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Excess Emissions During Startup, Shutdown, and Malfunction Events

General EPA Guidance to States

In 1978 the EPA first clarified that all excess emissions events are violations, and that no form of an "automatic exemption" policy is allowed [1]. However, States were given discretion on specific enforcement actions, with the burden put on the source to demonstrate that excess emissions were the result of "malfunctions" – defined in 40 CFR §60.2 as "a sudden, infrequent, and not reasonably preventable failure of equipment to operate in a normal manner. Failures caused by poor maintenance or careless operations are not malfunctions."

Due to subsequent confusion on what constituted a legitimate "malfunction", in 1982 EPA developed criteria to help determine if a malfunction had occurred [2]:

- Equipment must be maintained and operated in a manner consistent with minimizing emissions.
- Repairs must be made rapidly, using off-shift labor or overtime if necessary.
- The amount and duration of emissions must be minimized.
- The impact on ambient air quality must be minimized.
- The event must not be part of a recurring pattern that is indicative of inadequate design, operation, or maintenance.

The 1982 memo further considered startup and shutdown (S&S) periods as part of normal operations. Thus, excess emissions during S&S periods should be excused only if a malfunction occurred during the S&S period; or as clarified in a

[1] Kathleen M. Bennett, Assistant Administrator for Air, Noise, and Radiation, Memo, Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunction, September 28, 1982.
[2] See footnote 1.

subsequent memo in 1983 [3], provided that the source demonstrates that the excess emissions during S&S could not have been prevented through careful planning and design.

In 1999 [4], in response to problems and inconsistencies found in review of State Implementation Plans, the EPA provided further affirmation and clarification that:

- All excess emissions events must be considered as violations.

- "Automatic exemption" policies are not allowed.

- States have enforcement discretion to not penalize excess emissions produced under malfunction events.

- States may use an "Affirmative Defense" policy -- where the burden is on the source to provide a defense. The defense may only be used in cases where emissions contributions from a single source (or small group of sources) do not have the potential to cause an exceedance of the National Ambient Air Quality Standards (NAAQS) or Prevention of Significant Deterioration (PSD) increments.

  The memo further adds five items to the previous list of items on the 1982 memo to be considered when determining if an event is a "malfunction":

  -- Emissions are caused by a sudden, unavoidable breakdown of technology, beyond the control of the operator.
  -- Emissions: (a) did not stem from an event that could have been foreseen and avoided or planned for; and (b) could not have been avoided by better operation and maintenance practices.
  -- All emissions monitoring systems are kept in operation if possible.
  -- Actions in response to excess emissions are documented in operating logs or other relevant evidence.
  -- Operator must promptly notify the regulatory authority.

- State plans regarding startup, shutdown, and malfunctions do not prevent the ability of the EPA or citizens to enforce applicable requirements.

- Excess emissions during S&S are reasonably foreseeable, thus in general they should not be excused. However, there can be cases where control is not effective during S&S. In these situations, allowances for increased

[3] Kathleen M. Bennett, Assistant Administrator for Air, Noise, and Radiation, Memo, Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunction, February 15, 1983.
[4] Steven A. Herman and Robert Perciasepe, Memo, State Implementation Plans (SIPs): Policy Regarding Excess Emissions During Malfunctions, Startup, and Shutdown, September 20, 1999.

emissions may be made by the State, on a source-category specific basis, as long as:

-- Allowances are limited to specific, narrowly defined source categories, using specific controls.
-- Control must be technically infeasible during S&S.
-- Frequency and duration of S&S must be minimized.
-- States must analyze the potential worst-case emissions scenario.
-- All possible steps must be taken to minimize the impact on ambient air quality.
-- Sources must operate at all times in manner consistent with minimizing emissions.
-- Actions during S&S must be properly documented.

Alternatively, under the "Affirmative Defense" option, States may allow sources to request relief from excess emissions events during S&S if they can demonstrate that they meet the following criteria:

-- The period of excess emissions during S&S is short and infrequent, and could not have been prevented through careful planning and design.
-- Excess emissions are not part of a recurring pattern indicative of poor design or operation.
-- If excess emissions are caused by a bypass, then the bypass was unavoidable to prevent personal or property damage.
-- The facility, at all times, is operated under practices to minimize emissions.
-- Frequency and duration of the S&S event is minimized.
-- All possible steps are taken to minimize the impact on ambient air quality.
-- Emissions monitoring equipment is kept in operation.
-- The operator's actions are documented in operating log.
-- The operator promptly notifies the regulatory authority.

A number of recent EPA decisions on State Implementation Plan updates confirm that: (1) an "automatic exemption" policy for excess emissions during startup, shutdown, or malfunction events will not be allowed; and (2) authority for EPA or citizens to take enforcement actions will not be removed. For example see the States of California [5, 6], Michigan [7], Missouri [8], Arizona [9], Arkansas,

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[5] EPA, Approval and Promulgation of Implementation Plans; California State Implementation Plan Revision, South Coast Air Quality Management District, January 27, 2000, Vol. 65, No. 18, pp. 4357-4359.
[6] EPA, Disapproval of State Implementation Plan Revisions, Monterey Bay Unified Air Pollution District, June 1, 2004, Vol. 69, No. 105, pp. 30845-30847.
[7] EPA, Approval and Promulgation of Air Quality Implementation Plans; Michigan; Excess Emissions During Startup, Shutdown, or Malfunction, FR, February 24, 2003, Vol. 68, No. 36, pp. 8550-8553.

Virginia [10], Wisconsin [11], and Texas [12]. Further, a recent court decision confirmed that the source has the burden of proving that excess emissions occurred during a malfunction -- as opposed to the state showing that a malfunction did not occur [13].

EPA MACT Rulemaking

The EPA requires the development of a site-specific "Startup, Shutdown, and Malfunction Plan" for its "Maximum Achievable Control Technology" (MACT) rule makings, under Title III of the Clean Air Act Amendments of 1990 -- see 40 CFR §63.6 and §63.10. The Startup, Shutdown, and Malfunction (SS&M) Plan serves as a "bridge between the difficulty associated with determining compliance with an emission standard during these events, and a blanket exemption from emission limits." The "purpose of the plan is for the source to demonstrate how it will do its reasonable best to maintain compliance with the standards, even during SS&Ms." There have been numerous recent lawsuits and changes to the SS&M requirements, with the most recent in a final rule published on May 30, 2003 (68 FR 32585). Current rule language emphasizes the "general duty to minimize emissions at all times of operation":

> "at all times, including periods of SS&M, the source shall operate and maintain equipment in a manner consistent with good practices for minimizing emissions. During a period of SS&M, this general duty to minimize emissions requires the source to reduce emissions to the greatest extent consistent with good practices. The general duty to minimize emissions during SS&M does not require the source to achieve emission levels that would be required by the standard if this is not consistent with good practices." (§63.6(e)(1)(i)).

Note that recent EPA enforcement review of SS&M events at several petroleum refining and chemical facilities in Texas found that excess emissions events during SS&M events are too lengthy or are occurring too frequently. As a result, EPA emphasizes that "if excess emissions reflect a recurring pattern indicative of inadequate design, operation, or maintenance, then such incidents are not exempt SS&M events."

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[8] EPA, Approval and Promulgation of Implementation Plans; State of Missouri, FR, August 27, 2002, Vol. 67, No. 166, pp. 54965-54967.
[9] EPA, Revisions to the Arizona State Implementation Plan, Arizona Department of Environmental Quality, FR, May 11, 2001, Vol. 66, No. 92, pp. 24074-24075.
[10] Judith Katz, EPA Region III, Letter to David Barton, EarthJustice Legal Defense Fund, Response to State of Virginia Title V Operating Program, December 19, 2001.
[11] Bharat Mathur, EPA Region V, Letter to Eric Uram, Sierra Club, Response to State of Wisconsin's Title V Operating Program, November 27, 2001.
[12] EPA, Approval and Promulgation of Implementation Plans; Texas; Excess Emissions During Startup, Shutdown, and Malfunction Activities; and Notice of Resolution of Deficiency for Title V Permit Program, FR, March 2, 2004, Vol. 69, No. 41, pp. 9776-9780.
[13] Anderson v. Farmland Industries, Inc., 70 F. Supp. 2d 1218 (D. Kansas 1999).

Opacity

The previous discussions do not apply to opacity under District requirements for sources burning forestry and agricultural residues and Federal requirements for all source types:

- District – District Rule 202 ("Visible Emissions") generally limits visible emissions that are greater than Ringelmann Chart No. 1 (or equivalent opacity) to less than 3 minutes in any one hour. Under District Rule 203 Section A.12 ("Exceptions to Rule 202"), there is an exemption of compliance with Rule 202 requirements during startup, shutdown, and malfunction events for sources burning forestry and agricultural residues:

  "Smoke emissions from burners fired with forestry and agricultural residues when such emissions result from the startup or shutdown of the combustion process or from the malfunction of emission control equipment. This subsection shall not apply to emissions that exceed a period or periods of time aggregating more than 30 minutes in any 24-hour period. This subsection shall not apply to emissions which result from the failure to operate and maintain in good working order any emission control equipment."

- State – California Health and Safety Code §41701 and §41704 are identical to District Rules 202 and 203 with the exception that the State limits emissions at a Ringelmann Chart No. 2.

- Federal -- 40 CFR §60.11 states:

  -- §60.11(c) -- Opacity standards set forth in this part shall apply at all times except during periods of startup, shutdown, malfunction, and as otherwise provided in the applicable standard.

  -- §60.11(d) -- At all times, including periods of startup, shutdown, and malfunction, sources must to the extent practicable, maintain and operate facility in manner consistent with good practices for minimizing emissions.

Performance Tests (§60.8)

Performance testing requirements are discussed in 40 CFR §60.8. It includes a discussion of emission exceedances during startup, shutdown, and malfunction:

- §60.8(c) -- ..... "Operations during periods of startup, shutdown, and malfunction periods shall not constitute representative conditions for the purpose of performance testing, nor shall emissions in excess of the applicable emission limit during periods of startup, shutdown, or

> malfunction be considered a violation, unless otherwise specified in the applicable standard."

The likely intent of §60.8(c) is to excuse an emissions exceedance that occurred during the performance test and is determined to be the result of a malfunction or startup or shutdown event. It does not apply to subsequent, everyday, normal operations. To avoid contradiction with previously discussed guidance and requirements, the excess emissions exemption of §60.8(c) likely is limited to those pollutants which are only directly measured during the performance test (i.e., using manual source sampling methods, such as particulate matter, metals, HCl, or organics); and does not cover pollutants measured on a continuous basis by either CEMS or indirectly with CMS.