ALLEGHENY COUNTY HEALTH DEPARTMENT
Air Quality Program

SUMMARY OF PUBLIC COMMENTS AND DEPARTMENT RESPONSES ON THE PROPOSED STATE IMPLEMENTATION PLAN REVISION (NO. 90) FOR THE ALLEGHENY COUNTY, PA NONATTAINMENT AREA, 2012 $PM_{2.5}$ NAAQS

Notice of the opportunity for public comment appeared in the legal section of the Pittsburgh Post-Gazette on May 9, 2019. The public comment period started on May 10, 2019 and ended on June 11, 2019, with a public hearing held on the final day of the comment period.

General
Comments related to the SIP in general.

1. **Comment:** ACHD should strengthen its plan for cleaning up the high levels of fine particle pollution ($PM_{2.5}$) that Allegheny County has suffered from for too long. Citizens should know that they can safely raise kids in and protect their families from health threats such as asthma, heart disease, and cancer. ACHD should strengthen the plan by requiring U. S. Steel to reduce pollution from the Clairton Coke Works and by making the goal of the plan to clean the air. By planning to just barely meet the federal minimum air standards, residents are not meeting the health needs of their families.

   Response: This specific SIP is directed at bringing Allegheny County into attainment of the $PM_{2.5}$ standards.

2. **Comment:** EPA identifies a number of groups as being especially vulnerable to health problems from air pollution, children, seniors, and people who have asthma, health disease, and other cardiovascular conditions. In the Mon Valley, this represents over 50% of the residents. ACHD should improve their plan so that benefits of cleaner air can be seen today for these groups.

   Response: See the previous response.

3. **Comment:** The plan does not adequately monitor or mitigate air pollution that disproportionally affects Latino and black communities, making the plan not only environmentally inadequate but also classist and racist. Please consider commenter recommendations to strengthen the plan so that all populations can be protected from the effects of air pollution.

   Response: The monitor network is designed to assess areas of the highest concentrations in Allegheny County. When these locations are within attainment of the standards, all population groups are protected.

4. **Comment:** It is disappointing that the SIP cannot take into account the need for safety, backup, and redundancy modifications to protect the public in the event of acute events like the accident at Clairton Coke Works in December 2018 that had consequences into 2019.

   Response: The largest facilities in the county do include backup equipment or procedures in the case of emergencies. Such mitigation procedures are out of the scope of the SIP, however, and better addressed through other plans or requirements for facilities.

5. **Comment:** Despite efforts such as the SIP, Pittsburgh still has the 8th worst air in America. Last year alone, more people died from air pollution than from opioids. The rate of asthma is substantially higher in Pittsburgh than in the rest of the country, Pittsburgh is in the top 2% in the U.S. for cancers associated with air pollution.

   Response: This specific SIP is directed at bringing Allegheny County into attainment of the $PM_{2.5}$ standards.

6. **Comment:** If Pittsburgh ever hopes to attract the likes of Amazon or other tech companies, pollution problem must be addressed. Having an "F" rating from the American Lung Association (ALA) is unacceptable and embarrassing.

   Response: See the previous response.

7. **Comment:** ACHD should comply with deadlines set by Congress in the federal Clean Air Act. ACHD is nearly three years behind in submitting a proposed attainment demonstration to EPA to address nonattainment with the 2012 NAAQS and ignored the 18-month deadline set by Congress of October 15, 2016. Because of this delay, the Department faces potential sanctions in the form of more stringent offset requirements for new or modified major stationary sources if it does not submit the revision by November 7, 2019. A delay in a plan revision is a delay in the implementation of measures to improve air quality.

   Response: ACHD works diligently to submit plans within the required dates and to ensure public health. The complexity of the analyses included in the SIP, including an alternative modeling demonstration, required additional time for the development of a proper attainment demonstration.

8. **Comment:** The June 11, 2019 Pittsburgh City Paper discusses a new report from the American Thoracic Society and New York University's Marron Institute for Urban Management. The article and report highlight that the Pittsburgh region had the fourth most air pollution related deaths of any metro area in the country (232 deaths in 2017) and the most of any region outside of California. When matters of public health from air pollution

are at stake, timeliness is a necessity as well as the production of a quality analysis and plan for attainment demonstration.

Response: See previous response.

9. **Comment:** ACHD should identify the legal or policy authority in support of its representation that it is not allowed to prepare a control strategy that projects a future design value less than the national ambient air quality standard, as indicated at a recent public meeting. Clean Air Council is not aware of any legal authority for this argument.

   Response: This specific SIP is directed at bringing Allegheny County into attainment of the $PM_{2.5}$ standards.

10. **Comment:** There is no margin for error in the demonstration, given that the modeling shows the Liberty monitor reaches 12.0 µg/m³ exactly and not a lower value. The reality is that all models, emission inventories, and weather variability include inherent error that must be taken into account to ensure that the Liberty monitor is able to reach attainment. Without any reasonable margin of error, the SIP revision fails to require reasonable further progress. (See 42 U.S.C. § 7502(c)(2).)

    Response: ACHD recognizes that there can be uncertainties with the inputs and modeling used for any demonstration. The Weight of Evidence section shows that there is considerable overestimation included in the results. It should also be noted that the projected Liberty design value for the 24-hour standard, for which attainment must also be shown with this demonstration, is below the standard of 35 µg/m³ before rounding convention (rounded to the nearest whole number) as shown in Appendix I.2. Short-term elevated levels of $PM_{2.5}$ are the driving factor for annual levels at the Liberty site. Furthermore, the NAAQS levels already include an inherent margin of safety requisite to protect the public health, as stated in the preamble of the final rule (see 78 FR 3086, Jan. 15, 2013).

11. **Comment:** Health effects start to show up at levels above 8 µg/m³, and the World Health Organization sets 10 µg/m³ as its recommendation for average annual PM. At this level, 50% of Pittsburgh's population is currently being exposed to annual PM levels above the 10 µg/m³ guideline. What this means is that ACHD has the authority to pursue more health protective standards under the federal Clean Air Act, and the attainment demonstration should aim for the more protective standard.

    Response: The purpose of this SIP is to assure attainment of the NAAQS. Efforts beyond attainment of the NAAQS are outside the scope of this SIP.

12. Comment: Even if Liberty is not representative of the entire county, EPA AQI data from 2015-17 shows that three regional air monitors in Pittsburgh registered $PM_{2.5}$ concentrations worse than 90% of the U.S.

Response: See previous response.

13. Comment: For Emergency Episodes, ACHD should select a more stringent episode level for $PM_{2.5}$ than the proposed episode level for PM_{10}.

Response: By weight and particle size, PM_{10} inherently includes all PM of lesser diameter. ACHD recognizes that the NAAQS are more stringent for $PM_{2.5}$; however, emergency episode provisions are not required for a SIP submission, and there are no recommended emergency levels for $PM_{2.5}$. Presuming that an episode for $PM_{2.5}$ in the area would likely coincide with a substantial event for PM in general, ACHD deemed the PM_{10} level to be an appropriate level for $PM_{2.5}$.

Control Strategy

Comments related to control strategy used to demonstrate attainment for the area.

14. Comment: The Control Strategy (Section 3 of the SIP) references operating or installation permits that are applicable to the control conditions and emissions reductions. Permits relied on in the control strategy for this attainment plan must be submitted to EPA as part of this SIP revision.

Response: ACHD has included redacted versions of the applicable permits in Appendix L, which is a new appendix since the public comment version of the SIP. The non-redacted portions of the permits indicate the specific conditions and requirements for the local source modifications that have been used in the control strategy. Permit conditions that are not directly applicable to this SIP have been redacted.

15. Comment: Section 3.2, Local Source Shutdowns, lists several closures of industrial facilities. This section should explain which of these shutdowns are federally enforceable and reference the appropriate documentation.

Response: These closures were voluntary shutdowns that were not a result of consent decrees or other actions. However, these shutdowns are permanent closures, with revocation of corresponding operating permits. From a permitting aspect, which is a federally enforceable program for Allegheny County, these sources no longer exist. Follow-up inspections are also conducted by ACHD enforcement staff to ensure continued inactivity and/or demolition at these properties. These emissions reductions were included in the future case modeling as permanent reductions and therefore included in the control strategy. Based on ACHD analysis (not provided in the SIP), these sources also potentially contributed to monitored violations in the monitored timeframe of 2011-2013 (the timeframe used for

designations). The shutdown of these sources helps to assert that attainment will be maintained.

16. **Comment:** Section 3.2 also indicates that the Kosmos facility is no longer an inventoried source but has Emission Reduction Credits (ERCs) available that have not been included in the attainment demonstration. This is not clear. Please provide additional information why ACHD presumes that ERCs will not be used at same location or a nearby location.

    Response: The mention of ERCs was an error in the public comment version of the SIP, as the ERCs for this source have expired. The language regarding the ERCs for this source has been removed.

17. **Comment:** There is a need for local reductions from the three U. S. Steel facilities, specifically Clairton Coke Works because the Liberty monitor will not reach attainment without these reductions. These three facilities comprise over half of the $PM_{2.5}$ emissions from all point sources in the county, and there have been no significant emissions reductions from these facilities in the last six years. For the Clairton facility, nearly all decreases in emissions in the control strategy resulted from upgrades to the quenching towers in 2013, with the C Battery processes adding to emissions since 2012. ACHD could lower the allowable percentage of fugitive emissions from leaking doors, lids, and offtakes from coke oven batteries. Additionally, for the Edgar Thomson and Irvin facilities, there are no emissions reductions from base to future case.

    Response: The control strategy for this SIP was focused on enforceable source modifications with quantifiable emissions reductions. The result was a conservative approach that relies on the best known enforceable controls. Other reductions that have not been included in the control strategy have been included in Weight of Evidence. Further reduction strategies continue to be investigated for future implementation.

Emissions Inventories

Comments related to the emissions inventories used for the attainment demonstration.

18. **Comment:** The emissions inventory data used in the proposed attainment demonstration must include emissions in excess of permit limits from the Clairton Plant. It is not clear, however, that they do. 40 CFR Part 51 Appendix W requires that emissions from point sources should generally be modeled at design capacity, but provides that if such a source exceeds permit limits due to "poor maintenance, careless operation, or other preventable conditions," such excess emissions should be modeled.

    Response: The $PM_{2.5}$ modeling guidance mentions 40 CFR Part 51 Appendix W in reference to models in general, but for $PM_{2.5}$ demonstrations, actual emissions are used instead of design capacity emissions in order to properly account for the transformation of precursors. For sources with changes from base to future case, the projected inventory did

include emissions that were out of compliance if the most recent inventory included such emissions (i.e., based on recent stack tests).

19. Comment: ACHD should clarify the discrepancies between the 2011 emissions inventories and the data in other inventories, including the EPA National Emissions Inventory (NEI), the PA DEP's inventory, and ACHD's annual point source emissions inventory. In addition, ACHD should clarify the projected 2021 emissions inventory, which should be the best available representation of emissions growth and contraction, facility closures, new facilities, new controls and other changes in emissions forecast to occur.

Response: ACHD acknowledges that there have been discrepancies in the inventories for 2011 and other years, primarily due to the reporting methodologies of condensable PM emissions. ACHD cannot verify if there are additional discrepancies due to errors in data available on PA DEP or EPA web sites. For the 2011 base case inventory used in the SIP, the correct point source emissions were taken from the downloadable EPA 2011 NEI delimited/spreadsheet files (and incorporated into the downloadable MARAMA 2011 files), with the revisions noted in Appendix D. The procedure for the future case projections is also described in Appendix D, accounting for changes in emissions, with enforceable reductions included in the control strategy.

20. Comment: The revised plan does not include any requirements related to a significant mobile source of $PM_{2.5}$, Norfolk Southern's planned rail expansion, which will dramatically increase $PM_{2.5}$ and black carbon emissions in diesel pollution.

Response: The projected inventory did not include emissions to account for the Norfolk Southern proposed new route through the North Side, as the timeframe for this project is unknown, and there are no estimates of possible emissions increases by 2021. The future case area source inventory for 2021 did include emissions of NO_x (1428 tons/year), $PM_{2.5}$ (37 tons/year), and VOC (57 tons/year) from railroads throughout the county.

Meteorology

Comments related to the meteorology data used for the modeling demonstration and analyses included in the SIP.

21. Comment: ACHD's modeling for the future year 2021 is flawed because it is based on unrepresentative meteorological conditions in the base year 2011, where there was an unusually high amount of annual precipitation. Only four years of the past 30 years had a greater amount of precipitation, and only one of them occurred after the base year (in 2018). The base year also had the second-lowest number of annual inversions (157) during the 2009-2018 period, and year 2012 is far more representative of normal temperature inversion conditions than was the year 2011. Additionally, ACHD is implicitly appealing to climate change to substantiate its use of unrepresentative meteorological conditions for the future year, which is not recommended by EPA's modeling guidance.

Response: Based on the implementation rule, one of three years (2011, 2012, or 2013) was to be selected as the base year. As mentioned in Problem Statement (Section 2) of the SIP and the CAMx Model Protocol (Appendix F.2), part of the basis for selecting year 2011 was that 2011 NEI included the best-reviewed emissions data and modeling platform, and the use of other years would have required additional interpolations or estimations of emissions.

Regarding the meteorology for 2011 overall, as the SIP supports in both Section 2.3 and Appendix B, meteorological conditions in 2011 were suitable for the SIP modeling demonstration. While temperature inversion conditions are one key aspect of weather that determines mixing potential and subsequent $PM_{2.5}$ concentrations throughout the county, surface temperature, wind direction and speed, and precipitation are also important to $PM_{2.5}$ levels.

Wind and pollution roses show that 2011 represents the conditions during the five-year weighted monitored base period of interest – 2009 through 2013 – quite well. Although surface temperature and precipitation during 2011 were above normal and the frequency of inversions was below average for the period, temperature and precipitation during 2011 were closer to more recent weather conditions in Allegheny County.

As for morning surface inversions, on a monthly basis, October and November 2011 measured some of the strongest inversions of all months of the five years examined. In fact October 2011 recorded the strongest average inversion for any month during the five years under consideration. For 24-hour projections, only the highest (top 10%) days per quarter are used for the attainment tests, so the total number of high days in a quarter is less important than the highest overall days. Furthermore, in the county, based on the previous ten years of measurements, fall has the strongest inversions, while being the season with the second deepest, second most persistent, and second most-frequent occurrence of inversions of any season. And, historically, autumn months are typically when inversion conditions produce the highest particle-pollution concentrations. Thus, when looking more closely at the monthly data, 2011 represent worst-case, short-term conditions as well as variability for meteorology seen over the 2009-2013 timeframe.

Additionally, the modeled impacts are not used directly for the attainment tests, as the $PM_{2.5}$ design value projection approach uses the base and future year modeled results in a relative fashion to scale the observed base year timeframe monitored values. Any modeled under- or over-prediction is carried over from base to future year. The modeling showed good model performance for year 2011, and it's expected that 2012 or 2013 would show similar performance. Specific meteorological conditions are less critical for the demonstration than the model responses under the tested conditions.

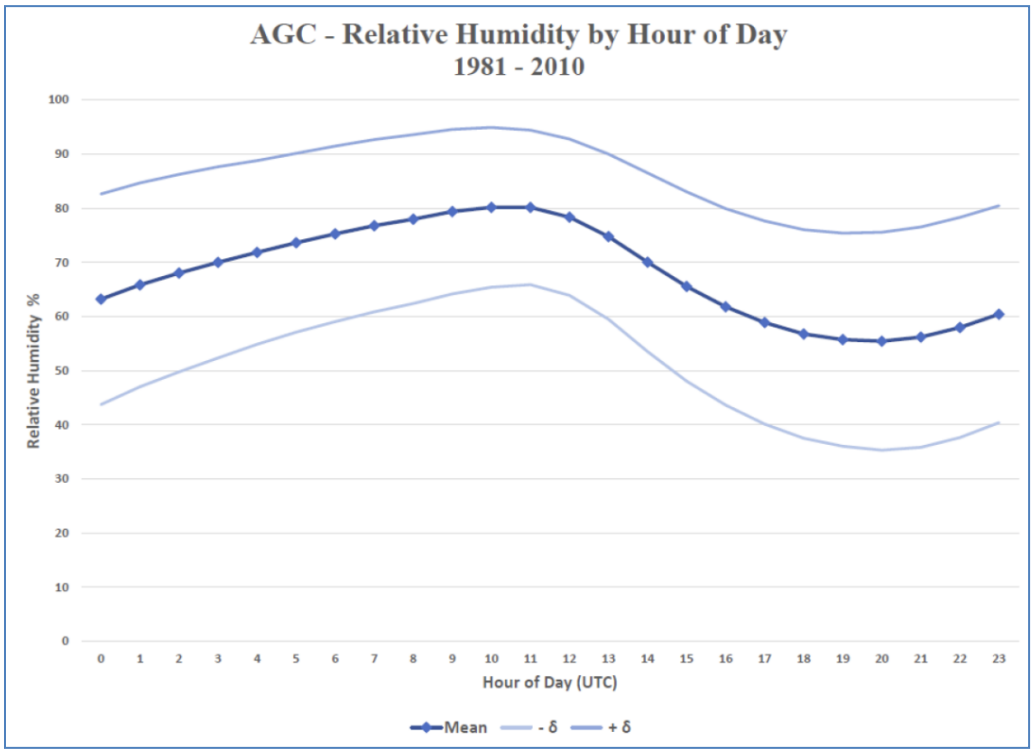
Last, the mention of more recent years was intended as a broad look at representative meteorology over a longer timeframe, and 2011 was not selected as a meteorological year because of higher precipitation due to climate change.

22. Comment: The effects of climate change are already being felt in Allegheny County, and the increase in the low temperature (at night) should also be included in the modeling.

Response: See the previous comment and response. Potential changes in meteorology due to climate change are generally not included in SIP demonstrations.

23. Comment: EPA recognizes the impact of inversion strength on the Liberty monitor's $PM_{2.5}$ concentrations. EPA also suggests that in addition to inversion strength, local $PM_{2.5}$ concentrations may be impacted by relative humidity (RH) levels especially if local air-borne particulates are water soluble. Water soluble air-borne particles will accrete mass as relative humidity levels in the atmosphere increase.

EPA examined quarterly $PM_{2.5}$ concentrations at the Liberty monitor and the nearby Allegheny County Airport (KAGC) daily averaged RH values and found that these values were weakly correlated. Maximum, minimum, and average daily temperatures and daily precipitation values showed little correlation with Liberty's corresponding quarterly $PM_{2.5}$ concentrations. On an hourly basis, however, the AGC airport 30-year average hourly RH profile (shown in the figure below) has a very similar diurnal pattern as the one constructed from Liberty's hourly TEOM $PM_{2.5}$ concentrations (see Figure 2-10 in Appendix G.3). Values typically run much higher during the overnight hours (peaking around dawn; note AGC is on GMT) and generally fall during the day, indicating there may be some relationship between Liberty's $PM_{2.5}$ concentrations and local RH values.



AGC Airport 30-Year Relative Humidity by Hour of Day (GMT)

Response: ACHD acknowledges the findings. The accretion of mass as relative humidity (RH) levels increase can change the size distribution of particulate matter in the air. This may be an area of investigation that could be pursued by ACHD in the future.

With respect to the tracking of RH by hour of the day during the most recent climatological record (1981–2010) from the Allegheny County Airport (KAGC), the figure shows a pattern that largely matches the growth and decay of ground-level temperature inversions within the county. This suggests that RH may have an important impact on the time of occurrence of elevated $PM_{2.5}$ concentrations. The results also help to confirm the general conclusion that the highest particulate matter concentrations occur during the overnight hours as shown by the modeling results. (Alternatively, this may show some degree of influence surface-layer inversions have on moisture concentrations (e.g., RH).)

24. Comment: In Appendix G.1 (WRF MODEL PERFORMANCE EVALUATION): Allegheny County should consider adding more statistical analyses for the d05 (0.444 km) grid since that grid is being used for the local area analysis via AERMOD. It might also be useful to compare the difference between the d04 and d05 MMIF extractions for the sources within the d05 grid that will be used in the local area analysis.

Response: Statistical analysis was performed for the d05 grid, and graphical results were included in Figure 21 through Figure 27 of Appendix G.1. The d05 analysis was somewhat limited, as only the Allegheny County Airport (KAGC) and ACHD Liberty meteorological stations were available within the domain. Comparisons of results from the d04 and d05 MMIF data were included in the SO_2 SIP for the 2010 NAAQS (and referenced in the $PM_{2.5}$ SIP), and overall results are similar to previous and not repeated in this SIP. A more in-depth analysis of WRF/MMIF data in different domains would require additional time and resources that would not fall within the schedule constraints of this SIP.

25. Comment: In Appendix G.1, Section 3.1.2. METSTAT Evaluation Using Integrated Surface Hourly Observations: Does a positive wind direction bias indicate wind directions are generally biased to the right of the true wind direction?

Response: Yes. Positive bias indicates wind directions that are to the right of true north (clockwise, in meteorological wind direction convention).

26. Comment: In Appendix G.1, Figure 8: This figure is listed as relative humidity (RH) but the units on the chart are expressed as g/kg and not %. These units are typically used for mixing ratios.

Response: This figure refers to absolute humidity and not relative humidity. Units of g/kg are an appropriate measure of humidity, which is generally defined as "some measure of the water vapor content of air" (Glossary of Meteorology, AMS, 2000, pg. 377). Absolute humidity shown in the figure is based on grams of water vapor per kg of (dry) air, which is

similar to the mixing ratio or specific humidity defined as grams of water vapor per kg of (moist) air. Within the temperature range found in the area, there is only a small difference between the two definitions – a difference that is much smaller than the model bias or error.

27. Comment: In Appendix G.1, Section 3.2.1: The analysis indicates the model experiences a negative temperature bias (Figure 7 in the previous section) in the d04 (1.33 km) grid. Does this bias extend vertically and does this lead to a bias in atmospheric stability? Has Allegheny County examined WRF model results for the Beaver Valley Nuclear Station meteorological tower to see if the model is correctly replicating the vertical profiles within the local river valleys? ACHD should consider adding an analysis comparing the WRF derived mixing heights (as determined in AERMET) and NWS station derived mixing heights to determine if the negative temperature bias leads to lower modeled mixing heights. A bias in higher model stability may lead to higher modeled concentrations especially for low-level sources that do not have significant vertical release values.

Response: Figures 9 through 13 in Appendix G.1 visually show that vertical profiles are well-matched for specific hours, despite some slight negative bias in predicted temperatures overall during the cooler months of the year. Analysis included in the SO_2 SIP (mentioned above) did examine average hourly temperatures at Beaver Valley, which showed similar diurnal patterns to the d04 WRF but with slightly lower average temperatures than the WRF for some hours, possibly due to valley influences. Similar to previous responses, a more in-depth analysis of vertical temperature profiles and stabilities for known stations compared to predicted results would require additional time and resources that are not available for this SIP. It is expected that that the temperature bias would not lead to significant differences in the overall modeled results.

Modeling Demonstration

Comments related to the modeling and evaluations used for the attainment demonstration.

28. Comment: ACHD's use of a Local Area Analysis to disregard a future design value higher than the standard is a violation of EPA regulations and a misreading of EPA's guidance document. After CAMx results showed a future design value (DV) of 12.5 µg/m³, ACHD used a mistaken rationale that the Liberty monitor is not suitable for comparison with the standard. Under federal regulations, this approach is only permissible for certain micro-scale and middle-scale sites, and the Liberty monitor is not one of those sites.

Response: ACHD is not stating that Liberty is unsuitable for comparison to the NAAQS with the Local Area Analysis (LAA). Liberty is a neighborhood scale site with a site objective of population exposure. Neighborhood scale represents concentrations over an area with dimensions in the 0.5 to 4.0 km range with reasonable homogeneity of particulate matter concentrations as well as land use and land surface characteristics. (See more discussion in the response below.) Additionally, EPA mentions micro- and middle-scale sites as a

clarification in the modeling guidance and not as an example of a modeling scenario in which a LAA is appropriate.

29. Comment: ACHD's use of a Local Area Analysis approach for the Liberty monitor is not consistent with EPA's procedures in the guidance document for attainment demonstrations for fine particulates. The purpose of a local area analysis is to supplement the results of the attainment test, not to replace the results. EPA recognizes that the application of a chemical transport grid model on a regional or local scale is the best tool available to judge the impacts of changes in future year emissions on concentrations (see Section 6.1.1 of the guidance). The CAMx model as configured for the SIP addressed local impacts by using the Plume-in-Grid (PiG) option, and ACHD's stated rationales for displacing the CAMx modeling are not justification for abandoning the CAMx results.

Response: The modeling used for the SIP demonstration involved a considerable amount of detail and complexity. ACHD's initial procedure, as indicated in the CAMx protocol in Appendix F, was to use CAMx as the model for all impacts/monitors, with the PiG option used for special plume treatment for the largest sources (essentially a "model-within-a-model"). The CAMx configuration included the option for the use of AERMOD for local primary $PM_{2.5}$ impacts (from the same largest sources) in case of potential issues with the initial results. Note that AERMOD is used only for primary $PM_{2.5}$, and all other impacts from the largest sources are based on the PiG results.

This technique using two different models is described in Section 4.6 of the modeling guidance as appropriate for use in attainment tests, and EPA Region III was consulted on this approach. The supplemental analysis described in Section 6.1.1 of the guidance can also include local modeling, and the term "local area analysis" itself is somewhat confusing. For this SIP, the analysis is better considered as refined "level 2" modeling for the local component that is actually enhancing the CAMx regional modeled results. Speciation and source apportionment analyses (see Appendix C) were also relied upon in order to determine the correct local and regional contributions.

Furthermore, the use of a chemical transport model is essentially the only way to model secondarily-formed $PM_{2.5}$, but EPA also recognizes special cases when a local nonattainment issue may require a refined analysis. In fact, there is no preferred model for the assessment of secondary $PM_{2.5}$ impacts, although models such as CAMx and CMAQ have been deemed by EPA as "technically appropriate" for the simulation of such impacts (see the Aug. 2017 clarification memo). AERMOD is actually the preferred model for primary $PM_{2.5}$ modeling in a near-field application (see the Apr. 2019 MERPs guidance).

After careful review of the results from the CAMx/PiG model runs and the EPA Modeled Attainment Test Software (MATS) projections, several valid factors led to inadequate and unrepresentative results from the CAMx-based results for Liberty (as described in Section 5.3.5 of the SIP). The 24-hour projected design value alone is an indicator that something is being calculated incorrectly, as the projected value is higher than any monitored 24-hour

design value since 2012. (As mentioned in other responses, 24-hour levels determine the annual level at Liberty.)

An important factor was the method by which battery fugitives were modeled (as low-level point sources). The alternative modeling demonstration in Appendix H shows that the point source type does not properly account for buoyancy from these sources, leading to significant overestimation. The alternative modeling BLP/AERMOD approach used with the LAA is the most appropriate method available for buoyant fugitives in complex terrain and has been used in three other EPA-approved demonstrations (see the EPA Model Clearinghouse).

Spatial resolution was also an important factor for the primary impacts with the CAMx simulation. As mentioned in the previous response, Liberty is representative of an area in the range of 0.5 to 4.0 km with homogeneity of concentrations and land type. The southern portion of the Liberty 1.33 km CAMx grid cell extends into an immediate impact zone, close to a stationary source, and with different land type. This location is not appropriate for $PM_{2.5}$ based on EPA siting requirements.

However, the most important factor concerns the modeled species apportionment with the CAMx modeling and MATS projections. As shown in the modeling documentation (see specifically Figure 2-6 in Appendix I.1), a large portion of the modeled excess was "other" component, which represents unspeciated primary $PM_{2.5}$ that is not assigned to specific chemical compounds by the model. From the EPA methodology, and as built into the MATS software, other component is directly associated with monitored crustal component (or fine soil), calculated from concentrations of soil-related trace elements. However, the monitored excess species at Liberty are mostly carbons (see Appendix C) and not crustal component (or trace elements that might be lumped in with fine soil, such as iron). While the CAMx/PiG results are showing good overall performance for total $PM_{2.5}$, the model species mapping algorithms are assigning the incorrect species to the primary excess at Liberty.

Therefore, the modeled excess must be reassigned in order to correctly predict the Liberty concentrations. This is crucial to the future projections because a control that reduces primary $PM_{2.5}$ emissions in the area will mostly scale down only the monitored crustal component when using the MATS software. This has little effect on the future design value, as crustal component is a very small portion of the monitored Liberty excess (see Figure 2.3 in Appendix C). A reduction in primary $PM_{2.5}$ from a contributing source should realistically scale down the more prominent excess species such as carbons.

For the LAA, the solution to the species apportionment problem was to model local primary material (LPM) as a separate species with AERMOD, added to the CAMx results without LPM. LPM is the sum of all excess species, since AERMOD does not include chemistry. (The use of LPM also eliminates further error in the composition of species, focusing instead on just the magnitude of the total localized primary impacts.) The AERMOD results were then used to scale down the analogous monitored LPM (sum of excess monitored species), with the CAMx non-LPM results used to scale the regional species. The modeled local excess from AERMOD showed very good agreement with monitored local excess in base year (see Appendix G.3).

In terms of a simple analogy, the CAMx/PiG results generated an excess of four apples at Liberty, but the actual monitored excess showed an excess of four oranges. The LAA accounted for the excess by modeling four generic "fruits." Even if additional modeling was not performed with AERMOD, additional recalculations would have been necessary to the CAMx output, as the MATS software does not allow for reapportionment of species.

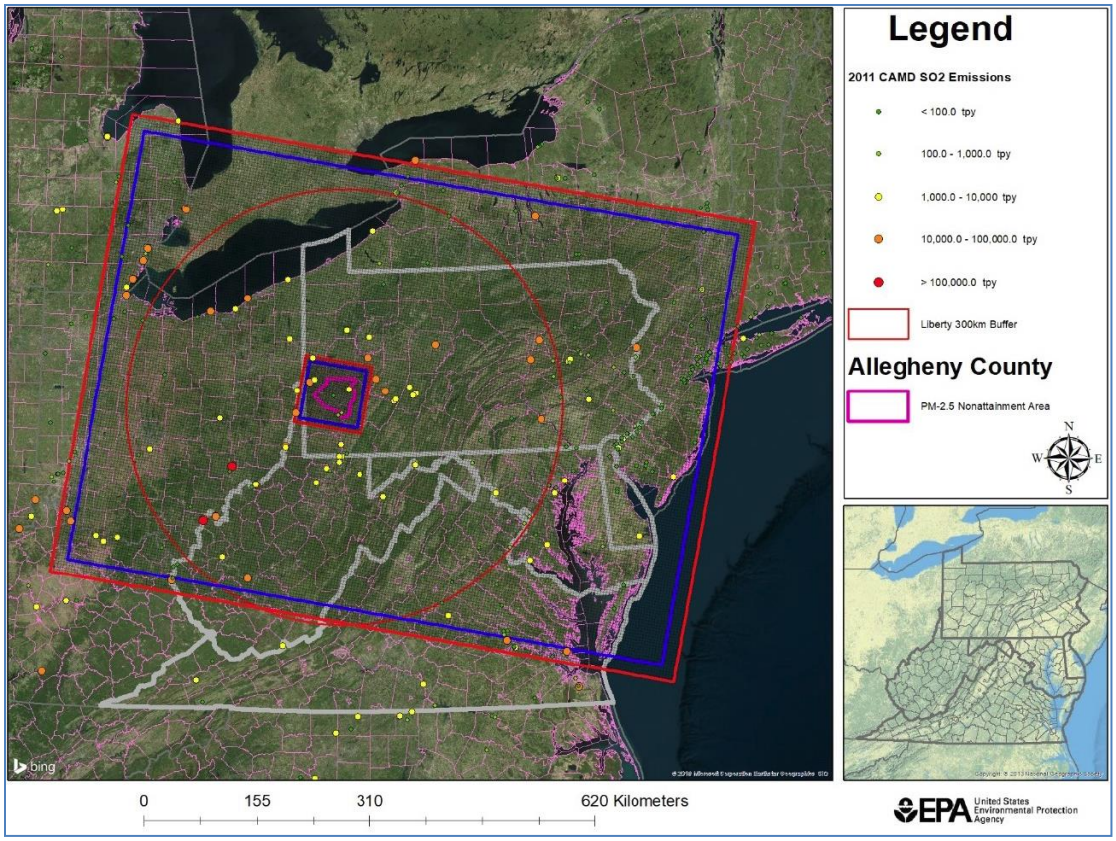
ACHD contends that the LAA methodology, with the use of AERMOD in combination with CAMx, was the best possible modeled simulation and led to the more appropriate design values for the Liberty site.

30. Comment: The CAMx/AERMOD approach via the local area analysis provides a better accounting of the $PM_{2.5}$ species than does the CAMx/Plume-in-Grid (PiG) approach (as noted in Appendices G and I). As for overall model performance, both approaches show comparable results, with the CAMx/PiG approach better at reproducing the upper end of Liberty's $PM_{2.5}$ concentrations (but not necessarily the correct $PM_{2.5}$ species that are contributing to those model high values).

Response: ACHD agrees that CAMx with PiG showed good performance for overall localized $PM_{2.5}$ excess concentrations. The LAA was needed for the proper handling of species for the localized excess. (See the above response.)

31. Comment: Regarding the CAMx modeling described in Section 5.3 of the SIP, the 1.33 km CAMx modeling domain used in the attainment demonstration may be too small in extent to explicitly capture all of the large point-source emission changes that need to be correctly predicted to determine the Relative Reduction Factors (RRFs) used in calculating the projected 2021 design values. The d04 grid only covers the area immediately surrounding Allegheny County. The figure below by EPA shows both the d03 (4 km CAMx grid) and the d04 (1.33 km CAMx grid) along with 2011 CAMD source data.

The d03 grid includes nearly all areas within 300 km of the Liberty monitor and a large number of significant point sources (mainly coal-fired EGUs) that impact regional concentrations in Allegheny County. While the impacts from these sources are theoretically captured in the d03 (4 km) CAMx grid and passed into the d04 (1.33 km) CAMx grid, the differences in the corresponding WRF simulations for each grid may lead to differences in where and when emissions from the d03 grid are being passed into the d04 grid. Additionally, there is no procedure to check if the emissions from the larger grid are being correctly passed into the subdomain (in time and space).



4 km and 1.33 km CAMx Domains and 2011 CAMD Sources

Response: The 1.33 km (d04) and 4 km (d03) domains were configured as two-way nested grid domains in the CAMx simulation. Using two-way grid nesting, air quality concentrations are transported in and out of the 1.33 km and 4 km domains. In addition, the largest point sources in the 1.33 km modeling domain were treated with additional detail by using the Plume-In-Grid (PiG) subgrid-scale plume chemistry and dispersion algorithm. Note that one-way grid nesting was treated between the 12 km eastern U.S. domain (d02) and the 4 km (d03) domain, whereby the output from the 36/12-km CAMx simulation were processed to define Boundary Conditions (BCs) for the 4 km domain so that the sources outside of the 4 km domain are also explicitly treated in the CAMx 4/1.33 two-way grid nesting. Therefore, distant source emissions have been accounted for.

The MATS analysis was performed for both the 1.33 km and the 4 km domains, and the projected $PM_{2.5}$ design values in Allegheny County are similar for both modeling domains. (See Appendix I.1.)

32. Comment: ACHD should consider conducting additional analyses to determine why the 4 km domain is producing somewhat lower values than the more refined 1.33 km domain. The d03 (4 km CAMx domain) projected 2021 $PM_{2.5}$ design values for the Liberty monitor (see Appendix I.1, Table 3-8) are slightly lower than the d04 (1.33 km CAMx domain) projected 2021 $PM_{2.5}$ design values; 12.2 µg/m³ annual, 38.6 µg/m³ 24-hour (see Table 3-8, Appendix I.2) versus 12.5 µg/m³ annual, 38.6 µg/m³ (see Table 3-6 & 3-7, Appendix I.2). Allegheny

County should consider additional analysis to determine what may be causing these differences.

Response: Looking at the other sites in Allegheny County, the results from the two domains are nearly the same, with the 1.33 km domain showing lower design values for most sites on both the annual and 24-hour bases. Liberty and Clairton are the only sites with higher design values within the 1.33 km domain.

Because the $PM_{2.5}$ design value projection approach uses the base and future year CAMx modeling results in a relative fashion to scale the observed base year design value, a lower future year design value does not necessarily mean that the CAMx concentrations themselves are lower, just that the reduction in CAMx $PM_{2.5}$ concentrations between the base and future year are greater in the 4 km than in the 1.33 km grids. The design values from the MATS attainment software are calculated from average modeled results for a 3 x 3 area of cells around the monitor, based on the EPA $PM_{2.5}$ modeling guidance. For a 4 km gridded domain, the modeled averages are based on modeled concentrations by species from within a 12 x 12 km area, whereas in the 1.33 km grid, the MATS average concentrations are from within a 4 x 4 km area. The effects of localized sources are lessened by the average of concentrations within a larger area when using the 4 km domain.

33. Comment: Section 5.3.4 of the SIP (CAMx Modeled Results), including Figure 5-4, lead the reader to believe that this attainment plan does not result in the area attaining the 2012 $PM_{2.5}$ NAAQS by its attainment date. Please indicate in this section that ACHD completed additional modeling as part of the attainment demonstration which does show attainment by that date, and cite the relevant sections of the attainment plan.

Response: Language has been added accordingly to Sections 5.3.4 (CAMx Modeled Results) and 5.3.5 (MATS Attainment Test Results).

34. Comment: In Section 5.5, Model Performance: Overall, the mean fractional error and mean fractional bias values for the 1st and 4th quarters may be less troublesome since $PM_{2.5}$ concentrations in these quarters have historically been lower than $PM_{2.5}$ concentrations in the 2nd and 3rd quarters. There may be larger model errors in the 1st and 4th quarters but monitor values are generally lower (outside periodic episodes of strong inversions) during these quarters making errors somewhat less important as noted in Appendix G.2.

Response: Appendix G.3 (AERMOD Model Performance Evaluation) also provides a breakdown of quarterly impacts by local and regional components, with the local impacts showing good agreement in all quarters.

35. Comment: In Appendix G.2 (CAMx BASE CASE MODELING AND MODEL PERFORMANCE EVALUATION), Section 4. MODEL PERFORMANCE EVALUATION (MPE): For clarification purposes, was a single cell (CAMx cell containing the monitor)

used for comparisons with monitor values or was an average over multiple cells used for comparisons with monitor values?

Response: The single CAMx cell containing the monitor was used for comparisons to monitor data.

36. Comment: In Appendix G.2, Section 4.2. Model Performance Statistics and Performance Goals and Criteria: Is "pseudonetcdf" (on page 16 below Table 4-3) a misspelling?

Response: This is not a misspelling. PseudoNetCDF is a downloadable software program that provides for the conversion from CAMx file formats to other formats.

37. Comment: In Appendix G.2, Section 4.3. Model Performance Evaluation: Adding the emissions from the PiG puffs presents special problems since the PiG approach attempts to limit the distribution of emissions within the CAMx grid cell. It might be helpful to indicate how much the PiG emissions are contributing to a grid cell's total $PM_{2.5}$ concentrations. It would also be helpful if some type of analysis could be made on how this accounting "spreads" the plume across the larger CAMx grid cell. The PiG spread could lead to higher modeled concentrations within some portions of the grid cell that are somewhat removed to the plume centerline (as it's envisioned in dispersion modeling).

Response: Table 2-4 in the Appendix I.1 (AIR QUALITY TECHNICAL SUPPORT DOCUMENT) shows the local contribution to total $PM_{2.5}$ concentrations in several different CAMx grid cells. The local components in this figure represent the PiG source contributions. PiG concentrations were combined with the CAMx concentrations by averaging the PiG values at all receptors within a CAMx grid cell, which were then added to the CAMx concentrations for the cell. The summed impacts were compared to the monitored values.

38. Comment: In Appendix G.2, Section 4.3.2. Total $PM_{2.5}$ Mass: Has Allegheny County conducted any analyses regarding potential biases between its TEOM and FRM monitors? EPA has seen some instances in the past where there were significant and sometimes seasonal biases between TEOM and FRM $PM_{2.5}$ monitors. It's unclear if any monitor biases would be important given the model results are being used to determine relative concentrations between a base year and a projected year.

Response: In general, the TEOM 24-hour averages showed lower values than concurrent FRM concentrations, with some differences by season. Note that these monitors have since been replaced by Federal Equivalent Method (FEM) monitors, which show closer readings to FRM values; for year 2011, only TEOM data were available for comparison to hourly modeled values. In that regard, the comparison of modeled 24-hour averages to FRM data should likely be considered the more reliable analysis for model performance.

39. Comment: In Appendix G.2, Figure 4-5. Quarterly Time Series of Daily FRM $PM_{2.5}$ at Liberty: It may be helpful to highlight (on the figure) the periods of missing data in the 1st, 2nd, and 4th quarters. It would also be useful have all quarters on the same vertical scale (or maybe a log scale) so you can distinguish the differences between higher values in the 1st and 4th quarters versus the 2nd and 3rd quarters.

Response: The missing periods of FRM data are shown in Appendix G.3. Revisions to this figure are not available due to time and resource constraints for the SIP.

40. Comment: In Appendix G.2, Figure 4-6. Annual Q-Q Plot of FRM and Modeled $PM_{2.5}$ at Liberty: EPA agrees that the results appear to indicate CAMx is overestimating $PM_{2.5}$ concentrations on days when the monitor is recording low values. Allegheny County attributes this result to an over-prediction of the regional $PM_{2.5}$ components. If the regional signal is being overplayed in the model, wouldn't the Q-Q plot be shifted to over-prediction across the entire scale of values including the peak values? Furthermore, this over-prediction at lower concentrations isn't consistently observed at the other monitors (as shown in Figure 4-7). Could part of the overestimation in the lower values be attributable to the relatively large CAMx grid cell (1.33 km) where emissions are spread across a much wider area than would be observed if the plume was only skirting parts of the CAMx grid cell?

Response: High $PM_{2.5}$ concentrations at Liberty occur when there are strong inversions. During these strong inversions, emissions from local sources are trapped close to the surface and presumably regional sources are not impacting the monitors as much. The weather patterns are likely different (without an inversion) when smaller $PM_{2.5}$ concentrations are observed, suggesting that regional sources play more of a role (see more discussion on page 25 of Appendix G.2). If a plume is instantly diluted into the CAMx grid cell (which for the PiG sources it is not), it should decrease the concentration, leading CAMx to under-predict and not over-predict. A real plume could have low concentrations at the center of the CAMx grid cell, but CAMx would include the average of the plume (averaged across the grid cell).

The comparison of Q-Q's for different sites (on pages 25-28 of Appendix G.2) suggests that there is an overall overestimation from Allegheny County-based urban components, observed at all sites, and especially at low concentrations. Over-prediction for all data is seen at Lawrenceville, the most urban site, and for nearly all data at North Braddock, which is also an urban site. The least amount of over-prediction is at South Fayette, the most rural site. Liberty and Clairton include a combination of different contributions. These sites record more urban-based excess than South Fayette but less than Lawrenceville, with the overestimation diminishing in the mid-to-high range.

41. Comment: In Appendix G.2, Figure 4-8 (Quarterly Scatterplots of Modeled $PM_{2.5}$ and FRM Observations from 8 Monitoring Sites in Allegheny County) and Figure 4-9 (Quarterly Scatterplots of Modeled PM2.5 and TEOM Observations at Liberty and Lawrenceville): Similar to the comment on Figure 4-5, it would be helpful if the (vertical) scales on all quarters were identical. It seems that the 1st and 4th quarter modeled $PM_{2.5}$ values are over-

predicted on the lower end of the scale; the model doesn't seem to be "cleaning out" properly. This may be impacted by any biases between the TEOM and FRM monitors.

Response: Similar to previous responses, revisions to these figures are not available due to time and resource constraints for the SIP.

42. Comment: In Appendix I.1 (AIR QUALITY TECHNICAL SUPPORT DOCUMENT), Figure 2-2: The Sammis and Cardinal coal-fired power plants are located just off the western edge of d04 (1.33 km) modeling domain. These two significant SO_x and NO_x sources are therefore not explicitly modeled within the primary domain; they are "accounted" for via boundary conditions from the d03 (4 km) domain. Proper capture within the modeling platform is important to correctly assess regional $PM_{2.5}$ concentrations within Allegheny County. The 2011 CAMD SO_x and NO_x emissions are summarized in the table below. Both Sammis and Cardinal exceed emissions from the nearby Cheswick power plant, which is in the d04 (1.33 km) CAMx domain used in the attainment demonstration.

2011 CAMD Emissions from 3 Large Coal-Fired Power Plants

Plant	Location	NOx tpy	SOx tpy
Cheswick	Allegheny County, PA	3,293.5	9,290.2
Sammis	Jefferson County, OH	7,635.3	4,202.4
Cardinal	Jefferson County, OH	2,235.1	25,199.6

Response: As noted in the previous response concerning the different domains, CAMx was run on the 4/1.33 km domains using two-way grid nesting, so emissions from Sammis and Cardinal were included in the CAMx 4/1.33 km simulation and did affect the 1.33 km CAMx results.

43. Comment: In Appendix I.1, Section 2.11. Local Source AERMOD Modeling: AERMOD version 18081 was used in the local source modeling not AERMOD 16216r as stated on page 31 of this section.

Response: AERMOD version 16216r was used by Ramboll to evaluate AERMOD versus PiG on a model-to-model basis, using identical source inputs and receptors. This evaluation was different from the subsequent modeling used for the LAA by ACHD, which utilized AERMOD version 18081. The LAA also included different source types, building parameters, species reapportionment, and other refinements that were not used in the Ramboll model-to-model comparison.

44. Comment: In Appendix I.1, Section 3.3.1. MATS Annual and 24-hr $PM_{2.5}$ Projections in 1.33 km CAMx Domain: It might be interesting to see how the projected model $PM_{2.5}$ components compare to the most recent speciated data from monitors in Allegheny County. Perhaps this could be included in a weight-of-evidence analysis if the projected values are significantly different from more recent values (projected values showing a large over-

prediction compared to recent values). If the model is over-predicting its projected $PM_{2.5}$ values when compared to the most recent monitor values it indicates that the projected 2021 design values may be overestimated thus providing additional support that Allegheny County will attain the $PM_{2.5}$ NAAQS by its statutory attainment date.

Response: ACHD did not include such information in the Weight of Evidence section because SANDWICH data are not available for years after 2015. It is difficult to compare modeled to monitored values for some species without the properly adjustments (e.g., organic carbon by mass balance cannot be directly compared to measured organic carbon, retained nitrate is adjusted seasonally by temperature and humidity, etc.).

For the modeled species that can be compared directly to measured (crustal component, elemental carbon, sulfate), the most recently available (year 2017) average major species concentrations for the regional Pittsburgh MSA sites were examined, as shown in the table below. (Liberty was excluded due to the previously mentioned issues with modeled species apportionment.)

Average MSA Concentrations	Crustal Component ($\mu g/m^3$)	Elemental Carbon ($\mu g/m^3$)	Sulfate ($\mu g/m^3$)
CAMx Modeled (2021)	0.432	0.455	1.858
CSN Monitored (2017)	0.455	0.567	1.220

For crustal component and elemental carbon, there is good agreement between modeled and monitored, including nearly identical results for crustal component. Modeled sulfate concentrations were considerably overestimated (by 52%) in comparison to 2017 monitored concentrations, supporting the conclusion that the use of ERTAC 2.4L2 was a conservative approach for future case SO_2 emissions. (See more in the response below.)

45. Comment: In Appendix I.1, Section 3.3.2. MATS Annual and 24-hr $PM_{2.5}$ Projections in 4 km CAMx Domain: EPA compared the d03 (4 km CAMx) results from Table 3-8 to the 2017 $PM_{2.5}$ design value spreadsheet available from EPA's Air Trends website. For the annual $PM_{2.5}$ NAAQS, the d03 grid appears to be predicting higher future concentrations for most of the monitors within the domain (i.e. the 2017 monitor design values are already lower than the projected 2021 values). Similarly, for the 24-hour $PM_{2.5}$ NAAQS, almost all projected values are higher than the 2017 monitor design values. This result seems to indicate the model may be over-predicting actual $PM_{2.5}$ design values within the domain, making it more likely Allegheny County will attain the $PM_{2.5}$ NAAQS by its statutory attainment date.

Response: ACHD acknowledges the findings. The overestimation is due mainly to the use of the ERTAC 2.4L2 emissions projections for SO_2 and NO_x from coal-fired power plants. The ERTAC 2.4L2 emissions for 2021 were essentially a 2015 inventory for power plants, with uncontrolled plants also adjusted for potential higher demand in 2021. Many deactivations and controls in place since 2015 and expected through 2021 have not been

accounted for in the modeled results. The regional modeled results can be considered to be conservative (overestimated) for actual future $PM_{2.5}$ concentrations.

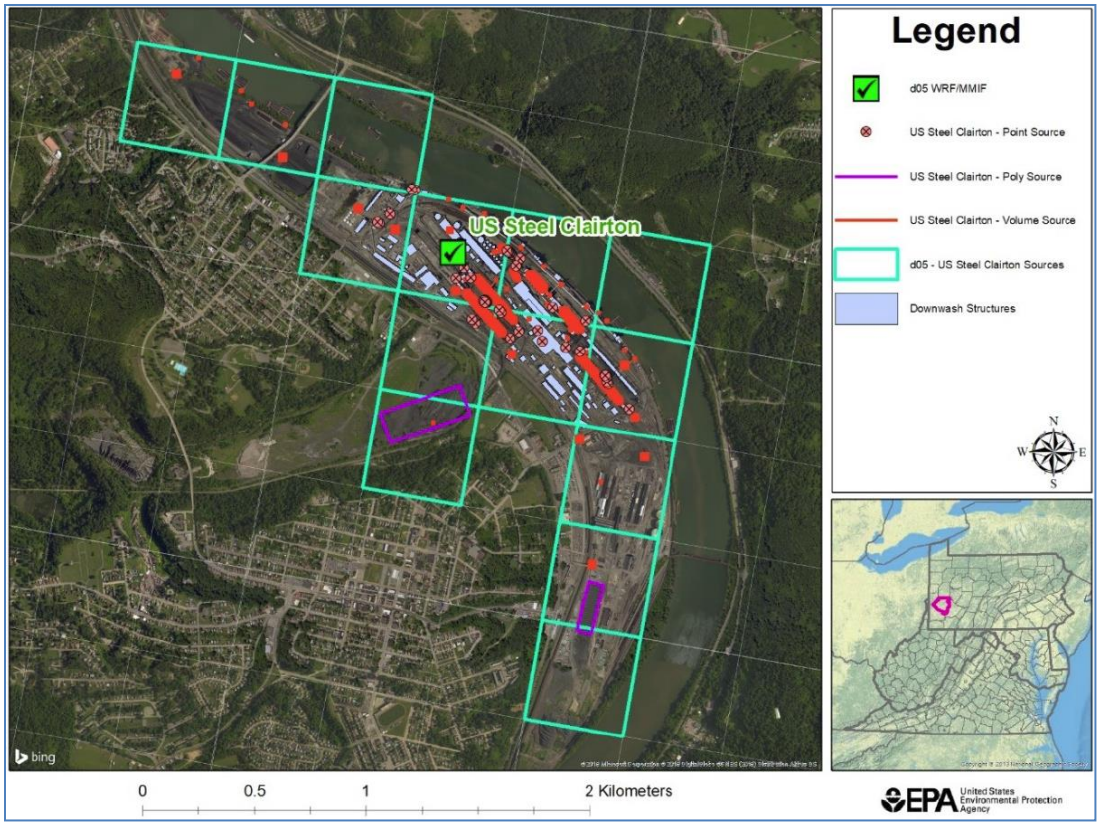
46. Comment: In Appendix I.2, Liberty Local Area Analysis: EPA would like to point out that the wind data used for the local area analysis is being lifted from two different WRF grids (the d04 1.33 km grid and the d05 0.444 km) though both grids share common boundary conditions. The different WRF grids probably do not produce the same types of wind structures and may create discontinuities within the local area analysis.

Response: The 4 km (d03) WRF domain supplies the boundary conditions for the 1.33 km (d04) WRF domain, which in turn supplies the boundary conditions for the 0.444 km (d05) WRF domain. Because the physics settings are the same, they do in fact produce similar wind structures in places with little terrain. The terrain resolution and land-use resolution are different, which is why the finer nests produce winds that follow the terrain more closely.

ACHD correspondingly chose to use the WRF/MMIF data from the d05 domain for use in the LAA modeling because it includes the more representative site-specific data for in-valley conditions. As mentioned in an earlier response, previous analysis included in the SO_2 SIP for the 2010 NAAQS provided more details on data from the different domains. Wind data from the 0.444 km domain showed the best comparisons to known multi-level data in the Mon Valley (from the Clairton sodar) and in southwestern PA (from the Beaver Valley Nuclear Tower).

ACHD also acknowledges that there are discontinuities overall when combining two different models. However, this combination was necessary for the LAA in order to provide a refined near-field analysis that properly simulates the local primary $PM_{2.5}$ impacts in the Liberty area.

47. Comment: In Appendix I.2: Allegheny County extracted WRF meteorological data from an individual d05 (0.444 km) grid to run with AERMOD in its LAA. EPA notes that some facilities that were included in Allegheny County's LAA span across multiple WRF grid cells. U. S. Steel Clairton is a sprawling facility that has modeled emission sources spread out across many d05 grid cells. The figure below shows the d05 grid cell that was extracted (using MMIF) for the LAA along with U. S. Steel Clairton's different sources (Point, Area, and Volume) and buildings that were included for downwash considerations. Facility emissions span fourteen (14) different d05 grid cells. Given the river orientation changes along the eastern border of U. S. Steel Clairton's property boundary, there may be significant differences in meteorological data across these grid cells. It may be unreasonable to assume wind patterns for the U. S. Steel Clairton plant can be properly represented by using only one grid cell.



U. S. Steel Clairton Emission Sources on the d05 WRF Grid

Response: ACHD recognizes the size of the Clairton facility and the potential for different wind fields across the plant property. The grid cell indicated in the figure was deemed to be appropriate based on several factors: 1) Only three of the Clairton d05 cells could be considered a plant centroid based on process locations and emissions, and WRF/MMIF uses land use averaged to the grid cell to generate surface characteristics supplied to AERMET. The selected cell contains the least degree of non-industrial land use, such as the river in the cell to the immediate right. 2) The MMIF data showed wind patterns comparable to data measured by sodar equipment, located in the cell to the immediate left of the selected cell. Wind fields in cells that are farther away from this location may be less verifiable, adding uncertainty to the prognostic wind fields. 3) The selected cell contains possibly the most complex valley patterns on the property, affected by Peters Creek Hollow to the south, Cousin Hollow to the north, and the larger Monongahela River Valley to the northwest and southeast. The correct in-valley flow is important for the proper simulation of the low-level plumes, with winds converging to similar flow patterns above-valley for different cells.

Reasonable Further Progress

Comments related to Reasonable Further Progress (RFP) requirements and quantitative milestones.

48. Comment: The Reasonable Further Progress (RFP) requirement is an annual requirement, not a triennial requirement. The plan should explain how the area is meeting the RFP

requirement (even if it is just "generally linear reductions") on a year by year basis. The quantitative milestone (QM) requirement is every three years, but that is just the times at which the state is supposed to document in a report, and EPA is supposed to verify, that the state is meeting its RFP requirement, as measured by that quantitative milestone yardstick. ACHD can rectify this by showing what emission reductions are anticipated on a year by year basis.

Response: The RFP section has been revised to show generally linear progress for both concentrations and point source emissions. (See Section 7 of the SIP.)

49. Comment: The RFP section does not clearly define the quantitative milestones. ACHD should explicitly state what it is using as the quantitative milestones, and refer to them as such. This way, there is no confusion in the future about what ACHD has chosen and EPA's agreement that the milestones are appropriate. If ACHD is choosing to use the "composite inventory" references in this section, it should state it explicitly. If the projected design values in the RFP section are provided for additional information and not milestones, it should be explicitly stated as well. Additionally, for quantitative milestone reports, this section needs to affirm that ACHD will submit its quantitative milestone reports to EPA by their due dates and needs to indicate what will be included in the reports.

Response: The RFP section has been revised to explicitly indicate the data to be used as milestones and to be included in the milestone reports. Air quality concentration data will be used as milestones. The composite inventory of most recently available emissions data is given in the SIP only as supporting information.

50. Comment: At a minimum, states must include in all attainment plans for moderate $PM_{2.5}$ nonattainment areas a quantitative milestone that all control measures identified and adopted as Reasonably Available Control Measure (RACM) and Reasonably Available Control Technology (RACT) for the area have been fully implemented within four years of designation. This milestone specifically derives from section 189(a)(1)(C) of the Clean Air Act (the Act), that applies to all moderate areas and thus represents a milestone that all moderate areas must meet regardless of whether it is listed explicitly as a milestone. (See 40 CFR 51.1013(a)(1)(iii).) If all measures have been implemented prior to submittal of the plan, the RFP section should state that.

Response: The RFP section has been revised to state that all controls measures have already been implemented before the SIP submittal, with no additional RACM/RACT or additional control measures identified.

Contingency Measures

Comments related to Contingency Measures to be implemented if the area fails to attain the NAAQS or meet RFP requirements.

51. Comment: The contingency measure portion of the proposed attainment plan for public comment does not meet the requirements of the Clean Air Act and EPA's PM implementation rule (Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements (81 FR 58010, August 2016).

Contingency measures must be specific, fully adopted rules or control measures that are ready to be implemented quickly upon a determination by EPA of the nonattainment area's failure to meet RFP, failure to meet any quantitative milestone, failure to submit a quantitative milestone report or failure to attain the standard by the applicable attainment date. The state's attainment plan submission must contain trigger mechanisms for the contingency measures, specify a schedule for implementation, and indicate that the measures will be implemented with minimal further action by the state or by the EPA (see EPA's PM implementation rule at 81 FR 58066-58069).

States must show that their contingency measures can be implemented with minimal further action on their part and with no additional rulemaking actions such as public hearings or legislative review. After EPA determines that a moderate $PM_{2.5}$ nonattainment area has failed to meet an RFP requirement or to attain the $PM_{2.5}$ NAAQS, EPA generally expects all actions needed to effect full implementation of the contingency measures to occur within 60 days after EPA notifies the state of the area's failure. EPA intends to notify the state of a failure to meet RFP or to attain the NAAQS by publication of its determination in the Federal Register. The state should ensure that the contingency measures are fully implemented as expeditiously as practicable after such notice.

Response: The contingency measures section has been revised to include specific controls to be implemented at the USS Clairton Plant. (See Section 8 of the SIP.)

52. Comment: ACHD should issue enforcement orders, as necessary, in the normal course of business. Enforcement actions are not appropriate contingency measures. There may be confusion because of EPA's policy regarding contingency measures for sulfur dioxide (SO_2) nonattainment areas. Because of the unique nature of SO_2 nonattainment areas, EPA made an exception and allows states to use enforcement actions as contingency measures, but only for SO_2 areas.

Response: The contingency measures section has been revised to exclude future enforcement actions as contingency measures. (However, controls to be implemented are a result of a recent settlement agreement and order.)

53. Comment: EPA believes that there are measures that ACHD can adopt that would be appropriate contingency measures. These measures could include additional emission reductions, beyond RACT, at the large stationary sources in the area.

In addition, EPA suggests that ACHD consider controls on the following area sources, which ACHD evaluated in its RACM analysis in Appendix J, to be used as contingency measures:

- Fuel Combustion (Industrial/Commercial) Area Sources: Installation of low-NO_x burners.
- Fugitive Dust Area Sources: Pave unpaved roads and parking lots, with no new unpaved roads to be constructed.

Response: As mentioned in a previous response, the contingency measures section has been revised to include specific controls to be implemented at the USS Clairton Plant. The implementation of area source controls have not been included, as these controls would either require too much time to implement or provide too small of a reduction of primary $PM_{2.5}$.

54. Comment: The "new wood burning curtailment campaign" mentioned in the contingency measures is not "specific" enough to qualify as a "contingency measure" because it does not specify what the parameters of the program would be. Given ACHD's statements in its RACM analysis, it is also unreasonable to expect that the wood burning program would sufficiently reduce emissions as contingency measures, specifically if Liberty fails to attain.

The program also fails as a "contingency measure" because it would require significant further action by ACHD to implement – ACHD would need to amend the existing definition of "Air Quality Action Day" in its air quality regulations to include days on which ambient concentrations of particulate matter threatened to exceed whatever unspecified concentration (albeit lower than the NAAQS) that triggers the program.

Finally, the culpability analysis described by the Proposed SIP Revision fails as a "contingency measure" because it would require significant further action by ACHD, including: review of facility operating conditions, analysis of monitored data, analysis of meteorological data, local source monitoring, and source apportionment analysis. Further, because the measures to be taken as a result of such an analysis are unknown until the analysis is completed, they cannot be specified, and thus do not qualify as "contingency measures."

Response: The contingency measures section has been revised to exclude the new wood burning curtailment campaign that was included in the public comment version of the SIP. ACHD will continue its current wood burning curtailment programs as described in the Weight of Evidence section of the SIP. Additionally, the culpability analysis has been excluded from the contingency measures section, with all controls to be implemented from the USS Clairton Plant.

Reasonably Available Control Technology

Comments related to Reasonably Available Control Technology (RACT) requirements for stationary point sources in area.

55. Comment: Allegheny County's RACT analysis in the plan is based on actual emissions. However, applicability for RACT should be based on potential-to-emit (PTE) emissions. This should be corrected in the SIP document and in the RACT analysis in Appendix J. For

the RACT methodology, identification of the largest stationary point sources should be based on a threshold of 100 tons/year, individually by pollutant. The tables showing the breakdown of the process or process groups should show potential emissions.

Response: The RACT analysis has been revised to include facilities that are major sources based on PTE emissions of PM, SO_2, or NO_x, and all emissions provided in the RACT analysis reflect PTE emissions. Since VOC was found to be insignificant, facilities that are major sources only for this precursor were excluded. All minor sources have also been excluded, since they are not subject to RACT requirements. The revised methodology added five sources and removed three sources since the public comment version of the SIP. More descriptions are given in Appendix J.2.

56. Comment: The RACT analysis indicates that controls on certain processes either meet RACT (or BACT) or are infeasible. The analysis must provide adequate technical and/or economic justification and documentation to support the determinations, including references to indicate the source of the information used to make the determination (i.e., where in the RBLC, or Control Manual, or MCM, etc.). Comparable level of controls and detailed cost and technical feasibility analyses should be included for the processes.

Response: The analysis has been revised to include more detailed information on the RACT evaluations. The tables containing the facility processes or process groups have been expanded to include rows with evaluations after each process/group.

57. Comment: In the RACT methodology, step 3, it states "Identify potential RACT alternatives for the process groups, with emphasis on the largest processes (with a total of 50 tons/year of $PM_{2.5}$ and significant precursors SO_2 and NO_x)." This threshold is too high. Major sources have potential emissions of 100 tons/year, and 50 tons/year is half the applicability level, leaving open the possibility of missing processes with significant emissions. For example, if a 100 tons/year source has five process groups each with emissions of 20 tons/year, this 50 tons/year threshold would result in no RACT analysis for this major source. Additionally, the threshold should be the same for $PM_{2.5}$ and precursors.

Response: This step was intended to be a general way of emphasizing the largest overall processes. The threshold has been removed from this step, revised to simply state that the processes with the largest emissions have undergone the most detailed review of controls and alternatives.

58. Comment: The RACT analysis mentions that the Pittsburgh International Airport is a point source that is not inventoried by ACHD and that no RACT analysis was performed for this source. This information is not clear. Is the Pittsburgh International Airport a point source that is not inventoried by ACHD, or is it not a point source in general? Should the co-located sources that are inventoried be considered separately or aggregated? If the Pittsburgh International Airport is a major source, it should be evaluated for RACT.

Response: The RACT analysis has been revised to further explain the Pittsburgh International Airport source. Pittsburgh International Airport is added to NEI by EPA in order to account for surface-level emissions from commercial and military aircraft, ground support equipment, and other airport operations. This source is added a point source to NEI presumably because it has a known location, instead of being allocated to county-wide emissions like nonroad mobile source emissions. But, it is not classified as a major stationary point source nor is it inventoried by ACHD. Accordingly, no RACT evaluation was performed this source. Additionally, the collocated point sources that ACHD does inventory are separate sources from this airport source.

59. Comment: For ATI Allegheny Ludlum, the evaluation for the 56" Tandem Mill should be clarified. Was the higher emission level of the base year used in the future case modeling?

Response: The analysis for this process has been expanded.

60. Comment: For Bay Valley, it should be explained why boilers other than Boiler 2 weren't evaluated. Additionally, it should be noted if the switch to natural gas is federally enforceable. If so, please indicate how. If not, the facility could switch back at any time and its PTE would still be greater than 100 tons/year, and therefore subject to RACT.

Response: The analysis for the boilers has been expanded. The switch to natural gas was required by installation permit and is federally enforceable.

61. Comment: For the following source processes, it should be indicated why the processes were not evaluated. These sources have considerable emissions. Are these processes subject to other control measures?

- ATI Allegheny Ludlum: Space Heaters
- Allied Waste Imperial: Dedicated Diesel Engines, Soil Stock Pile, Cover Soil Placement
- Universal Stainless: Off-Highway Diesel Equipment
- USS Clairton: Ammonia Flare, Keystone Cooling Tower, Heavy Duty Vehicles, Tug Boat Exhaust
- USS Edgar Thomson: BFG Flare

Response: The analyses for the ATI Allegheny Ludlum and U. S. Steel facilities have been expanded. Allied Waste is not a major source for PM or precursors and has been excluded in the revised RACT analysis. Additionally, the mobile sources for Universal Stainless (off-highway equipment) and for USS Clairton (heavy duty vehicle and tug boats) have been excluded in the revised RACT analysis. Some large stationary point sources featured estimates of site-specific mobile source emissions in the actual point source inventory for 2011, based on the inventory methodology at the time. (These emissions were also included in the 2021 projected inventory for consistency.) The updated inventory methodology for

ACHD and PA DEP does not include such emissions due to potential double-counting, since these emissions are also included in mobile source emissions inventories. There are also no potential-to-emit or allowable rates for these sources, as they were based on estimated vehicle/boat traffic or equipment usage in a year. For control of emissions, these sources are regulated according to federal heavy duty diesel vehicle, off-highway diesel equipment, and marine engine rules.

62. Comment: For many U. S. Steel processes that utilize coke oven gas (COG), the analysis states that the processes "meet RACT, with no feasible alternative identified." ACHD must provide adequate documentation and justification to support the determination that other controls are not feasible. What are the technical and/or economic factors that make additional controls infeasible?

Response: The analysis for these processes has been expanded.

63. Comment: ACHD should provide a more thorough RACT evaluation for the U. S. Steel facilities, in light of trends in technology and innovation. ACHD is relying on RACT determinations that appear to have been made a number of years ago and that may be out of date. Additionally, ACHD should provide an analysis of developments in international technologies in iron and steel and their applicability to the U. S. Steel facilities.

Response: The analysis for these facilities has been expanded.

64. Comment: The SIP does not require any additional Reasonably Available Control Technologies for the U. S. Steel facilities or the Cheswick power plant, which are the region's largest sources of particulate pollution.

Response: The analysis for these facilities has been expanded. These sources are meeting RACT requirements.

<u>Weight of Evidence</u>

Comments related to Weight of Evidence that support that attainment of the NAAQS will be achieved.

65. Comment: EPA examined the Liberty monitor's $PM_{2.5}$ concentrations to determine if there were any statistically significant trends in the data. Using R scripts, EPA applied a statistical analysis of Liberty's 98th percentile 24-hour $PM_{2.5}$ concentrations, quarterly $PM_{2.5}$ concentrations, and annual $PM_{2.5}$ concentrations (which are the average of the quarterly monitor values) for 1999 through 2017. The analysis included two years (1999 and 2016) that did not have complete data. All data sets showed statistically significant (P-values < 0.05) downward trends, indicating that $PM_{2.5}$ concentrations are declining at the Liberty monitor. EPA notes that declines (downward slopes of a linear trend line) in the 2nd and 3rd

quarters are larger than the 1st and 4th quarters. EPA suspects this is due to significant reductions to SO_2 emissions from regional coal-fired power plants. Controls on these emissions were rapidly put in place after 2008 and have probably contributed to declines in the sulfate portion of Liberty's $PM_{2.5}$ concentrations; sulfates have historically been higher during the spring and summer (2nd and 3rd quarters).

Response: ACHD acknowledges the findings.

66. Comment: The Liberty monitor is not on a trend towards attainment of the annual standard for fine particle pollution as suggested in the Weight of Evidence section. The trend line graph (Figure 11-1) is extremely misleading for two reasons. First, it seems clear from preliminary data from 2019 that the Liberty monitor is not going to continue a downward trend compared to 2018. Preliminary data from EPA's Air Quality System (AQS) for Jan. 1, 2019 to June 6, 2019 has Liberty with an average of 14.1 µg/m³. Given that historically the second half of the year has higher readings than the first half, it seems highly unlikely that Liberty will come in under 12.0 µg/m³ as an annual average for 2019. Even factoring in the differences between the FRM monitor at Liberty with the FEM continuous monitor that the preliminary data is based on, attainment for 2019 seems unlikely.

Second, it seems clear that there has in fact been an upward trend at Liberty starting at 2013. Regarding 2018 concentrations, ACHD's inversion analysis for 2009-2018 found that the extremely wet weather in 2018 resulted in the weakest and one of the lowest frequencies of inversion in 2018 compared to any other year in the past 10 years. In fact, it is possible that the annual average for $PM_{2.5}$ at Liberty correlates closely with the inversion frequency found in ACHD's inversion analysis, as opposed to emission reductions driving the values. If true, the assertion that Liberty is 'on track' to attain in 2021 would be based entirely on favorable weather conditions, not on emission reductions.

Response: As noted in the previous comment, decreases in concentrations from 1999 to 2017 are showing statistical significance for the Liberty monitor. ACHD further asserts that decreases in concentrations are a result of controls from both local and regional contributing sources. The control of short-term $PM_{2.5}$ levels at Liberty, which is the driving factor for annual levels, has contributed to lower concentrations. (See Figure 11.2, showing decreases in 98th percentiles from 2009-2018.)

Regarding 2019 data to-date, FRM is the primary monitor method used for comparison the NAAQS, and annual weighted means are based on the averages of quarterly means of creditable samples from the combined FRM and FEM records. The Liberty preliminary quarterly mean for the 1st quarter of 2019 is 12.8 µg/m³, with the highest concentrations occurring during an extreme meteorological event in the eastern U.S. on Feb. 2-4. While this event would not likely qualify as an exceptional event for exclusion from NAAQS comparison, it should be noted that the quarterly mean without these three days would be 10.9 µg/m³, which would be a record low quarterly mean in 1st quarter for Liberty. The preliminary quarterly mean for 2nd quarter is 10.3 µg/m³, which is a record low quarterly

mean for 2nd quarter for Liberty. The current preliminary weighted mean for 2019, based on the first two quarters of data, is 11.6 µg/m³.

Regarding 2018 data and meteorology in general, ACHD recognizes the potential effects of favorable or unfavorable meteorology on $PM_{2.5}$ levels, specifically the effects from inversions. (See also the earlier response regarding the use of 2011 meteorology and modeling in a relative sense.) Emphasis on higher concentrations in 2015-2017 could be misleading without taking into account the prevalence of inversions in these years. In any case, the continued long-term decrease in Liberty concentrations should be expected through 2021, with some variation from year to year that can be attributed in part to meteorology.

67. Comment: There is evidence that the Liberty monitor will continue to remain above the standards for fine particle pollution. Beyond the issues with ACHD's trend line arguments in Weight of Evidence, there are other factors that point in an opposite direction from ACHD's assertion that Liberty will come into attainment. ACHD cannot assume that U. S. Steel will end all violations of their permits between now and 2021, and there should be some quantification of the impact of current violations on the Liberty monitor. There are numerous items in the Weight of Evidence section that are highly unlikely to have any quantifiable impact on the Liberty monitor (e.g., the Pittsburgh municipal diesel ordinance, precursor emission reductions from local sources).

Response: As noted in a previous response, the future case inventory did include emissions that were above permitted limits as reported in recent emissions inventories. Also as noted previously, the Weight of Evidence indicates the overall conservatism (overestimation) for the future case modeled scenario.

68. Comment: Liberty's projected modeled 2021 $PM_{2.5}$ design values indicate that Allegheny County will just meet the $PM_{2.5}$ annual NAAQS by its statutory attainment date, but the preliminary 2018 annual weighted mean for Liberty is already less than the projected 2021 annual design value. Allegheny County has presented several pieces of information regarding the tendency of its modeling platform to overestimate $PM_{2.5}$ concentrations. This is attributed to an overestimation of future emissions from large coal-fired EGUs in the region (see Appendix K). Additional support for this conclusion could include comparisons of model predicted $PM_{2.5}$ concentrations and more current monitor values.

Response: Current monitored values for Allegheny County sites have been included in Appendix A of the SIP.

69. Comment: ACHD examined EGU emissions in the projected 2021 inventory as a weight-of-evidence factor. Generally speaking, Allegheny County has documented that the projected (EGU) 2021 inventory for many large SO_2 sources exceed emissions recently reported to the EPA Clean Air Markets Division (CAMD) emissions database. EPA reminds Allegheny County that CAMD is an emissions tracking/trading platform and does not

necessarily represent continuous emissions monitor (CEM) system values especially when CEM units are unavailable.

In general, EPA would agree that the projected EGU sector SO_x and NO_x emissions are probably overestimated based on current trends. Looking at the Pennsylvania-New Jersey-Maryland Interconnection LLC (PJM) documentation, over the last five (5) years there has been a significant shift in the EGU sector's fuel usage from coal to natural gas, which includes most areas surrounding the Allegheny County, PA $PM_{2.5}$ nonattainment area. It's not clear if the projected 2021 inventory reflects current fuel-use trends in the EGU sector. This is important because coal unit SO_x and NO_x emissions are substantially higher than comparable emissions from newer combined cycle natural gas units that are and will be brought online in the coming years.

Additional analysis regarding PJM's projected electric demand forecasts could be included in Allegheny County's weight of evidence section. In the recent PJM reports, it is noted that growth projections have been over-forecast over the last decade due in part to distributed solar and energy efficiency improvements. It might be helpful to examine the emission growth factors used in the electric generating sector's 2021 projected emissions growth versus the actual slower growth rates documented on the PJM grid. Over-predictions in electric demand growth may have led to over-predicted emissions growth in the model 2021 emission inventories.

Response: ACHD acknowledges the findings. Additional analysis regarding PJM electric demand forecasts has not been added to Weight of Evidence due to the schedule constraints of this SIP.

70. Comment: It may be useful for Allegheny County to explore the impacts that regional sustainability projects are having on electric demand. There are many entities that are voluntarily adopting sustainability standards whose goals will reduced air emissions through projects that help reduce electric demand. As noted in the PJM reports, these efforts have led to a noticeable reduction in the electric demand growth over the last decade.

Response: Additional analysis regarding sustainability projects has not been added to Weight of Evidence due to the schedule constraints of this SIP. ACHD's Clean Air Fund does support voluntary pollution reduction projects such as solar installations.

71. Comment: There may be less EGU deactivations than anticipated, reducing expectations in Weight of Evidence. Although many coal-fired power plants have been deactivated or closed mostly due to competitive costs, there is a federal viewpoint and a similar outlook by some states that coal and nuclear plants should be subsidized while cutting state support for renewable energy and energy efficiency. This could slow down the particulate reductions from expected closures.

Response: As noted in the footnotes in the Weight of Evidence section, ACHD acknowledges that expected reductions are not necessarily permanent retirements from the electric grid. Expected reductions are based on the best available data at the time of this SIP.

72. **Comment:** A hyperlink to education concerning health effects from wood burning should be fixed on the ACHD web site. Not having this information readily available on the web page reduces the likelihood that this Weight of Evidence description is as effective as described in the SIP.

Response: ACHD acknowledges that there have been issues previously with the web site links, especially during redesign of the site. At the time of this SIP, all links concerning wood burning appear to be working properly. (See the following link: https://www.alleghenycounty.us/Health-Department/Programs/Air-Quality/Information-for-Residents.aspx)

Commenters:

A summary of the individuals, organizations, or agencies that provided comments during the public comment period is given below. Copies of the submitted comments, including the transcript of proceedings at the public hearing, are available upon request.

- Residents, Allegheny County or Southwestern PA:
  - 152 commenters (120 of the commenters submitted identical comments)

- Clean Air Council, Climate Reality Project: Pittsburgh & Southwestern PA Chapter, and the Breathe Project, signed by the individuals below:
  - Joseph Otis Minott, Esq., and Christopher D. Ahlers, Esq., Clean Air Council
  - Matthew Mehalik, Ph.D., Executive Director, Breathe Project
  - Phoebe Shackeroff Reese, Co-Chair, Climate Reality: Pittsburgh & Southwestern PA Chapter

- Clean Water Action (CWA), submitted by Myron Arnowitt, Pennsylvania Director.

- Group Against Smog and Pollution (GASP), submitted by John K. Baillie, Senior Attorney.

- Lawrenceville Clean Air Now (LCAN), submitted by Emily Cleath.

- U.S. Environmental Protection Agency (EPA), Region III, submitted by Cristina Fernandez, Director, Air Protection Division.

Oral testimony was given at the public hearing by the following individuals:

- Myron Arnowitt, on behalf of Clean Water Action
- April Clisura, on behalf of Greenfield Neighbors for Clean Air
- Thomas Crown, on behalf of Lawrenceville Clean Air Now (LCAN)
- Melanie Meade, resident of the City of Clairton
- Matthew Mehalik, on behalf of The Breath Project
- Sister Kari Pohl, resident of Beaver County
- Angelo Taranto, on behalf of Allegheny County Clean Air Now (ACCAN)
- Jay Walker, on behalf of Clean Air Council