

Visible and Particulate Emission Limitations Discussion

Rule Requirements and History

Rule 301(1)(a) states that “a person shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of a density greater than a 6-minute average of 20% opacity, except for one 6-minute average per hour of not more than 27% opacity.” Rule 301 also includes provisions for lower opacity limits. Specifically, Rule 301(1)(c) allows a limit of less than 20% opacity “specified as a condition of a permit to install or permit to operate.”

With the advent of the renewable operating permit (ROP) program, AQD in 1997 developed Operational Memorandum No. 14 to evaluate the use of visible emission limits of less than 20% opacity in new source review permits. Taking an opacity limit of less than 20% offers several benefits to industry. These benefits include reducing potential emissions to avoid PSD and/or Title V applicability; reducing potential emissions for modeling; and the ability to demonstrate compliance via opacity testing instead of stack testing. AQD has issued multiple permits that include opacity limits less than 20%. It is the experience of AQD that the vast majority of these sources have demonstrated on-going compliance with their respective opacity limits.

ORR Recommendation A-9

The Air Quality Division (AQD) should develop a Policy Guidance Document addressing the use of visible emissions limits of less than 20% opacity in permit conditions. The process for developing the document should include stakeholder input and require any opacity limits that are more stringent than what is allowed by R 336.1301(1)(a) to be negotiated between the applicant and the AQD. The guidance document should be developed by June 1, 2012.

Analysis

AQD experience has shown that there is an approximate relationship between opacity and particulate emissions. As such, opacity limits are often included in permits as a surrogate for, or as an indicator of compliance with, particulate (PM, PM10, and/or PM2.5) emission limits. Opacity limits are also included in permits for sources where it is difficult to determine compliance with a mass emission limit. This may occur on fugitive sources such as storage piles, roadways, conveyors, roof monitors, and crushers. In addition, opacity limits are also included in permits as a surrogate method of assuring proper operation of an air pollution control device.

Rule 331(1)(a) states that “It is unlawful for a person to cause or allow the emission of particulate matter from any process or process equipment in excess of the maximum allowable emission rate listed in table 31.” Table 31, J applies to exhaust systems serving material handling equipment not otherwise listed in Table 31 and sets the maximum limit for this equipment at 0.10 pounds of particulate matter (PM) per 1000 pounds of exhaust gasses. The limits in terms of pounds of particulate matter (PM) per 1000 pounds of exhaust gasses is a concentration based limit, as opposed to a not mass based limit. Table 31, J applies to the majority of particulate sources permitted by the AQD.

The following table lays out three potential permitting scenarios evaluating the relationship between particulate concentration limits and opacity limits:

Concentration Limit	Opacity Limit	Typical Compliance Method	Permitting Issues
0.10 Lbs/1000Lbs	20%	Stack Testing	Greater Potential for PSD Greater Potential to Model Greater Potential for Title V Stack Testing or Continuous Emissions Monitor
<0.10 Lbs/1000Lbs	20%	Stack Testing	Less Potential for PSD Less Potential to Model Less Potential for Title V Stack Testing or Continuous Emissions Monitor
<0.10 Lbs/1000Lbs	<20%	Opacity Testing	Less Potential for PSD Less Potential to Model Less Potential for Title V Opacity Testing

As the table shows, the greater the potential emissions from a source, the more likely the source will be subject to major source permitting requirements such as PSD and/or Title V. Title V applicability results in the facility needing to pay emissions fees. Both PSD and Title V applicability require a greater degree of compliance demonstration than is required for a minor source. This greater degree of compliance is often demonstrated via stack testing. Stack testing is also often required to confirm a sources status as a synthetic minor. Option 2 in the table above often represents synthetic minors.

Accepting opacity limits of less than 20% often provides the permittee the option to demonstrate compliance via lower cost opacity testing rather higher cost stack testing. If the AQD were to eliminate the practice of tying lower particulate emission limits to lower opacity limits, options for permitting and compliance may be limited. A facility could request a limit of 0.10 pounds of particulate matter (PM) per 1000 pounds of exhaust gasses and 20% opacity but in doing so be less likely to avoid PSD, major non-attainment, and/or Title V and may have difficulty in passing modeling. PSD or major non-attainment permitting add both time and expense to the permitting process. Or they could choose to permit at less than 0.10 pounds of particulate matter (PM) per 1000 pounds of exhaust gasses and 20% opacity. This may result in compliance demonstration needing to be achieved by more expensive stack testing or installing a continuous emissions monitor in place of less expensive opacity testing. Compliance via a Method 9 reading to show the facility is meeting the 20% does not mean it is meeting the lower synthetic minor limit of less than 0.1 pounds per 1000 pounds.

An example illustrating this point would be the addition of a machining operation controlled by a 99.99% efficient 25,000 CFM baghouse to an existing PSD source. At 0.10 pounds of particulate matter (PM) per 1000 pounds of exhaust gasses, the allowed yearly emissions from the operation would 49.3 tons per year. This would subject the installation of this operation to PSD, which in-turn would require dispersion modeling. Also, compliance would need to be demonstrated via stack testing or a continuous emissions monitor. Instead at 0.010 pounds of particulate matter (PM) per 1000 pounds of exhaust gasses, the allowed yearly emissions from the operation would 4.93 tons per year. This would allow the installation to avoid PSD. If there were an associated 5% opacity limit, compliance may be demonstrated by opacity testing in place of stack testing or a continuous emissions monitor.

Recommendation

AQD developed the relationship between particulate emission limits and opacity limits in Operational Memorandum No. 14 as a benefit to industry. As can be seen above, eliminating this relationship may not be in industries best interest. As such, it is the recommendation of the AQD that Operational Memorandum No. 14 be maintained as it is currently written.

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