

Response-to-Comments on the Attainment Demonstration Modeling for the 2015 Ozone National Ambient Air Quality Standard Technical Support Document

Comments from WI DNR				
Date	Page/Section	Existing Text in Draft	Reviewer Comment	Response
7/17	Page 55, Table 4-4, Page 68 Table 4-9, Page 69 Table 4-11		There are missing data in the nonpoint oil and gas cells for Wisconsin throughout this table. Can these get added in? In addition, the total will also need to be updated to reflect the actual tons/day for these cells.	There are no emissions for nonpoint oil & gas in the 2022v1 inventory. Only point oil & gas. I've added a zero to these tables in the WI cell to avoid confusion.
7/17	Page 67, Table 4-8	Percent difference between base and future year (2026-2022) average ozone season day CO emissions	-Should the title years be reordered to result in a more direct interpretation of the data results, i.e., changed from '2026-2022' to '2022-2026'? Maintaining the existing format of the title may lead to misinterpretation of the relationship between percent increases/decreases and emission increases/reductions. -Assuming a positive percentage is interpreted as an increase in emissions, Wisconsin is noted to have a 40% increase in CO emissions from electricity generation. Wisconsin is looking into this further as this percent increase strikes us as a bit odd. If LADCO could research the accuracy of this data as well, that'd be helpful.	Future minus base is how we want to communicate these emissions changes because we want negatives to indicate lower emissions in the future year, i.e., the emissions are projected to decrease in the future. We found an error in the ERTAC reports that resulted in incorrect 2026 numbers in this summary. We confirmed that this error did not impact the modeling and was just in the reporting of the emissions. The corrected report data now show that EGU emissions are projected to decrease in all of the LADCO states in 2026.
7/17	Page 72, Table 4-13		The average ozone season day emissions by NAAs for the Wisconsin portion of the Chicago, IL-IN-WI NAA are equivalent, but the percent difference shows an increase for NOx and VOCs. Wisconsin is assuming this is due to the rounding of the tons	Yes, it was rounding. Decimals added to the integers that were the same in the table to support interpretation of the diff numbers.

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			per day, but if LADCO could double check these percentages, that would be helpful.	
7/17	Page 94	1. Weighted 5-year average of design values centered on the base model year (2022): $DVB_{2020-2024} = (DV_{2021} + DV_{2022} + DV_{2023})/3$	Equation should be: $DVB_{2020-2024} = DV_{2022} + DV_{2023} + DV_{2024})/3$. We are assuming the calculations were done correctly and this is just a typo.	Yes, this is typo. Text updated. This calculation is hard coded into SMAT-CE.
7/17	Page 28, Section 2.4.2	Mean O3 concentrations in all these high-ozone nodes have decreased ... since around 2008 (Figure 2-6) Similarly, the high-ozone nodes from the CART analysis....	Missing a period between “(Figure 2-6)” and “Similarly”	Text updated
7/18	Page 11, Table 1-2.	Table 1-2. U.S. EPA final actions....	I would say “latest” or “most recent” actions (or the like), since the EPA has in some cases taken multiple final actions (which I interpret to mean “final rules”) for some of these areas (e.g., EPA has reclassified some of these areas to attainment)	Text updated to “U.S. EPA latest actions on...”
7/18	Page 12	The attainment deadline for moderate NAAs to meet the	Should be “serious” rather than “moderate”. Note this correction must be made in two locations on this page.	Text updated; there were a few instances in the document where this needed to be updated.

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		2015 O3 NAAQS is August 3, 2027		
7/24	Table 6-1, pp. 104-105 and Table 6-2, p. 108	2026 DVs as included in the tables	The modeling results spreadsheet contains multiple results for 2026 DVs (see comments on the spreadsheet). The figures reflected in these tables need to be reviewed to ensure they reflect the correct values.	We double checked the spreadsheet and the table in the document for consistency. Added a note in the text that the 2022 DV column is the 5-year DVB2022-2024 values, not the 3-year official DVs.
7/24	Table 3-1, pages 38-39	MOVES2014 is noted as a component of Baseline Emission Processing	Is (MOVES2014) used as a reference here, or is this the correct version of MOVES used in the baseline emission processing?	This was a typo, text has been updated.
7/24	Page 39	We used...the 3-km High Resolution Rapid Refresh (HRRRv4) from NOAA to simulate 2022 meteorology.	From December of 2020 through mid-July of 2022, the HRRR model had an incorrect surface elevation of 0 meters above MSL for all Great Lakes water cells. Do we want to verify that this incorrect vertical gradient between water and land grid cells for part of the 2022 ozone season didn't impact the WRF modeling? Difference was around 180 meters for the Wisconsin Lake Michigan shoreline. Perhaps there was little impact, as later in the model performance evaluation, it's noted that the WRF simulations adequately captured the observed meso- and synoptic-scale processes during June 2022.	Thanks for noting this error in the HRRR data. We do not know the impact that this may have had on the LADCO modeling. We blended the HRRR data with NAM data to initialize and nudge WRF simulation which means that only some variables would be impacted by this error. While it's not clear how significant the impact was on our simulation, the performance of the LADCO WRF simulation is well within the range of acceptable model performance for air quality modeling studies.
7/24	Page 9	LADCO used the Comprehensive Air Quality Model with	CAMx v7.31 is stated later in the Project Overview (section 1.2, page 14). Difference is also seen in	We used 7.31, this was a typo. Text has been updated.

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		Extensions (CAMx) v7.30 photochemical model to support these analyses.	the Ramboll 2024 reference. Was the CAMx version used v7.30 or v7.31?	
7/24	Page 16	“Table 2.1 Table 2-1 shows...”	Typo – repeating text	Text updated
7/24	Page 27	“Figure 2-5 Figure 2-5...”	Typo – repeating text	Text updated
7/24	Table 3-1, Page 39	ERTAC 16.2 beta noted under Emissions Modeling Platform	Typo – Should this be ERTAC 22.0?	Text updated
7/24	Throughout TSD	ERTAC EGU v22.1	Should all instances of ERTAC EGU v22.1 be v22.0?	This was a typo; text updated
7/24	Page 107	“LADCO’s 2022 CAMx modeling platform used a 3:1 nesting ratio to simulation air quality at 12-km and 4-km resolutions.”	Typo – “simulation” should be “simulate”	Text updated
7/25	Throughout TSD	Use of “LADCO” or “we”	Inconsistent perspective throughout TSD. “LADCO”/third person used most, but there are some sections that use “we”/first person	But “we” are “LADCO”. You’re right...and this is a writing style that doesn’t materially detract from the results presented in the TSD.
7/24	4km DVF Summary Table tab		Rows containing incomplete data for non-operational/legacy monitors makes the table more difficult to read. For Wisconsin, the following 16 AQS IDs are listed with no observed	A new version of the spreadsheet filters out the monitors without 2024 DVs (using the -7 and -9 values in the DV columns).

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		2024 DVs or relevant modeling results: 550270007, 550370001, 550450001, 550550002, 550590002, 550710004, 550790041, 550790044, 550791025, 551010017, 551091002, 551170007, 551230008, 551310009, 551330017, 551390011	
	4km DVF Summary Table tab	<p>Spreadsheet contains multiple DVF results for each site.</p> <p>Example: Selecting Kenosha – Chiwaukee Prairie returns six results (rows 461, 950, 1439, 1928, 1217, and 2906). Some are duplicates, but some rows have different RRFs, which in turn give different results (e.g., three different 2026 average DVs: 74.6, 74.7 and 74.8).</p> <p>The data needs to be better organized and labeled so it’s clear what each site’s result corresponds to.</p>	This error was due to an error with filtering the different attainment test experiments we ran. We ran SMAT with and without water cells, and using different matrix sizes around the monitor cell. An updated spreadsheet includes only results for the 3x3 matrix that includes water cells.
7/24	4km DVF Summary Table tab	<p>Missing local site name labels for: 551270006 (Elkhorn) 550790068 (Milwaukee UWM UPark)</p> <p>(Possibly also an issue in other states – just checked Wisconsin’s)</p>	Added these names into the spreadsheet
7/24	Ozone_Max4DV_STD70_2002_2024 tab	Add drop down filter for ease of access for states	Users are free to create a local version of this sheet and add filtering as needed.
7/24	EPA Official 2024 DVs tab	Add drop down filter for ease of access for states	See above

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Comments from MI EGLE				
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07/25/2025	Pg. 10 / Sect. 1	"The four states and EPA signed a"	Add U.S. before EPA for consistency throughout. (Shuff)	Text updated
07/25/2025	12 / 1	"deadline occurs during the 2024 O3 season"	Typo – update "2024 O3 season" to "2027 O3 season" (Vaerten)	Text updated
07/25/2025	12 / 1	"achieve the NAAQS by August 3, 2027, the attainment date for moderate NAAs."	Change 'moderate' to 'serious'. (Shanley)	Text updated
07/25/2025	12 / 1	"The NAA SIPs, or attainment demonstrations, must include a demonstration which identifies emissions reduction strategies that are enough to achieve the NAAQS by August 3, 2027, the attainment date for moderate NAAs. "	Change "moderate" to "serious" (Shuff)	Text updated
07/25/2025	13 / 1	"and our predictions of future O3 design values for the following 2015 O3 NAAQS nonattainment areas: <ul style="list-style-type: none"> • Chicago, IL/IN/WI • St. Louis, MO/IL • Allegan County, MI • Berrien County, MI 	Technically, Detroit is a maintenance area. While the redesignation is being challenged, it currently is in maintenance. (Shanley)	Changed the text to: "...NAAQS nonattainment and maintenance areas."

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		<ul style="list-style-type: none"> • Muskegon County, MI • Detroit, MI” 		
07/25/2025	14 / 1.2	LADCO member states under Clean Air Section 172.	Add ‘Act’ after ‘Clean Air’ (Shanley)	Text updated
07/25/2025	16 / 2.1	"Figure 2-1 shows maps of the 2024 annual fourth high MDA8 values"	Change "annual fourth..." to "annual 4th..." for consistency throughout. (Shuff)	Text updated
07/25/2025	17 / 2.1	Figure 2-1. 2024 fourth high ozone MDA8 values (top) and draft 2012-2024 ozone design values (bottom)	Change ‘2012’ to ‘2022’ (Shanley)	Text updated
07/25/2025	17 / 2.1	"Figure 2-1 shows maps of the 2024 annual fourth high MDA8 values"	Change "annual fourth..." to "annual 4th..." for consistency throughout. (Shuff)	Text updated
07/25/2025	23 / Figure 2-3	The solid red line shows the level of the 2015 ozone NAAQS, and the dashed line shows the level of the 2015 ozone NAAQS.	Change the second ‘2015’ to ‘2008’ (Shanley)	Text updated
07/25/2025	25 / 2.3	Ozone transport is an issue affecting many portions of the eastern U.S. NAAs in the LADCO region receive high concentrations ...	Consider inserting ‘which’ between ‘region’ and ‘receive’ (Shanley)	While this suggestion was not used, the text was updated to be more clear
07/25/2025	26 / 2.4	"We applied CART to MDA O3 and meteorological data ..."	Is this the first time MDA is used? If so, the first use should be spelled out. (Shuff)	No, MDA is defined at its first use in the document (1 st paragraph of section 2 on page 16).
07/25/2025	27 / 2.4	(Figure 2-5 Figure 2-5	References to figures are repeated in a few different places in the document. (Shanley)	Text updated

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07/25/2025	29 / 2.4.1	"LADCO conducted CART analyses for the Detroit nonattainment area."	Detroit is a maintenance area. (Shanley)	Text updated
07/25/2025	40 / 3	"Table 3-2 Table 3-2 lists the 2022 base year.."	Typo – remove duplication of "Table 3-2" (Vaerten)	Text updated
07/25/2025	41 / 3	Table 3-2 Future Year Data Source "U.S. EPA 2022hc"	Potential typo – should the future year data source be U.S.EPA 2026hc for Biogenic, Residential Wood Combustion, and Wild and Prescribed Fires sectors? (Vaerten)	This is not a typo...biogenic, fires, and RWC emissions are held constant in the future year simulation, i.e., they are the 2022 estimates.
07/25/2025	43 / 3.6.1	"EPA AQS Surface Air Quality Data: Data files containing hourly-averaged concentration measurements at a wide variety of state and EPA monitoring Networks"	Add U.S. before EPA for consistency throughout. (Shuff)	Text updated
07/25/2025	43 / 3.6.1	"LADCO used the following routine air quality measurement data networks operating in in 2016 to assess CAMx O3 model performance"	'in' is repeated. Also, I believe '2016' should be '2022' (Shanley)	Text updated
07/25/2025	45 / 3.6.2	"Included in the most recent EPA guidance (U.S. EPA, 2018), they are useful and were used by LADCO in our model performance evaluation:"	Add U.S. before EPA for consistency throughout. (Shuff)	Text updated
07/25/2025	48 / 4	"Table 4-1 shows the LADCO state 2022 average O3 season (May	The ozone season day of May – September is inconsistent with the equation on pg. 49 that uses 244 days (March – October). Based on the provided narrative it wasn't clear the reason for this	The equation was incorrect, as were the references to the March-October ozone season. While this is the official ozone season for many parts of the country, we

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		– September) day emissions”	difference, perhaps the parenthesis on pg. 48 may need to be revised to align with the equation? If the other way around, I think adding additional context on why the equation is based on different months than the current ozone season would be helpful. (Vaerten)	used May-September average emissions summaries provided by U.S. EPA in this report.
07/25/2025	53 / Figure 4-6		While it may be accurate, I find it interesting that the UP generally has emission below 10 tons/month while the northern LP generally has greater than 10 tons/mo. I'm assuming northern LP is just above 10 and the UP is just below 10. The UP is different, but I am still surprised by the apparent distinction between the northern LP and the UP. (Shanley)	The UP has lower biogenic VOC emissions in the modeling than the LP, and this is what you're seeing in these plots. The validity of this difference and why it's happening will need to be investigated further.
07/25/2025	Pg. 59 & 62 / fig. 4-10 & 4-14		Title for figures is spilling over to the next page. (Shanley)	Spacing updated to keep the captions on the same page as the figures
07/25/2025	72 / 4.3	"Table 4-13 Table 4-13 presents average OSDE"	Add a space between "table 4-13" and "presents" (Shuff)	Text updated
07/25/2025	75 / figure 5-2	* <i>Green shading indicates a metric that meets the performance benchmarks for simple conditions, orange</i>	Footnote seems to be missing some language. (Shanley)	Text updated
07/25/2025	76 / 5.2	"The CAMx model performance evaluation (MPE)..."	MPE is spelled out earlier in the report, I believe. Maybe change to "The CAMx MPE.." (Shuff)	Text updated
07/25/2025	76 / 5.2.1	<i>"In general, the model slightly overestimates MDA O3 across the region in all months other than May and June. In May and June, the model tends to underestimate MDA8 O3</i>	Change 'MDA' to 'MDA8' (Shanley)	Text updated

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		<i>across large areas of the region.”</i>		
07/25/2025	94 / 6.1	<i>“Consistent with US EPA modeling guidance (US EPA, 2018), SMAT-CE uses a four-step process to estimate DVF2026:”</i>	Language says ‘four steps’ but 5 steps are listed. Also, the indentation seems to be inconsistent. Is one of the items supposed to be a subitem of one of the others? (Shanley)	Changed four step to “multi-step”. Fixed bullet alignment.
07/25/2025	105 / table 6.1		Table 6.1 is for ‘NAAs’. Detroit is in maintenance. Again, this could change depending on the outcome of the challenge, so in one way it’s probably best to have this data presented for Detroit, but I also don’t want the status of Detroit to be confused further. Was it a conscious decision to include Detroit in the NAA analyses? (Shanley)	Added “NAA and maintenance areas”. We wanted to include all of the ozone sensitive areas in the region. We’ve tried to indicate that the results in the report are for both nonattainment and maintenance areas...hoping this clears up any confusion.

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Comments from US EPA				
Date	Page/Section	Existing Text in Draft	Reviewer Comment	Response
	PDF pg. 10	<i>"(CAMx) v7.30"</i>	Is this a typo? Other references to CAMx in the TSD say v7.31.	Yes, that was a typo. Text updated.
	PDF pg. 13	<i>"Because the attainment deadline occurs during the 2024 O3 season"</i>	Update to "2027 O3 season"	Text updated
	PDF pg. 39	<i>"EPA's Motor Vehicle Emission Simulator (MOVES2014)"</i>	The modeling protocol (2/3/25 version) says modeling will be conducted with a more recent version, MOVES4. Is this a typo in the MOVES version?	Text updated
	PDF pg. 43	<i>Table 3-3 lists 2026 Emissions data as ERTAC16.1 EGU Point but Table 3-2 lists 2026 Emissions data as ERTAC22.1</i>	Please check the ERTAC version for consistency.	Two updates made to correct typos that referred to ERTAC 16.1.
	PDF pg. 81	<i>"Consistent with the spatial statistics plots in Figure 5-2 these tables highlight that averaged across all sites in a state, the model overestimates (positive NMBs) O3 in all months but June."</i>	This is a little unclear as currently written. Figure 5-2 shows that many sites in Region 5 are green (underestimated) in May, June, and July. I assume the averaging across the state is what creates an overall positive NMB in all months except June, but maybe this could get rephrased for clarity.	I removed the reference to the Figure in this sentence, which I think addresses your comment about clarity. With NMB (and bias in general) you get compensating errors that can lead to low bias numbers. But you can still infer the domain avg bias number by the dominant colors in the these plots (e.g., warm colors = positive NMB).
	PDF pg. 88	<i>"While the NMB results in Figure 5-10 reflect the general trend already discussed of CAMx</i>	This phrase is a little unclear. There are nuances in the MPE across months and areas, and this sentence seems inconsistent with how it has been portrayed earlier. For example, PDF pg. 77 says	That wording was awkward. Replaced with "Error! Reference source not found. shows that for the monitors in the region's urban areas, with only a few exceptions, the model meets the

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		<i>underestimating O3 (NMB<0) in most months, ...</i>	“model slightly overestimates MDA O3 across the region in all months other than May and June” and on PDF pg. 81, “averaged across all sites in a state, the model overestimates (positive NMBs) O3 in all months but June.” The statement is consistent with how the O3 > 60 ppb days have been previously described.	less stringent performance criteria both for all days and high concentration days.”
		MINOR COMMENTS		
	PDF pg. 15	<i>“Clean Air Section 172”</i>	Update to “Clean Air Act Section 172”	Text updated
	PDF pg. 17	<i>“Table 2-1 Table 2-1”</i>	Remove double	Text updated
	PDF pg. 39	<i>“U.S. EPA U.S. EPA (2019)”</i>	Remove double	Text updated
	PDF pg. 49	<i>“Table 3-2 Table 3-2”</i>	Remove double	Text updated
	PDF pg. 73	<i>“Table 4-13 Table 4-13”</i>	Remove double	Text updated
	PDF pg. 88	<i>“for all days and high concentration date”</i>	Update to “high concentration dates”	Text updated

