The Center For Regulatory Solutions

FEBRUARY 23, 2016

SBE COUNCIL
Small Business & Entrepreneurship Council

COMMENTS ON EPA'S BACKGROUND OZONE WHITE PAPER

PREPARED FOR THE CENTER FOR REGULATORY SOLUTIONS, A PROJECT OF THE SMALL BUSINESS & ENTREPRENEURSHIP COUNCIL BY FTI CONSULTING

FTI CONSULTING™

Executive Summary

On October 1, 2015, the Environmental Protection Agency (EPA) issued more stringent National Ambient Air Quality Standards (NAAQS) for ground-level ozone, lowering acceptable levels from 75 parts per billion (ppb) to 70 ppb. Prior to this decision, many Western states expressed their acute concern that a lower standard would border on ambient or "background" levels.[1] For example, New Mexico Governor Susana Martinez warned that the level EPA was contemplating was, "too extreme."[2] In particular, she was "concerned that even some of our most pristine areas, such as our national parks, will not be able to satisfy it. Many areas of New Mexico have background levels of ozone at or near the levels [EPA is] proposing, making it difficult for these cities and counties to come in[to] compliance."[3] Her concerns were echoed by Cara Keslar, Air Quality Monitoring Supervisor, Wyoming Department of Environmental Quality, who said: "Background levels of ozone in rural and remote locations, including many inter-mountain west national parks, can exceed the range of the ozone NAAQS proposed by EPA (65- 70 ppb). In many of these areas, very little of the ozone can be attributed to emissions from nearby sources."[4] Even Colorado's Senator Bennett expressed his concern for the impact that background ozone would have on Colorado's ability to comply with the lower standard.[5]

On December 22, 2015, EPA released a White Paper for stakeholder discussion, detailing issues associated with background ozone and the potential challenges it presents for meeting the new ozone NAAQS. Ostensibly, the purpose of the White Paper is to "establish a common understanding and foundation for additional conversations on background ozone and to inform any further action by the Agency."[6]

Background ozone has become an increasingly important issue, as EPA's ever lower ozone NAAQS push states toward levels that occur naturally or due to events outside of a state's control. For Western cities like Denver, Colorado, this poses the very serious threat that it will never be able to come into attainment.[7] If a region is out of attainment with ozone NAAQS, businesses both large and small are subjected to economic penalties and restrictions on their growth and development.[8] Aware of this implementation challenge, and in response to tough questioning from the panel's Chairman, on Sept. 29, 2015 , Assistant Administrator Janet McCabe testified before the Senate Committee on Environment and Public Works (EPW) that, "the Clean Air Act does not hold States responsible for pollution that is not generated from sources within their borders."

In order to participate in this nationwide dialog over background ozone, the Center for Regulatory Solutions (CRS), a project of the Small Business and Entrepreneurship Council, commissioned a technical review of EPA's White Paper. In these comments, we detail a number of issues related to EPA's characterization of background ozone, the impact it has on Western states, and discuss the adequacy of the regulatory relief mechanisms associated with background ozone. The defects we have uncovered in EPA's White Paper suggest that the agency is not adequately informed about the actual role of background ozone, and as such, they are not prepared to fairly implement the 2015 ozone NAAQS. Our findings are summarized below:

1. **The universe of scientific literature that EPA considered is incomplete and does not include relevant studies that suggest that background ozone is a much bigger problem for Western states.** In the White Paper, EPA asserts that there is no indication that background ozone will prevent any region from meeting the 2015 ozone NAAQS. However, several studies show a much higher impact of background ozone than what EPA models. As such, EPA should recognize a broader range of estimates of background ozone levels, rather than relying solely on its limited model outputs.
2. **The science behind background ozone is still not well understood.** EPA relies heavily on its modeling to inform background ozone levels, but some studies show that there are major deficiencies with the model's ability to accurately predict

---

[1] Martinez, S. (2015, March 3). [Letter written March 3, 2015 to Gina McCarthy]. Retrieved February 22, 2016, from http://documents.nam.org/ERP/NM_MartinezLetter_NAAQS_03 03 15.pdf
[2] *Ibid*.
[3] *Ibid*.
[4] Keslar, C. (2015, April 29). Testimony Before the House Environment Subcommittee of the Science, Space and Technology Committee Hearing on: "Reality Check Part II: The Impact of EPA's Proposed Ozone Standards on Rural America." Retrieved February 22, 2016 from https://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-114-SY18-WState-CKelsar-20150429.pdf
[5] Center for Regulatory Solutions. (2015, August 26). CRS Welcomes Bennet/Gardner Resistance to EPA Ozone Regulation. Retrieved February 22, 2016, from http://centerforregulatorysolutions.org/crs-welcomes-bennetgardner-resistance-to-epa-ozone-regulation/
[6] United States of America, Environmental Protection Agency. (2015, December 22). *Implementation of the 2015 Primary Ozone NAAQS: Issues Associated with Background Ozone White Paper for Discussion*. Retrieved February 22, 2016, from http://www3.epa.gov/ozonepollution/pdfs/whitepaper-bgo3-final.pdf
[7] Proctor, C. (2016, February 19). EPA report: Denver won't meet new, lower ozone limits in next decade - Denver Business Journal. Retrieved February 22, 2016, from http://www.bizjournals.com/denver/blog/earth_to_power/2016/02/epa-report-denver-won-t-meet-new-lower-ozone.html
[8] Center for Regulatory Solutions. (2015, August). *Slamming the Brakes: How Washington's Ozone Plan Will Hurt the Colorado Economy and Make Traffic Worse* (Rep.). Retrieved February 22, 2016, from Center for Regulatory Solutions website: http://centerforregulatorysolutions.org/wp-content/uploads/2015/08/CRS-Colorado-Ozone-Report.pdf

background ozone levels in certain situations. Furthermore, it is clear that the science behind specific aspects of background ozone (such as international transport) is not fully understood yet.

3. **EPA's definition of background ozone is limited and inconsistent**. While EPA acknowledges that some states are adversely affected by certain background ozone-enhancing "uncontrollable" events (i.e., wildfires, stratospheric intrusions, international emissions transport, etc.), it fails to include the impacts of interstate emissions transport within its definition of background ozone, even though several studies show that the impact can be significant. In essence, EPA's definition is relevant to states susceptible to "uncontrollable" international emissions (for example, border states near Canada and Mexico), but not to those that are downwind of another state's emissions.

4. **Background ozone levels vary dramatically by region, disadvantaging Western states.** Using EPA's own data of counties with 2012-2014 nonattainment challenges, we estimate that the margin of attainment (i.e., difference between the 70 ppb ozone NAAQS and background ozone levels) is 25 ppb lower for regions in the inter-mountain west versus those in the east. Therefore, the blanket 70 ppb standard creates inequity issues as regions with higher background ozone have much lower margins within their control.

5. **Geography plays a significant role in state's ability to achieve attainment.** EPA's modeling shows that 175 of the 178 counties not meeting the 70 ppb standard in the eastern U.S. had controllable manmade contributions to ground-level ozone levels greater than 50 percent. Conversely, in some regions in the west, manmade contributions can be as low as 10 percent of the total (i.e., 90 percent of ground-level ozone is made up of background ozone). And while some states might be effectively managing their manmade emissions, the natural geographical disadvantage that is present may push them toward nonattainment. Clearly, this creates inequities across various stakeholders.

6. **Many Western States have expressed their concern to EPA that the agency's regulatory tools are insufficient to provide relief from background ozone.** While there are certain provisions under the Clean Air Act that might help state regulators with background ozone challenges (such as the "exceptional events" rule), the general consensus is that these provisions are overly burdensome, unclear, and extremely resource-intensive. These tools and resources will matter more and more as the ozone NAAQS approach background ozone levels in some states. Yet comments from several state regulators show the inflexibilities and challenges associated with even using these provisions for regulatory relief.

7. **Our case study of the Wyoming Department of Environmental Quality/Air Quality Division's regulatory relief demonstration shows just how resource-intensive the process is.** EPA contends that its available tools and resources will help state regulators overcome challenges associated with background ozone, but using the Wyoming DEQ as a baseline (i.e., one of the only states that have actually received approval), it is evident that the process is extremely costly. The Wyoming DEQ estimates that future exceptional event demonstrations (such as those from wildfires) could take over 15 months to study, in addition to contractor assistance of more than $150,000. With new ozone NAAQS lowering the gap between background ozone and the standard, the need for more and more demonstrations will become much more prevalent.

Ultimately, we are grateful for the opportunity to provide our views on EPA's White Paper. In order to inform possible future regulatory decisions, we agree with EPA that it is important to have a dialogue over the challenges that background ozone poses. However, we find that there are several issues that need to be addressed before EPA should begin implementing the 2015 standard. This report outlines these issues in greater detail.

Importance of Background Ozone

On December 22, 2015, the U.S. Environmental Protection Agency (EPA) released *Implementation of the 2015 Primary Ozone NAAQS: Issues Associated with Background Ozone, White Paper for Discussion ("White Paper")*. EPA states that the White Paper will be used to "establish a common understanding and foundation for additional conversations on background ozone and to inform any further action by the Agency."[9] Along with a two-day workshop, EPA "is seeking input from states, tribes, and interested stakeholders on aspects of background ozone ("O_3") that are relevant to attaining the 2015 O_3 NAAQS in a manner consistent with the provisions of the Clean Air Act (CAA)."[10]

The White Paper is divided into several sections, including: EPA's definition of U.S. background ozone (USB), estimates of current background ozone, forecasted background ozone changes, discussion of conceptual models for attainment planning, available policy

[9] White Paper.
[10] *Ibid.*

tools and issues, and a preliminary list of questions for additional discussion. The White Paper also has an accompanied Appendix, which includes various modeling results and county-specific ozone levels (for those not meeting the new 70 ppb standard).

At first glance, the White Paper appears to provide topical information, makes the case that background ozone does not pose a problem for compliance at 70 ppb, and lists options for states and counties that may experience any extraordinary circumstances that push them out of attainment. Upon closer review, there are several issues with EPA's characterization and analysis of the impacts of USB. In this section, we show the wide range in scientific findings regarding background ozone in particular areas of the U.S., discuss deficiencies and concerns related to EPA's modeling of background ozone, and the importance of correctly defining background ozone.

Various Studies Show That EPA May Be Underestimating USB's Share of Ozone NAAQS in Western States

In this section, we show that USB comprises a large portion of total ozone levels in the Western States and that the occurrence of USB can affect design values (i.e., EPA's measurement of ozone levels). EPA, on the other hand, argues that while background ozone can make up a large proportion of total ozone levels across the U.S., its modeling indicates that manmade emission sources are the main contributor to regions that exceed the ozone NAAQS.[11] In other words, EPA asserts that on the high ozone days that are above ozone NAAQS attainment, USB accounts for a smaller portion of total ozone levels.

In Section 3 of the White Paper, EPA discusses the current "best estimates" of U.S. background ozone levels. EPA summarizes findings from various studies and also presents the results of its own modeling of current USB levels. Using its simulation models, EPA found that "mean USB MDA8 O_3 levels ranged from 25-50 ppb across the U.S."[12] EPA argues that "the highest modeled O_3 site-days… tend to have smaller fractional contributions from USB O_3 and conversely greater contributions from U.S. manmade emissions."[13] Put simply, EPA is suggesting that the days with high O_3 levels that would push a region toward nonattainment have a higher proportion of O_3 from manmade emissions compared with that of background. However, EPA does note that "there are cases in which the model predicts much larger USB proportions… usually occur[ing] in relation to a specific event, and occur[ing] more often in specific geographic locations, such as high elevations (e.g., due to stratospheric intrusions) or areas prone to influences from wildfires."[14] Furthermore, EPA even admits that "the ability of the model to capture influences from discrete events is uncertain."[15]

EPA summarizes its conclusions as it relates to current background ozone levels, but the findings are confusing. For example, EPA states that "USB O_3 can comprise a *considerable fraction* of the total MDA8 O_3 across the U.S., with the largest relative contributions at higher-elevations, rural locations in the inter-mountain western U.S. in the spring and early summer seasons."[16] But EPA goes on to state that "existing modeling analyses indicate that U.S. manmade emission sources are generally the dominant contributor to the modeled exceedances of the 2015 O_3 NAAQS… [and] when averaged over the entire U.S., the models estimate that the mean USB fractional contribution to daily maximum 8-hour average O_3 concentrations above 70 ppb is less than 35 percent."[17] In one sense, EPA admits that background ozone can account for a large portion of total ozone levels in regions across the U.S., but that when ozone levels go beyond the 70 ppb standard, background accounts for a much smaller portion (i.e., 35 percent on average).

This conclusion is not only overly generic (i.e., based on an average over the entire U.S.) and confusing (i.e., considerable fraction versus small portion), but is narrow in relation to estimated USB from other studies. For example, a few recent studies estimate that background ozone can account for between 78-93 percent of the 70 ppb ozone NAAQS in certain western U.S. states (as shown in the table below). This is considerably higher than what EPA's models suggest.

[11] White Paper.
[12] *Ibid.*
[13] *Ibid.*
[14] *Ibid.*
[15] *Ibid.*
[16] *Ibid. Emphasis added.*
[17] *Ibid.*

Table 1: Comparison of Background Ozone Estimates across the Western U.S.

Study	Author	Year of Publication	Study Date Range	Region Studied	Background Ozone Range	% of 70 ppb Standard
Springtime high surface ozone events over the western United States: Quantifying the role of stratospheric intrusions	Lin, M. et al.	2012	April-June 2010	Western U.S.	50-54.5	78%
Climate variability modulates western US ozone air quality in spring via deep stratospheric intrusions	Lin, M. et al.	2015	1991, 2012	Western U.S.	60+	86%
Improved Western US Background Ozone Estimates via Constraining Non-local and Local Source Contributions using Aura TES and OMI Observations	Huang, M., et al.	2015	June-July 2008	CA and NV	35-65	93%

In fact, EPA's own presentation of 2017 modeled ozone levels suggests that background ozone varies across different regions of the U.S. The appendix to the White Paper displays 2017 design values for 229 counties in three different regions in the U.S. (Eastern, California, and inter-mountain west) that do not meet the 70 ppb standard for 2012-14.[18] The table below displays the average modeled 2017 ozone levels attributable to manmade and background sources. It is clear that background ozone makes up anywhere between 36-70 percent of the total modeled ozone levels (1st column).

Table 2: Average EPA 2017 Design Value Ozone Level Proportion by Region[19]

Region	Background Sources	Manmade US Sources
Inter-Mountain West	70%	30%
California	50%	50%
Eastern	36%	64%

Source: Calculated from EPA White Paper. Background is calculated as 100% *less* manmade percentage.

EPA's general observations regarding background ozone are called into question by the wide range found in EPA's own work product and by the studies discussed above. As background ozone levels account for a large proportion of the total ozone levels for certain locations, it is apparent that these locations will have a difficult time meeting the ozone NAAQS especially as the delta between background and total ozone levels shrinks. Thus, while EPA asserts that "there is no indication that USB O_3 concentrations will prevent attainment of the 2015 O_3 NAAQS,"[20] this conclusion is weakened by EPA's reliance on a narrow set of results. Accordingly, EPA should review these additional studies and incorporate their findings into its analysis of the impact of background ozone on total ozone levels.

EPA's Characterization of Background Ozone is Limited

In the White Paper, EPA defines U.S. background ozone as the following:

- "[A]ny O_3 formed from sources or processes *other than* U.S. manmade emissions of nitrogen oxides (NOx), volatile organic compounds (VOC), methane (CH_4), and carbon monoxide (CO)."[21]
- "[D]oes not include intrastate or interstate transport of manmade O_3, which can also influence O_3 concentrations in downwind areas, but which can be addressed by certain provisions of the CAA."[22]

[18] It's important to focus on these counties specifically as they are those that are most highly affected by lower NAAQS.
[19] Note that these figures represent the fractional percentage of background ozone to total ozone ("design value") levels. While design values are not presented for 2017, the average design values for Eastern, California, and the inter -mountain west are 74 ppb, 84 ppb, and 74 ppb, respectively for 2012-2014. Thus, when comparing these levels to the 70 ppb standard, the fractional percentage may be slightly different than what is displayed in this table.
[20] White Paper.
[21] *Ibid*.

This definition of USB ozone is limited because it uses logic that is inconsistent with other EPA definitions of USB ozone. It is also inconsistent with testimony Assistant Administrator Janet McCabe provided to the Senate Environment and Public Works Committee. In response to a question from Chairman Inhofe, McCabe testified, "Senator, you are correct, the Clean Air Act does not hold States responsible for pollution that is not generated from sources within their borders.[23]

Moreover, in a separate 2015 report entitled *Tools for Addressing Background Ozone*, EPA states that "the law does not require states to reduce emissions from background sources that are not in their control."[24] Under this logic, inclusion of international emissions as background sources not in states' control makes sense. But the same rationale should apply to the interstate transport of manmade O_3 because a state has no control over an upwind state's manmade emissions. In fact, correctly identifying all sources of background ozone is an important piece in determining if EPA's characterization of current background ozone levels is accurate.

EPA's own analysis supports this point as EPA admits that "multiple analyses have shown that even the most remote O_3 monitoring locations in the U.S. are at least periodically affected by U.S. manmade emissions."[25] EPA points to recent data analyses of rural O_3 observations in Nevada and Utah, stating that "it was demonstrated that natural sources, international O_3 transport, O_3 transported from upwind states, and O_3 transported from urban areas within the state all contributed to monitored O_3 levels at rural sites in these two states."[26] Moreover, the State of Utah report cited by EPA concludes that "high ozone concentrations in rural Utah were potentially influenced by regional transport of ozone, springtime emissions of biogenic volatile organic compounds, stratospheric ozone intrusion and wildfire smoke."[27]

The conclusions from the studies that O_3 is traveling from across state borders also mirror the conclusions of other studies that EPA did not reference in the White Paper. For example, Huang et al. found that "trans-boundary and interstate transport of pollution can occur."[28] More specifically, the study found that "transport of SoCal anthropogenic pollution contributed similar magnitudes of O_3 in the mountain states as the Asian emission sources."[29] Similarly, Zhang et al. found that "the inter-mountain west is relatively remote and much of anthropogenic influence on ozone is expected to involve long-range transport."[30] This study finds that "California anthropogenic emissions increase surface ozone concentrations in downwind areas of Nevada, Utah and Arizona by 2-8 ppbv in spring and 5-15 ppbv in summer," or between 3-21 percent of the 70 ppb ozone NAAQS. In a case study of long-range transport from the Los Angeles Basin, Langford et al. concluded that ozone from the region may have been transported approximately 1,000 km to eastern Utah and western Colorado.[31] So while California has an extension for meeting the ozone NAAQS due to certain "extreme" nonattainment areas,[32] states that are downwind of its pollution are required to meet the standard under a completely different timeline. In essence, these states are being held accountable for some air pollution that is not only out of their control, but not even within their jurisdiction.

With several studies suggesting the impact of inter-regional emissions transport on local ozone levels, it is unclear why EPA has chosen to exclude interstate transport from its definition of background ozone. These analyses, along with those referenced by EPA, show that rural and remote monitoring sites have little control over local ozone levels due to outside influence, yet under EPA's definition of background ozone, these sites would be required to meet the ozone NAAQS, absent a difficult to obtain exemption. And while international emissions are included in EPA's definition of background ozone, evidence suggests that the impact of long-range transport from *within the U.S.* can create a measurable impact on observed ozone levels as well. Thus, we believe that EPA's definition of background ozone is too limited in scope and should be expanded to include interstate transport.

---

[22] *Ibid.*
[23] McCabe, J. (2015, September 29). Testimony Before the Senate Committee on Environment and Public Works Hearing on: "Economy-wide Implications of the President's Air Agenda" Retrieved February 22, 2016 from http://www.epw.senate.gov/public/_cache/files/e48cd463-0fbf-4d64-a296-a8b82e77c2a8/spw-092915-a.pdf
[24] *Ibid.*
[25] White Paper.
[26] *Ibid.*
[27] Arens, S., & Harper, K. (2013, January). *2012 Utah Ozone Study* (Rep. No. DAQK-15-13). Retrieved February 22, 2016, from Department of Environmental Quality, Division of Air Quality, State of Utah website: http://www.deq.utah.gov/Pollutants/O/ozone/docs/2013/05May/2012_Utah_Ozone_Study.pdf
[28] Huang, M., Bowman, K. W., Carmichael, G. R., Pierce, R. B., Worden, H. M., Luo, M., . . . Brown, S. S. (2013). Impact of Southern California anthropogenic emissions on ozone pollution in the mountain states: Model analysis and observational evidence from space. *Journal of Geophysical Research: Atmospheres J. Geophys. Res. Atmos., 118*(22), 12,784-12,803. Retrieved February 22, 2016, from http://onlinelibrary.wiley.com/doi/10.1002/2013JD020205/abstract
[29] *Ibid.*
[30] Zhang, L., Jacob, D. J., Yue, X., Downey, N. V., Wood, D. A., & Blewitt, D. (2014). Sources contributing to background surface ozone in the US Intermountain West. *Atmospheric Chemistry and Physics Atmos. Chem. Phys., 14*(11), 5295-5309. Retrieved February 22, 2016, from http://www.atmos-chem-phys.net/14/5295/2014/acp-14-5295-2014.html
[31] Langford, A. O., Senff, C. J., Alvarez, R. J., Banta, R. M., & Hardesty, R. M. (2010). Long-range transport of ozone from the Los Angeles Basin: A case study. *Geophys. Res. Lett. Geophysical Research Letters, 37*(6). Retrieved February 22, 2016, from http://onlinelibrary.wiley.com/doi/10.1029/2010GL042507/full
[32] McCabe, J. (2015, October 1). *Implementing the 2015 Ozone National Ambient Air Quality Standards* [Memorandum]. Washington, DC: Environmental Protection Agency. Retrieved February 22, 2016 from http://www3.epa.gov/ozonepollution/pdfs/20151001memo.pdf

Background Ozone Uncertainties and Modeling Deficiencies

In this section, we showcase a few of the uncertainties and deficiencies related to how EPA models background ozone. We point to a number of studies that discuss the pitfalls of the model EPA uses to determine current background ozone levels, which in turn calls into question the accuracy of EPA's results.

The White Paper repeatedly references modeling uncertainties and unknown variables. For example, EPA notes, "model estimates of USB are limited by the biases, errors, and uncertainties inherently associated with modeling simulations."[33] Additionally, when presenting the results, EPA further reiterates that "as with any other modeling exercise, these simulations have uncertainties and potential biases/errors."[34] Furthermore, EPA states that it is "working with states and other researchers to develop improved models," in addition to "work[ing] with states on monitoring and modeling studies to further improve [their] estimates of USB contributions on high O_3 days."[35] EPA even concedes that "as a part of the USB definition, one should note that determining which emissions are manmade, or from the U.S., can be difficult."[36] By EPA's own admission, it is very clear that the agency is concerned with the validity of its own modeling. However, EPA does not give any indication of what the model deficiencies may be, what the level of uncertainty is, or what kind of impact this could have on reaching attainment.

In order to calculate USB levels, EPA relies on photochemical grid models to estimate the contribution of background sources to observed surface ozone levels. Specifically, EPA estimated USB concentrations "using a combination of the GEOS-Chem global model and the Community Multi-scale Air Quality (CMAQ) (zero out) and CAMx (source apportionment) regional models."[37] EPA argues that the "general consistency between the two approaches increased confidence in the model findings."[38] However, researchers have noted specific deficiencies with these models, especially when it comes to predicting the contribution of stratospheric intrusion events which can elevate background ozone levels. EPA does not acknowledge this criticism in their White Paper.

For example, Lin et al. noted that "historically, the U.S. EPA has relied heavily on the GEOS-Chem global CTM for estimating background O_3 for policy assessments, however, studies have shown that GEOS-Chem underestimates the contribution from deep STT [(stratosphere-to-troposphere transport)] events to lower tropospheric O_3 and is unable to capture observed O_3 above 70 ppbv at remote mountain sites in spring."[39] Similarly, Zoogman et al. notes that "GEOS-Chem can reproduce ozone concentrations in the inter-mountain West up to 70 ppbv with relatively little error, but cannot reproduce exceptional events of higher concentrations."[40]

In addition to these exceptional events, there is also uncertainty regarding the level of background ozone contributions from international sources. EPA states that it is "working with the international research community… to improve [their] understanding of the intercontinental transport of air pollutants and the ability of the global and regional models to estimate the influence of extra-regional sources of pollutants on air quality in the U.S."[41] Others, including Fiore et al., recommended that as the ozone NAAQS are lowered in future years, "consideration of the large enhancement from anthropogenic emissions outside North America will become an essential element in the development of an emission control strategy."[42] This is especially important as emissions in East and South Asia "are expected to continue to increase."[43] Yet despite the clear issues with their model of choice, EPA has chosen to ignore these critiques and instead base its rule off of science that it does not currently fully understand.

In fact, with noted deficiencies in EPA's modeling and uncertainties regarding its ability to capture the impact of specific background-enhancing events, relying solely on their results might inaccurately characterize background ozone levels in various regions around the U.S.

---

[33] *Ibid*.
[34] *Ibid*.
[35] *Ibid*.
[36] *Ibid*.
[37] White Paper.
[38] *Ibid*.
[39] Lin, M., Fiore, A. M., Cooper, O. R., Horowitz, L. W., Langford, A. O., Levy, H., . . . Senff, C. J. (2012). Springtime high surface ozone events over the western United States: Quantifying the role of stratospheric intrusions. *Journal of Geophysical Research: Atmospheres J. Geophys. Res., 117*(D21). Retrieved February 22, 2016, from http://onlinelibrary.wiley.com/doi/10.1029/2012JD018151/abstract
[40] Zoogman, P., Jacob, D. J., Chance, K., Liu, X., Lin, M., Fiore, A., & Travis, K. (2014). Monitoring high-ozone events in the US Intermountain West using TEMPO geostationary satellite observations. *Atmospheric Chemistry and Physics Atmos. Chem. Phys., 14*(12), 6261-6271. Retrieved February 22, 2016, from http://www.atmos-chem-phys.net/14/6261/2014/acp-14-6261-2014.pdf
[41] White Paper.
[42] Fiore, A. M. (2002). Background ozone over the United States in summer: Origin, trend, and contribution to pollution episodes. *J. Geophys. Res. Journal of Geophysical Research, 107*(D15), ACH 11-1-ACH 11-25. Retrieved February 22, 2016, from http://onlinelibrary.wiley.com/doi/10.1029/2001JD000982/abstract
[43] White Paper.

'One Size Fits All' Approach Creates Inequities

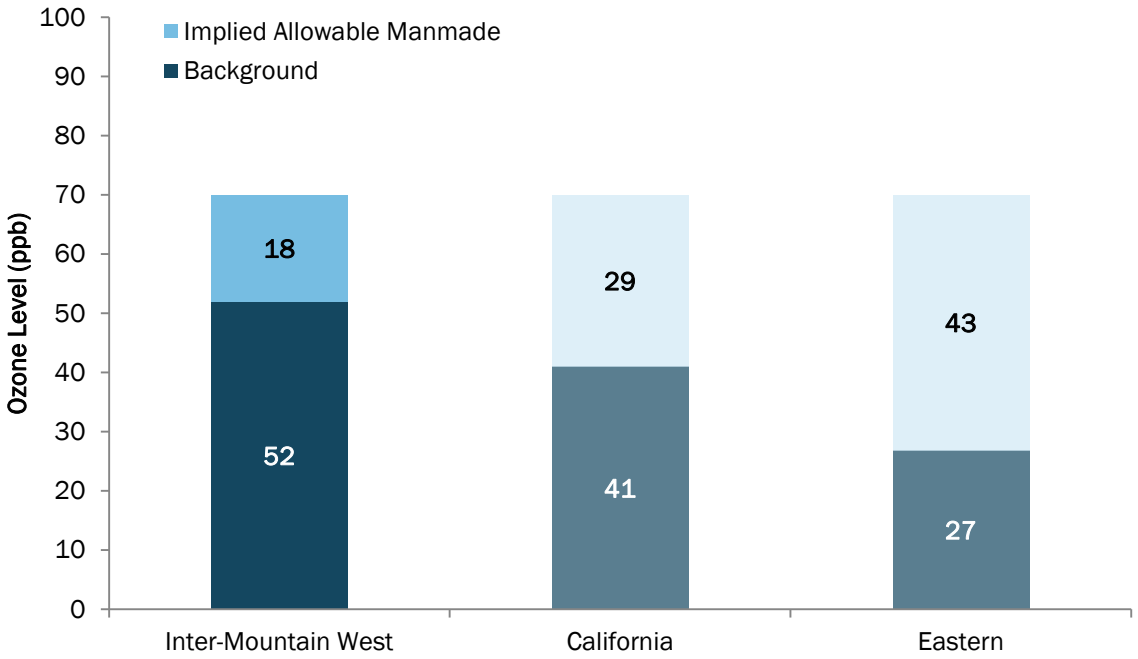
EPA's blanket 70 ppb ozone NAAQS naturally create inequities due to the variability of background ozone by region. As shown in the first column of Table 2 above, EPA's own model shows that the level of background ozone can range between 36-70 percent of the 2017 modeled ozone levels, on average. With such a wide range, the exact same efforts to curb manmade emissions in a location with low background ozone versus a location with high background ozone could result in one location meeting the ozone NAAQS and the other not. This is especially important to industries located in the inter-mountain west, which will bear much of the burden of the new lower standards. EPA's White Paper fails to acknowledge this, despite the major economic implications associated with a 'nonattainment' designation. Creating equity across all stakeholders should certainly be a key aspect of the federal government's policy. In this section, we discuss the inequity issues in greater detail.

Margin of Attainment is Naturally Lower Based on Background Ozone Levels

As the ozone NAAQS are pushed lower, the margin of attainment (or, the delta between the 70 ppb standard and background ozone levels) continues to shrink. For regions with particularly high background ozone levels, this can create several challenges. While EPA suggests that it offers regulatory relief under the CAA for regions that exceed the standard due to elevated background ozone levels, other mechanisms should also be in place to account for the fact that some regions have naturally higher background ozone and thus, a much lower margin of attainment. Furthermore, a lower margin of attainment puts some states and regions that actively work to reduce the effect of manmade emissions at a clear disadvantage compared with other areas in the U.S.

As discussed above and evidenced by the various studies cited and EPA itself, background ozone levels can be highly variable and significantly different at locations across the U.S. It is well established and agreed upon that the variability in background ozone is generally based on geographical location (i.e., inter-mountain west, California, parts of Texas, etc.). However, with known, elevated levels of background ozone, requiring the same attainment level creates issues for locations that have the misfortune of being located in one of these geographical regions. While certain counties may be significantly reducing their manmade emissions, background levels due to geographical local may be pushing them above attainment levels. In figure 1 below, we show an estimation of background ozone levels, along with the implied manmade emissions allowable up to the 70 ppb standard. As the chart shows, the Inter-Mountain West is at a significant disadvantage with the implied allowable manmade emissions equal to less than half of that of the Eastern region. In other words, due to the high background ozone levels in the inter-mountain west, we estimate that only 18 ppb of ozone from manmade sources will be allowable under the ozone NAAQS versus 43 ppb in the East.

Figure 1: Background vs. Implied Allowable Manmade Ozone Levels up to 70 ppb Standard[44]



Of course, the chart above is based on the notion that EPA's estimation of background ozone is 100 percent accurate. If, for example, there is any margin of error above their estimates, this could shrink the gap between attainment and background ozone levels even further. A recent NASA study suggests this is likely the case by finding that "wildfires and ozone transported to the region [(Northern California and Nevada)] from abroad can cause background ozone to exceed 60 ppb" and that a tighter standard "leave[s] little room for local ozone production under proposed stricter U.S. ground-level ozone standards."[45]

From a policy perspective, while there is the desire to curb ozone levels for human health reasons, creating equity among stakeholders should also be an important factor. EPA needs to balance the two, but in the case of a universal 70 ppb standard, and without any adjustment for locations with naturally higher background, clear inequities exist.

Geographical Challenges to Meeting Lower Ozone NAAQS

In this section, we discuss some of the challenges associated with background ozone due to the geography of certain regions. We note some contradictions and inequities EPA puts forth within its own data and analysis to support the idea of increased flexibility in meeting attainment for regions that are prone to elevated ozone levels from a purely geographical standpoint.

While EPA's White Paper concludes that its modeling "indicated that the vast majority of counties throughout the eastern U.S. with 2014 design values above 70 ppb would be below 70 ppb by 2025," it is noted that "areas in southern Central Valley and other historically high O_3 areas in Southern California have persistent high O_3 (i.e., > 70 ppb) despite expected improvements."[46] Furthermore, EPA states that the "modeling predicts levels above 70 ppb in the Denver area."[47] Or, in other words, despite attempts to reduce manmade emissions, the Denver area will still fall under nonattainment under EPA's modeling scenarios. Presumably, this is related to elevated levels of background ozone in the region.

In fact, this concept is even suggested by EPA when evaluating the preliminary conceptual model of O_3 attainment planning over the U.S. in section five of the White Paper. Of the 178 counties in the eastern U.S. with design values not meeting the 70 ppb standard,

[44] The figures here are calculated using the data in the Appendix to the White Paper. For illustrative purposes, the calculation assumes 2017 design values are equal to 2012-14 design values. We apply the percentages in column 1 of Table 2 above to calculate the estimated background levels. Subtracting this amount from 70 ppb results in the implied manmade emissions values shown in the chart.
[45] NASA Jet Propulsion Laboratory. (2015, September 29). NASA: Background Ozone a Major Issue in U.S. West. Retrieved February 22, 2016, from http://www.jpl.nasa.gov/news/news.php?feature=4723.
[46] White Paper.
[47] *Ibid.*

"only three counties had an estimated U.S. manmade contribution of less than 50 percent."[48] In other words, for the 175 other counties that would fall under nonattainment, the majority of the ozone levels are due to manmade emissions, which could be reasonably controlled.

In contrast, for California counties with 2012-2014 design values exceeding the 2015 ozone NAAQS, EPA states that because the contribution of U.S. manmade emissions range "from a low of 31 percent (Imperial County) to a high of 63 percent (Orange County)," the model of attainment will need to assess "the impact of event-driven USB sources like fires and stratospheric intrusions."[49] Additionally, EPA states that "the USB impacts of international emissions may also need to be assessed in California locations close to the Mexican border (e.g., Imperial County, and to a lesser degree San Diego County)."[50]

Similarly, EPA states that "the effects of USB O_3 are most notable at a relatively small number of sites in the inter-mountain western U.S."[51] Across the counties that fall under 2012-2014 nonattainment, "there is a wide range of the extent to which USB influences O_3 design values."[52] In some rural areas in the region, the model calculates that "only a 10 percent contribution from U.S. manmade sources"[53] affect the overall projected 2017 O_3 design values.[54] Thus, EPA concludes that "it will be important to assess and account for the contributions from USB sources to O_3 nonattainment in this region."[55] In essence, EPA notes that background ozone levels can account for as high as 90 percent of the total measured ozone in regions exceeding the ozone NAAQS. Of course, including the impact of interstate transport as background (which EPA does not currently include) could push these levels even higher, leaving little to no room for actually meeting the ozone NAAQS.

Given the notable differences in USB across regions in the U.S., it appears that not having any flexibility to account for the regional variability in USB would create significant inequities. Some regions are geographically at a natural disadvantage (for example, high elevation sites). And while the effort to cut manmade emissions might be substantial, it may not be enough to curb the effects of higher background ozone within the region. From this perspective, it would be inequitable to hold all regions to the same standard. Instead, EPA should allow for greater flexibility for gaining attainment designation in locations with particularly high background ozone.

EPA Resources and Tools Offer Little Flexibility

In this section, we evaluate in greater detail the tools and flexibilities EPA has to provide relief to states when background ozone pushes them out of attainment. We also present a case study in order to explore the challenges already experienced by state regulators.

The White Paper points out that the states have several relief provisions under the Clean Air Act for addressing nonattainment issues and background ozone, including: exceptional events exclusions (stratospheric intrusions, wildfires, or other events that are unlikely to recur and cannot be controllable or preventable), international transport (outside U.S. pollution poses significant impediment to meeting the standard), small nonattainment area boundaries (e.g., high elevation sites with no local emissions sources), and rural transport areas (no significant contribution of emission sources and does not include or is adjacent to a Metropolitan Statistical Area).[56]

While EPA states that the "Clean Air Act and EPA policies provide tools for air agencies to address exceedances of an ozone standard potentially caused by background ozone,"[57] it also notes that "some states and other stakeholders have expressed concern about the fairness and practicality of applying the CAA's regulatory relief mechanisms in locations where it can be argued that nearby manmade emissions are not largely responsible for elevated O_3 levels."[58] However, EPA argues that the "tool(s) available for each affected location will depend on the specific nature of background O_3 in each area," and that the "states would need to work cooperatively with EPA to develop supporting documentation and to take whatever public process steps are legally necessary to use the relief provisions [of the CAA]."[59]

---

[48] *Ibid*.
[49] *Ibid*.
[50] *Ibid*.
[51] *Ibid*.
[52] *Ibid*.
[53] *Ibid*.
[54] Note that this uses EPA's definition of background ozone. If, for example, the definition were expanded to include interstate transport, this value would be even less.
[55] White Paper.
[56] *Ibid*.
[57] United States Environmental Protection Agency. (2015, October 1). *Tools for Addressing Background Ozone* [Fact Sheet]. Retrieved February 22, 2016 from http://www3.epa.gov/ozonepollution/pdfs/20151001toolsfs.pdf
[58] White Paper, citation removed.
[59] *Ibid*.

State Regulators Are Concerned that Tools for Regulatory Relief Are Limited and Inadequate

In this section, we discuss views expressed by state regulators as it pertains to the regulatory relief mechanisms that EPA discusses in its White Paper. From survey results to comments directly to EPA, it is clear there are several concerns regarding the limitations and inflexibilities of the tools and resources available, especially for states that must rely on these tools and resources the most, as they are prone to elevated background ozone levels. EPA argues that its tools and resources provide valuable relief for areas with high levels of background ozone, but we identify a few of the key comments, issues, and sentiments felt by many stakeholders to suggest that this may not be the case.

The Association of Air Pollution Control Agencies (AAPCA) sought feedback from its membership on the tools and provisions available under the CAA in June 2015.[60] Since then, EPA has been in the process of updating the exceptional events rule and considering a set of revised rules and draft wildfire guidance documents.[61] However, despite EPA's attempt to update its tools and provisions based on concerns from states and other stakeholders, the comments from a February 2016 letter from the AAPCA to EPA further reiterates the concerns expressed in its earlier work.[62] This subsection provides more detail about what the state regulators are saying, and shows how the concerns over longstanding ozone NAAQS tools and provisions still exist today.

The survey conducted by AAPCA in June 2015 and the follow-up letter in February 2016 found that there are some significant limitations and numerous concerns with EPA's set of available tools and resources for addressing the challenges presented by background ozone. Despite the many issues and competing ideas about background ozone described earlier in these comments, EPA is relying solely on this limited set of tools to help regulators address background ozone in areas with very real nonattainment challenges. However, it is clear that many state regulators are struggling to see the real value in the tools presented, and are skeptical of how effective they actually are. A few of these concerns are noted below:

- a lack of familiarity with the tools as they relate to ozone;
- the burdensome and resource-intensive nature of the application/approval process;
- the low likelihood of EPA approval of applications under the tools; and
- outdated rules or guidance for state deployment of the tool.[63]

Furthermore, in relation to EPA's exceptional events exclusions process, some regulators argued that the "EPA should establish clear protocols for reviewing all of the exceptional events documentation," and that EPA should "provide additional clarification and guidance for submittal of exceptional event documentation."[64] The Nevada commission commented that "the analysis and demonstration for a single stratospheric intrusion exceptional events package would require resources beyond what is currently available."[65] Similarly, Texas regulators said that "the states face uncertainty regarding what is required for an acceptable exceptional events demonstration."[66] Finally, the Virginia DEQ argues that the demonstration "places an undue burden on the states by requiring a very stringent 'but for' demonstration, which goes well beyond the requirements in the Clean Air Act."[67] Of course, these are just a few of the comments related to EPA's ability to account for background ozone.

Moreover, in February 2016, AAPCA members submitted individual agency comments on EPA's Proposed 2015 Exceptional Events Rule Revisions and Draft Wildfire/Ozone Guidance. Similar to the pain points felt in prior years, some of the main concerns included the following:

- regulatory determinations are "insufficiently flexible and unnecessarily limit the utility of the Exceptional Events Rule …"[68]
- the timing of new, upcoming guidance,[69] and "the fact that it is not in the rule revisions may limit its applicability for other exceptional events,"[70] and

---

[60] Association of Air Pollution Control Agencies. (2015, June). *State Environmental Agency Perspectives on Background Ozone & Regulatory Relief* (Rep.). Retrieved February 22, 2016, from Association of Air Pollution Control Agencies website: http://www.csg.org/aapca_site/documents/AAPCASurvey-StateEnvironmentalAgencyPerspectivesonBackgroundOzoneandRegulatoryRelief-June201.pdf
[61] National Ambient Air Quality Standards for Ozone, 80 § 206 pgs. 65292-65468 (2015). (This final rule is still promulgated as proposed)
[62] Woods, C. J. (n.d.). Comments on Treatment of Data Influenced by Exceptional Events and draft Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone [Letter written February 3, 2016 to U.S. Environmental Protection Agency]. In EPA-HQ-OAR-2013-0572-0148. Retrieved February 22, 2016, from http://www.regulations.gov/?Daily#!documentDetail;D=EPA-HQ-OAR-2013-0572-0148
[63] AAPCA Results of a Survey.
[64] *Ibid.*
[65] *Ibid.*
[66] *Ibid.*
[67] *Ibid.*
[68] Woods, C. J.

- EPA's approach/methodology to submit a demonstration package for Wildfire Events "may inappropriately limit an agency's ability to demonstrate causality… may force air agencies into conducting more complex and resource-consuming exceptional events demonstrations than would otherwise be necessary."[71]

Additionally, other organizations such as Western States Air Resource (WESTAR) Council and the Wyoming DEQ – Air Quality Division (AQD) expressed their concerns for EPA's tools. WESTAR stated that "if EPA believes a state's SIP [(State Implementation Plan)] is deficient, it is EPA's responsibility to clearly identify the deficiency and the measures they believe are necessary to provide for attainment and maintenance of the relevant air quality standards."[72] In other words, WESTAR argues that the states should not be required to develop a State Implementation Plan to address uncontrollable sources of ozone, but rather EPA should be responsible for not only identifying these sources, but also providing the measures necessary to reach attainment. WESTAR also noted that "the data gathering and analysis requirements present an extreme resource drain," and the required modeling in EPA's proposed guidance "is a resource-demanding, costly, and time-consuming task."[73] Ultimately, the concern is that not only is EPA insufficiently providing guidance on identifying uncontrollable background ozone events, but they are placing an extremely costly burden on the states to prove it instead.

Similarly, the Wyoming DEQ argued that "demonstration is overly burdensome, confusing, and unnecessary." They go on to note that "EPA has only approved two such demonstrations between 2010 and 2015, a very small sample size for any kind of meaningful analysis."[74] Thus, while EPA believes it is providing the states with the tools necessary to account for the effects of elevated background ozone levels, the overall consensus of the state regulators is that EPA's efforts are not adequate.

In general, the state regulators have expressed that the process and option to even use EPA's tools (as they relate to confronting background ozone challenges) are extremely difficult. In fact, EPA even appears to agree with this thought, stating that:

- exceptional events are unique and varied;
- it is challenging for EPA to provide guidance that is both specific and generally applicable; and
- it is difficult for EPA to pre-determine how much evidence / technical analysis for demonstrations is sufficient.[75]

However, we believe that under the law, EPA should try to put all stakeholders on equal grounds. For example, if background ozone levels in Colorado are 10 ppb higher in a given year because of a series of wildfires that, under EPA's tools, Colorado should be able to remove these events from its calculation of the ozone NAAQS. But, based on the survey results and comments presented above, state regulators do not find that the tools really offer the relief they need.

Case Study: Wyoming

To give a sense of the process related to identifying and proving exceptional events and higher background ozone levels, we focus on the State of Wyoming Department of Environmental Quality/Air Quality Division's demonstration package for EPA as an example. In June 2012, Wyoming experienced a prolonged period of stratospheric intrusions which resulted in an 8-hour ozone standard exceedance at the Boulder and Big Piney ozone monitors in the Upper Green River Basin.[76] To address the impact of these intrusions, the state DEQ performed "statistical analyses… on the Boulder and Big Piney data" and through a "thorough evaluation of the June 14, 2012 episode," was able to confidently determine the events led to elevated ozone levels.[77] To prove this, the DEQ had to present supporting evidence that the event passed four tests, namely:

1. the event satisfies the criteria set forth in 40 CFR 50.1(j)[78];

---

[69] Note that "guidance" refers to EPA's Draft Guidance for Excluding Some Ambient Pollutant Concentration Data from Certain Calculations and Analyses for Purposes Other Than Retrospective Determinations of Attainment of the NAAQS.
[70] Woods, C. J.
[71] *Ibid.*
[72] Bird, B. (n.d.). Comments on the EPA Proposed Rule: Treatment of Data Influenced by Exceptional Events [Letter written January 29, 2016 to U.S. Environmental Protection Agency]. In EPA-HQ-OAR-2015-0229-0083. Retrieved February 22, 2016, from http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2015-0229-0083
[73] *Ibid.*
[74] Vehr, N. E. (n.d.). The State of Wyoming, Department of Environmental Quality- Air Quality Division Comments on the Draft Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations [Letter written February 3, 2016 to U.S. Environmental Protection Agency]. In EPA-HQ-OAR-2015-0229-0087. Retrieved February 22, 2016, from http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2015-0229-0087
[75] Treatment of Data Influenced by Exceptional Events, 80 § 224 pgs. 72840-72897 (2015).
[76] State of Wyoming Department of Environmental Quality/Air Quality Division. (2015, May). *Exceptional Event Demonstration Package for the Environmental Protection Agency: Big Piney and Boulder, Wyoming Ozone Standard Exceedances June 14, 2012* (Rep.). Retrieved February 22, 2016, from State of Wyoming Department of Environmental Quality/Air Quality Division website: http://www.epa.gov/sites/production/files/2015-05/documents/june_14_2012_bigpiney_boulder_si_package.pdf
[77] *Ibid.*
[78] This rule requires that an exceptional event affects air quality, is not reasonably controllable or preventable, and is a natural event.

2. there is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected the air quality in the area;
3. the event is associated with a measured concentration in excess of normal historical fluctuations, including background; and
4. there would have been no exceedance or violation but for the event.

In addition to the detailed statistical analysis tests performed by the DEQ (i.e., histograms, t-test, and box-and-whisker plots), an in-depth overview of supporting meteorological data was also presented. This presentation included a review of the weather patterns, GOES (Geostationary Operational Environmental Satellite) total column ozone data, AIRS satellite measurements of carbon monoxide, isentropic potential vorticity, relative humidity, and potential temperature vertical cross-sections, back trajectory analysis, stratospheric intrusion composite charts of IPV (isentropic potential vorticity), RH (relative humidity), and daily maximum 8-hour data, vertical mixing (as shown by lapse rates), upper air RAOBs (radiosonde observations), and surface-based air quality data.[79]

Ultimately, EPA agreed with the Wyoming DEQ and classified this event as "exceptional." However, obtaining this exemption was extremely expensive for a state with limited resources. In fact, the state DEQ has estimated that each demonstration "took between four and eight months to produce" and that future exceptional event demonstrations (such as for wildfires) "would require 15 months and contractor assistance of $150,000 to produce."[80] Furthermore, the DEQ notes that the effort required to produce one of these demonstrations used "internal staff with meteorological expertise, as well as assistance from EPA's stratospheric ozone intrusion workgroup, a group of state regulators, Federal regulators, and academics focused on researching and diagnosing stratospheric ozone intrusions."[81] Finally, the DEQ argues that "securing funding and additional staff resources for new NAAQS implementation is always a challenge, but this process will be even more difficult for low-population, rural states facing additional workloads under a more stringent ozone NAAQS."[82] In other words, as the ozone NAAQS are pushed lower and lower, the already resource-constrained state regulators will have an even more difficult time using EPA's tools to achieve attainment status for regions with high background ozone levels.

This sentiment was strongly expressed in the written testimony of Cara Keslar, the air quality monitoring supervisor for the Wyoming DEQ, before the House Environment Subcommittee of the Science, Space and Technology Committee hearing in April 2015.[83] Specifically, some of the key points Ms. Keslar addresses as it relates to EPA's tools and resources for regulatory relief include the following:

- the demonstrations that EPA has concurred with are lengthy and complicated. With the frequency of these events, there will be an *overwhelming amount of resources* needed from both state agencies and EPA in order to use the Exceptional Event Rule as a viable method of relief.
- Wyoming DEQ has spent approximately $9.5 million dollars over the last ten years performing research to lower ozone concentrations in the Upper Green River Basin. Yet even with all of this work, if EPA's tools do not sufficiently address the background ozone issues, the region still may have to perform additional research to obtain attainment status.
- the DEQ has submitted five different demonstrations of exceptional events (each one taking between 4-8 months to produce), but only <u>one</u> received concurrence from EPA. The other four demonstrations to date have not been acted on by EPA.
- a lower ozone standard would put an undue burden on Wyoming and other high-elevation rural states to address high ozone concentrations that are beyond the states' abilities to control.
- EPA must research and develop tools to determine the relative contribution of the elements of background ozone, streamline the efforts for states to document these contributions, and allow states to focus resources on pollution that can be controlled.

The Wyoming DEQ's historical experience with EPA's regulatory relief tools provides an example of what other states utilizing EPA's exemptions can expect. Clearly, not only is the process labor-intensive, costly, and burdensome, but it does not give state regulators the flexibility needed to account for ozone levels that are not in their control. Interestingly, several other states[84] who had a very similar experience to the Wyoming DEQ have submitted demonstrations that were either not accepted or have not received any judgement

[79] Wyoming Ozone Standard Exceedances.
[80] AAPCA Results of a Survey.
[81] *Ibid.*
[82] *Ibid.*
[83] Keslar, C. *Emphasis added*.
[84] For example, California ARB Demonstration and Kansas DHE Demonstrations.

from EPA.[85] So while EPA's White Paper discusses mitigation of the impact of background ozone through the provisions of the CAA, it fails to take into account the actual experience of the states that have attempted to use these provisions in the past.

Conclusion

Ultimately, it appears EPA's White Paper attempts to minimize the problem that background ozone poses for many states trying to achieve compliance with the new lower ozone standard. Moreover, the agency suggests that the relief mechanisms in the statute are sufficient to address the rare instances where background ozone pushes a state out of compliance. To the contrary, our review reveals that neither assertion is accurate or substantiated by the facts. What is clear, however, is that EPA is trying to regulate something for which the science is still not fully understood.

Through our review, we have identified several key areas of concern, focusing on regions with naturally high background ozone levels. Significantly, EPA's White Paper takes a restrictive view on data considered to formulate its conclusions, generating an overly optimistic scenario, and potentially underestimating the extent to which background ozone frustrates states' ability to comply with the new lower standard. In the first instance, EPA's own modeling of background ozone shows a wide range in the proportion of background ozone to total ozone levels ranging from 36-70 percent when accounting for U.S. manmade emission sources. However, other recent studies show that background ozone can be as high as 65 ppb in some parts of the western U.S. (or up to 93 percent of the 70 ppb standard). Additionally, EPA appears to contradict itself in that it concedes the fact that there are background ozone challenges in high-elevation sites, but then argues that on average, background only makes up about 35 percent of the total. With a wide range of results available from studies not used by EPA, we believe EPA should recognize the uncertainty in its modeling results and give greater weight to other studies' findings.

Moreover, EPA should quantify and account for deficiencies in their modeling and uncertainties related to where the ozone originates. As EPA notes in its White Paper, there are several uncertainties and potential biases within its own modeling. Some studies have also found that the model used by EPA (GEOS-Chem) has several deficiencies related to underestimating the contribution of certain events (i.e., stratospheric intrusions, international transport, etc.) to background ozone. In addition to the flaws in EPA's data, their definition of background ozone is contradictory and too limited for the purposes of their White Paper. In order to be consistent with Janet McCabe's pledge, the definition of background ozone should include interstate emissions as a source.

The way the statute is currently implemented, certain states, depending on purely geographic factors, are discriminated against and will be mired in nonattainment purgatory for the foreseeable future. With a blanket 70 ppb standard, the margin of attainment (i.e., the difference between the 70 ppb standard and background ozone levels) creates serious inequities across the U.S. While some regions, like Denver, Colorado, have made huge strides to reduce manmade emissions, they might never meet attainment levels because of elevated background ozone.

While EPA suggests it currently has the tools to alleviate this hardship, state regulators argue that the tools to provide such relief are limited and inflexible. The sentiment among states is that the process is unclear, overly burdensome, and extremely difficult. Furthermore, the state regulators voice the concern that as the ozone NAAQS are pushed lower, the need for proving exceptional events will increase as the margin between background ozone and attainment shrinks. The case study offered by Wyoming DEQ is a perfect example of how the process to identify and prove a single exceptional event does not come at a low cost. In fact, the Wyoming DEQ estimates that each event could take over 15 months to study and cost over $150,000 in outside contractor costs. Rather than spend resources on programs that go toward actually improving air quality, state regulators are instead required to use funds to prove that background ozone is the main cause of nonattainment.

In sum, EPA has not fully addressed other estimates of background ozone, it has ignored available evidence that runs counter to its narrative, and the regulatory relief remedies cited are inadequate for the task.

[85] See for example, WESTAR's WESTAR State Exceptional Events tracking table (available at: http://www.westar.org/exceptionalevents.html).