(6) Features that are considered to have not been commonly incorporated in locomotives before 2008 include but are not limited to those identified in this paragraph (h)(6).

(i) Electronically controlled pneumatic (ECP) brakes, computerized throttle management control, and advanced hybrid technology were not commonly incorporated in locomotives before 2008. Manufacturers may claim full credit for energy savings that result from applying these features to freshly manufactured and/or remanufactured locomotives.

(ii) Distributed power systems that use radio controls to optimize operation of locomotives in the middle and rear of a train were commonly incorporated in some but not all locomotives in 2008. Manufacturers may claim credit for incorporating these features into locomotives as follows:

(A) Manufacturers may claim prorated credit for incorporating distributed power systems in freshly manufactured locomotives. Multiply the energy saving rate by 0.50 when calculating the adjustment factor:

$AF = 1.000 - (\text{energy savings rate}) \times (0.50)$

(B) Manufacturers may claim full credit for retrofitting distributed power systems in remanufactured locomotives.

[73 FR 37197, June 30, 2008, as amended at 73 FR 59190, Oct. 8, 2008; 75 FR 22985, Apr. 30, 2010]

§ 1033.535 Adjusting emission levels to account for infrequently regenerating aftertreatment devices.

This section describes how to adjust emission results from locomotives using aftertreatment technology with infrequent regeneration events that occur during testing. See paragraph (e) of this section for how to adjust ramped modal testing. See paragraph (f) of this section for how to adjust discrete-mode testing. For this section, ''regeneration'' means an intended event during which emission levels change while the system restores aftertreatment performance. For example, hydrocarbon emissions may increase temporarily while oxidizing accumulated particulate matter in a trap. Also for this section, ''infrequent'' refers to regeneration events that are expected to occur on average less than once per sample period.

(a) *Developing adjustment factors.* Develop an upward adjustment factor and a downward adjustment factor for each pollutant based on measured emission data and observed regeneration frequency. Adjustment factors should generally apply to an entire engine family, but you may develop separate adjustment factors for different configurations within an engine family. If you use adjustment factors for certification, you must identify the frequency factor, F, from paragraph (b) of this section in your application for certification and use the adjustment factors in all testing for that engine family. You may use carryover or carry-across data to establish adjustment factors for an engine family, as described in §1033.235, consistent with good engineering judgment. All adjustment factors for regeneration are additive. Determine adjustment factors separately for different test segments as described in paragraphs (e) and (f) of this section. You may use either of the following different approaches for locomotives that use aftertreatment with infrequent regeneration events:

(1) You may disregard this section if you determine that regeneration does not significantly affect emission levels for an engine family (or configuration) or if it is not practical to identify when regeneration occurs. If you do not use adjustment factors under this section, your locomotives must meet emission standards for all testing, without regard to regeneration.

(2) You may ask us to approve an alternate methodology to account for regeneration events. We will generally limit approval to cases in which your locomotives use aftertreatment technology with extremely infrequent regeneration and you are unable to apply the provisions of this section.

(b) *Calculating average emission factors.* Calculate the average emission factor (EF_A) based on the following equation:

$EF_A = (F)(EF_H) + (1\text{-}F)(EF_L)$

Where:

F = the frequency of the regeneration event during normal in-use operation, expressed in terms of the fraction of equivalent tests during which the regeneration occurs. You may determine F from in-use operating data or running replicate tests. For example, if you observe that the regeneration occurs 125 times during 1000 MW-hrs of operation, and your locomotive typically accumulates 1 MW-hr per test, F would be (125) ÷ (1000) × (1) = 0.125.

EF_H = measured emissions from a test segment in which the regeneration occurs.

EF_L = measured emissions from a test segment in which the regeneration does not occur.

(c) *Applying adjustment factors.* Apply adjustment factors based on whether regeneration occurs during the test run. You must be able to identify regeneration in a way that is readily apparent during all testing.

(1) If regeneration does not occur during a test segment, add an upward adjustment factor to the measured emission rate. Determine the upward adjustment factor (UAF) using the following equation:

$$UAF = EF_A - EF_L$$

(2) If regeneration occurs or starts to occur during a test segment, subtract a downward adjustment factor from the measured emission rate. Determine the downward adjustment factor (DAF) using the following equation:

$$DAF = EF_H - EF_A$$

(d) *Sample calculation.* If EF_L is 0.10 g/bhp-hr, EF_H is 0.50 g/bhp-hr, and F is 0.10 (the regeneration occurs once for each ten tests), then:

EF_A = (0.10)(0.50 g/bhp-hr) + (1.00 − 0.10)(0.10 g/bhp-hr) = 0.14 g/bhp-hr.

UAF = 0.14 g/bhp-hr − 0.10 g/bhp-hr = 0.04 g/bhp-hr.

DAF = 0.50 g/bhp-hr − 0.14 g/bhp-hr = 0.36 g/bhp-hr

(e) *Ramped modal testing.* Develop separate adjustment factors for each test phase. If a regeneration has started but has not been completed when you reach the end of a test phase, use good engineering judgment to reduce your downward adjustments to be proportional to the emission impact that occurred in the test phases.

(f) *Discrete-mode testing.* Develop separate adjustment factors for each test mode. If a regeneration has started but has not been completed when you reach the end of the sampling time for a test mode extend the sampling period for that mode until the regeneration is completed.

Subpart G—Special Compliance Provisions

§ 1033.601 General compliance provisions.

Locomotive manufacturer/remanufacturers, as well as owners and operators of locomotives subject to the requirements of this part, and all other persons, must observe the provisions of this part, the requirements and prohibitions in 40 CFR part 1068, and the provisions of the Clean Air Act. The provisions of 40 CFR part 1068 apply for locomotives as specified in that part, except as otherwise specified in this section.

(a) *Meaning of terms.* When used in 40 CFR part 1068, apply meanings for specific terms as follows:

(1) ''Manufacturer'' means manufacturer and/or remanufacturer.

(2) ''Date of manufacture'' means date of original manufacture for freshly manufactured locomotives and the date on which a remanufacture is completed for remanufactured engines.

(b) *Engine rebuilding.* The provisions of 40 CFR 1068.120 do not apply when remanufacturing locomotives under a certificate of conformity issued under this part.

(c) *Exemptions.* (1) The exemption provisions of 40 CFR 1068.240 (i.e., exemptions for replacement engines) do not apply for domestic or imported locomotives. (Note: You may introduce into commerce freshly manufactured replacement engines under this part, provided the locomotives into which they are installed are covered by a certificate of conformity.)

(2) The exemption provisions of 40 CFR 1068.250 and 1068.255 (i.e., exemptions for hardship relief) do not apply for domestic or imported locomotives. See § 1033.620 for provisions related to hardship relief.