lead concentration in ambient air in excess of 50% (0.075 µg/m^3) of the NAAQS.

Appendix C - 2010 Indiana Lead Monitoring Network Plan, part of the Indiana 2010 Ambient Air Monitoring Plan (http://www.in.gov/idem/airquality/2389.htm) addressed the new requirements.

Two sources of high lead emissions were identified in East Chicago; Mittal Steel East and Mittal Steel West. East Chicago – Aldis St. (180890023) was already monitoring lead and was identified as the site suitable to monitor Mittal Steel East. East Chicago – E. 135th St. (180890033), located at Abraham Lincoln Elementary School, was established in January 2010 as the site to monitor lead emissions from Mittal Steel West.

The E. 135th St. site has operated continuously since January 2010. Aldis St. collected data until October 2012. At that time it had to be relocated. A new site, East Chicago – Marina (180890034) was established and began collecting data in October 2012. It continues to be operational. It is located approximately 350 meters ENE of the Aldis St. site.

NAAQS

The NAAQS for lead is 0.15 µg/m^3. The design value from a site is used for comparison to the NAAQS to determine attainment or nonattainment. The design value is the highest 3-month rolling average concentration, calculated from three monthly averages of data, obtained over a rolling three year period (38 months). If the design value is less than or equal to 0.15 µg/m^3 then the site is in attainment of the standard. If a rolling 3-month average is greater than 0.15 µg/m^3 then the site is considered to be nonattainment. Monitoring continues until there are 36 consecutive complete 3-month averages below 0.15 µg/m^3, at which time the site would be considered to be in attainment and become a candidate for discontinuation.

Data

Due to the proximity of Aldis St. and Marina, the data from the two sites can be considered as one set. That data are compared to the data from EC – E. 135th St. on Figure 1, a time-series graph of all the data collected since January 2010. The data from E. 135th St. has much higher

values than Aldis/Marina most of the time until March 2015. Mittal Steel East with a key facility, Long Carbon, appears to impact this site the most. Values ranged up to around 0.8 µg/m^3 on several occasions. These samples drove the 3-month rolling averages and the site design value up to 0.14 µg/m^3, just under the NAAQS. As per the NAAQS definition, the design value remained at that level through the end of 2014, even though many of the individual 3-month averages were in 0.03 – 0.05 µg/m^3 range.

From November 2014 through February 2015 Long Carbon had control equipment issues. The facility was officially shut down on March 1, 2015. During this period several values above 0.9 µg/m^3 drove the 3-month rolling average and the design value up to 0.42 µg/m^3.

Since March 2015, when Long Carbon was shut down, the lead values at E.135th St. have declined dramatically. The right portion of Figure 1 demonstrates the relative consistency of lower values as opposed to the values collected prior to that time. Figure 2 is a time series plot of the data from Marina and E. 135th St. from March 2015 until May 2017. The higher values reported now come from the Marina site, but they are less than 0.045 µg/m^3. The 3-month rolling averages since that time from both sites have been very low, usually around 0.01 µg/m^3, less than 10% of the NAAQS (Figures 3 and 4).

The current valid design value for E. 135th St. is 0.42 µg/m^3. There have been 25 consecutive valid 3-month rolling averages less than the NAAQS of 0.15 µg/m^3 since March 2015. With the pending demolition of the school, scheduled for the August/September 2017 timeframe, there will not be enough time to collect sufficient data to officially decrease the site design value into attainment.

Currently the design value for the Marina site is 0.06 µg/m^3. If the data trend continues, the design value will be 0.02 µg/m^3 with incomplete data by March of 2018 and 0.01 µg/m^3 with complete data later that year in September.

Figure 1 - East Chicago Monitoring Values (2010 – 2017)

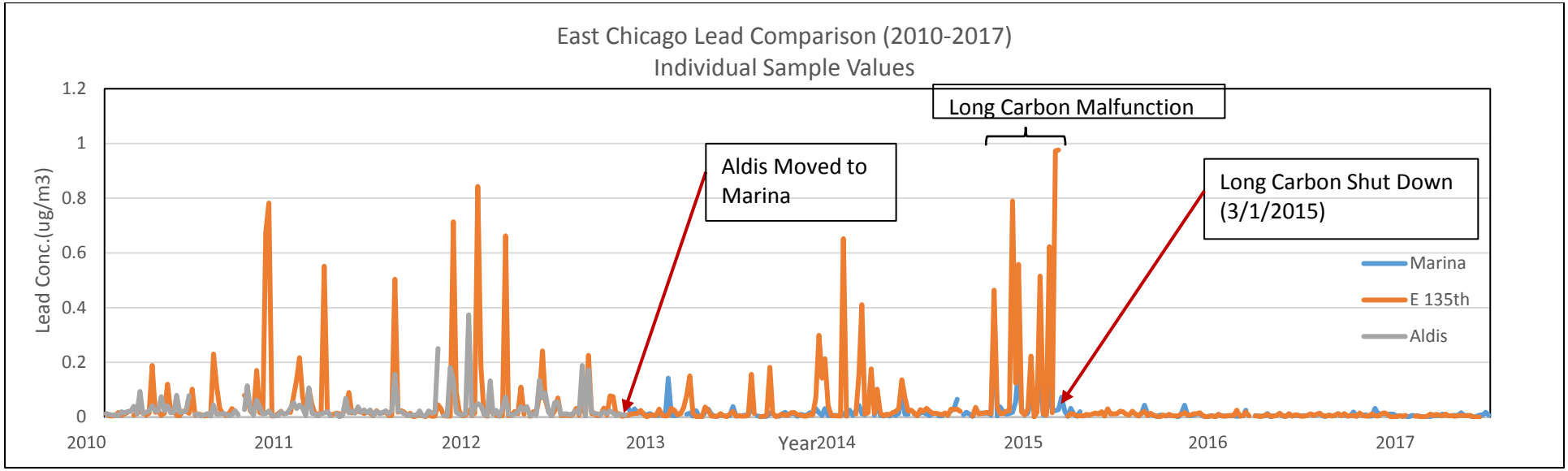


Figure 2 - East Chicago Monitoring Values (March 2015 – May 2017)

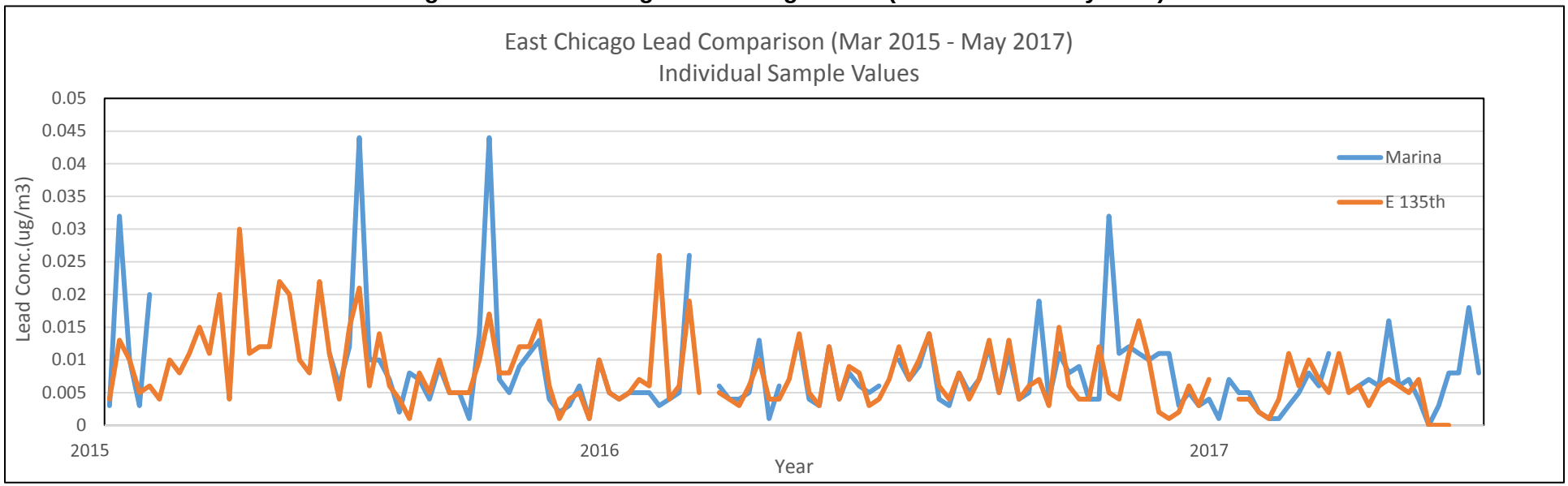


Figure 3 - East Chicago 3-Month Rolling Averages (2010 – 2017)

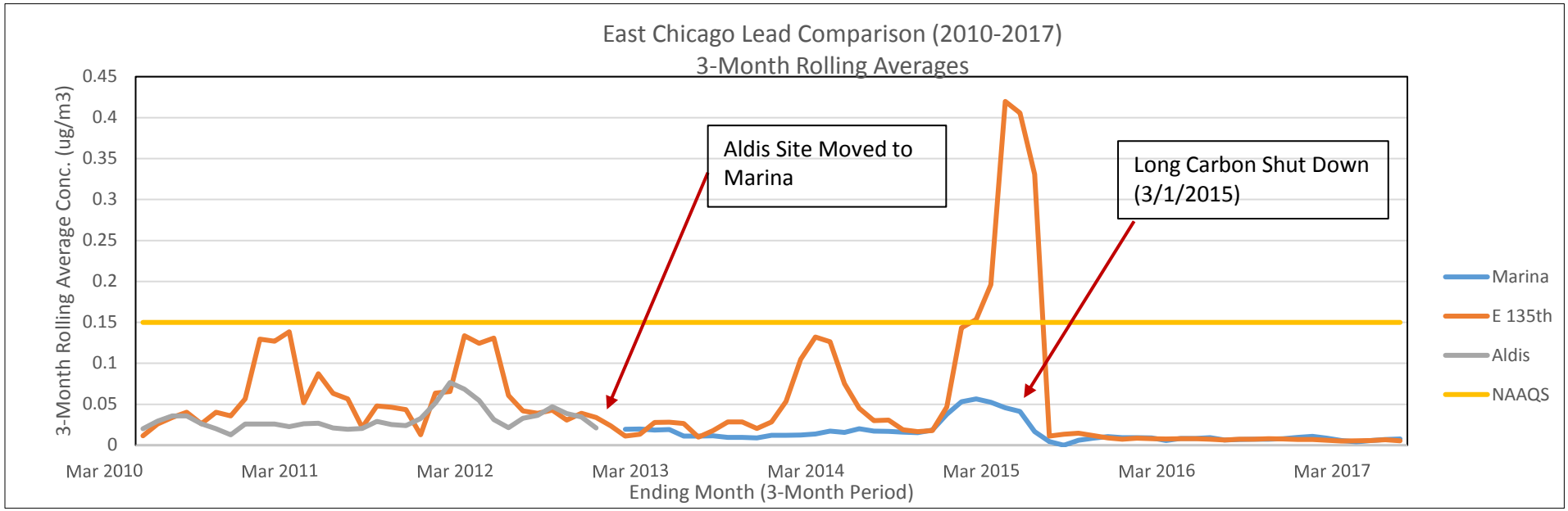
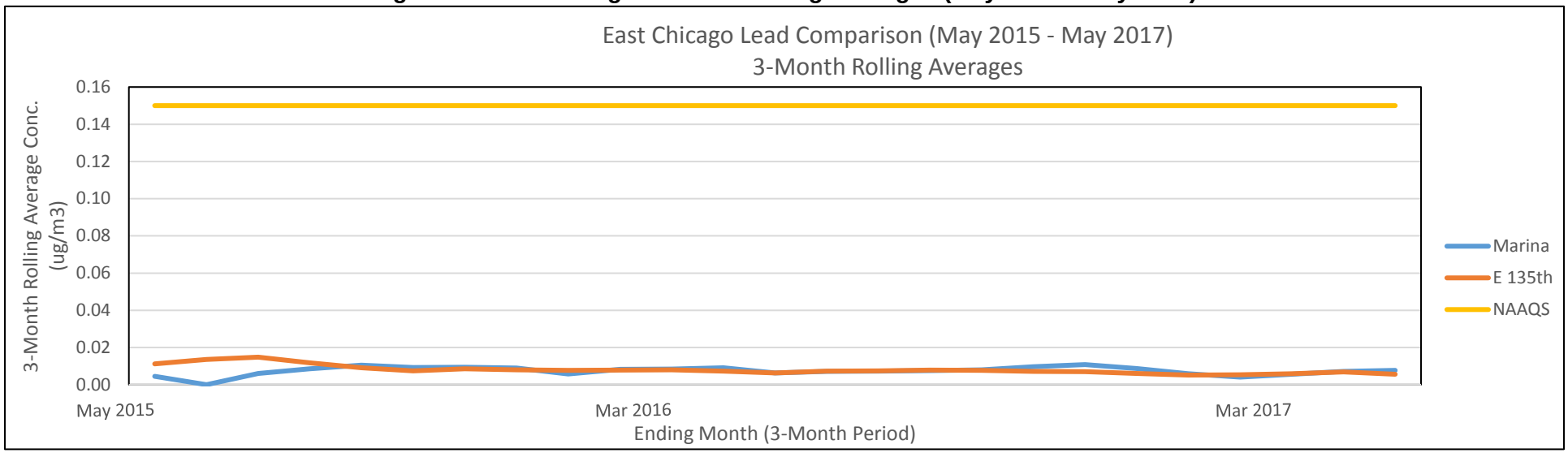


Figure 4 - East Chicago 3-Month Rolling Averages (May 2015 – May 2017)



Emissions

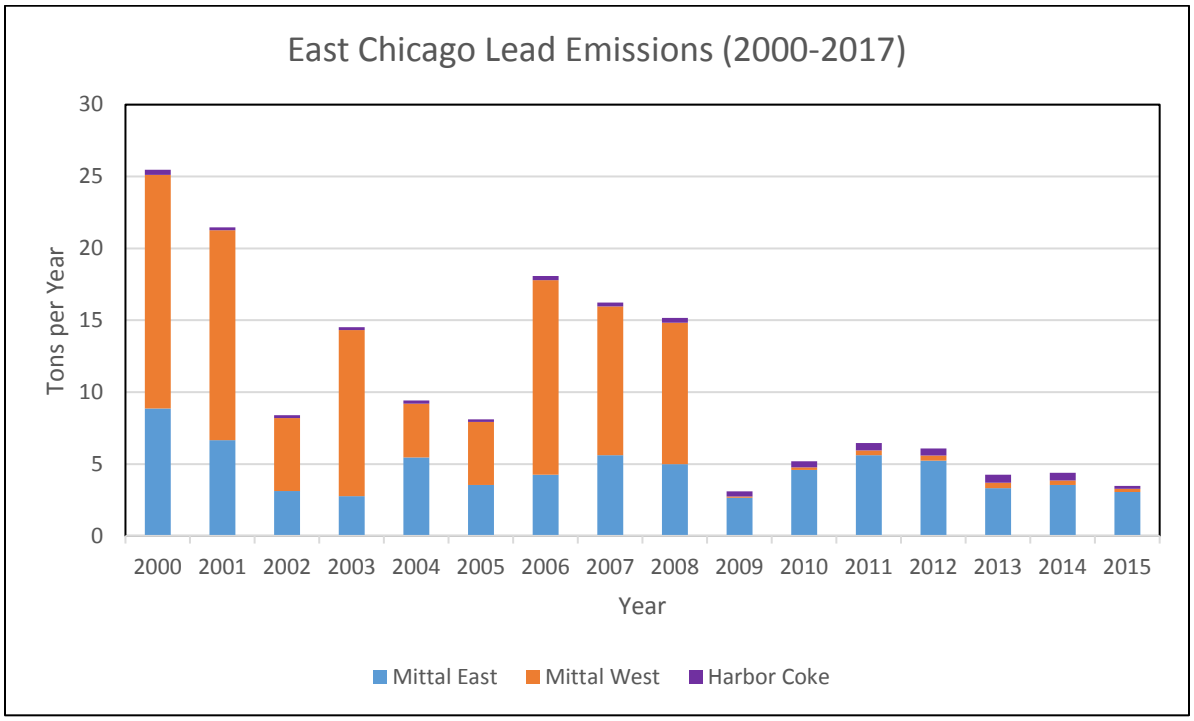
The emissions from the surrounding sources have decreased over the years. Table 1 lists the reported emissions and Figure 5 shows the relative amounts contributed by each source. In 2009, when the original Lead Monitoring Network Plan was developed and then implemented in 2010, the two sourced above 1.0 tpy were Arcelor Mittal USA LLC (Mittal Steel East) and Arcelor Mittal Indiana Harbor LLC (Mittal Steel West). The 2007 emissions (most current data at the time) were used for the modeling and site determination. Indiana Harbor Coke Company was not used in the original modeling, as its emissions were lower than the required threshold. All three sources were included in the current modeling below, even though only one source had emissions above 0.5 tpy.

The total reported lead emissions from the three main sources in 2007 were 16.24 tpy. The most current emissions data, 2015, from these sites is 3.48 tpy, 78% less than the 2007 total.

Table 1 - Lead Emissions

Lead Source			
St/Cnty	18089	18089	18089
Facility ID	00316	00318	00382
Facility	ARCELORMITTAL USA LLC (Mittal Steel East)	ARCELORMITTAL INDIANA HARBOR LLC (Mittal Steel West)	INDIANA HARBOR COKE COMPANY
Address	3210 Watling Street	3001 DICKEY RD	3210 WATLING STREET
Emissions			
Year	**Tons per Year**		
2000	8.86	16.26	0.36
2001	6.66	14.61	0.20
2002	3.11	5.07	0.21
2003	2.78	11.53	0.21
2004	5.46	3.73	0.24
2005	3.54	4.38	0.18
2006	4.25	13.55	0.28
2007	5.61	10.36	0.27
2008	4.98	9.84	0.35
2009	2.66	0.08	0.37
2010	4.60	0.17	0.42
2011	5.62	0.33	0.49
2012	5.25	0.36	0.48
2013	3.32	0.37	0.56
2014	3.54	0.31	0.53
2015	3.05	0.22	0.21

Figure 5 - Lead Emissions Trends



Modeling

In order to determine if monitoring is still needed in 2017, the sources were modeled with their current emission rates. All emission points emitting more than 0.01 tpy of lead at each of the Lake County lead sources were modeled. Actual Lake County lead emissions were taken from the 2015 EMITS inventory and totaled 4.38 tpy. Five of the thirty-one facilities that reported 2015 lead emissions in Lake County were included in the modeling demonstration. A total of 27 emission units had lead emissions of 4.18 tpy of lead, representing 95% of the lead emissions in the county. Table 2 lists the facilities with emission units emitting 0.01 tpy or more of lead in 2015.

Table 2 - Lead Sources in Lake County from Stacks Emitting above 0.01 tons per year

SOURCE NAME	Source ID	2015 EMISSION RATE (tons/year)
ARCELORMITTAL USA LLC	1808900316	3.0003
US STEEL - Gary Works	1808900121	0.7707
ARCELORMITTAL Indiana Harbor LLC	1808900318	0.1930
Indiana Harbor Coke Company	1808900382	0.2082
BP Products North America Inc. - Whiting	1808900003	0.0148

For this analysis, the American Meteorological Society / Environmental Protection Agency Regulatory Model (AERMOD) version 16216r was used. Land based receptors in a 200 meter grid were used covering a 12 kilometer square around the ArcelorMittal area. No receptors were placed over water since monitors could not be located there. Sources were modeled with Gary IITRI surface meteorology processed with South Bend National Weather Service (NWS) surface meteorological data, and Lincoln, Illinois upper air data using the three latest years of available meteorology (2013-2015). This was processed using American Meteorological Society / Environmental Protection Agency Regulatory Meteorology (AERMET) version 16216.

Table 3 shows the maximum modeled monthly lead concentrations for Lake County sources based on the actual 2015 lead emissions of 4.18 tons per year. Maximum modeled concentrations are well below the rolling 3 month average lead NAAQS of 0.15 µg/m^3.

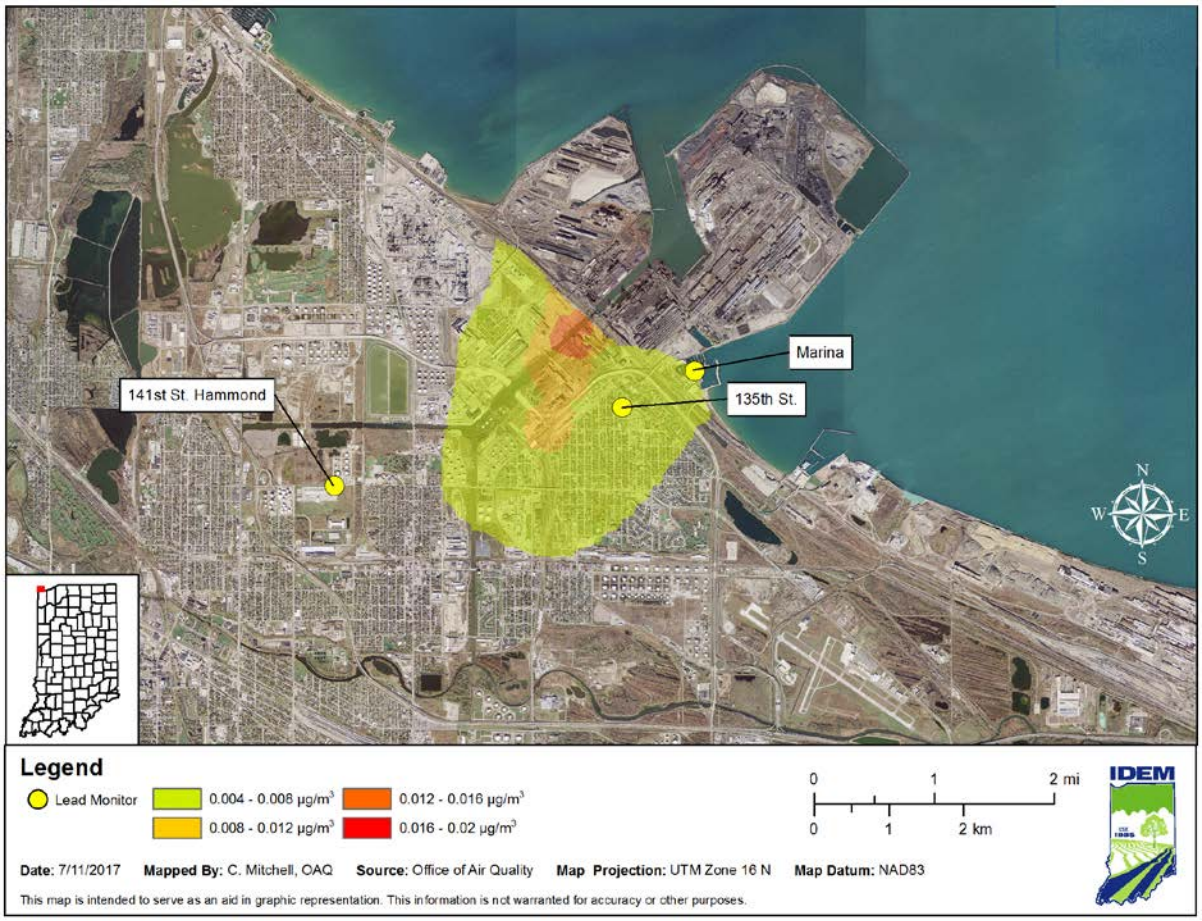
Table 3 - Modeled Impacts for Lake County Sources

SOURCE NAME	ACTUAL EMISSION RATE	HIGHEST MONTHLY LEAD IMPACT*	PERCENTAGE BELOW LEAD STANDARD
	(tons/year)	(µg/m^3)	%
Lake County Lead Sources	4.18	0.023	84.7%

* Highest monthly average was used as a conservative estimate of quarterly readings

The lead sources in Lake County have maximum modeled impacts less than 15% of the standard. Figure 6 shows the extent of the modeled lead concentrations in Lake County.

Figure 6 - Modeled Lead Concentrations for Lake County



Conclusion

Due to the following reasons IDEM concludes that the East Chicago – E. 135th St. site not be required to be relocated and that the East Chicago – Marina site is sufficient to address the lead monitoring near the Arcelor Mittal Steel Facility:

a. The data collected at both sites is very low. The highest individual values since March 2015 have been 0.030 µg/m^3 at E. 135th St. and 0.044 µg/m^3 at the Marina. The 3-month rolling averages for both sites have been at 0.01 µg/m^3.
b. The emissions from the three main and closest sources have decreased 78% in the past eight years.
c. The modeling performed using the most current emissions data shows a maximum value of 0.016 µg/m^3 (<15% of the NAAQS) impacting the area offsite from the source.
d. The current site location is being demolished and will be unavailable. Relocating the site would be very difficult due to the surrounding area and the ability to meet siting criteria.

e. With the decrease in emissions, only one source has over 0.5 tpy of lead emissions. Only one monitoring site would be required.

Proposal

IDEM proposes that the East Chicago – Marina site is sufficient to satisfy the monitoring requirements for the Arcelor Mittal Steel Facility. IDEM requests concurrence from U.S. EPA.