My Detailed Comments on Updated Cross State Air Pollution Rule

This document is an extended and more detailed description of the comments I submitted to the Environmental Protection Agency (EPA) on their latest proposed revision to the Cross State Air Pollution Rule. I have only posted once since Thanksgiving because I was called out of retirement to help the Environmental Energy Alliance of New York (EEANY) develop their comments on this rule-making but despite all the time I spent on them I was unable to include everything I thought was important. So, I submitted my own comments. This version seemed to complicated to be the primary post so I am including it as a reference.

I am a mostly retired air quality meteorologist who was involved in continuous emissions monitoring system compliance reporting at the start of the Acid Rain Program, regulatory analysis of all the subsequent cap and trade programs affecting New York, and several regional ozone modeling efforts. I was asked to help develop the EEANY comments on this rule because I was the primary author for the last iteration of their comments. I submitted the comments to expand on some of their arguments and to address additional issues not in their purview. The opinions expressed in this post and in my comments do not reflect the position of EEANY, any other of my previous employers or any other company I have been associated with, they represent my personal opinion.

Background

Ozone is today's most intractable air quality problem in the United States. Despite years of effort and a 35% decrease since 1980, many areas of the country still exceed the ozone national ambient air quality standard. It is formed in a photo-chemical reaction from nitrogen oxides (NOx,) created in any combustion process, and volatile organic compounds, basically anything with an odor. As a result, there are many sources, both man-made and natural, that must be considered on a regional scale, which complicates the transport and dispersion of the pollution, in order to develop a control program to limit ozone. Because the pollution crosses state lines this has become a controversy between states. In the eastern US, the conditions conducive to ozone formation (Hazy, hot and humid heat waves) also drive-up energy demand and increase emissions from the electric generating sector.

In order to address this problem EPA has promulgated a series of rules covering NOx emissions from the electric generating sector and certain other industrial sources over the years that limit emissions in the eastern US Ozone Season, defined as May 1 through September 30. EPA finalized the Cross State Air Pollution Rule (CSAPR) in 2011. The rule requires upwind states to reduce their emissions to improve air quality in downwind states. It became effective on January 1, 2015. In September 2016, the rule was revised because the ozone air quality standard was changed. On September 13, 2019 the US Court of Appeals for the DC Circuit remanded the CSAPR Update to the EPA to address the court's holding that the rule unlawfully allows significant contribution to continue beyond downwind attainment deadlines. This latest update is EPA's response to the court mandate.

According to EPA the rule works as follows:

> EPA sets a pollution limit (emission budget) for each of the states covered by CSAPR. Authorizations to emit pollution, known as allowances, are allocated to affected sources based on these state emissions budgets. The rule provides flexibility to affected sources, allowing

sources in each state to determine their own compliance path. This includes adding or operating control technologies, upgrading or improving controls, switching fuels, and using allowances. Sources can buy and sell allowances and bank (save) allowances for future use as long as each source holds enough allowances to account for its emissions by the end of the compliance period.

In the proposed rule, like any other emissions trading program, each affected source is required to submit one allowance for each ton emitted during the trading season. In CSAPR EPA allocated allowances equal to the cap to each state who then allocated them amongst the affected sources. In New York the allowances are allocated based on the proportion of recent average NOx emissions. The trading season is from May 1 to September 30 and the applicable allowances are surrendered on March 1 of the following year. The allowance bank is the sum of all the allowances held by any entity in the program. Note that the CSAPR update rule modified the allowance allocations and adjusted the bank to address the Court's decision that the previous iteration did not adequately address interstate pollution.

There is another complicating aspect of the rule related to interstate pollution. In order to limit a state's contributions to downwind exceedances the proposed program includes assurance levels that act as a cap on a state's NOx emissions during the Ozone Season. The assurance level equals the allowance allocation plus the variability limit that accounts for the year-to-year differences due to weather, electric demand and disruptions. If a state exceeds their assurance level then sources that exceed their assurance levels within that state will be assessed a 3-to-1 allowance surrender for each ton emitted above the assurance level.

My concern and that of the EEANY member companies is that the proposed New York emission budget is so limited and New York sources have such limited opportunities for further reductions that the sources will be forced to rely on the market for the allowances needed to operate throughout the ozone season. However, there are aspects of the proposed rule that are unprecedented and, especially since the program is not finalized but will start on May 1, 2021, that mean that the market may not be as liquid as EPA assumes. In the following I will explain these issues from a New York-centric position.

New York NOx Emissions

NYS Electric Generating Units (EGUs) have made significant reductions in NOx emissions as shown in the New York State Ozone Season NOx and Operating Parameters Trends table. That table uses emission and operating parameter data from all units reporting to the Environmental Protection Agency's Clean Air Markets Division for the 1999 through 2020 Ozone Seasons that illustrates the New York NOx emissions trend. Comparison of the reductions by control program beginning with the Ozone Transport Commission (OTC) program show that the NOx Budget Program (NBP) reduced average NOx Ozone Season emissions 25%, the Clean Air Interstate Rule (CAIR) reduced NOx emissions a further 54%, the first iteration of CSAPR (CSNOXOS) another 58% and the second phase of CSAPR (CSOSG2) an additional 37% for a total reduction of 91%. In addition to these control programs New York State modified its Reasonably Available Control Technology regulations that contributed to the observed reductions and with recent regulations implementation will further reduce emissions.

There are two implications to the current observed NOx emissions rates in New York. Firstly, because emissions are so low the pollution control costs for any further reductions will be very high. Secondly, there may not be many more reductions possible no the matter the cost. While there was a comment made that EPA should not tie the control-stringency levels it evaluates to the costs of particular emission-control technologies as a practical consideration that makes no sense. Clearly, it is not in the best interest of society to access reliable and affordable electricity. If the only consideration was air pollution then no combustion sources of any type would be allowed. Instead, EPA has to balance the benefits against the costs and, in my opinion, did so in a transparent and rational way. In this instance, it would be unreasonable to expect any further reductions from New York sources.

EEANY Comments

The CSAPR update rule is a cap-and-trade air or emissions trading pollution control program. The first phase in any such program is to establish the emissions cap. In this rule EPA used a three-step methodology:

1. Determine a future baseline that represents the current emissions levels with adjustments for retirements and new sources,
2. Factor in additional mitigation controls that adjust the baseline to account for reductions available at a specified cost threshold, and
3. Account for shifts in generation caused by the baseline adjustments and additional controls.

EEANY did not argue with the methodology only the resulting numbers for New York.

New York's biggest problem with EPA's methodology is that EPA does not account for the retirement of nuclear generation. When the last unit at the Indian Point nuclear generating station retires before the 2021 ozone season that means that 12% of the state's generation will have to be replaced compared to the baseline that EPA used. In the short term that means replacing zero-NOx emitting generation with generation that does emit NOx. The EEANY comments explain that nuclear retirements in the 12-state trading system mean that the baseline should be adjusted. EEANY shows that the authors of the rule did not understand the implications of the metric used to determine whether further controls are possible at their chosen cost threshold so that means EPA over-estimates potential NOx reductions. EEANY proposed specific recommendations and suggestions for baseline and control technology changes and suggested incorporating a safety valve to offer a compliance pathway in the face of the uncertainties.

My Comments

EEANY discussed potential issues with the emissions trading market. I included a description of several broad aspects of cap-and-trade programs to expand on the arguments for improving the chances of market success. Despite the success of all previous EPA cap and trade programs there are aspects of the proposed action that are unprecedented and could conceivably threaten the viability of this trading program. My comments illustrated the potential impact of the proposed allocations on New York by way of examples.

In the first example I analyzed what New York's allowance market would like using 2020 ozone season emissions as shown in the New York Expected Margin in 2021 with 2020 Emissions table. Last summer Indian Point Unit 2 had retired so the emissions necessary to replace that generation is incorporated. I

adjusted the 2020 emissions for the retirement of Unit 3 by assuming that the NOx emissions from the generation needed to replace the 3.68 million MWh of energy from Indian Point 3 is proportional to the ratio between the observed NOx emissions (3,563 tons) and gross load (26,745,631 MWh). That adds 512 tons of NOx to the baseline. The preliminary 2020 Ozone Season data available from EPA Clean Air Markets Division air markets program data website is 3,563 tons and would be projected to be 4,075 tons when the replacement power emissions are added.

The next step in the projection is to determine how many allowances are available. EPA proposes a New York emissions budget of 3,137 tons. The variability limit is 659 tons. Recall that is supposed to account for year-to-year differences due to weather, electric demand and disruptions and that if state-wide emissions are greater than the sum of the budget and variability limit, or assurance level, that EPA imposes penalties. The 5% set-aside for New Sources affects this projection in two ways. Firstly, 157 tons are taken from the budget and not available to existing sources. Secondly, in this example, the 94 tons emitted by the new sources in New York during 2020 are covered by this set-aside. The allowances at the beginning of the ozone season equal the emissions budget plus the allowance bank or variability limit less the 157-ton new source set-aside. As a result, there will be 3,639 allowances available at the start of the Ozone Season on May 1, 2021.

This example compares 2020 adjusted emissions to the allowances available. EPA acknowledges that affected sources set aside a contingency to account for monitoring problems and for sources that have to purchase allowances for compliance. I believe a minimum of 2.5% or 102 tons of the 4,075 emissions expected is appropriate for this contingency. The correct emissions to compare relative to the 3,659 allowances available is the 2020 adjusted emissions plus the contingency buffer minus the 2020 new source emissions or 4,083 tons. Note that the difference between the total set-aside and the emissions (63 tons) flows back into New York's available allowance pool but not until after reconciliation so that means that the allowances available for New York sources are effectively reduced by 63 tons in this example.

The allowance margin represents the difference between emissions and allowances. The difference between the available allowances and effective emissions is -444. The negative number means that New York State will have to obtain allowances from the market to meet its compliance obligations and monitoring contingency. Importantly, because the emissions in this example are 279 tons greater than the assurance level two additional allowances for each excess ton would have to be surrendered for compliance for a total of 558 additional allowances meaning that a total of 4,641allowances would be needed to cover the emissions, the CEMS contingency buffer, and the compliance assurance penalty. In this example New York sources would have to go outside the state for 1,002 allowances for compliance.

In my comments I included a second example that calculated the numbers on a unit-by-unit basis and then determined the allowances need for each facility. There are 70 CSAPR Group 3 facilities in New York. In the analogous example case only 31 of the facilities would be able to comply with the proposed allocations. Seven facilities would be able to comply without exceeding their assurance levels but 32 facilities would be required to surrender additional allowances. I concluded that New York facilities would have to get 2,534 allowances from the market.

Limits of Emissions Trading Comments

Unquestionably market-based emissions trading programs have been a success to date. However, past success does not necessarily ensure future success. So far, these programs have produced greater emissions reductions than those required for compliance, met the targets faster than required and with lower costs than expected for a command-and-control approach. However, it is appropriate to look into the reasons for those successes. Ultimately, I think market certainty is a primary driver for success.

A successful emissions trading program has a robust and liquid allowance market that allows affected sources to operate as needed while meeting the emissions reductions. There are several conditions that lead to a successful program. I believe the most important key to success is the ability for some sources to be able to over control. Sources that can install cost-effective controls and reduce emissions below their allowance allocations, can sell excess allowances to sources with more expensive compliance options. In order for that to work the cap has to be set so that over-control is possible. In addition, in order to be able to use the allowances produced by sources who can over control, the market must be mature enough that those sources have enough market certainty that they are willing to generate those allowances and sell them. Most programs have included a substantial time period between the final rule promulgation and start of the program that included credit for early reductions such that additional allowances were generated. Finally, the market must be large enough that other trading considerations don't influence the market. Many of the states in the affected region are de-regulated so generating companies compete with each other. It is not unreasonable to expect that might influence a decision to sell allowances.

The proposed rule may not meet all these conditions. EEANY's comments showed that unless the baseline includes an adjustment for nuclear retirements it will be set so low that NY generators who have few remaining options to make further reductions will have to rely on the market to match historic operations. EEANY also described issues with EPA's assumptions for potential SCR optimization that mean that even meeting the proposed allocation levels may not be possible. The short time between promulgation and the start of the trading program prevents any early reductions. In my comments I described other factors affecting trading decisions.

I think there is a disconnect between market-based program theory and industry reality. There is a lack of understanding from those outside the regulated community about how allowances are treated by affected sources. The theory suggests that allowance trading can be a profit center within an electric generating company but that generally is not the case. When the Acid Rain Program was first promulgated EPA emphasized the importance of compliance and incorporated the Designated Representative, commonly referred to as the designated felon, into the compliance process. Individuals assigned that responsibility understand non-compliance is a serious problem. Clearly, the electric generation industry takes compliance mandates very seriously. It is my experience that not only is compliance a priority requirement but even the optics of compliance are a management mandate. Owners and operators simply don't even want to give the appearance of non-compliance. Also, I know that many of the affected companies have a bonus compensation program. It is difficult to develop goals that can be quantified and are critical to the business but environmental compliance is an easy

bonus target that meets those criteria. All these factors mean that there are regulatory, corporate, and personal reasons for an affected source to take a conservative approach to compliance obligations. Because of this history and experience, affected sources typically treat allowances as a compliance mechanism rather than a commodity for potential sales profit as presumed by market theory.

Furthermore, there are practical issues related to buying and selling compliance obligations. Sources that in theory may be able to generate excess allowances for sale weigh the real costs of non-compliance and certain operational costs to lower emission rates against the speculative benefit of selling allowances at an unknown cost. Sources that may be able to generate excess allowances may also have conservative policies for determining what may be needed for compliance purposes and what they consider is excess and could be sold. On the other hand, are sources that do not have sufficient allowances on hand and have to rely on the market to purchase what is needed. The same drivers that affect selling decisions affect operations when purchasing allowances is necessary. Traditionally, sources only operate within the bounds of allowances on hand. Unless the trading market is liquid, operating without allowances runs the risk of non-compliance if the allowances cannot be purchased. Even if the market is liquid the price must be stable or setting the market price for operating without allowances in hand runs the risk of losses if the actual cost of purchasing allowances later exceeds the estimated cost when the emissions were generated.

The proposed trading program adds uncertainties related to timing. This program may not become effective until after the 2021 Ozone Season trading program has begun. It is difficult to imagine how a reliable market price can develop with so little time. The market is not going to know whether or not EPA's presumptions about the SCR optimization potential are reasonable until more than halfway through the trading season when the second quarter monitoring reports are submitted and posted. Even then the data only cover May and June, 40% of the season.

The lack of emissions data market knowledge has another ramification. Recall that the compliance assurance provision could require a surrender penalty of three allowances for each ton of NOx emitted. If a source exceeds their assurance level but the state does not, there is no penalty. If the state goes over the assurance level, then any emissions over the individual unit's assurance level gets assessed the penalty. A source that may be able to purchase one allowance for each ton emitted may not be able to purchase three allowances for each ton emitted over their assurance level. Furthermore, the allowance cost adder triples at that point but is conditional upon the state situation. All these factors will have to be considered and are another impediment against relying on the market in this situation.

In conclusion, there are multiple reasons why the emissions trading program in the proposed rule may not be as successful as past programs.

Ozone Episodes

This proposed action is taken in response to the United States Court of Appeals for the District of Columbia Circuit's (D.C. Circuit) remand of the Cross-State Air Pollution Rule (CSAPR) Update in Wisconsin v. EPA on September 13, 2019. The proposed action establishes electricity generating units (EGUs) with revised budgets via a new CSAPR NOX Ozone Season Group 3 Trading Program that is

intended to “fully eliminate” upwind states’ significant contributions to downwind air quality problems for the 2008 ozone NAAQS.

EPA’s proposed allocations reduce the 12-state baseline, allocations and allowance bank for the Ozone Season in an attempt to reduce ozone precursor emissions. There is a fatal flaw to this approach however. Ozone exceedances are an episodic feature associated with high energy demand lasting no more than several days and there is no guarantee that emissions during the episode are lowered sufficiently to reduce ozone during episodes using a seasonal trading program. As it stands a higher emitting unit will incorporate a high price for their energy produced reflecting the scarcity of allowances. As a result, the unit will not be called on to provide power unless the price is high and because high prices occur when demand is high the higher emitting units will still operate during ozone episodes.

In my opinion the only way to address the episodic nature of ozone episodes with a cap-and-trade program is to have a trading program over a time period consistent with the problem. For all intents and purposes, the internal NOx RACT 24-hour averaging plans developed by New York affected sources were trading programs. There are no technological barriers to developing such a system across companies and states but it would certainly require work. The development of the appropriate cap would be a major undertaking but proving compliance with the existing reporting mechanisms would be relatively simple. The system for daily trading is another effort that should not be under-estimated but it also should not be dismissed out of hand.

There is one final aspect of all this that needs to be mentioned. The electric generation sector is not the only source of ozone precursor emissions. Emissions from this sector are an easy target because the ultimate costs to the consumer are buried in utility bills so regulators can “hide” from the ramifications of the added costs. On the other hand, motor vehicle exhaust is a major source of pre-cursors but any limitations on mobile sources directly impact the public so regulators could not deny their culpability. My point is that even with all realistic electric sector reductions, that there still is no guarantee that the ozone levels will get below the national ambient air quality standard limits.

Conclusion

Despite the success of cap-and-trade air pollution control programs to date, it is inappropriate to expect that future programs will necessarily succeed as well if the reasons for past success are not considered. The proposed EPA CSAPR trading programs does not consider those factors in its allowance allocations and schedule.

I have concerns about the level of the cap. New York State has a remarkable record reducing NOX emissions and has a new regulation that will further reduce emissions with new limits on its peaking units. Nonetheless, EPA’s proposed cap requires half the state’s facilities to rely on trading to meet their compliance requirements if future emissions equal 2020 emissions. No sources in New York can over-control and provide sufficient allowances for state compliance which means that the inter-state trading is required and that means that the compliance assurance penalty is a concern. EPA’s proposed baseline does not account for the fixed increase in emissions due to nuclear retirements over and above the inter-annual variability due to weather, demand or disruptions. In New York the loss of 12% of the state’s nuclear generation means that this will definitely impact future emissions. The theory of cap-and-

trade markets does not recognize the reality of industry practices that all lead to the inescapable conclusion that mark liquidity is a real concern in the proposed program.

Therefore, it would be prudent for EPA to revise the baselines to account for nuclear retirements and correct the SCR optimization reductions for new allocations and variability limits. Furthermore, because of the aggressive schedule a safety valve which allows the use of Group 2 allowances is a reasonable backstop in the event of unexpected developments. If adjustments are not made to the allowances available and weather, demand or disruptions increase NOx emissions, then there could be situations where the only compliance option available is to limit operations.