COMMENTS BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY REGARDING THE NOTICE OF AVAILABILITY OF THE ENVIRONMENTAL PROTECTION AGENCY'S PRELIMINARY INTERSTATE OZONE TRANSPORT MODELING DATA FOR THE 2015 OZONE NATIONAL AMBIENT AIR QUALITY STANDARD

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I. Summary

On January 6, 2017, the United States (U.S.) Environmental Protection Agency (EPA) published in the *Federal Register* a Notice of Availability of preliminary interstate ozone transport modeling data for the ozone National Ambient Air Quality Standard (NAAQS) that was promulgated on October 1, 2015. This information is used to develop state implementation plans (SIP).

The Texas Commission on Environmental Quality (TCEQ) provides the following comments on the proposed rule.

II. Comments

A. General Comments

A.1. The EPA should not include the Clean Power Plan (CPP) in the updated electric generating unit (EGU) projections.

On February 9, 2016, the U.S. Supreme Court issued a stay on the CPP, thereby suspending the effect of the regulation while the issue is being decided by the courts. The EPA should not include the CPP in its updated EGU projections due to the uncertainty surrounding the rule. While the 2023 future base case year for this modeling is early in the CPP compliance schedule, including the CPP in the Integrated Planning Model (IPM) projections is likely to lead to incorrect IPM projections regarding future operations of EGUs if the CPP rule is ultimately overturned.

A.2. The EPA does not provide a rationale for using the attainment deadline for moderate nonattainment areas as the projected analysis year.

The EPA states that the year 2023 was used as the analytic year for the preliminary modeling because that year aligns with the expected attainment year for moderate ozone nonattainment areas under the 2015 ozone NAAQS. However, the EPA does not provide any rationale for why the expected moderate attainment year is appropriate to use as the projected analysis year. The EPA should explain the rationale for using the moderate attainment year in modeling interstate transport contributions for the 2015 ozone NAAQS as well as for future NAAQS to which this approach may be applied.

B. Emissions Inventory

B.1 The TCEQ has updated nonpoint source oil and gas emissions estimates for drilling rig engines based on a study completed in 2015 and will provide this data to the EPA. The EPA should revise its 2017 and 2023 future-year inventories to incorporate these updates.

The TCEQ appreciates the EPA updating its nonpoint source oil and gas inventory in response to previous TCEQ comments. Since that time, the TCEQ has further improved its drilling rig emissions inventory based upon updated data from horizontal well drilling rigs. From 2011 through 2015, Texas drilling activity increased by approximately 32%. However, despite the increase in activity, the TCEQ updates to this source category emissions inventory result in a 10% *decrease* in nitrogen oxides (NO_x) emissions estimates from 2011 through 2015. In contrast, EPA's Texas drilling rig emissions inventory indicates a 32% increase in NO_x emissions from 2011 through 2017, which reflects increased drilling rig activity but not the characteristics of the Texas drilling rig fleet.

The changes in Texas drilling rig emissions can primarily be attributed to two factors: the rise in horizontal well drilling, and the diesel engines that are used for horizontal well drilling are both newer and have higher horsepower than traditional well drilling rig engines. The TCEQ updated both its drilling rig engine fleet profile and emissions factors based upon this study, and the EPA should update Texas' future-year drilling rig emissions and emissions factors with the TCEQ emissions factors.

B.2 In general for Texas EGUs, the EPA should use TCEQ-reported emissions rates for the 2011 base-year emissions inventory, and ensure future-year EGU emissions are reasonable based upon individual EGU characteristics and representative historic emissions data. Otherwise, the EPA risks over-predicting criteria pollutant formation by modeling unrealistically high emissions data.

The TCEQ encourages the EPA to adjust the EGU base-case and future-year emissions inventories as follows:

1. Calaveras Plant, J.K. Spruce Unit 1: Reviewing the 2011 base-year emissions inventory, the EPA appears to have replaced TCEQ-reported sulfur dioxide (SO_2) emissions inventory data for a specific EGU with Part 75 data-substituted values. Specifically, the 2011 SO_2 emissions rate for J.K. Spruce Unit 1 has been replaced by worst-case 2011 emissions data due to a calibration issue with the continuous emissions monitoring system (CEMS). While the TCEQ agrees this approach is appropriate in the context of Title IV regulations and compliance, it is not necessarily the most appropriate representation when modeling actual emissions data, due to the risk of over-predicting criteria pollutant formation from unrealistically high emissions data. Instead, the TCEQ-reported point source emissions inventory values should be used as these values are more representative of actual emissions that occurred during the CEMS malfunction.
2. Calaveras Plant, J.K. Spruce Unit 2: 2017 and 2023 future-year SO_2 emissions appear unrealistically high based upon previous years' emissions data and unit characteristics. The EPA-predicted 2017 and 2023 SO_2 emissions represent a 420% and 500% increase, respectively, from 2011 values, which appears improbable given the unit has flue gas desulfurization controls installed and

burns low-sulfur Western coal. The unit commenced operation in 2010, and SO_2 emissions have never exceeded 250 tons per year, even when the unit was operating 80-90% of the year. The EPA should adjust its future year emissions for this unit accordingly.

3. Harrington Station Power Plant, Unit 061B: 2017 and 2023 future-year SO_2 emissions appear unrealistically high based upon previous years' emissions data and unit characteristics. The EPA-predicted 2017 and 2023 SO_2 emissions represent a 110% and 50% increase, respectively, from 2011 values, which appears improbable given the unit burns low-sulfur Western coal. Since 2005, the unit's SO_2 emissions have never exceeded 7,400 tons per year, even though the unit has operated 6,500 or more hours each year during that time period. The EPA should adjust its future-year emissions for this unit accordingly.
4. Bosque County Power Plant, Unit GT-1: 2017 and 2023 future-year NO_X emissions appear unrealistically high based upon previous years' emissions data and unit characteristics. The EPA-predicted 2017 and 2023 NO_X emissions represent a 1,163% and 632% increase, respectively, from 2011 values, which appears improbable given the unit installed selective catalytic reduction control technology in 2011. The future-year emissions appear to reflect pre-controlled emissions when the unit was operating at low load during commissioning and are not representative of current unit characteristics and operation. The EPA should adjust its future-year emissions for this unit accordingly.

C. Modeling

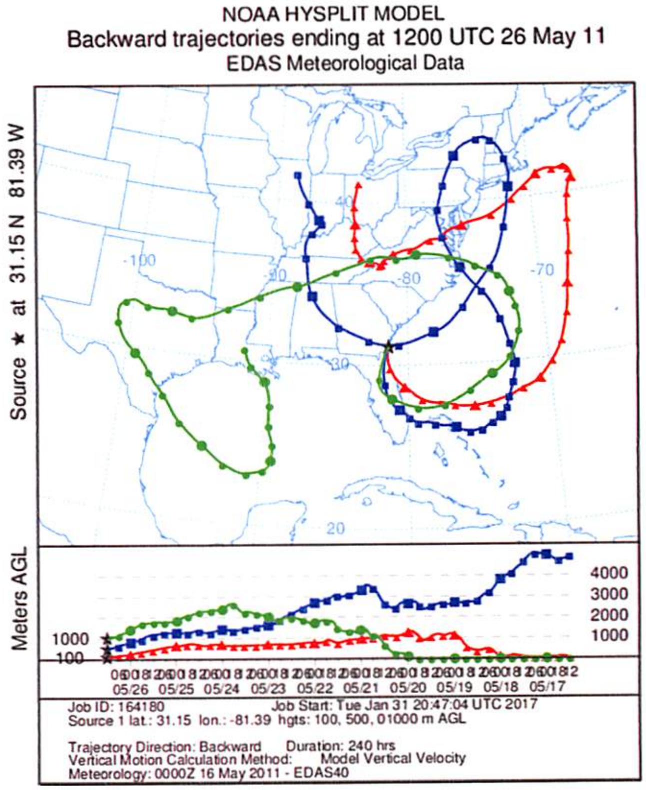
C.1. The TCEQ continues to support flexibility in the approach used by states when addressing interstate ozone transport.

The TCEQ appreciates the EPA's effort to provide information relevant to development of Good Neighbor SIPs in a timely manner. Earlier modeling for interstate transport was not timely and was very prescriptive, leaving little or no room for states to address the issues themselves. For this Notice of Data Availability (NODA), it appears that states can adopt the framework proffered in whole or in part to craft individualized approaches based on their own modeling. The TCEQ agrees with methods that support cooperative federalism as embodied in the Federal Clean Air Act and encourages the EPA to continue to support flexibility going forward.

C.2. The EPA should not apply boundary conditions developed for 2011 for modeling a 2023 future year.

One serious flaw with the EPA model projections for 2023 is the use of 2011 boundary conditions in the future-case modeling. It is not reasonable to expect precursor concentrations to remain constant along the domain boundaries for 12 years given technological, demographic, and regulatory changes worldwide. In instances where the 2011 boundary conditions are higher than what should be used in 2023, the model will over-predict the future design values and may erroneously classify monitors as "nonattainment" or "maintenance."

Figure 1. Back trajectories illustrating recirculation of air parcels out of (and returning into) the modeling domain



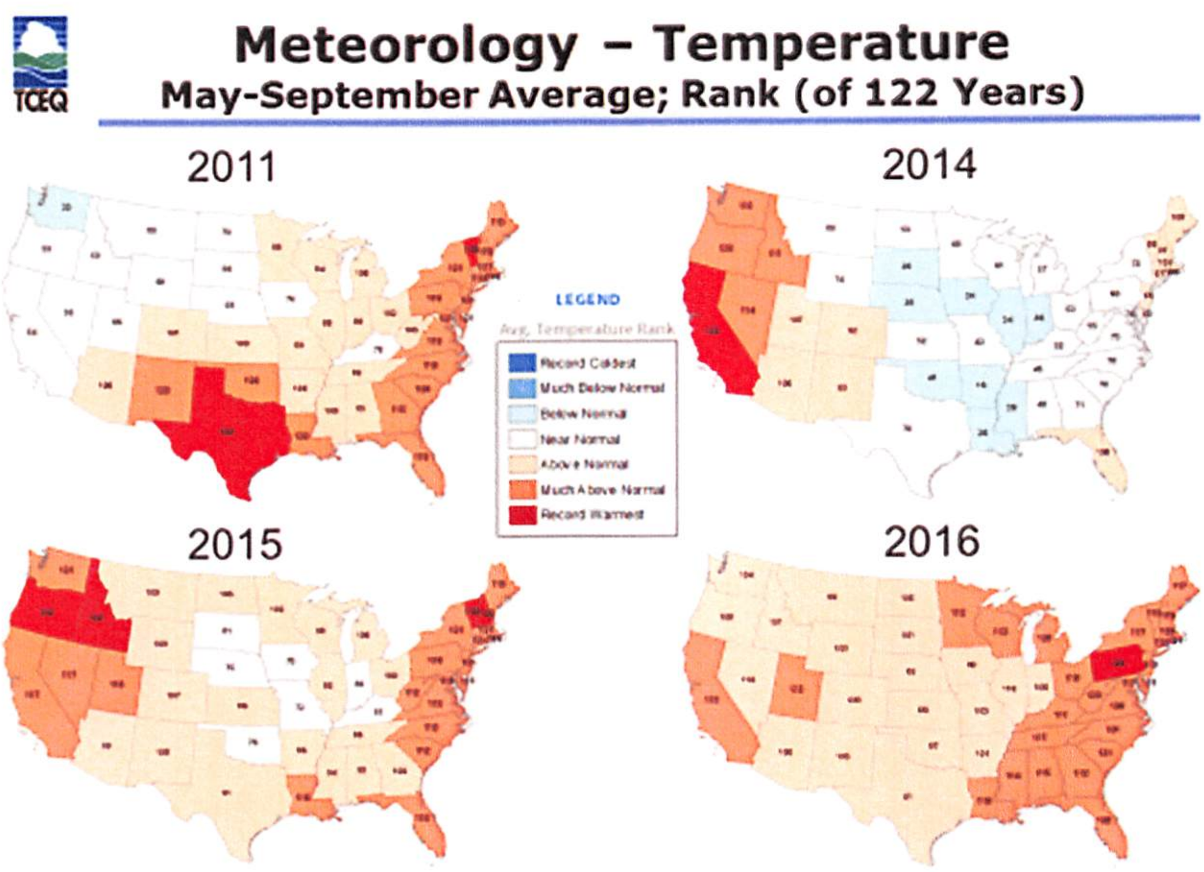
One example of this type of situation is shown in Figure 1. In cases where air parcels generated in the U.S. are advected out of the modeling domain then recirculated back in, the returning parcels will still reflect the 2011 precursor loads and not those expected in 2023. The back trajectories depicted in Figure 1 show air parcels generated in the U.S. being transported outside the eastern boundary of the continental U.S. (CONUS) domain then returned, ending up at St. Simon's Island, Georgia at 7:00 AM on May 26, 2011. Although cases such as this may be relatively rare, they illustrate the need for boundary conditions congruent with the future year being modeled.

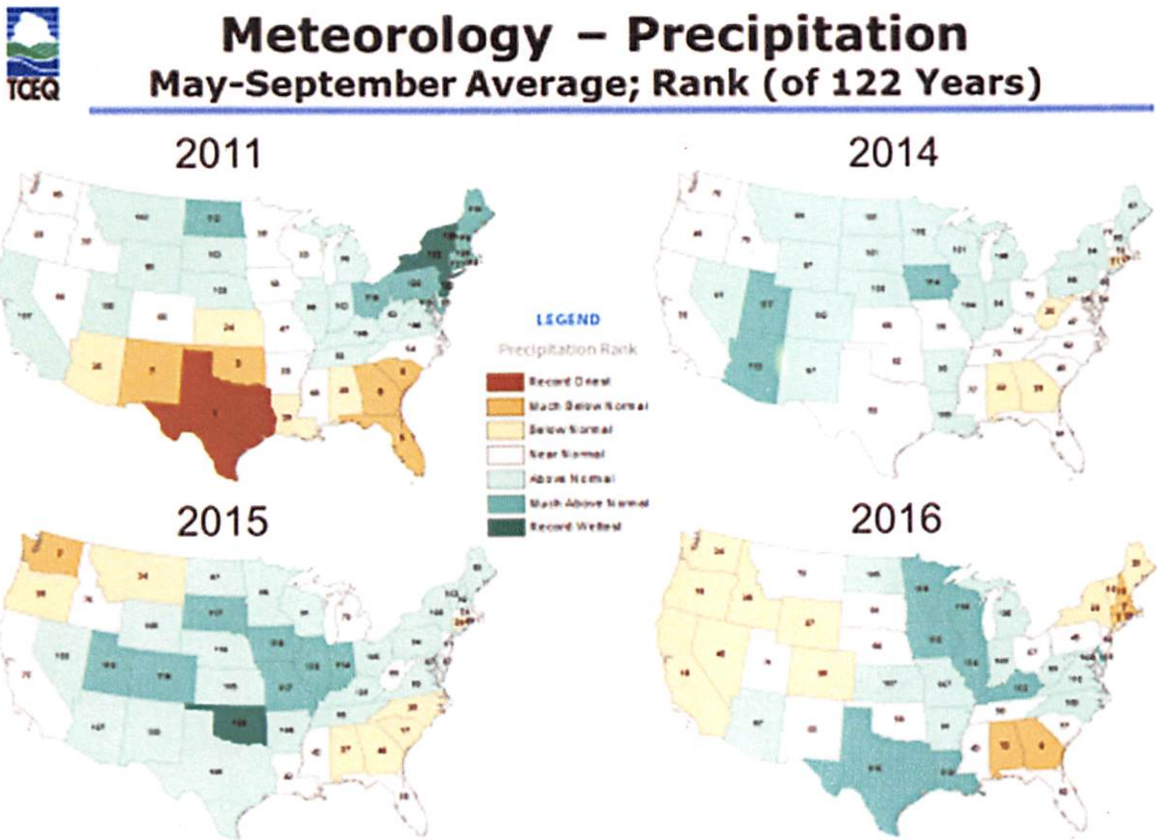
C.3. 2011 is not representative of historical ozone formation for Texas and surrounding states because of the atypical meteorology (e.g., extreme temperatures) and related events (e.g., wildfires and exceptional drought).

The EPA originally developed the 2011 platform for its "Good Neighbor" modeling in order to address the ozone transport requirements for the 2008 ozone NAAQS. While this platform is available to states, the TCEQ has not adopted this platform for Texas because 2011 was the single-worst drought year recorded in Texas since at least 1895. Figure 2 illustrates that Texas (along with Oklahoma, New Mexico, and Louisiana) experienced the hottest summer in the 117-year span 1895 through 2011, while the entire Southeast, southern portions of the Midwest, and Arizona were exceptionally hot. While any single year will show local meteorological anomalies, for Texas 2011 is unacceptable for use in regulatory applications because any conclusions resulting from modeling this extremely atypical year would not likely apply for more normal years. Based on more recent data (2014-2016), it is clear that 2011 is indeed anomalous and does not represent a new normal meteorological pattern or current (or future year) conditions.

Because 2011 represents such an exceptional drought year, there is high likelihood that any emissions reduction strategies based on that year will not be appropriate for more normal meteorological years. In fact, it is impossible to find a single "representative" year for the entire country; therefore, the EPA should model multiple years to create a robust platform that all states (as well as the EPA) can utilize for regulatory purposes.

Figure 2: May through September Average Temperature and Precipitation Ranks (https://gis.ncdc.noaa.gov/maps/ncei/cag)





C.4. 2011 may is not conducive to good model performance in Texas, and relatively poor model performance increases uncertainty surrounding estimates of contribution.

On Page 7 of the Modeling Technical Support Document, the EPA claims that "[a]s described in Appendix A, the predictions from the 2011 modeling platform correspond closely to observed concentrations in terms of the magnitude, temporal fluctuations, and geographic differences for 8-hour daily maximum ozone. Thus, the model performance results demonstrate the scientific credibility of our 2011 modeling platform. These results provide confidence in the ability of the modeling platform to provide a reasonable projection of expected future year ozone concentrations and contributions." While this statement may be valid for some areas, it is certainly not true for Texas. The median MDA8 ozone Normalized Mean Bias for Texas (over 78 monitors) is –9.0%, substantially larger (in magnitude) than the national average of –2.5% and is well outside the interquartile range for this statistic (-0.8% to +7.55%) reported by Simon *et al.*[1], perhaps reflecting issues related to the extreme weather conditions seen in 2011. The relatively poor performance of the EPA's modeling increases the uncertainty associated with the EPA's estimated contribution by Texas to downwind monitors.

[1] Simon, H., Baker, K. R., Phillips, S, (2012), Compilation and interpretation of photochemical model performance statistics published between 2006 and 2012, Atmos. Environ., 61, 124-139.

C.5. The EPA should optimize meteorological parameters used for subsequent photochemical modeling.

In section 2.2 of the EPA Air Quality Modeling Technical Support Document for the 2015 Ozone NAAQS Preliminary Interstate Transport Assessment, the meteorological data are described. The Weather Research and Forecasting (WRF) modeling used to provide meteorological fields is now somewhat dated. The WRF modeling was conducted for a 2011 base year and used WRF version 3.4. Subsequent upgrades have made improvements in the Morrison microphysics scheme and Kain-Fritsch cumulus parameterization that are part of the EPA WRF configuration. More importantly, to correctly assess long-range transport, the EPA should increase vertical resolution for the WRF and Comprehensive Air Quality Model with Extensions (CAMx) models. Increased vertical resolution will better capture wind shear aloft.

Concurrent with upgrading to a more current version of WRF and increasing vertical resolution, the EPA should consider a modeling sensitivity using an alternate choice of planetary boundary layer (PBL) scheme. The asymmetric convective model 2 (ACM2) PBL preferred by the EPA may be prone to over-mixing through the PBL, and this may enhance pollutant transport by lofting local emissions into transport layers. In addition, the PBL routine also contributes to the triggering of cumulus parameterizations. The 2011 modeling showed precipitation biases over the eastern U.S., which might suppress those regional emissions. Given this uncertainty, sensitivity testing with an alternate PBL option, in addition to upgraded Kain-Fritcsh in more recent WRF versions, will allow a better understanding of cloud and precipitation variability that will affect long-range pollutant transport.

C.6. The EPA has not demonstrated the appropriateness of a 1% threshold to identify significant contribution to nonattainment and interference with maintenance.

The EPA has used the 1% of the relevant ozone NAAQS threshold as rigid definition of "significant contribution to nonattainment and interference with maintenance." This simplistic criteria to identify nonattainment and maintenance monitors is incomplete because it does not take into account the complexities of ozone chemistry, nor does it account for different attainment and maintenance challenges experienced by different areas. By requiring states to use the same narrow criteria, the EPA is denying them the opportunity to better characterize potential impacts to downwind monitors. States could reasonably consider relative contribution from local sources, sensitivity of downwind monitors to upwind state emissions, and impact of foreign emissions when determining whether they significantly contribute to nonattainment or interfere with maintenance at downwind monitors. This is especially true for the more stringent 0.7 ppb threshold (1% of the 2015 70 ppb NAAQS), which is an order of magnitude smaller than the biases and error documented for this modeling. In addition, the EPA has not demonstrated that the contribution of 0.7 ppb to modeled MDA8 ozone concentrations is appropriate for linking an upwind state to downwind nonattainment and maintenance monitors. The TCEQ encourages the EPA to allow states the flexibility in choice of modeling and monitoring methods when assessing contributions to nonattainment and interference with maintenance for downwind states.

C.7. The EPA should appropriately differentiate action necessary for nonattainment and maintenance sites.

While the NODA uses somewhat distinct criteria for labeling sites as "nonattainment" or "maintenance," in past regulatory applications the EPA has treated these distinct types of areas, and the states linked to them, identically. In reality, maintenance sites are different from nonattainment sites, and states may find that it is not appropriate to address linkages to these two groups in an identical fashion. Under the "Good Neighbor" clause of the 1990 Federal Clean Air Act amendments, states are required to take appropriate measures to mitigate interference with maintenance in downwind states, but there is no reason to assume, as the EPA has in the past, that these measures are identical to those required to address nonattainment areas.

C.8. The EPA should account for air quality trends when identifying maintenance areas.

While the design value of a monitor is well-defined as the average fourth-high observed maximum daily eight-hour (MDA8) ozone concentration, there is no such definition for monitored "maintenance," thus the EPA's criteria for designating "maintenance" monitors is somewhat arbitrary. The intent of using the maximum predicted design value in a three-year window is to account in some degree for meteorological variability[2], but the EPA's proposed approach fails to account for emission reductions that have occurred over the five-year span (2009-2013) that comprises the three design values, and thus unfairly penalizes states linked to areas that showed significant air quality improvements in the latter part of this five-year period. A more rational approach would be to use the 2013 design value (2011-2013; the final regulatory design value within the five-year span) rather than the maximum to identify maintenance monitors. Using the latest design value in this context accounts for real progress in air quality and is also consistent with granting one-year extensions to nonattainment areas that have no exceedances of the ozone NAAQS in the most recent year.

Furthermore, the EPA should use monitoring data to finalize the status of monitors modeled as "maintenance," similar to what is done for "nonattainment" monitors. If a monitor is modeled as "maintenance" in 2023 but has a 2016 monitored design value of 70 ppb or higher, it might be justifiable to label it as "maintenance." However, a monitor with a 2016 monitored design value below 70 ppb should <u>not</u> be considered "maintenance" regardless of its 2023 modeled concentration. In short, if the latest monitored data indicate a site is attaining the standard, there should be no upwind state obligations related to it.

C.9. The EPA should use a consistent approach for assessing future attainment status and for calculating state contributions to future design values.

The EPA has used contributions from the days that had a modeled eight-hour daily maximum concentration greater than the 2008 Ozone NAAQS (≥71 parts per billion (ppb) to determine a state's contribution to a monitor's future design value. Because

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[2] Page 97 of draft modeling guidance: https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

the number of days that have modeled eight-hour daily maximum concentrations greater than 71 ppb might not be the same as the top 10 days that went into the relative response factor (RRF) calculations, this approach is inconsistent with how the future-year design values are calculated. Using one set of days to calculate the future-year design value that is the basis for a monitor's future attainment status (attainment/maintenance/nonattainment) and a different set to determine the states' contribution to that design value is inconsistent and seemingly arbitrary. The EPA should use a consistent basis for both assessing future attainment status and for calculating state contributions or provide a rational justification for doing otherwise.

C.10. The EPA should finalize the applicable modeling guidance.

The EPA provided "Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" in December 2014. The TCEQ carefully reviewed that document and provided detailed comments, and undoubtedly many other groups did so as well. However, the EPA has not formally responded (either positively or negatively) to these comments, and has still not provided final guidance. This inaction by the EPA leaves states in the difficult position of choosing whether to follow the 2007 "final" or the new "draft" guidance without knowing what the EPA (specifically, the applicable regional office) expects. The NODA refers to the draft guidance so perhaps the EPA intends for states to follow it, but if this is the case, the EPA should finalize the document. Indeed, the TCEQ urges the EPA to finalize the applicable modeling guidance prior to issuing regulatory actions that cite that guidance.

C.11. The EPA should evaluate model performance for ozone and ozone precursors to ensure that the model is getting the "right answer for the right reason."

The EPA appears to have focused only on ozone metrics for its model performance evaluation (MPE). This is contradictory to the EPA's guidance to states regarding MPE. The December 2014 draft modeling guidance document "Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" states "[a]n operational evaluation for ozone should include collocated measurements of ozone precursors NO_x, carbon monoxide and volatile organic compounds, and ideally, vertical profile measurements that can be used to determine the extent of vertical mixing of pollutants and the concentration of ozone and precursors above the boundary layer." The EPA should be consistent with its application of the guidance and follow the same processes to which it expects states to adhere.

C. 12. Upwind states should not be required to compensate for international emissions.

Increasingly strict ozone standards will make attainment of these standards extremely difficult, if not impossible for practical purposes, in areas heavily influenced by foreign emissions and/or natural events such as stratospheric intrusion (the TCEQ has commented separately on the 2015 ozone standard itself[3]). Of the 10 monitors east of the Rockies identified as "nonattainment" in 2023 in the NODA, only two would retain that distinction if emissions from the categories "Canada & Mexico" and "Offshore"

[3] https://www.tceq.texas.gov/assets/public/agency/nc/air/TCEQ-Comments-on-EPA-HQ-OAR-2008-0699-NAAQS.pdf

were excluded, and of the 22 monitors classified as either "nonattainment" or "maintenance" only eight would continue to be tagged. Because the modeling domain only includes small fractions of Canada and Mexico, it is very likely that no monitor east of the Rockies would be classified as "nonattainment" or "maintenance" were it not for "emissions emanating from outside of the United States." A rational interpretation of Section 818 of the Federal Clean Air Act (42 U.S. Code, §7509a), therefore, is that while some monitors still may not attain the 2015 ozone standard by 2023, upwind states should not be held responsible for making extraordinary emission reductions to compensate for international emissions.