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December 11, 2018

William Frederick Durham, Director
West Virginia Division of Air Quality
601 57th Street
Charleston, WV 25304

Re: Proposed Infrastructure State Implementation Plan Related to the 2015 Ozone NAAQS.

Dear Director Durham:

On September 28, 2018, the Midwest Ozone Group (MOG)[1] submitted comments in support of the West Virginia Department of Environmental Protection's ("DEP") proposed Demonstration of Compliance with the Good Neighbor SIP Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I) related to the 2015 ozone National Ambient Air Quality Standard (NAAQS). Since the filing of those comments, two significant developments have occurred that we would like to bring to your attention through the filing of these supplemental comments in support of the agency's proposal. We request that these comments be included in the record related to the agency's proposal.

1. **New updated state-of-the-science 4km modeling performed by Alpine Geophysics on behalf of MOG confirms that there are no nonattainment monitors linked to the state and that three maintenance monitors have been eliminated.**

As pointed out in MOG's initial comments, the agency's proposal relies on modeling work performed by Alpine Geophysics on behalf of MOG. This modeling was undertaken to address the concerns about whether EPA's modeling with a 12 km grid is sufficiently refined to address the land/water interface issues. To address this concern, Alpine Geophysics undertook to run EPA's modeling platform at a finer 4km grid using an EPA-approved technique called "flexi-nesting".

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[1] The members of and participants in the Midwest Ozone Group include: American Coalition for Clean Coal Electricity, American Electric Power, American Forest & Paper Association, American Wood Council, Ameren, Alcoa, Appalachian Region Independent Power Producers Association (ARIPPA), ArcelorMittal, Associated Electric Cooperative, Citizens Energy Group, Council of Industrial Boiler Owners, Duke Energy, East Kentucky Power Cooperative, FirstEnergy, Indiana Energy Association, Indiana Utility Group, LGE / KU, National Lime Association, Ohio Utility Group, Olympus Power, and City Water, Light and Power (Springfield IL).

Since that time, Alpine Geophysics, at the request of MOG, has rerun EPA's 2011/2023en modeling platform on our 4km domains using 4km-processed emissions. This was done in a further effort to refine modeled ozone concentrations at and near land-water interface receptors. Alpine Geophysics has completed the model performance evaluation on these domains and at key receptors. Based upon this evaluation, there is consistent performance with the earlier 4km results and therefore this updated platform demonstrates the scientific credibility for these 4km domains. These results provide confidence in the ability of the modeling platform to provide a reasonable projection of expected future year ozone concentrations and contributions.

This model performance evaluation and the results of the updated 4km modeling have been incorporated into a Technical Support Document (TSD)[2] that is attached to these comments and identified as Exhibit A.

These results support the conclusions that:

- The Harford MD monitor has a predicted average design value of 70.9 ppb in 2023 which means it is no longer a nonattainment monitor with respect to the 2015 ozone NAAQS.

- While the Sheboygan WI monitor has a new predicted average design value of 71.5 ppb, there is no existing source apportionment information indicating that West Virginia is a significant contributor to this monitor. Indeed, that value includes international emissions where recognition of even a small portion of those emissions would be more than enough to reduce the predicted concentration at the Sheboygan monitor to attainment.

- There are no other monitors in the eastern U.S. that are predicted to be in nonattainment with the 2015 ozone NAAQS and no nonattainment monitors anywhere that are linked to West Virginia.

- The monitor located at Philadelphia PA that was linked to West Virginia is no longer predicting concentrations that would cause it to be treated as a maintenance monitor and, therefore, there is no need to address it in the state's Good Neighbor SIP.

- Without consideration of any maintenance monitor flexibility guidance, which will be discussed later, the only maintenance monitors to which West Virginia is linked[3] are the monitors at Harford MD (240251001) and Gloucester NJ (340150002).

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[2] "Air Quality Modeling Technical Support Document for Midwest Ozone Group's Updated 4km Modeling," prepared by Alpine Geophysics, LLC, Burnsville, NC. December 2018. http://www.midwestozonegroup.com/files/Final_TSD_-_Updated_4km_Ozone_Modeling_Dec_2018_.pdf

Set out in the table below is a comparison of the new updated 4km results taken from the TSD with the previous flexi-nested 4km results for those monitors that were previously identified as being either nonattainment or maintenance monitors.

			Ozone Design Value (ppb)				
				Original 4km Modeling		Updated 4km Modeling	
Monitor	**State**	**County**	**DVb (2011)**	**DVf (2023) Ave**	**DVf (2023) Max**	**DVf (2023) Ave**	**DVf (2023) Max**
90010017	Connecticut	Fairfield	80.3	69.2	71.5	66.8	69.0
90013007	Connecticut	Fairfield	84.3	69.7	73.6	69.2	73.1
90019003	Connecticut	Fairfield	83.7	69.9	72.7	68.3	71.0
90099002	Connecticut	New Haven	85.7	70.3	73.0	68.9	71.5
90110124	Connecticut	New London	80.3	68.2	71.3	66.0	69.1
240251001	Maryland	Harford	90.0	71.1	73.5	70.9	73.3
260050003	Michigan	Allegan	82.7	70.3	73.1	70.0	72.8
340150002	New Jersey	Gloucester	84.3	68.8	71.0	68.8	71.0
360850067	New York	Richmond	81.3	69.6	71.0	69.6	71.0
361030002	New York	Suffolk	83.3	70.7	72.1	70.6	72.0
421010024	Pennsylvania	Philadelphia	83.3	68.0	71.0	67.5	70.5
551170006	Wisconsin	Sheboygan	84.3	71.7	74.0	71.5	73.8

These new data alone offer additional support for the conclusion reached in our initial comments, that the agency's proposal is very conservative in its conclusion that no additional emission reductions beyond existing and planned controls are necessary to comply with the requirements of Section 110(a)(2)(D)(i)(I) of the federal Clean Air Act. This conclusion is strengthened even more with consideration of the maintenance monitor flexibility guidance to be discussed next in these comments.

2. An alternative methodology should be used to determine whether the Harford MD and Gloucester NJ monitors should be considered maintenance monitors.

As stated above, MOG's new updated 4km modeling results demonstrate that West Virginia is no longer linked to any nonattainment monitors and only two monitors that would qualify as maintenance monitors under the criteria used for that determination by EPA in the CSAPR rule.

[3] See "Addressing Maintenance Monitor Flexibilities Using the 2023 Cross-State Air Pollution Rule Closeout Modeling Platform - Revised December 2018," prepared by Alpine Geophysics, LLC, Burnsville, NC. December 2018. http://www.midwestozonegroup.com/files/Maintenance_Monitor_Flexibility_Dec_2018_.pdf.

On October 19, 2018, EPA issued new guidance[4] in the form of a memorandum entitled "Considerations or Identifying Maintenance Receptors for Use in Clean Air Act Section 110(a)(2)(D)(i)(I) Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards" ("EPA's Memo"). That guidance recognizes an alternative methodology for making a determination of the monitor's status as a maintenance monitor. A copy of that guidance is attached to these comments and identified as Exhibit B.

Alpine Geophysics was tasked by MOG to review EPA's Memo and to apply MOG's updated 4km modeling results presented in this letter as well observed ozone concentrations[5] to relevant monitors to determine whether those monitors would qualify as maintenance monitors under EPA's alternative methodology.

Under EPA's Memo, a modeled demonstration would first need to show that using an alternative base year period would lead to a projected future year design value at or below a concentration of 70.9 ppb which is necessary to demonstrate modeled attainment of the 2015 ozone NAAQS of 70 ppb. If that demonstration is successful, EPA's Memo states that EPA would expect states to include with their SIP demonstration submission technical analyses showing that:

1. meteorological conditions in the area of the monitoring site were conducive to ozone formation during the period of clean data or during the alternative base period design value used for projections;
2. ozone concentrations have been trending downward at the site since 2011 (and ozone precursor emissions of nitrogen oxide (NOx) and volatile organic compounds (VOC) have also decreased); and
3. emissions are expected to continue to decline in the upwind states out to the attainment date of the receptor.

EPA's Memo provided the meteorological data to support #1 above. EPA also provided historical emission trends[6] and emission projections[7] that demonstrate continued decline of ozone precursors through 2023 to support #3. Alpine Geophysics then used modeled ozone concentration data from EPA's 12km and MOG's updated 4km modeling, as well as historical observed concentrations, to address the #2 condition.

a. **Utilization of alternative base period design values results in a projection of clean data for the monitors in question.**

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[4] https://www.epa.gov/airmarkets/considerations-identifying-maintenance-receptors-memo

[5] Appendix, "Addressing Maintenance Monitor Flexibilities Using the 2023 Cross-State Air Pollution Rule Closeout Modeling Platform - Revised December 2018," prepared by Alpine Geophysics, LLC, Burnsville, NC. December 2018. http://www.midwestozonegroup.com/files/Maintenance_Monitor_Flexibility_Dec_2018_.pdf.

[6] https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data

[7] https://www.epa.gov/air-emissions-modeling/additional-updates-2011-and-2023-emissions-version-63-platform-technical

The Harford MD and Gloucester NJ monitors have been identified by MOG's updated 4km modeling as the only monitors linked to West Virginia that could be characterized as maintenance monitors under the CSAPR test. A first step in applying the flexibility guidance set forth in EPA's Memo is to determine whether these two monitors should be properly characterized as a maintenance receptor under the alternative methodology, Alpine Geophysics reviewed 2023 ozone design values using alternate base year concentrations (from the three, three-year time periods between 2009 – 2013) for each of these two monitors. These data, presented in the following table, demonstrate that each of the monitors has at least one alternate base year period design value that results in a 2023 projection equal to or lower than the 70.9 ppb threshold satisfying this condition of EPA's alternative methodology.

Alternate Base Year Projections of 2023 ozone Design Values (ppb) from Alpine 4km Modeling for Key Monitors in the 4km Domains.

				2023 Ozone Design Value (ppb)		
Monitor	**State**	**County**	**DVb (2011)**	**DVf (Ave)**	**DVf (Max)**	**DVf (Max 2011/13)**
240251001	Maryland	Harford	90.0	70.9	73.3	67.0
340150002	New Jersey	Gloucester	84.3	68.8	71.0	68.6

b. **Meteorological conditions of the monitors were conducive to ozone formation.**

One of the criteria established in EPA's Memo for approving an alternative demonstration of a monitor's maintenance status is that the "meteorological conditions in the area of the monitoring site were conducive to ozone formation during the period of clean data or during the alternative base period design value used for projections."

EPA's Memo at page A-3 goes on to offer the following general comment on meteorological conditions:

> In general, below average temperatures are on indication that meteorological conditions are unconducive for ozone formation, whereas above average temperatures are an indication that meteorology is conducive to ozone formation. Within a particular summer season, the degree that meteorology is conducive for ozone formation can vary from region to region and fluctuate with time within a particular region. For example, the temperature-related information presented below suggests that summer meteorology was generally conducive for ozone formation in 2010, 2011, 2012 and 2016 in most regions. In contrast, the summer of 2009 was generally unconducive for ozone formation, overall, in most regions. In addition, the summers of 2013 and 2014 were not particularly conducive for ozone formation in the Upper Midwest, Ohio Valley, South, Southeast.

Significantly, the alternative demonstrations set forth in this memorandum for the two monitors involved are based upon alternative base year periods involving the years 2011 through 2013. EPA has recognized that, with one limited exception relevant to this analysis (the summer of 2013 in the Upper Midwest), the meteorology in these years was conducive to ozone formation. Because neither the Harford MD nor Gloucester NJ monitors are located in the Upper Midwest, we can correctly conclude that the alternative base period design values stated above for these monitors reflect meteorology in ozone conducive years.

By basing model projections for the attainment year of 2023 on alternative base period design values for ozone conducive years, the Harford MD and Gloucester CT monitors meet the meteorological threshold of EPA's Memo.

c. **Ozone concentrations are trending downward.**

As an additional supporting case to the flexibility in identifying maintenance monitors, EPA guidance provides that a state would need to show that "ozone concentrations have been trending downward at the site since 2011". The first table below presents 4th high ozone concentration data[8] measured at each noted receptor and a calculated slope between 2011 and the most recently EPA-approved 4th high concentrations from 2017. The second table below presents a count of the number of ozone exceedance days per monitor per year relative to the 2015 70 ppb ozone NAAQS.

4th High Ozone Concentrations (ppb) and Slope Calculation for Key Monitors in the 4km Domains.

			4th High Ozone Concentration (ppb)							
Monitor	**State**	**County**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Slope (2011-2017) (ppb/yr)**
240251001	Maryland	Harford	98	86	72	67	74	79	76	-2.79
340150002	New Jersey	Gloucester	92	87	73	70	76	76	73	-2.71

Daily Ozone Exceedance Counts and Slope Calculation for Key Monitors in the 4km Domains.

			Daily Ozone Exceedance Counts							
Monitor	**State**	**County**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Slope (2011-2017**
240251001	Maryland	Harford	22	17	5	3	5	9	6	-2.29
340150002	New Jersey	Gloucester	17	21	4	3	6	7	6	-2.11

[8] Appendix, "Addressing Maintenance Monitor Flexibilities Using the 2023 Cross-State Air Pollution Rule Closeout Modeling Platform - Revised December 2018," prepared by Alpine Geophysics, LLC, Burnsville, NC. December 2018. http://www.midwestozonegroup.com/files/Maintenance_Monitor_Flexibility_Dec_2018_.pdf.

In the case of each of the Harford MD and Gloucester NJ monitors, negative slopes for both 4th high ozone concentrations and daily ozone exceedance counts indicate the necessary downward trends in ozone concentrations necessary to satisfy this requirement of EPA's Memo.

d. **Emissions of ozone precursors have been trending downwards since 2011 and are expected to continue to decline out to the attainment date of the receptor.**

NOx and VOC emissions across the CSAPR region have been dramaticaly reduced in recent years. These emission reductions will continue as the result of "on-the-books" regulatory programs already required by states on their own sources, "on-the-way" regulatory programs that have already been identified by state regulatory agencies as efforts that they must undertake as well as from the effectiveness of a variety of EPA programs including the CSAPR Update Rule.

Presented below are tables developed from EPA modeling platform summaries[9] illustrating the estimated total anthropogenic emission reduction emission reduction in the CSAPR states.

As can be seen in the first table, total annual anthropogenic NOx emissions are predicted to decline by 29% between 2011 and 2017 over the CSAPR domain and by 43% (an additional 1.24 million tons) between 2011 and 2023.

Final CSAPR Update Modeling Platform Anthropogenic NOx Emissions (Annual Tons).

	Annual Anthropogenic NOx Emissions (Tons)			Emissions Delta (2017-2011)		Emissions Delta (2023-2011)	
State	**2011**	**2017**	**2023**	**Tons**	**%**	**Tons**	**%**
Alabama	359,797	220,260	184,429	139,537	-39%	175,368	-49%
Arkansas	232,185	168,909	132,148	63,276	-27%	100,037	-43%
Illinois	506,607	354,086	293,450	152,521	-30%	213,156	-42%
Indiana	444,421	317,558	243,954	126,863	-29%	200,467	-45%
Iowa	240,028	163,126	124,650	76,901	-32%	115,377	-48%
Kansas	341,575	270,171	172,954	71,404	-21%	168,621	-49%
Kentucky	327,403	224,098	171,194	103,305	-32%	156,209	-48%
Louisiana	535,339	410,036	373,849	125,303	-23%	161,490	-30%
Maryland	165,550	108,186	88,383	57,364	-35%	77,167	-47%
Michigan	443,936	296,009	228,242	147,927	-33%	215,694	-49%
Mississippi	205,800	128,510	105,941	77,290	-38%	99,859	-49%
Missouri	376,256	237,246	192,990	139,010	-37%	183,266	-49%
New Jersey	191,035	127,246	101,659	63,789	-33%	89,376	-47%
New York	388,350	264,653	230,001	123,696	-32%	158,349	-41%

[9] 83 Fed. Reg. 7716 (February 22, 2018).

	Annual Anthropogenic NOx Emissions (Tons)			Emissions Delta (2017-2011)		Emissions Delta (2023-2011)	
State	**2011**	**2017**	**2023**	**Tons**	**%**	**Tons**	**%**
Ohio	546,547	358,107	252,828	188,439	-34%	293,719	-54%
Oklahoma	427,278	308,622	255,341	118,656	-28%	171,937	-40%
Pennsylvania	562,366	405,312	293,048	157,054	-28%	269,318	-48%
Tennessee	322,578	209,873	160,166	112,705	-35%	162,411	-50%
Texas	1,277,432	1,042,256	869,949	235,176	-18%	407,482	-32%
Virginia	313,848	199,696	161,677	114,152	-36%	152,171	-48%
West Virginia	174,219	160,102	136,333	14,117	-8%	37,886	-22%
Wisconsin	268,715	178,927	140,827	89,788	-33%	127,888	-48%
CSAPR States	**8,651,264**	**6,152,990**	**4,914,012**	**2,498,274**	**-29%**	**3,737,252**	**-43%**

Importantly, and as stated in our initial comments, the estimated 2017 emissions used in the EPA modeling are inflated as compared to the actual 2017 CEM-reported EGU emissions. As can be seen in the following table, when the CSAPR-modeled 2017 annual EGU emissions are compared to the actual CEM-reported 2017 annual EGU emissions, it becomes apparent that there is a significant domain-wide overestimation (129,000 annual tons NOx) of the predicted emissions for this category. The modeled values from state-to-state vary between over- and under-estimated, domain-wide, CEM-reported annual NOx ranging from 158% overestimation (2017 actual emissions are 61% of modeled emissions) for Pennsylvania to 54% underestimation (2017 actual emissions are 118% of modeled emissions) for Virginia with a domain-wide overestimation of 18% (129,553 tons) of annual NOx emissions from EGUs.

Final CSAPR Update Modeling Platform EGU NOx Emissions Compared to CEM-Reported EGU NOx Emissions (Annual Tons).

	Annual EGU NOx Emissions (Tons)			Emissions Delta 2017 CEM-2017 EPA	
State	**2011 EPA**	**2017 EPA**	**2017 CEM**	**Tons**	**%**
Alabama	64,008	23,207	24,085	878	4%
Arkansas	38,878	24,103	27,500	3,397	14%
Illinois	73,689	31,132	33,066	1,934	6%
Indiana	119,388	89,739	63,421	(26,318)	-29%
Iowa	39,712	26,041	22,564	(3,477)	-13%
Kansas	43,405	25,104	13,032	(12,072)	-48%
Kentucky	92,279	57,520	46,053	(11,467)	-20%
Louisiana	52,010	19,271	29,249	9,978	52%
Maryland	19,774	6,001	6,112	111	2%
Michigan	77,893	52,829	37,739	(15,090)	-29%
Mississippi	28,039	14,759	12,162	(2,597)	-18%

	Annual EGU NOx Emissions (Tons)			Emissions Delta 2017 CEM-2017 EPA	
State	**2011 EPA**	**2017 EPA**	**2017 CEM**	**Tons**	**%**
Missouri	66,170	38,064	49,692	11,628	31%
New Jersey	7,241	2,918	3,443	524	18%
New York	27,379	10,191	11,253	1,062	10%
Ohio	104,203	68,477	57,039	(11,438)	-17%
Oklahoma	80,936	32,366	21,761	(10,606)	-33%
Pennsylvania	153,563	95,828	37,148	(58,680)	-61%
Tennessee	27,000	14,798	18,201	3,402	23%
Texas	148,473	112,670	109,914	(2,756)	-2%
Virginia	40,141	7,589	16,545	8,957	118%
West Virginia	56,620	63,485	44,079	(19,406)	-31%
Wisconsin	31,881	15,374	17,856	2,482	16%
CSAPR States	**1,392,682**	**831,466**	**701,913**	**(129,553)**	**-16%**

As can be seen in the second table, total annual anthropogenic VOC emissions are predicted to decline by 9% between 2011 and 2017 over the CSAPR domain and by 15% (an additional 1.43 million tons) between 2011 and 2023.

Final CSAPR Update Modeling Platform Anthropogenic VOC Emissions (Annual Tons).

	Annual Anthropogenic VOC Emissions (Tons)			Emissions Delta (2017-2011)		Emissions Delta (2023-2011)	
State	**2011**	**2017**	**2023**	**Tons**	**%**	**Tons**	**%**
Alabama	393,465	328,996	306,583	64,468	-16%	86,882	-22%
Arkansas	342,779	312,750	295,210	30,029	-9%	47,569	-14%
Illinois	372,137	320,543	294,087	51,594	-14%	78,049	-21%
Indiana	284,378	226,734	200,827	57,644	-20%	83,551	-29%
Iowa	191,201	158,520	144,326	32,681	-17%	46,875	-25%
Kansas	461,871	457,042	388,734	4,828	-1%	73,137	-16%
Kentucky	273,603	236,383	214,051	37,220	-14%	59,551	-22%
Louisiana	692,238	647,568	586,378	44,670	-6%	105,860	-15%
Maryland	125,468	105,316	95,511	20,152	-16%	29,957	-24%
Michigan	450,276	350,937	301,599	99,339	-22%	148,677	-33%
Mississippi	274,537	236,316	213,200	38,221	-14%	61,338	-22%
Missouri	377,268	331,054	307,386	46,214	-12%	69,882	-19%
New Jersey	183,091	152,805	141,113	30,286	-17%	41,978	-23%
New York	417,438	337,078	301,794	80,361	-19%	115,645	-28%
Ohio	391,315	306,215	303,144	85,101	-22%	88,172	-23%
Oklahoma	607,943	561,947	538,770	45,996	-8%	69,172	-11%
Pennsylvania	376,322	317,876	293,703	58,446	-16%	82,618	-22%
Tennessee	290,998	231,537	207,178	59,461	-20%	83,820	-29%

	Annual Anthropogenic VOC Emissions (Tons)			Emissions Delta (2017-2011)		Emissions Delta (2023-2011)	
State	**2011**	**2017**	**2023**	**Tons**	**%**	**Tons**	**%**
Texas	2,194,868	2,324,259	2,244,343	(129,391)	6%	(49,475)	2%
Virginia	295,360	254,049	235,605	41,311	-14%	59,755	-20%
West Virginia	139,516	173,841	172,511	(34,324)	25%	(32,995)	24%
Wisconsin	288,296	231,988	204,074	56,308	-20%	84,222	-29%
CSAPR States	**9,424,368**	**8,603,753**	**7,990,125**	**820,614**	**-9%**	**1,434,242**	**-15%**

EPA's October 19, 2018, guidance memo offers states the option of using an alternative method of identifying maintenance monitors to be addressed in their Good Neighbor SIPs related to the 2015 ozone NAAQS. When current data is applied to the various criteria identified by EPA, it is clear that neither Harford MD nor Gloucester NJ monitors should be considered maintenance monitors for purposes related to the 2015 ozone NAAQS.

Conclusion

The data presented in these supplemental comments demonstrates that there are no nonattainment or maintenance monitors linked to West Virginia. We ask that the agency recognize this conclusion as fundamental principal underlying the state's Good Neighbor SIP. The Midwest Ozone Group continues to support the DEP's draft Good Neighbor SIP as a conservative justification for the conclusion that no additional emissions reductions beyond existing and planned controls are necessary to mitigate any contribution West Virginia may have to any downwind monitors to comply with CAA section 110(a)(2)(D)(i)(I).

Very truly yours,

David M. Flannery

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Legal Counsel
Midwest Ozone Group

cc:

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