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<tr><th colspan="4">Comments from Holly Kaloz/Jennifer Van Vlerah, Ohio EPA, 02/15/2018</th></tr>
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<tr><td>1</td><td>6</td><td>LADCO will replace the EGU emissions in the EN platform with 2023 EGU forecasts estimated with the ERTAC EGU Tool.</td><td>According to a presentation at the MJO-EPA Technical call last August, 2023 projected ozone season NOx emissions via ERTAC v2.6 are higher than the EPA's EGU emissions for both the LADCO region and for Total emissions (see below). Can LADCO provide this comparison for Ohio, specifically?<br><br>Also, in the CenSARA and WESTAR/WRAP regions, 2023 emissions are projected by ERTAC to be higher than 2016 actual emissions. This doesn't seem realistic given the widespread shutdown of coal-fired power plants.<br><br>Regional Result Comparisons<br>(Ozone Season NOx Emission for Covered Units)<br><table><tr><th></th><th>2016 OS NOx</th><th>2023 Eng. Analysis OS NOx</th><th>2023 ERTAC v2.6 OS NOx</th></tr><tr><td>CenSARA</td><td>151,910</td><td>128,343</td><td>155,345</td></tr><tr><td>LADCO</td><td>106,528</td><td>76,091</td><td>80,285</td></tr><tr><td>MARAMA</td><td>87,042</td><td>66,688</td><td>63,448</td></tr><tr><td>NESCAUM</td><td>11,431</td><td>10,564</td><td>8,911</td></tr><tr><td>SESARM</td><td>143,461</td><td>113,212</td><td>116,932</td></tr><tr><td>WESTAR/WRAP</td><td>103,514</td><td>79,548</td><td>111,624</td></tr><tr><td>Total</td><td>553,758</td><td>431,268</td><td>495,602</td></tr></table>Note - 1)regional values sum to value greater than total as four states are in multiple MJOs, 2) WESTAR/WRAP totals include units located on tribal lands</td><td>Yes, LADCO will produce an analysis of the ERTAC EGU emissions, by state, that we will use for this modeling study. This analysis will compare the 2023 ERTAC emissions against the emissions that were included in the EPA EN platform.<br><br>ERTAC has generally estimated higher future year emissions than EPA (IPM) for several reasons:<br><br>(1) IPM shuts down inefficient units at a faster rate. ERTAC only closes units if directed by a state or company; (2) IPM implements control technologies at their highest level in all scenarios regardless of whether those controls were optimized in the base year. ERTAC reduces emissions based on clearly identified reason(s) to reduce them; and (3) EPA has been more optimistic about the effectiveness of their emissions control programs than ERTAC. The result is that ERTAC generally results in higher emissions due to lower effectiveness of control programs the future years relative to EPA estimates.<br><br>Regarding the question about the CenSARA and WRAP EGU emissions, the ERTAC group identified this issue last fall. The</td></tr>
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| | | | | group is working to include updated shutdown information for 10+ coal units that had shut down by 2016 but that ERTAC had not identified as candidates for shutdown. In late January 2018 ERTAC solicited comments from states to help to identify these units and an updated emissions projection from ERTAC EGU will be included in the 2016-based runs. We will investigate the feasibility of including the known EGU unit shut-downs that are not in the current ERTAC EGU run in this 2023 simulation. If we can come up with an expeditious solution, we will factor these changes into this simulation; otherwise, we will use the ERTAC v2.6 emissions, as is, and provide comparisons with the emissions used in the EPA 2023 EN platform. |
| 2 | 8 | LADCO will tag both source regions and emissions inventory sectors for our APCA modeling. LADCO will create emissions tracers for the following source regions (see Figure 2 and Figure 3):<br>• Regions: Chicago counties, Gary counties, Milwaukee counties, Sheboygan County, Illinois, Wisconsin, Indiana, | If possible, it would be helpful to tag each individual state, even those outside the LADCO region, to determine their contribution. This is needed to determine what proportion Ohio will need to address. Each state only has to address their proportion of the amount that causes nonattainment to avoid over-control, and control must be proportional across all significant states. To determine Ohio's proportion, we need to identify the nonattainment monitors, determine the amount by which those monitors exceed the standard, determine which other states have significant | We will review the 2023el and 2023en source apportionment modeling by EPA, and the 2023 modeling by Alpine Geophysics for MOG and refine the source region tagging for the LADCO simulation to give a better picture of the significant contributors to ozone in the East U.S. |

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| | | Ohio, Michigan, Minnesota, CENSARA, MANE-VU, SESARM, WRAP, Canada, Great Lakes | contribution (>1%), determine the proportion (amongst the other significant states) of the excess that is Ohio's. To do this, we need to know all of the other states with significant contribution and how much that contribution is. We could estimate our contribution using the regions proposed, but won't be able to really nail it down without individual state source apportionment. We understand this may be a significant resource issue, however. Perhaps LADCO could tag some more important individual states or regions, such as historic big players, and/or those states that show significant contribution in the most recent available U.S. EPA modeling (2023el). Western states should make little difference and so could stay as one group. | |
| 3 | | LADCO will tag both source regions and emissions inventory sectors for our APCA modeling. LADCO will create emissions tracers for the following source regions (see Figure 2 and Figure 3):<br>• Regions: Chicago counties, Gary counties, Milwaukee counties, Sheboygan County, Illinois, Wisconsin, Indiana, Ohio, Michigan, Minnesota, CENSARA, MANE-VU, | Ohio would appreciate tagging the counties within the non-attainment areas (Columbus, Cleveland and Cincinnati), as we could potentially use that information to better target controls, if needed. | LADCO will include the counties for all three NAAs in Ohio |

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| | | SESARM, WRAP, Canada, Great Lakes | | |

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| 1 | 5 | LADCO will simulate May through September 2011 with CAMx as individual months using 10-day model spin-up periods for each month. | Is the simulation process of modeling each month individually with 10-day spin ups periods and making the runs concurrently due to the short time period for completing the modeling? A full summer run would give more consistent results over the time period. | Yes, we will run the individual months to speed up the run times. Regional modeling simulations with different initial conditions converge at about 7-9 days (see Saamali et al, 2009, Atmospheric Environment, Volume 43, Issue 32, Pages 4873-4885, ISSN 1352-2310, https://doi.org/10.1016/j.atmosenv.2009.07.019.) LADCO disagrees that running the simulation continuously will give substantially different results than parallel simulations run with sufficient spin up periods. |
| 2 | 6 | LADCO will replace the EGU emissions in the EN platform with 2023 EGU forecasts estimated with the ERTAC EGU Tool. | Indiana strongly supports this change in the emissions platform as the ERTAC files are more representative of EGU emissions throughout the Midwest and Northeast. This will provide a better analysis and more reliable results. | We will provide analysis of these emissions before the simulation begins to give the states a chance to comment on these data. |
| 3 | 8-9 | LADCO will use the CAMx Anthropogenic Precursor Culpability Assessment (APCA) tool to calculate emissions | Indiana is concerned with the difference in results between APCA and OSAT. MOG modeling seemed to indicate different contributions when using APCA instead of OSAT. Would conducting | We don't have time to run both OSAT and APCA for the October 2018 iSIP deadline. We can go back and run OSAT later after developing the technical support products for |

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| | | tracers for identifying upwind sources of ozone at downwind monitoring sites. | the source apportionment with OSAT as well as APCA be valuable to help explain potential differences? (See comment 5) | the iSIP, if the Project Team feels like that would be worthwhile.<br><br>It's not surprising that the two approaches give different answers, and that the answers are inconsistent (e.g., OSAT higher than APCA in some cases, and lower in others). Temporal and special variability of the chemical regimes (i.e, NOx vs VOC limited) in a model run will influence how the emissions are attributed by the source apportionment tool.<br><br>Technically, LADCO feels that APCA is the more appropriate tool to use for transport-related culpability assessments because it considers any ozone that was formed with anthropogenic precursors as anthropogenic in nature. In the absence of the anthro influence, the ozone would not have formed. OSAT tags anything that involves biogenic emissions as biogenic; OSAT will only identify ozone as being anthro, if both the NOx and VOC precursors are anthro. From a culpability standpoint, APCA is more representative of "controllable" contributions to ozone because it tags ozone that could be mitigated by controls on anthro sources as anthro in nature. |

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| 4 | 8 | Figure 3 CAMx APCA Source Regions, LADCO zoom | Is Kenosha County, WI included in either the Chicago or Milwaukee areas? The intended nonattainment area for the Chicago IL-IN-WI area covers the eastern portion of Kenosha County. Also, are the individual county regions included in the state region (i.e., Gary Counties included in Indiana's contribution)? Based on the Chicago/Illinois and Milwaukee/Wisconsin plots, they are not. | Yes, Kenosha and Sheboygan counties will be included as separate source regions.<br><br>The NAA county tags are masked out of the state, i.e., not included in the state contribution. We can add APCA tags together as a post-processing step, so we'll have some flexibility in how we interpret these results. Most likely we'll want to have, for example, an all IN tracer that is built up from the sum of the three NAA area (Chicago, Louisville, Cinci) tracers and the tracer for the rest of the state. But by tagging the NAA counties separately, we'll also be able to see the influence of the emissions originating in those counties on the NAA and elsewhere. |
| 5 | 10 | Figure 4 Example APCA region-inventory sector contribution plot | Use of the Figure 4 example is concerning to Indiana as it appears the Indiana and Gary contributions to Door County are overstated when compared to the other regions. Is this plot merely an example or does it represent actual modeled contributions? Indiana would want to review the details on its model inputs/results if it is actual modeled impacts. | This plot was pulled from an older LADCO source apportionment modeling study document. It's in this document as an example of the types of plots we'll use to display the results. We will replace this plot with another example. |
| 6 | 11 | Figure 5 Example APCA tracer spatial plot | What are the units on the sliding scale of Figure 5? | ppbV, noted in the caption now. |

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| 7 | | | General comment: Following EPA's modeling/emissions platform is appropriate and spelled out well in the document. | Thanks for the comment. |