Enclosure 2

ArcelorMittal – Burns Harbor Modeling Protocol to Support Monitoring Approach for the Data Requirements Rule

June 2016

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Air Quality Modeling for Locating SO_2 Monitor for **ArcelorMittal - Burns Harbor**

1.0 1-Hour Sulfur Dioxide National Ambient Air Quality Standard

The United States Environmental Protection Agency (U.S. EPA) established the 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb), based on the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations, as stated in the Federal Register Volume 75, Number 119, page 35520, published June 22, 2010. For air quality modeling purposes, the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ) will use an equivalent 1-hour SO_2 NAAQS of 196.2 micrograms per cubic meter ($\mu g/m^3$) as stated in the November 7, 2011 Federal Register, Volume 76, Number 215. This is based on the 5-year average of the annual 99th percentile of the 1-hour daily maximum modeled SO_2 concentrations, representing the fourth high of the 1-hour daily maximum SO_2 modeled concentrations.

U.S. EPA must complete the designations on a schedule that contains three rounds with specific deadlines. Each round of designations directly affects each state and must be addressed.

1) Areas that have current monitored design values in violation of the 2010 1-hour SO_2 NAAQS of 75 ppb;

2) As addressed in the "Round 2" Sierra Club and Natural Resources Defense Council consent decree: areas that contain sources that, according to U.S. EPA's Air Markets Database, either emitted more the 16,000 tons of SO_2 in 2012 or had emissions of more than 2,600 tons of SO_2 and an emission rate of at least 0.45 lbs SO_2/MMBtu in 2012;

3) Areas around sources subject to the Data Requirements Rule (DRR), which set an emissions threshold limit of 2,000 tons of SO_2 per year in 2014. Sources meeting this emission threshold will need to characterize air quality in the area surrounding the source.

a.) The court's order directs U.S. EPA to complete area designations for the areas where states have not installed and begun operating a new SO_2 monitoring network under the DRR (Round 3) by December, 2017.

b.) The court's order directs U.S. EPA to designate all remaining areas of the country addressed under the DRR (Round 4) by December, 2020

2.0 Methodology for the DRR Air Quality Modeling for ArcelorMittal – Burns Harbor

This air quality modeling protocol addresses requirements specific to the DRR. ArcelorMittal - Burns Harbor (Burns Harbor) was identified by IDEM as one of eleven sources within the state

that met the DRR criteria of emitting 2,000 tons or more of SO_2 in 2014; Burns Harbor emitted 12,189 tons of SO_2. U.S. EPA has since included six additional DRR sources to Indiana's DRR list; five sources were addressed through the Round 2 – Consent Decree order and one source was added based on U.S. EPA's review of their SO_2 emissions.

As per the requirements of the DRR, air agencies are required to indicate by July 1, 2016 which of the following three options they will rely on to characterize air quality in the area surrounding the DRR sources: 1) ambient monitoring, 2) air quality modeling or 3) establishing a permanent and federally enforceable emission limit of a source's total SO_2 emissions to below 2,000 tons per year. Burns Harbor wishes to characterize air quality in the vicinity of the facility through the use of ambient air quality monitoring.

Burns Harbor is an integrated steel mill consisting of two blast furnaces, three hot strip mill furnaces, plate mill furnaces, two coke batteries, three basic oxygen furnaces (BOF) hot metal desulfurization steel making processes, five power station boilers, and a sinter plant. There are also two blast furnace gas flares and a clean coke oven gas flare which emit a small amount of SO_2. Some processes such as the BOF steel making processes have roof monitor emissions in addition to stack emissions. The blast furnaces also have non-point slag pit loadout fugitive SO_2 emissions which are modeled as volume sources.

U.S. EPA provided guidance in order to conduct an appropriate air dispersion modeling analysis to aid in determining the number and location of monitors necessary to accurately characterize the air quality in the area surrounding Burns Harbor. U.S. EPA's SO_2 NAAQS Designations Modeling Technical Assistance Document (TAD) guidance has several recommendations for modeling methodology for determining attainment designations, including:

1) Use of actual emissions to assess modeled concentrations to reflect current air quality.

2) Use of 3 years of meteorology and modeling results to calculate a simulated 1-hour SO_2 design value consistent with the 3-year 1-hour SO_2 monitored design values.

3) Placement of receptors only in locations where an air quality monitor could be placed.

- Based on the SO_2 NAAQS Designations Modeling TAD, Section 4.2; IDEM will only place modeling receptors where feasible to place a monitor. Therefore, in bodies of water or an area where monitor citing criteria would not be reasonably met, IDEM will not place receptors in those locations.

4) Use of actual stack heights rather than following the Good Engineering Practice (GEP) stack height policy when modeling actual emissions for area designations to address the DRR.

IDEM will follow U.S. EPA's designation modeling and monitoring recommendations to conduct 1-hour SO_2 modeling to determine the appropriate number of monitors and the placement of the monitor(s). Modeling results will look at the 4th high maximum daily 1-hour SO_2 concentrations averaged over the 3-year modeled period of 2012 - 2014.

2.1 Area Characterization

The ArcelorMittal - Burns Harbor facility is located at 250 West U.S. Highway 12, Burns Harbor, Westchester Township in Porter County, Indiana. The northern end of the Burns Harbor plant borders the southern shoreline of Lake Michigan. The receptor grid was adjusted to remove the receptors which are located over Lake Michigan since this is an area where monitors could not be located. Figure 1 shows the property boundary of the facility and the extent of the 10 kilometer modeling receptor grid into nearby townships and eastern Lake County, as well as SO_2 sources in the proximity of Burns Harbor.

Figure 1: Map of ArcelorMittal - Burns Harbor and Extent of Receptor Grid

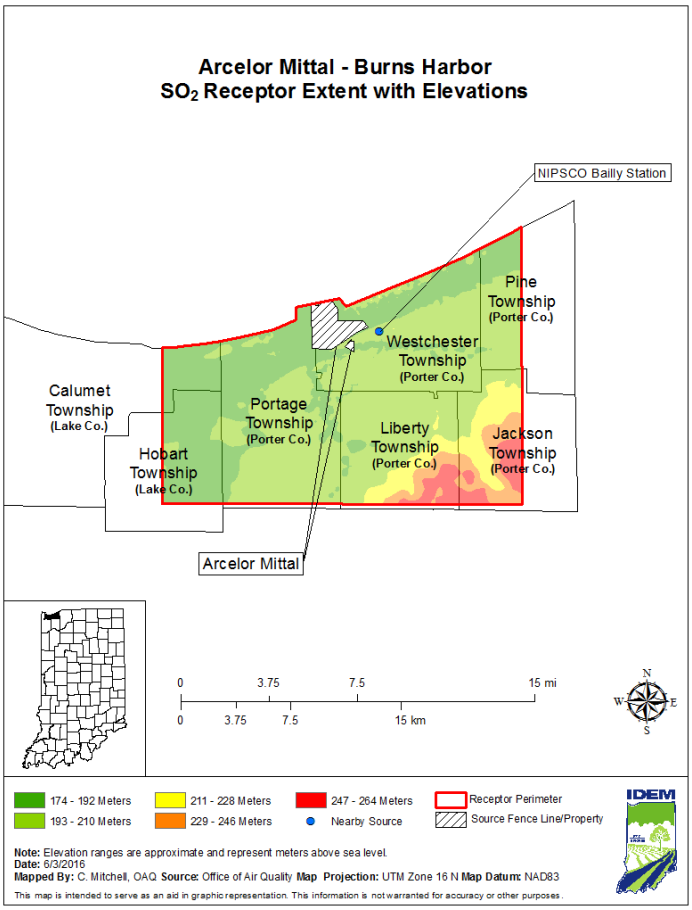
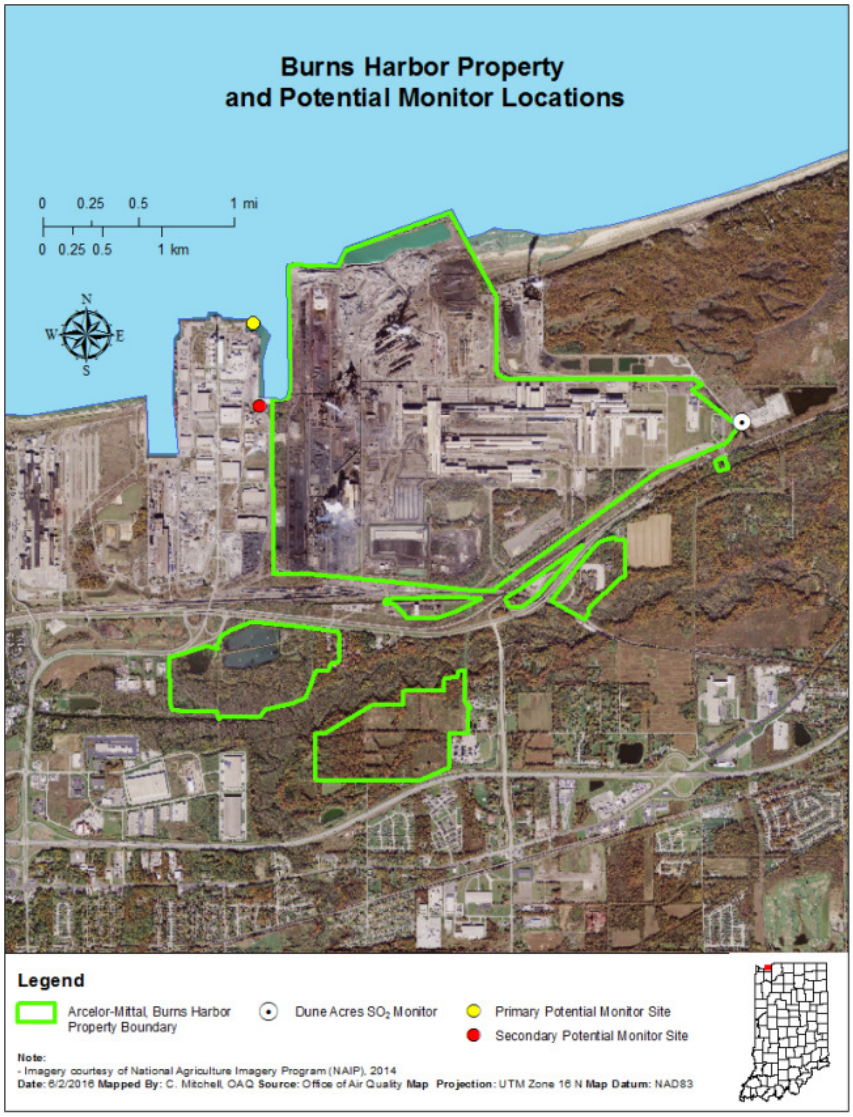


Figure 2 shows an overhead view of Burns Harbor, with Lake Michigan bordering Burns Harbor to the north, the NIPSCO - Bailly Generating Station is the adjacent property to the east, U.S. Highway 12 borders Burns Harbor to the south, and the industrialized Port of Indiana is located to the west.

Figure 2: ArcelorMittal - Burns Harbor: Overview of Site and Surrounding Area



3.0 SO_2 Emissions Sources to be Modeled

IDEM modeled the worst-case daily actual emissions taken from fuel usage and production data records as provided by Burns Harbor. Burns Harbor processed emissions from several of their operations with varying hourly emissions rates based on a maximum daily emission rate. The 24-hour daily average emissions were based on those maximum daily emission rates. The SO_2

NAAQS Designations Modeling TAD, Section 5 is referenced to best characterize any temporal and/or seasonal variability of emissions. This included any seasonal, monthly or daily variations that could be quantified. For all other Burns Harbor emission units without adequate daily emissions records, the annual emissions taken from 2012 – 2014 will be averaged.

NIPSCO – Bailly Generating Station is located adjacent to Burns Harbor. Bailly Generating Station emitted less than 2,000 tons of SO_2 in 2014 and is not listed as a DRR source. NIPSCO – Bailly's 2012-2014 continuous emission monitoring (CEM) data will be evaluated along with Burns Harbor in the modeling analysis.

In order to get an accurate representation of air quality, NIPSCO's Michigan City Generating Station in LaPorte County and U.S. Steel – Gary Works in Lake County were included in the modeling. These sources had actual 2014 emissions that could potentially impact air quality in the vicinity of the Burns Harbor facility. Actual 2014 emissions were modeled from both of these facilities. A summary of modeled facility emissions is found in Table 1 while a summary of all the emission units modeled for the Burns Harbor analysis can be found in Appendix A.

Table 1: 1-Hour SO_2 Modeling Inventory for ArcelorMittal - Burns Harbor

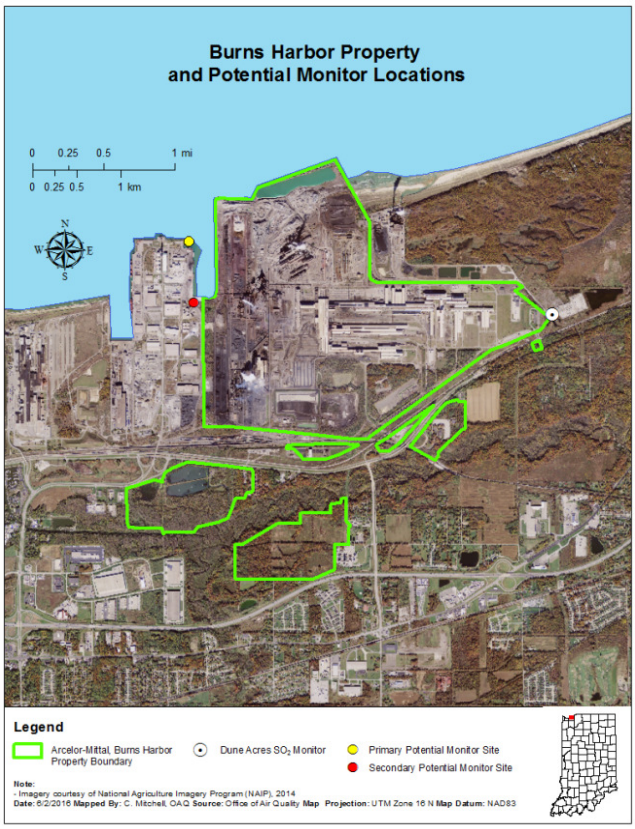
Source	Source ID	Location	SO_2 Emissions (tpy)
NIPSCO - Bailly Generating Station Units 7 and 8	18-127-00002	Porter County	2012-2014 Hourly CEMS Data
NIPSCO - Michigan City Generating Station Boiler 12	18-091-00021	LaPorte County	15,991 (2014)
U.S. Steel – Gary Works	18-089-00002	Lake County	3,285 (2014)

4.0 Information Gathering for Monitoring Site Analysis

4.1 Monitoring Site Overview

IDEM currently does not operate any SO_2 monitoring sites in Porter County. However, NIPSCO - Bailly operates the Dune Acres Substation SO_2 monitor (18-127-0011), located immediately east of Burns Harbor, at Latitude 41.6341096^o N, Longitude - 87.101478^o W. Figure 3 shows the Burns Harbor property with the Dune Acres Substation SO_2 monitor located to the east.

Figure 3: Burns Harbor – Overview of Site with Dune Acres Substation SO_2 Monitor



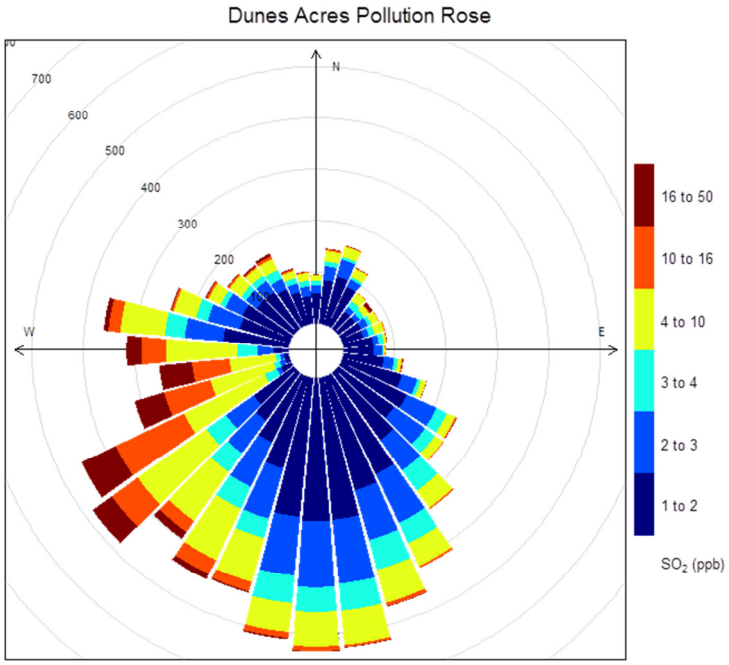
The Dune Acres Substation SO_2 monitor has been in operation for several decades. Table 2 reflects the overall reduction in SO_2 concentrations in the area as the 1-hour SO_2 design values have been trending downward consistently over the past ten years at the Dune Acres monitor. Design values represent the 99% percentile of the 1-hour daily maximum concentrations, averaged over three years. The Dune Acres monitored 1-hour SO_2 design values have been less than 50% of the 1-hour SO_2 NAAQS of 75 ppb over the past several years.

Table 2: 1-Hour SO_2 Design Values (ppb)
for the Dune Acres Monitor (2006 – 2015)

Monitor ID	06 - 08	07 - 09	08 - 10	09 - 11	10 - 12	11 - 13	12 - 14	13 - 15
18-127-0011	66	65	65	52	47	39	33	34

Figure 4 shows the pollution roses from 2012 through 2014, indicating higher SO_2 concentrations monitored at Dune Acres, while well below the 1-hour SO_2 standard, come from the west and west-southwest.

Figure 4: Pollution Rose for Dune Acres SO_2 Monitor – 2012-2014



Burns Harbor is proposing to locate an SO_2 monitoring station along the western property boundary at the Port of Indiana Fishing Area based on the 1-hour SO_2 modeling results. This monitor in addition to the existing NIPSCO's Dune Acres SO_2 monitor will constitute an adequate SO_2 monitoring network for the area surrounding Burns Harbor and NIPSCO-Bailly.

5.0 Model Selection

5.1 AERMOD Dispersion Model

In accordance with Appendix A of Appendix W to 40 Code of Federal Regulations (CFR) Part 51, IDEM used the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) version 15181 to model Burns Harbor. U.S. EPA's SO_2 NAAQS Designations Modeling TAD, specific to the attainment designation modeling, recommends using actual stack heights when modeling actual emissions instead of following the GEP stack height requirement. U.S. EPA's Building Profile Input Program-PRIME (BPIP-PRIME) will be used to account for any building downwash concerns.

5.2 AERMAP

The AERMOD terrain preprocessor mapping program, AERMAP, was used to determine the elevation terrain heights for the receptor, building, and source locations using the Universal Transverse Mercator (UTM) coordinate system. AERMAP version 11103 assigned the elevations from the National Elevation Dataset (NED) using the North American Datum (NAD)

1983 as recommended in 40 CFR Part 51, Revision to the Guideline on Air Quality Models, Appendix W and later revised in the AERMOD Implementation Guide. The Auer Land Use Classification Scheme was used to determine a rural land use in the area.

6.0 Receptor Grid and Modeling Domain

The receptor grid and modeling domain was based on guidance provided in the memorandum "Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standards", dated March 20, 2015, and the SO_2 NAAQS Designations Modeling TAD. IDEM used a multi-nested rectangular receptor grid with appropriate spacing of receptors based on the distance from the modeled emission points to detect significant concentration gradients. IDEM did not have maximum modeled 1-hour SO_2 impacts or source-culpable modeled violations that extended out beyond 10 kilometers from Burns Harbor.

- Receptor spacing at the Burns Harbor fence line was placed every 50 meters
- Receptor spacing at 100 meters out to a distance of 3,000 meters (3 kilometers)
- Receptor spacing at 250 meters out to a distance of 5,000 meters (5 kilometers)
- Receptor spacing at 500 meters out to a distance of 10,000 meters (10 kilometers)

Based on the SO_2 NAAQS Designations Modeling TAD, Section 4.2, IDEM only placed modeling receptors where it is feasible to place a monitor. Areas over bodies of water or areas where a monitor could not be located and operated were not included as part of the receptor grid.

7.0 Meteorological Data

7.1 AERMET

As stated in 40 CFR Part 51, Appendix W, Section 8.3.1.2 and the SO_2 NAAQS Designations Modeling TAD, Indiana used three years (2012-2014) of on-site meteorological data taken from the Gary-IITRI surface data and upper air meteorological data from the Lincoln, Illinois National Weather Service station which were processed with the latest version of the AERMOD meteorological data preprocessor program AERMET (version 15181).

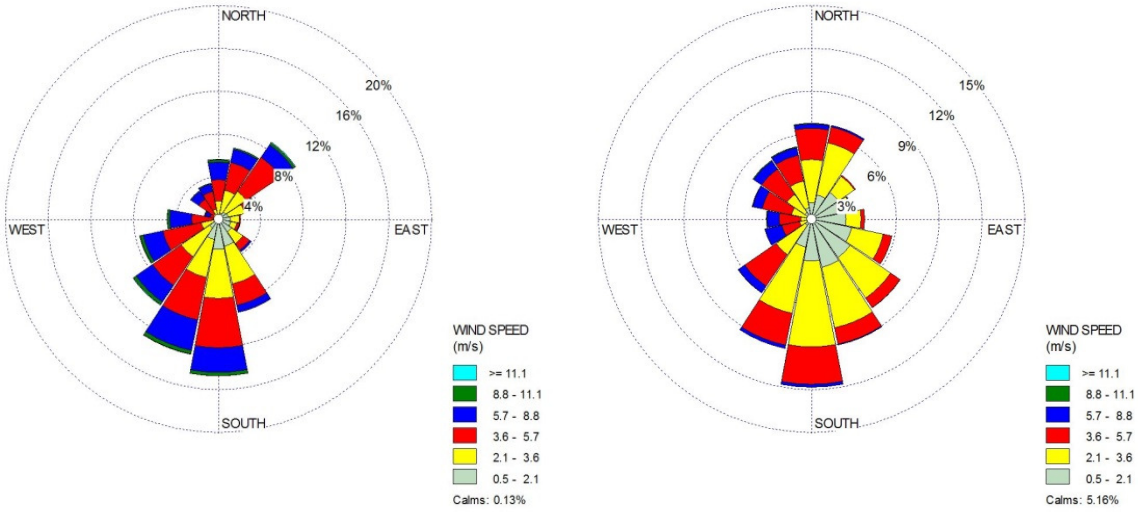
Surface meteorological data from the Gary-IITRI site and upper air meteorological data from Lincoln, Illinois were used to accurately account for the influence of lake breezes from Lake Michigan on the meteorological conditions in the area immediately surrounding the Burns Harbor facility. Besides the influence from the lake breezes on pollutant transport and dispersion, synoptic meteorology dominates pollutant dispersion in the area surrounding Burns

Harbor. There are no other significant geographic influences on the meteorology in the area that would complicate the placement of monitoring sites in this area.

The Gary-IITRI and Dune Acres wind roses for the 3-year modeled period (2012-2014) are shown in Figure 5. Both wind roses depict the north and north-northeast wind direction associated with the lake breeze influence and the predominant wind direction from the south and south-southwest associated with the land breeze influence.

Figure 5: Cumulative Wind Rose (2012 – 2014)

Gary IITRI **Dune Acres**



7.2 AERMINUTE/AERSURFACE

The 1-minute wind speeds and wind directions, taken from the Automated Surface Observing System (ASOS) NWS stations and onsite meteorological stations, were processed with U.S. EPA's 1-minute data processor program AERMINUTE version 15272.

U.S. EPA's program AERSURFACE version 13016 was used to determine the surface characteristics; albedo, Bowen ratio, and surface roughness for the South Bend NWS meteorological tower location corresponding with the Gary-IITRI onsite meteorological data. Surface characteristics were determined for each of 12 wind direction sectors with a recommended default radius of one kilometer.

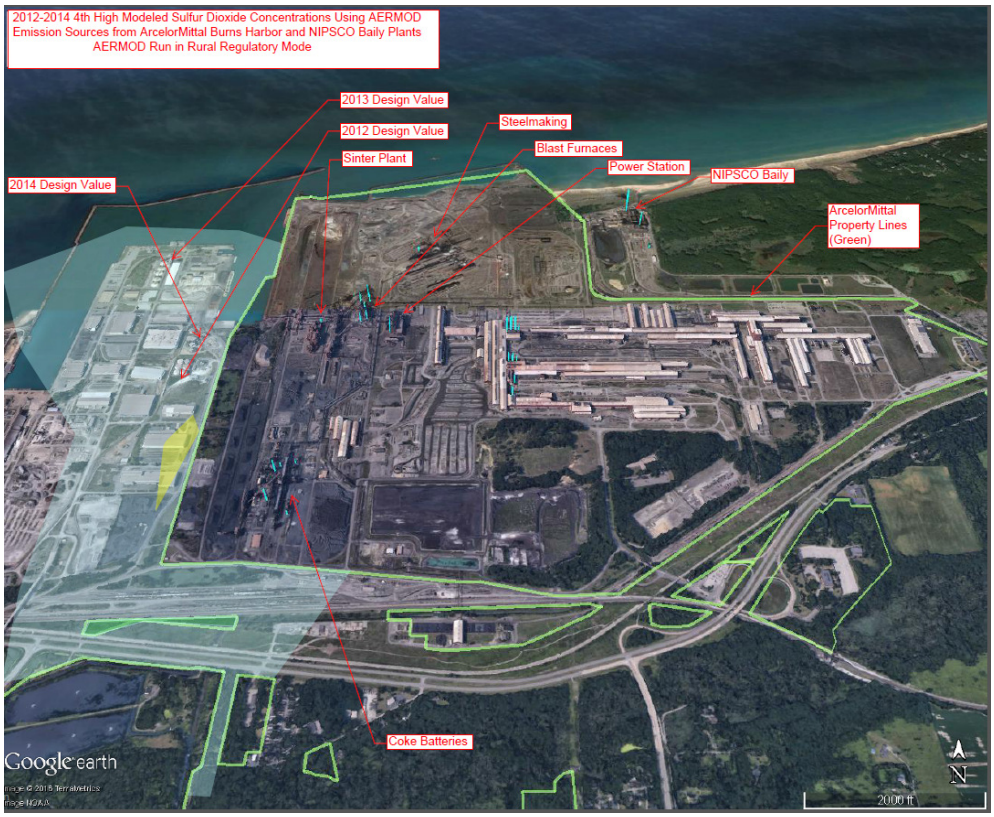
The albedo and the Bowen ratio surface characteristics were adjusted during the three winter months of January, February, and December in accordance with the U.S. EPA Region V document, "Regional Meteorological Data Processing Protocol," dated May 6, 2011.

8.0 Modeling Results

Figure 6 shows the maximum modeled 4th high concentrations, based on modeling conducted by OCS Environmental, Inc., the consulting firm representing Burns Harbor. The results indicate a maximum concentration "hot spot" along the western property boundary of Burns Harbor extending west over the Port of Indiana. Emission source groups are indicated on the map as well as the highest modeled concentrations over the three-year modeled period. Highest concentrations were shown to occur to the west-northwest and west of the facility in the vicinity of the potential SO_2 monitoring site.

The Port of Indiana owns the area west of Burns Harbor. The Port of Indiana represents an industrialized area with numerous businesses located in the area. There is limited property available to properly site an ambient air monitor. Locations in which to place an SO_2 monitor, within the maximum modeled concentration area, have been determined but a location has not yet been secured for leasing to install the monitoring equipment and shelter. Each of these locations have the accessibility and available resources to meet the DRR monitoring deadline to procure, install and operate the monitoring equipment to adequately characterize air quality in the area immediately surrounding Burns Harbor.

Figure 6: ArcelorMittal Modeled Results with Emission Sources and Maximum Impacts



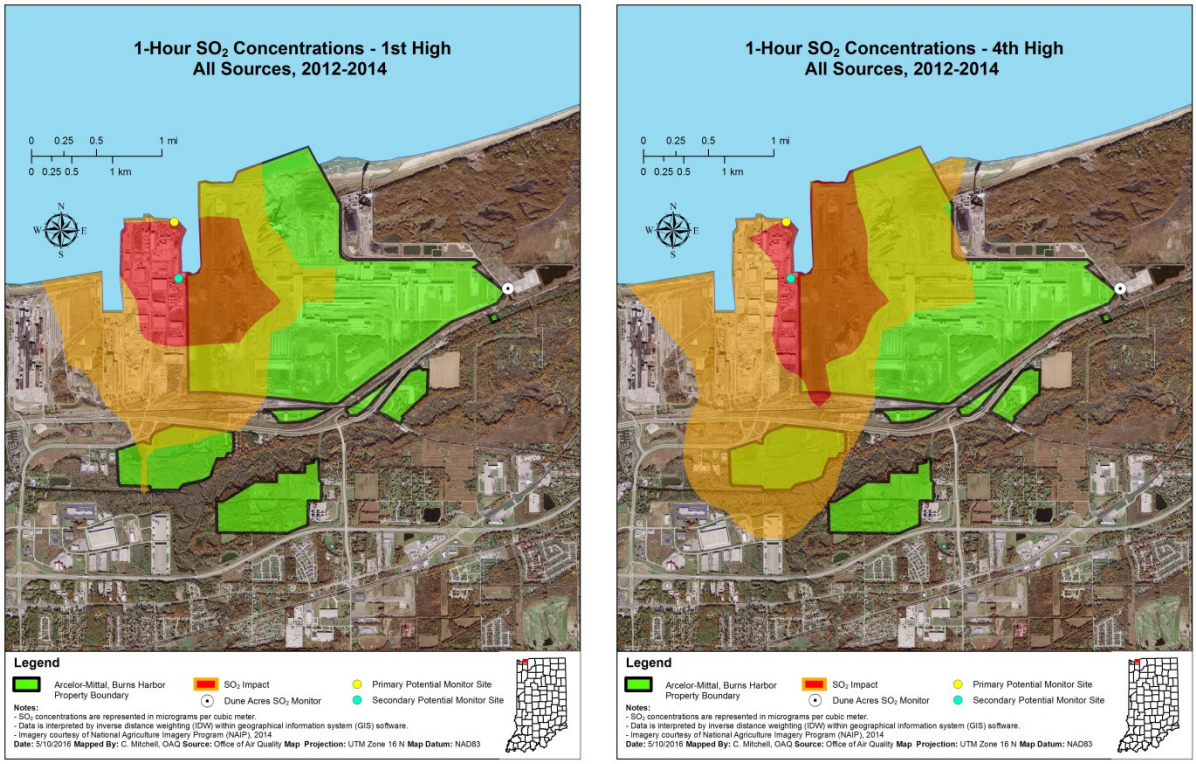
A culpability study was conducted to determine which emission source groups had the largest modeled impact in the maximum concentration "hot spot" zone. The Burns Harbor emission units culpable for the maximum SO_2 impacts are the Power Station Boilers #8 – 12, with approximately 44% of the modeled concentrations coming from these units, as shown in Table 3. All other Burns Harbor emission units contribute less than 10% for each emission unit grouping. Therefore, locating an ambient SO_2 monitor near the Power Station Boilers, where the maximum modeled 1-hour SO_2 impacts from Burns Harbor occur, would be appropriate. The proposed SO_2 monitoring location, west and west-northwest of the Power Station Boilers, would adequately capture SO_2 impacts from the majority of the largest contributing SO_2 emission sources and characterize the air quality in the area.

Table 3: Burns Harbor Culpable Source SO_2 Modeling

Source	Percent Contribution
Power Station Boiler Nos. 8 through 12	43.8%
C Furnace Stoves	9.3%
Background	8.3%
D Furnace Stoves	7.8%
Sinter Plant Windbox Scrubber Stack	6.5%
C Furnace BFG Flare	6.5%
D Furnace BFG Flare	4.8%
NIPSCO Bailly Unit 7/8: Main Stack at 2012-2014 Actual CEM Emissions File Main Stack	3.4%
ALL OTHERS LESS THAN 3% CONTRIBUTION	

Figure 7 shows the maximum modeled 1st and 4th high concentration isopleths as modeled by IDEM, indicating clear maximum concentration gradients along the western and west-northwest property boundary of Burns Harbor. The modeling results compare favorably with the Burns Harbor modeling, conducted by OCS Environmental, Inc., shown previously in Figure 5.

Figure 7: Map of Burns Harbor Modeling Results for Potential SO_2 Monitors Sites: 1st and 4th High Maximum Daily 1-hour SO_2 Concentrations



Burns Harbor has researched the Port of Indiana area to determine appropriate locations for an SO_2 monitor within the maximum 1-hour SO_2 concentration "hot spot". Two potential monitoring sites were found: a fishing area in the northern portion of the port and an existing

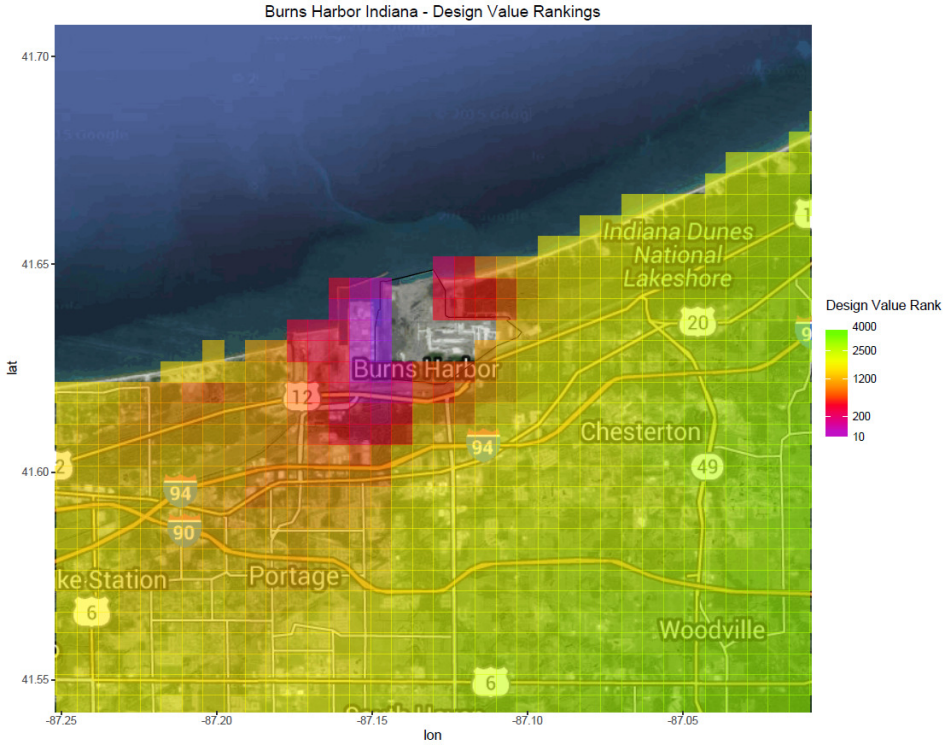
lead monitor site located in the Port of Indiana, directly west of the Power Stations and Blast Furnaces emission units at Burns Harbor. These two sites fall within the maximum modeled 1st and 4th high concentration zones and would provide accurate assessment of the 1-hour SO_2 air quality in the area. The sites are located close to each other, representing a similar localized air shed and should not be considered for two separate monitoring sites. There are concerns with locating an SO_2 monitor at the lead monitoring site due to its proximity to a rail line and service roadway. There is also concern about the time necessary to secure a lease agreement with the Port of Indiana in order to acquire the land needed to set up the ambient air SO_2 monitor by January 1, 2017.

8.1 Modeling to Inform Monitoring Placement

IDEM conducted modeling that closely followed U.S. EPA's SO_2 NAAQS Designations Monitoring TAD, Appendix A guidance, which provided an example of using dispersion modeling to inform monitoring placement of ambient monitors. The Burns Harbor hourly emissions were modeled, but emissions were not normalized due to the fact that variable emission rates at several of the emission units within Burns Harbor were modeled. Elements of the Monitoring TAD, Appendix A, analysis were used to evaluate the modeling results and the frequency of the highest maximum 4th high modeled concentrations which occur along the west-northwest and western property lines of Burns Harbor. With Lake Michigan to the north of Burns Harbor and no modeling receptors placed over the lake, the maximum modeled impacts occur directly west of the facility, over the Port of Indiana. This area will be the focus of the analysis for Data Requirement Rule purposes.

The first step in the analysis was to model Burns Harbor and all other large SO_2 emission sources in the area to determine the design values at each receptor. This provided a means to understand the relative magnitude of ambient SO_2 concentration across the area. The design value represents the 3-year average of each year's 4th daily highest 1-hour maximum concentration. This is the equivalent of the 99th percentile of the daily 1-hour maximum concentrations. Figure 8 shows the plot map of the area surrounding Burns Harbor. The design values were ranked from highest to the lowest. The rankings were plotted on the map which shows the highest modeled design values occurred on the western property lines of Burns Harbor and over the industrialized Port of Indiana area.

Figure 8: Plot Map of SO_2 Design Values for the Area Surrounding Burns Harbor



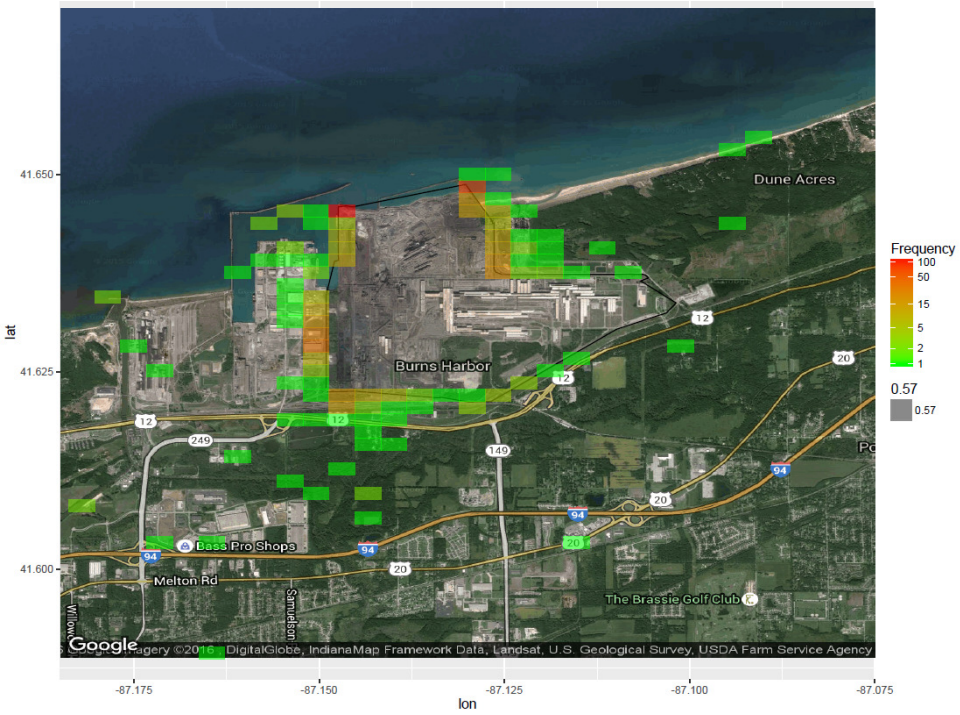
Step Two in the analysis was to determine the receptors with the highest frequency of days having the daily 1-hour maximum concentrations. Table 4 shows the receptors with the highest frequency of days with the maximum modeled SO_2 impacts and their ranking.

Table 4: Top 20 Ranking of Receptors With Highest Frequency of Days with Maximum Modeled SO_2 Impacts

Rank	UTM E	UTM N	Number of Days	Rank	UTM E	UTM N	Number of Days
1	487879.6	4610468	110	**10**	487582.8	4608824	17
2	489155	4610783	78	**10**	489205	4610696	17
3	487582.6	4608574	36	**13**	487850	4607750	16
4	487582.7	4608624	28	**13**	487582.6	4608474	16
4	487582.8	4608724	28	**13**	487582.9	4608924	16
6	487582.6	4608524	21	**13**	489230	4610653	16
6	487582.7	4608674	21	**17**	489472.2	4609649	15
6	489564.5	4609514	21	**17**	489472.5	4609699	15
9	489472.8	4609749	18	**19**	487582.9	4608873.9	14
10	487582.8	4608774	17	**19**	489473.1	4609799.1	14

Figure 9 shows the cumulative number of days for each receptor that modeled the highest frequency of days with the daily 1-hour maximum concentration among all receptors. The receptors with the highest frequencies of the daily 1-hour maximum concentrations occur northwest, west and northeast of Burns Harbor. The area adjacent to Burns Harbor is the NIPSCO – Bailly Generating Station property, located east and northeast. NIPSCO – Bailly operates an SO_2 monitoring station, along the east property line of Burns Harbor.

Figure 9: Map of Cumulative Number of 1-Hour SO_2 Daily Maximum Days



Priority was given to creating a list of receptors for consideration for locating an SO_2 ambient air monitoring site that would characterize air quality in the area immediately surrounding Burns Harbor. The scoring strategy recommended in Appendix A of the Monitoring TAD was followed. There are several steps in the process:

- Calculate the modeled design values for each of the receptors
- Rank the receptors from highest to lowest modeled design value (Concentration Rank)
- Using the MAXDAILY output option in AERMOD to determine each modeled day's highest concentration at each receptor
- Determine the number of days each receptor is the highest concentration for that day
- Rank the results (from highest to lowest) of the number of days each receptor had the highest concentration for each day during the 3-year modeled period (Frequency Rank)

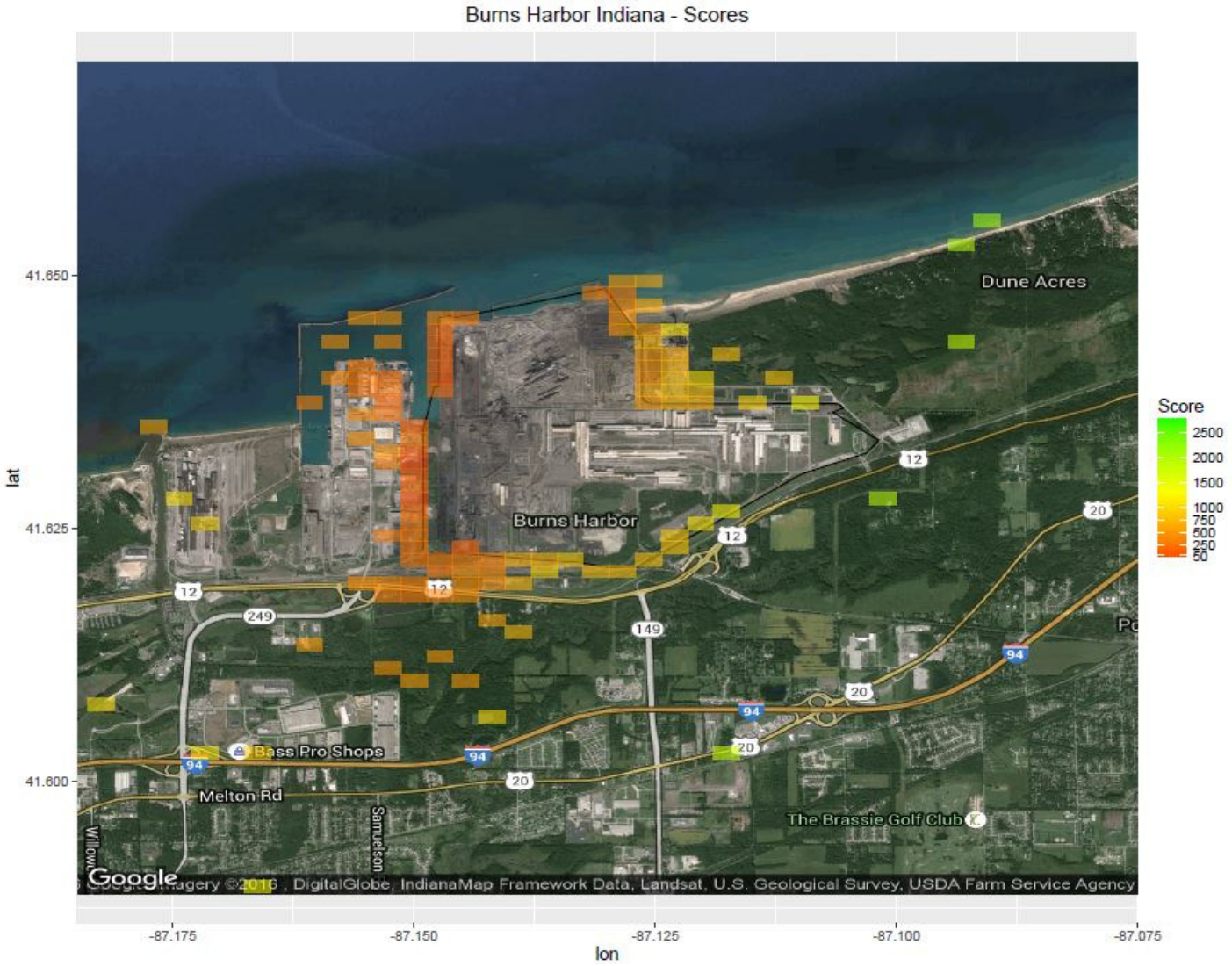
- For each receptor, add the Concentration Rank and Frequency Rank scores to determine which receptor had an overall score where the lowest possible score would have the highest overall design value and highest number of days where the receptor had the highest modeled concentration. Those receptors would represent prime locations for an ambient air monitor.

This analysis can be used to define specific receptors that are more prone to encounter higher modeled concentrations and would be prime candidates for siting an ambient air monitor. Table 5 below details the overall scoring results while Figure 10 shows the scoring results based on the location and rank of the receptors. This evaluation provided valuable information in helping to establish a monitor that will best characterize air quality in the area near Burns Harbor.

Table 5: Overall Scoring of Maximum Design Value/Frequency of Maximum Days

UTM E	UTM N	Concentration	Frequency	Frequency	Overall	Score
X receptor	Y receptor	Rank	Rank	of Max Days	Score	Rank
487582.7	4608623.9	3	4	28	7	1
487582.8	4608723.9	7	5	28	12	2
487582.6	4608573.9	9	3	36	12	2
487582.7	4608673.9	8	7	21	15	4
487582.8	4608773.9	6	10	17	16	5
487582.9	4608923.9	2	15	16	17	6
487582.6	4608523.9	12	6	21	18	7
487582.8	4608823.9	11	11	17	22	8
487582.9	4608873.9	4	19	14	23	9
487582.6	4608473.9	16	14	16	30	10
487724	4609770.9	1	30	10	31	11
487582.5	4608423.9	17	22	13	39	12
487582.9	4608973.9	14	29	10	43	13
487582.5	4608373.9	24	36	8	60	14
487879.6	4610467.9	70	1	110	71	15
487679.4	4609703.6	18	54	5	72	16
487850	4607850	49	26	11	75	17
487724.1	4609870.9	36	40	7	76	18
487583	4609073.9	27	53	5	80	19
487724.1	4609820.9	26	63	4	89	20

Figure 10: Plot Map of Overall Scoring of Maximum Design Value/Frequency of Maximum Days



9.0 Summary for Results for Burns Harbor Monitor Placement

ArcelorMittal - Burns Harbor is located at 250 West US Highway 12, Burns Harbor, Westchester Township in Porter County, Indiana. Burns Harbor is an integrated steel mill consisting of two blast furnaces, three hot strip mill furnaces, plate mill furnaces, two coke batteries, three basic oxygen furnaces (BOF) hot metal desulfurization steel making processes, five power station boilers, and a sinter plant. Burns Harbor was identified as one of the Indiana sources that met the Data Requirements Rule criteria of emitting 2,000 tons or more of SO_2 in 2014 (12,189 tons).

As per the requirements of the DRR, air agencies are required to indicate by July 1, 2016 which of the following three options they will rely on to characterize air quality in the area surrounding the DRR source: 1) ambient monitoring, 2) air quality modeling or 3) establishing a limit of a source's total SO_2 emissions to below 2,000 tons per year. Burns Harbor wishes to characterize air quality in the area immediately surrounding the facility through the use of ambient air quality monitoring. Burns Harbor has submitted its SO_2 DRR Monitoring Quality Assurance Project Plan (QAPP) to IDEM's monitoring branch in order for it to be included in IDEM's 2017 Ambient Air Monitoring Network Plan. This plan will be submitted to U.S. EPA by July 1st.

IDEM conducted air dispersion modeling, consistent with U.S. EPA's SO_2 NAAQS Designations Modeling and Monitoring Technical Assistance Documents (TADs) to determine the most appropriate location for the SO_2 monitor that is representative of ambient air accessible to the public and best characterizes ambient air quality in the area. Based on the recommended analysis in Appendix A of the Monitoring TAD for conducting modeling to inform monitoring placement, scoring results concluded maximum SO_2 impacts and receptors with frequencies of highest number of days with the highest concentration for each modeled day occurred most often along Burns Harbor's western property line. The adjacent area west of Burns Harbor is the Port of Indiana, an industrialized area with limited accessibility and few viable options for appropriately locating an ambient air monitor.

Burns Harbor has identified two locations that fall within the highest ranked area to capture the highest SO_2 impacts from Burns Harbor and surrounding SO_2 emission sources impacting the area. As mentioned previously, air quality is fairly consistent throughout the area west of Burns Harbor based on the 1st and 4th high modeling results. One of the two proposed sites would suffice in characterizing air quality in the area.

Options for a proposed monitoring site location along with approximate coordinates are presented in Appendix B. Either of these sites will adequately characterize air quality in the area and support designation of the area for 1-hour SO_2 under the Data Requirements Rule provisions.

Appendix A

Point and Volume Source Emissions Inventory Modeled for Burns Harbor DRR Analysis

Table A.1 Point Sources Modeled for the Data Requirements Rule Air Quality Characterization for Burns Harbor									
		Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter	SO2
Source ID	Source Description	(m)	(m)	(m)	(ft)	(°F)	(m/s)	(ft)	(tpy)
6	Burns Harbor - POWER STATION BOILER #9 (8-12 INCLUDED)	488403	4609297	201.63	223.0	450.0	13.9	11.5	7324.1
59	Burns Harbor - STEELMAKING HMD STATION #2	488512	4609940.1	176.66	85.0	90.0	5.9	10.0	12.4
2501	Burns Harbor - Power Station Boiler #7	488405.1	4609254.67	200.52	223.0	450.0	14.4	10.5	1555.4
3018	Burns Harbor - BATTERY #1 PECS	488053.26	4608389.39	198.69	100.0	190.0	25.3	8.0	60.1
3024	Burns Harbor - BATTERY #2 PECS	488059.09	4608115.47	196.57	88.0	190.0	25.3	8.0	63.1
3026	Burns Harbor - #1 Underfire Coke Oven	487967.91	4608346.21	195.67	252.0	550.0	9.1	12.4	2332.7
3027	Burns Harbor - #2 Underfire Coke Oven	487958.62	4608190.52	193.96	249.0	550.0	9.1	13.3	2696.0
3091	Burns Harbor - Coke Oven Export Gas Flare	487988	4608372	195.96	100.0	3000.0	9.4	3.0	2.1
3513	Burns Harbor - SINTER PLANT WINDBOX SCRUBBER STACK	488038.33	4609328.76	200.37	79.0	120.0	13.9	17.0	1193.2
3540	Burns Harbor - C Furnace BFG Flare 2 flareheads	488274.8	4609359	207.62	210.0	1500.0	41.6	5.0	775.8
3547	Burns Harbor - C Furnace Stoves/Stacks (4 stoves)	488244.31	4609338.62	208.42	201.0	500.0	15.8	11.4	660.4
3553	Burns Harbor - D Furnace BFG Flare 2 flareheads	488278.28	4609495.5	199	210.0	1500.0	41.6	5.0	775.8
3560	Burns Harbor - D Furnace Stoves/Stacks (4 stoves)	488229.23	4609495.55	197.3	201.0	500.0	14.9	11.8	392.0
4002	Burns Harbor - STEELMAKING HMD STATION #1	488512.1	4609935.55	176.71	85.0	90.0	12.9	6.7	12.2
4008	Burns Harbor - STEELMAKING HMD STATION #3	488514.6	4609952.1	176.53	40.0	115.0	12.9	8.7	12.4
6502	Burns Harbor - 160" PM #7 IN/OUT REHEAT FURNACE	489042.18	4608913.72	197	108.0	950.0	10.0	7.3	0.2
6503	Burns Harbor - 160" Plate Mill #1 Slab Reheat Furnace	489013.97	4609042.93	197	178.0	750.0	4.4	10.2	201.4

6504	Burns Harbor - 160" Plate Mill #2 Slab Reheat Furnace	489035	4609042.91	197	178.0	750.0	4.1	10.5	0.5
6505	Burns Harbor - 160" PM #8 BATCH FURNACE	489042.16	4608893.61	197	167.0	750.0	3.0	5.7	0.0
6509	Burns Harbor - 160" PM #5 IN/OUT REHEAT FURNACE	489053.88	4609038.63	197	131.0	950.0	12.5	6.4	0.0
7001	Burns Harbor - 110" Plate Mill #1 & 2 Stack	489029.59	4608810.75	197	179.0	1050.0	2.1	14.6	1.0
90A	Burns Harbor - HOT STRIP MILL #1 WALKING BEAM FCE E	489029.2	4609235.4	197	315.0	1000.0	7.1	10.5	118.4
90B	Burns Harbor - HOT STRIP MILL #1 WALKING BEAM FCE W	489009	4609235	197	315.0	1000.0	7.1	10.5	118.4
91A	Burns Harbor - HOT STRIP MILL #2 WALKING BEAM FCE E	489051.1	4609235.7	197	315.0	1000.0	7.0	10.5	125.8
91B	Burns Harbor - HOT STRIP MILL #2 WALKING BEAM FCE W	489030.1	4609235.4	197	315.0	1000.0	7.0	10.5	125.8
92A	Burns Harbor - HOT STRIP MILL #3 REHEAT FURNACE STACK E	489069	4609235.6	197	136.0	1000.0	8.8	13.0	122.7
92B	Burns Harbor - HOT STRIP MILL #3 REHEAT FURNACE STACK W	489053.1	4609235.7	197	136.0	1000.0	8.8	13.0	122.7
BOIL12	Michigan City	507543	4618923	177.84	505.0	293.7	30.4	21.0	15990.6
U78FGD	NIPSCO Baily	489738	4610321	186.28	480.0	130.0	26.6	20.5	1116.8
U10CT	NIPSCO Baily	489833	4609968	188.09	40.0	829.0	18.8	14.0	0.0
AUX12	NIPSCO Baily	489805	4610184	188.22	300.0	550.0	17.8	6.0	0.0
BFCCHBH	NIPSCO Baily	488262	4609414	204.53	213.3	500.0	24.7	5.1	130.7
BFDCGBG	NIPSCO Baily	488263	4609553	193.75	231.8	500.0	24.7	5.1	130.7
94011	Sinter Plant Windbox	473218	4607057	182.33	185.0	235.0	20.2	11.3	700.5
940541	TBBH Boiler 1	472661	4607149	181.7	150.0	570.0	14.5	12.0	69.6
940542	TBBH Boiler 2	472661	4607136	181.69	150.0	570.0	14.5	12.0	123.0
940543	TBBH Boiler 3	472661	4607123	181.69	150.0	570.0	14.5	12.0	117.2

940545	TBBH Boiler 5	472661	4607096	181.7	150.0	570.0	14.5	12.0	61.8
94017	84 HSM Reheat Furnaces	468755	4608668	179.65	163.0	803.0	50.8	8.1	63.7
940121	No. 4 BH Boiler 1	472592	4607817	181.01	116.0	370.0	18.8	9.5	146.9
940122	No. 4 BH Boiler 2	472592	4607792	181.7	116.0	370.0	18.8	9.5	168.1
940123	No. 4 BH Boiler 3	472592	4607767	181.7	116.0	370.0	18.8	9.5	112.5
940401	CPBH Boiler 8	474393	4606802	184.13	309.0	505.0	5.7	10.0	23.5
940402	CPBH Boiler 9	474436	4606850	183.77	200.0	505.0	5.7	9.2	12.7
940403	CPBH Boiler 10	474436	4606866	183.9	200.0	505.0	5.7	9.2	12.7
94070	Tail Gas Incinerator	474470	4606815	183.01	320.0	1150.0	22.9	1.9	37.9
94026	No. 2 Underfiring	473903	4606522	183.01	350.0	204.0	3.2	20.0	118.3
94038	CPBH Boiler 6	474362	4606775	184.12	133.0	505.0	5.3	8.5	23.5
94037	CPBH Boilers 4 an 5	474337	4606775	184.1	133.0	505.0	5.3	8.5	23.5
94066	No. 14 BF Casthouse	472643	4607841	180.63	165.0	134.0	20.4	13.0	736.9
94020	No. 14 BF Stoves	472696	4607680	181.8	250.0	126.0	6.2	15.5	85.6
94053	TBBH Boiler 6	472655	4607079	181.6	150.0	440.0	12.2	12.0	73.8
94039	Coke Plant Boiler No. 7	474370	4606803	184.1	105.0	505.0	5.1	8.5	23.5
94036	Coke Plant Boiler No. 3	474315	4606782	184.1	129.0	505.0	9.3	6.2	23.5
94021	No. 4 BF Stoves	472694	4606861	181.37	225.0	107.0	3.5	12.8	64.8
94022	No. 6 BF Stoves	472697	4607006	181.48	225.0	116.0	8.1	12.8	108.1
94023	No. 8 BF Stoves	472701	4607166	181.72	250.0	105.0	5.9	12.8	43.2

94041	No. 1 BOP HM Desulf	472325	4606631	180.56	80.0	80.0	22.8	10.2	43.4
94007	Sinter Cooler	473194	4607100	182.2	100.0	360.0	18.9	18.0	101.4
USPRECA	Precarbon #2 (by Coke Battery #2) includes CASP C	473933	4606552	183	164.0	440.3	10.0	6.6	4.2
USBFGFL	BFG Flare Stacks (closer to BF #4)	472724	4606895	181.5	656.2	1200.0	10.0	16.4	63.3
94045	No. 2 QBOP HM Desulf	472524	4607641	181.9	55.0	137.0	16.3	3.8	34.7
940TBBOIL6		472665	4607079	181.6	150.0	440.0	12.2	12.0	73.8
94045QBOP2		472524	4607641	181.87	55.0	137.0	16.3	3.8	34.7
940CB5	Coke Battery #5	473200	4606400	181.87	250.0	440.0	4.4	10.0	58.2
940CB7	Coke Battery #7	473200	4606600	181.9	250.0	500.0	5.6	10.0	70.6

Table A.2 Volume Sources Modeled for the Data Requirements Rule Air Quality Characterization for Burns Harbor								
Source ID	**Source Description**	**Easting (X)**	**Northing (Y)**	**Base Elevation**	**Release Height**	**Horizontal Dimension**	**Vertical Dimension**	**SO2**
		(m)	**(m)**	**(m)**	**(ft)**	**(ft)**	**(ft)**	**(tpy)**
133	Burns Harbor - C Furnace Slag Pit Loadout Fugitives	488222	4609449	200.7	164.0	52.5	12.0	1114.5
134	Burns Harbor - D Furnace Slag Pit Loadout Fugitives	488220	4609591	190.0	164.0	52.5	12.0	1088.1
FE101	Burns Harbor - Fugitives	488022.5	4608137.9	195.2	53.9	44.6	25.1	0.5
FE102	Burns Harbor - Fugitives	488023.4	4608163.5	195.5	53.9	44.6	25.1	0.5
FE103	Burns Harbor - Fugitives	488022.8	4608185.1	195.8	53.9	44.6	25.1	0.5
FE104	Burns Harbor - Slab Yard 3 Hot Strip Mill Roof Monitor	488023.1	4608208.7	196.0	53.9	44.6	25.1	0.5
FE105	Burns Harbor - Slab Yard 2 Hot Strip Mill Roof Monitor	488024.3	4608231.3	196.3	53.9	44.6	25.1	0.5
FE201	Burns Harbor - Hot Strip Mill Furnace 1 Fugitive	488012.9	4608305.6	196.6	55.0	44.7	25.6	0.5
FE202	Burns Harbor - Hot Strip Mill Furnace 2 Fugitives	488013.2	4608327.3	196.9	55.0	44.7	25.6	0.5
FE203	Burns Harbor - Hot Strip Mill Furnace 3 Fugitives	488012.7	4608349.1	196.9	55.0	44.7	25.6	0.5
FE204	Burns Harbor - Hot Strip Mill Roof Monitor	488013.1	4608375.5	197.0	55.0	44.7	25.6	0.5
FE205	Burns Harbor - Fugitives	488013.9	4608397.5	197.0	55.0	44.7	25.6	0.5
BFDCHFUG	Burns Harbor - Blast Furnace D Casthouse Fugitives	488240.5	4609560.6	192.6	81.1	70.2	11.5	14.5
BFCCHFUG	Burns Harbor - Blast Furnace C Casthouse Fugitives	488242.5	4609426.3	203.2	81.1	70.2	11.5	14.5
447110	#4 Blast Furnace Casthouse Fugitives (1)	472679.54	4606687.39	179.8	59.4	14.1	28.9	6.7
447210	#4 Blast Furnace Casthouse Fugitives (2)	472685.4	4606667.67	179.8	59.4	14.1	28.9	6.7
447310	#4 Blast Furnace Casthouse Fugitives (3)	472691.27	4606647.95	179.8	59.4	14.1	28.9	6.7
447410	#6 Blast Furnace Casthouse Fugitives (1)	472683	4606847.98	179.8	57.4	14.1	28.9	6.5
447510	#6 Blast Furnace Casthouse Fugitives (2)	472688.87	4606828.26	179.8	57.4	14.1	28.9	6.5

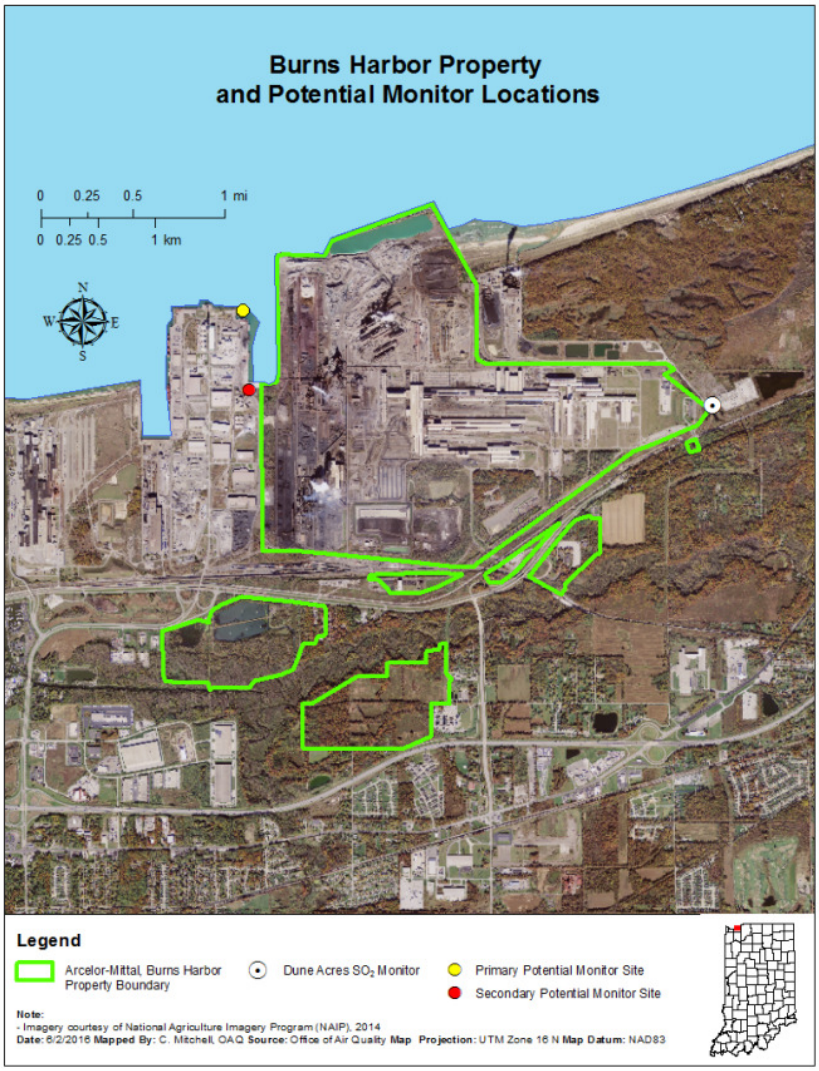
447610	#6 Blast Furnace Casthouse Fugitives (3)	472694.73	4606808.54	179.8	57.4	14.1	28.9	6.5
447710	#8 Blast Furnace Casthouse Fugitives (1)	472686.66	4606991.88	179.8	56.4	14.1	27.5	5.9
447810	#8 Blast Furnace Casthouse Fugitives (2)	472692.52	4606972.16	179.8	56.4	14.1	27.5	5.9
447910	#8 Blast Furnace Casthouse Fugitives (3)	472698.38	4606952.44	179.8	56.4	14.1	27.5	5.9
448110	#13 Blast Furnace Casthouse Fugitives (1)	472710.63	4607478.29	179.8	112.9	21.0	52.5	13.0
448210	#13 Blast Furnace Casthouse Fugitives (2)	472713.07	4607461.22	179.8	112.9	21.0	52.5	13.0

Appendix B

Potential Monitoring Site:

Map and Coordinates

Figure B.1: Map of Burns Harbor Property Lines and SO_2 Monitor Location Options



Primary SO_2 monitoring site is the Port of Indiana Fishing Area:
Latitude 41.641466 ^{o} Longitude -87.1510663^{o}
UTM coordinates: 487419.09 E 4609980.87 N

Secondary SO_2 monitoring location (co-located with Pb monitor (18-127-0027):
Latitude 41.63518 ^{o} Longitude -87.150367 ^{o}
UTM coordinates: 487476.09 E 4609283.00 N

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Enclosure 3

Appendix C from the Proposed Indiana 2017 Ambient Air Monitoring Plan

June 2016

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Appendix C

SO_2 DRR – Data Requirements Rule

Introduction

The SO_2 primary NAAQS was strengthened June 22, 2010. The 1-hour standard is 75 ppb. After U.S. EPA establishes or revises a primary and/or secondary NAAQS, the Clean Air Act requires U.S. EPA to designate areas as "attainment" (meeting), "nonattainment" (not meeting), or "unclassifiable" (insufficient data) after monitoring data is collected by state, local and tribal governments. Once SO_2 nonattainment area designations take effect, state and local governments have 18 months to develop State Implementation Plans, (SIPs) outlining how areas will attain and maintain the standards by reducing air pollutant emissions contributing to SO_2 concentrations.

Overview

In the initial round (Round 1) of nonattainment designations in 2010 parts of five Indiana counties were deemed nonattainment for SO_2 (see Figure 11, page 57 of the 2017 ANP).

In response to court-order, the U.S. EPA must complete remaining designations in three additional rounds: Round 2 by July 2, 2016, Round 3 by December 31, 2017, and Round 4 by December 31, 2020. U.S. EPA will complete these designations by designating areas as either nonattainment, attainment, or unclassifiable.

The court-order directs U.S. EPA to designate two groups of areas under Round 2 air quality designations for the 2010 primary 1-hour SO_2 NAAQS: (1) areas that have current monitored design values in violation of the NAAQS not previously designated during Round 1, and (2) areas containing stationary sources that had not been announced as of March 2, 2015 for retirement and that according to the U.S. EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2, or more than 2,600 tons of SO_2 with an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU).

On August 10, 2015 U.S. EPA established a timetable and other requirements for state, local and tribal air agencies to: (1) characterize current air quality in areas with large sources of sulfur dioxide (SO_2) emissions through monitoring or modeling techniques and (2) provide such air quality data to the U.S. EPA. At a minimum, air agencies must characterize air quality around sources that emit 2,000 tons per year (tpy) or more of SO_2. These data will be used in designations in Round 3 and Round 4.

This rule gives air agencies the flexibility to characterize air quality using either modeling of actual source emissions or using appropriately sited ambient air quality monitors. Indiana's SO_2 sources have been allowed to determine whether they will use modeling or monitoring to demonstrate compliance with the SO_2 Data Requirements Rule (DRR).

An air agency may avoid the requirement for air quality characterization near a source by adopting enforceable emission limits that ensure that the source will not emit more than 2,000 tpy of SO_2. These limits must be adopted and effective by January 13, 2017.

Indiana SO_2 Sources

Table 1 lists the major emission sources of SO_2 in Indiana and how the air quality characterization plan will be handled by the DRR. The colored highlighted sources have already been accounted and are not subject to the DRR. In Round 1, Townships in five counties have been designated nonattainment. In Round 2, five additional counties or portions of counties are Intended Nonattainment Areas or Intended Unclassifiable/Attainment Areas. The U.S. EPA will make the determination by July 2, 2016.

Two sources initially reported 2014 SO_2 emissions above 2,000 tpy making them subject to the DRR. After further analysis it was determined their 2014 SO_2 emissions were calculated incorrectly placing their 2014 emissions below the 2,000 tpy threshold. ESSROC Cement Corp. in Cass County and Tate & Lyle in Tippecanoe County corrected their 2014 emissions and provided the necessary documentation to support their claims.

ALCOA – Warrick Operations announced January 7, 2016 they would close their smelting operations in Warrick County by March 31, 2016. They missed the announced retirement deadline of March 2, 2015 and are subject to the DRR.

Isolatek International in Huntington has been added to the DRR list by the U.S. EPA due to an unresolved enforcement action.

Table 1 - Indiana Major SO_2 Sources & Air Quality Characterization Plans

County	Facility Name	2014 TPY	Approach
Cass	ESSROC Cement Corp	270	
Cass	Logansport Municipal Utilities	1,715	
Dearborn	Tanners Creek Generating Station	18,109	
Floyd	Gallagher Generating Station	3,524	Modeling
Gibson	Gibson Generating Station	22,055	
Huntington	Isolatek International	164	Modeling
Jasper	Schahfer Generating Station	8,412	Modeling
Jefferson	Cliffty Creek Generating Station	3,731	
Lake	Coke Engery LLC	4,952	Modeling
Lake	U.S. Steel - Gary Works	3,285	Modeling
Lake	Arcelomittal USA	2,163	Modeling
Lake	Indiana Harbor Coke	1,838	
Lake	Arcelomittal Indiana Harbor	1,587	
LaPorte	Michigan City Generating Station	15,991	
Marion	Harding Street Generating Station	29,855	
Monroe	Indiana University	1,740	
Morgan	Eagle Valley Generating Station	7,959	
Pike	Petersburg Generating Station	66,252	
Pike	Ratts Generating Station	8,550	
Porter	Arcelomittal Burns Harbor LLC	12,189	Monitoring
Porter	Bailly Generating Station	1,117	
Posey	AB Brown Generating Station	8,404	
Posey	SABIC Innovative Plastics	4,030	Modeling
Spencer	Rockport Generating Station	54,979	
Sullivan	Merom Generating Station	3,318	Modeling
Tippecanoe	Tate & Lyle	1,612	
Tippecanoe	Purdue University	1,118	
Vermillion	Cayuga Generating Station	3,448	Modeling
Vermillion	Eli Lilly - Clinton Labs	1,851	
Vigo	Wabash River Generating Station	26,828	
Warrick	ALCOA - Warrick Power Plant	4,993	Modeling
Warrick	ALCOA - Warrick Operations	3,500	Modeling
Warrick	Culley Generating Station	1,896	
Wayne	IMPA (RPL) Generating Station	1,158	

All coloring is based on 2014 TPY.

- Already accounted for in a nonattainment area. DRR not applicable. Round 1.
- Consent decree source. DRR not applicable. Round 2.
- Closed or closing. DRR not applicable.
- Below 2,000 TPY threshold. DRR not applicable.

3 options to characterize air quality:

- Modeling analysis submitted to U.S. EPA by January 13, 2017.
- Monitoring operational by January 1, 2017.
- Enforceable emissions limitations < 2,000 tpy adopted and effective by January 13, 2017.

By January 15, 2016, the DRR requires each air agency to submit to the relevant U.S. EPA Regional Administrator a final list identifying the sources in the state around which SO_2 air quality is to be characterized. This characterization will be performed for sources that exceeded 2,000 tpy of SO_2 emissions during the most recent year for which emissions data for the applicable sources are available. In addition, SO_2 characterization must be performed for areas identified by the air agency or by U.S. EPA as also warranting air quality characterization, such as clusters of sources where no single source emits greater than 2,000 tpy of SO_2. This is considered a permanent list of sources that excludes sources in areas designated as nonattainment before January 2016 and shall not be altered by designations after January 2016. Table 2 is taken from Table 1 and is a listing of the 12 sources of SO_2 in Indiana subject to the DRR.

Table 2:
Indiana SO_2 Sources Subject to Air Quality Characterization for the Round 3 Designation Process

County	Facility Name	2014 SO_2 Emissions (tons)
Floyd	Gallagher Generating Station	3,524
Huntington	Isolatek International	164
Jasper	Schahfer Generating Station	8,412
Lake	Coke Energy LLC	4,952
Lake	U.S. Steel – Gary Works	3,285
Lake	Arcelormittal USA	2,163
Porter	Arcelormittal Burns Harbor LLC	12,189
Posey	SABIC Innovative Plastics	4,030
Sullivan	Merom Generating Station	3,318
Vermillion	Cayuga Generating Station	3,448
Warrick	ALCOA – Warrick Power Plant	4,993
Warrick	ALCOA – Warrick Operations	3,500

Note that this table represents those sources around which SO_2 air quality will be characterized. Additional sources of SO_2 emissions in close proximity to the listed source will be included in the characterization.

Only ArcelorMittal - Burns Harbor LLC will operate SO_2 air quality monitoring. The remaining sources will model to meet the DRR.

ArcelorMittal - Burns Harbor LLC SO_2 Air Quality Monitoring.

ArcelorMittal - Burns Harbor LLC will establish one SO_2 air quality monitoring site at the Port of Indiana Fishing Area; Lat. 41.641466, Long. -87.1510663. Address: Ship Dr., Portage, IN 46368. The placement of this site was determined through modeling. ArcelorMittal will be its own PQAO responsible for their data's accuracy and collecting their data under approved methods and standards as stated in their individual monitoring plan, the State Quality Assurance Manual, and U.S. EPA requirements. Clean Air Engineering, Palatine, Illinois will provide program and project management. The QAPP has been submitted to IDEM for review and approval. The site will be collecting SO_2 data by January 1, 2017.

Meteorological data will be supplied by NIPSCO Bailly's Dunes Acres (181270011) monitoring site.

Modeling

ArcelorMittal - Burns Harbor is located at 250 West US Highway 12, Burns Harbor, in Westchester Township, Porter County, Indiana. Burns Harbor is an integrated steel mill consisting of two blast furnaces, three hot strip mill furnaces, plate mill furnaces, two coke batteries, three basic oxygen furnaces (BOF) hot metal desulfurization steel making processes, five power station boilers, and a sinter plant. There are also two blast furnace gas flares and a clean coke oven gas flare which emit a small amount of SO_2. The northern end of the Burns Harbor plant borders the southern shoreline of Lake Michigan. The mill borders Lake Michigan and Indiana Dunes National Lakeshore to the north and east respectively, with woodlands, residential, and lighter industry to the south. The terrain is mostly flat to slightly rolling. Several additional SO_2 sources were modeled, including the NIPSCO - Bailly and NIPSCO – Michigan City Generating Stations to appropriately characterize air quality in the area.

The modeling results indicate that maximum modeled 1-hour SO_2 concentrations fall directly west and northwest of the Burns Harbor facility. Locating an SO_2 monitor in this general area would capture the maximum concentrations from the source. Based on the modeling results, the most culpable emission sources at Burns Harbor contributing to the maximum 1-hour SO_2 concentrations are the Power Station

boilers and C & D furnaces. These emission sources are located directly east of the proposed SO_2 monitoring site. Figure 1 provides an overview of the Burns Harbor facility and the surrounding area.

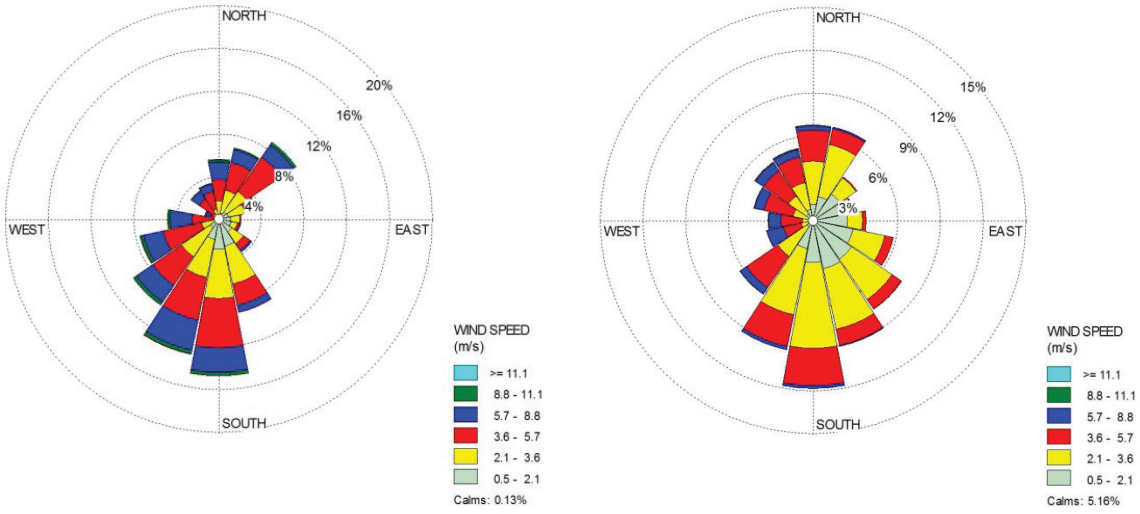
Figure 1
ArcelorMittal - Burns Harbor – Overview of Site

Meteorology/Wind Rose

The Gary - IITRI surface meteorological data and the Lincoln, Illinois upper air meteorological data, taken from 2012 through 2014, was used to determine the meteorological conditions surrounding Burns Harbor in AERMOD. The Gary - IITRI surface meteorological data will be used to more accurately include the influence of Lake Michigan on the meteorological conditions at and in the area immediately surrounding the ArcelorMittal - Burns Harbor facility. The Gary - IITRI and Dune Acres wind roses for the 3-year modeled period 2012 - 2014 are shown as Figure 2. Both wind rose depicts the north and northeast wind direction associated with the lake breeze influence and the predominate wind from the southerly direction.

Figure 2:
3-year Cumulative Wind Rose (2012 – 2014)

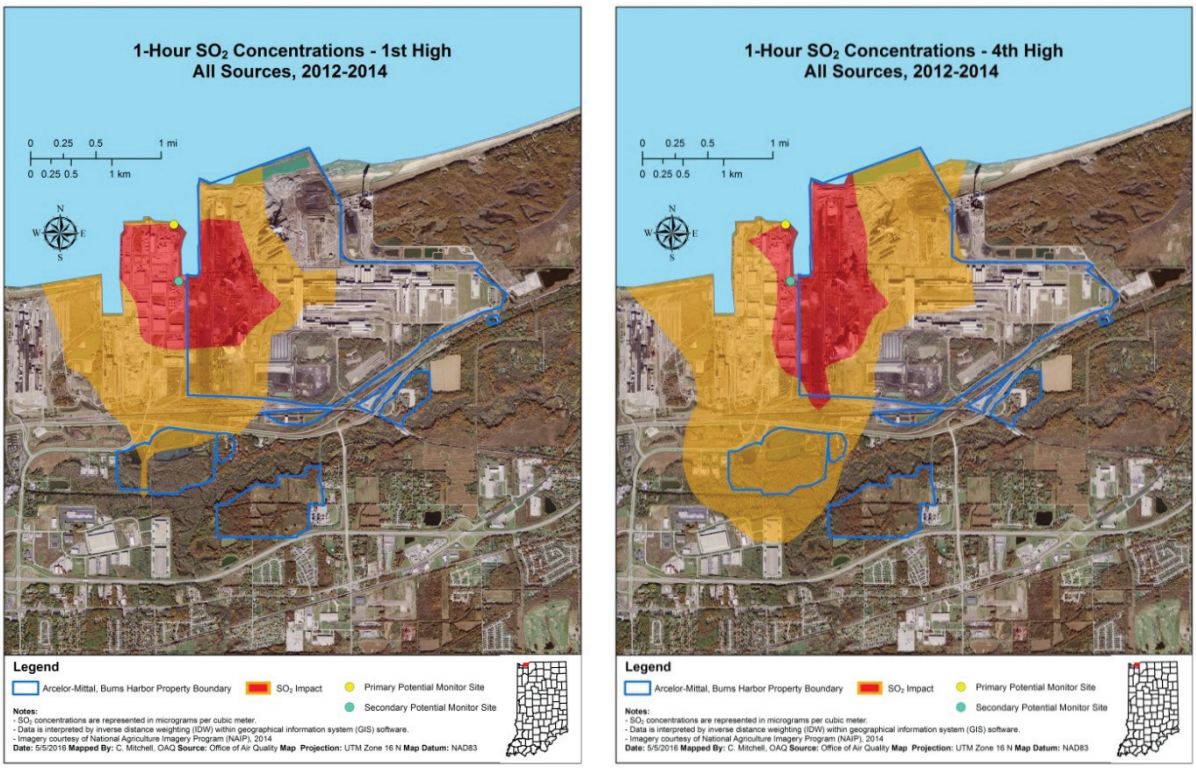
Gary - IITRI **Dune Acres**



Monitoring Site

IDEM currently does not operate an SO_2 monitoring site in Porter County; however, NIPSCO Bailly operates the Dune Acres Substation SO_2 monitor (181270011), immediately east of Burns Harbor. Burns Harbor is proposing to locate a SO_2 monitoring station at the Port of Indiana Fishing Area, based on the 1-hour SO_2 modeling results. Figure 3 below shows the maximum modeled 1st high and 4th high concentration isopleths, indicating definite maximum concentration gradients along the western property boundary of Burns Harbor. The maximum 4th high SO_2 concentration over a 3-year modeled period is what is compared to the 1-hour SO_2 National Ambient Air Quality Standard of 75 parts per billion (ppb) or 196.2 micrograms per cubic meter (µg/m^3).

Figure 3:
Map of ArcelorMittal - Burns Harbor and Surrounding Area for Potential SO_2 Monitoring Sites



IDEM feels that the modeling results for both the maximum 1st and 4th high concentrations over the 3-year period of 2012 through 2014 match well with each other and represents the impact from all SO_2 sources in the area to best characterize the air quality in the area surrounding the identified Data Requirements Rule source.