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February 22, 2016

Ms. Heather McTeer Toney
Regional Administrator
U.S. EPA, Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

RE: Request for the Campbell-Clermont, KY-OH area to be redesignated as attaining the 2010 1-Hour Sulfur Dioxide (SO_2) National Ambient Air Quality Standards (NAAQS)

Dear Ms. McTeer Toney:

On August 5, 2013, EPA published the initial SO_2 nonattainment area designations for the 2010 1-hour SO_2 National Ambient Air Quality Standard (NAAQS) across the country. Those nonattainment designations became effective October 4, 2013 (78 FR 47191). In that Final Rule, EPA designated portions of Campbell County, Kentucky and Clermont County, Ohio as nonattainment for the 2010 1-hour SO_2 NAAQS. Through this submission, the Commonwealth of Kentucky formally requests EPA to redesignate Campbell County, Kentucky to attainment status for the 2010 1-hour SO_2 NAAQS.

Ambient air monitoring collected between 2012 and 2014 demonstrates that the Northern Kentucky area attains the 2010 1-hour SO_2 NAAQS. Further, the largest source of SO_2 emissions located within the nonattainment area, the Walter C. Beckjord power plant, permanently ceased operations on September 1, 2014. Since the Beckjord plant shutdown, ambient air quality measurements of SO_2 have drastically declined. With the permanent shutdown of the facility, maintenance of the NAAQS will be ensured.

In accordance with 40 CFR 51.102, the Division made the Campbell County redesignation request for the 2010 1-hr SO_2 NAAQS available for public comment from December 1, 2015 until January 6, 2016. The only comments received during the public comment period were from the EPA. A response to EPA's comments is included in this submittal.

If you have any questions or comments concerning this matter, please contact Ms. Melissa Duff, Program Planning Branch Manager for the Division for Air Quality at (502) 564-3999 or Melissa.duff@ky.gov.

Sincerely Yours,

Charles G. Snavely
Secretary

CGS/cmb
Cc: Beverly Banister
Lynorae Benjamin
Scott Davis
Sean Lakeman

REQUEST TO REDESIGNATE KENTUCKY COUNTY
LOCATED WITHIN THE

CAMPBELL-CLERMONT, KY-OH
2010 1-HOUR SO_2 NONATTAINMENT AREA

Prepared by:
Kentucky Energy and Environment Cabinet
Division for Air Quality
February 2016

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CHAPTER ONE
Introduction

The Clean Air Act (CAA) requires each state with areas failing to meet the 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) to develop State Implementation Plans (SIPs) to expeditiously attain and maintain the standard. The United States Environmental Protection Agency (EPA) promulgated the revised NAAQS for SO_2 on June 2, 2010. EPA replaced the 24-hour and annual standards with a new 1-hour standard of 75 parts per billion (ppb). The new 1-hour SO_2 standard was published on June 22, 2010, and became effective on August 23, 2010 (75 FR 35520). The standard is based on the three-year average of the annual 99th percentile of 1-hour daily maximum concentrations.

On August 5, 2013, EPA published the initial SO_2 nonattainment area designations for the 1-hour SO_2 standard across the country which became effective October 4, 2013 (78 FR 47191). Portions of Campbell County, Kentucky and Clermont County, Ohio were designated as nonattainment for the 2010 SO_2 NAAQS. According to the Technical Support Document (TSD) provided by EPA, this designation was based on a violating monitor located in Campbell County, KY. Another contributing factor to the nonattainment designation was the Duke Energy Beckjord facility located in Clermont County, OH which is located 10 miles from the violating monitor. The Beckjord facility permanently shut down in September 2015 (see appendix I). This document will demonstrate how factors have contributed to the area returning to compliance and how the air quality has greatly improved within this area.

The CAA requires states with SO_2 nonattainment areas to submit a plan within eighteen months of the effective date of the designations (April 4, 2015) detailing how the SO_2 standard will be attained by October 4, 2018 (referred to as an "attainment demonstration"). However, areas that attain before the required date for submitting a plan may be exempt from certain otherwise applicable requirements. Section 107(d)(3)(D) of the CAA allows states to submit a revised designation to the EPA requesting nonattainment areas be redesignated to attainment. The following criteria listed within Section 107(d)(3)(E) of the CAA, must be met in order for an area to be redesignated from nonattainment to attainment:

1. The Administrator determines that the area has attained the SO_2 standard. (CAA Section 107(d)(3)(E)(i))
2. The Administrator has fully approved the applicable implementation plan for the area under Section 110(k). (CAA Section 107(d)(3)(E)(ii))
3. The Administrator determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP, federal requirements, and other permanent and enforceable reductions. (CAA Section 107(d)(3)(E)(iii))
4. The State has met all requirements under Section 110 and Part D of Title I of the Act. (CAA Section 107(d)(3)(E)(v))
5. The Administrator has fully approved a maintenance plan, including a contingency plan, under Section 175A. (CAA Section 107(d)(3)(E)(iv))

Each of these criteria are discussed in more detail under Chapter Two with a detailed analysis in subsequent chapters.

The powers and duties of the Cabinet established in KRS 224.10-100 provide the Energy and Environment Cabinet with the statutory authority to prepare and develop a comprehensive plan or plans related to the environment of the Commonwealth. Additionally, KRS 224.10-100 requires the cabinet to administer and enforce all rules, regulations and orders promulgated under Chapter 224, Environmental Protection, including those regulations that provide for the prevention, abatement, and control of all air pollution.

CHAPTER TWO
Requirements for Redesignation

This redesignation request was prepared in accordance with CAA Section 107(d)(3)(E). Below is a summary of each redesignation criterion as it applies to the Campbell-Clermont, KY-OH area.

1. Attainment of the standard (CAA Section 107(d)(3)(E)(i))

There are two components involved in making this demonstration. The first component relies on ambient air quality data. The State must demonstrate to the Administrator that the area is attaining the applicable NAAQS by providing 3 years of clean ambient air quality data. The data should be the product of ambient monitoring that represents the area of highest concentration. The data should be collected and quality-assured in accordance with 40 CFR 58 and recorded in EPA's Air Quality System (AQS) database in order for it to be available to the public for review. Pursuant to 40 CFR 50.17, the 1-hour primary standard is met at an ambient air quality monitoring site when the 3-year average of the annual (99^{th} percentile) of the daily maximum 1-hour average concentrations is less than or equal to 75 ppb, as determined in accordance with 40 CFR 50, Appendix T.

Demonstration: Currently, the design value of the ambient monitoring data for the Campbell-Clermont, KY-OH area is measured at 72 ppb using data collected from 2012 through 2014 (please refer to Chapter Three for detailed monitoring information). Chapter four provides the emissions inventory portion of this submittal which demonstrates that SO_2 emissions decline over time and that these reductions are due to permanent and enforceable emission reductions.

The second component relies upon supplemental EPA-approved air quality modeling. If a monitor is located within an area of maximum concentration, attainment can be made solely on monitoring data. However, when a nonattainment area does not have any monitors or they are not located within an area of maximum concentration then air quality dispersion modeling is necessary to estimate SO_2 concentrations.

Demonstration: Ohio completed the modeling for the nonattainment area and shared their results with Kentucky. Chapter Three (requirement 4 of 4) provides an in depth explanation of the modeling method used to show that the area will remain in attainment for the 2010 SO_2 NAAQS.

2. Approved SIP for the area under CAA Section 110(k) (CAA Section 107(d)(3)(E)(ii))

The SIP for the area must be fully approved under section 110(k), and must satisfy all requirements that apply to the area.

Demonstration: Kentucky submitted a final SIP that documents the CAA requirements of Section 110(a) infrastructure provisions for the 2010 1-hour SO_2 NAAQS on April 26, 2013.

3. Permanent and enforceable improvement in air quality (CAA Section 107(d)(3)(E)(iii))

The state must be able to reasonably attribute the improvement in air quality to emission reductions which are permanent and enforceable. The state should estimate the percent reduction achieved from federal measures as well as control measures that have been adopted and implemented by the state.

Demonstration: Chapter Four discusses this requirement in more detail and provides the demonstration.

4. Section 110 and Part D requirements (CAA Section 107(d)(3)(E)(v))

For purposes of redesignation, a state must meet all requirements of the CAA Section 110 *State Implementation Plans for National Primary and Secondary Ambient Air Quality Standards* and CAA Section 171, Part D *Plan Requirements for Nonattainment Areas* that were applicable prior to submittal of the complete redesignation request.

Demonstration: This document demonstrates that the Campbell-Clermont County, KY- OH 2010 1-hr SO_2 nonattainment area meets the requirements of CAA Section 110 and Subpart D and therefore is eligible to be redesignated to attainment.

5. Maintenance plans (CAA Section 107(d)(3)(E)(iv))

Section 107(d)(3)(E) of the CAA stipulates that for an area to be redesignated, the EPA must fully approve a maintenance plan that meets the requirements of Section 175A. A state may submit both the redesignation request and the maintenance plan at the same time. The maintenance plan will constitute a SIP revision and must provide for maintenance of the relevant NAAQS in the area for at least ten years after redesignation along with a commitment to review the plan. Section 175A further states that the plan shall contain such additional measures, if any, as may be necessary to ensure such maintenance.

The maintenance plan shall contain such contingency measures as the Administrator deems necessary to ensure prompt correction of any violation of the NAAQS. At a minimum, the contingency measures must include a requirement that the state will implement all measures contained in the nonattainment SIP prior to redesignation.

Demonstration: This document satisfies each of the maintenance provisions listed below. Please see chapter four for detailed information. States seeking approval of a maintenance plan for a nonattainment area should consider the following provisions:

- Attainment inventory (Chapter Four);
- Maintenance demonstration (Chapter Four);
- Monitoring network (Chapter Three);
- Verification of continued attainment (Chapter Five, Requirement 4 of 5);
- Contingency plan (Chapter Six).

CHAPTER THREE
SO_2 Monitoring

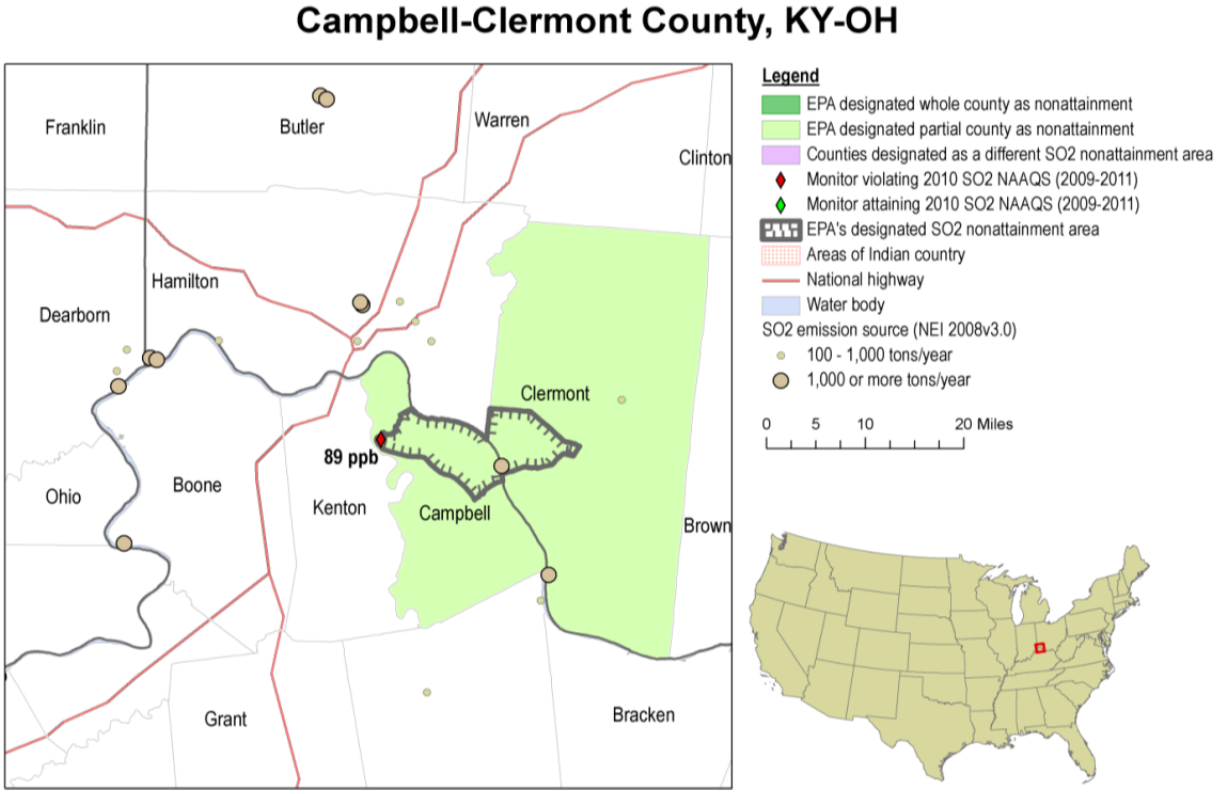
This chapter provides detailed information showing that Kentucky meets the requirements of CAA Section 107(d)(3)(E)(i).

There is one SO_2 monitor located in Campbell County within the Kentucky portion of the nonattainment area. The 2010 1-hour SO_2 nonattainment designation was based on data collected from 2009-2011. The Campbell County monitor showed a three year average of 89 ppb which resulted in a portion of Campbell County being designated as nonattainment. The partial county boundary for Campbell County encompasses five census tracts which include the area bordered by KY Hwy 1566 from Ohio River to KY Hwy 9 (AA Highway) to the Southeast; KY Hwy 9 (AA Highway) from Hwy 1566 to I-275 to the Southwest; I-275 to Hwy 2345 (John's Hill Road), Hwy 2345 to US-27, US-27 to I-275, I-275 to Ohio River to the Northwest; and the Ohio River from I-275 to KY Hwy 1566 to the Northeast.

There are no SO_2 monitors located in Clermont County, OH. EPA considers emissions in the vicinity of a violating monitor an important factor for determining whether a nearby area is contributing to a monitored violation. As stated in EPA's TSD for Ohio's area designations, the Duke Energy's W.C. Beckjord Station is believed to be the main source contributing to the violation of the Campbell County monitor. Therefore, the Pierce Township in Clermont County was designated nonattainment for the 2010 SO_2 NAAQS.

The Kentucky monitor is operated by the Kentucky Division for Air Quality, Florence Regional Office. The nonattainment boundary and the location of the monitoring site for this nonattainment area is shown in Figure 1.

Figure 1 - Map of the Campbell-Clermont, KY-OH nonattainment area and monitor location



Source: Ohio EPA

Requirement 1 of 4

A demonstration that the NAAQS for 1-hour SO_2, as published in 40 CFR 50.17, has been attained.

Demonstration: The three-year average of the annual 99th percentile of 1-hour daily maximum concentrations, based on data from the Campbell County monitor is 72 ppb. A listing of the design value for 2012 through 2014 is shown in Table 1.

In accordance with 40 CFR Part 50, Appendix T, three complete years of monitoring data are required to demonstrate attainment at a monitoring site. The 1-hour SO_2 standard is met at an ambient air quality monitoring site when the three-year average of the annual 99th percentile of 1-hour daily maximum concentrations is less than or equal to 75 ppb. The three-year average of the annual 99th percentile of 1-hour daily maximum concentrations is also called the site's "design value." To be complete, at least 75 percent of the days in each quarter of each of the three consecutive years must have at least one reported hourly value. Hourly SO_2 data are reported to EPA's Air Quality System (AQS) to at most one place after the decimal with additional digits truncated (no rounding). While calculating design values, one decimal place must be carried in the computations, with final values rounded to the nearest 1 ppb. Decimals 0.5 or greater are rounded up, and those less than 0.5 are rounded down. Values at or below 75 ppb meet the standard while values greater than 75 ppb exceed the standard. An area is in compliance with the 1-hour SO_2 standard only if every monitoring site in the area meets the NAAQS. The air quality design value for the area is the highest design value among all sites in

the area.

Table 1 – Monitoring Data for the Campbell-Clermont, KY-OH area for 2012 – 2014

		Year (ppb)			Average 2012-2014 (ppb)
Site	**County**	**2012**	**2013**	**2014**	
21-037-3002	Campbell KY	85	71	61	72

Source: EPA Air Quality System (AQS); http://www.epa.gov/ttn/airs/airsaqs/index.htm

Requirement 2 of 4

Ambient monitoring data that has been quality assured in accordance with 40 CFR 58, Appendix A, is recorded in the EPA Air Quality System (AQS) database, and available for public view. Each state and local agency must develop a quality system to ensure that the monitoring results:

- Meet a well-defined need, use, or purpose;
- Provide data of adequate quality;
- Satisfy stakeholder expectations;
- Comply with applicable standards specifications;
- Comply with statutory/other requirements of society;
- Reflect consideration of cost and economics.

Demonstration: The Division for Air Quality has a quality assurance program which ensures that all air monitoring data collected is accurate and precise; air monitors are audited on a scheduled basis; and data validation is performed monthly. All ambient air data shown in Table 1 has been quality-assured in accordance with 40 CFR 58, Appendix A and the data has been recorded into the EPA AQS database. It is anticipated that these monitors will remain at current locations for the foreseeable future.

Requirement 3 of 4

A commitment that once redesignated, the state will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

Demonstration: Kentucky will continue to operate an ambient air quality monitoring network consistent with the network plan and assessments required by 40 CFR 58.10 and 40 CFR 58, Appendix D. Any modification to the network will be conducted in accordance with 40 CFR 58.14. As required by 40 CFR 58.16, all data collected will be recorded in the AQS database and will therefore be available to the public.

Requirement 4 of 4

Supplemental EPA-approved air quality modeling to show monitors are located in the area of maximum concentration.

Where a monitor is located in the area of maximum concentration, a determination of attainment may be made based on monitoring data alone without the need for additional air quality modeling.

When a nonattainment area has no monitors, or monitors not located in the area of maximum concentration, air quality dispersion modeling is generally needed to estimate SO_2 concentrations in the area.

Demonstration: The analysis provided by Ohio EPA demonstrates violations at this monitor were caused by emissions from the Walter C. Beckjord facility located east of the monitor along the Ohio River in Ohio. The facility was 60 years old with no SO_2 controls. On September 1, 2014,[1] the Walter C. Beckjord facility ceased operations of all EGUs and by the end of 2014 the remaining oil-fired units. Ohio EPA was notified of the permanent shutdown of the units on October 14, 2014 and May 28, 2015 (Appendix B, Appendix I). There are no other significant point sources of SO_2 emissions located in the nonattainment area. Within the portion of Campbell County, KY there are eleven sources which combined only emit 0.78 tons per year (tpy) of SO_2 (Appendix C).

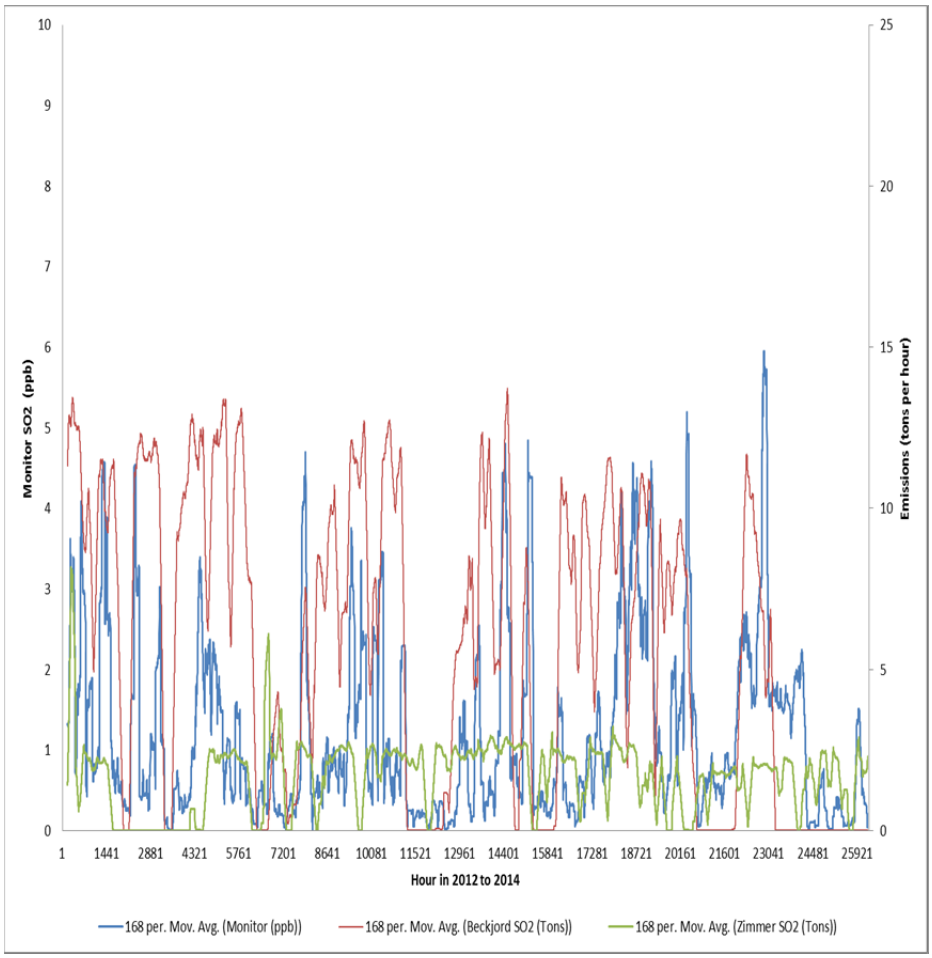
Located south (and slightly east) of the monitor, but outside of the nonattainment area, is the William H. Zimmer facility. It was determined during the nonattainment designation process that emissions from the William H. Zimmer facility likely do not impact the violating monitor at question; therefore, the nonattainment area was not expanded to encompass this facility. To support the previous conclusion, Ohio EPA performed an extensive meteorology, emissions and back-trajectory analysis and has included this analysis as Appendix D. This analysis concludes that it was in fact the Walter C. Beckjord facility that caused the violations and not the William H. Zimmer facility. The back trajectory analysis also demonstrates that emissions from the William H. Zimmer facility likely do not impact the nonattainment area as a whole.

This conclusion is further supported by an air quality trend analysis of the monitoring site. Figure 2 shows both Walter C. Beckjord and William H. Zimmer SO_2 rolling hourly emissions[2] for the 2012 to 2014 period along with rolling hourly SO_2 concentrations at the monitor. For clarity in the demonstration of the long-term trend, the emissions and monitor values are presented as rolling 168 hour averages. Elevated monitor concentrations are associated with peak emissions from Walter C. Beckjord throughout this three-year period. During this period there were significant fluctuations and changes in Walter C. Beckjord's SO_2 emissions. However, emissions remained stable at the William H. Zimmer facility. Requirement 3 of 4 under Chapter 4 identifies more specific emission trends from the Walter C. Beckjord facility's six emissions units. As can be seen in that section, emissions at Walter C. Beckjord have steadily declined due to operation of the four smaller EGUs ceasing between 2009 and 2013 and lastly the two larger EGUs in 2014.

[1] The letter contained in Appendix B identifies the permanent shutdown of all units occurred on October 1, 2014. However, a review of CAMD emissions showed that all the units ceased operation by September 1, 2014.

[2] Only the EGU emissions at Walter C. Beckjord were analyzed. The SO_2 emissions from the oil-fired units are trivial in comparison. For example, in 2014 total SO_2 emissions were 62,602.44 tons for the facility. Of that total, less than 0.03 tons were reported for all non-EGU sources at the facility.

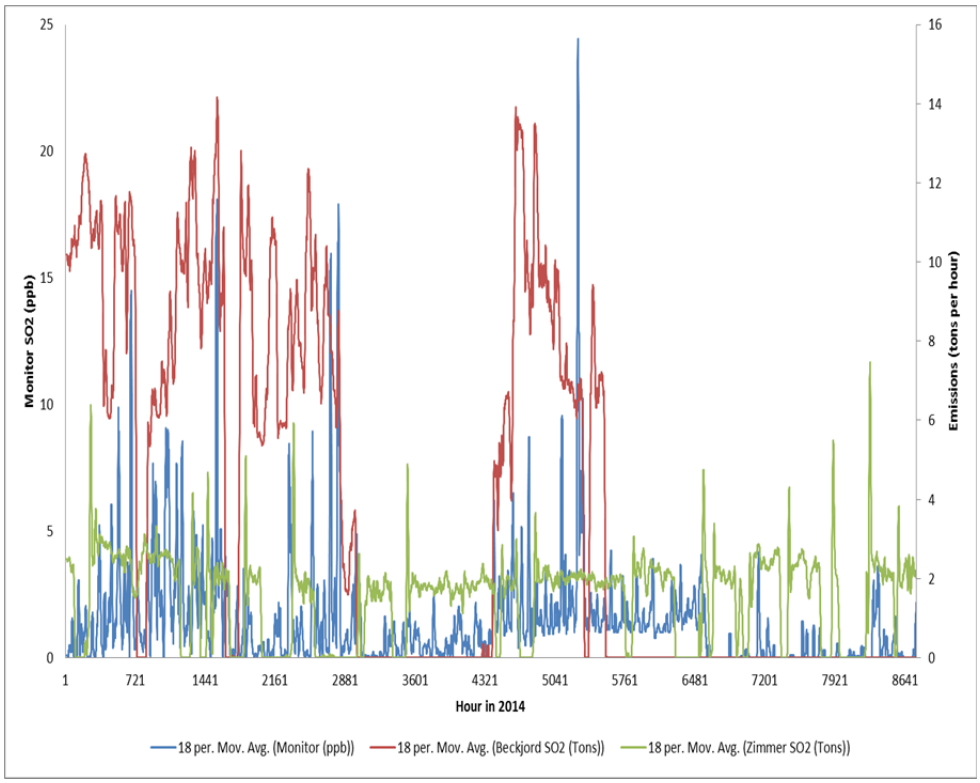
Figure 2: 2012 to 2014 Walter C. Beckjord and William H. Zimmer hourly emissions with hourly SO_2 monitoring data



Source: Ohio EPA

Only the two larger EGUs remained in operation during 2014 and completely ceased operation on September 20, 2014. In addition, from May 5 to June 29, 2014, these EGUs also did not operate. Figure 3 also presented as a rolling average of 18 hours to more clearly illustrate the long-term trend, shows an obvious downward trend in monitored SO_2 concentrations during these periods even though operations at William H. Zimmer remained consistent.

Figure 3: 2014 Walter C. Beckjord and William H. Zimmer hourly emissions with hourly SO_2 monitoring data



Source: Ohio EPA

Ohio EPA provided an analysis of the 2014 hourly monitoring data which shows that the average hourly monitored SO_2 level was 2.27 ppb during periods of operation of the two remaining EGUs at the Walter C. Beckjord facility while during the May 5 to June 29, 2014 period and the post September 20, 2014 period the average hourly monitored SO_2 level was 0.72 ppb. The long term trend clearly indicates that reductions in emissions at the Walter C. Beckjord facility have led to reductions in monitored concentrations. Further analyses, presented below, demonstrate the impacts of reduced emissions on peak monitor values.

Since there are no longer any significant point sources of emissions impacting this monitor, it was determined an air quality dispersion modeling analysis to determine the area of maximum concentration would not be relevant or necessary for this redesignation request. However, Ohio EPA conducted a conservative modeling analysis to demonstrate that concentrations throughout the nonattainment area will be relatively uniform and that the point of maximum concentration in the nonattainment area resultant from emissions from the William H. Zimmer facility will not exceed the standard. This additional analysis is included as Appendix J. This analysis shows a maximum worst-case 99th percentile value of 52.4 ppb within the nonattainment area. As noted in Appendix J, this design value is likely an over estimation but it allowed Ohio EPA to demonstrate in a highly conservative manner that emissions from the William H. Zimmer facility will not cause an exceedance of the standard in this nonattainment area. This is further supported by both the back trajectory analysis and the analysis of emissions and monitor values above. Also included in the Appendix J analysis is a demonstration that the point of maximum

impact is located approximately 1.4 km southeast of the William H. Zimmer facility, and the point of maximum in the nonattainment area represents an area approximately 84% reduction from the overall maximum impact.

Ohio EPA conducted a second analysis of monitor values, wind directions, and emissions for all hours in which SO_2 emissions from the Walter C. Beckjord facility were zero to illustrate the impact of the shutdown of the Walter C. Beckjord facility on peak monitor values. This analysis indicates that for those identified hours, the maximum recorded concentration was 34 ppb, and that the 99^{th} percentile of nonzero monitored values for the same period was 11 ppb. This analysis, presented in Appendix K, also demonstrates that the primary wind directions impacting the monitor in the absence of Walter C. Beckjord emissions were from the West and Northwest, where sources are located 30 to 35 km distant from the monitor, and will have SO_2 reductions of approximately 66% from 2014 levels as of June 1, 2015. The large distances between these sources and the monitor location, as well as the nonattainment area as a whole, would indicate that there is unlikely to be a significant concentration gradient and thus monitor is determined to be representative of ambient SO_2 concentrations across the nonattainment area.

EPA also requested that an analysis of background concentration be completed for this area to determine predicted concentrations in the future and ensure that maintenance would be achieved. Ohio EPA completed this analysis for the area and shared their results with Kentucky. Information on the analysis can be found in Chapter Four.

CHAPTER FOUR
Emission Inventory

This chapter discusses the emissions inventory portion of this submittal and shows how Kentucky meets the requirements of CAA Section 107(d)(3)(E)(iii).

Requirement 1 of 4
A comprehensive inventory of SO_2 emissions was completed for the base year and a projection of the emission inventory to a year at least 10 years following redesignation.

Demonstration: Periodic emission inventories from all sectors (mobile, area, non-road, and point sources) are prepared every three years. The 2011 periodic inventory has been identified as one of the preferred databases for SIP development and coincides with nonattainment air quality in the Campbell-Clermont, KY-OH area. The 2011 inventory is used as the base year for the purpose of this submittal and is being submitted to EPA with this document to fulfill all emissions inventory requirements under the 2010 SO_2 standard.

For the attainment year, 2014 was selected since it corresponds to one of the years in the design value showing attainment (2012 – 2014). The 2014 attainment year also corresponds to the year where the permanent and enforceable improvement in air quality leading to attainment occurred due to the entirety of the Walter C. Beckjord facility permanently ceasing operations.

In consultation with EPA, Kentucky selected the year 2027 as the maintenance year for this redesignation request. This document contains projected emissions inventories for 2017, 2020, 2022, and 2027.

The information below describes the procedures used to generate future year emission projections based on the 2011 base year inventory. Appendix C describes the methodologies discussed below in more detail.

All base year emissions data are taken from the National Emissions Inventory (NEI) with the exception of:

- Ohio's EGU emissions were obtained from EPA's Clean Air Markets Division (CAMD)[3] database.
- Point source emissions for Kentucky were obtained from Kentucky's Emission Inventory database.
- Mobile emissions were generated by Ohio-Kentucky-Indiana Regional Council of Governments (OKI).

Projections were developed for each sector as follows:

- Area source emissions were compiled from the 2011 NEI and projections were developed by Kentucky.

[3] http://www.epa.gov/airmarkets/index.html

- Mobile source emissions were calculated from MOVES2014b-produced emission factors. As performed by OKI, mobile source emission projections are based on the EPA MOVES model. The analysis is described in more detail in Appendix E.
- Non-EGU point source information was compiled from Kentucky's 2011 Emissions Inventory Database, while Ohio's EGU point source information was compiled from the 2011 data in the CAMD database. Projections were developed by Kentucky as described in Appendix C.
- Non-road emissions were compiled from the 2011 NEI and projections were developed by Kentucky.
- Biogenic emissions are negligible and are not included in these summaries.

Sectors included in the following tables are: Electrical Generating Unit (EGU-Point); Non-Electrical Generating Unit Point (Non-EGU); Non-road Mobile (Non-road); Other (Area); and On-road Mobile (On-road).

Table 2 – Kentucky Portion SO_2 Emission Inventory Totals for Base Year 2011, Attainment 2014, Projected 2017 & 2022, 2020 Interim and 2027 Maintenance (tpy)

Sector	2011 Base	2014 Attainment	2017 Projected	2020 Interim	2022 Projected	2027 Maintenance
EGU Point	0	0	0	0	0	0
Non-EGU	0.78	0.78	0.79	0.79	0.78	0.78
Non-road	0.20	0.20	0.20	0.20	0.20	0.20
Area	6.03	6.04	6.06	6.08	6.03	6.02
On-road	1.55	1.51	1.44	1.40	1.37	1.26
TOTAL	**8.56**	**8.53**	**8.49**	**8.47**	**8.38**	**8.26**

Table 3 – Ohio Portion SO_2 Emission Inventory Totals for Base Year 2011, Attainment 2014, Projected 2017 & 2022, Interim 2020 and 2027 Maintenance (tpy)

Sector	2011 Base	2014 Attainment	2017 Projected	2020 Interim	2022 Projected	2027 Maintenance
EGU Point	90,834.50	32,602.44	0	0	0	0
Non-EGU	0	0	0	0	0	0
Non-road	0.17	0.18	0.18	0.18	0.18	0.19
Area	7.51	7.63	7.75	7.88	7.86	8.00
On-road	0.34	0.33	0.32	0.31	0.30	0.28
TOTAL	**90,842.52**	**32,610.58**	**8.25**	**8.37**	**8.34**	**8.47**

Table 4 – Combined Campbell-Clermont, KY-OH Area SO_2 Emission Inventory Totals for Base Year 2011, Attainment 2014, Projected 2017 & 2022, Interim 2020 and 2027 Maintenance (tpy)

SO_2	2011 Base	2014 Attainment	2017 Projected	2020 Interim	2022 Projected	2027 Maintenance
Ohio Portion	90,842.52	32,610.58	8.25	8.37	8.34	8.47
Kentucky Portion	8.56	8.53	8.49	8.47	8.38	8.26
COMBINED SO_2 TOTAL	**90,851.08**	**32,619.11**	**16.74**	**16.84**	**16.72**	**16.73**

As part of the redesignation request and maintenance plan, motor vehicle emission budgets must be established unless it is determined mobile sources are insignificant contributors for a specific pollutant. Due to the relatively small, and decreasing, amounts of sulfur in gasoline and on-road diesel fuel, the U.S. EPA's transportation conformity rules provide that they do not apply to SO_2 unless transportation conformity budgets exist for other reasons, such as that SO_2 is found to be a significant contributor to a $PM_{2.5}$ nonattainment problem, or if the SIP has established an approved or adequate budget for such emissions as part of the reasonable further progress (RFP), attainment or maintenance strategy. Neither of these circumstances applies here. Kentucky did not create an SO_2 budget for the 1997 $PM_{2.5}$ NAAQS Cincinnati-Hamilton OH-KY-IN redesignation request because mobile SO_2 was found to be an insignificant contributor to the $PM_{2.5}$ nonattainment problem. Both Campbell County, KY and Clermont County, OH were included in that nonattainment area. Therefore, mobile source SO_2 emission budgets are not required for this area.

Requirement 2 of 4
A demonstration that the projected level of emissions is sufficient to maintain the SO_2 standard.

Demonstration: Maintenance of the SO_2 standard is demonstrated either by showing that future emissions will not exceed the level of the attainment inventory or by modeling to show that the future mix of sources and emission rates will not cause a violation of the NAAQS. Additionally, it should also include a listing of all SO_2 control measures being implemented in the area by sector (See Chapter Five).

It was determined that a modeling analysis of maximum concentration location would not be warranted given the unique circumstances of this specific redesignation request. Ohio EPA conducted a conservative analysis of the maximum concentration within the nonattainment area and demonstrated that an exceedance of the standard would not occur at any point in the nonattainment area (Appendix J). As of September 1, 2014 (when the Walter C. Beckjord facility ceased operations), there are no significant point sources of SO_2 emissions located in the nonattainment area.

Emission trends are an important gauge for continued compliance with the SO_2 standard. Maintenance is demonstrated when the future-year (2027) projected emission totals are below the 2014 attainment year totals.

Table 5 – Campbell-Clermont, KY-OH Area Comparison of 2014 attainment year and 2020 and 2027 projected emission estimates (tpy)

	2014 Attainment	2020 Interim	2020 Projected Decrease	2027 Maintenance	2027 Projected Decrease
SO_2	32,619.11	16.84	-32,602.27	16.73	-32.602.38

As shown in the Table 5 above, SO_2 emissions in the nonattainment area are projected to decrease by 32,602 tpy in both 2020 and 2027. This drop in emissions from the attainment year in conjunction with the fact that the entire nonattainment area's total emissions will drop from 16.84 in 2020 to 16.73 in 2027 demonstrate continued maintenance.

In addition to the above, EPA has requested Ohio EPA and Kentucky to perform an analysis of background concentration for this nonattainment area to determine predicted concentrations in the future and ensure that maintenance would be achieved. Ohio EPA agreed to perform the background analyses for both Kentucky and Ohio. Ohio EPA has determined a conservative average background concentration for this area is 4.76 ppb, and a conservative 99th percentile background or this area is 11 ppb. The analysis to support this determination is included in Appendix F and Appendix K.

Requirement 3 of 4

A demonstration that improvement in air quality between the year violations occurred and the year attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology.

Demonstration: Permanent and enforceable reductions should be a result of emission limitations in the SIP. Sufficient quantitative information about emission reductions should be provided to demonstrate the improvement in air quality is attributed to permanent and enforceable measures, such as the enforcement of obtaining a permit to restart a facility.

This section demonstrates that permanent and enforceable reductions of SO_2 emissions have contributed to the attainment of the 1-hour SO_2 standard in this area.

As shown in Table 6 below, permanent and enforceable reductions were realized in this area due to the permanent shut down of the Walter C. Beckjord facility. This facility will not be allowed to restart without obtaining a permit. Newly issued permits are subject to major source regulatory programs that are efficient at controlling the amount of emissions released.

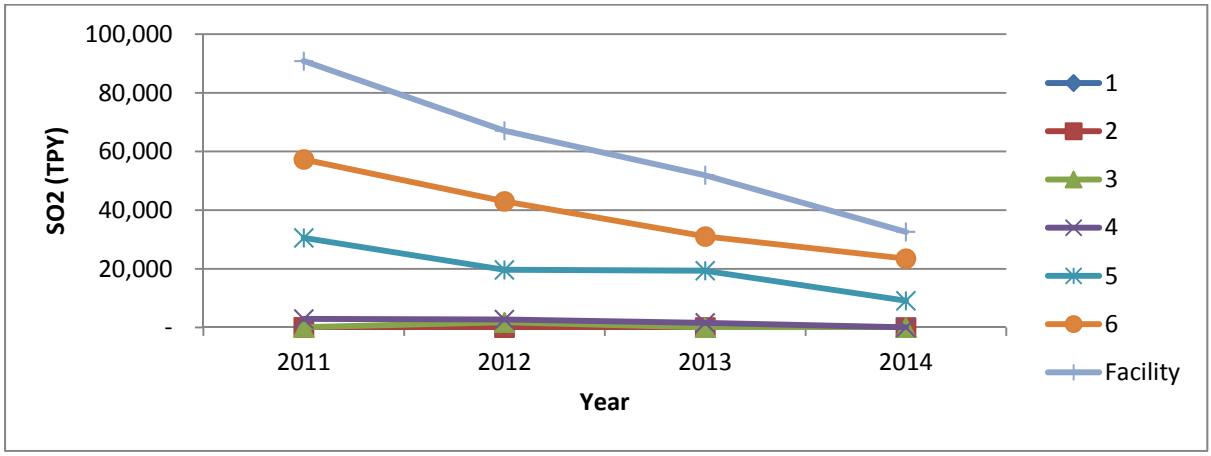
Table 6 – Campbell-Clermont, KY-OH area comparison of 2011 base year and 2014 attainment year EGU reductions

	2011	2014
EGU SO_2	90,834.50	32,602.44

As discussed under Requirement 4 of 4 in Chapter Three, violations at this monitor were determined to be caused by emissions from the Walter C. Beckjord facility which ceased operations of EGUs beginning September 1, 2014 and the remaining oil-fired units by the end of 2014. Ohio EPA was notified of the permanent shutdown on October 14, 2014 and May 28, 2015 (Appendix B, Appendix I).

The Walter C Beckjord facility was comprised of six EGUs: B001 and B002 were 94 megawatts (MW) each; B003 was 128 MW; B004 was 150 MW, B005 was 238 MW; and B006 was 414 MW. Emissions of SO_2, by unit and for the entire facility, from 2011 through 2014 can be seen in Figure 4 below.

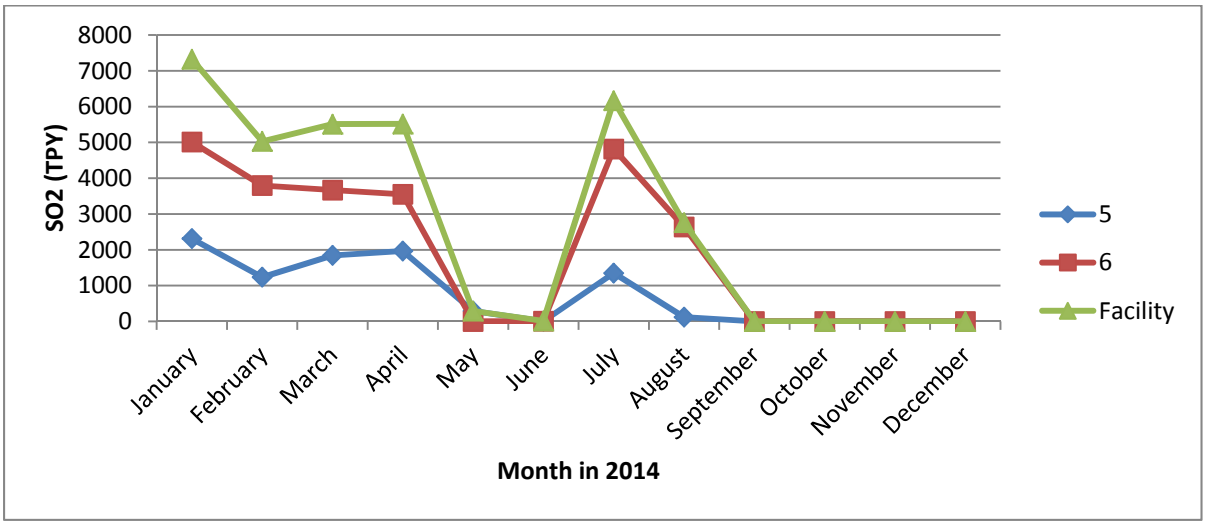
Figure 4: Walter C. Beckjord SO_2 Emissions by Unit and Entire Facility



Source: Ohio EPA

B001 last operated in 2009, B002 in 2011, B003 in 2012, B004 in 2013, and both B005 and B006 ceased operation on September 1, 2014 as indicated in Figure 5 below.

Figure 5: Walter C. Beckjord SO_2 Emissions For Units B005 and B006 in 2014



Source: Ohio EPA

Inventories of Walter C. Beckjord's SO_2 emissions for 2008 to 2014 can be found in Appendix G.

In addition to permanent and enforceable reductions, several programs have led, and will continue to lead, to further reductions of SO_2. Chapter Five, Requirement 5 of 5, provides more information on federal and state plans that will reduce SO_2 levels across several sectors.

Requirement 4 of 4
Provisions for future annual updates of the inventory to enable tracking of the emission levels, including an annual emission statement from major sources.

Demonstration: In Kentucky, major point sources in all counties are required to submit air emissions information annually, in accordance with EPA's Air Emissions Reporting Rule (AERR). Kentucky prepares a new periodic inventory for all SO_2 emission sectors every three years. These SO_2 inventories will be prepared for future years as necessary to comply with the inventory reporting requirements established in 40 CFR 51, Subpart A. Emissions information will be compared to the 2011 base year and the 2027 projected maintenance year inventories to assess emission trends, as necessary, and to assure continued compliance with the 1-hour SO_2 standard.

CHAPTER FIVE
Control Measures and Regulations

This chapter discusses the permanent and enforceable reductions, and maintenance plan requirements in depth and shows how Kentucky meets the requirements of CAA Sections 107(d)(3)(E)(ii), 107(d)(3)(E)(iv), and 107(d)(3)(E)(v).

Requirement 1 of 5
Section 172(c)(1) requires states with nonattainment areas to submit a SIP providing for implementation of all 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)).

Demonstration: Section 172(c)(1) of the CAA requires SIPs to provide for the implementation of all RACM to demonstrate attainment as expeditiously as practicable. A subset of RACM is reasonably available control technology (RACT), which relates specifically to stationary point sources. The nonattainment area has attained the standard making it eligible for redesignation. With the shutdown of the W.C. Beckjord facility there are no longer any significant point sources located in the nonattainment area, therefore no further point source emissions controls are possible. There are no additional measures that are necessary to demonstrate attainment as expeditiously as practicable. Also, there are no potential measures that if considered collectively would advance the attainment year by one year or more.

The TSD provided by EPA noted that the SO_2 emissions totaled 37.7 tpy using 2008 NEI data.[4] This number represents all emission for the entire Campbell County area. However, only a portion of Campbell County was designated as nonattainment. The partial county boundary for Campbell County encompasses only five census tracts. At the time Campbell County was designated as nonattainment, the SO_2 emissions emitted from sources in the area were insignificant. As seen in the current emissions inventory discussed in Chapter Four, Campbell County's SO_2 emissions are still insignificant and SO_2 emissions have decreased dramatically since the closure of W.C. Beckjord. The Campbell County, Kentucky SO_2 Nonattainment Area will continue to implement the control measures already adopted and described in Chapter Five, requirement 4 of 5.

Kentucky promulgated rules requiring reasonable available control measures from stationary sources for particular source categories. The RACT requirements included in the Kentucky SIP can be found in 401 KAR Chapter 59 for new sources and 401 KAR Chapter 61 for existing sources.[5]

Requirement 2 of 5
Section 172(c)(2) of the 1990 CAA Amendments requires SIPs for nonattainment areas to show reasonable further progress (RFP). Section 171(1) defines RFP as "such annual incremental

[4] Final Technical Support Document, Kentucky First Round of Nonattainment Area Designations for the 2010 SO_2 Primary NAAQS (EPA-HQ-OAR-2012-0233-0308, July 2013)
[5] 40 CFR Part 52, Subpart S.

reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date."

Demonstration: RFP requirements are established as part of the attainment demonstration SIPs due in April of 2015. Because this area attained the standard prior to the due date, Kentucky is not obligated to submit the RFP attainment demonstration elements. The only significant source of emissions in the area for which RFP would apply would have been the W.C. Beckjord facility, which permanently shut down by May 28, 2015. As explained in Chapter Four, the point source emissions in the area have declined drastically due to the permanent shutdown of the entire facility. Table 7 below shows the correlation between the decrease in W.C. Beckjord's emissions and the design value for the Campbell County monitor (21-037-3002).

Table 7 – W.C. Beckjord SO_2 Emissions and Campbell County, KY Monitor 2011-2014

Years	W.C. Beckjord SO_2 Emissions (tpy)	SO_2 Design Value (ppb)
2011	90,834.50	109
2012	67,068.84	85
2013	51,900.34	71
2014	32,602.44	61

Requirement 3 of 5
Acceptable provisions to provide for new source review.

Demonstration: Kentucky has a longstanding and fully implemented NSR program. This is addressed in 401 KAR Chapter 51.[6] The chapter includes provisions for the PSD permitting program in KAR 51:017. Kentucky's PSD program was approved by EPA on September 1, 1989 (54 FR 36307) as part of the SIP. Any new facility will be regulated to demonstrate compliance with the NAAQS.

Requirement 4 of 5
Section 172(c)(6) requires other plan provisions, such as control measures, to provide for attainment of the standard.

Demonstration: As discussed in-depth throughout Chapters Three and Four, W.C. Beckjord provided notification to Ohio EPA on May 28, 2015 that the entire facility had permanently shut down. There are no other major sources within the nonattainment area. This facility will not be allowed to restart without obtaining a permit. Newly issued permits are subject to major source regulatory programs that are efficient at controlling the amount of emissions released.

Along with the substantial decrease in emissions due to the permanent shutdown of W.C. Beckjord, there are several control measures already in place or being implemented over the next

[6] http://www.lrc.ky.gov/kar/401/051/052.htm

few years that will reduce stationary point, highway mobile, and nonroad mobile source emissions. The following programs have shown or are expected to show emission reductions in SO_2 emissions due to regulatory measures implemented by both the EPA and Kentucky. Also, monitoring, recordkeeping, and reporting requirements are incorporated into permits to ensure ongoing compliance. Kentucky has an active enforcement program to address violations discovered by field office staff.

Federal Control Measures

Acid Rain Program

The Acid Rain Program requires major emission reductions of SO_2 and nitrogen oxides (NO_x), the primary precursors of acid rain, from the power sector. This was done in two phases. Phase I began in 1995 and affected the largest coal-burning units in 21 eastern and midwestern states. Phase II began in 2000 and expanded the program to include smaller units fired by coal, oil and gas. Under Phase II, EPA also tightened the annual SO_2 emissions limits, with a permanent annual cap set at 8.95 million allowances, starting in 2010.

Clean Air Interstate Rule

Significant emissions reductions from coal-fired electricity generating units (EGUs) have contributed to the region's reduction in emissions and significant improvement in air quality. On May 12, 2005 the EPA promulgated the Clean Air Interstate Rule (CAIR). CAIR required 27 eastern states as well as the District of Columbia to achieve SO_2 and NOx emission reductions for new and existing EGUs. CAIR utilized a cap and trade system to reduce SO_2 and NOx emissions. The CAIR NO_x ozone season and annual programs began in 2009, while the CAIR SO_2 annual program began in 2010. The D.C. Circuit remanded CAIR without vacatur on December 23, 2008. The December 23, 2008 court ruling left CAIR and the CAIR FIPs, including the CAIR trading programs, in place until the U.S. EPA issued a new rule to replace CAIR in accordance with the July 11, 2008 decision.

Kentucky developed regulations 401 KAR 51:210, 401 KAR 51:220, and 401 KAR 51:230 (effective February 2, 2007) in response to CAIR; those regulations are still in place. However, reductions due to this regulation and CAIR were not included in the inventory and its projections for the Kentucky portion of the nonattainment area.

Cross-State Air Pollution Rule

EPA issued the Cross-State Air Pollution Rule (CSAPR) in July 2011. As amended, CSAPR requires 28 states in the eastern half of the United States to significantly improve air quality by reducing power plant emissions that cross state lines and contribute to ozone and fine particle pollution in other states. CSAPR was scheduled to replace CAIR starting on January 1, 2012. However, the timing of CSAPR's implementation was affected by D.C. Circuit actions that stayed and then vacated CSAPR before implementation. On April 29, 2014, the U.S. Supreme Court reversed the D.C. Circuit's vacatur, and on October 23, 2014, the D.C. Circuit granted EPA's motion to lift the stay and shift the CSAPR compliance deadlines by three years.

Accordingly, CSAPR Phase I implementation began January 1, 2015, with Phase II to begin in 2017.

Mercury and Air Toxics Standard

The Mercury and Air Toxics Standard (MATS) was finalized by the EPA in December 2011. The rule regulates emissions of heavy metals and acid gases from new and existing coal and oil fired power plants. Under MATS, all coal fired units must meet emissions limits for mercury, particulate matter, and hydrochloric acid (HCl). However, EGUs can choose to demonstrate compliance by taking an SO_2 limit instead of the HCl limit. Methods of controlling SO_2 from coal-fired power plants include: cleaning the coal to remove the sulfur; switching to lower SO_2 fuel; purchasing SO_2 allowances; and installing flue gas desulfurization systems. Coal washing helps remove 25-40% of the sulfur; it is accomplished by grinding the coal into smaller pieces and passing it through a process called gravity separation.

Requirement 5 of 5
Assure that all existing control measures will remain in effect after redesignation unless the state demonstrates through modeling that the standard can be maintained without one or more control measures.

Demonstration: Kentucky commits to maintaining the aforementioned control measures after redesignation. Kentucky hereby commits that any changes to its rules or emission limits applicable to SO_2 as required for maintenance of the 1-hour SO_2 standard in the Kentucky portion of the Campbell-Clermont, KY-OH area, will be submitted to EPA for approval as a SIP revision.

Kentucky has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emission of SO_2 precursors in the Campbell-Clermont, KY-OH area.

CHAPTER SIX
Contingency Measures

This chapter provides detailed information showing that Kentucky meets the requirements of CAA Section 107(d)(3)(E)(v).

Requirement 1 of 3
A commitment to submit a revised plan eight years after redesignation.

Demonstration: Section 175A(b) of the CAA requires that eight years after formal redesignation, the state continues to provide for maintenance of the standard by submitting another maintenance plan that covers an additional 10 years. If this requirement remains applicable for this area, Kentucky commits to submit a plan for future maintenance of Campbell County as required.

Requirement 2 of 3
A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standard occur.

Demonstration: Kentucky will rely on enforcing the applicable reductions in source permits. All measures in the permit and the SIP are implemented prior to redesignation of the area to attainment. The modeling of SO_2 sources is considered reliable for predicting the amount of SO_2 emitted from sources in the nonattainment area.

In the event that a monitored exceedance of the SO_2 NAAQS occurs in the future, the State will expeditiously investigate and perform culpability analyses to determine the source that caused the exceedance and/or violation, and enforce any SIP or permit limit that is violated. Comprehensive enforcement and compliance programs exist in the State to identify sources of violations of the NAAQS and to undertake an aggressive follow-up for compliance and enforcement.

Further, if all sources are found to be in compliance with applicable SIP and permit emission limits, the State shall perform the necessary analysis to determine the cause of the exceedance, and determine what additional control measures are necessary to impose on the area's stationary sources to continue to maintain attainment of the SO_2 NAAQS.

The State shall inform any affected stationary sources of SO_2 of the potential need for additional control measures. If there is a violation of the NAAQS for SO_2, the State will notify the stationary source that the potential exists for a NAAQS violation.

Within six months, the source must submit a detailed plan of action specifying additional control measures to be implemented no later than 18 months after the notification. The additional control measures will be submitted to the EPA for approval and incorporation into the SIP.

Any new major stationary source is subject to PSD, including determination of best available controls as well as an ambient air quality impact analysis[7], prior to the construction and operation in an area attaining the standard.[8] If the area no longer attains the standard, the construction of a major stationary source would be subject to the nonattainment new source review requirements.[9]

Requirement 3 of 3
A list of SO_2, sources potentially subject to future additional control requirements.

Demonstration: Given that there are no other significant point sources in the area at this time, it is not possible to provide a list of potentially subject sources.

[7] Refer to comment #5 from Scott Davis, "predetermined monitored concentration"
[8] 401 KAR 51:017, as approved into the Kentucky SIP on September 15, 2010 (75 FR 55988)
[9] 401 KAR 51:052, as approved into the Kentucky SIP on September 15, 2010 (75 FR 55988)

CHAPTER SEVEN
Public Participation

A public hearing was scheduled, in accordance with 40 CFR 51.102, to be held at the Division for Air Quality offices located at 200 Fair Oaks Lane, Frankfort, KY on January 6, 2016. No request for a public hearing was received; therefore, the scheduled public hearing was cancelled.

The SIP revision package was made available on the Division's website during the 30 day comment period from December 1, 2015, until January 6, 2016. The Division received written comments from EPA during the public comment period and no other comments were received. The Division's response to those comments is provided in Appendix H along with a copy of the public hearing notice.

CHAPTER EIGHT
Conclusions

The Campbell-Clermont, KY-OH SO_2 nonattainment area has attained the 2010 1-hour NAAQS for SO_2 and complied with the applicable provisions of the 1990 Amendments to the CAA regarding redesignations of SO_2 nonattainment areas. Documentation to that effect is contained herein. Kentucky has prepared a redesignation request and maintenance plan that meet the requirements of Section 110(a)(1) of the 1990 CAA.

Based on this presentation, the Campbell-Clermont, KY-OH 1-hour SO_2 nonattainment area meets the requirements for redesignation under the CAA and EPA guidance. Kentucky has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures. Furthermore, because the only contributing source in this area has permanently shut down, continued compliance (maintenance) with the standard is ensured.

The State of Kentucky hereby requests that the Campbell-Clermont, KY-OH 1-hour SO_2 nonattainment area be redesignated to attainment simultaneously with EPA approval of the maintenance plan provisions contained herein.

Appendix A-1

Kentucky DAQ Air Quality Certification

Steven L. Beshear
Governor

Energy and Environment Cabinet
Department for Environmental Protection
Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601-1403
air.ky.gov

Leonard K. Peters
Secretary

February 13, 2015

Beverly Banister, Director
Air, Pesticides and Toxics Management Division
U.S. Environmental Protection Agency, Region 4
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303

Dear Ms. Banister:

The Kentucky Division for Air Quality is respectfully submitting 2014 hourly ozone and sulfur dioxide data, as well as five-minute sulfur dioxide data, for certification. The data, for which certification is requested, is listed on the following attached AQS-generated reports:

- AMP600: hourly averaged ozone data (parameter code 44201) and sulfur dioxide data (parameter code 42401)
- AMP450nc: five-minute averaged sulfur dioxide data (parameter code 42406)

I hereby certify that the ambient concentration data and the quality assurance data are completely submitted to AQS. I also certify that, to the best of my knowledge, the ambient air concentration data are accurate, taking into account the quality assurance findings.

If there are any questions or concerns, please contact Ms. Jennifer Miller, Environmental Scientist with our Technical Services Branch, at (502) 564-3999, extension 4050.

Sincerely,

Sean Alteri

Sean Alteri,
Director

SA/jfm
Enclosures

c: Darren Palmer, USEPA Region 4
Daniel Garver, USEPA Region 4
Keith Goff, USEPA Region 4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: FNX

CERTIFICATION EVALUATION AND CONCURRENCE

Report Request ID: 1297134

Report Code: AMP600

Feb. 13, 2015

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	21										

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA	44201		
CRITERIA	42401		

AGENCY SELECTIONS

Kentucky Division For Air Quality

SELECTED OPTIONS

Option Type	Option Value
MERGE PDF FILES	YES
AGENCY ROLE	CERTIFYING

DATE CRITERIA

Start Date	End Date
2014	2014

Data Evaluation and Concurrence Report Summary

Feb. 13, 2015

Certification Year: 2014
Certifying Agency (CA): Kentucky Division For Air Quality (0584)

Pollutants in Report:

Parameter Name	Code	Monitors Evaluated	Monitors Recommended for Concurrence by AQS	Monitors NOT Recommended for Concurrence by AQS
Ozone	44201	22	22	0
Sulfur dioxide	42401	9	9	0

PQAOs in Report:

PQAO Name	PQAO Code	TSA Date
Kentucky Division For Air Quality	0584	06/19/12

Summary of 'N' flags for all pollutants:

PQAO	Parameter Code	AQS Site-ID	POC	AQS Recommended Flag	Cert. Agency Recommended Flag	Reason for AQS Recommendation

Signature of Monitoring Organization Representative: Sean Alteri

Data Evaluation and Concurrence Report for Gaseous Pollutants

Certifying Year 2014
Certifying Agency Code Kentucky Division For Air Quality (0584)
Parameter Ozone (44201) (ppm)
PQAO Name Kentucky Division For Air Quality (0584)
QAPP Approval Date 04/21/2011

NPAP Audit Summary:

Number of Valid Audits	NPAP Bias	Criteria Met
7	-1.2658	Y

AQS Site ID	POC	Monitor Type	Routine Data						One Point Quality Check			Annual PE		NPAP		QAPP Appr.	Concur. Flag		
			Mean	Min	Max	Exceed. Count	Outlier Count	Perc. Comp.	Precision	Bias	Complete	Bias	Complete	Bias	PQAO Level Criteria		Aqs Rec Flag	CA Rec Flag	Epa Concur
21-013-0002	1	SPM	0.045	0.013	0.071	0	0	97	2.06	+/-1.90	94	- 2.48	100		Y	Y	Y	Y	S
21-015-0003	1	SLAMS	0.046	0.014	0.072	0	0	99	2.14	+/-1.98	100	- 1.12	100		Y	Y	Y	Y	S
21-019-0017	1	SLAMS	0.049	0.019	0.083	0	0	99	1.48	+3.94	100	- 1.62	100		Y	Y	Y	Y	S
21-029-0006	1	SLAMS	0.047	0.015	0.088	0	0	90	1.57	+2.44	94	- 3.56	100		Y	Y	Y	Y	S
21-037-3002	1	SLAMS	0.051	0.022	0.082	0	0	99	3.77	+/-4.29	94	- 2.38	100		Y	Y	Y	Y	S
21-043-0500	1	SPM	0.045	0.017	0.068	0	0	99	1.27	+/-1.00	100	- 1.67	100		Y	Y	Y	Y	S
21-047-0006	2	SLAMS	0.047	0.014	0.075	0	0	99	1.17	+/-1.13	100	- 0.84	100		Y	Y	Y	Y	S
21-059-0005	1	SLAMS	0.048	0.017	0.077	0	0	98	3.32	+4.42	100	- 1.07	100		Y	Y	Y	Y	S
21-067-0012	1	SLAMS	0.049	0.014	0.074	0	0	99	1.60	+2.62	100	- 0.90	100		Y	Y	Y	Y	S
21-089-0007	1	SLAMS	0.047	0.010	0.075	0	0	99	0.99	+1.42	100	- 0.27	100		Y	Y	Y	Y	S
21-091-0012	1	SLAMS	0.049	0.018	0.082	0	0	96	1.76	+/-1.88	100	- 1.72	100		Y	Y	Y	Y	S
21-093-0006	1	SLAMS	0.047	0.019	0.072	0	0	90	4.46	+/-4.22	94	- 2.32	100		Y	Y	Y	Y	S
21-101-0014	1	SPM	0.050	0.019	0.080	0	0	98	1.49	+3.25	100	0.37	100		Y	Y	Y	Y	S
21-113-0001	1	SLAMS	0.049	0.019	0.074	0	0	99	1.50	+3.95	100	- 2.23	100		Y	Y	Y	Y	S
21-139-0003	1	SLAMS	0.049	0.019	0.074	0	0	100	1.17	+2.08	100	- 0.86	100		Y	Y	Y	Y	S
21-145-1024	1	SLAMS	0.047	0.016	0.077	0	0	99	2.24	+/-1.50	100	- 2.08	100		Y	Y	Y	Y	S
21-185-0004	1	SLAMS	0.049	0.021	0.083	0	0	99	3.39	-3.43	100	- 0.61	100		Y	Y	Y	Y	S
21-193-0003	1	SPM	0.043	0.014	0.067	0	0	100	1.40	+3.33	100	- 1.72	100	- 4.17	Y	Y	Y	Y	S
21-195-0002	1	SPM	0.044	0.014	0.084	0	0	99	0.79	+2.90	100	- 1.32	100	- 2.86	Y	Y	Y	Y	S
21-199-0003	1	SPM	0.047	0.016	0.074	0	0	99	1.30	+1.78	100	0.78	100		Y	Y	Y	Y	S
21-213-0004	1	SPM	0.047	0.013	0.074	0	0	99	2.23	+/-2.05	88	- 2.38	100	- 3.77	Y	Y	Y	Y	S
21-227-0009	1	SLAMS	0.048	0.016	0.075	0	0	98	2.46	+/-2.15	94	- 1.17	100	3.77	Y	Y	Y	Y	S

Data Evaluation and Concurrence Report for Gaseous Pollutants

Certifying Year 2014
Certifying Agency Code Kentucky Division For Air Quality (0584)
Parameter Sulfur dioxide (42401) (ppb)
PQAO Name Kentucky Division For Air Quality (0584)
QAPP Approval Date 04/21/2011

NPAP Audit Summary:

Number of Valid Audits	NPAP Bias	Criteria Met
2	-5.0725	Y

AQS Site ID	POC	Monitor Type	Routine Data Mean	Min	Max	Exceed. Count	Outlier Count	Perc. Comp.	One Point Quality Check Precision	Bias	Complete	Annual PE Bias	Complete	NPAP Bias	PQAO Level Criteria	QAPP Appr.	Concur. Flag Aqs Rec Flag	CA Rec Flag	Epa Concur
21-019-0017	1	SLAMS	0.5	0.0	51.0		0	99	1.86	-3.89	100	- 0.89	100		Y	Y	Y	Y	S
21-037-3002	1	SLAMS	1.5	0.0	93.0		0	99	2.19	-3.43	100	- 2.36	100		Y	Y	Y	Y	S
21-047-0006	2	SPM	0.6	0.0	31.0		0	99	4.49	+4.48	85	6.83	100		Y	Y	Y	Y	S
21-059-0005	1	SLAMS	1.6	0.0	65.0		0	99	4.05	+/-3.18	100	3.34	100		Y	Y	Y	Y	S
21-067-0012	1	SLAMS	0.3	0.0	28.0		0	99	2.13	-2.49	100	- 0.32	100		Y	Y	Y	Y	S
21-089-0007	1	SPM	0.6	0.0	23.0		0	99	2.05	+1.99	100	1.10	100		Y	Y	Y	Y	S
21-101-0014	1	SLAMS	0.9	0.0	38.0		0	99	0.87	-1.34	100	2.29	100		Y	Y	Y	Y	S
21-113-0001	1	SPM	0.4	0.0	19.0		0	99	2.13	-4.35	100	3.27	100		Y	Y	Y	Y	S
21-145-1024	1	SLAMS	0.4	0.0	38.0		0	98	4.54	-4.59	96	- 0.36	100		Y	Y	Y	Y	S

Data Evaluation and Concurrence Report for Particulate Matter

Data Concurrence and Evaluation Report for Lead

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: FNX

QUICKLOOK ALL PARAMETERS

Report Request ID: 1297136 Report Code: AMP450NC Feb. 13, 2015

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	21										

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
ALL	42406		

SELECTED OPTIONS

Option Type	Option Value
MERGE PDF FILES	YES
EVENTS PROCESSING	EXCLUDE REGIONALLY CONCURRED EVENTS
AGENCY ROLE	PQAO

SORT ORDER

Order	Column
1	STATE_CODE
2	COUNTY_CODE
3	SITE_ID
4	PARAMETER_CODE
5	POC
6	DATES
7	EDT_ID

SCR GROUP SELECTIONS

Kentucky

DATE CRITERIA

Start Date	End Date
2014	2014

APPLICABLE STANDARDS

Standard Description

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM

QUICKLOOK ALL PARAMETERS

Feb. 13, 2015

EXCEPTIONAL DATA TYPES

EDT	DESCRIPTION
0	NO EVENTS
1	EVENTS EXCLUDED
2	EVENTS INCLUDED
5	EVENTS WITH CONCURRENCE EXCLUDED

QUICKLOOK ALL PARAMETERS

Feb. 13, 2015

Parameter	Unit	POC	PQAO	Year	Meth	# Obs	1st Max Value	2nd Max Value	3rd Max Value	4th Max Value	Arith. Mean	Duration	Cert& Eval	EDT
Site ID: 21-019-0017 City: Ashland	County: Boyd						Address: FIVCO HEALTH DEPARTMENT, 2924 HOLT STREET							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8690	76.0	52.0	42.0	40.0	.79	1 HOUR		0
Site ID: 21-037-3002 City: Highland Heights	County: Campbell						Address: 524A JOHN'S HILL ROAD							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8673	218.0	163.0	140.0	125.0	2.30	1 HOUR		0
Site ID: 21-047-0006 City: Not in a city	County: Christian						Address: WILLIAMSON RESIDENCE, 10800 PILOT ROCK ROAD							
42406 SO2 max 5-min avg	Parts per billion	2	0584	2014	100	7240	36.0	31.0	29.0	27.0	.85	1 HOUR		0
Site ID: 21-059-0005 City: Not in a city	County: Daviess						Address: 716 PLEASANT VALLEY ROAD							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8703	133.0	124.0	121.0	101.0	2.95	1 HOUR		0
Site ID: 21-067-0012 City: Lexington-Fayette (corporate name for Lexington)	County: Fayette						Address: FAYETTE COUNTY HEALTH DEPT, 650 NEWTOWN PIKE							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8714	35.0	22.0	22.0	21.0	.52	1 HOUR		0
Site ID: 21-089-0007 City: Worthington	County: Greenup						Address: SCOTT STREET & CENTER AVENUE							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8694	31.0	30.0	22.0	22.0	.88	1 HOUR		0
Site ID: 21-101-0014 City: Not in a city	County: Henderson						Address: BASKETT FIRE DEPARTMENT, 7492 DR. HODGE ROAD							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8694	66.0	60.0	59.0	57.0	1.71	1 HOUR		0
Site ID: 21-113-0001 City: Nicholasville	County: Jessamine						Address: KYTC MAINTENANCE GARAGE, 260 WILSON DRIVE							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8710	32.0	19.0	19.0	17.0	.55	1 HOUR		0
Site ID: 21-145-1024 City: Paducah	County: McCracken						Address: JACKSON PURCHASE RECC, 2901 POWELL STREET							
42406 SO2 max 5-min avg	Parts per billion	1	0584	2014	100	8588	46.0	40.0	38.0	34.0	.70	1 HOUR		0

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM

QUICKLOOK ALL PARAMETERS

Feb. 13, 2015

METHODS USED IN THIS REPORT

PARAMETER	METHOD CODE	COLLECTION METHOD	ANALYSIS METHOD
42406	100	INSTRUMENTAL	ULTRAVIOLET FLUORESCENCE

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM

QUICKLOOK ALL PARAMETERS

Feb. 13, 2015

PQAOS USED IN THIS REPORT

PQAO	AGENCY DESCRIPTION
0584	Kentucky Division For Air Quality

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM

QUICKLOOK ALL PARAMETERS

Feb. 13, 2015

CERTIFICATION EVALUATION AND CONCURRENCE FLAG MEANINGS

FLAG	MEANING
M	The monitoring organization has revised data from this monitor since the most recent certification letter received from the state.
N	The certifying agency has submitted the certification letter and required summary reports, but the certifying agency and/or EPA has determined that issues regarding the quality of the ambient concentration data cannot be resolved due to data completeness, the lack of performed quality assurance checks or the results of uncertainty statistics shown in the AMP255 report or the certification and quality assurance report.
S	The certifying agency has submitted the certification letter and required summary reports. A value of "S" conveys no Regional assessment regarding data quality per se. This flag will remain until the Region provides an "N" or "Y" concurrence flag.
U	Uncertified. The certifying agency did not submit a required certification letter and summary reports for this monitor even though the due date has passed, or the state's certification letter specifically did not apply the certification to this monitor.
X	Certification is not required by 40 CFR 58.15 and no conditions apply to be the basis for assigning another flag value
Y	The certifying agency has submitted a certification letter, and EPA has no unresolved reservations about data quality (after reviewing the letter, the attached summary reports, the amount of quality assurance data submitted to AQS, the quality statistics, and the highest reported concentrations).

Note: The * indicates that the mean does not satisfy summary criteria.

Appendix A-2

2012-2014 Air Quality Data

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: GYE

DESIGN VALUE REPORT

Report Request ID: 1304254 Report Code: AMP480 Mar. 6, 2015

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	21	037	3002								

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
DESIGN VALUE	42401		

SELECTED OPTIONS

Option Type	Option Value
SINGLE EVENT PROCESSING	EXCLUDE REGIONALLY CONCURRED EVENTS
WORKFILE DELIMITER	,
USER SITE METADATA	COUNTY NAME
MERGE PDF FILES	YES
QUARTERLY DATA IN WORKFILE	NO
AGENCY ROLE	PQAO

DATE CRITERIA

Start Date	End Date
2014	2014

APPLICABLE STANDARDS

Standard Description
SO2 1-hour 2010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Mar. 6, 2015

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

Pollutant: Sulfur dioxide(42401)
Standard Units: Parts per billion(008)
NAAQS Standard: SO2 1-hour 2010
Statistic: Annual 99th Percentile **Level:** 75

Design Value Year: 2014

REPORT EXCLUDES MEASUREMENTS WITH REGIONALLY CONCURRED EVENT FLAGS.

State Name: Kentucky

		2014			2013			2012			3-Year	
Site ID	COUNTY NAME	Comp. Qrtrs	99th Percentile	Cert& Eval	Comp. Qrtrs	99th Percentile	Cert& Eval	Comp. Qrtrs	99th Percentile	Cert& Eval	Design Value	Valid Ind.
21-037-3002	Campbell	4	61	Y	4	71	Y	4	85	Y	72	Y

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

CERTIFICATION EVALUATION AND CONCURRENCE FLAG MEANINGS

FLAG	MEANING
M	The monitoring organization has revised data from this monitor since the most recent certification letter received from the state.
N	The certifying agency has submitted the certification letter and required summary reports, but the certifying agency and/or EPA has determined that issues regarding the quality of the ambient concentration data cannot be resolved due to data completeness, the lack of performed quality assurance checks or the results of uncertainty statistics shown in the AMP255 report or the certification and quality assurance report.
S	The certifying agency has submitted the certification letter and required summary reports. A value of "S" conveys no Regional assessment regarding data quality per se. This flag will remain until the Region provides an "N" or "Y" concurrence flag.
U	Uncertified. The certifying agency did not submit a required certification letter and summary reports for this monitor even though the due date has passed, or the state's certification letter specifically did not apply the certification to this monitor.
X	Certification is not required by 40 CFR 58.15 and no conditions apply to be the basis for assigning another flag value
Y	The certifying agency has submitted a certification letter, and EPA has no unresolved reservations about data quality (after reviewing the letter, the attached summary reports, the amount of quality assurance data submitted to AQS, the quality statistics, and the highest reported concentrations).

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

Appendix B

Letter of Notification of Permanent Shutdown of Walter C. Beckjord Facility

DUKE ENERGY OHIO

Duke Energy Ohio, Inc.
139 E. 4th Street
Cincinnati, OH 45202

October 14, 2014

Mr. Bradley M. Miller
Southwest Ohio Air Quality Agency
250 William Howard Taft Drive
Cincinnati, Ohio 45219

RE: Duke Energy Ohio, Inc., W.C. Beckjord Station
Facility ID No.: 1413100008
Emissions Units: B001, B002, B003, B004, B005, and B006

Dear Mr. Miller:

This letter is to inform you that, as of October 1, 2014, the six coal-fired emissions units at W.C. Beckjord Station (B001, B002, B003, B004, B005, and B006) are permanently shut down and removed from service. It is the understanding of Duke Energy Ohio, Inc. that authorization to operate the affected units has ceased as of October 1, 2014 and the permittee shall not be required to meet any Title V permit requirements applicable to these emissions units, except for any residual requirements, such as the quarterly deviation reports and annual compliance certification covering the period during which the emissions units last operated.

Please call Andrew Roebel at 513-287-2356 if you should have any questions regarding this information.

Based on information and belief formed after reasonable inquiry, I certify that all factual statements in this transmittal are true, accurate and complete to the best of my knowledge.

Very truly yours,

Michael Sharp

Michael Sharp
GM III – NonReg Fossil Station

Appendix C

Emissions Summary & Projections

SO_2 Redesignation Request Emissions Summary and Projections

Campbell, KY – Clermont, OH

Introduction

In January 2015, the Kentucky Division for Air Quality collaborated with the Ohio Environmental Protection Agency (Ohio EPA) to prepare a redesignation request for the sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS). This redesignation request relates to the interstate area of portions of Campbell County in Kentucky and Clermont County in Ohio. For Campbell County, the portion incudes five Census Tracts: 519.01, 519.03, 529.00, 531.00, and 533.01. And for Clermont County, the portion is Pierce Township.

Selection of Years

In developing this SO_2 redesignation request, the initial step was to select the years from base year to maintenance year. After discussions between representatives from the Kentucky Division for Air Quality and the Ohio EPA, the appropriate years were selected. For the base year, 2011 was selected to develop a comprehensive SO_2 emissions inventory for which projected emissions could be estimated for several future years.

For the attainment year, 2014 was selected since it corresponds to one of the years in the design value showing attainment. These design value years are 2012, 2013, and 2014. The 2014 attainment year also corresponds to the year where the permanent and enforceable improvement in air quality leading to attainment occurred due to Clermont County's Walter C. Beckjord facility permanently ceasing operations.

Below is a summary of the years chosen for each state.

YEARS FOR SO_2 REDESIGNATION REQUEST – KENTUCKY AND OHIO

Year	Year Type	Kentucky	Ohio
2011	Base Year	√	√
2014	Attainment Year	√	√
2017	Interim Maintenance Year	√	
2020	Interim Maintenance Year		√
2022	Interim Maintenance Year	√	
2027	Maintenance Year	√	√

Therefore, the years for both states used in this redesignation request are:

2011, 2014, 2017, 2020, 2022, and 2027

The 2011 National Emissions Inventory (NEI) was used for area and non-highway mobile source emissions. Along with Census and projected Census data, additional years of 2010 Census, 2020

Census, and 2030 Census years are also used as part of the population and growth rate calculations.

Below are detailed explanations for projections on population growth factors and future year SO_2 emissions from point, area, highway mobile, and non-highway mobile sources. The Kentucky Division for Air Quality has provided all emission and projection data for both counties in an *Excel* spreadsheet. Unless otherwise noted, the following narrative applies to both Campbell County in Kentucky and Clermont County in Ohio.

Population Growth

There are a total of five growth rates used for projecting Future Year SO_2 emissions. These growth rates can be divided into three groups based on the specific calculation type.

1) There is only one growth rate in the first group: the 2011-2014 growth rate. This growth rate, from the base year to the attainment year, was calculated by simply dividing the 2014 population by the 2011 population.

2) There are two growth rates in the second group: the 2014-2017 growth rate and the 2014-2020 growth rate. Projected from the 2014 attainment year, or Present Year, these growth rates were projected out towards and including the Future Year. For this growth rate group, the Future Year was 2020 as it would result in more-accurate growth rates. The following formula was used in *Excel* to calculate these growth rates.

Growth Factor = EXP(RATE(Y,,-PY,FY))^n

Where Y = Total Years between Present and Future Years
PY = Present Year, in this case, 2014
FY = Future Year, in this case, 2020
n = Number of Years Out From Present Year

Using an example for a growth rate out to the year 2017, the following formula is used.

2014-2017 Growth Factor = EXP(RATE(6,,-2014,2020))^3

where 6 represents the total years between 2014 (Present Year) and 2020 (Future Year). From 2014, projecting 3 years (n) out would represent 2017. A similar formula is also applied to calculate the growth rate for 2020.

3) The final two growth rates are in the third group: the 2014-2022 growth rate and the 2014-2027 growth rate. Again, projected from the 2014 attainment year, or Present Year, these growth rates were projected out towards and including the Future Year. For this growth rate group, the Future Year was 2030 as it would result in more-accurate growth rates. The 2030 year was also used since 2022 and 2027 falls outside of the range using the Future Year 2020 indicated in the second growth rate group. The following formula was used in *Excel* to calculate these growth rates.

Growth Factor = EXP(RATE(Y,,-PY,FY))^n

Where Y = Total Years between Present and Future Years
PY = Present Year, in this case, 2014
FY = Future Year, in this case, 2030
n = Number of Years Out From Present Year

Using an example for a growth rate out to the year 2022, the following formula is used.

2014-2022 Growth Factor = EXP(RATE(16,,-2014,2030))^8

where 16 represents the total years between 2014 (Present Year) and 2030 (Future Year). From 2014, projecting 8 years (n) out would represent 2022. A similar formula is also applied to calculate the growth rate for 2027.

Point Source Emissions

For Campbell County, Kentucky, point source facilities were first identified within the five Census Tracts. There were a total of 11 facilities located within these Census Tract boundaries. After the facility locations were found, the 2011 base year emissions from those point sources were obtained from the Kentucky Emissions Inventory database. Finally, point source emissions were projected for the years 2014 attainment year, 2017, 2020, 2022, and 2027. Growth rates for these projected years were used as described in the section titled, "Population Growth."

For Pierce Township in Clermont County, Ohio, the only point source facility is Walter C. Beckjord Station. However, in a letter from Duke Energy Ohio, Inc. to the Southwest Ohio Air Quality Agency that is dated October 14, 2014, the six coal-fired emissions units (B001, B002, B003, B004, B005, and B006) "are permanently shut down and removed from service." The letter continues to indicate "that authorization to operate the affected units has ceased as of October 1, 2014." According to Ms. Jennifer Van Vlerah (Ohio EPA), the facility actually ceased operation on September 1, 2014. Therefore, this facility only operated for the first eight months of 2014.

Area Source Emissions

The 2011 NEI, the most-recent NEI, was used to obtain 2011 base year area source emissions for both Campbell County, Kentucky and Clermont County, Ohio. These emissions represent the entire counties.

The appropriate population percentages were applied to each county (29.0% for Campbell County, 7.3% for Clermont County). By applying these percentages to the county emissions for area sources, the five Census Tracts and Pierce Township are now represented.

With the 2011 base year area source emissions now established for the county portions, those emissions were multiplied by the 2011-2014 growth rate to obtain the 2014 emissions. The 2014

attainment year emissions were then projected for 2017, 2020, 2022, and 2027 by using the growth rates explained in the section titled, "Population Growth."

Highway Mobile Source Emissions

The Ohio-Kentucky-Indiana Regional Council of Governments, or OKI, provided the highway mobile source emissions for 2011 base year, 2014 attainment year, 2017, 2020, 2022, and 2027. The emissions for the specific county portions were not calculated based on population percentages. Rather, the emissions were more accurately reflected by dividing the vehicle miles traveled in the portion by the vehicle miles traveled in the entire county.

Non-Highway Mobile Source Emissions

Just like area source emissions, the 2011 NEI was used to obtain 2011 base year non-highway mobile source emissions for both Campbell County, Kentucky and Clermont County, Ohio. These emissions represent the entire counties.

The appropriate population percentages were applied to each county (29.0% for Campbell County, 7.3% for Clermont County). By applying these percentages to the county emissions for non-highway mobile source sources, the five Census Tracts and Pierce Township are now represented.

With the 2011 base year non-highway mobile source emissions now established for the county portions, those emissions were multiplied by the 2011-2014 growth rate to obtain the 2014 emissions. The 2014 attainment year emissions were then projected for 2017, 2020, 2022, and 2027 by using the growth rates explained in the section titled, "Population Growth."

Summary of Emissions

As indicated in the *Excel* worksheet titled, "Total Emissions Summary," there is a very significant reduction in SO_2 emissions for the subject portions in Campbell County, Kentucky and Clermont County, Ohio.

Enter Pollutant(s) Here:	SO2			Enter Area Here:		Campbell-Clermont Counties, KY-OH (Portions)			
ENTIRE COUNTY	Census 2010 [1]	Base Year 2011 [2]	Attain 2014	Proj 2017	Census 2020 [1]		Proj 2022	Proj 2027	Census 2030 [1]
Campbell, KY	90,336	90,946	91,178	91,410	91,642		90,954	90,815	90,731
Clermont, OH [4]	197,363	198,543	201,762	205,028	208,330		207,846	211,741	214,090

DECENNIAL COUNTY GROWTH*	'10-'20	'20-'30
Campbell, KY	1.446%	-0.994%
Clermont, OH	5.557%	2.765%

COUNTY GROWTH RATES FOR EMISSION PROJECTIONS						
COUNTY		'11-'14	'14-'17	'14-'20	'14-'22	'14-'27
Campbell, KY		1.0025	1.0025	1.0051	0.9975	0.9960
Clermont, OH		1.0162	1.0162	1.0326	1.0302	1.0495

CENSUS TRACTS / TOWNSHIP	Census 2010	Base Year 2011*	Attain 2014*	Proj 2017*	Census 2020*		Proj 2022*	Proj 2027*	Census 2030*
Campbell, KY -- Census Tracts	26,368	26,406	26,520	26,634	26,749		26,502	26,490	26,483
Campbell, KY -- Population %	29.2%	29.0%	29.1%	29.1%	29.2%		29.1%	29.2%	29.2%
Clermont, OH (Pierce Township) [4]	14,378	14,458	14,684	14,914	15,146		15,208	15,544	15,747
Clermont, OH -- Population %	7.3%	7.3%	7.3%	7.3%	7.3%		7.3%	7.3%	7.4%

Campbell County: Census Tract	Census 2010 [3]	Base Year 2011*	Attain 2014*	Proj 2017*	Census 2020*		Proj 2022*	Proj 2027*	Census 2030*
519.01	4,986	4,993	5,015	5,036	5,058		5,011	5,009	5,008
519.03	5,316	5,324	5,347	5,370	5,393		5,343	5,341	5,339
529.00	5,362	5,370	5,393	5,416	5,440		5,389	5,387	5,385
531.00	5,810	5,818	5,843	5,869	5,894		5,839	5,837	5,835
533.01	4,894	4,901	4,922	4,943	4,965		4,919	4,917	4,915
TOTAL ("Census Tracts" above)	**26,368**	**26,406**	**26,520**	**26,634**	**26,749**		**26,502**	**26,490**	**26,483**

1) Population Projections 2015-2050, Census Data for 2010, 2020, and 2030, "Total Population", Kentucky State Data Center, *http://ksdc.louisville.edu/index.php/kentucky-demographic-data/projections*

2) Population Estimates for 2011 and 2012, "Total Population (2013)", Kentucky State Data Center, *http://ksdc.louisville.edu/index.php/kentucky-demographic-data/estimates/population-and-housing-units*

3) 2010 Census Tract and Block Data -- Campbell County, Kentucky State Data Center, *http://ksdc.louisville.edu/index.php/kentucky-demographic-data/decennial-census*

4) E-mail from Jennifer Van Vlerah, Ohio EPA, Population Data for Pierce Township in Clermont County, Ohio December 8, 2014.

* Indicates that county-wide growth factors were applied due to limited access to specific localized population data.

The area for this SO_2 redesignation request includes five Census Tracts in Campbell County, KY (519.01, 519.03, 529.00, 531.00, and 533.01) and Pierce Township in Clermont County, OH.

Joe Forgacs Kentucky Division for Air Quality

-- April 2015

POINT SOURCE EMISSIONS

POLLUTANT(S):	SO2		AREA:	Campbell-Clermont Counties, KY-OH (Portions)			
		Base Year	Attainment	Projected	Projected	Projected	Projected
		2011	2014	2017	2020	2022	2027
Facility ID	Facility Name	tpy	tpy	tpy	tpy	tpy	tpy
Campbell, KY							
2103700008	Prestress Services Industries LLC	0.00	0.00	0.00	0.00	0.00	0.00
2103700060	Barrett Paving Materials	0.14	0.14	0.14	0.14	0.14	0.14
2103700061	Archer Daniel Midland Corp	0.00	0.00	0.00	0.00	0.00	0.00
2103700066	Fischer Special Manufacturing Co	0.00	0.00	0.00	0.00	0.00	0.00
2103700090	Continental Silver Grove LLC	0.65	0.65	0.65	0.65	0.65	0.64
2103700091	DTE Silver Grove LLC	0.00	0.00	0.00	0.00	0.00	0.00
2103700106	Griffin Industries Inc	0.00	0.00	0.00	0.00	0.00	0.00
2103700107	Insight KY Partners II LP - Highland Heights	0.00	0.00	0.00	0.00	0.00	0.00
2103700108	Insight KY Partners II LP - Alexandria	0.00	0.00	0.00	0.00	0.00	0.00
2103700112	Verizon Wireless - Cold Spring II	0.00	0.00	0.00	0.00	0.00	0.00
2103700115	Verizon Wireless - Carthage	0.00	0.00	0.00	0.00	0.00	0.00
	TOTAL	**0.78**	**0.78**	**0.79**	**0.79**	**0.78**	**0.78**
Clermont, OH							
1413100008	Walter C. Beckjord	90,834.50	32,602.44	0.00	0.00	0.00	0.00
	TOTAL	**90,834.50**	**32,602.44**	**0.00**	**0.00**	**0.00**	**0.00**
	POINT TOTAL	**90,835.28**	**32,603.22**	**0.79**	**0.79**	**0.78**	**0.78**

The area for this SO_2 redesignation request includes five Census Tracts in Campbell County, KY (519.01, 519.03, 529.00, 531.00, and 533.01) and Pierce Township in Clermont County, OH.

2011 baseyear point source emissions were determined based on location within these specific localized areas in each county. For Campbell County, 2011 point source emissions were obtained through the Kentucky Emissions Inventory database. Growth rates in the "Pop Growth" worksheet, shaded in gray, were then applied to the Future Year emissions for 2014 (attainment year), 2017, 2020, 2022, and 2027. The Walter C. Beckjord facility in Clermont County permanently closed during 2014.

Data Source #1 : Kentucky Emissions Inventory database (2011)

Data Source #2 : E-mail from Jennifer Van Vlerah, Ohio EPA, Point Source Emissions for Pierce Township in Clermont County, Ohio, December 17, 2014

AREA SOURCE EMISSIONS

POLLUTANT(S):	SO2		AREA:	Campbell-Clermont Counties, KY-OH (Portions)				
	ENTIRE Base Year 2011	Population	PORTION Base Year 2011	PORTION Attainment 2014	PORTION Projected 2017	PORTION Projected 2020	PORTION Projected 2022	PORTION Projected 2027
COUNTY	tpy	%	tpy	tpy	tpy	tpy	tpy	tpy
Campbell, KY	20.77	29.0%	6.03	6.05	6.07	6.08	6.04	6.03
Clermont, OH	103.06	7.3%	7.50	7.62	7.74	7.87	7.85	8.00
AREA TOTAL	**123.83**		**13.53**	**13.67**	**13.81**	**13.95**	**13.89**	**14.03**

The area for this SO_2 redesignation request includes five Census Tracts in Campbell County, KY (519.01, 519.03, 529.00, 531.00, and 533.01) and Pierce Township in Clermont County, OH.

2011 baseyear area source emissions were obtained from the National Emissions Inventory (U.S. EPA). Growth rates in the "Pop Growth" worksheet, shaded in gray, were then applied to project the Future Year SO_2 emissions for 2014 (attainment year), 2017, 2020, 2022, and 2027. County portions were applied by multiplying the 2011 emissions for the entire county by the Population %. Emissions from the portions were then be projected out to Future Years.

Data Source : National Emissions Inventory (2011), U.S. EPA

HIGHWAY MOBILE SOURCE EMISSIONS

POLLUTANT(S):	SO2			AREA:	Campbell-Clermont Counties, KY-OH (Portions)		
	PORTION Base Year 2011	Population % (if applicable)	PORTION Attainment 2014	PORTION Projected 2017	PORTION Projected 2020	PORTION Projected 2022	PORTION Projected 2027
COUNTY	tpy		tpy	tpy	tpy	tpy	tpy
Campbell, KY	1.55		1.51	1.44	1.40	1.37	1.26
Clermont, OH	0.34		0.33	0.32	0.31	0.30	0.28
HWY MOBILE	**1.89**		**1.84**	**1.76**	**1.71**	**1.67**	**1.54**

The area for this SO_2 redesignation request includes five Census Tracts in Campbell County, KY (519.01, 519.03, 529.00, 531.00, and 533.01) and Pierce Township in Clermont County, OH.

Andy Reser from the Ohio-Kentucky-Indiana Regional Council of Governments, or OKI, provided the highway mobile source emissions for 2011 baseyear, 2014 (attainment year), 2017, 2020, 2022, and 2027. The emissions for the specific portions of each county were not calculated based on population percentages. Instead, the emissions were more accurately reflected by dividing the vehicle miles traveled in the portion by the vehicle miles traveled in the entire county.

Data Source : Ohio-Kentucky-Indiana (OKI) Regional Council of Governments

NON-HIGHWAY MOBILE SOURCE EMISSIONS

POLLUTANT(S):	SO2		AREA:	Campbell-Clermont Counties, KY-OH (Portions)				
	ENTIRE Base Year 2011	Population	PORTION Base Year 2011	PORTION Attainment 2014	PORTION Projected 2017	PORTION Projected 2020	PORTION Projected 2022	PORTION Projected 2027
COUNTY	tpy	%	tpy	tpy	tpy	tpy	tpy	tpy
Campbell, KY	0.68	29.0%	0.20	0.20	0.20	0.20	0.20	0.20
Clermont, OH	2.40	7.3%	0.17	0.17	0.17	0.18	0.18	0.18
NON-HWY TOTAL	**3.08**		**0.37**	**0.37**	**0.37**	**0.38**	**0.38**	**0.38**

The area for this SO_2 redesignation request includes five Census Tracts in Campbell County, KY (519.01, 519.03, 529.00, 531.00, and 533.01) and Pierce Township in Clermont County, OH.

2011 baseyear non-highway source emissions were obtained from the National Emissions Inventory (U.S. EPA). Growth rates in the "Pop Growth" worksheet, shaded in gray, were then applied to project the Future Year SO_2 emissions for 2014 (attainment year), 2017, 2020, 2022, and 2027. County portions were applied by multiplying the 2011 emissions for the entire county by the Population %. Emissions from the portions were then be projected out to Future Years.

Data Source : National Emissions Inventory (2011), U.S. EPA

TOTAL EMISSIONS SUMMARY

POLLUTANT(S):	SO2		AREA:	Campbell-Clermont Counties, KY-OH (Portions)		
	PORTION	PORTION	PORTION	PORTION	PORTION	PORTION
	Base Year	Attainment	Projected	Projected	Projected	Projected
	2011	2014	2017	2020	2022	2027
COUNTY	tpy	tpy	tpy	tpy	tpy	tpy
Campbell, KY						
Point	0.78	0.78	0.79	0.79	0.78	0.78
Area	6.03	6.05	6.07	6.08	6.04	6.03
Hwy Mobile	1.55	1.51	1.44	1.40	1.37	1.26
Non-Hwy	0.20	0.20	0.20	0.20	0.20	0.20
TOTAL	**8.56**	**8.54**	**8.50**	**8.47**	**8.39**	**8.27**
Clermont, OH						
Point	90,834.50	32,602.44	-	-	-	-
Area	7.50	7.62	7.75	7.88	7.85	8.00
Hwy Mobile	0.34	0.33	0.32	0.31	0.30	0.28
Non-Hwy	0.17	0.17	0.17	0.18	0.18	0.18
TOTAL	**90,842.51**	**32,610.56**	**8.24**	**8.37**	**8.33**	**8.46**
AREA TOTAL	**90,851.07**	**32,619.10**	**16.74**	**16.84**	**16.72**	**16.73**

The area for this SO_2 redesignation request includes five Census Tracts in Campbell County, KY (519.01, 519.03, 529.00, 531.00, and 533.01) and Pierce Township in Clermont County, OH.

2011 baseyear emissions were obtained from a variety of sources. Point source emissions were obtained from state emissions inventory databases. 2011 baseyear area and non-highway mobile source emissions were obtained from the National Emissions Inventory (U.S. EPA). All highway mobile source emissions were obtained from the Ohio-Kentucky-Indiana Regional Council of Governments, or OKI, in Cincinnati, Ohio. Growth rates in the "Pop Growth" worksheet, shaded in gray, were then applied to project the Future Year SO_2 emissions for 2014 (attainment year), 2017, 2020, 2022, and 2027. Where applicable (area and non-highway), county portions were applied by multiplying the 2011 baseyear emissions for the entire county by the Population %. Emissions from the portions were then be projected out to Future Years.

Appendix D

Campbell County, KY SO_2 Monitor
2010-2014 Exceedance Analysis

Appendix D
Campbell County, Kentucky SO2 Monitor 21-037-3002
2010-2014 Exceedance Analysis
January 20, 2014

I. Background

Between January 1, 2010 and August 31, 2014, 44 exceedances of the 2010 1-hour SO2 National Ambient Air Quality Standard (NAAQS) of 75 ppb were recorded at the John's Hill Road Monitoring Site in Campbell County, Kentucky, Monitor ID 21-037-3002. This monitor, shown in Table 1, is located in the northern part of Campbell County, Kentucky, south of Cincinnati, Ohio (Figure 1).

In this report, data is analyzed to identify potential SO2 sources contributing to the 1-hour NAAQS exceedances at Monitor 21-037-3002. Two major SO2 emission sources were considered for the investigation, given their proximity to the monitors and the predominant wind directions potentially impacting the monitor in Campbell County. The sources, Duke Energy's W.C. Beckjord (Beckjord) and W. H. Zimmer (Zimmer) facilities in Clermont County, OH, are located east and south-east, respectfully, of Kentucky monitor 21-037-3002 (Figure 2).

II. Methodology

A back trajectory analysis was performed for the exceedances at monitor 21-037-3002 using the National Oceanic and Atmospheric Administration's (NOAA) Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT)[1]. HYSPLIT is a complete system for modeling simple air parcel trajectories, both in forward and backward modes. The model calculation method is a hybrid between the Lagrangian approach, which uses a moving frame of reference as the air parcels move from their initial location, and the Eulerian approach, which uses a fixed 3-dimensional grid as a frame of reference.

For this report HYSPLIT back-trajectories were created using NOAA's archived North American Mesoscale Modeling System, 12 kilometer grid resolution meteorological dataset (NAM 12 kilometers). The back trajectories originated at the violating monitor location on each hour that corresponds to a measured exceedance of the 1-hr SO2 NAAQS and were initialized at 500 meters above ground level with the "Model Vertical Velocity" model option. The main purpose of these analyses was to determine a probable cause of recorded exceedances by simulating the flow of 24-hour air trajectory patterns in the backward mode. Meteorological data used to create the HYSPLIT back trajectories was taken from the National Weather Service Station located at the Cincinnati Northern Kentucky Airport (KCVG).

Back-trajectories alone were not used for this analysis since they may not always be indicative of flow patterns during very short periods of time when exceedances occur

[1] Draxler, R.R. and Rolph, G.D., 2012. HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) Model access via NOAA ARL READY Website (http://ready.arl.noaa.gov/HYSPLIT.php). NOAA Air Resources Laboratory, Silver Spring, MD.

(e.g, single or few hours). In those cases, an analysis of hourly wind patterns aids in determining the flow of emissions from these sources for the hours around the exceedance.

Table 1. Summary of the 2010 1-hour SO2 NAAQS exceedances at Monitor ID 21-037-3002.

Year	Month	Day	Hour (EST)	Monitored Value (ppb)
2010	April	14	9:00	106
2010	April	14	13:00	142
2010	April	14	14:00	140
2010	April	14	15:00	86
2010	April	14	16:00	86
2010	July	31	14:00	82
2010	August	27	9:00	118
2010	September	14	11:00	99
2010	November	24	11:00	105
2011	February	23	9:00	137
2011	March	3	10:00	86
2011	March	3	13:00	92
2011	March	7	12:00	82
2011	March	7	13:00	76
2011	March	7	15:00	87
2011	March	8	17:00	84
2011	March	20	7:00	89
2011	April	22	3:00	109
2011	June	3	10:00	102
2011	June	3	11:00	142
2011	July	5	10:00	91
2011	July	5	11:00	180
2011	July	15	17:00	76
2011	July	15	18:00	92
2011	August	30	10:00	86
2011	August	30	11:00	76
2011	August	30	12:00	84
2011	August	30	13:00	84
2011	August	30	14:00	80
2012	January	11	12:00	76
2012	January	25	12:00	85
2012	February	3	17:00	82
2012	February	20	12:00	117
2012	February	20	13:00	156
2012	February	28	12:00	77
2012	April	7	11:00	99

Year	Month	Day	Hour (EST)	Monitored Value (ppb)
2012	April	7	15:00	81
2012	May	6	18:00	93
2013	February	9	13:00	96
2013	February	9	14:00	124
2013	February	25	9:00	100
2013	February	25	10:00	125
2013	March	5	6:00	125
2014	March	6	12:00	93

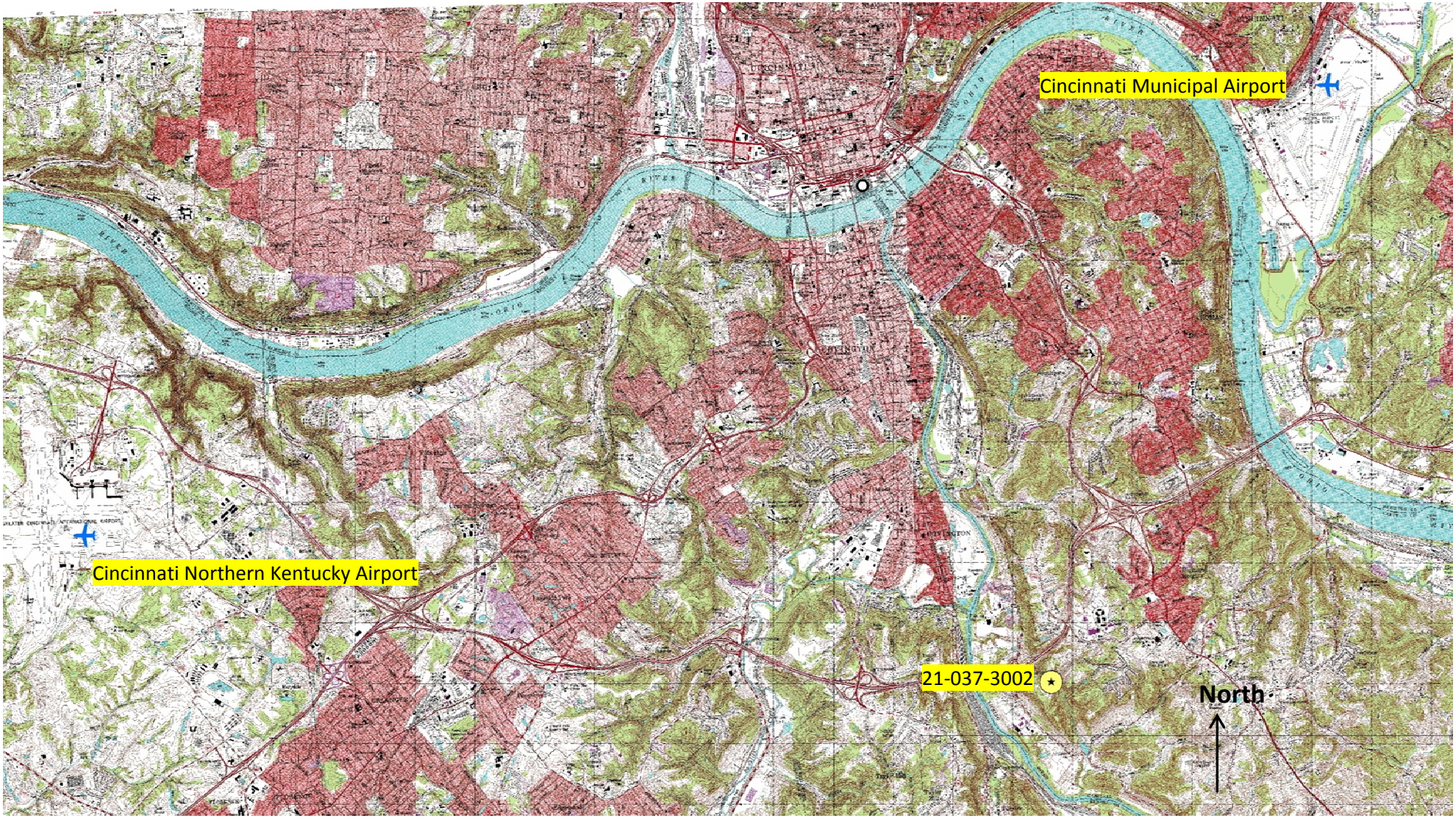


Figure 1. Topographic map of the Monitor ID 21-037-3002 and nearby Airports

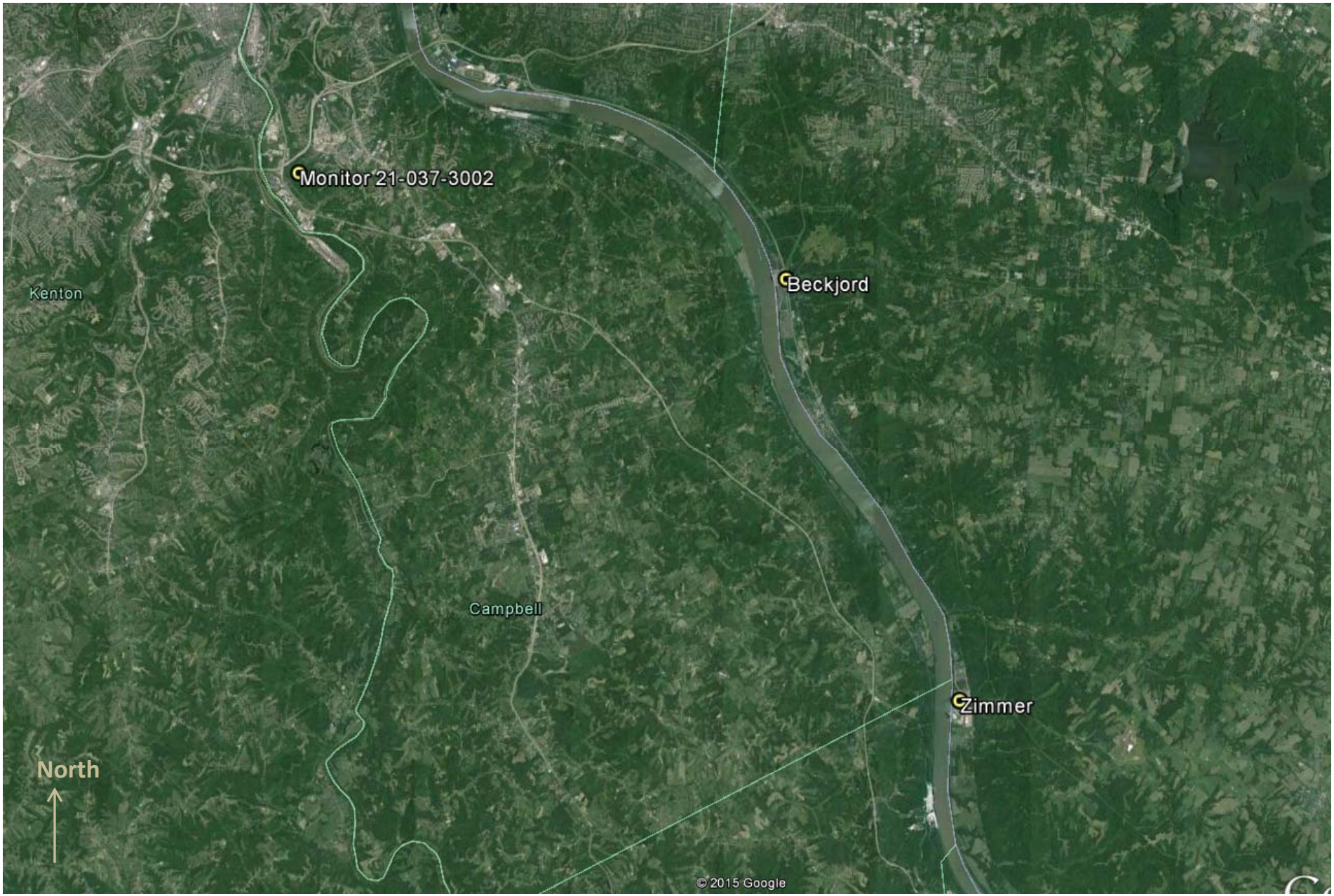


Figure 2. Locations of Duke Energy's W.C. Beckjord and William H. Zimmer facilities

The results of the exceedance day HYPSLIT back trajectory modeling were divided into the following categories:

> Section III: Beckjord Trajectories - HYSPLIT trajectories passed over or near Beckjord (29 exceedances);
>
> Section IV: Zimmer Trajectories - HYSPLIT trajectories passed over or near Zimmer (1 exceedance);
>
> Section V: Intermediate Trajectories (4 exceedances);
>
> Section VI: Other Trajectories – HYSPLIT trajectories do not clearly indicate either Beckjord or Zimmer (10 exceedances).

This report is organized in accordance with the above categories.

For all exceedance days, a further examination of the surface meteorology was conducted. There are two surface meteorology stations located near the Kentucky Monitor 21-037-3002. To determine the best station to use for this analysis, a windrose of all days in which an exceedance was recorded at monitor 21-037-3002 during the 2010 to 2014 period is shown for both Cincinnati Northern Kentucky Airport (KCVG Station #93814) and Cincinnati Municipal Airport (KLUK Station # 93812) in Figure 3 and Figure 4, respectively. It is readily apparent from the windrose data in Figure 4 that the river valley close to Cincinnati Municipal Airport influences the local wind direction.

Meteorological data from the Cincinnati Northern Kentucky Airport was selected based on the similar topography of the airport location and the monitor station location (Figure 1). Although the weather station located at Cincinnati Municipal Airport is closer in proximity to the monitoring station location, the closeness of this airport to the river valley channels local winds in a northeast to southwest or southeast to northeast direction. This channeling is not expected to be present at the monitoring station location.

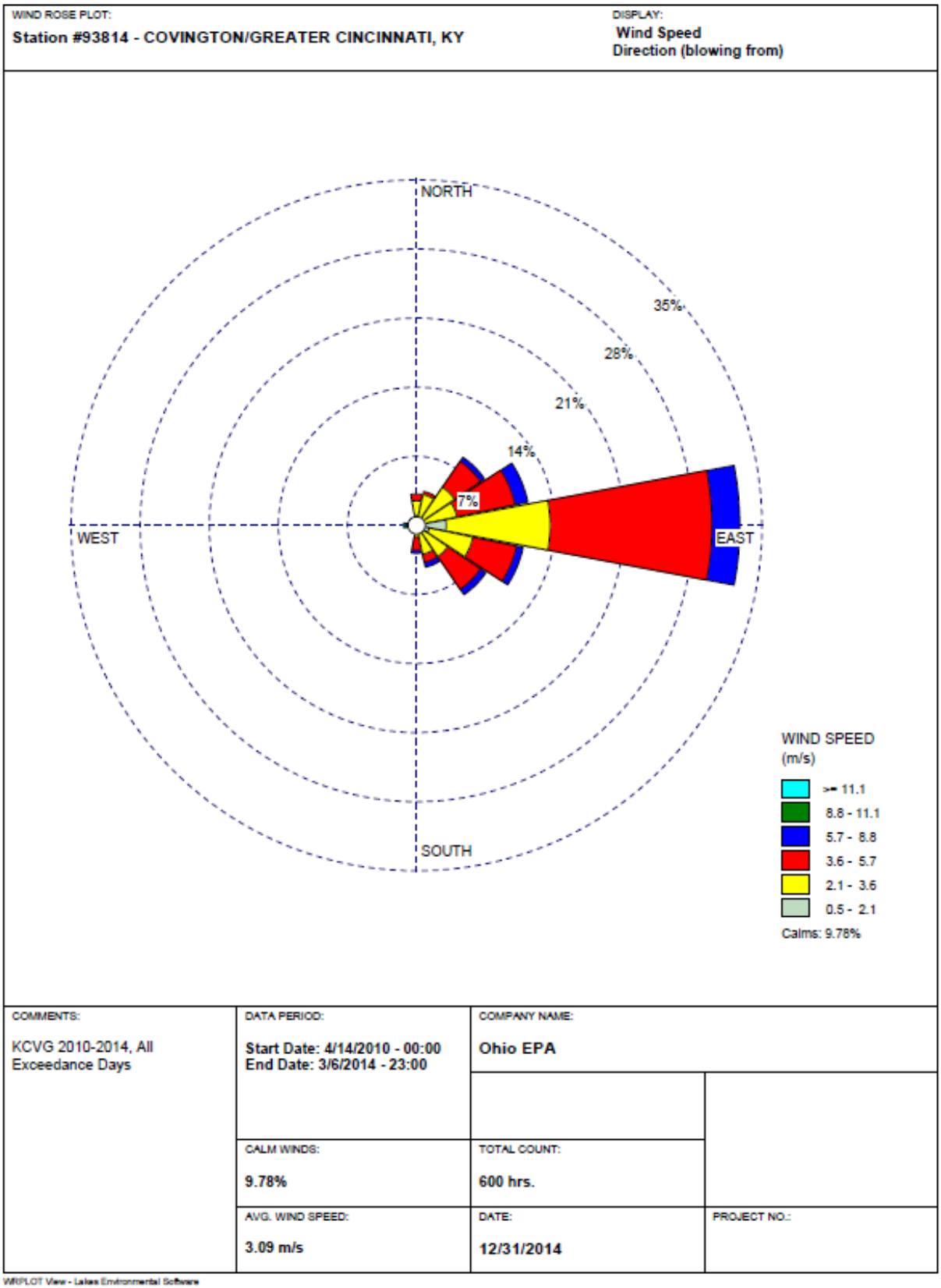


Figure 3: Cincinnati Northern Kentucky Airport (KCVG) wind rose for all exceedance days, 2010 to 2014

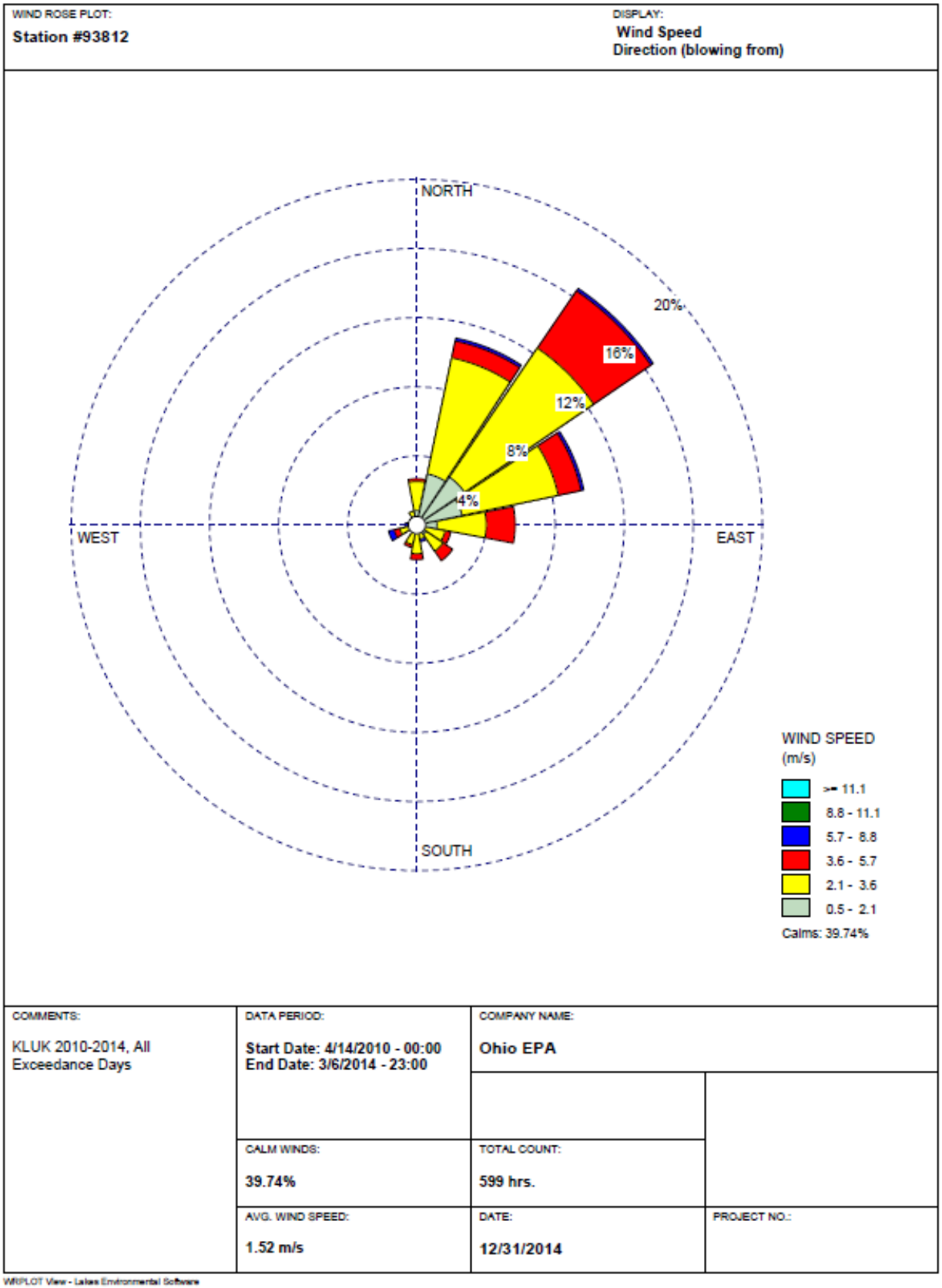


Figure 4: Cincinnati Municipal Airport (KLUK) wind rose for all exceedance days, 2010 to 2014

In some instances, the hourly emissions data were also reviewed in addition to the meteorological and HYSPLITY back trajectories. Hourly emissions data were downloaded from the U.S. EPA's Clean Air Markets Database (CAMD) and analyzed in comparison with the monitor exceedances.

The annual 2010-2014 emissions, shown in

Table 2

Table **2.** Annual emissions summary for Beckjord and Zimmer, indicate that the Beckjord facility emitted significantly more SO2 than the Zimmer facility during the time period 2010-2014. It should be noted that the Zimmer facility was fitted with flue gas de-sulfurization controls in December of 1990, which operate continuously by permit. The Beckjord facility does not have similar, advanced pollution controls for SO2.

Table 2. Annual emissions summary for Beckjord and Zimmer

	Annual SO2 Emission (tons)				
Facility	**2010**	**2011**	**2012**	**2013**	**2014**
W H Zimmer Generating Station	19,388	18,044	11,975	18,457	9,780
W C Beckjord Generating Station	69,156	90,835	67,069	51,900	32,627

Note: Emissions for Jan. 1, 2010-Aug. 31, 2014

The following sections of this report describe the results of the findings of the above described analyses.

III. Beckjord Trajectories

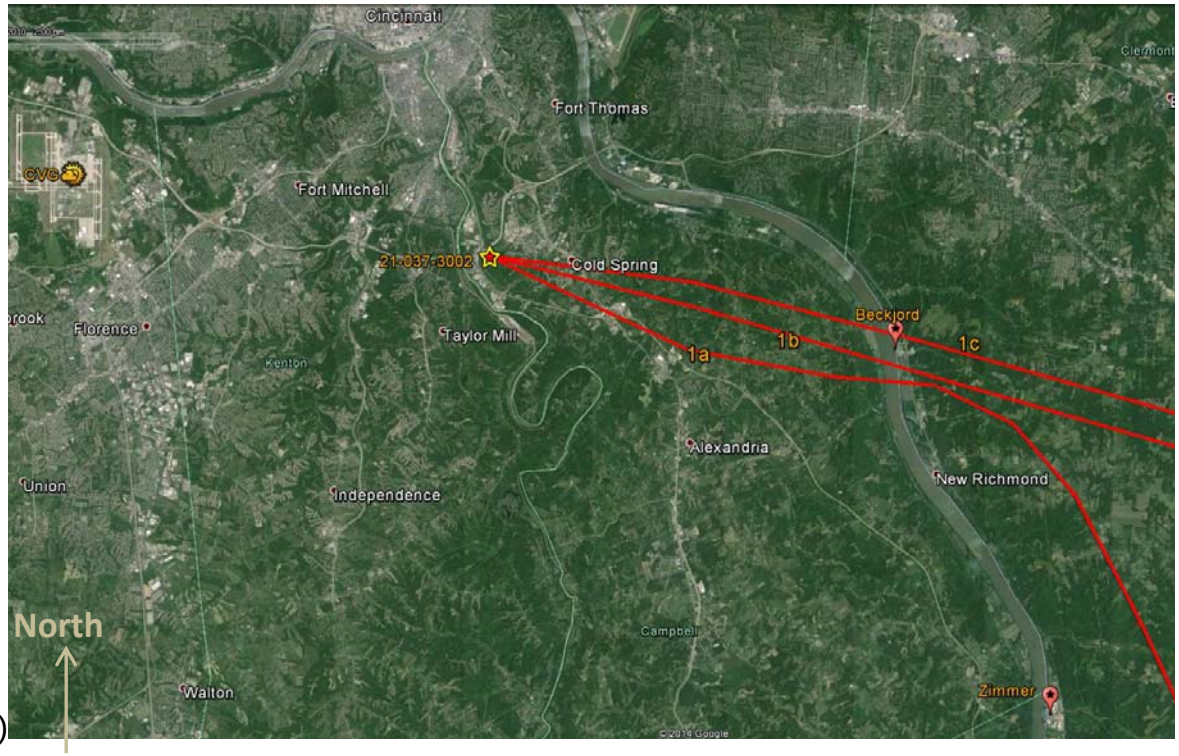
This section includes exceedance days in which the HYSPLIT back trajectories pass directly over or in close proximity to the Beckjord facility indicating a high probability of Beckjord contributing to the exceedances reported at the monitor. In this Section surface level wind data is also discussed in relation to the exceedance time and dates.

April 14, 2010

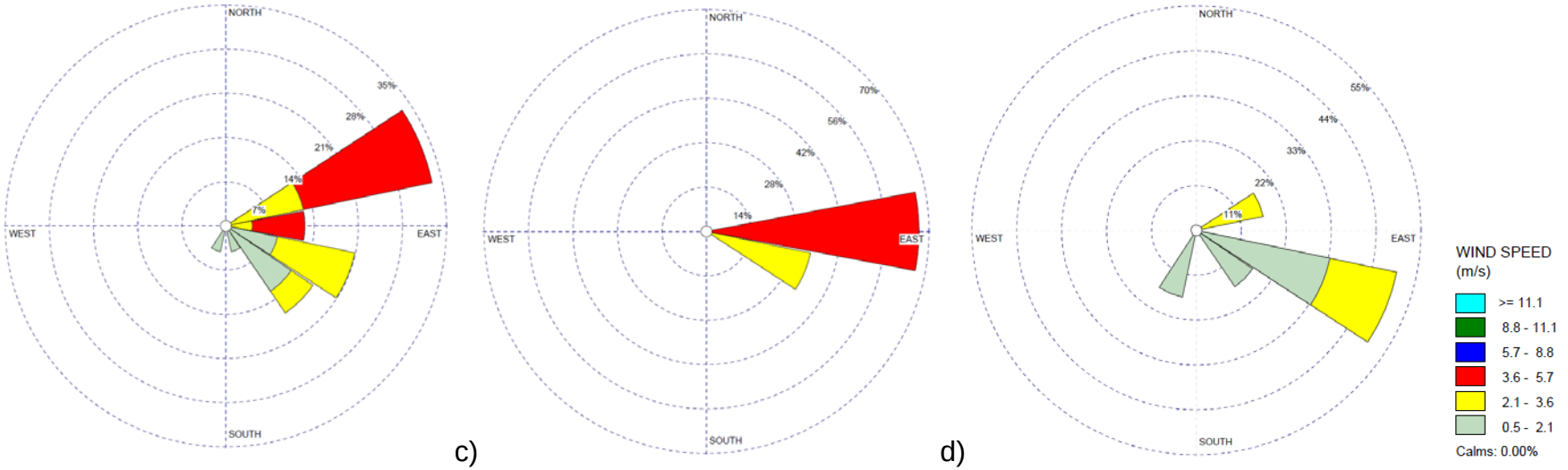
On April 14, 2010, five exceedances were reported at Monitor ID 21-037-3002 between 9:00 and 16:00. The exceedance values ranged from 86 to 142 ppb. Three HYSPLIT back trajectories were modeled as shown in Figure 5a to represent the five exceedances in the table below. The surface level meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 5b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 5c and 5d show the windrose data around the time of the 9:00 hour and 13:00 to 16:00 hour exceedance periods, respectively.

All three back trajectories pass directly over or in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. In addition, the windrose data at the time of the exceedances shows the wind was blowing predominantly from the eastern direction, where the Beckjord facility is located. The April 14, 2010 exceedances are attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Monitored Value (ppb)
1a	2010	4	14	9:00	106
1a	2010	4	14	13:00	142
1b	2010	4	14	14:00	140
1c	2010	4	14	15:00	86
1c	2010	4	14	16:00	86



a)



b) c) d)

Figure 5. a) HYSPLIT back trajectory modeling for April 14, 2010; b) 24-hour windrose data at KCVG Station on April 14, 2010; c) 3-hour windrose data from 8:00 to 10:00 at KCVG Station on April 14, 2010; d) 6-hour windrose data from 12:00-17:00.

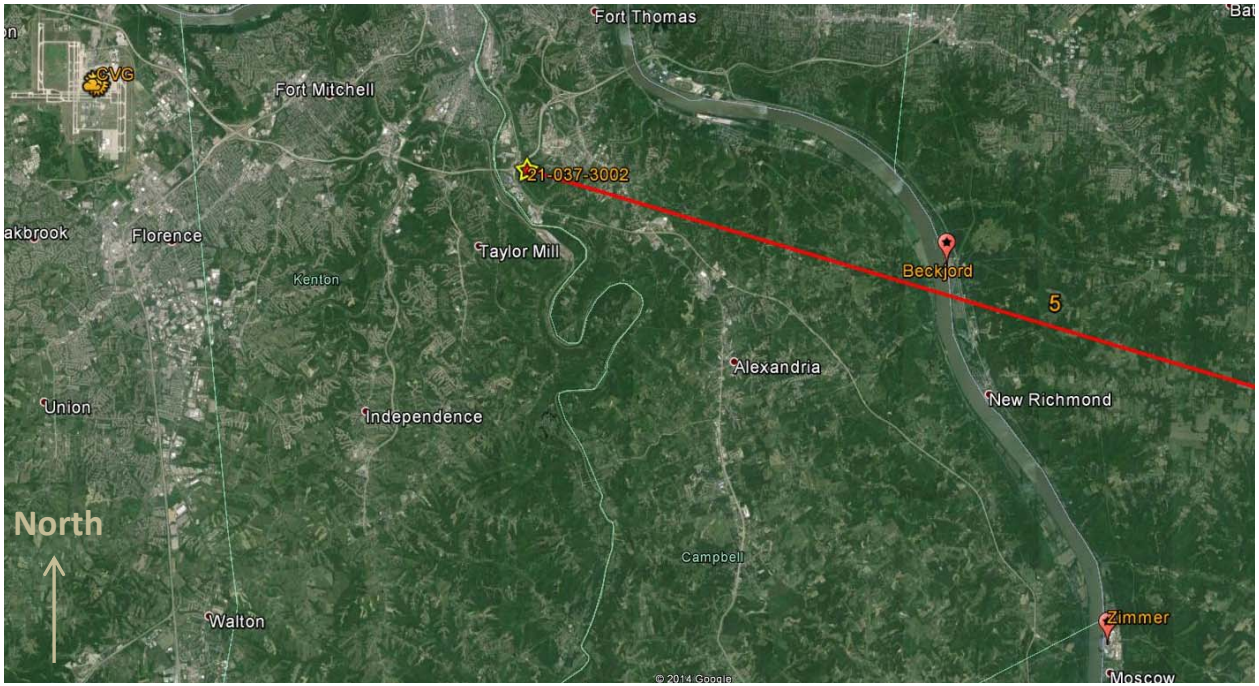
November 24, 2010

On November 24, 2010, one exceedance was reported at Monitor ID 21-037-3002 at 11:00. The exceedance value reported was 105 ppb as shown in the table below. The exceedance was modeled by one HYSPLIT back trajectory in Figure 6a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 6b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 6c shows the windrose data around the time of the exceedance hour.

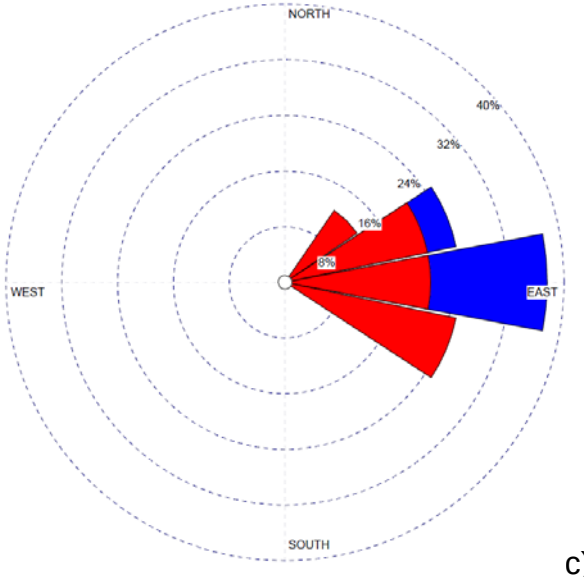
The HYSPLIT back trajectory passes in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. In addition, the windrose data at the time of the exceedances shows the wind was blowing predominantly from the eastern direction, where the Beckjord facility is located. The November 24, 2010 exceedances are attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
5	2010	November	24	11:00	105

a)



b)



c)

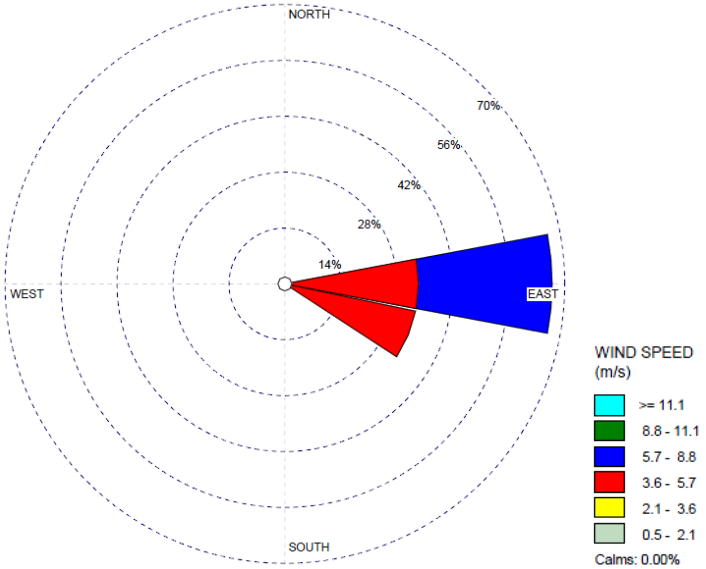


Figure 6. a) HYSPLIT back trajectory modeling for April 14, 2010; b) 24-hour windrose data at KCVG Station on November 24, 2010; c) 3-hour windrose data from 10:00 to 12:00 at KCVG Station on November 24, 2010.

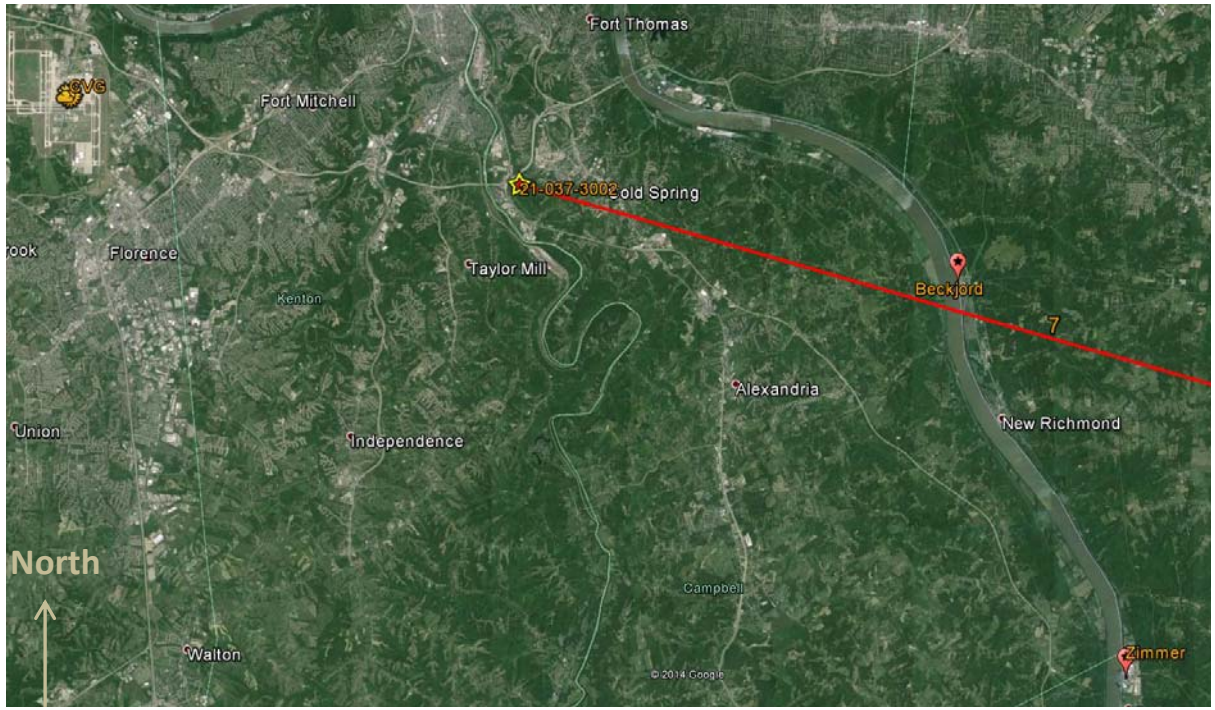
March 3, 2011

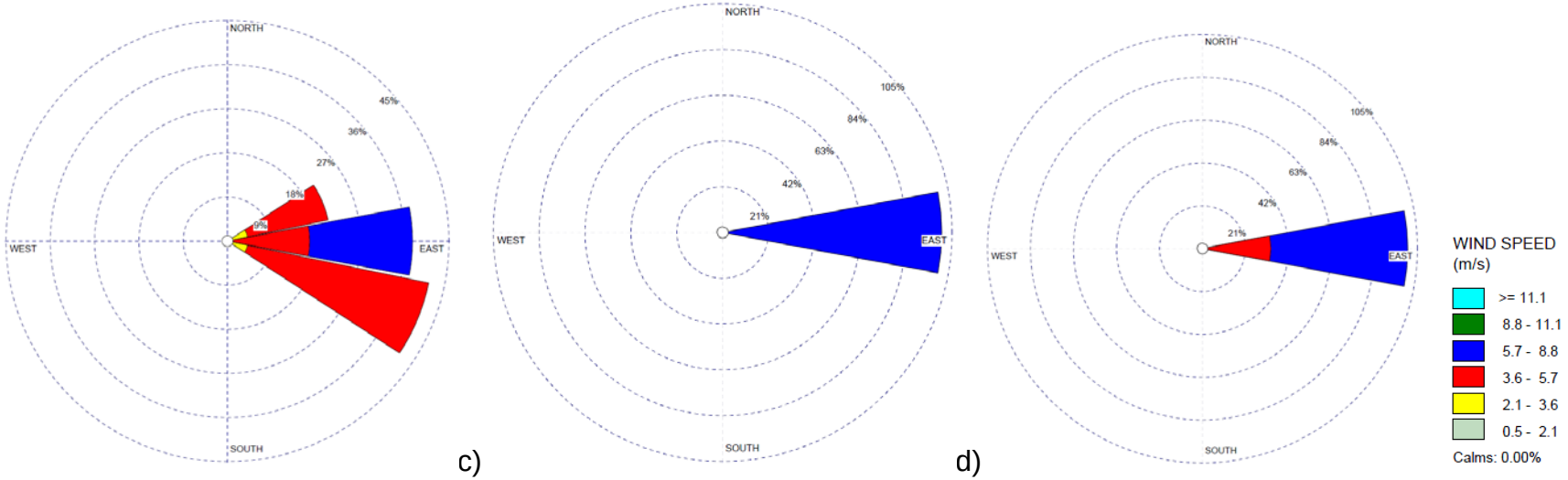
On March 3, 2011, two exceedances were reported at Monitor ID 21-037-3002 at 10:00 and 13:00. The exceedance values reported were 86 and 92, respectively. The exceedances were modeled by one HYSPLIT back trajectory in Figure 7a. The surface level meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 7b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 7c and 7d show the windrose data around the time of the exceedance hours.

The HYSPLIT back trajectory passes in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. In addition, the windrose data at the time of the exceedances shows the wind was blowing exclusively from the eastern direction, where the Beckjord facility is located. The March 3, 2011 exceedances are therefore expected to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
7	2011	March	3	10:00	86
7	2011	March	3	13:00	92

a)





b) c) d)

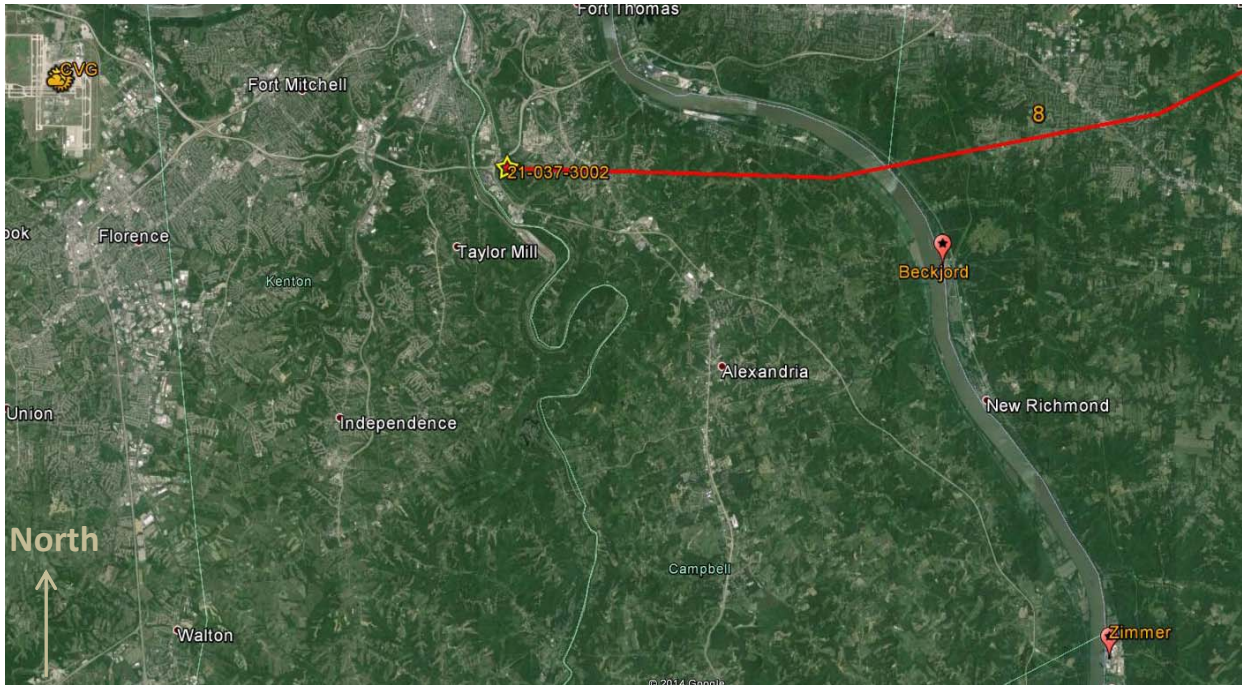
Figure 7. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on March 3, 2011; b) 24-hour windrose data at KCVG Station on March 3, 2011; c) 3-hour windrose data from 9:00 to 11:00 at KCVG Station on March 3, 2011; d) 3-hour windrose data from 12:00 to 14:00 at KCVG Station on March 3, 2011.

March 7, 2011

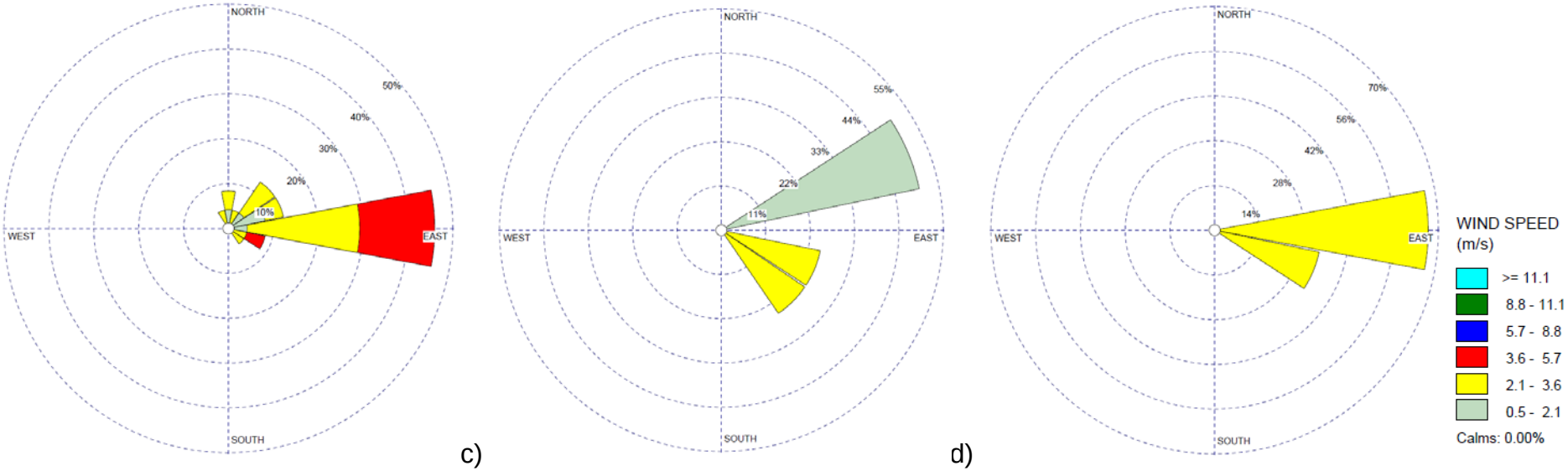
On March 7, 2011, three exceedances were reported at Monitor ID 21-037-3002 between 12:00 and 15:00. The exceedance values reported ranged from 76 to 87 ppb. The exceedances were modeled by one HYSPLIT back trajectory in Figure 8a. The surface level meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 8b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 8c and 8d show the windrose data around the time of the exceedance hours.

The HYSPLIT back trajectory passes in close proximity to the Beckjord facility indicating a high probability of Beckjord contributing to the exceedances reported at the monitor. In addition, the windrose data at the time of the exceedances shows the wind was blowing predominately from the eastern direction, where the Beckjord facility is located. The March 7, 2011 exceedances are therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
8	2011	March	7	12:00	82
8	2011	March	7	13:00	76
8	2011	March	7	15:00	87



a)



b) c) d)

Figure 8. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on March 7, 2011; b) 24-hour windrose data at KCVG Station on March 7, 2011; c) 4-hour windrose data from 11:00 to 14:00 at KCVG Station on March 7, 2011; d) 3-hour windrose data from 14:00 to 16:00 at KCVG Station on March 7, 2011.

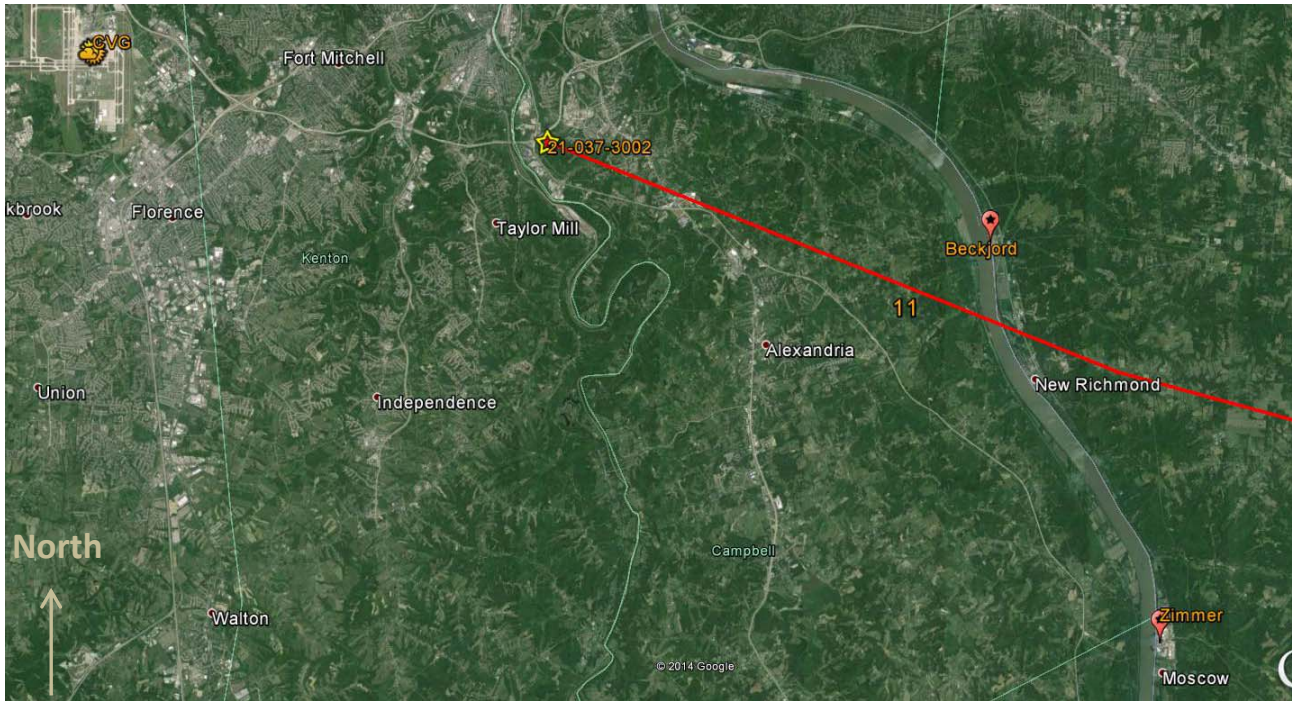
June 3, 2011

On June 3, 2011, two exceedances were reported at Monitor ID 21-037-3002 between 10:00 and 11:00. The exceedance values reported ranged from 102 to 142 ppb. The exceedances were modeled by one HYSPLIT back trajectory in Figure 9a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 9b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 9c shows the windrose data around the time of the exceedance.

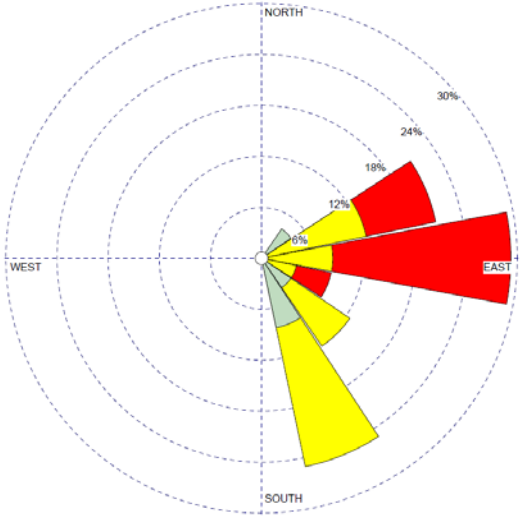
The HYSPLIT back trajectory passes in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. In addition, the windrose data around the time of the exceedances shows the wind was blowing predominately from the eastern direction, where the Beckjord facility is located. The June 3, 2011 exceedances are therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
11	2011	June	3	10:00	102
11	2011	June	3	11:00	142

a)



b)



c)

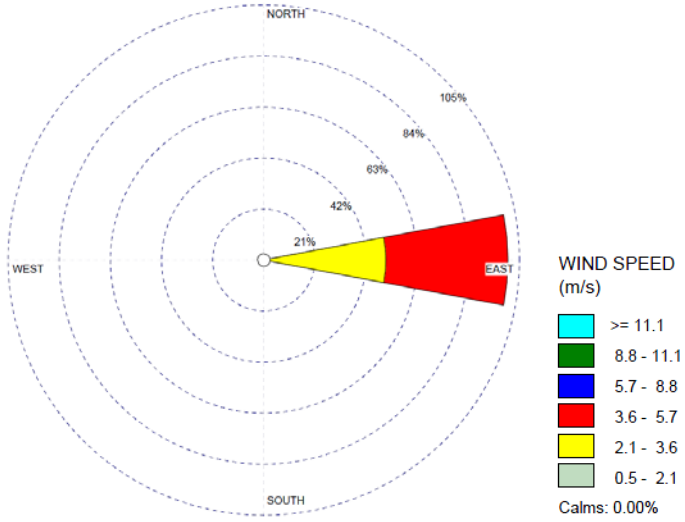


Figure 9. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on June 3, 2011; b) 24-hour windrose data at KCVG Station on June 3, 2011; c) 4-hour windrose data from 9:00 to 12:00 at KCVG Station on June 3, 2011.

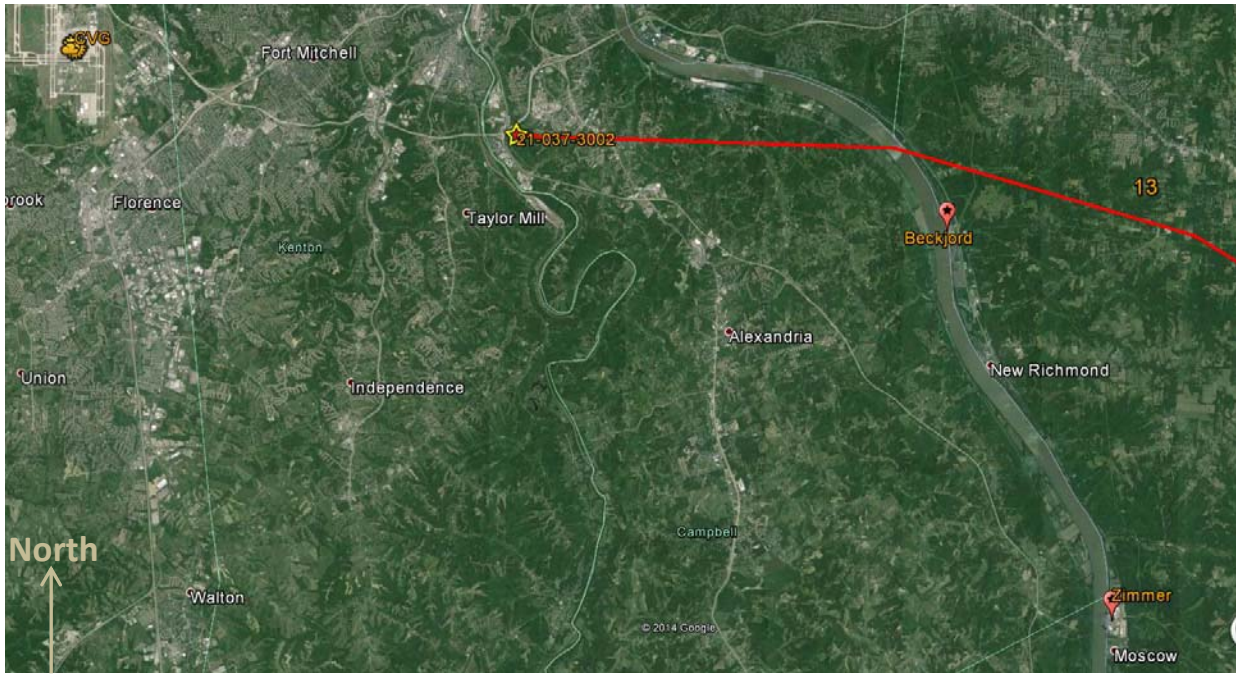
July 15, 2011

On July 15, 2011, two exceedances were reported at Monitor ID 21-037-3002 between 17:00 and 18:00. The exceedance values reported ranged from 76 to 92 ppb. The exceedances were modeled by one HYSPLIT back trajectory in Figure 10a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 10b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 10c shows the windrose data around the time of the exceedance.

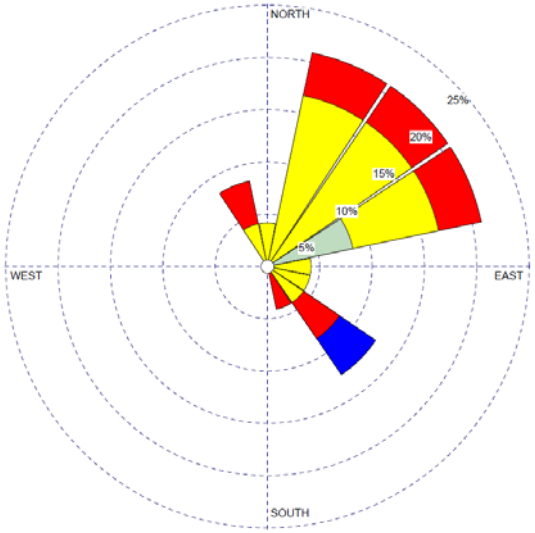
The HYSPLIT back trajectory passes in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The windrose data at the time of the exceedances shows the wind was blowing predominately from the northeast and northwest direction. However, given the lack of other significant sources of SO2 located north of the monitor and the close proximity of the HYPSLIT back trajectory, it is likely that the emissions from Beckjord contributed to the exceedances.

Trajectory ID	Year	Month	Day	Hour	Reading
13	2011	July	15	17:00	76
13	2011	July	15	18:00	92

a)



b)



c)

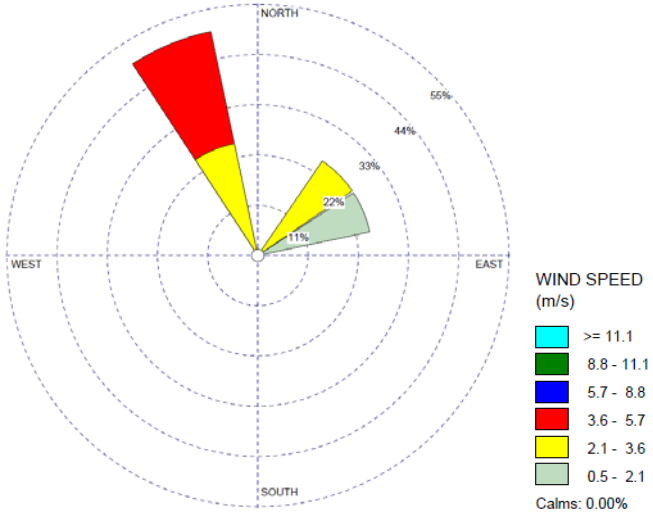


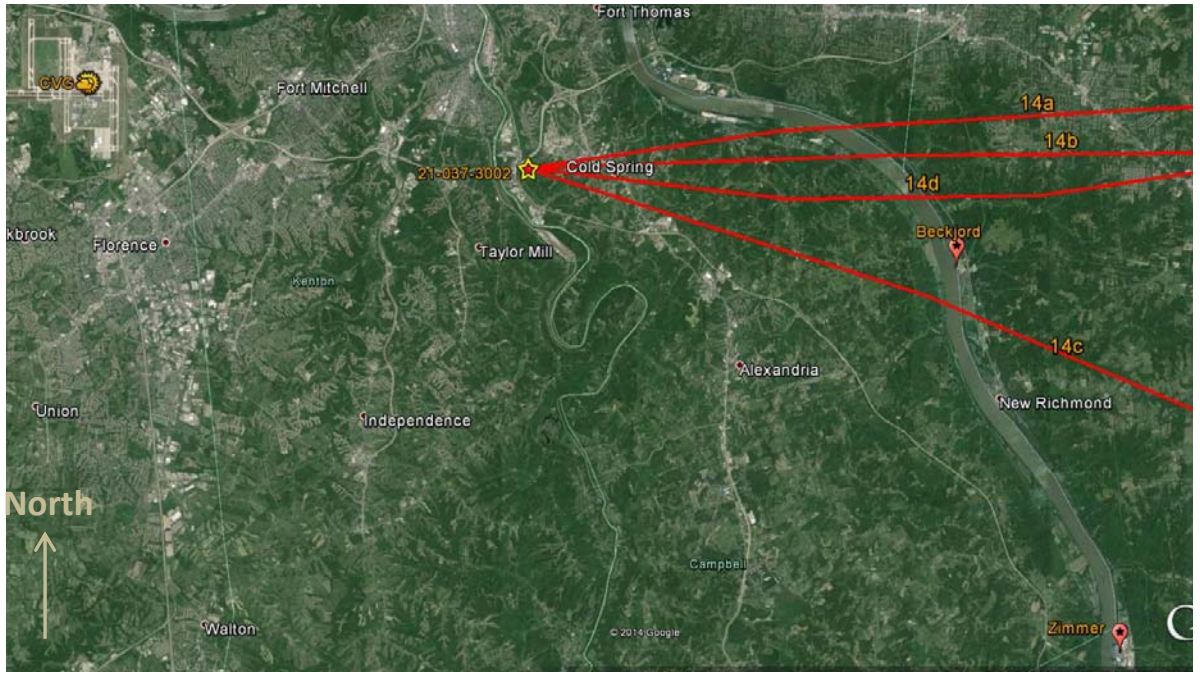
Figure 10. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on June 3, 2011; b) 24-hour windrose data at KCVG Station on June 3, 2011; c) 4-hour windrose data from 16:00 to 19:00 at KCVG Station on June 3, 2011.

August 30, 2011

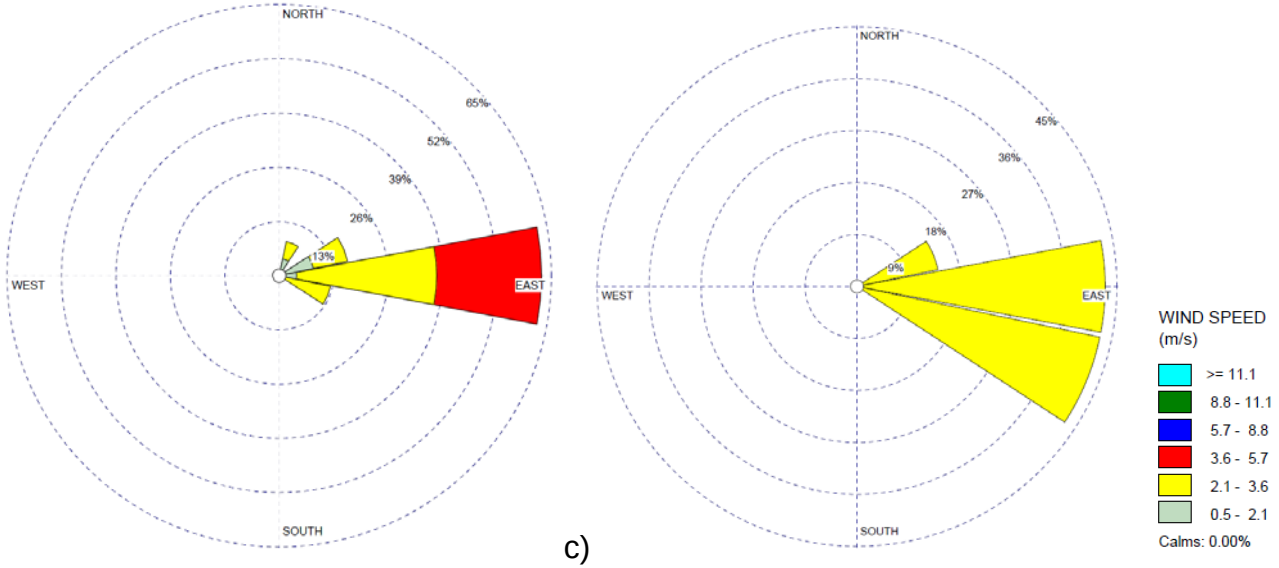
On August 30, 2011, five exceedances were reported at Monitor ID 21-037-3002 between 10:00 and 14:00. The exceedance values reported ranged from 76 to 86 ppb. The exceedances were modeled by four HYSPLIT back trajectory in Figure 11a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 11b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 8c shows the windrose data around the time of the exceedance.

The HYSPLIT back trajectories pass in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The windrose data on the day of the exceedance and at the time of the exceedances shows the wind was blowing predominately from the east. The August 30, 2011 exceedances are therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
14a	2011	August	30	10:00	86
14b	2011	August	30	11:00	76
14b	2011	August	30	12:00	84
14c	2011	August	30	13:00	84
14d	2011	August	30	14:00	80



a)



b) c)

Figure 11. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on August 30, 2011; b) 24-hour windrose data at KCVG Station on August 30, 2011; c) 6-hour windrose data from 9:00 to 15:00 at KCVG Station on August 30,2011.

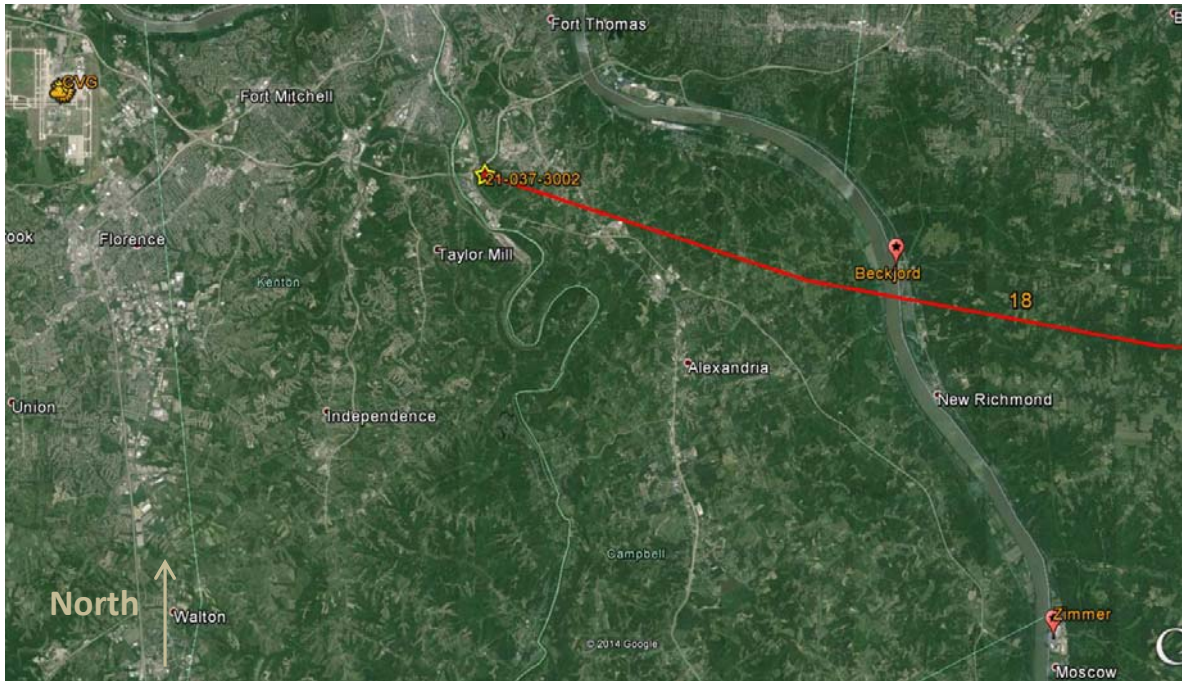
February 20, 2012

On February 20, 2012, two exceedances were reported at Monitor ID 21-037-3002 between 12:00 and 13:00. The exceedance values reported ranged from 117 to 156 ppb. The exceedances were modeled by one HYSPLIT back trajectory in Figure 12a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 12b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 12c shows the windrose data around the time of the exceedance.

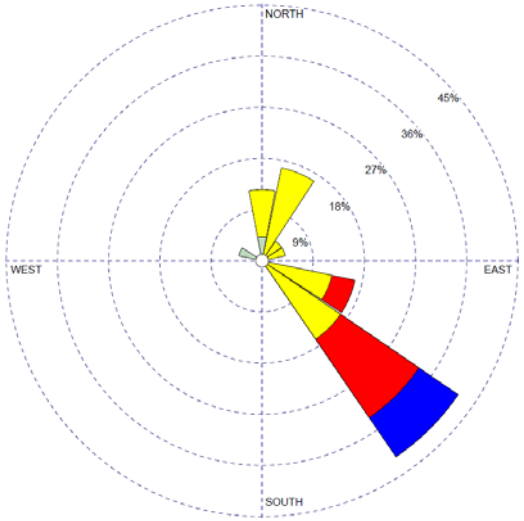
The HYSPLIT back trajectory passes in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The windrose data on the day of the exceedance and at the time of the exceedances shows the wind was blowing predominately from the east/southeast. The August 30, 2011 exceedances are therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
18	2012	February	20	12:00	117
18	2012	February	20	13:00	156

a)



b)



c)

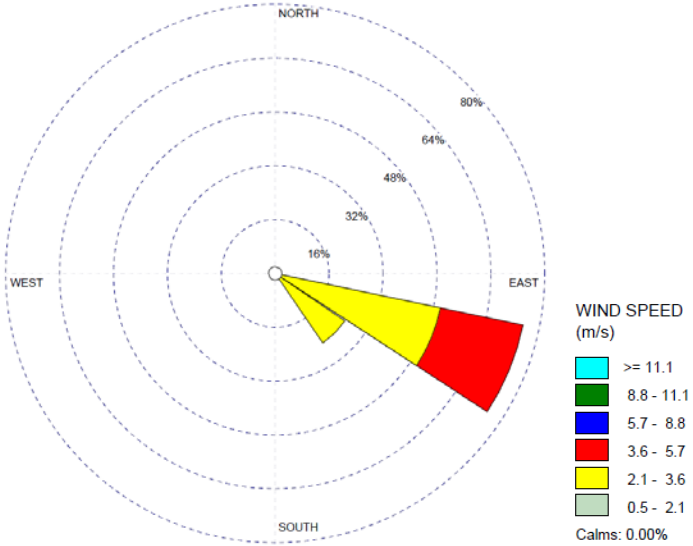


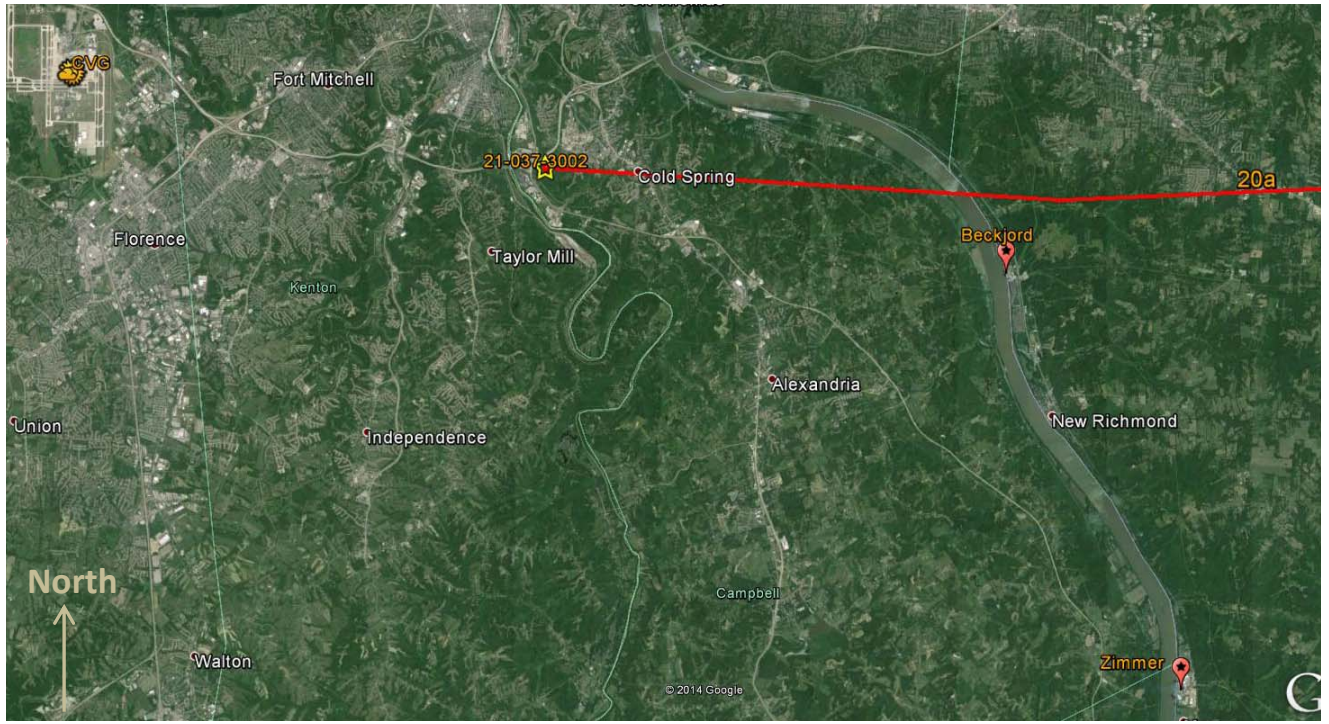
Figure 12. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on February 20, 2012; b) 24-hour windrose data at KCVG Station on February 20, 2012; c) 4-hour windrose data from 11:00 to 14:00 at KCVG Station on February 20, 2012.

April 7, 2012

On April 7, 2012, one exceedance was reported at Monitor ID 21-037-3002 at 11:00. The exceedance value reported was 99 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 13a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 13b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 13c shows the windrose data around the time of the exceedance.

The HYSPLIT back trajectory passes in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The windrose data on the day of the exceedance and at the time of the exceedances shows the wind was blowing predominately from the east/southeast. Zimmer was not operating on this day; the April 7, 2012 exceedance is therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
20a	2012	April	7	11:00	99



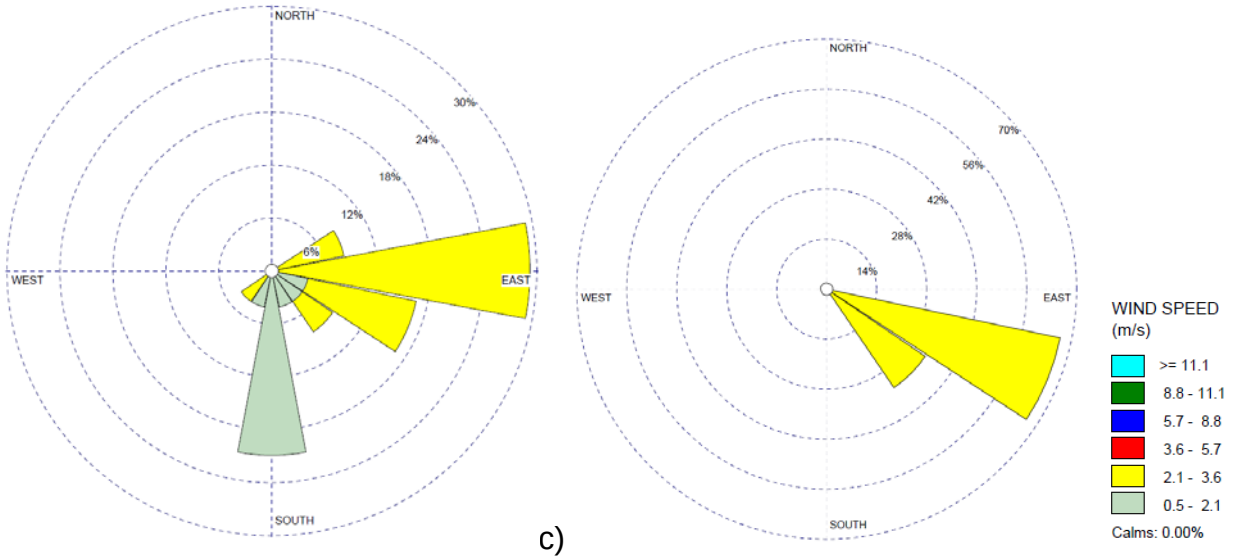


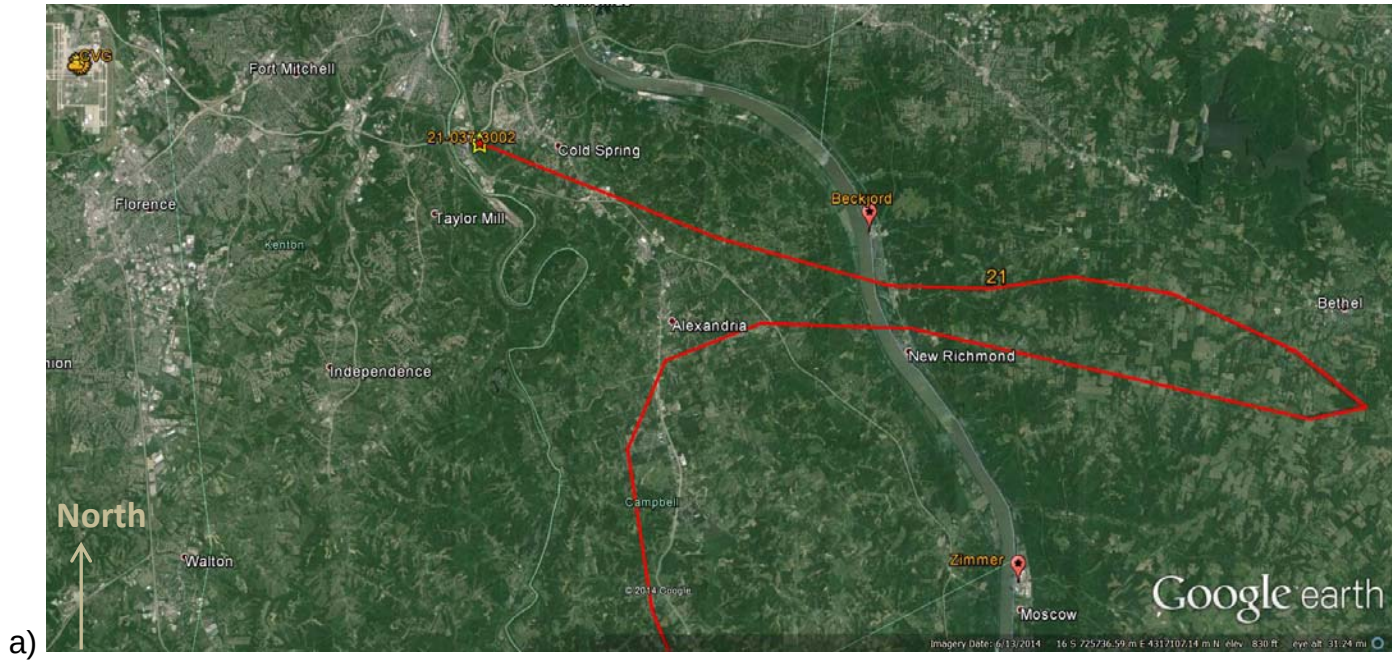
Figure 13. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on April 7, 2012; b) 24-hour windrose data at KCVG Station on April 7, 2012; c) 3-hour windrose data from 10:00 to 12:00 at KCVG Station on April 7, 2012.

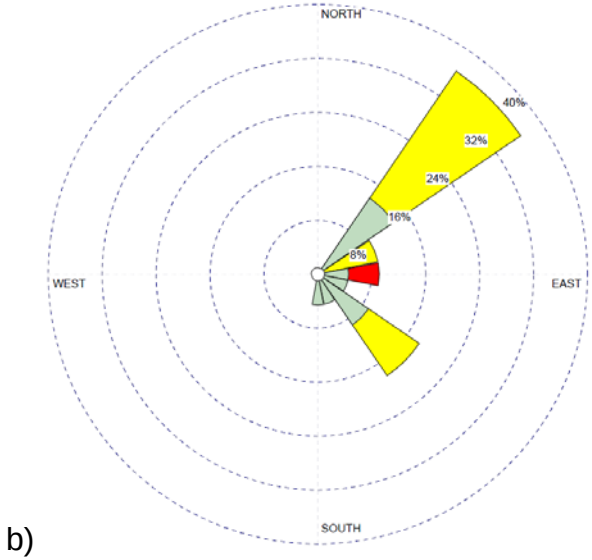
May 6, 2012

On May 6, 2012, one exceedance was reported at Monitor ID 21-037-3002 at 18:00. The exceedance value reported ranged was 93 ppb. The exceedance was modeled by one back trajectory in Figure 14a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 14b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 14c shows the windrose data around the time of the exceedance.

The HYSPLIT back trajectories pass in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The windrose data from around time of the exceedance shows the wind was blowing from the east and southeast. Also, Zimmer did not operate on this day. The May 6, 2012 exceedances are therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
21	2012	May	6	18:00	93





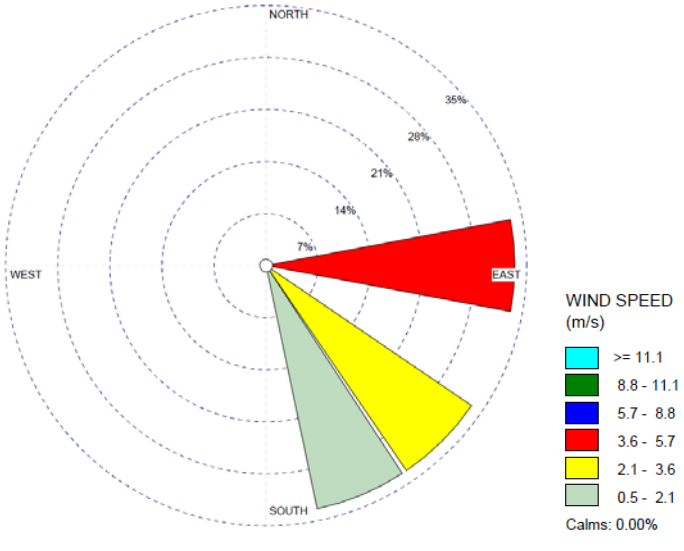


Figure 14. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on May 6, 2012; b) 24-hour windrose data at KCVG Station on May 6, 2012; c) 3-hour windrose data from 17:00 to 19:00 at KCVG Station on May 6, 2012.

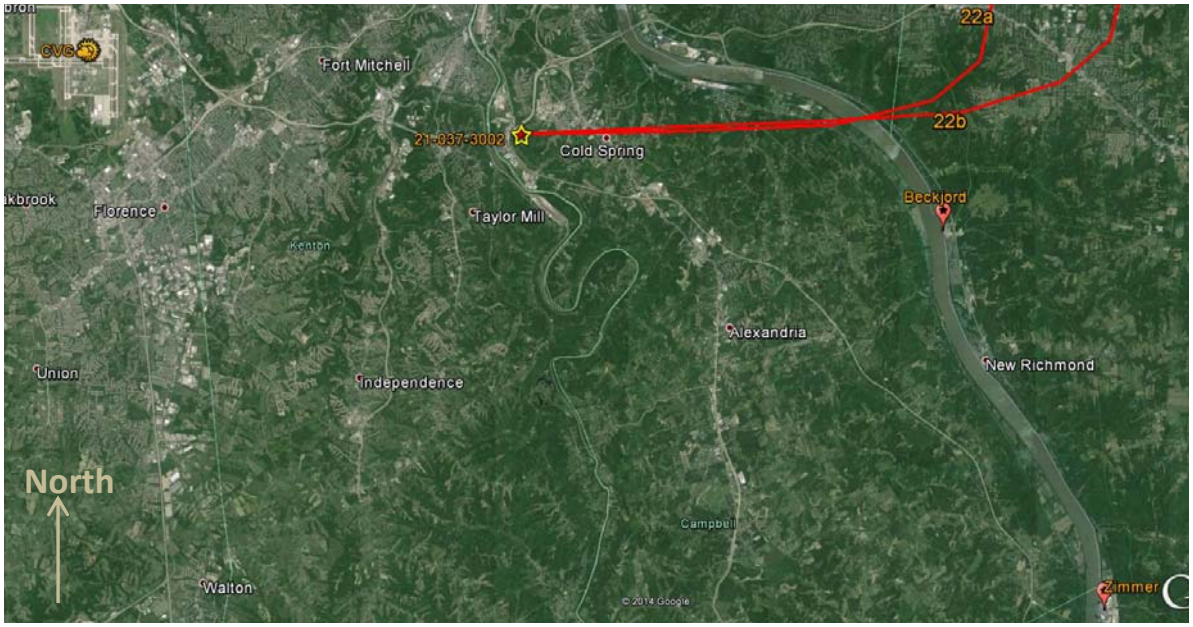
February 9, 2013

On February 9, 2013, two exceedances were reported at Monitor ID 21-037-3002 between 13:00 and 14:00. The exceedance values reported ranged from 96 to 124 (Table 6). The exceedances were each modeled by an individual trajectory in Figure 15a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 15b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 15c shows the windrose data around the time of the exceedance.

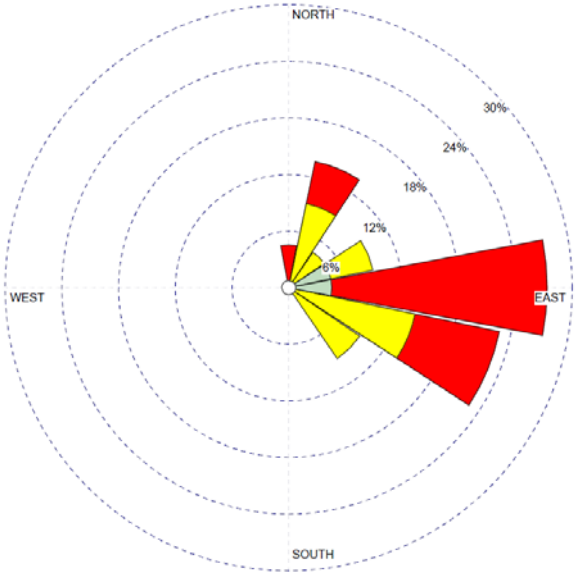
The HYSPLIT back trajectories pass in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The surface windrose data from around time of the exceedance shows the wind was blowing from the east and southeast. Zimmer did not operate on this day; the February 9, 2013 exceedances are therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
22a	2013	February	9	13:00	96
22b	2013	February	9	14:00	124

a)



b)



c)

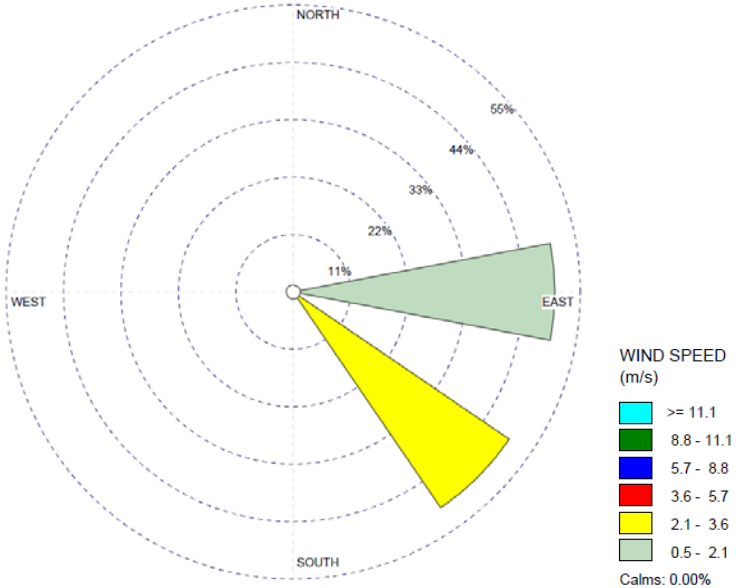


Figure 15. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on February 9, 2013; b) 24-hour windrose data at KCVG Station on February 9, 2013; c) 2-hour windrose data from 13:00 to 14:00 at KCVG Station on February 9, 2013.

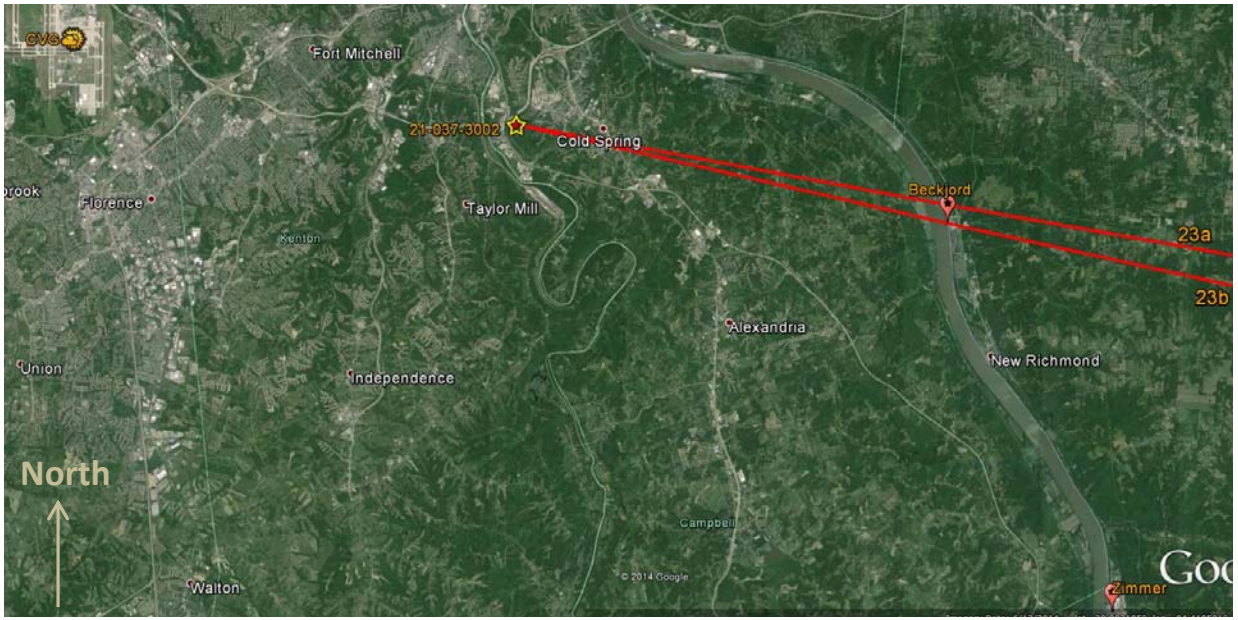
February 25, 2013

On February 25, 2013, two exceedances were reported at Monitor ID 21-037-3002 at 9:00 and 10:00. The exceedance values reported ranged from 100 to 125 ppb. The exceedances were each modeled by an individual trajectory in Figure 16a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 16b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 16c shows the windrose data around the time of the exceedance.

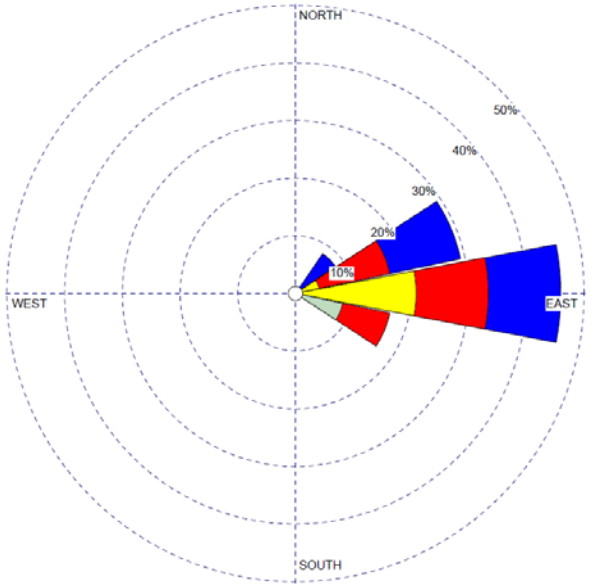
The HYSPLIT back trajectories pass directly over and in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The surface windrose data from around time of the exceedance shows the wind was blowing from the east/southeast. Zimmer did not operate on this day, therefore, the February 25, 2013 exceedances are predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
23a	2013	February	25	9:00	100
23b	2013	February	25	10:00	125

a)



b)



c)

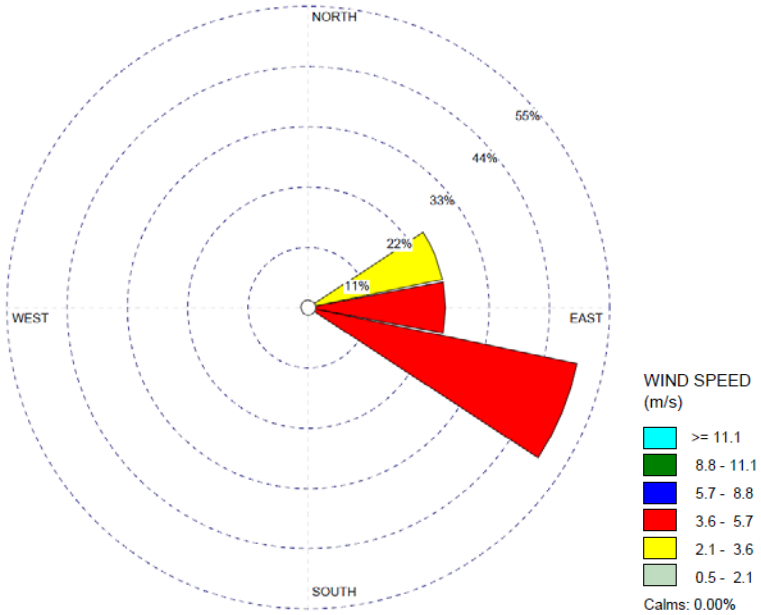


Figure 16. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on February 25, 2013; b) 24-hour windrose data at KCVG Station on February 25, 2013; c) 4-hour windrose data from 8:00 to 11:00 at KCVG Station on February 25, 2013.

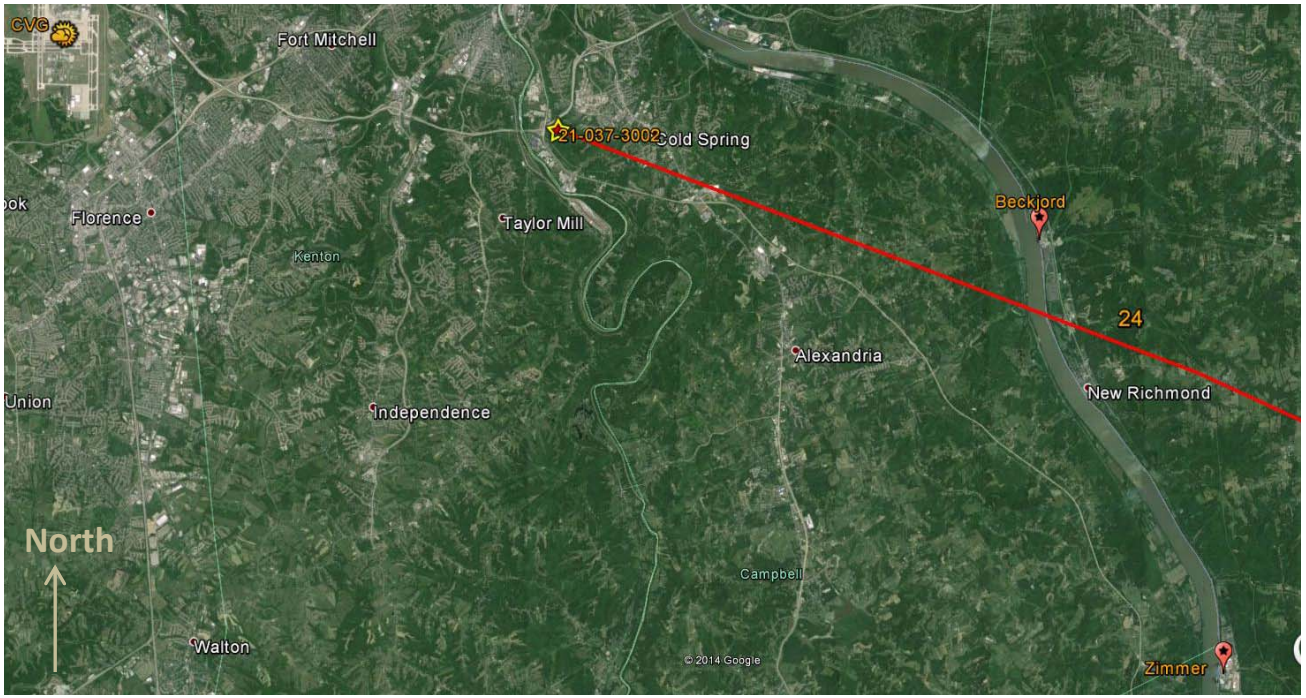
March 5, 2013

On March 5, 2013, one exceedance was reported at Monitor ID 21-037-3002 at 6:00. The exceedance value reported was 125 ppb. The exceedance was modeled by an individual trajectory in Figure 17a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 17b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 17c shows the windrose data around the time of the exceedance.

The HYSPLIT back trajectories pass in close proximity to the Beckjord facility. This indicates a high probability of Beckjord contributing to the exceedances reported at the monitor. The surface windrose data on the exceedance day and around time of the exceedance show the wind was blowing predominately from the east. The March 5, 2013 exceedance is therefore predicted to be attributable to the Beckjord facility.

Trajectory ID	Year	Month	Day	Hour	Reading
24	2013	March	5	6:00	125

a)



b)

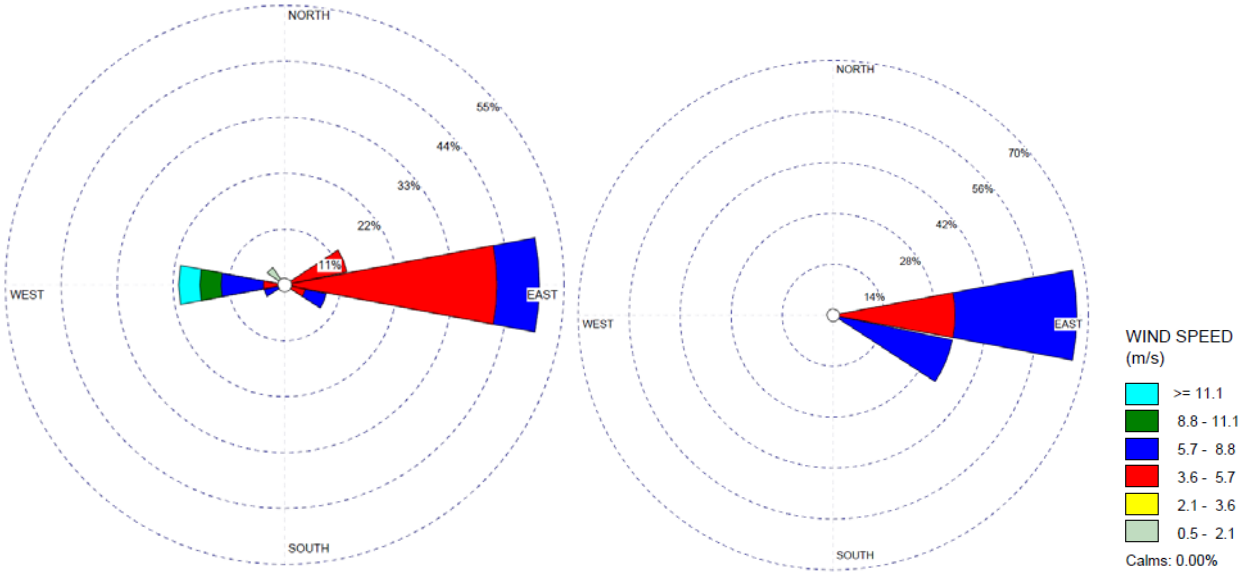


Figure 17. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on March 5, 2014; b) 24-hour windrose data at KCVG Station on March 5, 2014; c) 2-hour windrose data from 5:00 to 7:00 at KCVG Station on March 5, 2014.

IV. Zimmer Trajectories

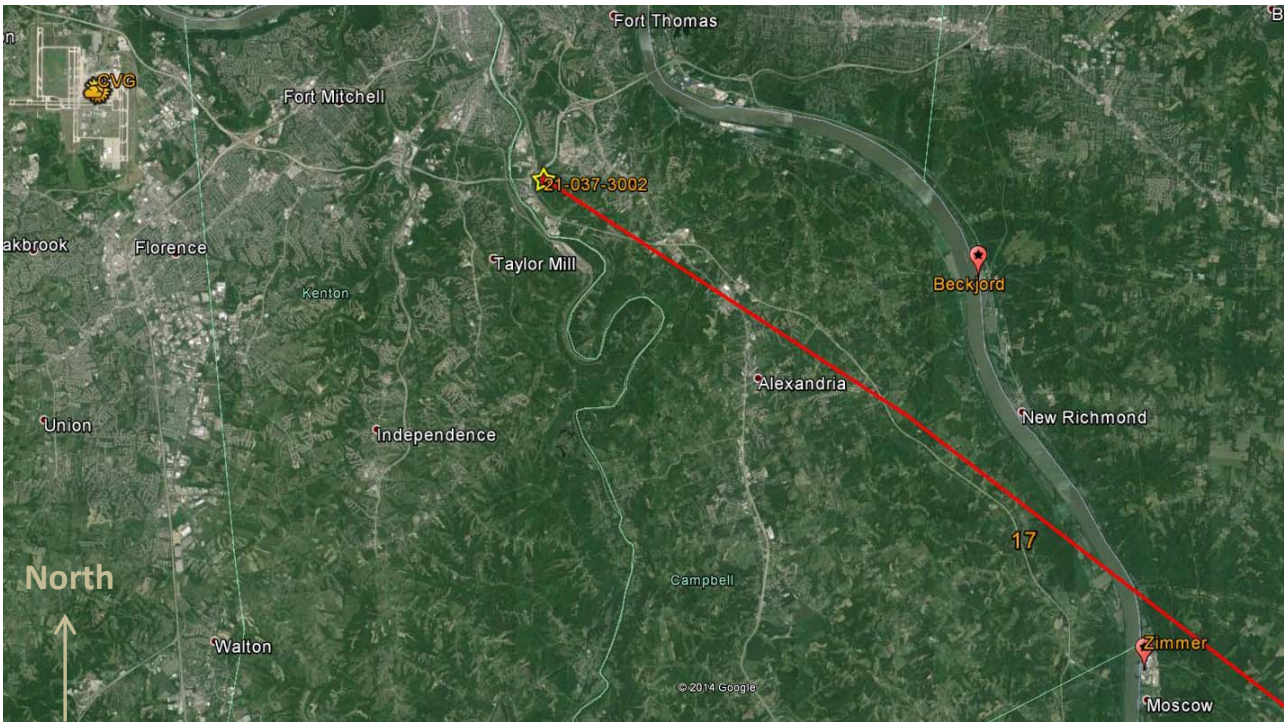
This Section includes exceedance days in which the HYSPLIT back trajectories pass directly over or in close proximity to the Zimmer facility indicating a high probability of Zimmer contributing to the exceedances reported at the monitor. Also in this Section, data including surface wind data and CEMS data were analyzed to draw conclusions about the likely contribution of Zimmer emissions in relation to the exceedance at the monitor.

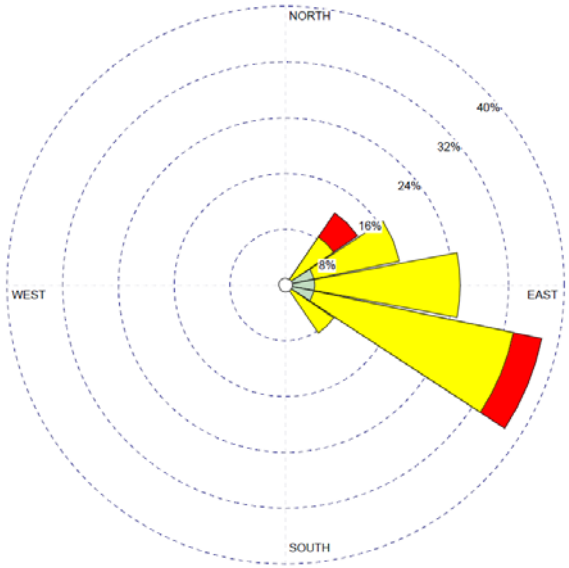
February 3, 2012

On February 3, 2012, one exceedance was reported at Monitor ID 21-037-3002 at 17:00. The exceedance value reported was 82 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 18a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 18b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 18c shows the windrose data around the time of the exceedance hour. Figure 18d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day. The HYSPLIT back trajectory passes in close proximity to the Zimmer facility. This indicates a high probability of Zimmer contributing to the exceedances reported at the monitor. The windrose data at the time of the exceedances shows the wind was blowing predominantly from the northeastern direction with a slight contribution form the southeastern direction between 16:00 and 18:00. Examining the windrose data for the entire day shows surface winds blowing predominately from the east/ southeast direction. Based on the results of the HYSPLIT data it would appear Zimmer was the most likely contributor. However, based on the windrose data it would appear Beckjord was more likely the contributor to the exceedance on February 3, 2012. It should be noted emissions from Beckjord were over five times the emissions of Zimmer prior to and during the exceedance period.

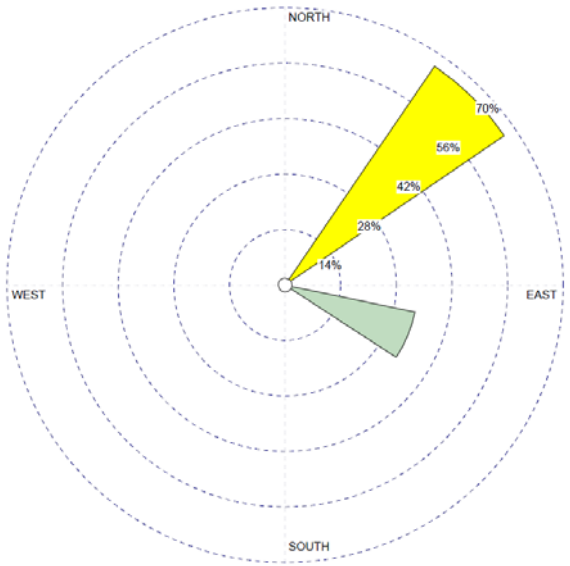
Trajectory ID	Year	Month	Day	Hour	Reading
17	2012	February	3	17:00	82

a)

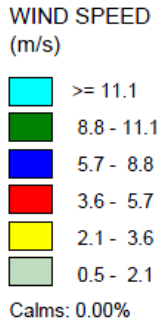

Fort Thomas
CVG
Fort Mitchell
21-037-3002
Florence
Taylor Mill
Kenton
Beckjord
Alexandria
New Richmond
Union
Independence
17
North
Campbell
Walton
Zimmer
© 2014 Google
Moscow



b)



c)



d)

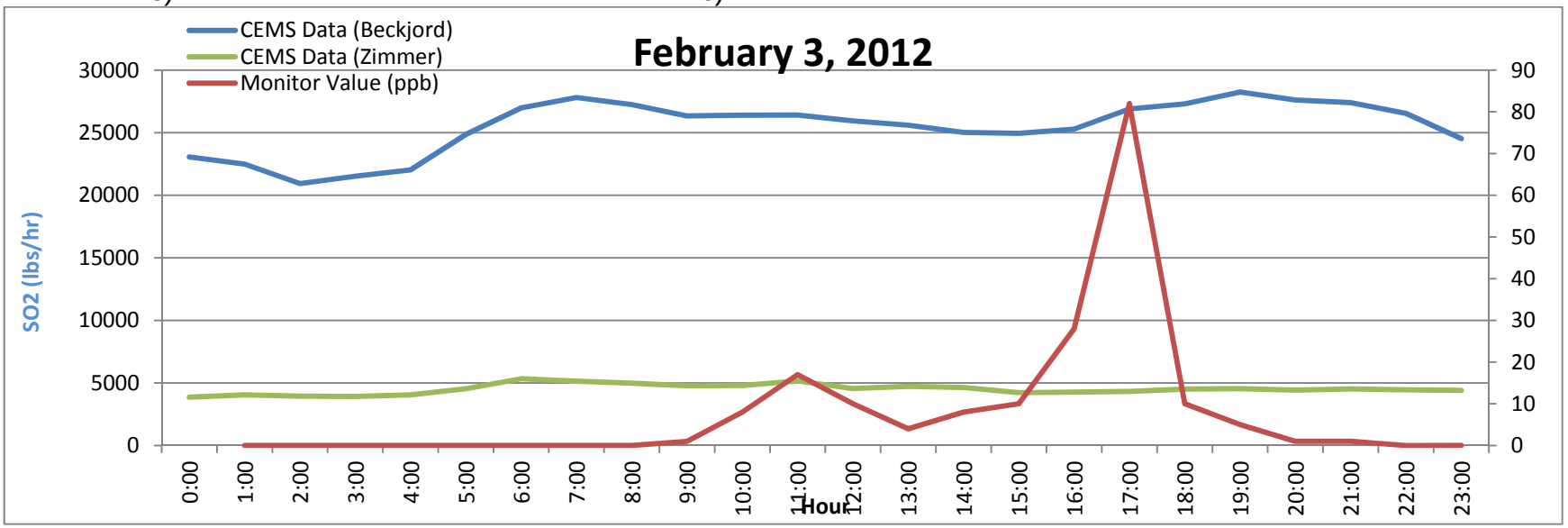


Figure 18. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on February 3, 2012; b) 24-hour windrose data at KCVG Station on February 3, 2012; c) 3-hour windrose data from 16:00 to 18:00 at KCVG Station on February 3, 2012.

V. Intermediate Trajectories

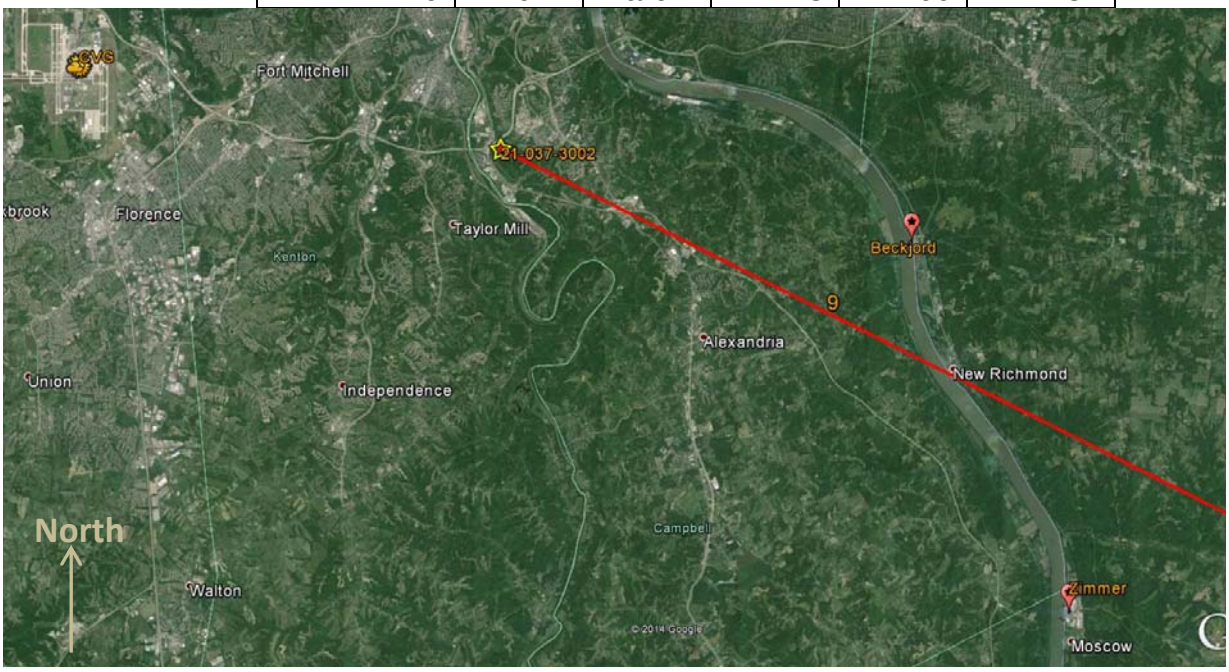
This Section includes exceedance days in which the HYSPLIT back trajectories pass between the Beckjord and Zimmer facilities and are not directly attributable to either facility. Additional data including surface wind data and CEMS were analyzed to draw conclusions about the likely contributions of Beckjord and Zimmer emissions in relation to the exceedance at the monitor.

March 8, 2011 - Beckjord

On March 8, 2011, one exceedance was reported at Monitor ID 21-037-3002 at 17:00. The exceedance value reported was 84 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 19a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 19b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 19c shows the windrose data around the time of the exceedance hour. Figure 19d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day. The HYSPLIT back trajectory passes in between the Beckjord facility and the Zimmer facility. Examination of the wind rose around the time of the exceedance demonstrates that the prevailing surface winds were from the East. The surface wind direction data would suggest that emissions from Beckjord were most likely impacting the monitor and contributing to the exceedance. In addition, emissions data shown in Figure 6e, demonstrate that on this date emissions from the Beckjord facility were approximately four times greater than those of Zimmer. Based on the analysis of the data for March 8, 2011 Beckjord has a high probability of contributing to the exceedance at the monitor.

Trajectory ID	Year	Month	Day	Hour	Reading
9	2011	March	8	17:00	84

a)



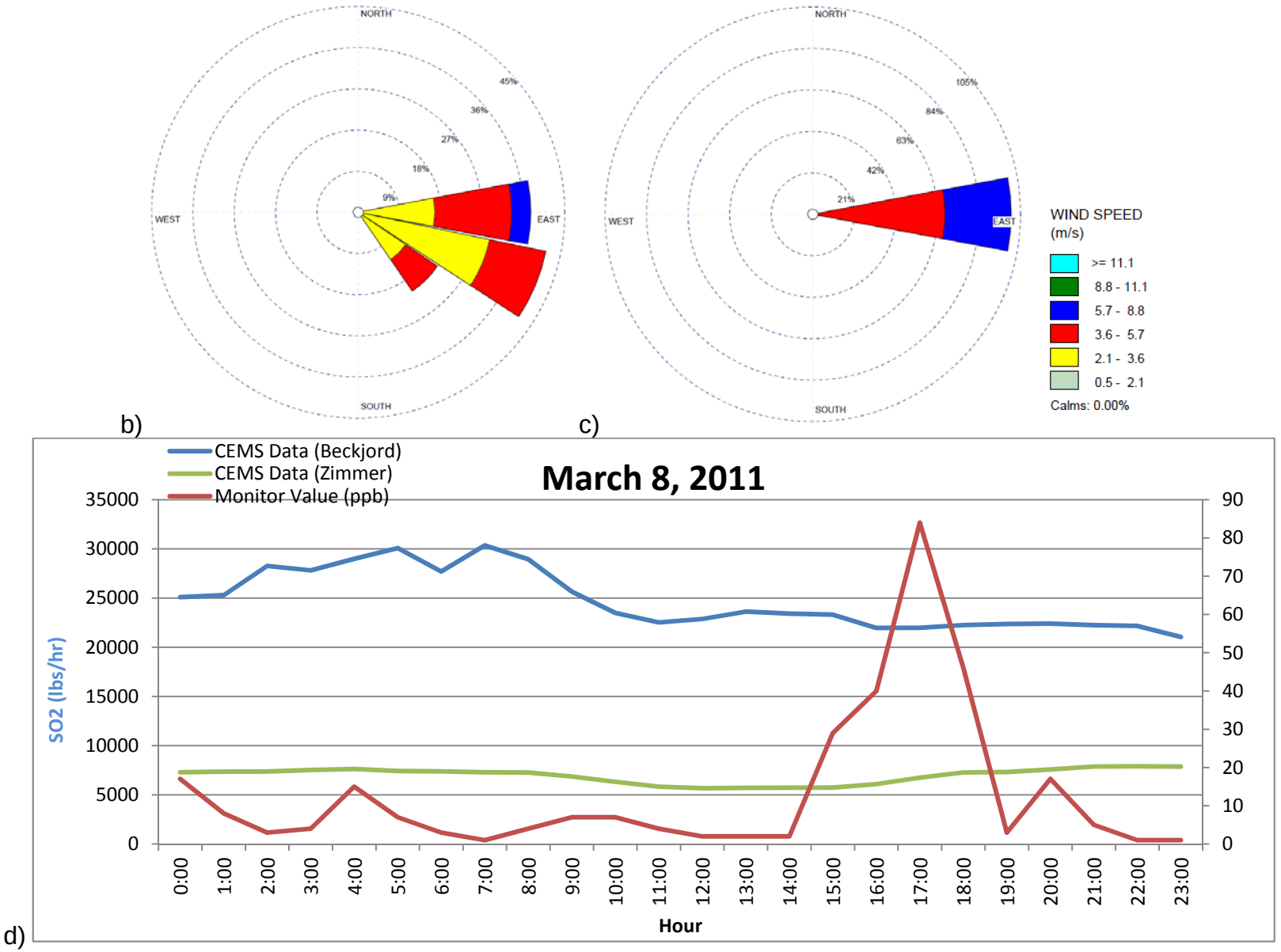


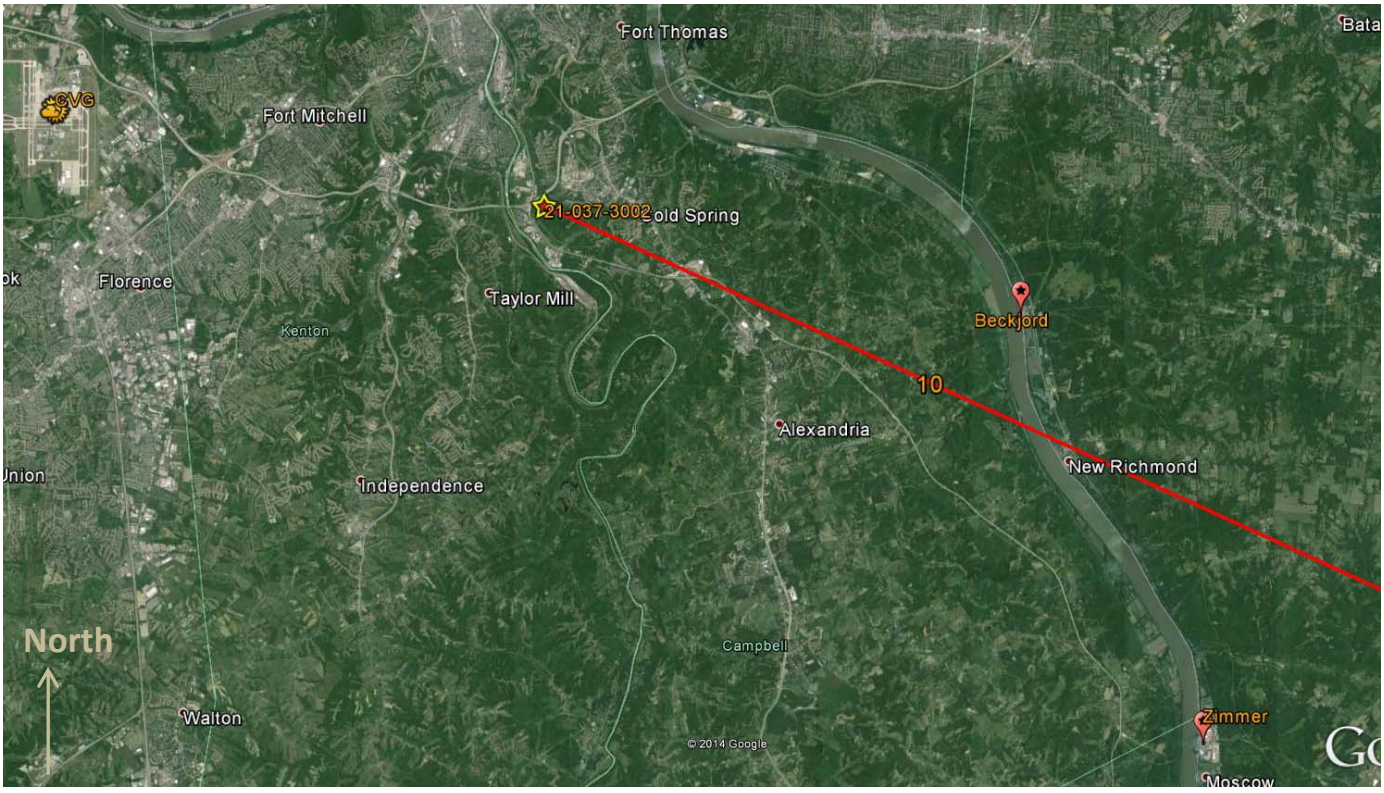
Figure 19. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on March 8, 2011; b) 24-hour windrose data at KCVG Station on March 8, 2011; c) 3-hour windrose data from 16:00 to 18:00 at KCVG Station on March 8, 2011; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

March 20, 2011 - Beckjord

On March 20, 2011, one exceedance was reported at Monitor ID 21-037-3002 at 7:00. The exceedance value reported was 89 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 20. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 20b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 20c shows the windrose data around the time of the exceedance hour. Figure 20d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day. The HYSPLIT back trajectory passes in between the Beckjord facility and the Zimmer facility. Examination of the wind rose around the time of the exceedance demonstrates that the prevailing surface winds were from the East. The surface wind direction data would suggest that emissions from Beckjord were most likely impacting the monitor and contributing to the exceedance. It should be noted that the winds did not begin blowing from the south and southeast until approximately 13:00, well after the exceedance was recorded. Additionally, prior to the exceedance emissions from Beckjord increased markedly in a relatively short period of time, while emissions from Zimmer remained relatively constant. Taking these further data into account, it is highly probable that emissions from Beckjord are the likely contributor to the exceedance recorded on March 20, 2011.

Trajectory ID	Year	Month	Day	Hour	Reading
10	2011	March	20	7:00	89

a)



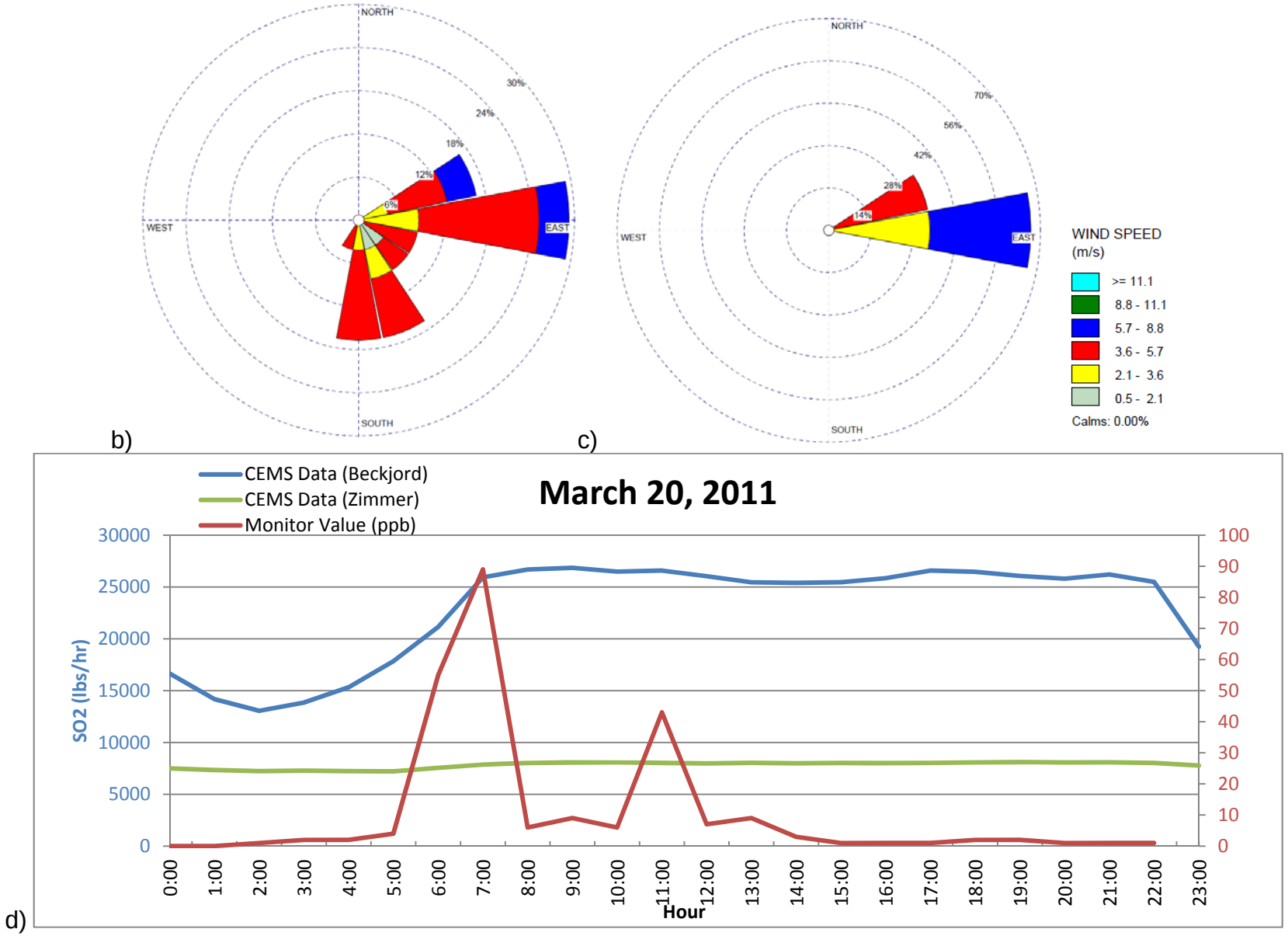


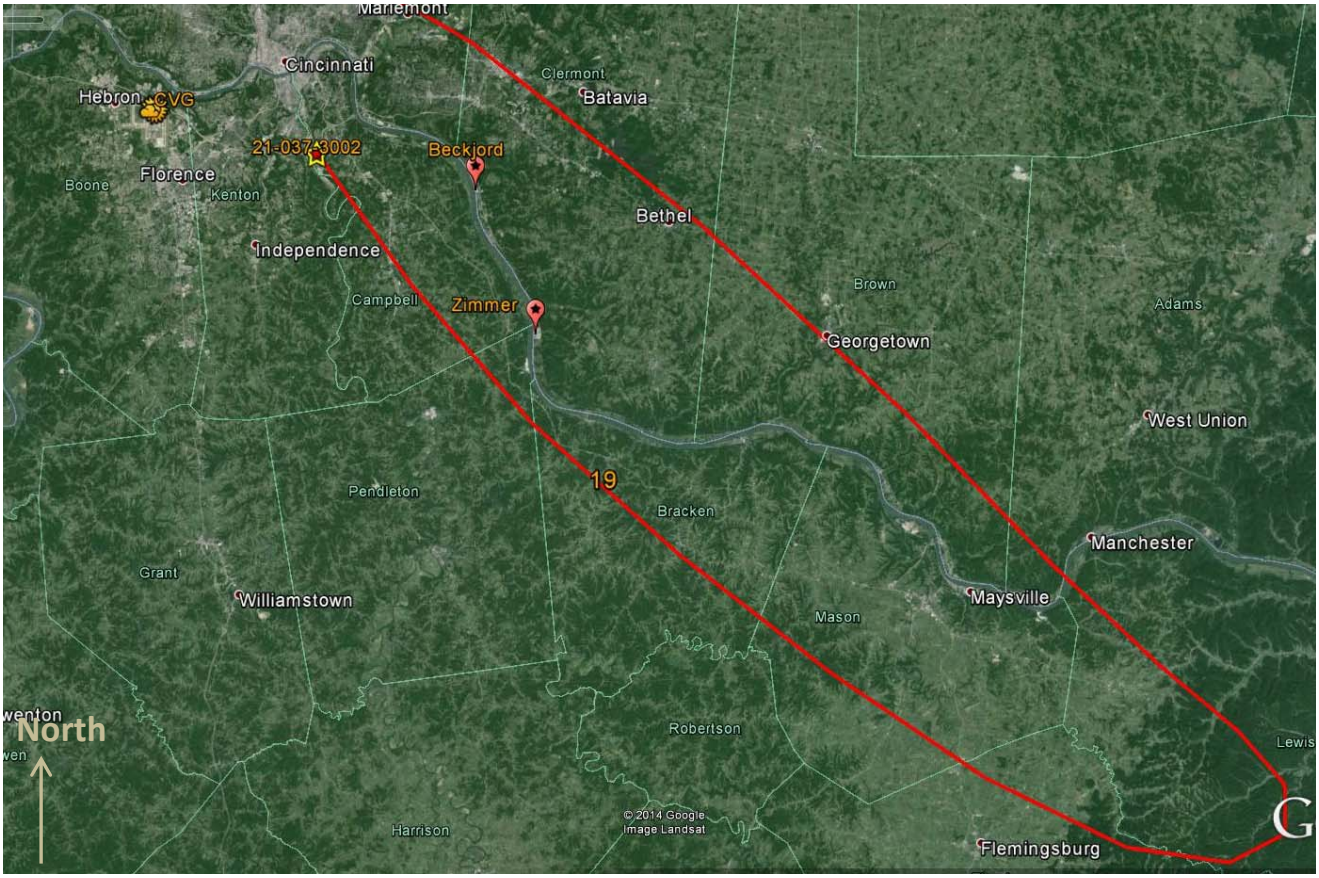
Figure 20. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on March 20, 2011; b) 24-hour windrose data at KCVG Station on March 20, 2011; c) 3-hour windrose data from 6:00 to 8:00 at KCVG Station on March 20, 2011; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

February 28, 2012 - Beckjord

On February 28, 2012, one exceedance was reported at Monitor ID 21-037-3002 at 12:00. The exceedance value reported was 77 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 21a. The trajectory analysis on this date is atypical, as the upper level winds take a circuitous route around both Beckjord and Zimmer prior to reaching the monitor location. This impedes a straightforward determination of the cause of the exceedance based on the HYSPLIT data. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 21b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 21c shows the windrose data around the time of the exceedance hour. Figure 21d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day. The surface wind data around the time of the violation shows predominant winds from the eastern direction. Further examination of the emissions data shows only that emissions data from Beckjord were approximately five times greater than that of Zimmer. Taking these further data into account, it is highly probable that emissions from Beckjord are the likely contributor to the exceedance on February 28, 2012.

Trajectory ID	Year	Month	Day	Hour	Reading
19	2012	February	28	12:00	77

a)



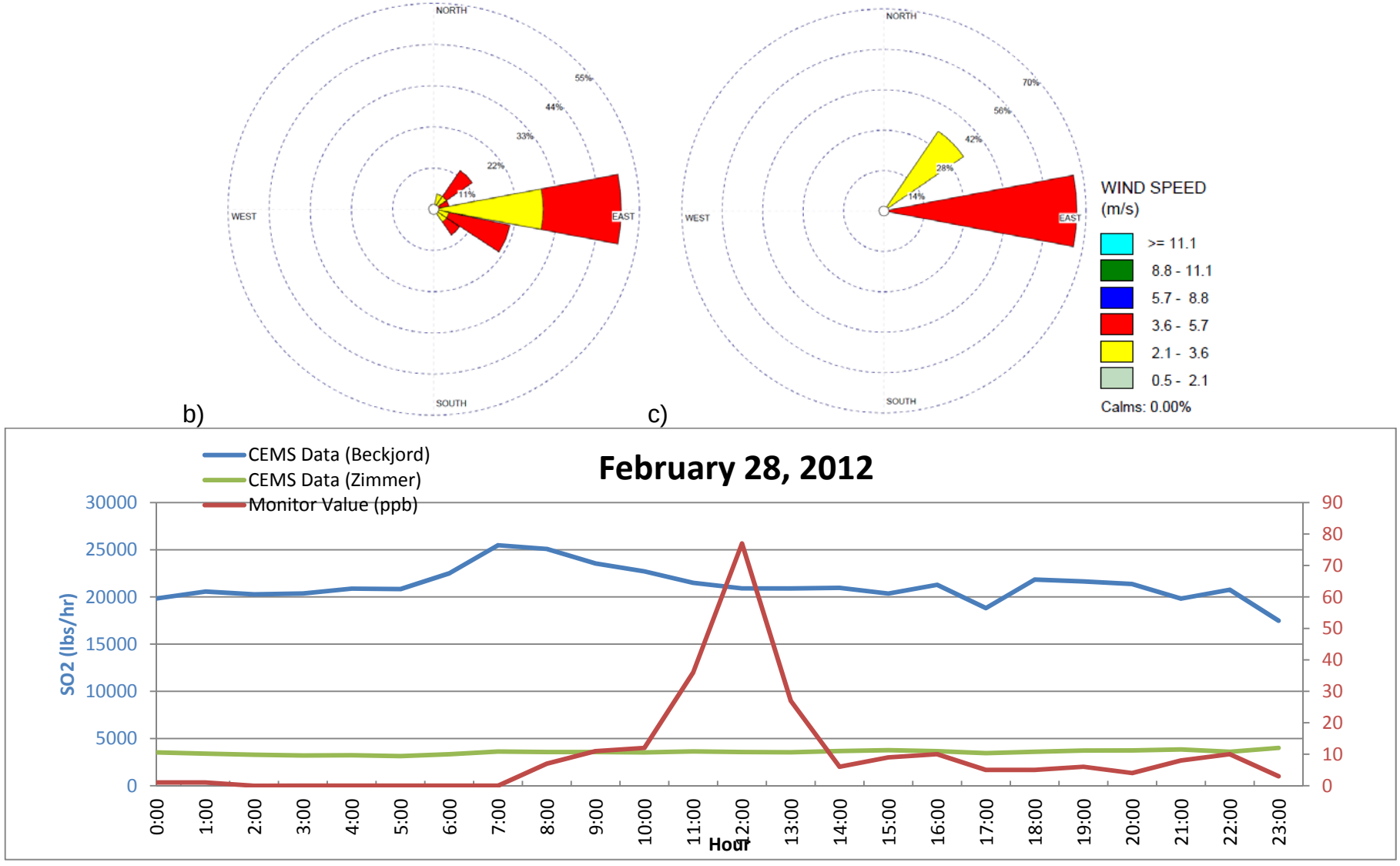


Figure 21. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on February 28, 2012; b) 24-hour windrose data at KCVG Station on February 28, 2012; c) 3-hour windrose data from 11:00 to 13:00 at KCVG Station on February 28, 2012; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

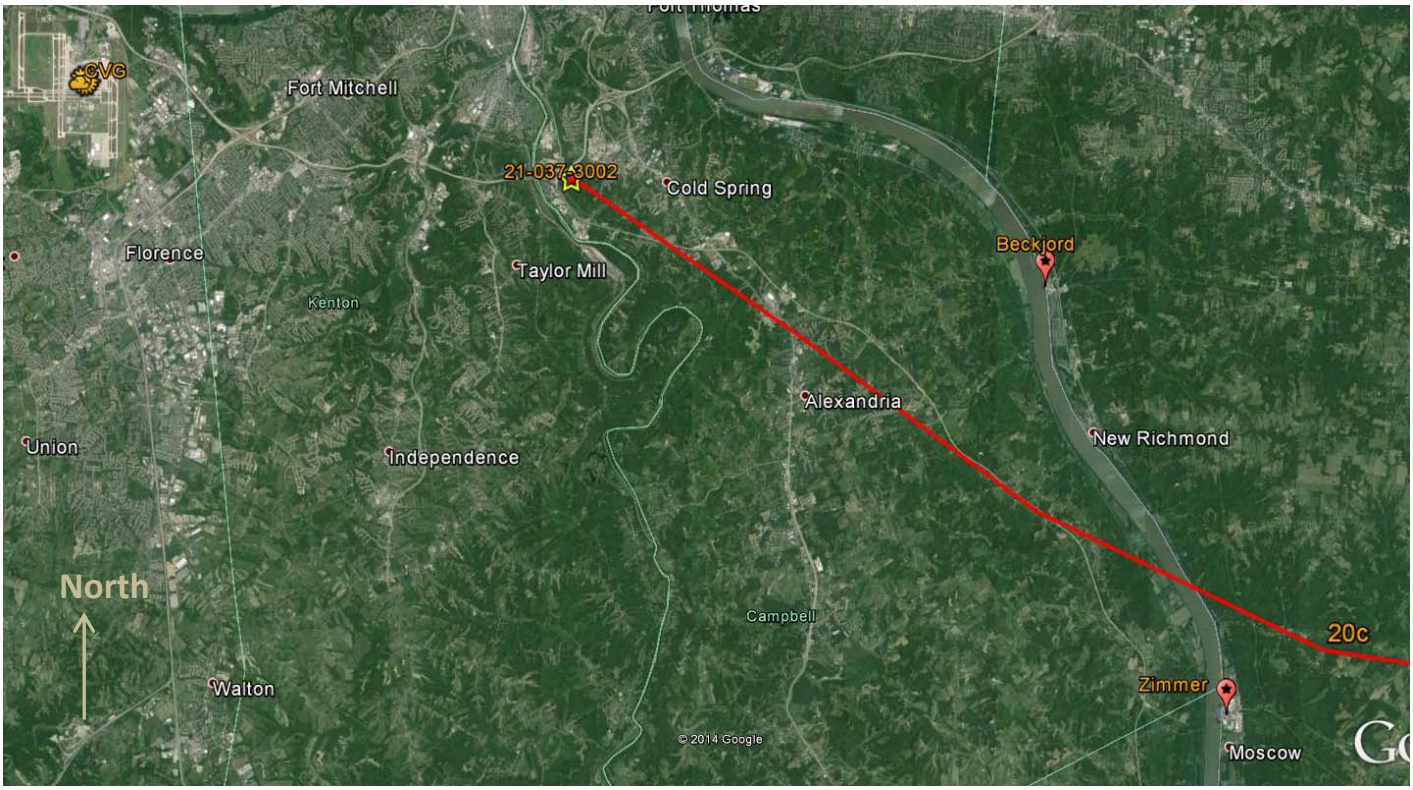
April 7, 2012 – Beckjord

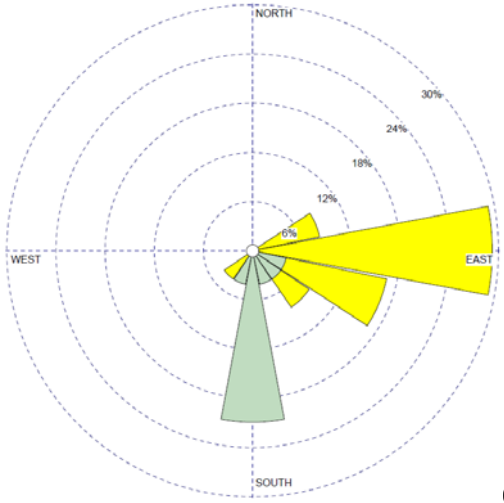
On April 7, 2012, two exceedances were reported at Monitor ID 21-037-3002. Beckjord was determined to be the most probably contributor the exceedance at the 11:00 hour as discussed in Section I of this report. The exceedance of 81 ppb at 15:00 is discussed below. The exceedance was modeled by one HYSPLIT back trajectory in Figure 22a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 22b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 22c shows the windrose data around the time of the exceedance hour. Figure 22d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT back trajectory passes in close proximity to the Zimmer facility. This indicates a high probability of Zimmer contributing to the exceedance reported at the monitor. The windrose data at the time of the exceedances winds were blowing from the east/southeast direction between 14:00 and 16:00. This would indicate Beckjord and Zimmer may have contributed to the exceedance; however, as shown in Figure 22d Zimmer did not have SO_2 emissions on this day. Therefore, it is most likely that the exceedance was caused by the Beckjord facility.

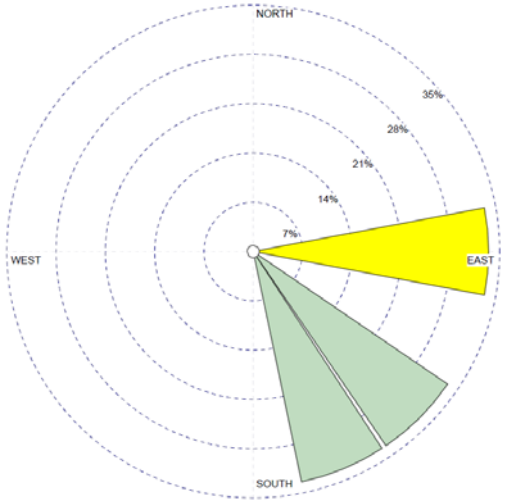
Trajectory ID	Year	Month	Day	Hour	Reading
20c	2012	April	7	15:00	81

a)

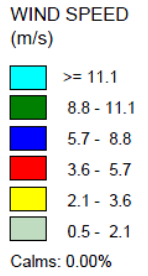


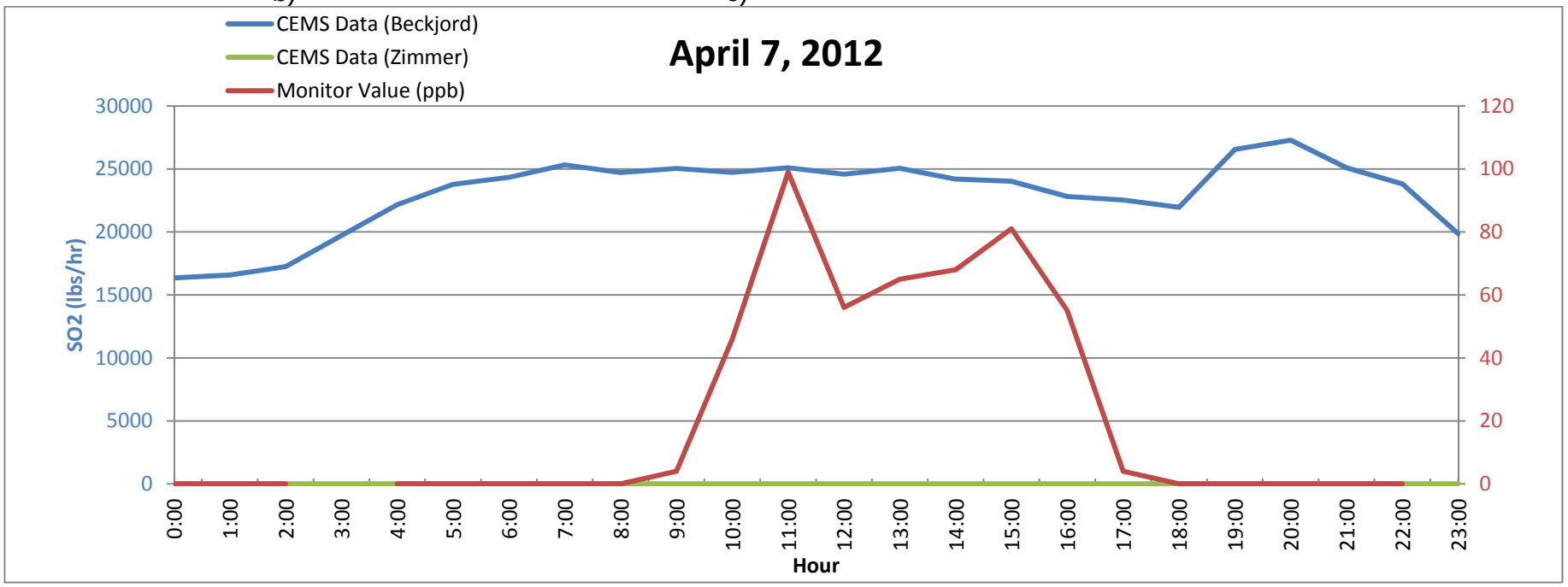


b)



c)





d)

Figure 22. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on April 7, 2012; b) 24-hour windrose data at KCVG Station on April 7, 2012; c) 3-hour windrose data from 14:00 to 16:00 at KCVG Station on April 7, 2012; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

VI. Other Trajectories

This Section includes exceedance days in which the HYSPLIT back trajectories do not pass near proximity to Beckjord or Zimmer. For these exceedance days, the analysis relied heavily upon the surface wind data and CEMS data to determine the likely contribution of Beckjord and Zimmer emissions in relation to the exceedance at the monitor.

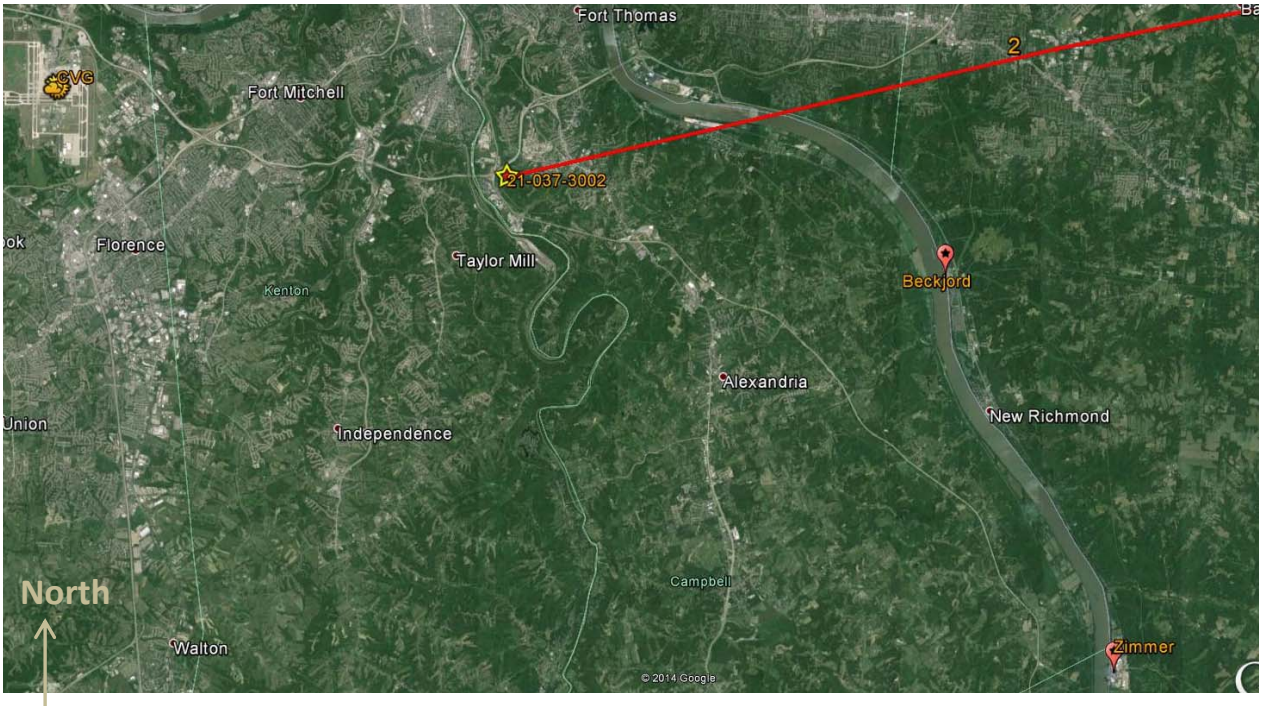
July 31, 2010 - Beckjord

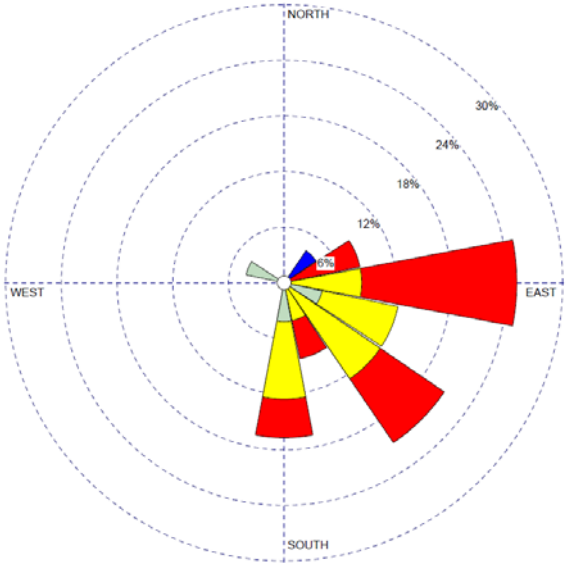
On July 31, 2010, one exceedance was reported at Monitor ID 21-037-3002 at 14:00. The reported exceedance value was 82 ppb. One HYSPLIT back trajectories was modeled as shown in Figure 23a to represent the exceedance in the table below. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 23b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 23c shows the windrose data around the time of the 14:00 hour exceedance.

The HYSPLIT back trajectories pass north the Beckjord facility. The windrose data at the time of the exceedances shows the wind was blowing exclusively from the direction where the Beckjord facility is located. The SO2 emissions at the Beckjord facility markedly increased in the hours priors to the exceedance. Based on the combined interpretation of the data presented for this exceedance day, Beckjord is the most likely contributor to the exceedances reported at the monitor.

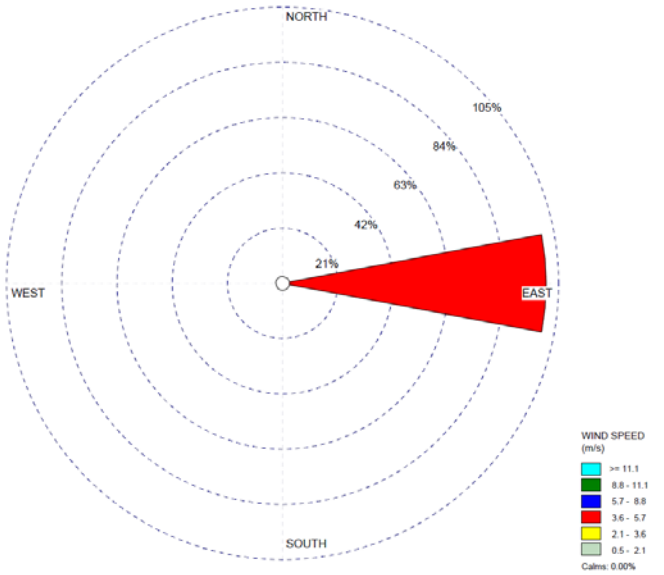
Trajectory ID	Year	Month	Day	Hour	Reading
2	2010	7	31	14:00	82

a)





b)



c)

d)

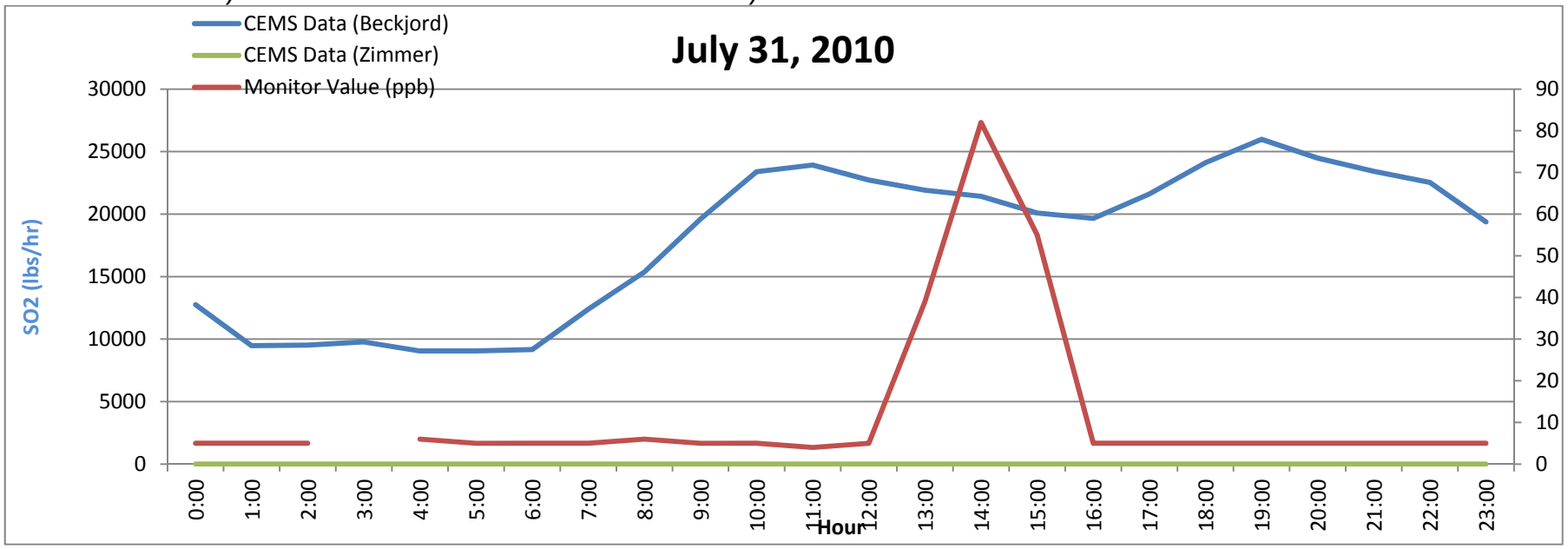


Figure 23. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on July 31, 2010; b) 24-hour windrose data at KCVG Station on July 31, 2010; c) 3-hour windrose data from 13:00 to 15:00 at KCVG Station on July 31, 2010; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

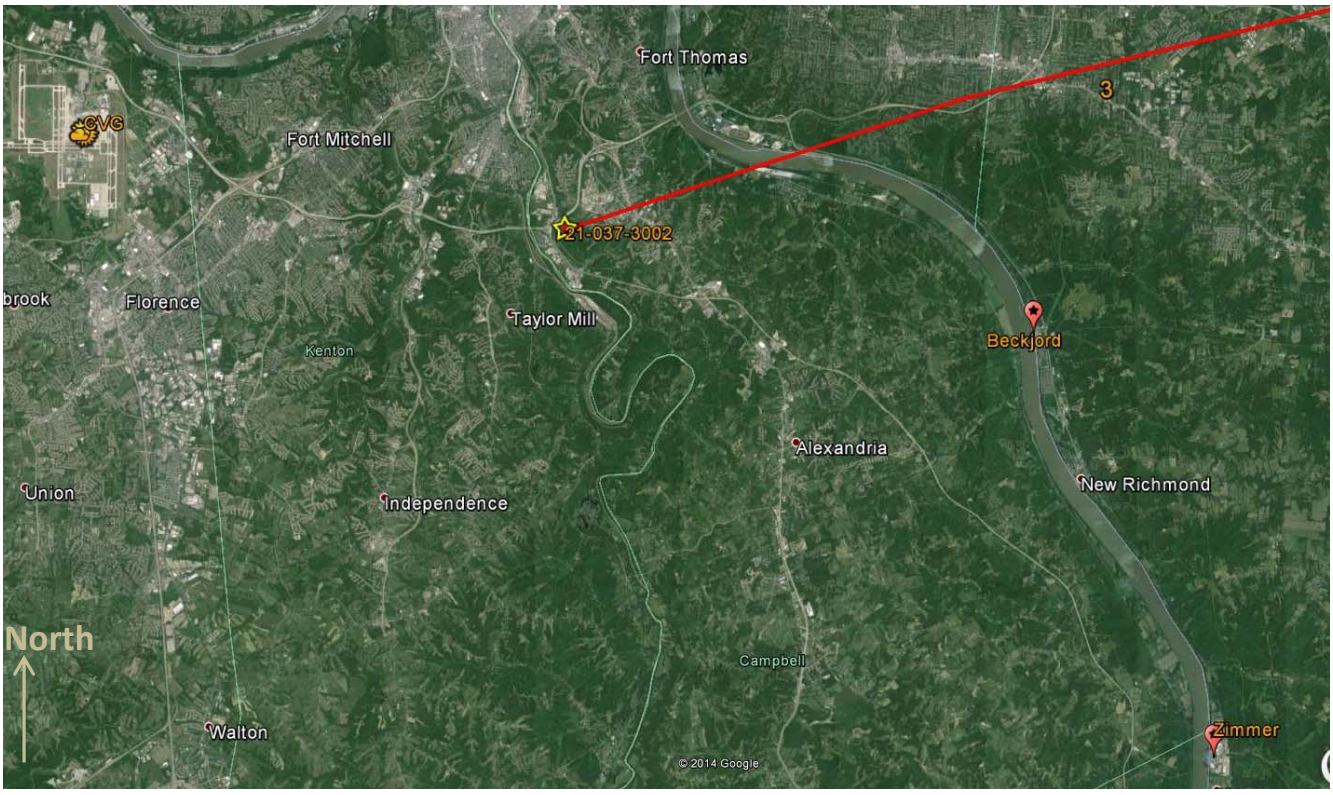
August 27, 2010 - Beckjord

On August 27, 2010, one exceedance was reported at Monitor ID 21-037-3002 at 9:00. The exceedance value reported was 118 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 24a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 24b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 24c shows the windrose data around the time of the exceedance hour. Figure 24d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT back trajectory is shown north of the Beckjord facility. The windrose data at the time of the exceedances shows the wind was blowing from the east/northeast. The SO2 emissions at the Beckjord facility markedly increased in the hours priors to the exceedance. Based on the data presented for this exceedance day, Beckjord is the most likely contributor to the exceedances reported at the monitor.

Trajectory ID	Year	Month	Day	Hour	Reading
3	2010	August	27	9:00	118

a)



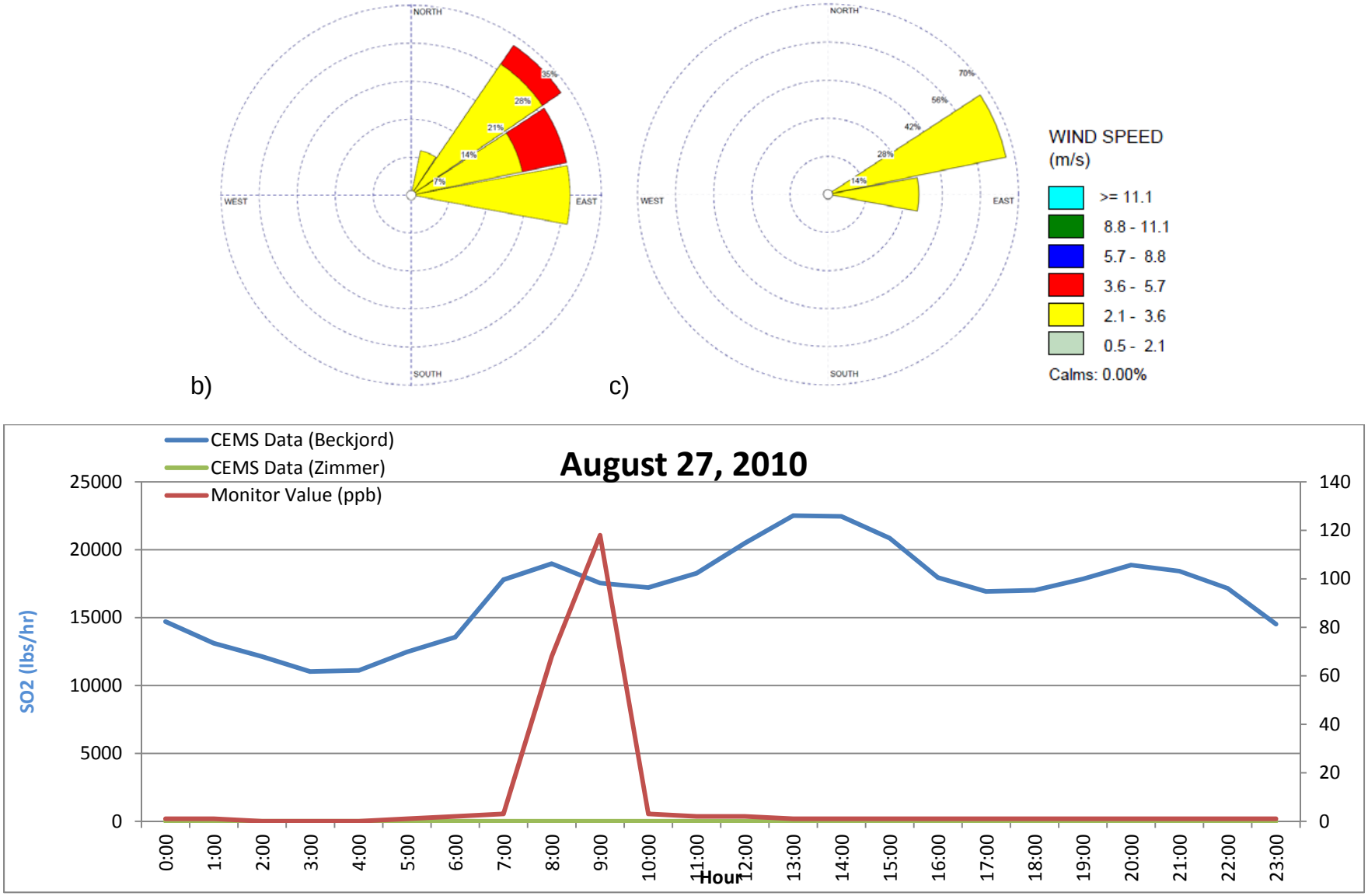


Figure 24. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on August 27, 2010; b) 24-hour windrose data at KCVG Station on August 27, 2010; c) 3-hour windrose data from 8:00 to 10:00 at KCVG Station on August 27, 2010; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

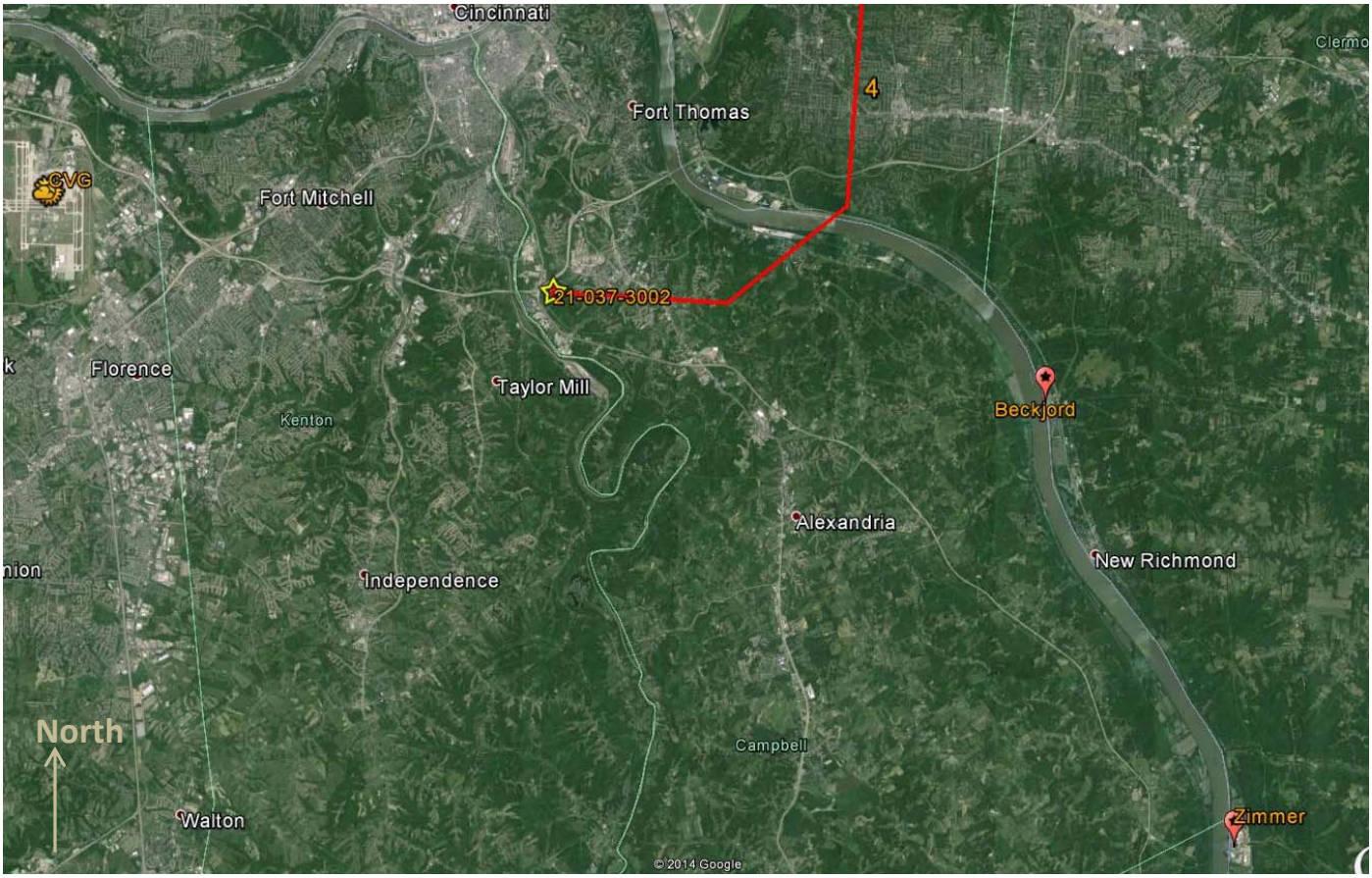
September 14, 2010 – Beckjord

On September 14, 2010, one exceedance was reported at Monitor ID 21-037-3002 at 11:00. The exceedance value reported was 118 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 25a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 25b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 25c shows the windrose data around the time of the exceedance hour. Figure 25d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT trajectory does not pass over or in close proximity to Beckjord or Zimmer. Examination of the wind direction data reveals that surface level winds on this date were primarily from the east which suggests that emissions from Beckjord are the likely cause of the exceedance on this date. Furthermore, examination of the emissions data shown in Figure 25d shows that emissions from Beckjord markedly increased in the hours leading up to the exceedance. Based on the data, and the lack of other significant sources of SO2 along the trajectory shown, Beckjord was determined to be the most likely contributor to the exceedance.

Trajectory ID	Year	Month	Day	Hour	Reading
4	2010	September	14	11:00	99

a)



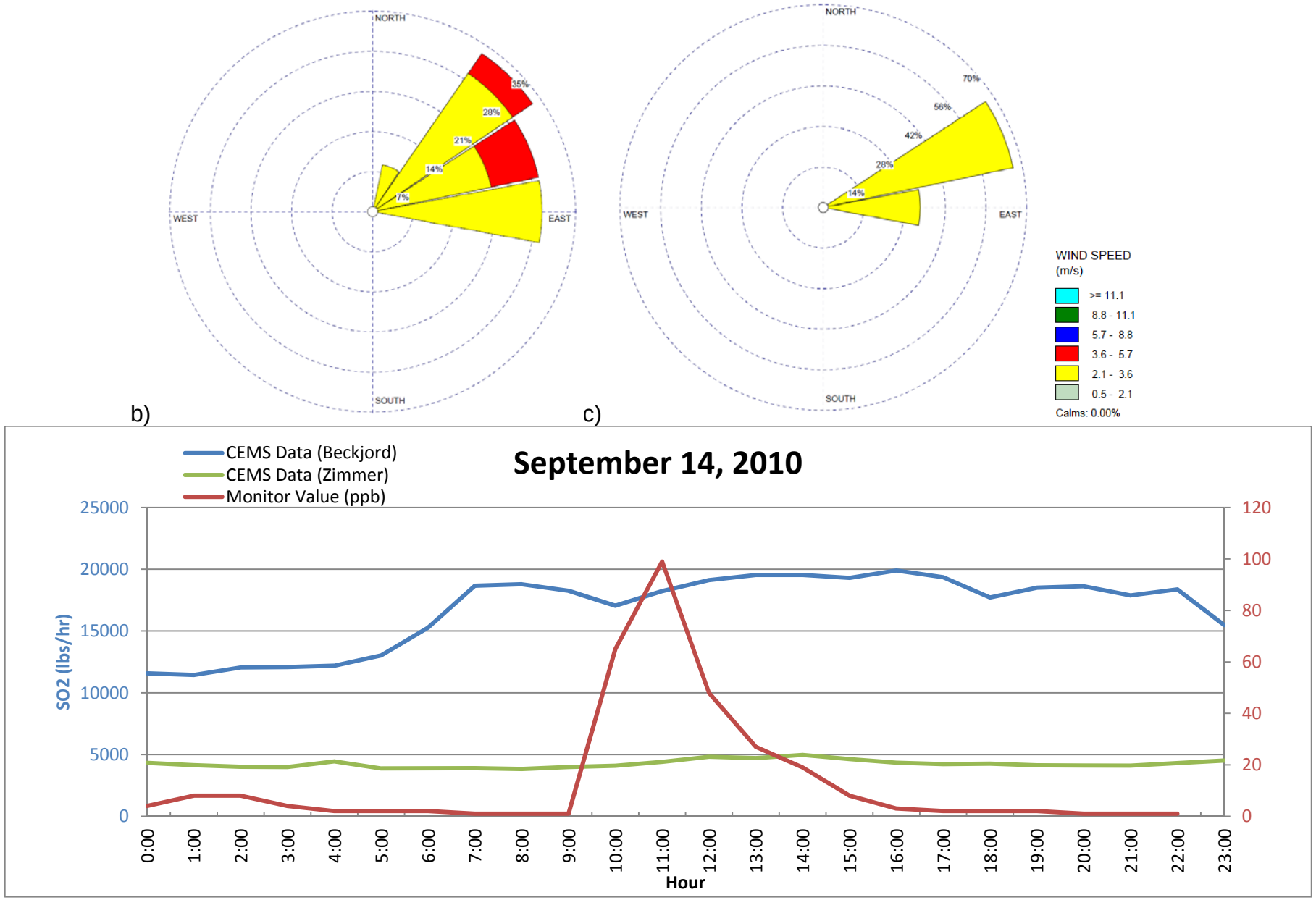


Figure 25. a) HYSPLIT back trajectory from Monitor ID 21-037-3002 on September 14, 2010 at 11:00 ; c) 24-hour windrose data at KCVG Station on September 14, 2010; d) 3-hour windrose data from 8:00 to 11:00 at KCVG Station on September 14, 2010; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

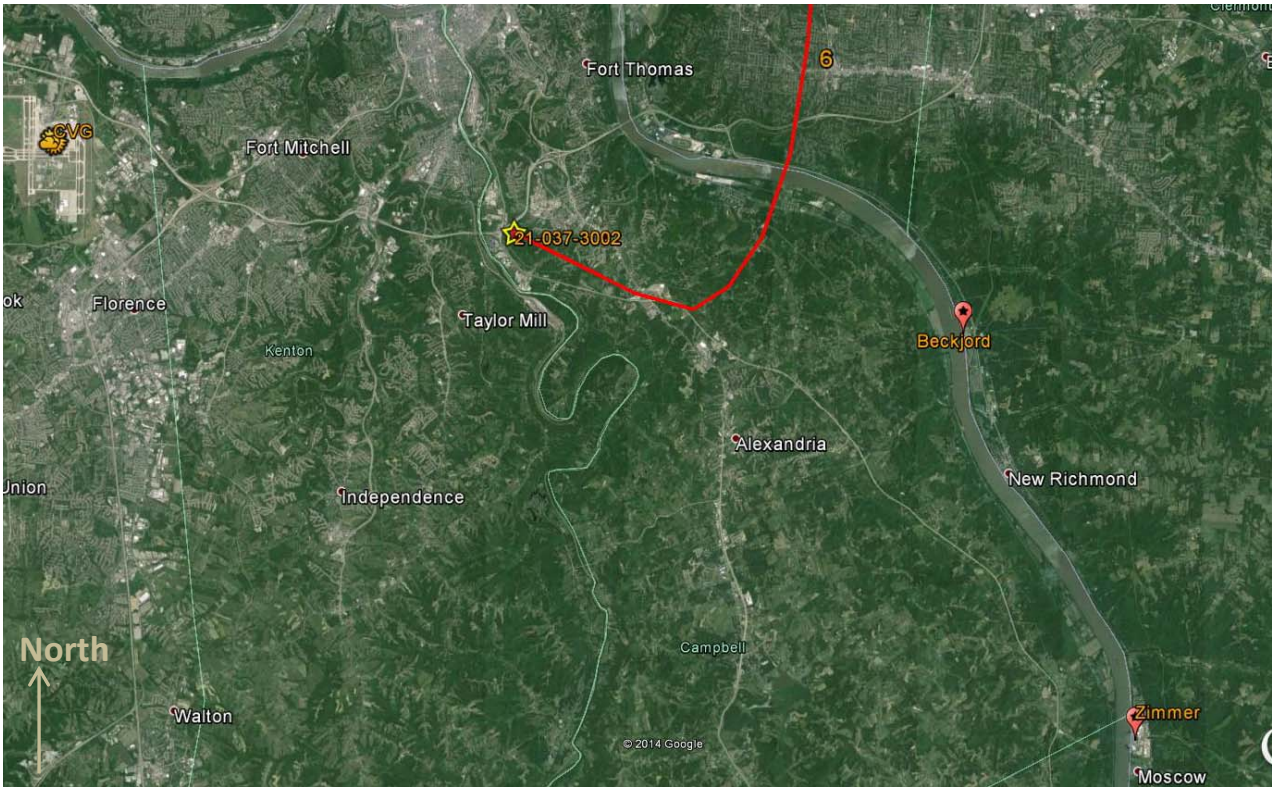
February 23, 2011 - Beckjord

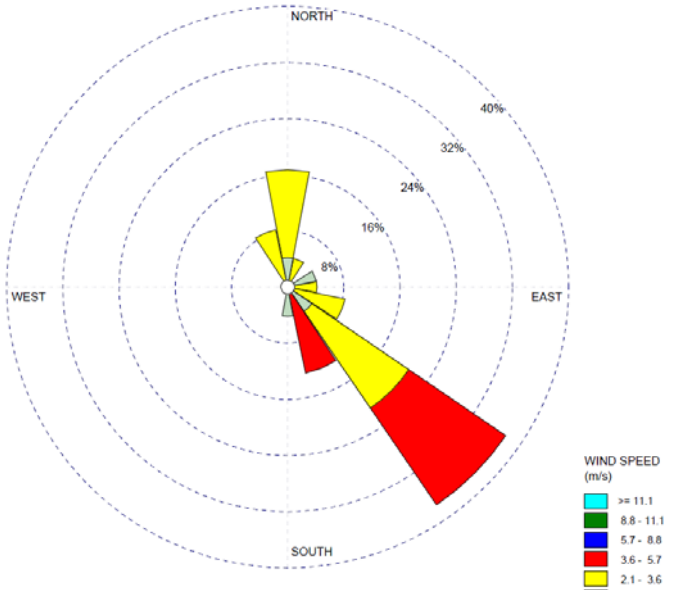
On February 23, 2011, one exceedance was reported at Monitor ID 21-037-3002 at 9:00. The exceedance value reported was 137 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 26a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 26b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 26c shows the windrose data around the time of the exceedance hour. Figure 26d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT trajectory does not pass over or in close proximity to Beckjord or Zimmer. Emissions from both facilities were relatively stable throughout the day and recorded values remained low at the monitor with the exception of the sharp spike observed at the exceedance hour. Examination of the wind direction data reveals that surface level winds on this date were predominantly from the southeast direction where Zimmer is located. Winds data around the time of the exceedance reveals that surface level winds during this period were predominantly from the eastern direction where Beckjord is located. Based on the data, Beckjord was determined to be the most likely contributor to the exceedance.

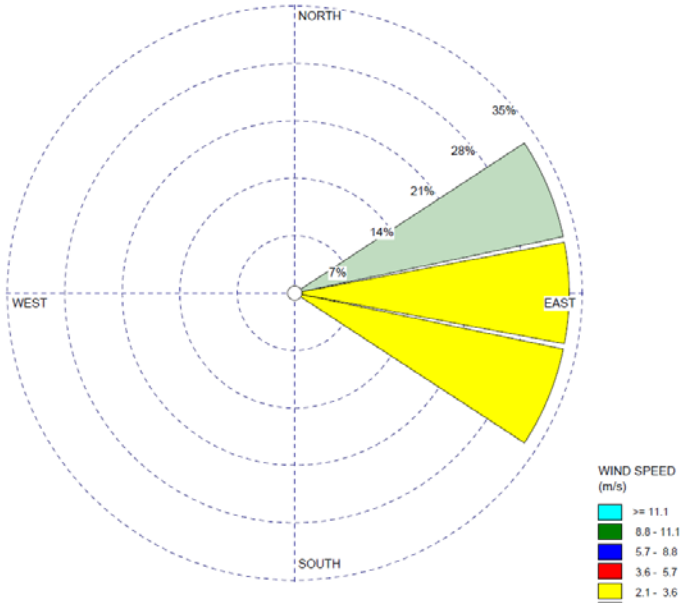
Trajectory ID	Year	Month	Day	Hour	Reading
6	2011	February	23	9:00	137

a)

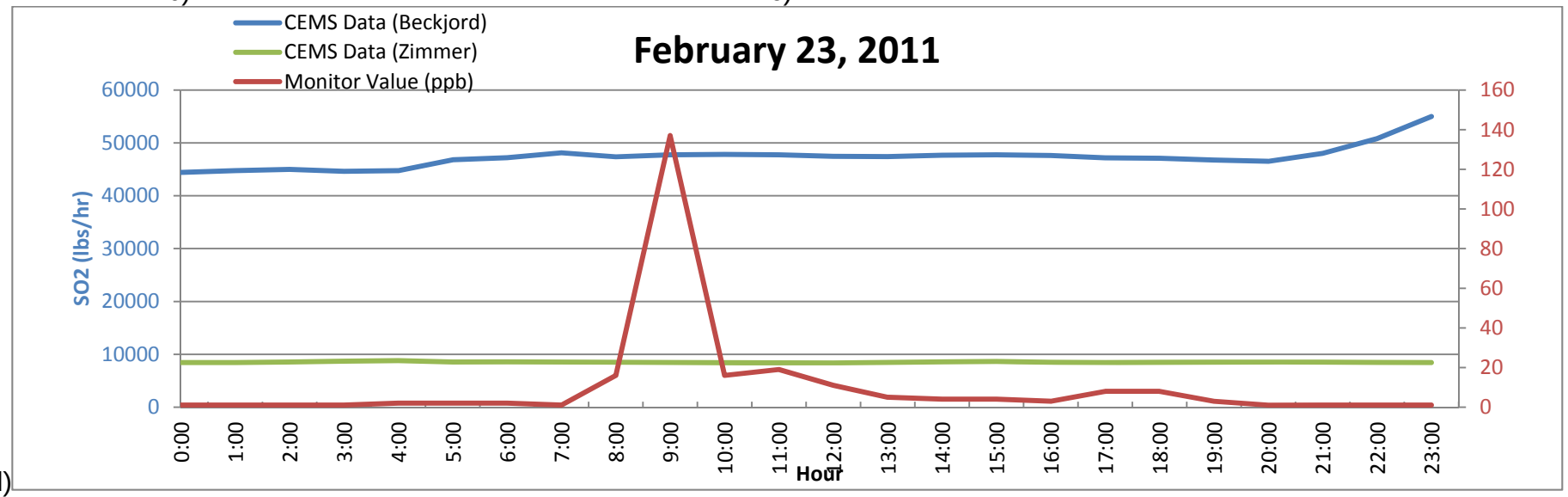




b)



c)



d)

Figure 26. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on February 23, 2011; b) 24-hour windrose data at KCVG Station on February 23, 2011; c) 3-hour windrose data from 8:00 to 11:00 at KCVG Station on February 23, 2011; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

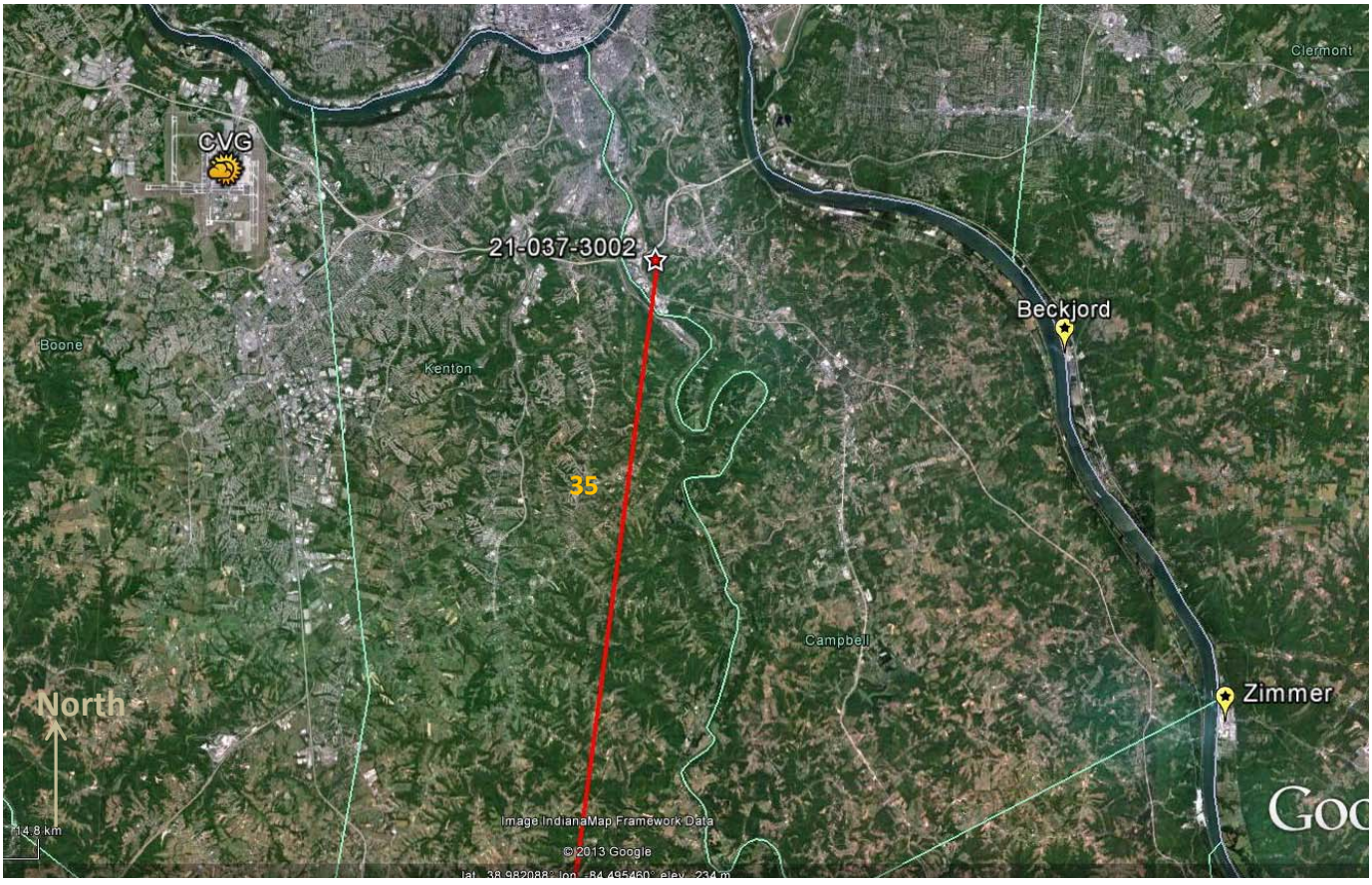
April 22, 2011 – Beckjord

On April 22, 2011, one exceedance was reported at Monitor ID 21-037-3002 at 3:00. The exceedance value reported was 109 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 27a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 27b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 27c shows the windrose data around the time of the exceedance hour. Figure 27d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT trajectory does not pass over or in close proximity to Beckjord or Zimmer. Examination of the surface wind direction data reveals that surface level winds on this date were predominantly from the east. Winds data around the time of the exceedance shows that surface level winds during this period were also predominantly from the east where Beckjord is located. Based on the data, Beckjord was determined to be the most likely contributor to the exceedance.

Trajectory ID	Year	Month	Day	Hour	Reading
35	2011	April	22	3:00	109

a)



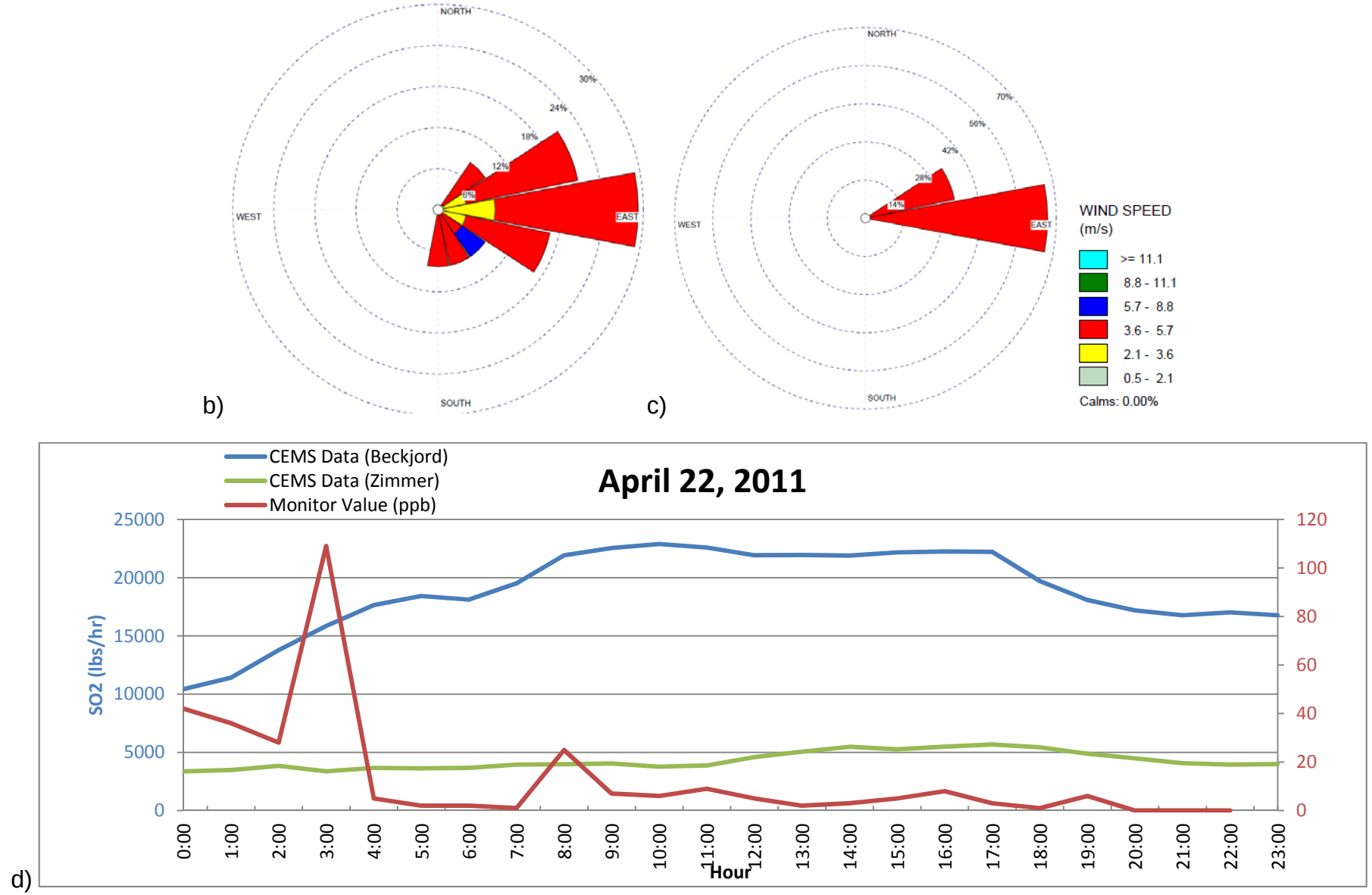


Figure 27. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on April 22, 2011; b) 24-hour windrose data at KCVG Station on April 22, 2011; c) 3-hour windrose data from 2:00 to 4:00 at KCVG Station on April 22, 2011; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

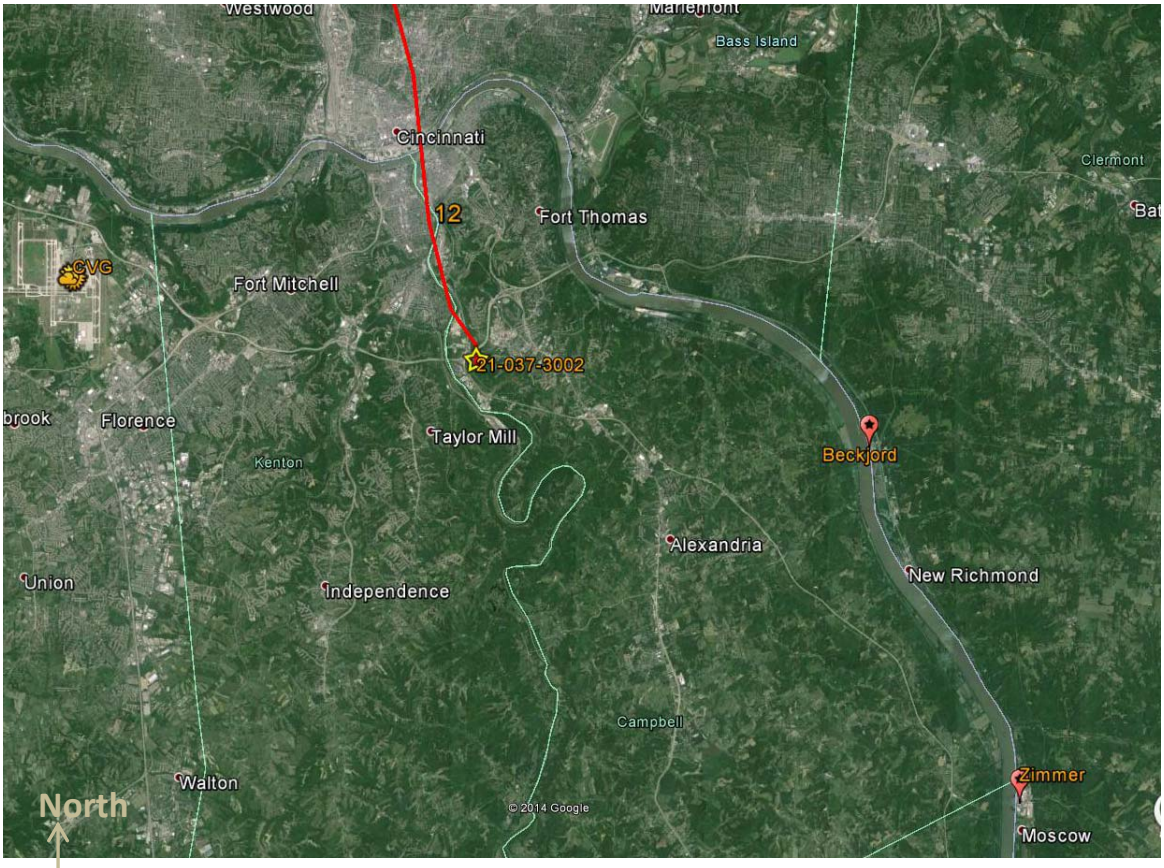
July 5, 2011 - Beckjord

On July 5, 2011, two exceedances were reported at Monitor ID 21-037-3002 between 10:00 and 11:00. The exceedance values reported were 91 and 180, respectively. The exceedances were modeled by one HYSPLIT back trajectory in Figure 28a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 28b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 28c shows the windrose data around the time of the exceedance hours. Figure 28d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT trajectory does not pass over or in close proximity to Beckjord or Zimmer. Examination of the surface wind direction data reveals that surface level winds on this date were predominantly northwest. Wind data around the time of the exceedance shows that surface level winds during this period were from the northeast/east/southeast indicating that Beckjord or Zimmer may have contributed to the exceedance. The CEMS data shows the Beckjord emissions markedly increased in the hours prior to the exceedance and the emissions at Zimmer were zero at the time of the exceedance and for several hours prior. Based on this information, Beckjord was determined to be the most likely contributor to the exceedance.

Trajectory ID	Year	Month	Day	Hour	Reading
12	2011	July	5	10:00	91
12	2011	July	5	11:00	180

a)



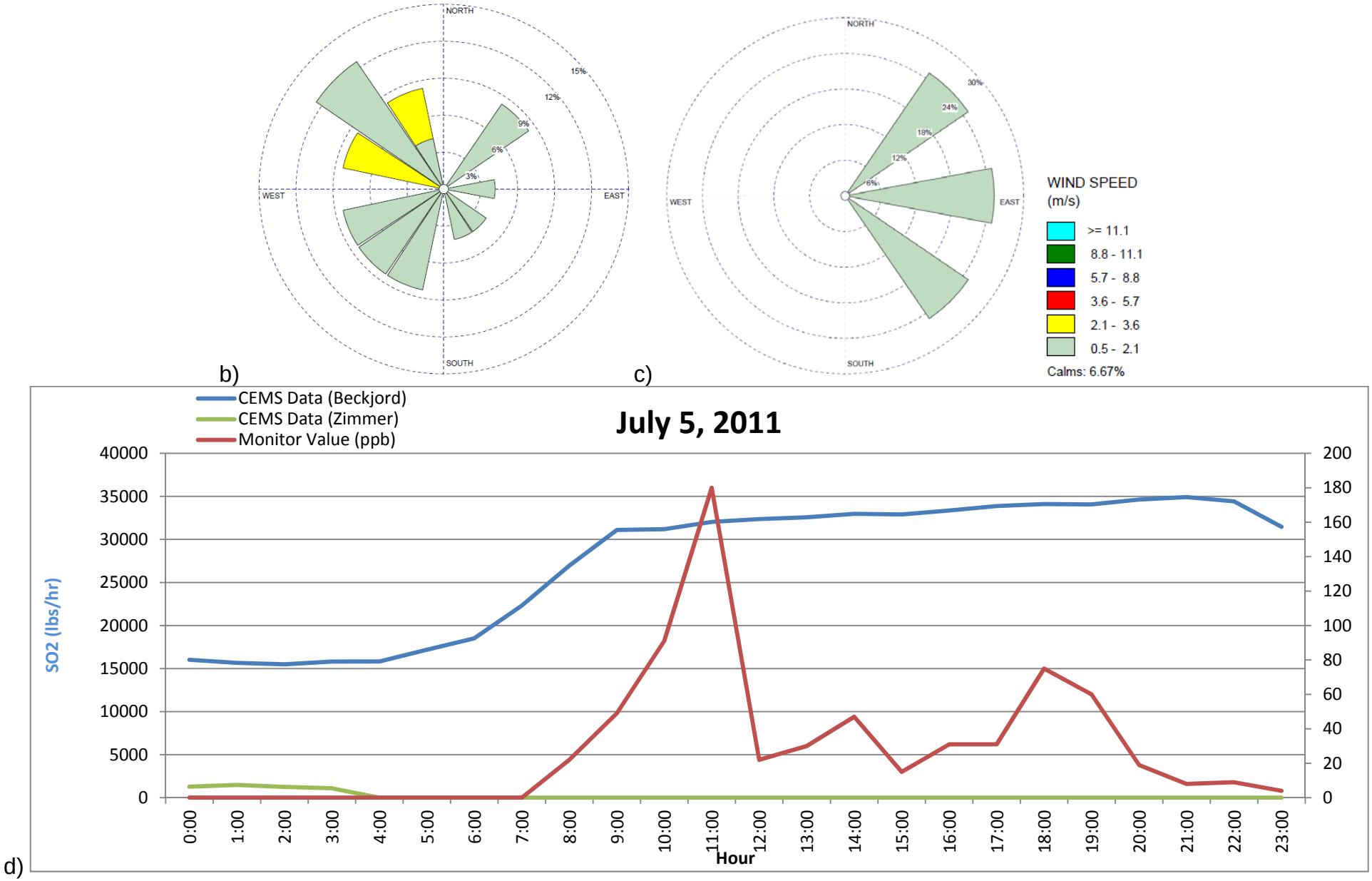


Figure 28. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on July 5, 2011; b) 24-hour windrose data at KCVG Station on July 5, 2011; c) 3-hour windrose data from 9:00 to 12:00 at KCVG Station on July 5, 2011; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

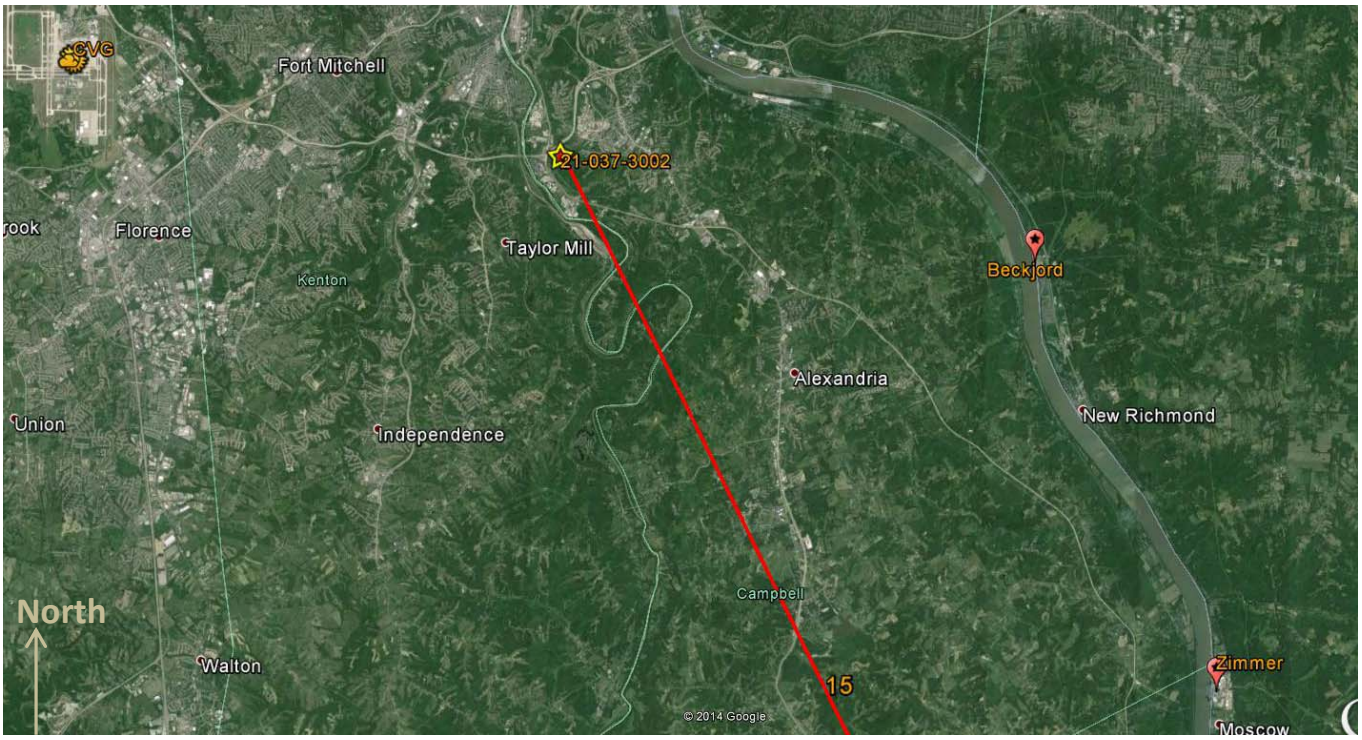
January 11, 2012 - Beckjord

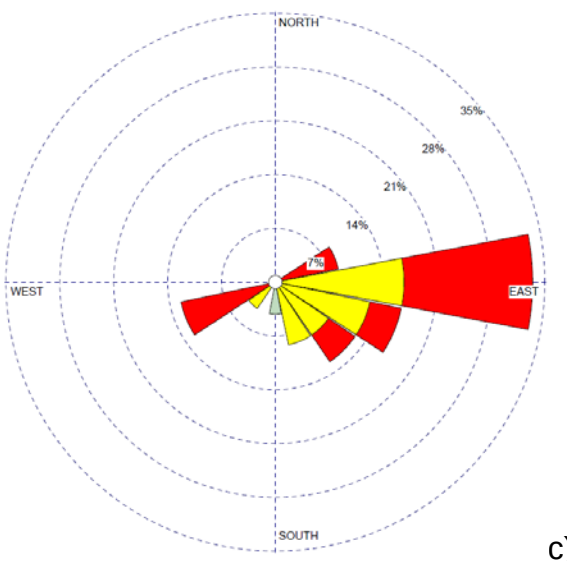
On January 11, 2012, one exceedance was reported at Monitor ID 21-037-3002 between at 12:00. The exceedance value reported was 76 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 29a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 29b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 29c shows the windrose data around the time of the exceedance hour. Figure 29d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT trajectory does not pass over or in close proximity to Beckjord or Zimmer. The CEMS data shows a slight increase in SO2 emissions in the hours prior to the exceedance; the Zimmer SO2 emissions remained steadily elevated throughout the day until dropping off at 15:00. Examination of the surface wind direction data reveals that surface level winds on this date were predominantly from the east. Surface level wind data around the time of the exceedance shows that surface level winds during this period were exclusively from the east indicating a high probability that Beckjord contributed to the exceedance. Based on this information, Beckjord was determined to be the most likely contributor to the exceedance.

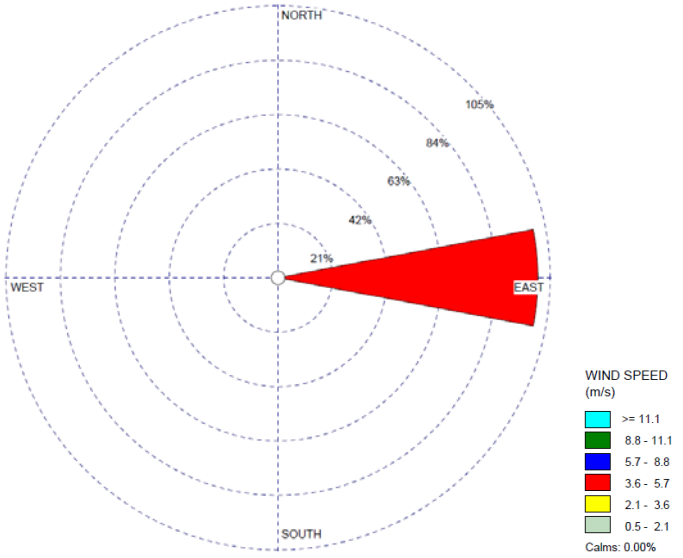
Trajectory ID	Year	Month	Day	Hour	Reading
15	2012	January	11	12:00	76

a)





b)



c)

d)

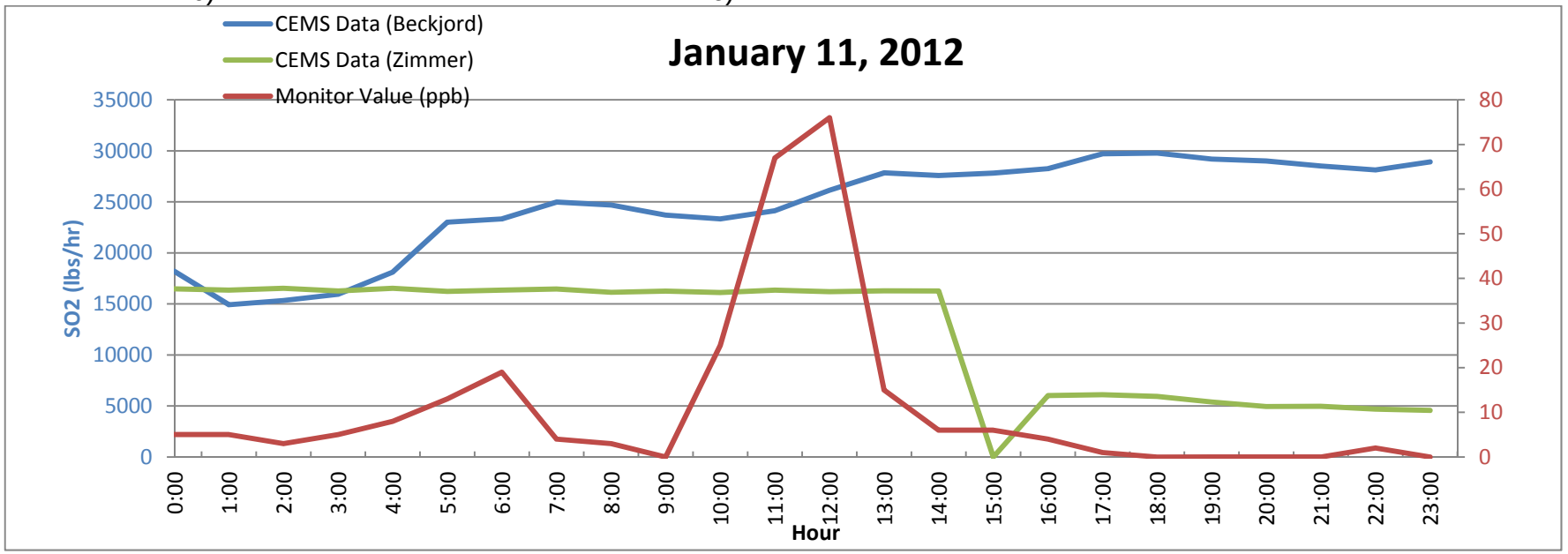


Figure 29. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on January 11, 2012; b) 24-hour windrose data at KCVG Station on January 11, 2012; c) 3-hour windrose data from 11:00 to 13:00 at KCVG Station on January 11,2012; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

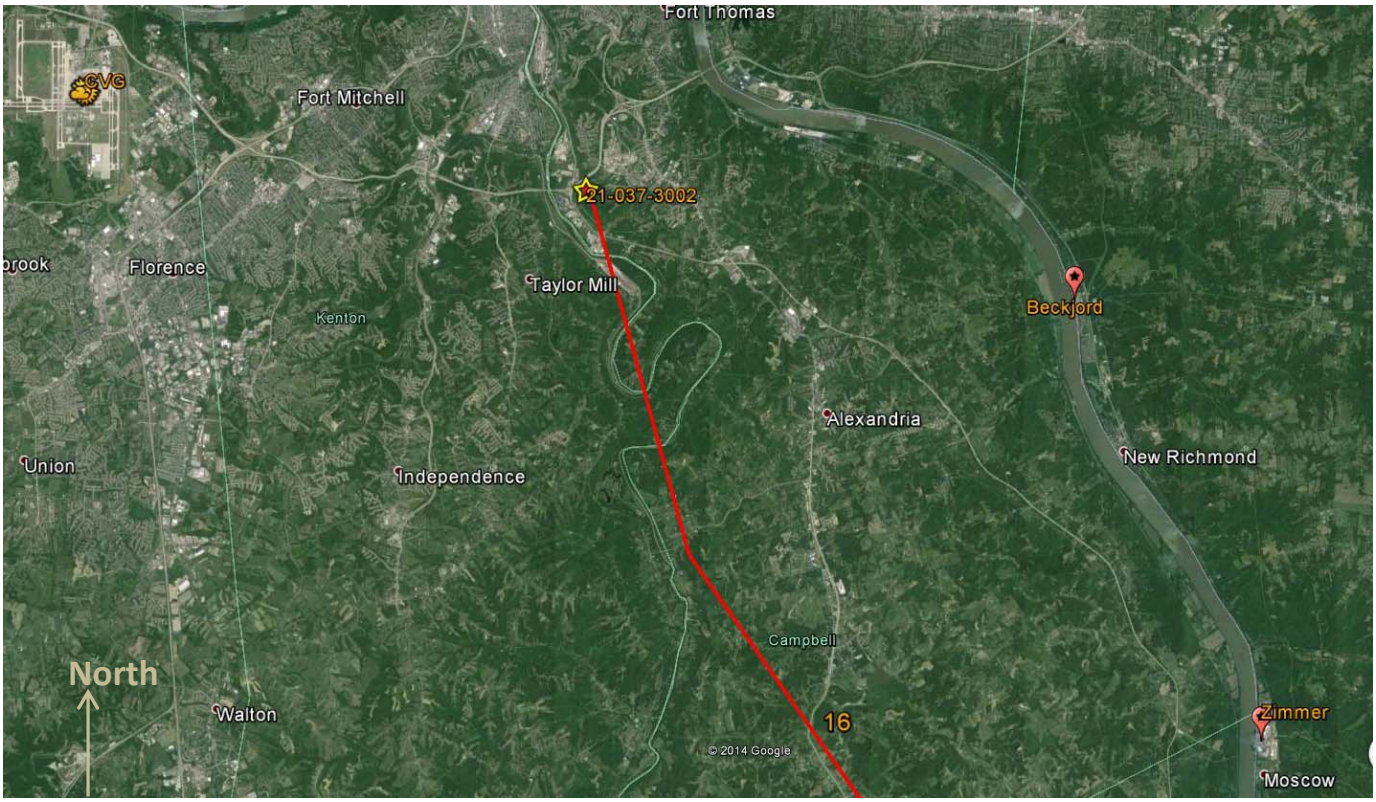
January 25, 2012 – Beckjord/Combined

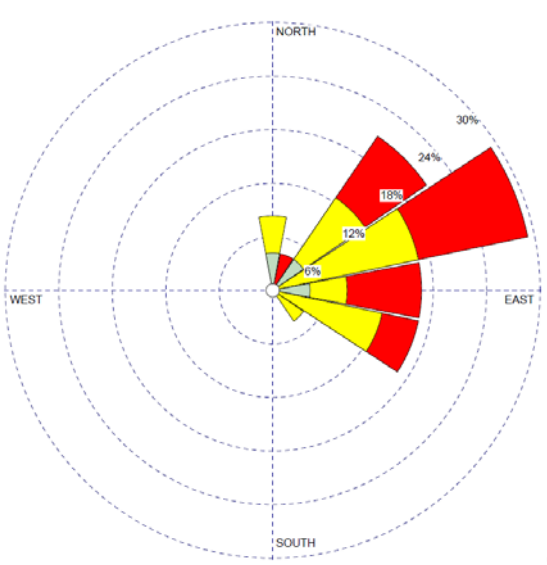
On January 25, 2012, one exceedance was reported at Monitor ID 21-037-3002 at 12:00. The exceedance value reported was 85 ppb. The exceedance was modeled by one HYSPLIT back trajectory in Figure 30a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 30b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 30c shows the windrose data around the time of the exceedance hour. Figure 30d shows the CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

The HYSPLIT trajectory does not pass over or in close proximity to Beckjord or Zimmer. The CEMS data shows both facilities emissions remained relatively constant throughout the day. Examination of the surface wind direction data around the time of the exceedance shows winds were blowing from the northeast/east/southeast direction. It should be noted that Beckjord's emissions were over four times that of Zimmer during the day. This would indicate that Beckjord was the main contributor to the exceedance although wind data may indicate Zimmer had a contribution.

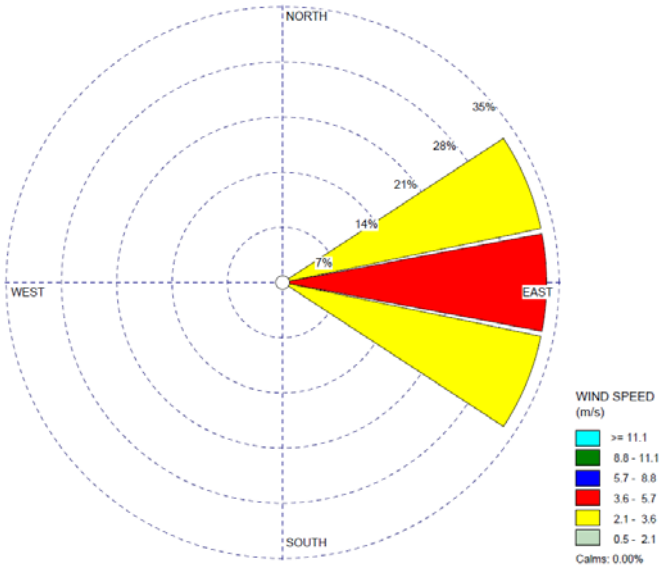
Trajectory ID	Year	Month	Day	Hour	Reading
16	2012	January	25	12:00	85

a)

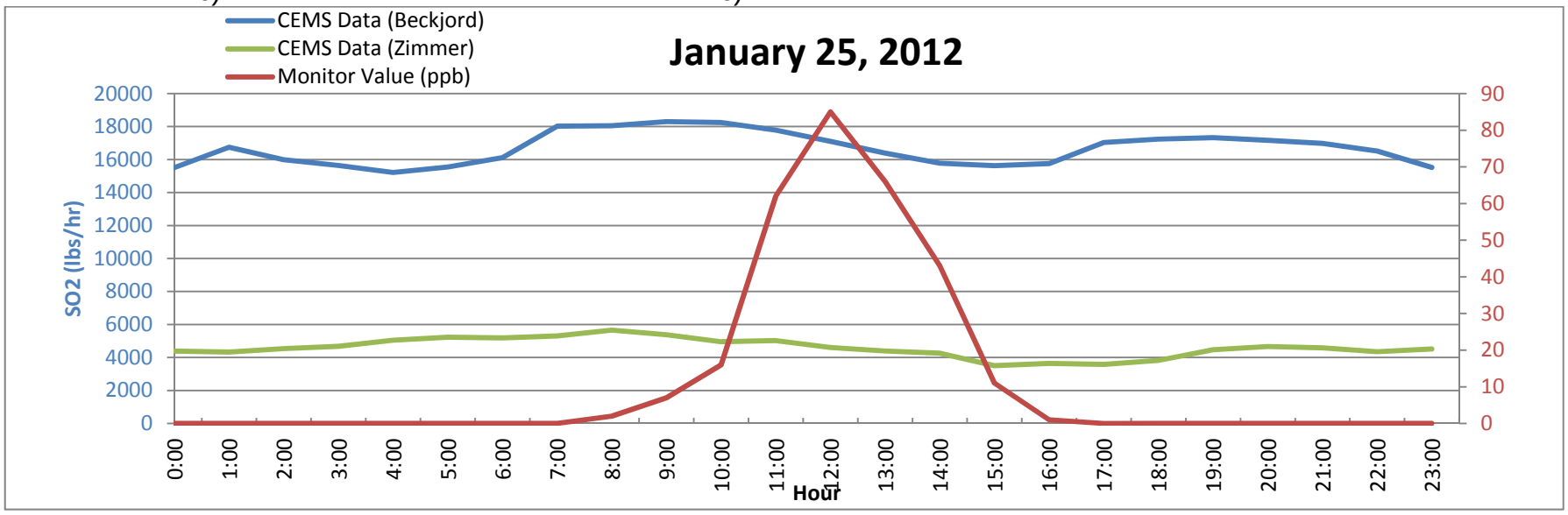




b)



c)



d)

Figure 30. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on January 25, 2012; b) 24-hour windrose data at KCVG Station on January 25, 2012; c) 3-hour windrose data from 11:00 to 13:00 at KCVG Station on January 25,2012; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

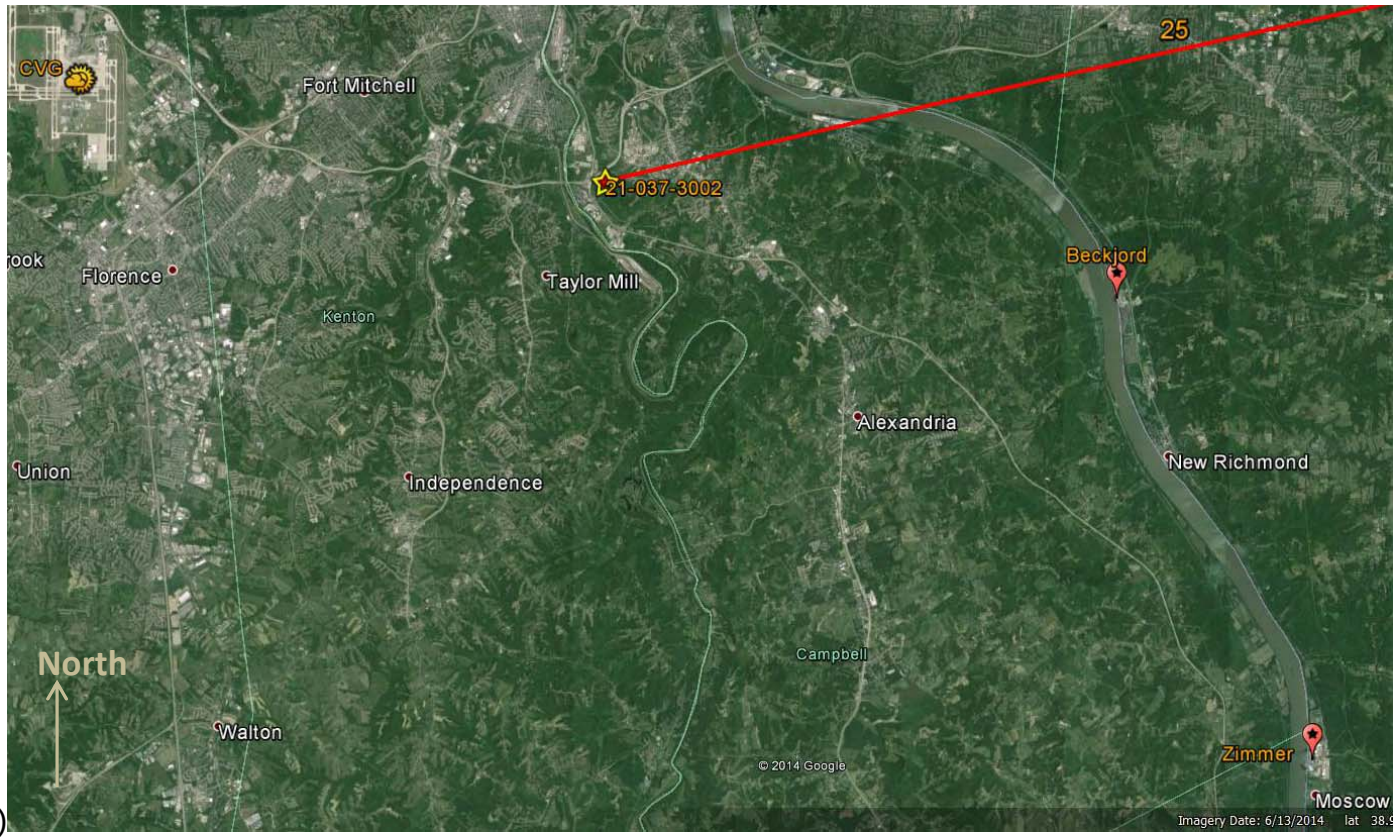
March 6, 2014 – neither

On March 6, 2013, one exceedance was reported at Monitor ID 21-037-3002 at 12:00. The exceedance value reported was 93 ppb. The exceedance was modeled by an individual trajectory in Figure 31a. The meteorological windrose data was also plotted to determine where the wind was blowing from on the exceedance date. Figure 31b shows the windrose data for a 24 hour period on the exceedance day (0:00 to 23:00), Figure 31c shows the windrose data around the time of the exceedance.

The HYSPLIT back trajectories pass north of the Beckjord facility. The surface windrose data on the exceedance day and around time of the exceedance show the wind was blowing predominately from the northeast. The March 6, 2014 exceedance is therefore not attributable to Beckjord or Zimmer. Ohio EPA is not aware of other major sources of SO2 emissions in the area encompassed by the trajectory.

Trajectory ID	Year	Month	Day	Hour	Reading
25	2014	March	6	12:00	93

a)



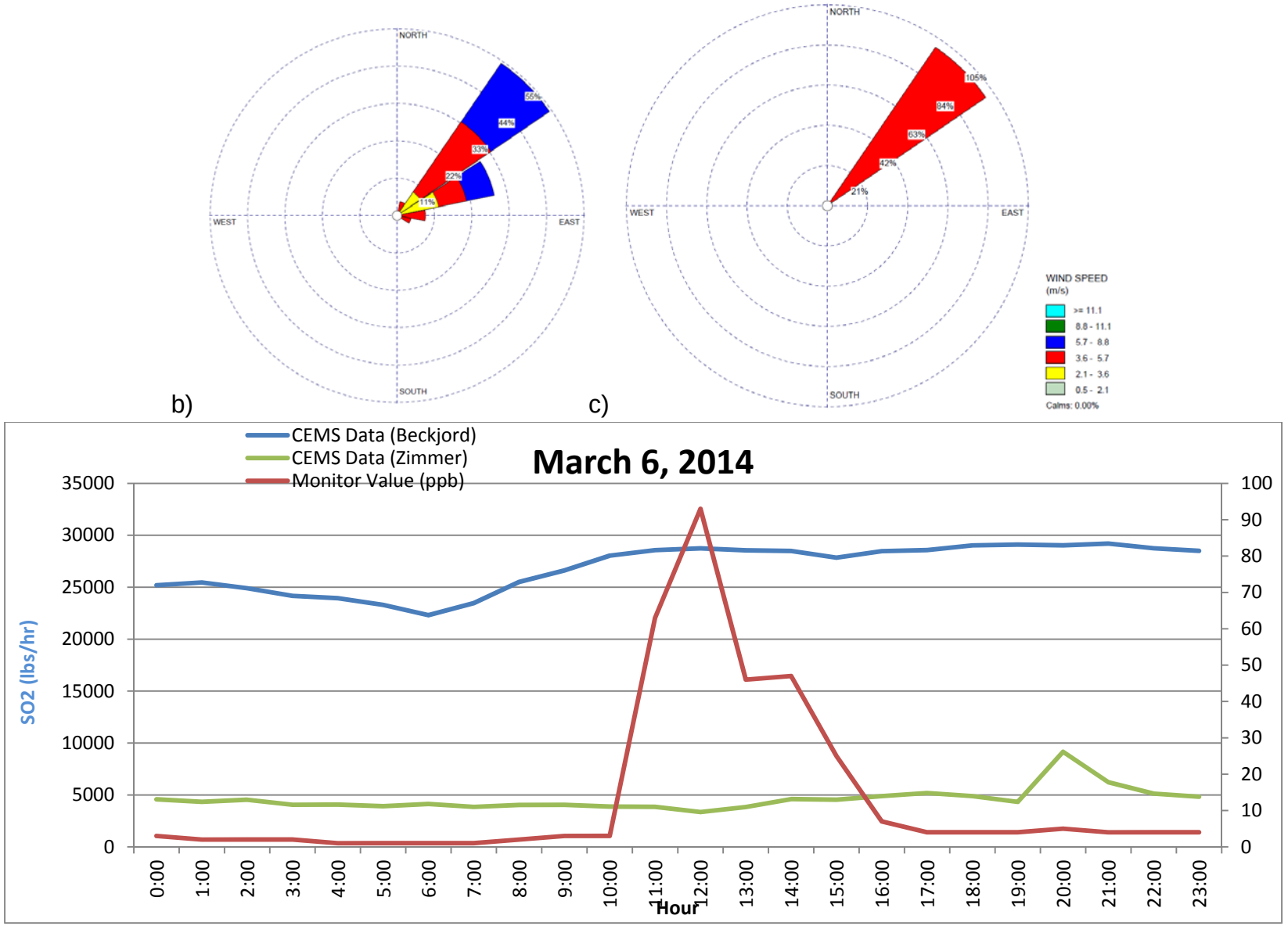


Figure 31. a) Beckjord and Zimmer CEMS data and monitored values at Kentucky Monitor ID 21-037-3002 on March 6, 2014; b) 24-hour windrose data at KCVG Station on March 6, 2014; c) 2-hour windrose data from 11:00 to 13:00 at KCVG Station on March 6, 2014; d) CEMS data for both the Beckjord and Zimmer facilities in relation to the recorded monitored values on an hourly basis for the exceedance day.

VII. Summary

Between January 1, 2010 and August 31, 2014, 44 exceedances of the 2010 1-hour SO2 NAAQS were reported at Monitor ID 21-037-3002. Review of the data presented in this report indicates 42 of the exceedances were most likely attributable to SO2 emissions at the W.C. Beckjord Facility; and 1 exceedance was likely attributable to the W.C. Beckjord Facility but may have been influenced by SO2 emissions from both facilities; and 1 exceedance was not attributable to either facility.

As presented in Table 2 of this report, the W.C. Beckjord Facility consistently emitted substantially higher SO2 emission for the period analyzed. Although emissions themselves are not directly indicative of a particular source causing or contributing to an exceedance or exceedances, together with the majority of exceedances being attributable to Beckjord demonstrates the Beckjord facility is the primary SO2 source causing exceedances of the 1-hour SO2 NAAQS at monitor 21-037-3002.

Appendix E

SO_2 On-Road Emissions Inventory

2011, 2014, 2017, 2020, 2022 and 2027 SO_2 On-Road Emissions Inventory for Campbell-Clermont Counties, KY-OH 1-HOUR SO_2 Nonattainment Area

REVISED
January 2015

Prepared for the Ohio Environmental Protection Agency and Kentucky Division for Air Quality by

OKI Regional Council of Governments

Ohio · Kentucky · Indiana
Regional Council of Governments

Acknowledgments

Title	2011, 2014, 2017, 2020, 2022 and 2027 SO2 On-Road Emissions Inventory for Campbell-Clermont Counties, KY-OH 1-HOUR SO2 Nonattainment Area
Abstract	This report was prepared for the Ohio Environmental Protection Agency. The SO2 Nonattainment Area includes a portions of Campbell County Kentucky and Clermont County Ohio. EPA's Motor Vehicle Emission Simulation (MOVES) 2014 was used to generate the emission inventory.
Date	January 2015
Agency	Ohio-Kentucky-Indiana Regional Council of Governments Mark Policinski, Executive Director Robert Koehler, P.E., Deputy Director
Project Manager	Andrew J. Reser, AICP
Project Staff	Larry Buckler

The preparation of this document was financed cooperatively by the Federal Highway Administration, the Federal Transit Administration, the Commonwealth of Kentucky Transportation Cabinet, the Ohio Department of Transportation, and the units of local and county government in the OKI region. The opinions, findings, and conclusions expressed in this document are those of the OKI Regional Council of Governments and are not necessarily those of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

2011, 2014, 2017, 2020, 2022 and 2027 SO_2 On-Road Emissions Inventory for Campbell-Clermont Counties, KY-OH 1-HOUR SO_2

This report was prepared for the Ohio Environmental Protection Agency and the Kentucky Department for Air Quality. The SO_2 nonattainment area includes a portion of Campbell County Kentucky and a portion of Clermont County Ohio. EPA's Motor Vehicle Emissions Simulator (MOVES) 2014 model was used to generate the vehicle emission inventory. Details on the various county data inputs used to generate the SO_2 inventory are described in Tables 2 and 3.

Table 1 shows daily (tons per summer day) and annual (tons per year) on-road SO_2 emissions for the Nonattainment Area. Emissions within each state portion of the Nonattainment Area are also shown. Vehicle miles traveled (VMT) in the nonattainment area ranges from 510 million per year in 2011 to 570 million per year in 2027. Information on OKI's process for developing forecasts of future travel patterns is provided.

Table 1						
Campbell-Clermont KY-OH SO_2 Nonattainment Area - Daily On-Road Emissions (tons per summer day)						
	2011	2014	2017	2020	2022	2027
Campbell-Clermont SO_2 Daily Mobile Emissions	**0.006**	**0.006**	**0.006**	**0.006**	**0.006**	**0.005**
Campbell, KY (partial)	0.005	0.005	0.005	0.005	0.005	0.004
Clermont, OH (partial)	0.001	0.001	0.001	0.001	0.001	0.001
Campbell-Clermont KY-OH SO_2 Nonattainment Area - Annual On-Road Emissions (tons per year)						
	2011	2014	2017	2020	2022	2027
Campbell-Clermont SO_2 Annual Mobile Emissions	**1.887**	**1.837**	**1.757**	**1.702**	**1.668**	**1.537**
Campbell, KY (partial)	1.547	1.506	1.441	1.396	1.368	1.260
Clermont, OH (partial)	0.340	0.331	0.316	0.306	0.300	0.277

Mobile Source Emission Forecast Process

Emission Factor Model

OKI's inventory assessment utilized U.S.EPA's emissions model MOVES2014 to generate SO_2 emissions. Table 3 summarizes the settings used in the MOVES run specification file. Table 4 lists the data used in the MOVES County-Data Manager. Further technical details on the use of MOVES are found in the appendix to the OKI report *"Mobile Source Emissions Inventory for Cincinnati PM2.5 Nonattainment Area"*, revised December 2010.

Table 2

MOVES Run Specications Parameter	Settings
MOVES 2014	default database 20141021
Scale	County, Emission Rates
Time Span	Time aggregation = Hour July and April weekday, July meteorological data and annual average meteorological data used in place of April data All hours of day selected Weekdays only
Geographic Bounds	One Custom Domain for 3 Kentucky counties
Vehicles/Equipment	All vehicle source types. Fuel types=gasoline, diesel, ethanol and CNG
Road Type	All road types including off-network
Pollutants and Processes	SO2. No emissions from refueling.
Strategies	Default
General Output	Units= grams, joules and miles
Output Emissions	Time = hour, Location =county, on-road emission rates by road type and source use type.
Advanced Performance	none

Table 3

MOVES County Data Manager	Data Source
Source Type Population	Local and default. Local data from KYTC (2013) and ODOT (2010) from motor vehicle registration data. Default data used for source types 41, 61 and 62 in Ohio and types 61 and 62 in Kentucky. Growth factor applied for future years.
Vehicle Type VMT	Local and default. HPMSVTypeYear VMT=daily VMT from OKI travel demand model with EPA's daily to annual VMT converter applied. monthVMTFraction = default. dayVMTFraction=default, hourVMTFraction=local.
I/M Programs	No I/M program.
Fuel Formulation	Default MOVES2014 fuel formulations. Reflects RFG program in KY.
Fuel Supply	Default
Meteorology Data	Local. MOBILE6 converted values for Ohio and Kentucky values from Kentucky Division for Air Quality.
Ramp Fraction	Local. OKI travel demand model.
Road Type Distribution	Local. OKI travel demand model.
Age Distribution	Local and default. Local data from KYTC (2013) and ODOT (2010) from motor vehicle registration data. Default data used for source types 41, 61 and 62 in Ohio and types 61 and 62 in Kentucky.
Average Speed Distribution	Local. OKI travel demand model.

OKI Travel Demand Model

Vehicle miles traveled and vehicle hours were estimated using the OKI Travel Demand Model Version 7.6. The OKI Travel Demand Model is composed of CUBE Voyager programs and a series of FORTRAN programs written by OKI. It is a state of the practice model that uses the standard four phase sequential modeling approach of trip generation, distribution, modal choice and assignment. The model uses demographic and land use data and capacity and free-flow speed characteristics for each roadway segment in the network to produce a "loaded" highway network with forecasted traffic volumes with revised speeds based on specified speed/capacity relationships.

Travel analysis zones are the basic geographic unit for estimating travel in the OKI model. The OKI region is subdivided into 1608 traffic analysis zones to permit detail as well as manageability. A variety of socioeconomic data items are used in the OKI transportation planning process. These data are used primarily to forecast future travel patterns by serving as independent variables in OKI trip generation equations. The following categories of planning data are utilized:

- Population (household and group quarter)
- Households

- Household vehicles
- Employment (by employment category and zone of work)
- Labor force participation (by zone of residence)
- Area type

The principal data requirements of the OKI travel demand forecasting model are population and employment. From these variables, other characteristics including households, labor force, and personal vehicles may be derived. Chapter 3 of OKI 2040 Regional Transportation Plan Update provides a complete demographic overview of the region.

OKI utilizes both base year (2005), past year (2010) and future year data (2015, 2020, 2030, and 2040) in the planning process. Planning data are maintained at the Traffic Analysis Zone (TAZ) level, and originate in the 2000 Census of Population and Housing. Base year 2005 and future year data for each variable are developed through various methods. More detailed explanation of base year and future year data generation for each of the above-mentioned categories of planning data follows. All of the variables represent the latest OKI planning assumptions.

Population

Base and Future Year Data: Population data for base year 2005, past year 2010 and future years 2015, 2020, 2030, and 2040 originate with the 2000 Census of Population and Housing. Utilizing ArcGIS, population data at the zonal level for 2000 was derived from the area proportion allocation of block level population.

As a tri-state regional planning agency, OKI uses the most current county level projections as prepared by the respective state data centers (Ohio Department of Development Office of Strategic Research, Kentucky State Data Center and Indiana Business Research Center) as control totals. Projections (years 2005 to 2040) were released by the Ohio state data center in 2011, the Indiana state data center in 2007 and the Kentucky State Data Center in 2009. Population projections at the zonal level are calculated by multiplying household size by the projected zonal households. Household size is factored so that, in each county, the sum of the zonal populations equals the control total.

Households

Base Year Data: Household data for base year 2005 originates with the 2000 Census of Population and Housing. Utilizing the geographic information system ArcGIS, household data at the zonal level for 2000 was derived from the area proportion allocation of block level households. Year 2000 household data was updated to 2005 with residential building permits issued between January 2000 and December 2004. The residential building locations were geo-coded in ArcGIS, and then aggregated to the TAZs. The housing unit totals for each TAZ were converted to households by applying a vacancy rate, an adjustment for permitted but unbuilt units, and subtracting demolitions (where data was available).

These households were then added to the year Census 2000 zonal household total to arrive at 2005 households for each TAZ.

Future Year Data: The preparation of household projections was accomplished by calculating the number of households for a projected county population using ratios of householders to total population by age specific cohorts derived from the 2000 Census for each analysis year. Disaggregation to TAZs was determined by historical trends, existing and future land use, topography, flood plain information, availability of land, local knowledge and other factors.

Household Vehicles

Base and Future Year Data: Base and future year household vehicle data were obtained from the 2000 Census of Population and Housing. The 2000 Census was the only source of household vehicle data available at the block group level at the time the data was developed. Average vehicles per household were calculated for block groups then applied to the TAZs associated with each block group. The 2005, 2010, 2020, 2030 and 2040 vehicles per household level was held at the 2000 level based on the fact that, since 2002, the number of vehicles per household has exceeded the number of drivers per household.

Labor Force

Base and Future Year Data: The OKI labor force is a function of the population as determined by a labor force participation ratio (the number of employed persons in the labor force per persons 16 and over). Household data for base year 2005 originates with the 2000 Census of Population and Housing. Utilizing the geographic information system ArcGIS, household data at the zonal level for 2000 was derived from the area proportion allocation of block group level employed labor force. The labor force projections for 2005, 2010, 2015, 2020, 2030, and 2040 were based on the most recent projections of national labor force participation rates by age and sex cohorts from the U.S. Department of Labor, Bureau of Labor Statistics for each of those years. These rates were then applied to the projected county age/sex cohorts and adjusted to eliminate the unemployed to arrive at a county employed labor force control total. Employed labor force at the zonal level is calculated by multiplying the labor force participation rate by the zonal population. The labor force participation rate is adjusted so that, in each county, the sum of the zonal labor force counts equals the control total.

Employment

Base Year Data: Quarterly Census of Employment and Wages (QCEW or ES202) data for 2005 was utilized as the primary tool to calculate employment at the zonal level. Individual business records containing physical location, number of employees and North American Industry Classification System (NAICS) code were geocoded through ArcGIS and aggregated to the TAZ level. This data set was supplemented by other sources of data to complete the commuting employment picture in the OKI region. Each zone's employment was divided according to the NAICS code into three classes (retail, office, industrial) based upon the potential for generating trips.

Future Year Data: For future year employment projection, calculation was first made of the employment at the regional level. At the regional level, employment is a calculation of the region's employed labor force minus workers who live in the region but commute out to work, plus workers who live outside the region but commute in to work. The regional total was disaggregated first to the county level based on historic trends and expected changes in the county's share of the region's employment and then to the TAZ level. Disaggregation to TAZs was determined by historical trends, existing and future land use, topography, flood plain information, availability of land, local knowledge and other factors.

Area Type

Base and Future Year Data: For each analysis year, each TAZ is assigned an area type designation as CBD, Urban, Suburban or Rural based on population and employment densities.

Model Calibration

OKI's Travel Demand Model has been validated to observed traffic volumes for the model base year 2005. The modeling network encompasses the entire ozone Maintenance area with the exception of Clinton County, Ohio. The modeling network also includes Greene, Miami and Montgomery counties in Ohio and the remainder of Dearborn County Indiana. The difference between estimated vehicle miles traveled (VMT) and 2005 observed VMT is less than 1%. A highway screenline analysis compares the screenline observed and simulated traffic volume discrepancies with the ODOT standard of maximum desirable deviation. The comparison shows that the model performs at a satisfactory level and all the errors were under the ODOT curve. Further information can be found in OKI's 2007 report, "OKI/MVRPC Travel Demand Model Methodology/Validation Report". For the calibration, OKI used over 3000 traffic counts collected through 2006 by the Ohio Department of Transportation (ODOT), the Kentucky Transportation Cabinet, many county and local governments, transportation engineering consultants, and OKI. These traffic counts cover nearly 50% percent of the links in the OKI portion of the modeling network. The methodology provides consistency with past emission inventory and conformity analysis work performed by OKI.

Local Inputs and Post-Model Processing

OKI incorporates a variety of sources of local data to both improve and confirm the accuracy of VMT, as well as other travel-related parameters. Free flow speeds used on the highway and transit networks are based on travel time studies performed locally. The OKI post-processing program, IMPACT, uses the loaded highway network to generate VMT by hour, VMT by speed distribution and VMT by facility type. These tables are then included as input into MOVES. Two separate sets of VMT tables are generated: one for the four Ohio counties plus Dearborn County Indiana, and a second for the three Kentucky counties. The VMT by hour tables utilize hourly traffic distribution and directional split factors for different roadway types as developed by OKI. The main source of the data was the permanent traffic counting stations located throughout the OKI region for the years of 2004-2006. This data was supplemented with data collected at coverage count stations (locations with counts taken on only one-

two days). The stations were classified by area type: urban and rural, and functional classification: freeway, arterial and collector. Speeds representing various "loaded" conditions (with traffic volumes) are estimated using techniques from the 1997 Highway Capacity Manual. This permits the estimation of speeds as conditions vary from hour to hour on the different facility types throughout the region. The IMPACT program performs the appropriate summation by area and roadway type as well as regional totals. OKI has also developed seasonal conversion factors to adjust traffic volumes to summer conditions. The factors were derived from local data collected at permanent traffic counting stations during 2004-2007 utilizing the average daily traffic monthly conversion factors for June, July and August.

Use of SO2 Nonattainment Area District in Post-Model Processing

U.S.EPA defined the census tracts included in the Campbell-Clermont KY-OH SO_2 Nonattainment area. These same census tract boundaries were used to establish a "reporting district" in the OKI post-model processing. Average speed and VMT distribution by month, hour, vehicle type and road type were generated for the SO_2 nonattainment area and used in the emission calculation. Emissions were further split into Kentucky and Ohio portions based on the percentage of calculated nonattainment area VMT within each state.

Appendix F

Background Analysis

Appendix F
Background Concentration Determination for Non-Attainment Area
January 23, 2015

U.S.EPA issued the "Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions" on April 23, 2014. In Appendix A of the guidance, several approaches for determining the SO_2 background concentrations are suggested. In this appendix, Ohio EPA, working with the Kentucky DAQ, has applied the methods suggested in U.S. EPA's guidance to identify the potential SO_2 background concentration in the Campbell County KY-OH, nonattainment area for the 1-hour SO_2 National Ambient Air Quality Standard (NAAQS).

According to the guidance, a "first tier" approach uses a uniform monitored background contribution based on the overall highest hourly background SO_2 concentration from a representative monitor. However, this approach is identified as "… conservative in many cases and may also be prone to reflecting source-oriented impacts, increasing the potential for double-counting of monitored contribution." Therefore, U.S.EPA recommends a less conservation "first tier" method based on the monitored design values for the latest 3-year period. From the design value report (See Appendix A-2 of the Redesignation Request and Maintenance Plan) at Monitor 21-037-3002 for 2012-2014, the 3-year design value is 72 ppb, which is slightly less than the 2010 1-hour SO_2 NAAQS. Thus, both of the "first tier" methods are overly conservative and are not appropriate for determining the background concentration of this area.

As discussed in U.S. EPA's guidance, Section 8.2.2.b of Appendix W provides another option:

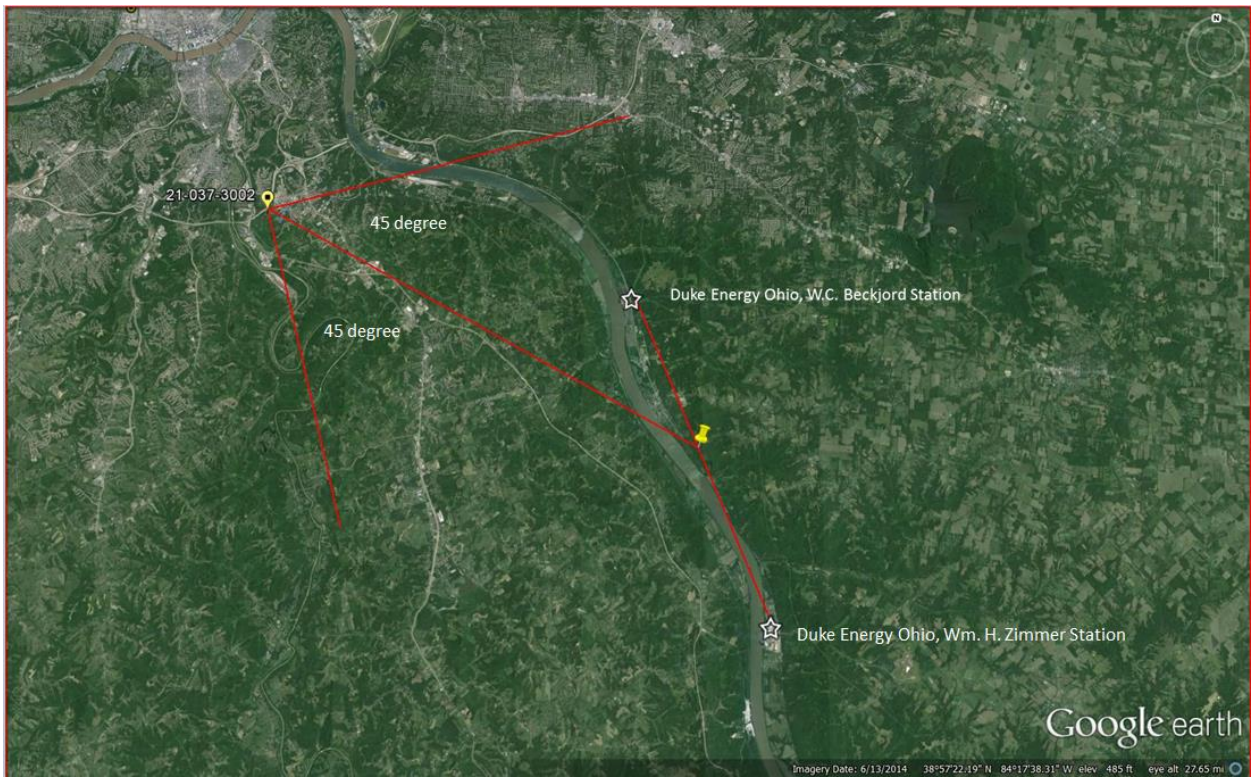
> "Use air quality data in the vicinity of the source to determine the background concentration for the averaging times of concern. Determine the mean background concentration at each monitor by excluding concentrations when the source in question is impacting the monitor…For shorter time periods, the meteorological conditions accompanying concentrations for concern should be identified. Concentrations for meteorological conditions of concern, at monitors, not impacted by the source in question, should be averaged for separate averaging time to determine the average background value. Monitoring sites inside a 90 degree sector downwind of the source may be used to determine the area of impact."

The Kentucky monitor 21-037-3002 is the only monitor located in the vicinity of our study area suitable for this analysis. Two major SO_2 emission sources, Duke Energy's W.C. Beckjord (Beckjord) and W. H. Zimmer (Zimmer) facilities were considered as a part of this analysis and concentrations were excluded when these sources in question were impacting the monitor.

Google Earth tools were used to determine an arc of 90 degrees when these two sources in question are impacting the monitor, and the hourly meteorological data (WBAN: 93814) was downloaded via ftp://ftp.ncdc.noaa.gov/pub/data/noaa/isd-lite. As can be seen in the Figure 1 below, these two sources would impact the monitor when

the wind blows from 74.81° to 164.81°. Therefore, the hourly monitoring data with the recorded wind directions within the range were eliminated.

Figure 1



The average SO_2 concentration was then calculated for each year in the 2010-2014 dataset which was retrieved from U.S. EPA's Air Quality System (AQS). Data for 2014 was only available through August 31, 2014 at the time of this analysis. In addition, to be more conservative, the annual average SO2 concentrations for non-zero values were calculated. The results show the highest value, 4.40 ppb, is the background concentration for this area using this approach (see Table 1).

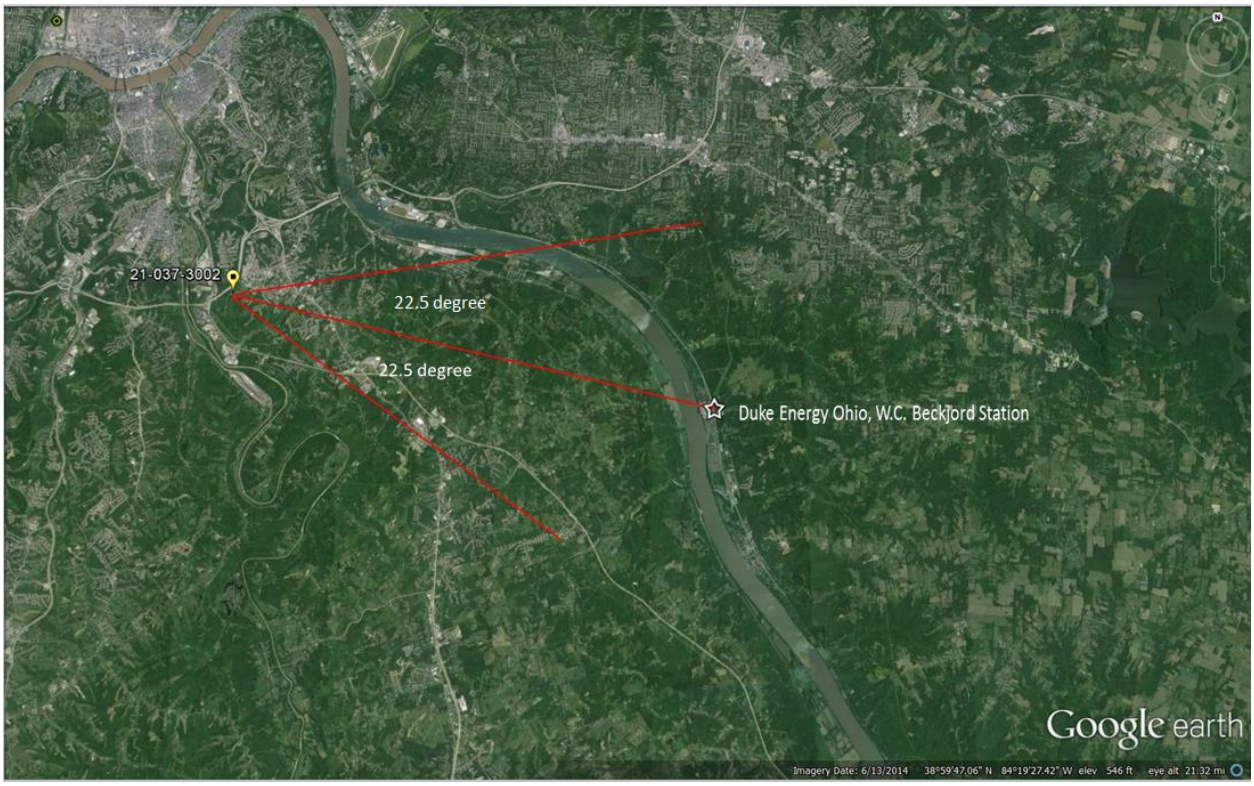
Table 1

Year	Background Concentration (all data) (unit: ppb)	Background Concentration (non-zero) (unit: ppb)
2010	3.82	4.36
2011	2.12	4.10
2012	1.16	3.91
2013	1.01	4.40
2014[1]	1.86	2.89

[1] Through August 31, 2014

Because it has been determined that Beckjord is the only source impacting this monitor, and given their proximity to the monitor and the predominant wind directions potentially impacting the monitor, the same analysis was also conducted and concentrations were excluded only when Beckjord was impacting the monitor. Again, Google Earth tools were used to determine an arc of wind directions to exclude from the background determination. In this instance, a reduced arc of 45 degrees was used instead of 90 degrees. It was determined that an exclusion arc of 90 degrees relative to the monitor would potentially eliminate any potential contributions of Zimmer emissions to monitor values. The reduced arc allows for the exclusion of Beckjord emission impacts, the inclusion of Zimmer impacts, and provides an additional measure of conservatism to the background determination. The hourly meteorological data (WBAN: 93814) was downloaded via ftp://ftp.ncdc.noaa.gov/pub/data/noaa/isd-lite. As can be seen in the Figure 2 below, Beckjord would impact the monitor when the wind blows from 81° to 126°. Therefore, the hourly monitoring data with the recorded wind directions within the range were eliminated.

Figure 2



The average SO_2 concentration was then calculated for each year in the 2010-2014 dataset. Again, to be more conservative, the annual average SO_2 concentrations for non-zero values were calculated. The results show the highest value, 4.76 ppb, is the background concentration for this area using this approach (see Table 2).

Table 2

Year	Background Concentration (all data) (unit: ppb)	Background Concentration (non-zero) (unit: ppb)
2010	3.82	4.49
2011	1.94	4.28
2012	1.03	4.29
2013	0.8	4.76
2014[2]	1.66	2.91

In summary, the background concentration for this area can be conservatively estimated at 4.76 ppb without double-counting emissions from Beckjord based on the above analysis.

To preserve conservatism in the background and to demonstrate further that the shutdown of the Walter C. Beckjord facilities provides for attainment, Ohio EPA conducted an analysis of hourly SO_2 concentrations recorded at monitor 21-037-3002, wind direction data from the Cincinnati weather station located at the Cincinnati Northern Kentucky Airport, and emissions from both the Walter C. Beckjord and William H. Zimmer facilities for years 2012 through February 28, 2015. The full analysis is presented in detail in Appendix K of the redesignation request. Briefly, Ohio EPA compiled 2,939 non-zero monitor values for which SO_2 emissions from the Walter C. Beckjord facility were zero. The 99th percentile value of these hourly data is the 29th highest hourly value, or 11 ppb. Note that 11 ppb represents the 99th percentile of all hours, not of maximum daily values and is therefore more conservative than an actual design value for this period. Additionally, by not attempting to account for plume travel time from the Walter C. Beckjord facility to the monitor, it is likely that some hours in this dataset represent impacts of emissions from the Walter C. Beckjord facility, and therefore carry an additional measure of conservatism. As noted in Appendix K of the redesignation request, no exceedances of the standard were recorded at any hour for which emissions from Walter C. Beckjord were zero.

[2] Through August 31, 2014

Appendix G

Walter C. Beckjord's SO_2 Emissions
2008-2014

Walter C. Beckjord SO2 Emissions

Source: Clean Air Markets Division

Unit ID	Year	SO2 (tons)	Total for Year (tons)
1	2008	2,431.54	
2	2008	1,738.06	
3	2008	3,554.09	
4	2008	4,985.54	
5	2008	4,712.97	
6	2008	8,978.32	26,400.52
1	2009	2,097.94	
2	2009	2,527.04	
3	2009	3,347.04	
4	2009	6,756.47	
5	2009	7,566.78	
6	2009	19,669.24	41,964.51
1	2010		
2	2010		
3	2010		
4	2010	4,492.46	
5	2010	17,719.17	
6	2010	46,944.64	69,156.26
1	2011		
2	2011	44.33	
3	2011	42.04	
4	2011	2,884.31	
5	2011	30,555.61	
6	2011	57,308.22	90,834.50
1	2012		
2	2012		
3	2012	1,732.39	
4	2012	2,697.96	
5	2012	19,639.14	
6	2012	42,999.34	67,068.83
1	2013		
2	2013		
3	2013		
4	2013	1,546.01	
5	2013	19,324.96	
6	2013	31,029.36	51,900.33
1	2014		
2	2014		
3	2014		
4	2014		
5	2014	9,116.64	
6	2014	23,485.80	32,602.44

Unit	January	February	March	April	May	June	July	August	September	October	November	December
5	2312.89	1233.69	1841.44	1965.11	288.49	6.11	1348.93	119.98	0.00	0.00	0.00	0.00
6	5010.98	3795.20	3667.22	3549.07	0.00	5.74	4817.56	2640.04	0.00	0.00	0.00	0.00
Facility	7323.87	5028.90	5508.66	5514.18	288.49	11.85	6166.49	2760.01	0.00	0.00	0.00	0.00

Appendix H

Public Notice & Comment Documents

KENTUCKY DIVISION FOR AIR QUALITY
NOTICE OF PUBLIC HEARING
SO2 NATIONAL AMBIENT AIR QUALITY STANDARD RE-DESIGNATION REQUEST
FOR CAMPBELL COUNTY, KENTUCKY

The Kentucky Energy and Environment Cabinet will conduct a public hearing on January 6, 2016 at 10:00 a.m. (EDT) in the Conference Room of the Division for Air Quality, 200 Fair Oaks Lane, 1st Floor, Frankfort, Kentucky. This hearing is being held to receive comments on a 2010 SO_2 National Ambient Air Quality Standard re-designation request for Campbell County, Kentucky.

This hearing is open to the public and all interested persons will be given the opportunity to present testimony. The hearing will be held, if requested, at the date, time and place given above. It is not necessary that the hearing be held or attended in order for persons to comment on the proposed submittal to EPA. To assure that all comments are accurately recorded, the Division requests that oral comments presented at the hearing also be provided in written form, if possible. To be considered part of the hearing record, written comments must be received by the close of the hearing. Written comments should be sent to the contact person. If no request for a public hearing is received, the hearing will be cancelled, and notice of the cancellation will be posted at the website listed below. Request for a public hearing must be received no later than December 30, 2015 while all comments must be submitted no later than January 6, 2016.

The full text of the proposed SIP revision is available for public inspection and copying during regular business hours (8:00 a.m. to 4:30 p.m.) at the following Division for Air Quality locations: 200 Fair Oaks, 1st Floor, Frankfort, Kentucky; Florence Regional Office, 802 Veterans Mem Dr., Suite 110, Florence, Kentucky. Any individual requiring copies may submit a request to the Division for Air Quality in writing, by telephone, or by fax. Requests for copies should be directed to the contact person. In addition, an electronic version of the proposed SIP revision document and relevant attachments can be downloaded from the Division for Air Quality's website at: **http://air.ky.gov/Pages/PublicNoticesandHearings.aspx.**

The hearing facility is accessible to people with disabilities. An interpreter or other auxiliary aid or service will be provided upon request. Please direct these requests to the contact person.

CONTACT PERSON: Melissa Duff, Program Planning and Administration Branch Manager, Division for Air Quality, 200 Fair Oaks Lane, Frankfort, Kentucky 40601. Phone (502) 564-3999; Fax (502) 564-4666; E-mail melissa.duff@ky.gov.

The Energy and Environment Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities.

Florence Regional Office
8020 Veterans Mem Dr., Suite 110
Florence, KY 41042

Response to Comments

From December 1, 2015, until January 6, 2016, the Cabinet provided an opportunity for comments on the proposed State Implementation Plan (SIP) submittal requesting that Campbell County, Kentucky be redesignated to attainment for the 2010 SO_2 National Ambient Air Quality Standards (NAAQS). The public notice announcing the public comment period included an opportunity to request a public hearing. No request for a public hearing was received; therefore, the scheduled public hearing was cancelled.

During the public comment period, the only comments received were from the U.S. Environmental Protection Agency (U.S. EPA). The comments and responses are listed below.

Response to Comments for the proposed SIP revision to address CAA Section 110 requirements for the 2010 1-hour SO_2 NAAQS.

1. Comment: Demonstration of Attainment (applicable to Chapters 2-4): The central showing of attainment for this nonattainment area (NAA) should focus on whether the entire NAA is now attaining the 2010 Sulfur Dioxide (SO_2) National Ambient Air Quality Standard (NAAQS), including the consideration of sources outside the area. In consultation with Ohio, please ensure the attainment demonstration addresses whether the monitor represents SO_2 concentrations throughout the NAA to support the conclusion that the area is attaining the standard, including those portions of the area close to the William H. Zimmer facility.
(Scott Davis, U.S. EPA)

Response: The Cabinet incorporated information to demonstrate attainment of the 2010 1-hour SO_2 standard in the pre-hearing submittal. Ohio provided Kentucky with a background analysis (Appendix F); a monitor analysis (Appendix K); and a modeling analysis (Appendix J) included in the Cabinet's pre-hearing submittal. All information reflects data as included in Ohio's submittal to EPA Region 5. A summary of the findings of Ohio's analysis can be found in Chapter Three, requirement 4 of 4. (Please see pages 7-11).

2. Comment: Chapter Five – Control Measures and Regulations – Requirement 1 of 5 – RACT/RACM: Based on the United States Court of Appeals for the Sixth Circuit (Sixth Circuit) March 18, 2015 opinion regarding redesignation of the Cincinnati-Hamilton 1997 fine particulate matter NAA, the state may be obligated to provide a Reasonable Available Control Technology (RACT)/Reasonable Available Control Measures (RACM) analysis for the Campbell County portion of the SO_2 nonattainment area. To address the RACT/ RACM requirement the Commonwealth needs to show they have adopted RACT/RACM that would enable the area to attain as expeditiously as practicable. EPA recommends the Commonwealth clarify that RACT/RACM was considered and document reasons why additional controls were not necessary or possible.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges this comment. Additional narrative has been included clarifying that RACT/RACM were considered. An explanation as to why additional controls were not necessary or possible has been included. (Please see page 18).

3. Comment: Chapter Five – Control Measures and Regulations – Requirement 2 of 5 – RFP: Please indicate that Reasonable Further Progress (RFP) would only be applicable for the Duke Energy W.C. Beckjord facility and discuss the source's cessation of emissions and resulting impacts to the area's air quality.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges this comment and further explanation has been added to Chapter 5, requirement 2 of 5. (Please see pages 18-19).

4. Comment: Chapter Five – Control Measures and Regulations – Requirement 4 of 5 – Federal Control Measures: In consultation with Ohio, please revise this discussion to focus on the Duke Energy W.C. Beckjord facility shutdown and the absence of significant SO_2 emitting sources within the NAA. Additionally, EPA cautions on the inclusion of federal trading programs when discussing permanent and enforceable measures for this area. Discussion of these programs may prompt the requirement to demonstrate how they contribute to the attainment and continued maintenance of the 2010 SO_2 NAAQS.
(Scott Davis, U.S. EPA)

Response: The cabinet acknowledges this comment. Narrative has been added to Chapter Five, requirement 4 of 5 that focus' on the shutdown of the W.C. Beckjord facility and the absence of significant SO2 emitting sources within the nonattainment area. (Please see pages 19-20).

5. Comment: Chapter Six – Contingency measures: Please provide additional details regarding triggering events and establish that at least one measure will be implemented as expeditiously as practicable. Specifically, please provide additional information regarding a potential exceedance or future violation trigger (e.g. predetermined monitored concentration) including the level of response the state expects to implement and the timeframe for implementation.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges this comment and further explanation has been added to Chapter 6, requirement 2 of 3. (Please see pages 22-23).

6. Comment: Chapter Two – Requirements for Redesignation (pg.4): Under Requirement #5 – *Maintenance Plans*, the commonwealth indicates that verification of continued attainment is documented in *Chapter four, Requirement 5 of 5*. However, Chapter Four only documents four requirements. Should this reference Chapter 5 instead?
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges this comment and has corrected the error. (Please see page 4).

Appendix I

Notification of Permanent Shutdown
Walter C. Beckjord
Combustion Turbines

DUKE ENERGY OHIO

Duke Energy Ohio, Inc.
139 E. 4th Street
Cincinnati, OH 45202

May 28, 2015

Mr. Christopher Beekman
Ohio EPA - DAPC
Lazarus Government Center
50 West Town St., Suite 700
Columbus, Ohio 43215

RE: Duke Energy Ohio, Inc., W.C. Beckjord Station
Facility ID No.: 1413100008
Emissions Units: B007, B008, B009, and B010

Dear Mr. Beekman:

This letter is to inform you that, as of December 31, 2014, the four oil-fired emissions units at W.C. Beckjord Station (B007, B008, B009, and B010) are permanently shut down and removed from service. It is the understanding of Duke Energy Ohio, Inc. that authorization to operate the affected units has ceased as of December 31, 2014 and the permittee shall not be required to meet any Title V permit requirements applicable to these emissions units, except for any residual requirements, such as the quarterly deviation reports and annual compliance certification covering the period during which the emissions units last operated.

Please call Andrew Roebel at 513-287-2356 if you should have any questions regarding this information.

Based on information and belief formed after reasonable inquiry, I certify that all factual statements in this transmittal are true, accurate and complete to the best of my knowledge.

Very truly yours,

Mark J. Schmidt

Mark J. Schmidt
Manager – Reg Plant Demo & Retirement

Appendix J

Supplemental Modeling Demonstration
William H. Zimmer Facility

Appendix J

Supplemental Modeling Demonstration, William H. Zimmer Facility

Introduction

This document supports the redesignation request for the Campbell-Clermont partial nonattainment area in the State of Ohio and the Commonwealth of Kentucky. This nonattainment area encompasses emissions from the Walter C. Beckjord facility. There are no other significant sources of SO_2 emissions within the nonattainment area that warrant inclusion in the modeling analysis. As can be seen from the inventory included in the redesignation request, the SO_2 emissions from the point sources comprise 99.95% of the 2014 SO_2 emissions in the entire nonattainment area. Notably, violations at this monitor were determined to be caused by emissions from the Walter C. Beckjord facility located along the Ohio River in Ohio east of the monitor. On September 1, 2014[1], the Walter C. Beckjord facility ceased operations. Ohio EPA was notified of the permanent shutdown on October 14, 2014. (Appendix B and I of the redesignation request) There are no other significant point sources of SO_2 emissions located in the nonattainment area. Within the portion of Campbell County, KY that is a part of this area there are 11 sources which combined emit less than one ton per year (tpy) of SO_2. (Appendix C of the redesignation request) There are no other point sources of SO_2 emissions in the portion of Clermont County, OH that is a part of this area.

Located south (and slightly east) of the monitor, but outside of the nonattainment area, is the William H. Zimmer facility (see Figure 1). It was determined during the nonattainment designation process that emissions from the William H. Zimmer facility likely do not impact the violating monitor at question, and therefore, the nonattainment area was not expanded to encompass this facility. To support the previous conclusion, Ohio EPA performed an extensive meteorology, emissions and back-trajectory analysis and has included this analysis as Appendix D of the redesignation request. This analysis concludes that it was in fact the Walter C. Beckjord facility that caused the violations and not the William H. Zimmer facility.

[1] The letter contained in Appendix B identifies the permanent shutdown of all units occurred on October 1, 2014. However, a review of CAMD emissions showed that all the units ceased operation by September 1, 2014.

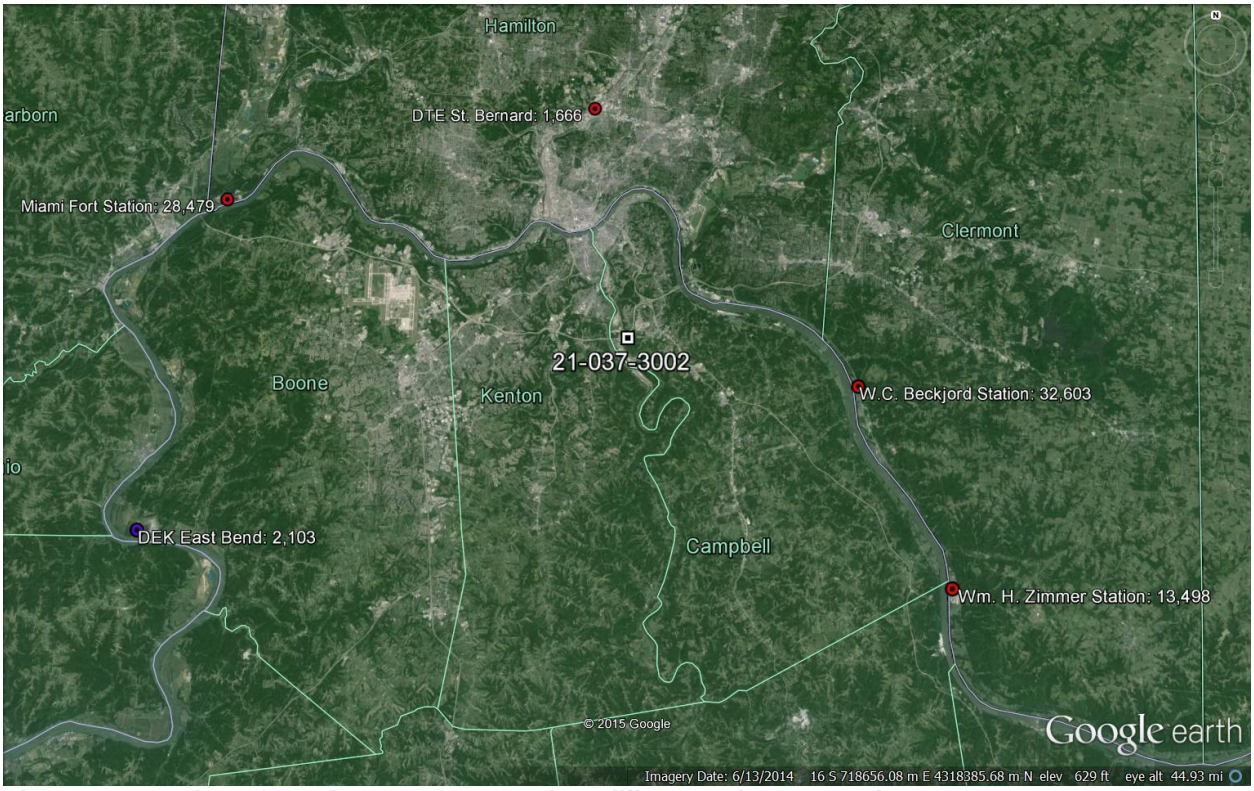


Figure 1: Location of monitor 21-037-3002 the William H. Zimmer Station.

In support of this conclusion, Ohio EPA conducted a supplemental modeling analysis to determine the location of maximum impact from emissions originating from the William H. Zimmer facility as well as a conservative extrapolation of monitored values to the point of maximum impact. The supplemental modeling was performed due to the proximity of the William H. Zimmer facility to the nonattainment area and the level of emissions from this source. Ohio EPA determined that the significant distance (30 to 35 km), prevailing winds, and emission reductions from sources located to the west of the nonattainment area did not warrant the inclusion of these sources in a supplemental modeling analysis. This is consistent with U.S. EPA's *Ohio Area Designations For the 2010 SO2 Primary National Ambient Air Quality Standard* technical support document. The analysis presented in this document further demonstrates that emissions from William H. Zimmer do not impact the nonattainment area to a significant degree and that emissions from William H. Zimmer are not likely to cause exceedances both at the monitor location or in the entirety of the nonattainment area.

Modeling Approach

Per U.S. EPA's SO_2 nonattainment area SIP guidance,

> "Appendix A of this document contains modeling guidance supplemental to that provided in the preamble to the final rulemaking promulgating the 2010 S02 NAAQS and in 40 CFR part 51, Appendix W. Appendix A of this document has also been updated to respond to issues raised during the comment period related

> to the September 2011 draft SO_2 Guidance Document. This guidance clarifies the EPA's recommendations on how to conduct refined dispersion modeling under Appendix W to support the implementation of the 2010 SO_2 NAAQS."

Per the SO_2 nonattainment area SIP guidance, five years of National Weather Service data is sufficient to represent attainment of the standard. The purpose of this demonstration, determining the location of maximum impact of emissions from William H. Zimmer and demonstrating that these emissions will not cause exceedances in the nonattainment area, necessitates that the limited period of time for which monitor data is available after the shutdown of the Walter C. Beckjord facility is replicated by the modeling analysis. As such, five years of meteorological data was not used, but a limited meteorological dataset from August 30, 2014 to February 28, 2015, inclusive, was modeled. This period of time represents the most recent period of time for which the Walter C. Beckjord facility is shutdown and data is available. As a full three years of data are not available, the modeled form of the standard is expressed as the 99th percentile of the available 192 maximum daily values. For a time period of 192 days, the form of the standard of both monitored and modeled values is represented by the second highest maximum daily value.

The recommended dispersion model for SIP modeling for SO_2 is the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) modeling system. There are two input data processors that are regulatory components of the AERMOD modeling system: AERMET, a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, and AERMAP, a terrain data preprocessor that incorporates complex terrain using United States Geological Survey (USGS) Digital Elevation Data. Additionally, Ohio EPA utilized the AERMINUTE module to incorporate 1-minute ASOS meteorological data into the hourly surface input file. Ohio EPA utilized the most up-to-date versions of AERMOD and the associated preprocessors available at the time of the modeling analyses. These are as follows: AERMOD version 14134, AERMET version 14134, AERMINUTE version 14237, and AERMAP version 11103.

The intent of this supplemental modeling is to demonstrate that the William H. Zimmer facility does not cause or contribute to an exceedance of the standard not only at the violating monitor, but across the entirety of the nonattainment area. For this purpose, Ohio EPA collected monitor data for the August 30, 2014 through February 28, 2015 period, when the entirety of the Walter C. Beckjord facility is known to have zero emissions. Using this monitor data, Ohio EPA modeled all sources at the William H. Zimmer facility at 1 gram per second. Using the modeled impacts at receptors across the nonattainment area, as well as the location of the monitor, Ohio EPA scaled the 99th percentile of monitor data for this period to represent a maximum predicted impacted in the nonattainment area as a whole. As described below, this modeling is conservative in its treatment of constant emissions, the assumption that a one-to-one ratio between monitored concentrations and impacts in the nonattainment area is present, and its consideration of only the spatial, and not temporal, relationship between monitor and modeled values.

Meteorological Data

In order to generate meteorological input data for use with AERMOD, AERMET, along with AERMINUTE and AERSURFACE preprocessing for the modeling domain was conducted to generate the surface (.sfc) and profile (.pfl). Ohio EPA used the AERMINUTE pre-processing module. This module accepts as input 1-minute ASOS meteorological surface observations, calculates an hourly average for each hour in the modeled time period, and substitutes any missing values from the co-located ISHD surface data. Use of AERMINUTE reduces the number of calm hours present in the input files, and these enhanced hourly files are therefore considered more representative of local meteorological conditions.

Meteorological data from August 30, 2014 through February 28, 2015 from the Cincinnati, OH surface station (Station # 93814) located at the Covington/Greater Cincinnati Airport in Kentucky and the Wilmington, OH upper air station (Station # 13841) located at the Wilmington Airborne Park airport were used in these analyses. These sites were determined to be representative of the nonattainment area. AERSURFACE was run using twelve sectors and four seasons for the surface station location.

Emission Sources

Three emission sources (two egress points) from William H. Zimmer were included in the modeling analysis. The relevant release point parameters for the two egress points included in the analysis are presented in Table 1, below. As described previously, the emission rate of all units was set to 1 gram/second to allow for a straightforward scaling of modeled values to monitored concentrations. All emissions sources included in the modeling analysis were treated as point sources.

Source ID	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter	SO2
		(m)	(m)	(m)	(m)	(K)	(m/s)	(m)	(g/s)
B006_ZM	Main Boiler Unit 1 Stack	740462.3	4305892	155.4	174	328	16.971	12.8	1
AUX_AB	Aux Blr AB Comn Stack	740391.7	4305630	155.3	91	604	26.3	3.35	1

Table 1: Modeled SO2 emission sources, William H. Zimmer.

Receptors

A receptor grid of 1000 meter spacing was placed within the boundaries of the nonattainment area. Initial screening-level modeling indicated that the maximum impact of William H. Zimmer occurs within approximately 1 km of the facility. The center of the nonattainment area itself is located approximately 20 km (11.5 km at the closest point) from the William H. Zimmer emission units, and as such, a fine receptor grid was deemed unnecessary to capture significant concentration gradients. Limiting the number of receptors was also necessary to maintain reasonable file sizes to conduct

post-processing and analysis of modeled outputs. In addition to this grid, a single receptor was placed in the monitor location. A second modeling grid, using 50 meter spacing to 3 km, was performed to determine the location of Zimmer's maximum impact. This finer grid was placed based on screening level modeling analysis.

Results

As stated previously, the modeling analysis was conducted to determine the location of maximum impact from emissions originating from the William H. Zimmer facility and to conservatively demonstrate, using monitored values, that emissions from William H. Zimmer will not cause an exceedance of the standard anywhere within the nonattainment area. The 2nd highest modeled maximum daily value for the time period (99th percentile) at the receptor representing the monitor was 0.18731 $\mu g/m^3$. Ohio EPA determined that the 2nd highest maximum modeled value across all receptors in the nonattainment area was 0.40866 $\mu g/m^3$, and used this value for the extrapolation analysis.

To extrapolate these values based on monitor data, Ohio EPA determined that the 2nd highest maximum daily value recorded during the August 30, 2014 to February 28, 2015 period to be 24 ppb. Using the modeled impacts above, Ohio EPA used a simple ratio to scale this value to the point of maximum impact in the nonattainment area, as follows:

$$\frac{0.18731}{24\ ppb} = \frac{0.40866}{X}$$

Using the 2nd highest maximum daily value across all receptors in the nonattainment area, 0.40866 $\mu g/m^3$, in the ratio above yields a maximum concentration of 52.4 ppb. The conservatively extrapolated value is below the standard.

Ohio EPA considers this demonstration highly conservative for several reasons. Firstly, the modeling assumed continuous operation of all units at the William H. Zimmer facility, which is not reflective of normal operating conditions, in particular the two auxiliary boilers. These units operated only 676 hours in 2013 and 1,167 hours in 2014. Secondly, the extrapolation implicitly assumes that all ambient SO_2 recorded at the monitor location originates from William H. Zimmer. Lastly, the temporal relationship between the monitor data and modeled data was not considered. By accounting only for the spatial relationship between modeled and monitor values, the extrapolation assumes that the 99th percentile impacts occur simultaneously across the entirety of nonattainment area, including at the monitor location. This provides an additional layer of conservatism to the analysis. When modeled values and monitor values are paired in time, the first-highest maximum extrapolated impact was determined to be 30 ppb.

An additional extrapolation of modeled impacts was performed based on actual emissions data from the William H. Zimmer facility. The highest annual emissions from years 2010-2014 occurred in 2010, when the William H. Zimmer facility emitted 19,388.1 tons of SO_2. This annual emission rate was converted to an average emission

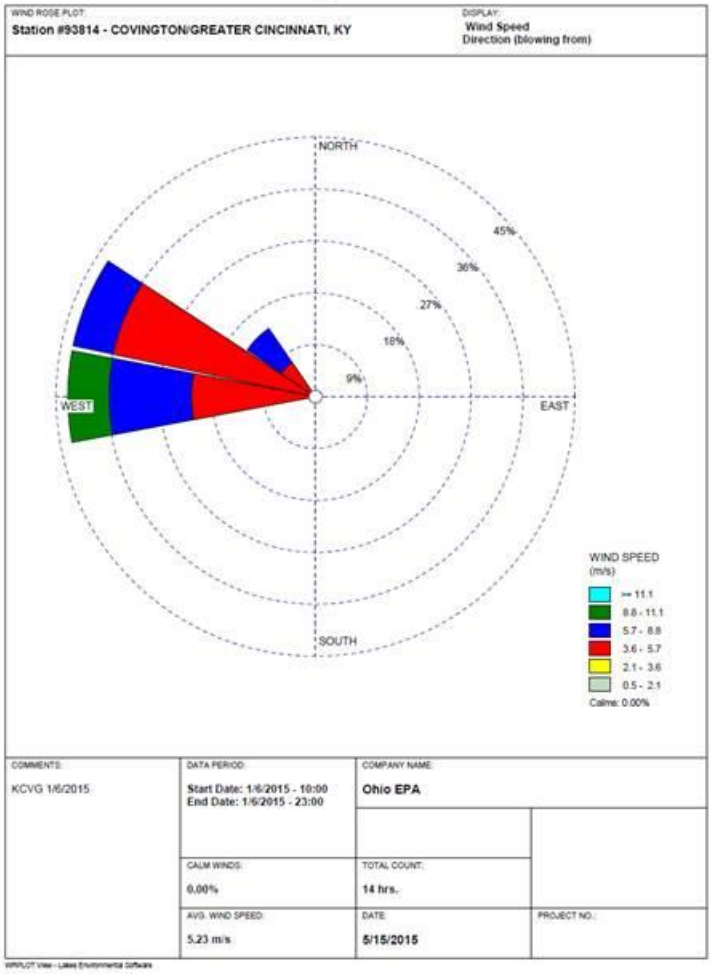
rate of 557.73 grams/second. Using this value, and the results of the extrapolation demonstration above, Ohio EPA used the following ratio to estimate the impacts of emissions from the William H. Zimmer plant at both the receptor location and at the point of highest impact in the nonattainment area:

$$\frac{2\ grams/second}{0.40866\ ug/m3} = \frac{557.73\ grams/second}{X\ ug/m3}$$

The solution to this equation, 113.96 μg/m^3 (43.56 ppb) is well below the standard of 75 ppb and indicates that emissions from the William H. Zimmer facility are unlikely to cause an exceedance of the standard across the entirety of the nonattainment area. Substituting the modeled results at the monitor location, 0.18731 μg/m^3, into the above ratio yields an estimated impact of 52.23 μg/m^3 (19.96 ppb). This extrapolation is remarkable in its consistency with the monitor data for periods when the Walter C. Beckjord facility was not operational and with the previous extrapolation based on monitor data. These results, as well as the consistency of these analyses with monitor values, provide strong additional support for Ohio EPA's contention that the closure of the Walter C. Beckjord facility will provide for attainment of the standard in the entirety of the nonattainment area and that emissions from William H. Zimmer will not cause or contribute to an exceedance of the standard.

Analysis of wind rose data from the Covington/Greater Cincinnati Airport for the first highest and second highest maximum daily concentrations recorded at the monitor during the August 30, 2014 through February 28, 2015 period support the conclusion that the analysis conducted by Ohio EPA is highly conservative and indicates that emissions from William H. Zimmer are not contributing to elevated monitor readings. The first highest maximum daily value recorded during this period was 34 ppb, occurring on January 14, 2015 at 9:00 AM. Monitor values remained elevated until 12:00 PM on the same day. The second highest maximum daily value of 24 ppb occurred on January 6, 2015 at 7:00 PM. Concentrations recorded at the monitor were elevated from January 6, 2015 at 5:00 AM until 12:00 AM on January 7, 2015. The wind roses for these periods are shown in Figure 2, below.

January 6, 2015



January 14, 2015

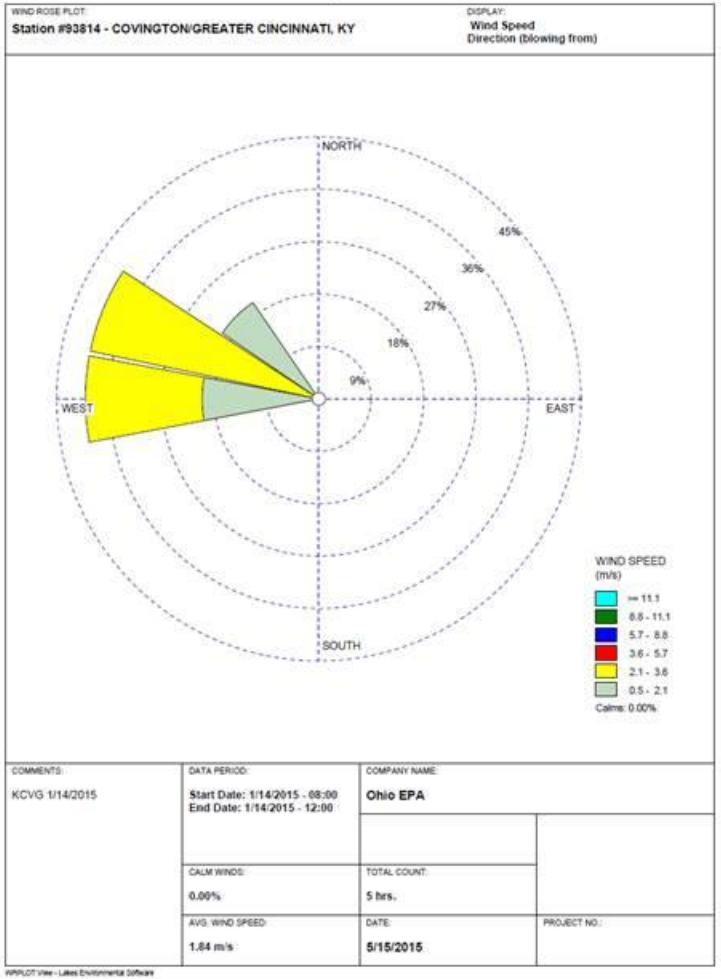


Figure 2: KCVG wind roses, January 6 and January 14, 2015.

The data shown in Figure 2 indicates that winds were primarily from the West and Northwest during the times when the highest and second highest monitored values were recorded. This suggests that emissions from William H. Zimmer were not impacting the monitor, or the nonattainment area, during these times. An analysis of hourly emissions, monitor values, and wind directions, presented in Appendix K of this redesignation submittal confirms that when emissions from the Walter C. Beckjord facility are eliminated from analysis, the wind directions primarily impacting the monitor are from the West and Northwest, and that at no time when the Walter C. Beckjord facility was not operating was an hourly monitor value above 34 ppb recorded. Thus, the extrapolation analysis performed based on modeled impacts represents a highly conservative estimate of the impact of emissions from William H. Zimmer on both the monitor and the nonattainment area as a whole. Further, Ohio EPA determined that point of maximum impact of emissions from Zimmer during the modeled time period was located approximately 1.4 km to the southeast from the largest source at the William H. Zimmer facility. From the point of this maximum impact to the point of maximum impact within the nonattainment area, there is a decrease in concentration of 84%.

These analyses, as well as the analysis presented in Appendix K, further support the results of the trajectory analysis presented in Appendix D, and demonstrate that the impacts of Zimmer are minimal at both the monitor location and the entirety of the nonattainment area. These results are consistent with the predominant winds in the area, which originate primarily from the south and southwest. Additional wind rose data is presented in Appendix K.

Appendix K

Analysis of Monitor Values, Emissions, & Wind Direction Data

Appendix K

Analysis of Monitored Concentrations and Wind Direction

Introduction

This document supports the redesignation request for the Campbell-Clermont partial nonattainment area in the State of Ohio and the Commonwealth of Kentucky. This nonattainment area encompasses emissions from the Walter C. Beckjord facility. There are no other significant sources of SO_2 emissions within the nonattainment area that warrant inclusion in the modeling analysis. As can be seen from the inventory included in the redesignation request, the SO_2 emissions from the point sources comprise 99.95% of the 2014 SO_2 emissions in the entire nonattainment area. Notably, violations at this monitor were determined to be caused by emissions from the Walter C. Beckjord facility located along the Ohio River in Ohio east of the monitor. On September 1, 2014[1], the Walter C. Beckjord facility ceased operations. Ohio EPA was notified of the permanent shutdown on October 14, 2014. (Appendix B and I of the redesignation request) There are no other significant point sources of SO_2 emissions located in the nonattainment area. Within the portion of Campbell County, KY that is a part of this area there are 11 sources which combined emit less than one ton per year (tpy) of SO_2. (Appendix C of the redesignation request) There are no other point sources of SO_2 emissions in the portion of Clermont County, OH that is a part of this area.

Located south (and slightly east) of the monitor, but outside of the nonattainment area, is the William H. Zimmer facility (see Figure 1). It was determined during the nonattainment designation process that emissions from the William H. Zimmer facility likely do not impact the violating monitor at question, and therefore, the nonattainment area was not expanded to encompass this facility. To support the previous conclusion, Ohio EPA performed an extensive meteorology, emissions and back-trajectory analysis and has included this analysis as Appendix D of the redesignation request. This analysis concludes that it was in fact the Walter C. Beckjord facility that caused the violations and not the William H. Zimmer facility.

In support of this conclusion, Ohio EPA conducted an analysis of hourly SO_2 concentrations recorded at monitor 21-037-3002, wind direction data from the Cincinnati weather station located at the Cincinnati Northern Kentucky Airport, and emissions from both the Walter C. Beckjord and William H. Zimmer facilities for years 2012 through February 28, 2015. This time period is henceforth referred to as the study period. The analysis presented in this document further demonstrates that emissions from William H. Zimmer and other sources within and outside of the nonattainment area are not likely to cause exceedances both at the monitor and in the entirety of the nonattainment area

[1] The letter contained in Appendix B identifies the permanent shutdown of all units occurred on October 1, 2014. However, a review of CAMD emissions showed that all the units ceased operation by September 1, 2014.

and that the shutdown of the Walter C. Beckjord facility will result in attainment of the standard.

Methodology

Hourly SO_2 emissions data from the Walter C. Beckjord and William H. Zimmer facilities were collected from the U.S. EPA Clean Air Markets Database for the study period. Hourly and one-minute wind data were collected from the National Weather Service station located at the Cincinnati Northern Kentucky Airport. To ensure that the most complete meteorological record possible was used, Ohio EPA processed the hourly meteorological data and one-minute ASOS data using the most recent versions of the AERMOD preprocessors AERMET and AERMINUTE. In addition to eliminating missing periods in the meteorological data, this processing provided hourly outputs that were more easily paired with hourly emission and monitor data. Hourly monitoring data for monitor 21-037-3002 were obtained from U.S. EPA's Air Quality System.

After compiling the above hourly data, Ohio EPA binned all data based on wind direction data, in ten degree increments. This was done for the entirety of the study period. The same binning of the data by wind direction was also done for only those periods in which the Walter C. Beckjord facility had zero SO_2 emissions. This yielded a substantial dataset of 10,231 hours monitoring data not impacted by emissions from the Walter C. Beckjord facility. It should be noted, however, that no accounting for any temporal overlap between any hour of zero emissions from the Walter C. Beckjord facility and monitor values was performed. Thus, it is likely that this dataset represents some impacts from Walter C. Beckjord at the monitor location. Ohio EPA believes that by not accounting for this overlap, any subsequent analysis of this dataset will be conservative.

Within each of the above datasets, Ohio EPA determined for each wind direction bin the highest and second-highest monitored concentration, the percentage each wind direction bin represents to the total, and the number and percentage of monitor values of 0 ppb.

Analysis and Results

To determine the primary wind directions in which monitored concentrations are elevated, Ohio EPA evaluated those bins for which either the first or second highest monitored value represented an exceedance of the standard. Further, Ohio EPA included in its evaluation any bin for which the sum of the first and second highest monitored values within that bin exceeded the average plus the sample standard deviation of this value, across all bins. For the full study period, which includes impacts from the Walter C. Beckjord facility, Ohio EPA determined that winds originating from between 31° and 140° and from between 151° and 170° had the greatest impact on monitor concentrations. The results of this analysis are consistent with those presented in Appendix D of the redesignation request. The maximum concentration recorded at the monitor during the study period, 156 ppb, was the result of winds originating between 121° and 130°. This result is again consistent with the results presented in

Appendix D of the redesignation request, which details this exceedance as the February 20, 2012 exceedance, and is attributed to emissions from the Walter C. Beckjord facility.

The same binning analysis described above was performed for the dataset compiled from hours in which emissions from the Walter C. Beckjord facility were zero. It should be noted that this data set of 10,231 hours encompasses 1,445 hours of 2012, 2,542 hours of 2013, 4,828 hours of 2014, and 1,416 hours of 2015. Additionally, no exceedances of the standard were monitored during these hours, and the highest maximum hourly concentration recorded during these hours was 34 ppb. Using the same procedure as described above, Ohio EPA determined that for this dataset, winds originating between 211° and 220°, as well as those originating between 251° and 300° had the greatest impact on monitor concentrations. This represents a significant shift in impacting wind directions with respect to the results of the full study period. Further, these wind direction bins resulted in no exceedances at the monitor over the full 2012 to February 28, 2015 study period. Ohio EPA contends that this is strong evidence that the shutdown of the Walter C. Beckjord facility will result in the attainment of the standard both at the monitor and across the entirety of the nonattainment area. This is supported by the supplemental modeling and extrapolation analysis described in Appendix J of the redesignation request.

The shift in impacting wind directions observed between the datasets is significant, and warrants further analysis. Figure 1, below, shows the location of monitor 21-037-3002 and facilities within a 50 km radius with SO_2 emissions greater than or equal to 1,000 TPY in 2014.

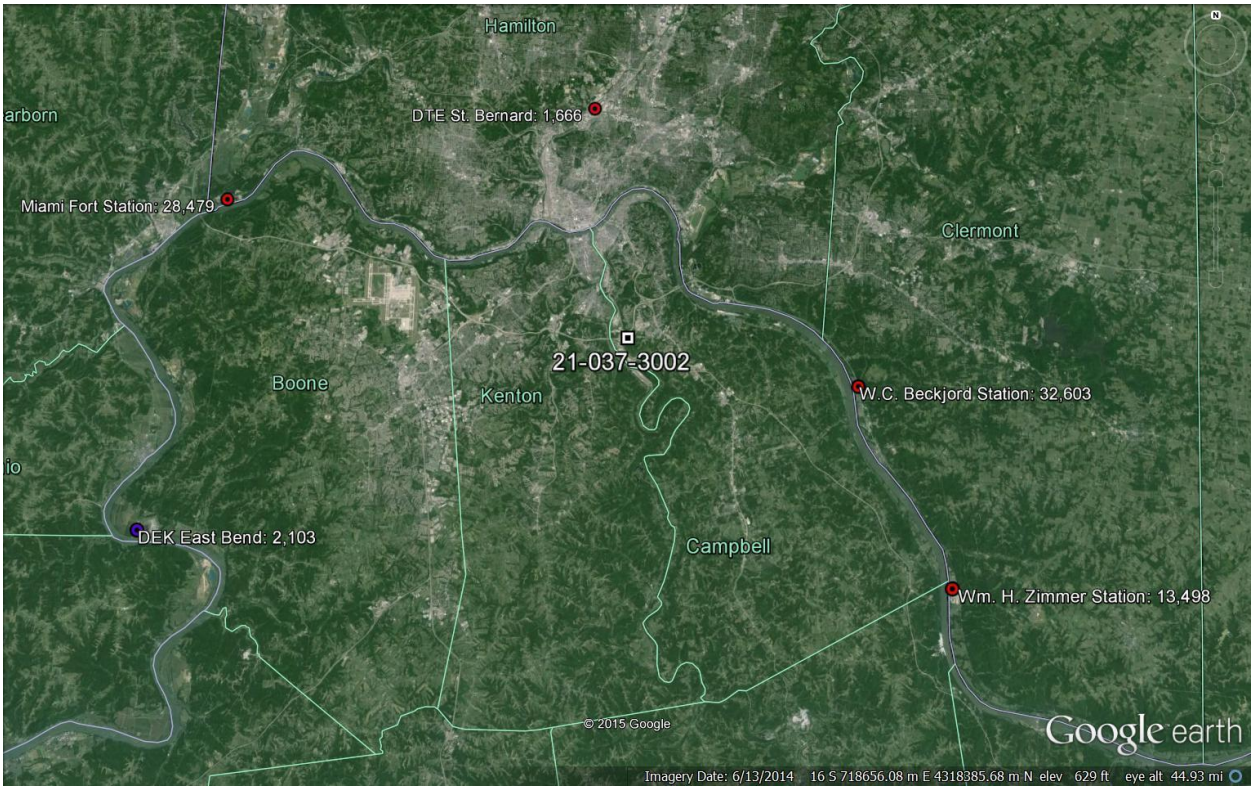


Figure 1: Facilities within 50 km of monitor 21-037-3002 with 2014 emissions >1,000 tons SO2.

As stated above, Ohio EPA determined that for the dataset excluding periods when the Walter C. Beckjord facility was emitting SO_2, winds originating between 211° and 220°, as well as those originating between 251° and 300° had the greatest impact on monitor concentrations. Figure 1 above suggests that these wind directions would bring emissions from the Miami Fort Station, 30.3 km away from the monitor, and from the Duke Energy Kentucky East Bend facility, located 35.3 km distant from the monitor. Given these large distances, Ohio EPA believes that the impact of these facilities will be relatively uniform across the nonattainment area. Dispersion screening tests for Miami Fort Station would suggest that over this distance, there would be an approximately 86% decrease from the point of maximum concentration, located within approximately 1 km of the facility, to a point 30 km distant, and an 89% decrease at 40 km. This indicates that there is little concentration gradient across the nonattainment area associated with sources located 30 to 35 km distant. Further, as demonstrated above, the highest concentration recorded at the monitor with winds originating from the above directions is 34 ppb. Ohio EPA believes that it is highly unlikely that a future exceedance of the standard will be observed at the monitor location due to emissions from these facilities, and given the significant distances between these facilities and the nonattainment area it is unlikely that a significant concentration gradient across the nonattainment area from these facilities is present. Additionally, Ohio EPA anticipates a further reduction in SO_2 emissions from those facilities potentially impacting the monitor in the future.

In 2014, the facilities above emitted 78,349 tons of SO_2. The shutdown of the Walter C. Beckjord facility, which Ohio EPA has demonstrated in detail is the primary cause of monitored exceedances, will result in a 32,603 ton decrease in SO_2 emissions. Miami Fort Unit 6 (Ohio EPA unit ID B007), an uncontrolled unit, is shutdown as of June 1, 2016 to comply with the Mercury and Air Toxics Standards. (Appendix L of the redesignation request) This will result in a further 18,796 ton reduction from 2014 levels. In total, this represents a reduction in SO_2 emissions of approximately 66% from 2014 levels. As previously demonstrated, no hourly SO_2 values were above the standard have been recorded when emissions from the Walter C. Beckjord facility are eliminated from analysis, and the highest recorded monitor value across this dataset is 34 ppb. When this is considered in light of the substantial reduction in SO_2 emissions in and around the nonattainment area, it is highly unlikely that an exceedance of the standard will be monitored in the future, nor is there likely to be a significant concentration gradient in the nonattainment area given the significant distances between SO_2 emission sources and the nonattainment area.

Lastly, Ohio EPA compiled the first through 30th highest hourly monitored SO_2 concentrations for all hours during the 2012-February 28, 2015 period for which SO_2 emissions from the Walter C. Beckjord facility were zero. These data are presented in Table 1, below.

Monitor 21-037-3002		
Date	**Hour**	**Monitor Value (ppb)**
January 14, 2015	10	34
September 2, 2013	7	29
January 14, 2015	9	26
January 6, 2015	19	24
September 4, 2013	17	20
January 14, 2015	11	20
May 17, 2013	12	19
August 22, 2014	11	19
January 8, 2015	1	19
September 22, 2012	9	18
September 2, 2014	17	18
January 5, 2015	9	18
January 6, 2015	21	18
September 2, 2013	6	17
January 6, 2015	18	17
August 27, 2014	15	15
January 9, 2015	22	15
January 6, 2015	17	14
January 6, 2015	20	14
January 9, 2015	21	14
September 30, 2012	10	13

May 17, 2013	11	13
November 12, 2014	16	13
January 5, 2015	13	13
January 22, 2015	16	13
September 14, 2012	11	12
October 9, 2013	10	12
October 28, 2014	15	12
September 30, 2012	**11**	**11**
May 25, 2013	11	11

Table 1: Highest hourly monitored SO2 concentrations, 2012-February 28, 2015, monitor 21-037-3002, Walter C. Beckjord impacts removed.

To maintain conservatism, Ohio EPA eliminated monitor values of zero from the percentile calculation, giving a total of 2,939 non-zero monitor values for which SO_2 emissions from the Walter C. Beckjord facility were zero. Thus, the 99th percentile value of these data is the 29th highest hourly value. This value, 11 ppb, was recorded on September 30, 2012 and is highlighted in Table 1, above.

Ohio EPA has demonstrated that a significant shift in wind directions which impact monitor 21-037-3002 are observed when emissions from the Walter C. Beckjord facility are eliminated from hourly wind and monitor data. From amongst this dataset, the highest monitor value recorded was 34 ppb, and the 99th percentile of the non-zero values is 11 ppb. Further, those sources impacting the monitor in the absence of emissions from the Walter C. Beckjord facility are located 30 to 35 km distant from the monitor and are therefore unlikely to cause a significant concentration gradient across the nonattainment area. Thus, monitor values are considered representative of ambient SO_2 concentrations across the entire nonattainment area. Additionally, a significant reduction in SO_2 emissions is anticipated for those sources in and around the nonattainment area. Taken together, Ohio EPA contends that the monitor is representative of the nonattainment area, that the shutdown of the Walter C. Beckjord facility will bring the monitor and nonattainment area into attainment of the standard, and that no hourly monitored value for the January 1, 2012 to February 28, 2015 study period associated with periods of zero emissions from the Walter C. Beckjord was above the standard.

Appendix L

Notification of Permanent Shutdown
Miami Fort Power Station
Unit 6

Dynegy Resource I, LLC
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

June 11, 2015

Mr. Christopher Beekman
Ohio Environmental Protection Agency
Division of Air Pollution Control
P.O. Box 1049
Columbus, Oh 43216-1049

Re: Miami Fort Power Station, ID No. 1431350093
MATS Rule Compliance Extension for Unit 6 – Final Quarterly Status Update

Dear Mr. Beekman:

On December 12, 2013, Ohio EPA's Division of Air Pollution Control (DAPC) approved a request by Duke Energy Kentucky (DEK) to extend the Mercury and Air Toxics (MATS) Rule compliance date for Unit 6 at Miami Fort Power Station by 47 days, to June 1, 2015. DAPC's approval directed DEK to submit quarterly status update reports regarding this extension within 15 days after the end of calendar quarters.

Though DEK remains the owner of Miami Fort Unit 6, responsibility for its operation shifted from Duke Energy to Dynegy on April 2, 2015. This final quarterly status update report is provided by Dynegy.

During the second quarter of 2015, DEK continued to include Miami Fort Unit 6 as an eligible resource in its Fixed Resource Requirement (FRR) plan to meet its FRR capacity obligation, and offered it on a day-ahead basis into the PJM energy market until May 31, 2015.

Consistent with the terms of DAPC's compliance extension, operation of Miami Fort Unit 6 has ceased, effective June 1, 2015.

Please contact me at 513-467-5885 (Chris.Osterbrink@Dynegy.com) or Larry Waite at 618-343-7828 (Larry.Waite@Dynegy.com) with any questions regarding this report.

Sincerely,
Dynegy Resource I, LLC

/s/ Chris Osterbrink

Chris Osterbrink
Managing Director, Plant Operations
Miami Fort Power Station

cc: Robert Hodanbosi, Ohio EPA, DAPC, Central Office
Brad Miller, Southwest Ohio Air Quality Agency
J. Michael Geers, Duke Energy