Subpart V—Nitric Acid Production

§ 98.220 Definition of source category.

A nitric acid production facility uses one or more trains to produce weak nitric acid (30 to 70 percent in strength). A nitric acid train produces weak nitric acid through the catalytic oxidation of ammonia.

§ 98.221 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains a nitric acid train and the facility meets the requirements of either § 98.2(a)(1) or (a)(2).

§ 98.222 GHGs to report.

(a) You must report N_2O process emissions from each nitric acid production train as required by this subpart.

(b) You must report under subpart C of this part (General Stationary Fuel Combustion Sources) the emissions of CO_2, CH_4, and N_2O from each stationary combustion unit by following the requirements of subpart C.

§ 98.223 Calculating GHG emissions.

(a) You must determine annual N_2O process emissions from each nitric acid train according to paragraphs (a)(1) or (a)(2) of this section.

(1) Use a site-specific emission factor and production data according to paragraphs (b) through (h) of this section.

(2) Request Administrator approval for an alternative method of determining N_2O emissions according to paragraphs (a)(2)(i) and (a)(2)(ii) of this section.

(i) You must submit the request within 45 days following promulgation of this subpart or within the first 30 days of each subsequent reporting year.

(ii) If the Administrator does not approve your requested alternative method within 150 days of the end of the reporting year, you must determine the N_2O emissions factor for the current reporting period using the procedures specified in paragraph (a)(1) of this section.

(b) You must conduct an annual performance test according to paragraphs (b)(1) through (b)(3) of this section.

(1) You must measure N_2O emissions from the absorber tail gas vent for each nitric acid train using the methods specified in § 98.224(b) through (d).

(2) You must conduct the performance test under normal process operating conditions and without using N_2O abatement technology (if applicable).

(3) You must measure the production rate during the performance test and calculate the production rate for the test period in metric tons (100 percent acid basis) per hour.

(c) You must determine an N_2O emissions factor to use in Equation V–3 of this section according to paragraphs (c)(1) or (c)(2) of this section.

(1) You may request Administrator approval for an alternative method of determining N_2O concentration according to the procedures in paragraphs (a)(2)(i) and (a)(2)(ii) of this section. Alternative methods include the use of N_2O CEMs.

(2) Using the results of the performance test in paragraph (b) of this section, you must calculate an average site-specific emission factor for each nitric acid train "t" according to Equation V–1 of this section:

$$EF_{N2Ot} = \frac{\sum_{1}^{n} \dfrac{C_{N2O} * 1.14 \times 10^{-7} * Q}{P}}{n} \qquad \text{(Eq. V-1)}$$

Where:

EF_{N2Ot} = Average site-specific N_2O emissions factor for nitric acid train "t" (lb N_2O generated/ton nitric acid produced, 100 percent acid basis).

C_{N2O} = N_2O concentration for each test run during the performance test (ppm N_2O).

1.14×10^{-7} = Conversion factor (lb/dscf-ppm N_2O).

Q = Volumetric flow rate of effluent gas for each test run during the performance test (dscf/hr).

P = Production rate for each test run during the performance test (tons nitric acid produced per hour, 100 percent acid basis).

n = Number of test runs.

(d) If applicable, you must determine the destruction efficiency for each N_2O abatement technology according to paragraphs (d)(1), (d)(2), or (d)(3) of this section.

(1) Use the manufacturer's specified destruction efficiency.

(2) Estimate the destruction efficiency through process knowledge. Examples of information that could constitute process knowledge include calculations based on material balances, process stoichiometry, or previous test results provided the results are still relevant to the current vent stream conditions. You must document how process knowledge (if applicable) was used to determine the destruction efficiency.

(3) Calculate the destruction efficiency by conducting an additional performance test on the emissions stream following the N_2O abatement technology.

(e) If applicable, you must determine the abatement factor for each N_2O abatement technology. The abatement factor is calculated for each nitric acid train according to Equation V–2 of this section.

$$AF_{Nt} = \frac{P_{at\ Abate}}{P_{at}} \quad \text{(Eq. V-2)}$$

Where:

$AF_{N\ t}$ = Abatement factor of N_2O abatement technology at nitric acid train "t" (fraction of annual production that abatement technology is operating).

$P_{a\ t}$ = Total annual nitric acid production from nitric acid train "t" (ton acid produced, 100 percent acid basis).

$P_{a\ t\ Abate}$ = Annual nitric acid production from nitric acid train "t" during which N_2O abatement was used (ton acid produced, 100 percent acid basis).

(f) You must determine the annual amount of nitric acid produced and the annual amount of nitric acid produced while each N_2O abatement technology is operating from each nitric acid train (100 percent basis).

(g) You must calculate N_2O emissions for each nitric acid train by multiplying the emissions factor (determined in Equation V–1 of this section) by the annual nitric acid production and accounting for N_2O abatement, according to Equation V–3 of this section:

$$EF_{N_2Ot} = \sum_{N=1}^{z} \frac{EF_{N2Ot} * P_{at} * \left(1 - \left(DF_{Nt} * AF_{Nt}\right)\right)}{2204.63} \quad \text{(Eq. V-3)}$$

Where:

E_{N2Ot} = N_2O mass emissions per year for nitric acid train "t" (metric tons).

EF_{N2Ot} = Average site-specific N_2O emissions factor for nitric acid train "t" (lb N_2O generated/ton acid produced, 100 percent acid basis).

$P_{a\ t}$ = Annual nitric acid production from the train "t" (ton acid produced, 100 percent acid basis).

$DF_{N\ t}$ = Destruction efficiency of N_2O abatement technology N that is used on nitric acid train "t" (percent of N_2O removed from air stream).

$AF_{N\ t}$ = Abatement factor of N_2O abatement technology for nitric acid train "t" (fraction of annual production that abatement technology is operating).

2204.63 = Conversion factor (lb/metric ton).

z = Number of different N_2O abatement technologies.

(h) You must determine the annual nitric acid production emissions combined from all nitric acid trains at your facility using Equation V–4 of this section:

$$N_2O = \sum_{t=1}^{m} E_{N2Ot} \qquad \text{(Eq. V-4)}$$

Where:

N_2O = Annual process N_2O emissions from nitric acid production facility (metric tons).

E_{N2Ot} = N_2O mass emissions per year for nitric acid train ''t'' (metric tons).

m = Number of nitric acid trains.

§ 98.224 Monitoring and QA/QC requirements.

(a) You must conduct a new performance test and calculate a new site-specific emissions factor according to a test plan as specified in paragraphs (a)(1) through (a)(3) of this section.

(1) Conduct the performance test annually.

(2) Conduct the performance test when your nitric acid production process is changed, specifically when abatement equipment is installed.

(3) If you requested Administrator approval for an alternative method of determining N_2O concentration under § 98.223(a)(2), you must conduct the performance test if your request has not been approved by the Administrator within 150 days of the end of the reporting year in which it was submitted.

(b) You must measure the N_2O concentration during the performance test using one of the methods in paragraphs (b)(1) through (b)(3) of this section.

(1) EPA Method 320 at 40 CFR part 63, appendix A, Measurement of Vapor Phase Organic and Inorganic Emissions by Extractive Fourier Transform Infrared (FTIR) Spectroscopy.

(2) ASTM D6348–03 Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy (incorporated by reference in § 98.7).

(3) An equivalent method, with Administrator approval.

(c) You must determine the production rate(s) (100 percent basis) from each nitric acid train during the performance test according to paragraphs (c)(1) or (c)(2) of this section.

(1) Direct measurement of production and concentration (such as using flow meters, weigh scales, for production and concentration measurements).

(2) Existing plant procedures used for accounting purposes (i.e. dedicated tank-level and acid concentration measurements).

(d) You must conduct all performance tests in conjunction with the applicable EPA methods in 40 CFR part 60, appendices A–1 through A–4. Conduct three emissions test runs of 1 hour each. All QA/QC procedures specified in the reference test methods and any associated performance specifications apply. For each test, the facility must prepare an emission factor determination report that must include the items in paragraphs (d)(1) through (d)(3) of this section.

(1) Analysis of samples, determination of emissions, and raw data.

(2) All information and data used to derive the emissions factor(s).

(3) The production rate during each test and how it was determined.

(e) You must determine the monthly nitric acid production and the monthly nitric acid production during which N_2O abatement technology is operating from each nitric acid train according to the methods in paragraphs (c)(1) or (c)(2) of this section.

(f) You must determine the annual nitric acid production and the annual nitric acid production during which N_2O abatement technology is operating for each train by summing the respective monthly nitric acid production quantities.

§ 98.225 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations is required. Therefore, whenever a quality-assured value of a required parameter is unavailable, a substitute data value for the missing parameter shall be used in the calculations as specified in paragraphs (a) and (b) of this section.

(a) For each missing value of nitric acid production, the substitute data