



Low Mass Emissions Monitoring Option

US EPA Clean Air Markets Division
Emissions Monitoring Branch

Low Mass Emissions Monitoring Methodology



- The LME Methodology (§75.19) may be used in lieu of CEMS or the methods under Appendices D and E to determine hourly heat input, SO₂ emissions, and NO_x emissions.
- For SO₂ and NO_x, the LME methodology requires use of generic default emission rates or site-specific default emission rates. For heat input, you must use either the maximum rated heat input rate for each operating hour or long term fuel flow.
- Once the LME methodology has been selected, it must be used for **all** program parameters.
 - “Mixing-and-matching” LME with other Part 75 methodologies is **not** allowed.
- The LME Methodology is **not an exemption** from the monitoring and reporting requirements.

LME Applicability



- Natural gas and oil fired units only (**no solid fuels!**)
- Emissions limitations (§75.19(a)(1)(i))
 - ARP and non-ARP units subject to the TR Annual programs: $\text{NO}_x < 100$ tons/year and $\text{SO}_2 \leq 25$ tons/year
 - Units subject to Transport Rule ozone season NO_x program electing to report on a year round basis: $\text{NO}_x < 100$ tons/year and ≤ 50 tons/ozone season (see §75.19(a)(1)(i)(A)(2))
 - Ozone season only reporting units: $\text{NO}_x \leq 50$ tons/control period

Initial LME Qualification

§75.19(a)(2)(ii)



- Initial qualification is based on:
 - A demonstration that in **each** of the 3 years immediately preceding the year of the application, the SO₂ and NO_x emissions did not exceed the applicable annual and or seasonal threshold limits.
 - Emissions data from historical Part 75 EDRs must be used, where these reports are available, or
 - In the absence of historical EDR's, reliable estimates of the unit's emissions for the previous 3 years (or ozone seasons) must be provided.
 - The estimates may be based on records of unit operation, fuel usage, representative emission test data, CEM data, fuel sampling data, etc.
 - Conservative default values may also be used in the calculations (e.g., the rates from Tables LM-1 through LM-3 in §75.19, the unit's maximum rated heat input, etc.)
- For units with less than 3 years of operating history, projected emissions estimates may be used.
- If a unit cannot qualify for LME status based on historical emissions and/or projected emissions, it is still possible to use the LME methodology if an enforceable permit restriction is accepted see §75.19(a)(3)(i) .

Disqualification from Using LME Methodology



- If at the end of a calendar year or ozone season, it is determined that the emissions from an LME unit exceeded the applicable threshold, then:
 - The LME unit is disqualified from LME methodology.
 - The Owner or Operator must install and certify monitoring systems that meet Part 75 requirements by December 31 of the calendar year following the year that the limit was exceeded.
 - If the monitoring systems are not installed and certified by the deadline, then the unit must report maximum potential values for SO_2 , NO_x and heat input for every hour of operation until the appropriate systems are installed and certified.

Disqualification from LME Due to Fuel Change



- §75.19(b)(3) - If a LME unit changes fuels, such that a fuel other than those allowed for use in the LME methodology is combusted, the unit is disqualified as of the first hour that the new fuel is combusted.
- The Owner or Operator must install, and certify monitoring systems that meet the monitoring requirements of Part 75 prior to switching fuels.
- If the required monitoring systems are not installed and certified prior to the fuel switch, then the unit must report maximum potential values for SO₂, NO_x and heat input for every hour of operation until the appropriate systems are installed and certified.

Regaining LME Status if Lost



- When a unit has been disqualified from the LME methodology, the owner or operator may submit an application to re-qualify as an LME unit only if:
 - Three years of monitored emissions data are obtained, following the disqualification year, showing that the unit emitted less than the limits specified in §75.19(a)(1)(i)(A); and
 - The Authorized Account Representative certifies in the application that the unit operation during those monitored years is representative of the projected future operation for the unit.

Generic Default Emission Rates

§75.19(c)

Generic SO₂ Emission Rate
Table LM-1

Fuel Type	SO ₂ Emission Factors
Pipeline Natural Gas	0.0006 lb/mmBtu
Other Natural Gas	0.06 lb/mmBtu
Residual Oil	2.1 lb/mmBtu.
Diesel Fuel	0.5 lb/mmBtu

Generic NO_x Emission Rate
Table LM-2

Unit Type	Fuel Type	NO _x Emission Rate (lb/mmBtu)
Turbine	Gas	0.7
Turbine	Oil	1.2
Boiler	Gas	1.5
Boiler	Oil	2

LME Monitoring Option for Determining SO₂ Emissions



- If the unit combusts oil or natural gas, use the generic default emission rate in Table LM-1. Alternatively, for fuel oil combustion, a lower, fuel specific SO₂ emission factor may be used in lieu of the applicable emission factor for Table LM-1, **if a federally enforceable permit condition is in place that limits the sulfur content of the oil.**
- If the unit combusts a gaseous fuel other than natural gas, site-specific default emission rates must be determined in the following way for all program parameters, since there are no generic values in §75.19 for such fuels:
 - For SO₂, the sulfur content of the fuel is quantified by performing the 720-hour demonstration described in Part 75., Appendix D, section 2.3.6, to determine whether the unit is eligible to use a default SO₂ emission rate for reporting purposes.
 - If the unit is not eligible, then the LME methodology may not be used.
 - But if the unit is eligible, the appropriate value of the fuel's sulfur content (from the demo) is substituted into Equation D-1h in Appendix D, to determine the default SO₂ emission rate in units of lb/mmBtu.

LME Monitoring Option for Determining NO_x Mass Emissions



- For a LME unit, NO_x mass emissions are determined based on:
 - NO_x emission rate (lb/mmBtu)
 - Default NO_x Emission Rate from Table LM-2, or
 - Fuel-and-unit specific NO_x Emission Rate.

and

- The cumulative heat input (mmBtu) during the reporting period:
 - Maximum Rated Heat Input Rate, or
 - Long Term Fuel Flow.

Fuel-and-Unit Specific NO_x Emission Rate



- §75.19(c)(1)(iv)(C)
 - Perform four load Appendix E testing
 - Use the highest 3-run average NO_x emission rate from the testing.
 - For units tested with SCR or SNCR
 - Use the highest 3-run average NO_x emission rate from the testing, or
 - 0.15 lb/mmBtu, whichever is greater.
- §75.19(c)(1)(iv)(G)
 - Use the 95th percentile value from 3 years of quality-assured NO_x emission rate data from a NO_x-diluent CEMS
 - Part 60 or State Certified CEMS may be used.
 - The data from a Part 60 or State Certified CEMS is only useable to determine the fuel-and-unit specific NO_x emission rate, and **cannot** be used for Part 75 reporting or to assess ongoing LME qualification!

Fuel-and-Unit Specific NO_x Emission Rate



- Reduced Testing requirements (§75.19(c)(1)(iv)(I))
 - Rather than testing at four load levels, you may test at fewer loads (for a single unit or all units in a group of identical units) if the data analysis required by §75.19(c)(1)(iv)(J) demonstrates that a unit or set of identical units operated at fewer than four load levels for at least 85.0 percent of all operating hours in the previous three years (12 calendar quarters) prior to the calendar quarter of the appendix E testing. For example, if 85% of the operating hours were at one load level, a single-load test may be done at that load level.
 - If a unit reports on an ozone season-only basis, the unit may qualify for reduced testing based on unit operation in the three previous ozone seasons, rather than in the previous 12 calendar quarters.

Fuel-and-Unit Specific NO_x Emission Rate



- Representative appendix E testing may be done on a subset of low mass emissions units in a group of identical units.
- Identical units must be of the same size (based on maximum rated hourly HI), manufacturer and model, similar operating conditions etc. (§75.19(c)(1)(iv)(B)(1)).
- If all the LME units in a group qualify as identical, then representative testing of a subset of the units may be performed according to Table LM-4 of §75.19. For instance, in a group of 3 identical units, only 2 need to be tested.
- The fuel-and-unit specific NO_x Emission Rate may **NOT** be used until after the fuel-and-unit specific NO_x emission rate testing has been completed (§75.19(a)(4)).
 - Instead you must use either:
 - The applicable default from Table LM-2, or
 - The maximum potential NO_x emission rate (Part 75 Appendix A §2.1.2.1(b)).

Maximum Rated Heat Input Method



- §72.2 defines the Maximum Rated Heat Input as:
 - *“a unit-specific maximum hourly heat input (mmBtu) which is the higher of the manufacturer’s maximum rated heat input or the highest observed hourly heat input”*
- Total Heat Input for the quarter is the product of the number of operating hours (OPHrs) and the Maximum Rated Heat Input (MRHI):

$$HI_{qtr} = OPHrs_{qtr} \times MRHI$$

Long Term Fuel Flow Heat Input Method



- Quarterly Fuel Flow Determination:
 - Qualified gas billing records
 - Tank drop methods (for oil) listed in §75.19(c)(3)(ii)(B)(2), or
 - A fuel flow meter certified, maintained, and quality assured according to Part 75 Appendix D*.

- GCV Determination:
 - Part 75, Appendix D* §2.2 and 2.3, or
 - Default GCV in Table LM-5.
 - Pipeline Natural Gas - 1050 Btu/scf
 - Natural Gas - 1100 Btu/scf
 - Residual Oil - 19,700 Btu/lb or 167,500 Btu/gal
 - Diesel Fuel - 20,500 Btu/lb or 151,700 Btu/gal

*Note – While certain paragraphs of §75.19 reference sections of Appendix D, the methodology is still LME

LME NO_x Mass Determinations



- At the end of each reporting period, the total heat input is apportioned to each operating hour by load
- The NO_x emission rate is multiplied by the hourly heat input value to determine the NO_x mass emissions (lb) for each hour of operation
- The hourly NO_x mass values are then summed over each reporting period and over the entire ozone season and/or calendar year (as applicable).

LME Resources



- An LME tutorial is also available to show you how to use ECMPS to generate monitoring plans and quarterly reports:
http://ecmps.camdsupport.com/tutorials/ECMPS_LME_Emissions.htm
- More information about LME is available in Section 6 of the *Plain English Guide to the Part 75 Rule*:
http://www.epa.gov/airmarkets/emissions/docs/plain_english_guide_part75_rule.pdf
- For questions, please contact your appropriate EMB Analyst:
<http://www.epa.gov/airmarkets/emissions/cem-contact.html>