

Attainment Designations and the SO₂ Data Requirements Rule:

Progress So Far, But What Happens Next?

A look at the complex, deadline-shifting designation process for the 1-hr SO₂ NAAQS from a modeler's perspective.

The designation process for the 1-hr sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS) has provided a seemingly endless amount of business for air dispersion modelers, monitoring experts, and other consultants for more than two years. Since the U.S. Environmental Protection Agency (EPA) issued its first set of 120-day letters in February 2013, identifying the 29 areas for which EPA proposed to make its initial nonattainment designations, a great deal has occurred, and each new event has had an impact on the air consulting world.

With the comment period now closed for agency, industry, and public input regarding the July 2016 deadline for designations under the *Sierra Club and Natural Resources Defense Council vs. EPA* consent decree, we pause to look at those events and how they impacted the process, and as the next round

of work appears on the horizon in the context of the finalized 1-hr SO₂ Data Requirements Rule (DRR) and the proposed revisions to Appendix W (the federal guidelines on air quality modeling), we consider how these developments will affect the next wave of designation based work.

The History

The first set of nonattainment designations for 1-hr SO₂ came into effect in August 2013, triggering a series of complicated studies, many of which are still underway, to determine a path forward to get those areas into attainment. These studies have often involved the use of non-default features of EPA's preferred regulatory model, AERMOD, or even the development of alternative modeling approaches requiring repeated interactions with EPA over many months to gain approval. Others have involved the deployment of on-site meteorological towers and ambient monitors to collect data for future designation work.

In May 2014, EPA issued the proposed DRR to provide a process by which the rest of the country would be designated relative to the NAAQS by proposing emission thresholds above which a facility would have to be studied, either via air dispersion modeling or ambient monitoring, to determine the attainment status of the area around it.

Additionally, the proposed rule established a recommended timeline for two additional sets of designations: December 2017 for designations based on modeling studies, and January 2020

for monitor-based designations. States and Tribal Agencies would have to decide by January 2016 whether each study would use the modeling or monitoring path, and those that were intent on using monitoring would need to have the monitors in place by January 2017. The final rule was expected to be released near the end of 2014.

With at least a proposed framework to define what facilities would be affected and how the studies should be approached, many companies began executing internal studies, generally under client-attorney privilege to protect their data, to determine where they stood relative to the standard and to allow time to prepare should any changes need to be made to bring the facility into compliance. The volume of this work tapered off, however, as the release date for the final rule was delayed by nearly a year to September 2015.

Enter the Consent Decree

That lull in the action ended quickly on March 2, 2015, when a consent decree was filed resolving a lawsuit brought by Sierra Club and Natural Resources Defense Council against EPA.¹ The consent decree had two important elements to it: First, it created an additional, more immediate deadline for designations to be made for facilities with 2012 emissions of more than 16,000 tons of SO₂ (or more than 2,600 tons of SO₂ at an average SO₂ emission rate of 0.45 lb/MMBtu or higher, according to EPA's Clean Air Markets

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Database).² Facilities that had announced units for retirement by the date of the consent decree were exempt, leaving 69 facilities affected immediately. Interestingly, as the Clean Air Markets Database only records emissions from electricity generating units (EGUs), this earlier deadline was targeted directly at coal-fired power plants to the exclusion of many non-power generating facilities across the United States with emissions higher than those affected by the new round of designations.

The second important element of the consent decree was that it formalized the two designation dates in the proposed DRR. This created an interesting dilemma: With the deadlines for the final two rounds of designations now fixed, the clock was ticking not only for the facilities above the thresholds in the consent decree, but also all of the other facilities with emissions above the proposed thresholds in the DRR. With the final DRR not yet published, there was the potential that the fixed deadlines could approach or even occur before the final rule was in place. But, without the final rule to confirm that the proposed approaches to attainment demonstrations would be those put in the final rule, or what the final emissions thresholds were that would require a facility to perform a study, how would one be sure that the time and effort put into an attainment study would ultimately meet the requirements of the finalized rule, or indeed, depending on which of the three emission thresholds in the proposed rule was chosen as the final, whether a facility was required to perform a study at all?

The Modeling Frenzy Begins

Despite these questions, with the timelines now fixed facilities moved forward with their studies under the assumption that the procedures for modeling and monitoring to gain an attainment designation would not change significantly from the Technical Assistance Documents (TADs) for modeling and monitoring that had existed in draft form since December 2013. This approach was not unusual in the air dispersion modeling world, where the vast majority of modeling guidance exists only in draft form in a variety of EPA memoranda and other documents, but is often treated as official.

For the facilities included in the first round of designations, the already shortened timeline was further compressed. With all of the opposing interests related to each facility, the EPA Regions expected to have to quickly review the validity of as many as three separate modeling studies per facility on the consent decree list, from industry, state agencies, and outside interveners. As a result, the EPA Regions set a deadline for input from the state agencies and outside interests of September 18, 2015, for recommendations regarding attainment designations. Because of this, the six-month period from March to September 2015 was a frenzy of modeling studies that kept air dispersion modelers from environmental consulting companies across the country working late nights trying to keep up.

Because of the shortened deadline, there was no time to consider the monitoring route for these facilities. Instead, modeling under the guidelines set in the draft SO₂ Modeling TAD³ was the order of the day. That guidance followed a methodology with some significant differences from typical regulatory modeling: Rather than attempting to predict the worst-case future air quality as is the rule when modeling during a permitting action, the SO₂ Modeling TAD specifies that the modeling should characterize the air quality as it stands now or “modeling represents monitoring,” with significant changes to standard permit modeling. They include:

- the ability to model the three most recent years of actual emissions data rather than modeling worst-case potential to emit (PTE) emissions for each source;
- the use of full stack heights, regardless of whether those stack heights exceeded the good engineering practice (GEP) formula heights for each stack; and
- the placement of model receptors only where a monitor could reasonably be sited, meaning that bodies of water, fenced-in areas precluded from public access, and other locations could potentially be excluded from the receptor grid.

Typically, the process for these studies involved first modeling the PTE emissions of the facility if



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there was any hope of a modeled result below the standard, because facilities demonstrating impacts below the standard using PTE emissions would not be subject to additional work in the future to show continued compliance with the NAAQS. Failing a successful modeling study using PTE, which was the case with nearly all of the facilities on the consent decree list, modeling with actual emissions was then attempted.

If that modeling also failed, a further round of modeling including refinement of the meteorological data and ambient background concentrations and possibly engineering changes to the facility itself would be tried. Finally, if it were determined that a modeling solution could not be found, the modeling results, along with other data, could instead be used to inform the placement of ambient monitors, either as part of the State Implementation Plan (SIP) or to develop a three-year monitoring plan for those facilities not part of the consent decree designations.

Appendix W and the Final Data Requirements Rule

As the consent decree modeling was nearing completion, facilities that were likely to be included in the next round of designations were also modeling their sites and many states were performing modeling of their own, with or without input from the facilities they were studying. Around this time, however, two additional curves were thrown at those affected by the DRR:

- On July 29, 2015, the proposed Revision to the Guideline on Air Quality Models (Appendix W) was published in the *Federal Register*.⁴ Along with the proposed changes to the guidance came a new version of AERMOD, as well as a recommendation that a new feature of AERMOD that corrects known issues in the model in certain low-wind conditions that is currently a non-default option, become a default part of the model.
- As many consultants, state agency modelers,



and concerned industry experts converged on Research Triangle Park for the 11th Conference on Air Quality Modeling and Proposed Rulemaking at EPA Headquarters, the final version of the DRR⁵ was signed on August 10, 2015, setting the threshold at which facilities were required to perform attainment studies at 2,000 tons. Additionally, a new option for attainment was presented: those facilities that chose to take an enforceable limit of 2,000 tons of SO₂ or less by January 13, 2017, would be exempt from further study.



Several important questions remain unanswered.

Questions Moving Forward

The final DRR rule leads us to where we are today. Unfortunately, the level of detail in the final DRR was less than most interested parties had hoped for. Additionally, the proposed changes to the *Guideline on Air Quality Models*, while offering new refinements based on better science, are currently still considered to be non-default. These developments leave several important questions that may impact how the next round of SO₂ designation studies will be performed:

- Most agencies and industry have been operating under the assumption that the emissions threshold selected would not only be the most stringent that EPA proposed (1,000 tons in areas with populations over one million people or 2,000 tons for less populated areas), but that the final rule would eliminate the two-pronged approach and simply set the limit to 1,000 tons. Additionally, states still have the option to include any source, regardless of their emissions, if they believe there may be a concern with NAAQS compliance in their area. An example of this might be several sources just under the threshold clustered in an urban area that individually might not be a problem, but cumulatively could cause a NAAQS violation. But, if those facilities are all under 2,000 tons/year SO₂ emissions, could they not all simply take the 2,000-ton limit and be exempt from further review?
- Also regarding the 2,000-ton annual emissions threshold. What if a facility is just over the threshold and modeling shows potential impacts above the NAAQS, can that facility agree to take an annual 2,000-ton emission

limit without having to demonstrate that the new limit would produce modeled results under the standard? While the rule would seem to suggest so, some states are proceeding as if this is not the case.

- The LOWWIND3 option for AERMOD, which corrects known issues that cause AERMOD to over-predict impacts in some low-wind situations and often results in lower modeled impacts, is proposed to become a default part of the AERMOD system, but currently is still considered non-default. As a result, justification for the use of LOWWIND3 would be required and have to be approved by the reviewing agency before being allowed, a process that can often take close to a year of negotiations back and forth to resolve. In fact, the proposed revisions might be made default faster than the process of getting the non-default option approved. The LOWWIND3 option, if the proposed revisions do go through, will be default before the deadline to submit modeling demonstrations, but potentially *after* the deadline to commit to a modeling or monitoring study, which is July 2016. Should those conducting modeling assume that LOWWIND3 will be made default at the risk that it may not be if the difference is compliance or non-compliance?
- Last, the final DRR did not clarify how EPA will address on-going maintenance of areas designated attainment using modeling featuring actual emissions, or monitors deployed for attainment designation purposes. For modeling, the requirements could range anywhere from performing a new study every year or several years on a rolling three years of recent actual emissions data to simply having to file paperwork periodically to show that a facility's emissions have not increased such that the NAAQS might be threatened. It is suggested that monitors might be shut down depending on how low the ambient concentrations are found to be, but the criteria are not concretely defined.

Conclusion

These issues and more face those undertaking modeling exercises for their upcoming attainment demonstrations. The states themselves are also grappling with these issues without more detailed

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guidance from EPA, and each seems to have a slightly different approach. For LOWWIND3, some states are assuming it will be added as a default feature to AERMOD and are using it now. Others are holding off until the proposed revisions are approved. Without clarity on how to handle sources that may cause an attainment problem but are below the 2,000-ton threshold, most states appear to be moving forward almost as if the option to accept a 2,000-ton enforceable limit doesn't exist. How will that play out?

Finally, there is the issue of maintenance: what are the conditions that require re-modeling a facility when actual emissions were used in the attainment demonstration and how long and under what conditions must a monitor employed to make an attainment designation continue operations? All of these questions need to be answered in the next few months. As usual, the best advice is to talk to your local state agency to better understand their approach and to work collaboratively toward a successful attainment study. **em**

References

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5. 40 CFR Part 51: Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS); Final Rule; U.S. Environmental Protection Agency; *Federal Register* **2015**, 80 (162), August 21, 2015; available at <http://www.gpo.gov/fdsys/pkg/FR-2015-08-21/pdf/2015-20367.pdf>.

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