

**Responsiveness Summary of the Illinois Environmental
Protection Agency Following a Public Hearing on December 16, 2015**

February 25, 2016

On December 16, 2015, the Illinois Environmental Protection Agency (Illinois EPA) held a public hearing in Springfield, Illinois, regarding the Attainment Demonstration for the 2010 Sulfur Dioxide (SO₂) National Ambient Air Quality Standard (NAAQS), titled “Illinois Sulfur Dioxide (SO₂) Attainment Demonstration: Lemont, Lockport, and DuPage Townships (Cook/Will Counties) and Cincinnati, Pekin, and Hollis Townships (Pekin/Tazewell Counties).” The Attainment Demonstration contains the State’s plan to attain the SO₂ NAAQS in the Pekin and Lemont nonattainment areas (NAAs). The Illinois EPA intends to submit this document to the United States Environmental Protection Agency (USEPA) as a State Implementation Plan (SIP) revision. The hearing was held to satisfy the requirements of Section 110(l) of the Clean Air Act (CAA) regarding public hearings for SIP submittals.

Following the public hearing, the Illinois EPA received comments from the Sierra Club and the Environmental Law and Policy Center jointly. A summary of the comments and the Illinois EPA’s responses are as follows:

Emissions During Flaring Events

The commenter claims that flaring of gases “produces more emissions than IEPA’s modeling has assumed” and also suggests that the emissions actually modeled “appear to be at stand-by rates (in other words, simply when the pilot flame is present but not during actual flaring events when purge gas, process gas, or other off-spec gases are routed to the flare).” The Agency modeled applicable Consent Decree, permit condition, and/or rule-based limits interpreted as non-upset conditions, i.e. units’ usual operation, as recommended by USEPA. It is well known that flares have a variety of purposes and can have varying frequency of use. For example, some flares are “backups” while others are an integral part of a continuous process. Since flares typically serve as safety devices, there can be events with dramatically higher flow rates and emission rates. These events, however, are unlikely to be routine occurrences and are certainly not amenable to reliable quantitation of emission rates, flow rates, and release temperatures for SIP-related modeling. Moreover, it is highly uncertain as to whether these high emissions flaring events are continuous enough to significantly contribute to the annual distribution of maximum daily 1-hour SO₂ concentrations, resulting in a potential NAAQS violation.

The commenter’s contention that “flaring events are not captured by modeling maximum allowable emissions from permits, and modeling that relies on permit limits for flares is not representative of actual emissions from flares” can only be viewed as true if the event itself represents a permit violation, or if an exemption for an emergency malfunction or other cause allows for excess emissions. Otherwise, specific limits typically apply. When considering the possible spectrum of flaring events for a single or multiple flares, the Agency cannot possibly

model every possible hypothetical situation that may occur, including situations in which sources violate applicable emission limitations; this is the very reason the Agency follows USEPA’s approach and models normal source/unit operation.

The commenter also suggests that the numeric values of certain flare release parameters (exit temperatures, flow rates, exit velocities, and heat loss fraction), which were input or the basis of inputs to the model, “indicate pilot operations and not flaring events.” It is important to note that regarding the methodology of modeling flares, there is specific guidance provided by USEPA. In the April 2014 document titled *Guidance for 1-Hour SO₂ nonattainment Area SIP Submissions*, Appendix A, page A-15, the following is stated: “Sources such as flares can be modeled in AERMOD using the parameter input methodology described in Section 2.1.2 of the AERSCREEN User’s Guide (U.S.EPA, 2011c).” That Section – “2.1.2 Flares” – specifies the various flare source inputs, which include the emission rate, stack height, total heat release rate, and radiative heat loss fraction. “The heat loss fraction can be user selected or the SCREEN3 default value of 0.55 ... For the exit velocity and exit temperature, AERSCREEN defaults these values to 20 m/s and 1,273 K, respectively, as done in SCREEN3 (U.S.EPA, 1995). The stack diameter and effective stack height used in AERMOD are calculated from the inputs as:

$$D = 9.88 \times 10^{-4} \times \sqrt{HR \times (1 - HL)}$$

$$H_{eff} = H_s + 4.56 \times 10^{-3} \times HR^{0.478}$$

Where D is effective stack diameter, HR is the heat release rate, HL is the heat loss fraction, H_{eff} is effective stack height and H_s is the stack height entered by the user.”

So, though specific modeling inputs may give the appearance of representing “pilot operations,” they actually reflect an established methodology for treating flares in regulatory modeling applications.

Emissions from Sources Utilizing Ultra-Low Sulfur Fuel

The commenter has expressed skepticism and perhaps disbelief as to the accuracy and achievability of purported SO₂ emission reduction percentages resulting from distillate fuel oil and residual fuel oil sulfur content limit requirements. In Exhibit 5, Attachment 5 (Table 3 – Modeled Versus Allowable Emission Rates, Column 6), the percentage reductions for final modeled emission rates relative to initial allowable emission rates have conveniently been provided by the commenter. With the exception of the three sources assigned reductions of 100% – an unrealistic and unfortunate artifact of emissions rounding – most sources have allowable SO₂ emissions reductions exceeding 90.00% and an “over-99% reduction is assumed for 500 sources.” However, it is important to remember that these represent reduction percentages for allowable emissions (typically specified in permits), not actual emissions. So, even though an emission source has been using a fuel with a sulfur content lower than otherwise allowed by permit, this does not negate the magnitude of the percentage reductions between current permitted limits and the final modeled values. Modeled sources affected by the lower fuel sulfur

content limits were identified in the Lemont and Pekin culpability spreadsheets (the second modeling scenario in each study area).

Even more importantly, though, the reduction percentages are actually unimportant, because the modeled emission rates (corresponding with 15 ppm distillate fuel oil and 1000 ppm residual fuel oil) represent the maximum possible emissions from diesel-burning units under the Illinois Pollution Control Board rule, calculated based upon the maximum possible fuel use for each unit and the maximum sulfur content of the fuel. What is of importance is the emission value being modeled to reach and demonstrate attainment, not the allowable limit that had been previously in effect for the source.

The Agency's modeling has been overly conservative and thus overestimates SO₂ emissions. So, even if the commenter's claims are true that "the modeling hews closely to the NAAQS," the Agency is confident that the modeling demonstration is valid and that the revised SO₂ SIP will translate into expeditious attainment of the SO₂ 1-hour NAAQS in the Lemont and Pekin nonattainment areas.

Startup, Shutdown, Malfunction (SSM) Implications

The commenter claims that, for modeled sources that are not subject to Section 214.603, emissions during SSM events could increase SO₂ concentrations in NAAs. However, the Agency's model follows USEPA's recommended approach of modeling sources' routine operations. The Agency did not model, and USEPA has not recommended that it model, emissions that may occur during SSM events. As discussed above on the topic of flares, there is no possible way the Agency could begin to guess in its modeling the range of emissions that might occur during SSM events or the duration of such emissions for approximately 2,000 sources, nor are such guesses necessary. The Agency modeled these sources' maximum allowable emissions, currently enforceable via emission limitations in other regulations or permit conditions. These limitations generally apply during all hours of operation, just like the Agency's proposed emission limitations in Section 214.603.

Conclusion and Agency Action

The Agency appreciates the commenter's interest in this matter. However, Illinois EPA has followed USEPA guidance and performed all of the necessary modeling to demonstrate that the underlying rules adopted by the Illinois Pollution Control Board will bring the areas into attainment. The Agency intends to submit this Attainment Demonstration to USEPA as a SIP revision, and is confident it will be approved. In light of this, the Agency does not intend to implement any changes as a result of these comments.