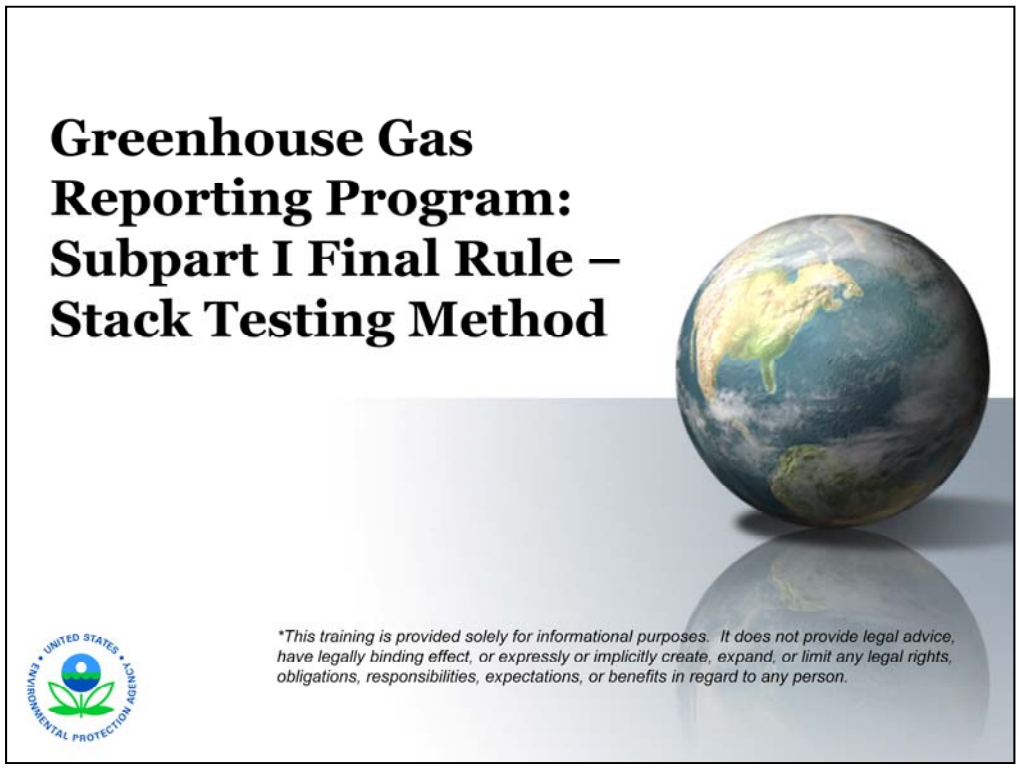
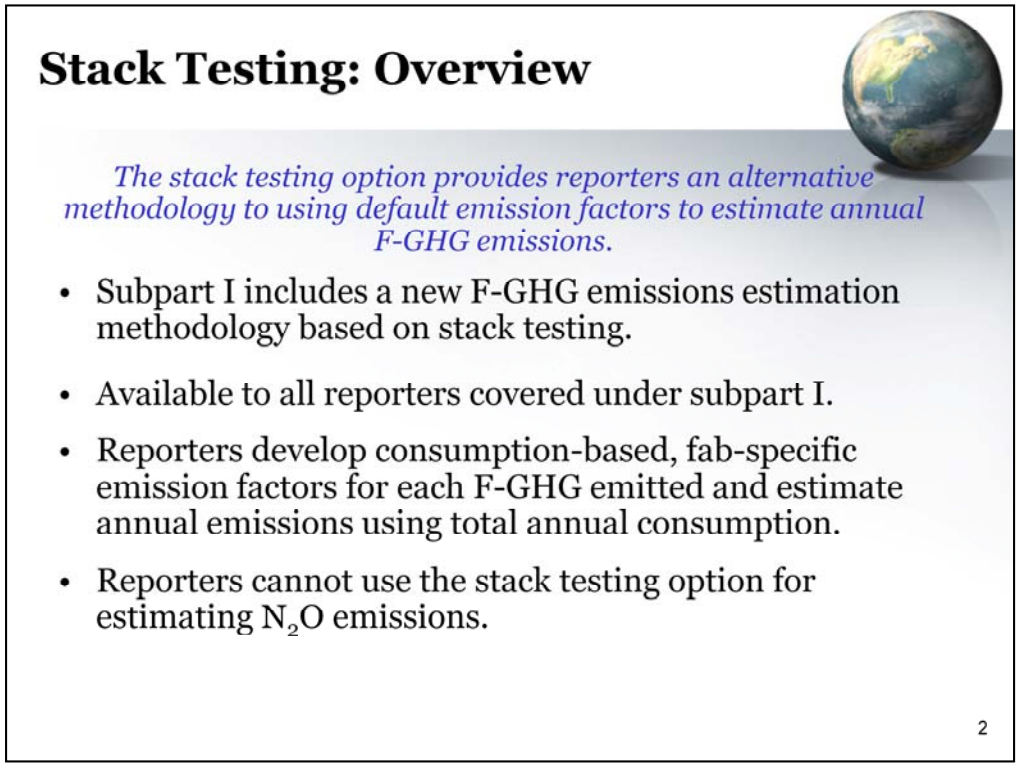


Welcome to the U.S. Environmental Protection Agency's Greenhouse Gas Reporting Rule online training. This training covers the 2013 Final Amendments to subpart I, which were published in the Federal Register on November 13, 2013. A copy of the Federal Register Final rule notice is available on our website – http://www.epa.gov/ghgreporting.

This webinar specifically covers the alternative stack testing method under 40 CFR 98.93(i) of the final subpart I rule. A separate webinar covers the other changes to the rule in the final rule amendments.

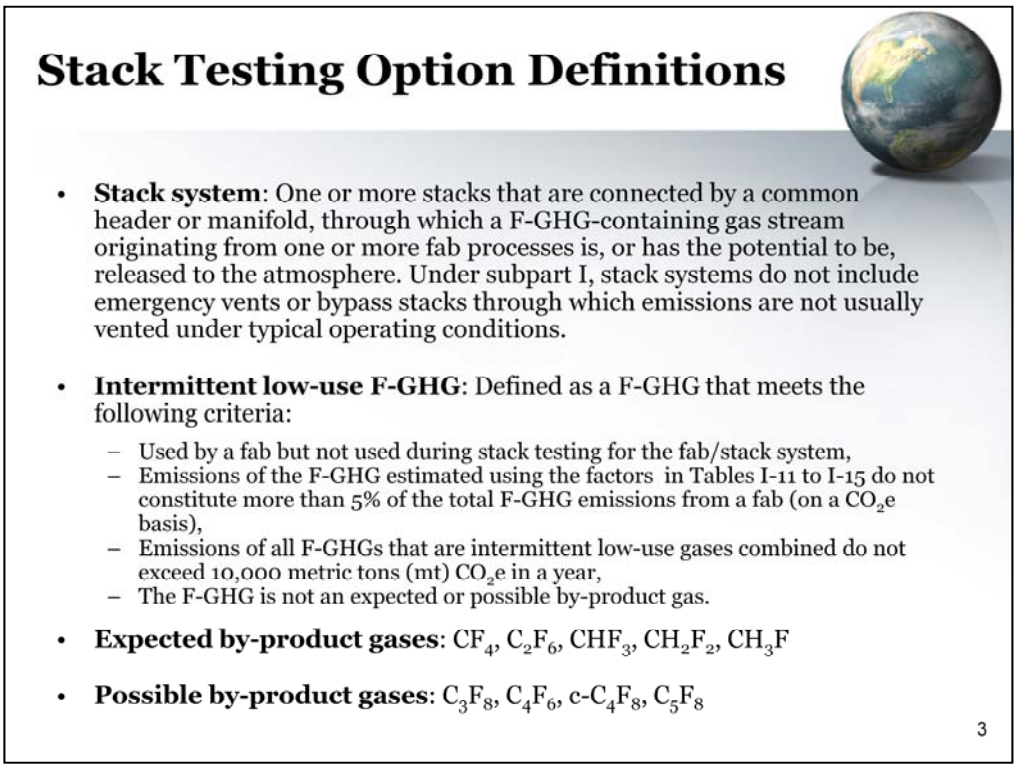
Disclaimer: This training is provided solely for informational purposes. It does not provide legal advice, have legally binding effect, or expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits in regard to any person.



The stack testing option under 40 CFR 98.93(i) is available to all reporters subject to subpart I, including semiconductor, MEMS, LCD, and PV manufacturers.

The stack testing option is based on the conclusion that F-GHG emissions are a direct and reasonably constant function of F-GHG consumption. Under the stack testing option, reporters measure emissions of F-GHGs from their fab and use the consumption of F-GHGs during the emissions test to develop fab-specific F-GHG emission factors. Reporters then multiply those fab-specific emission factors by the annual consumption of F-GHGs to determine their total annual F-GHG emissions.

A review of stack test data provided to EPA revealed inconsistent results for stack measurements of N2O emissions. Since a cause could not be isolated for the inconsistencies, and the reliability of estimating N2O emissions using fab-specific factors could not be determined, reporters cannot use the stack testing option to estimate annual N2O emissions.



The following definitions are helpful for understanding the stack testing method:

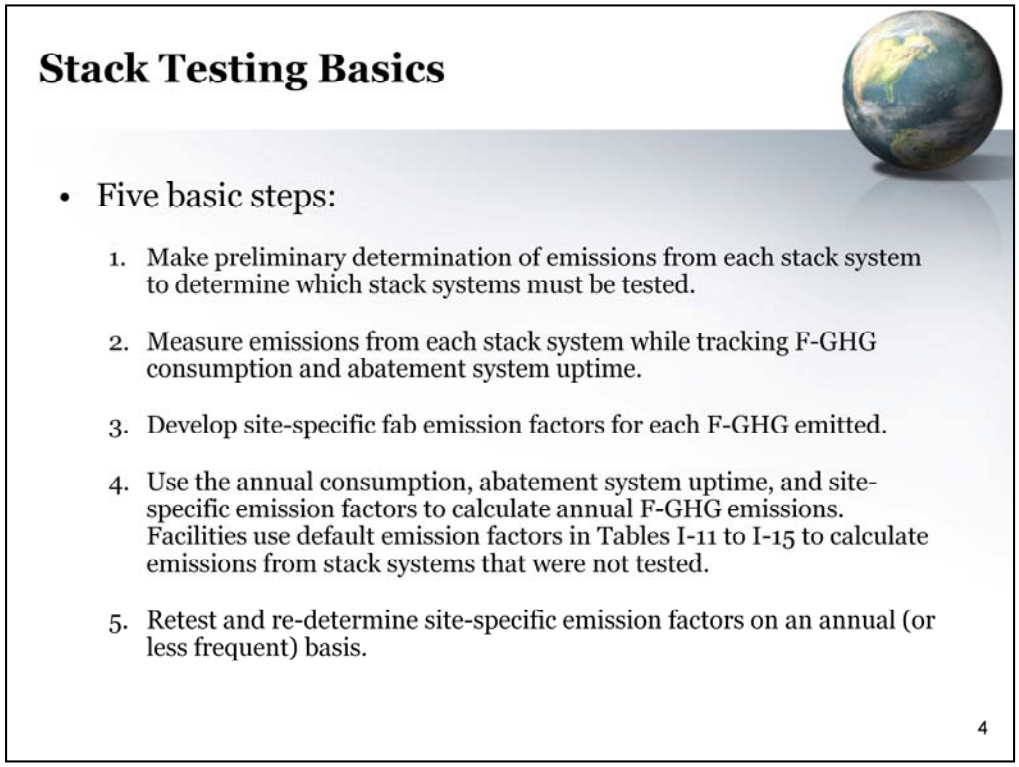
A **stack system** means one or more stacks that are connected by a common header or manifold, through which a F-GHG-containing gas stream originating from one or more fab processes is, or has the potential to be, released to the atmosphere. Under subpart I, stack systems do not include emergency vents or bypass stacks through which emissions are not usually vented under typical operating conditions.

An **intermittent low-use F-GHG** is defined as a F-GHG that meets the following criteria: (1) Used by a fab, but not used during stack testing for the fab/stack system, (2) Emissions of the gas estimated using the methods in 40 CFR 98.93(i)(4)) and the factors in Tables I-11 to I-15 do not constitute more than 5% of the total F-GHG emissions from a fab (on a CO2e basis), (3) Emissions of all F-GHGs that are intermittent low-use gases combined do not exceed 10,000 metric tons (mt) of CO2e in a year, and (4) The F-GHG is not an expected or possible by-product gas identified in Table I-17 of subpart I, and listed in the slide.

Expected by-products are those F-GHG expected to be emitted as a by-product (i.e., CF4, C2F6, CHF3, CH2F2, and CH3F).

Possible by-products are those F-GHG that are possibly emitted as a by-product (i.e., C3F8, C4F6, c-C4F8, and C5F8).

Both expected and possible by-products are listed in Table I-17 to subpart I. The distinction between expected and possible by-products is important when reporters measure for F-GHGs that may occur in concentrations below the field detection limit (FDL). The FDL is the lowest concentration that should be detectable through measurements. This distinction is covered in greater detail later in the presentation.



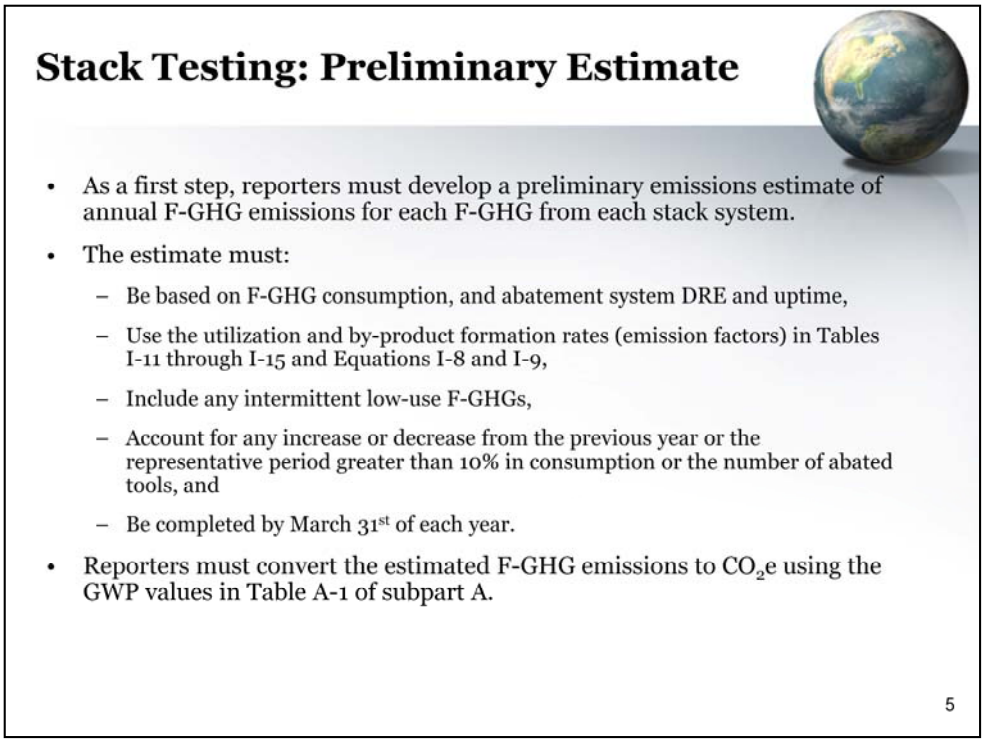
The stack testing option can be divided into 5 basic steps.

Reporters first make a preliminary determination of emissions from each stack system to determine which stack systems must be tested based on default emission factors in Tables I-11 to I-15 and criteria described in the rule.

After reporters determine which stack systems must be tested, they must measure emissions from each stack system while tracking consumption of F-GHGs in tools associated with the stack systems being tested. Reporters then use the emissions and consumption data to develop site-specific emission factors for each F-GHG emitted from the fab for which stack testing is being used.

Throughout the reporting year, reporters track F-GHG consumption and abatement system downtime. At the conclusion of the reporting year, reporters use the annual consumption and abatement system downtime, in conjunction with the site-specific emission factors, to calculate annual F-GHG emissions for each fab. Reporters must use default emission factors in Tables I-11 to I-15 to calculate emissions from stack systems that were not tested.

Reporters must re-determine their site-specific emission factors on an annual basis. Reporters have the option to test less frequently if they meet certain criteria under subpart I. As discussed later, reporters are also required to perform a re-test if certain scenarios occur.

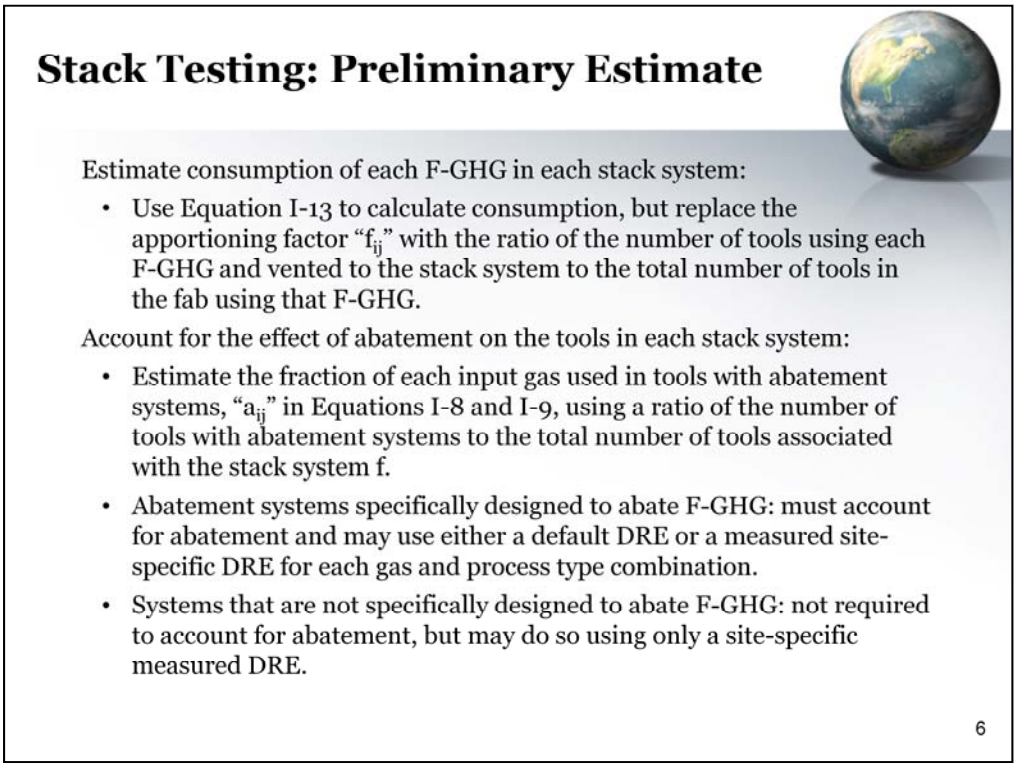


As a first step, reporters must develop a preliminary emissions estimate of annual F-GHG emissions for each F-GHG from each stack system by March 31st of each year (see 40 CFR 98.93(i)(1)). To develop the preliminary estimate, reporters must use the gas consumption in the tools associated with the stack system and gas utilization rates and by-product formation rates in Tables I-11 through I-15 of subpart I in conjunction with Equations I-8 and I-9. In developing the preliminary estimate, the “process sub-type or process type” basis in Equations I-8 and I-8 is replaced by a “stack system” basis. Reporters are also required to include any intermittent low-use F-GHGs in the estimate.

Reporters must use representative data from the previous reporting year to estimate consumption and the uptime of all abatement systems in each stack system. If data from the previous reporting year are not available, reporters must use representative operating data from a period of 30 days or more.

Reporters must also account for any anticipated change in activity for the fab (i.e., an increase or decrease in the annual consumption and emissions of any F-GHG) greater than 10 percent for the current reporting year compared to the previous reporting year. Reporters must use a quantifiable metric, engineering judgment, or other industry standard practice to account for the change.

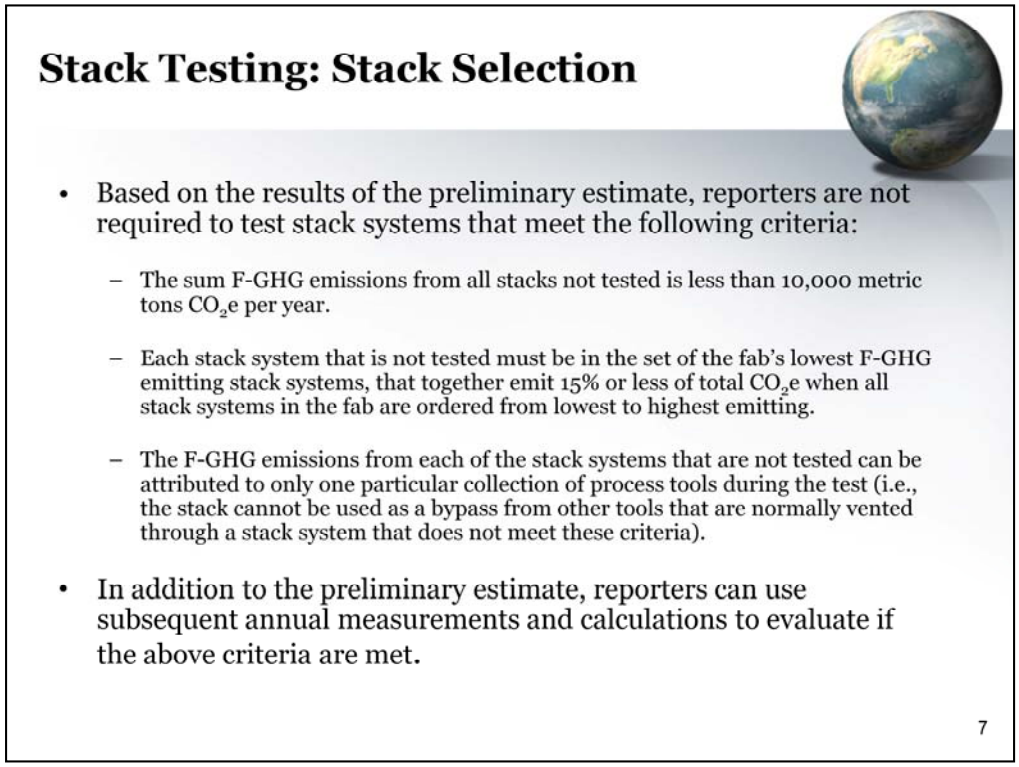
Reporters must convert the preliminary estimate to a CO2e basis using the GWP values in Table A-1 of subpart A. Reporters must use a default value of 2,000 for F-GHGs in Tables I-11 through I-15 for which Table A-1 does not list a GWP.



As part of the preliminary estimate, reporters must estimate the consumption of each F-GHG in each stack system. This can be done by multiplying the total consumption of that gas, by the ratio of the number of tools using that F-GHG associated with the stack system, to the total number of tools using that F-GHG in the fab.

Reporters must also account for abatement in the preliminary estimate, including the fraction of gas used in tools with abatement, and the DRE of the abatement system. If the systems are specifically designed to abate F-GHG, they must account for abatement; if they are not specifically designed for F-GHG, accounting for abatement is optional. To estimate the fraction of gas used in tools with abatement, "a_{ij}" in Equations I-8 and I-9, reporters use the ratio of the number of tools with abatement systems to the total number of tools associated with the stack system.

For abatement systems specifically designed to abate F-GHG, reporters may use either a default DRE or a measured site-specific DRE for each gas and process type combination. For systems that are not specifically designed to abate F-GHG, if reporters elect to account for abatement, they must use only a site-specific measured DRE. Reporters cannot use the default DREs for systems that are not specifically designed to abate F-GHG.

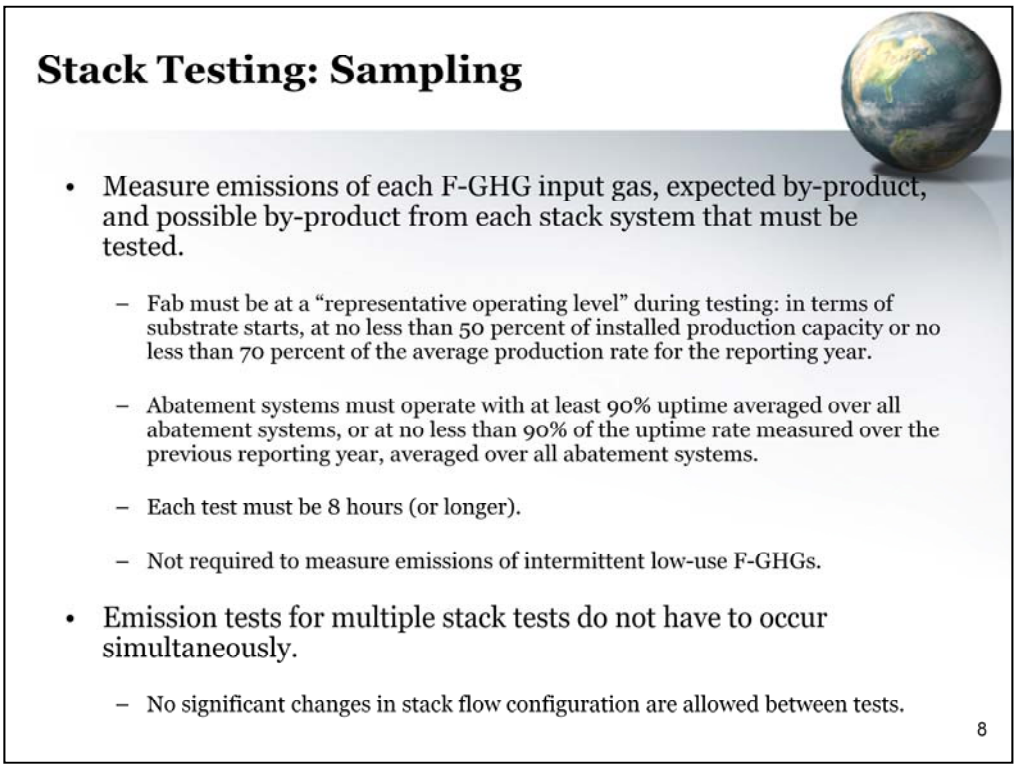


Using the results of the preliminary estimate, reporters must rank the F-GHG emitting stack systems at their fab from lowest to highest emitting and determine which stack systems must be tested per 40 CFR 98.93(i)(2). Reporters are not required to test low-emitting stack systems if those stack systems meet the following three criteria:

1) The sum of the F-GHG emissions from all combined stack systems in the fab that are not tested is less than 10,000 metric tons CO2e per year;
2) Each of the stack systems that are not tested are within the fab's lowest F-GHG emitting stack systems that together emit 15% or less of total CO2e F-GHG emissions from the fab; and
3) The F-GHG emissions from each of the stack systems that are not tested can be attributed to only one particular collection of process tools during the test (i.e., the stack cannot be used as a bypass from other tools that are normally vented through a stack system that does not meet these criteria).

In addition to the preliminary estimate under 40 CFR 98.93(i)(1), reporters can use subsequent annual measurements and calculations to evaluate if the above criteria are met.

Recall that a stack system, as defined in subpart I and presented in an earlier slide, means one or more stacks that are connected by a common header or manifold through which a fluorinated GHG-containing gas stream originating from one or more fab processes is, or has the potential to be, released to the atmosphere.



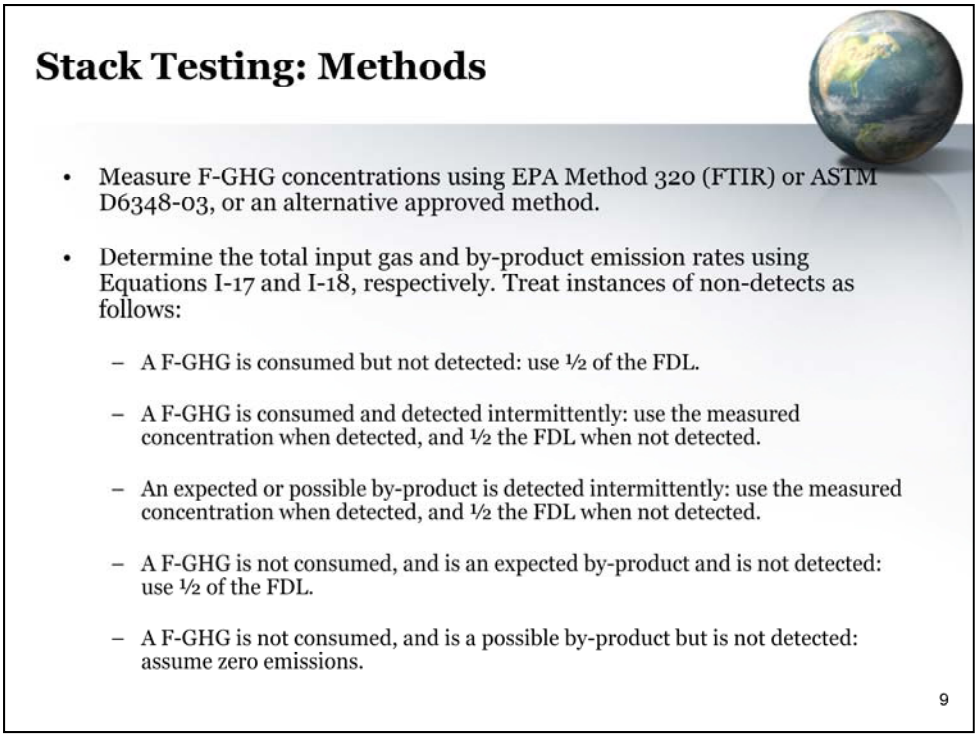
For stack systems that must be tested, reporters must measure emissions of each F-GHG input gas, expected by-product, and possible by-product (as defined earlier).

The tests must be conducted during a period in which the fab is operating at a "representative operating level" as defined in 40 CFR 98.98: in terms of substrate starts for the period of testing or monitoring, at no less than 50 percent of installed production capacity or no less than 70 percent of the average production rate for the reporting year.

The test must also be conducted with the abatement systems connected to the stack operating with at least 90% average uptime, or at no less than 90% of the uptime measured during the previous reporting year (averaged over all abatement systems connected to the stack system being tested).

Reporters are not required to test for F-GHGs that meet the intermittent low-use criteria; however, if a F-GHG was not consumed during the stack test, but does not meet the definition of an intermittent low-use F-GHG, reporters are required to test the stack systems associated with the use of the particular F-GHG when the gas is being consumed at a magnitude that allows determination of an emission factor. If a F-GHG consumed in the reported year was not consumed during the stack test, and is no longer being used by the fab, then emissions of that gas must be calculated using the default emission factor estimation methodology under 40 CFR 98.93(i)(4).

Reporters are not required to measure all stacks simultaneously, but reporters must certify that no significant changes in stack flow configuration occur between tests. Specifically, no more than 10% of the total number of F-GHG emitting tools may be newly connected or disconnected during testing and no operating tools may be moved to a different stack system during testing. Additionally, no POU abatement systems may be permanently removed from service during testing.



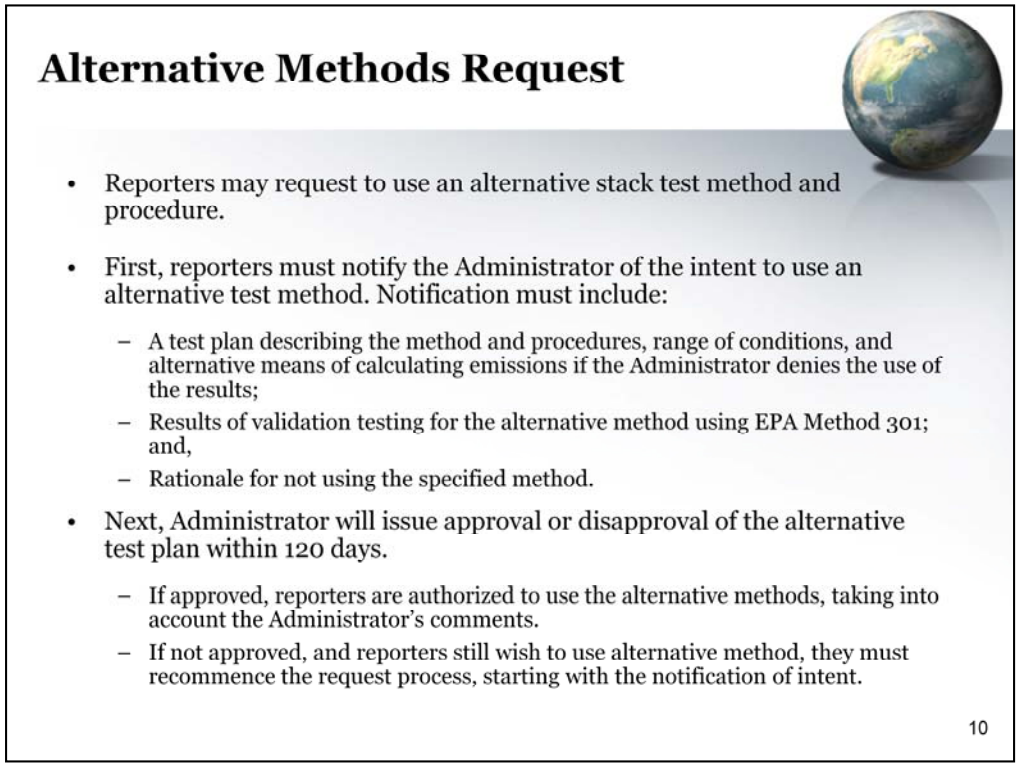
To conduct the stack testing, reporters must use EPA Method 320, ASTM D6348-03 to measure F-GHG concentration. Reporters must also use EPA Methods 1 through 4 at 40 CFR part 60, appendices A-1, A-2, and A-3 to measure other stack gas parameters needed to convert F-GHG concentrations to mass emissions. Reporters can request permission from the EPA to use an alternative to any of the stack testing methods specified in Table I-9 of subpart I using the procedures under § 98.94(k) (Additional details on requesting the use of an alternative method are covered later in the presentation).

If reporters elect to use ASTM D6348-03, they must also adhere to additional requirements that are specified in the footnotes to Table I-9 to subpart I regarding the methods and procedures for conducting emissions tests.

Reporters determine the total input gas and by-product emission rates (in kg per hour) using Equations I-17 and I-18 (respectively). **Note:** The EPA is aware of two minor errors in Equation I-17 in the final rule amendments. The first is that the term Q_j should actually be Q_s, as it is in the definition of terms listed below the equation. The second is that the term under the summation sign that reads s=1 should instead be m=1, where m is the time interval.

The final rule amendments specify how reporters must handle stack concentrations that are “non-detects” below the field detection limit (FDL) for the methods. The FDL is the lowest concentration that should be detectable through measurements, as defined in Method 320. Reporters must treat these instances as follows:
•If a F-GHG is consumed during testing, but emissions are not detected, the reporter must use ½ of the FDL for the concentration of that F-GHG in calculations.
•If a F-GHG is consumed during testing and detected intermittently during the test run, the reporter must use the measured concentration for the value of that F-GHG when available and use ½ of the FDL for the value when the F-GHG is not detected.
•If a F-GHG is an expected or possible by-product (as listed in Table I-17), and is detected intermittently during the test run the reporter must use the measured concentration for the value of that F-GHG when available and use ½ of the FDL for the value when the F-GHG is not detected.
•If a F-GHG is not consumed, and is an expected by-product and is not detected, the reporter must use ½ of the FDL.
•If a F-GHG is not consumed, and is a possible byproduct and is not detected, the reporter must assume zero emissions for that F-GHG for the tested stack system.

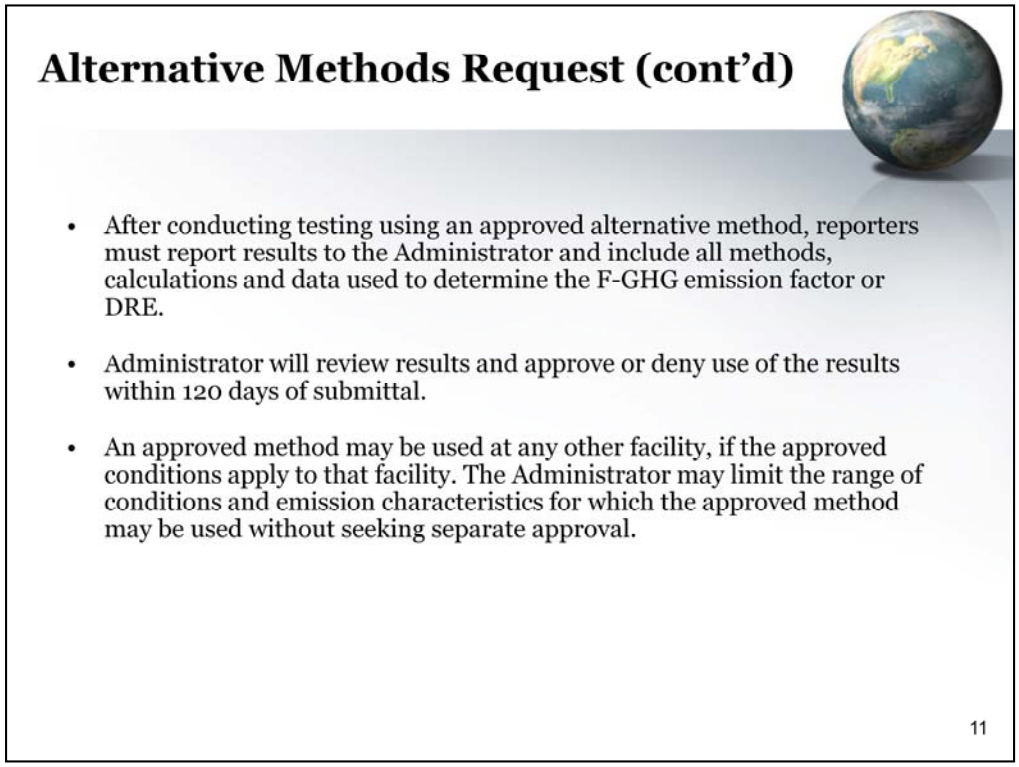
Reporters are required to achieve FLDs that are less than or equal to the maximum FDLs listed in Table I-10.



In the final rule amendments, reporters may request to use an alternative stack test method and procedure (or an alternative method to determine abatement system DRE) by adhering to the requirements in 40 CFR 98.94(k)(1) through (k)(6). An alternative method is any method of sampling and analyzing for a fluorinated GHG or N2O, or the determination of parameters other than concentration (e.g., flow measurements) that is not a method specified in subpart I and that has been demonstrated to the Administrator's satisfaction, using Method 301 in appendix A of part 63, to produce results adequate for the Administrator's determination that it may be used in place of a method specified elsewhere in subpart I.

Reporters must first notify the Administrator (or authorized representative) of the intent to use an alternative test method. The notification must include a test plan describing the alternative method and procedures, the range of conditions over which the validation is intended to be applicable, and an alternative means of calculating the fab-level F-GHG emissions (or abatement system DRE) if the Administrator denies the use of the results of the alternative method. The reporter must validate the alternative method using EPA method 301 and submit the results of the Method 301 validation process along with the notification of intention and a rationale for not using the specified method.

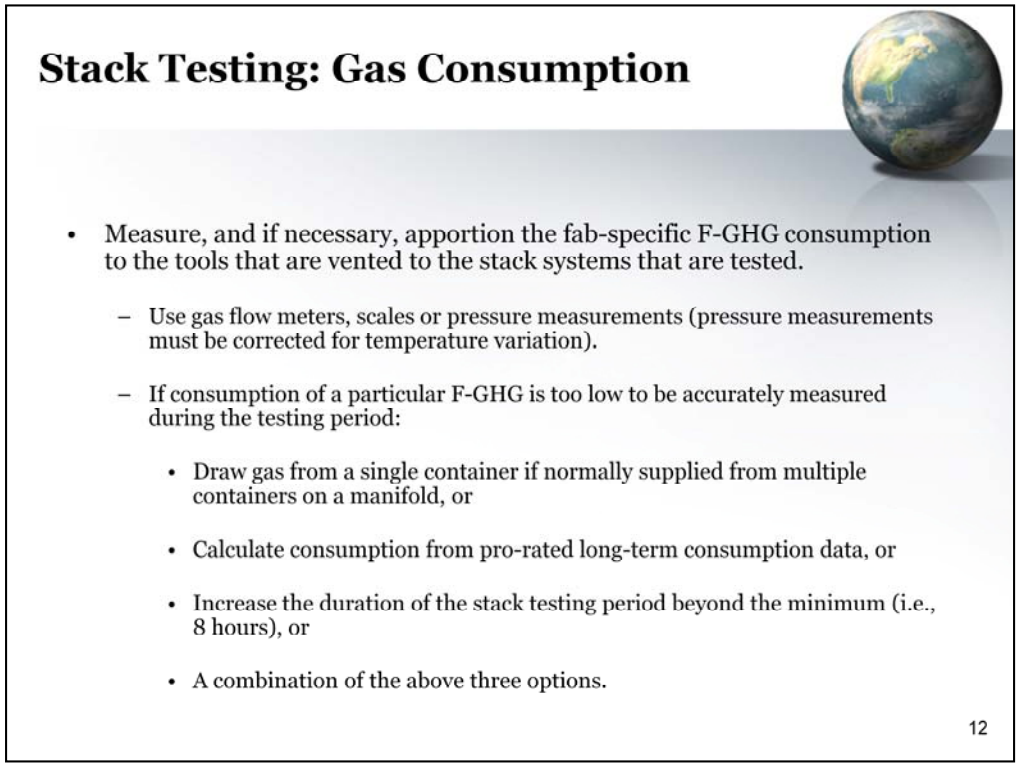
The Administrator will review the submission and issue an approval or disapproval of the alternative test plan within 120 days of the reporter's notification. The reporter is required to respond to any of the Administrator's questions on the test plan before obtaining approval and take into account the Administrators comments on the test plan in conducting the test using the alternative method. The reporter must respond to questions or requests for additional information during the 120 day review period and the Administrator's questions or request for additional information will not extend that review period. Therefore, it is the reporter's obligation to respond in a timely manner. If the alternative test plan is not approved and the reporter still wishes to use an alternative method, the reporter must recommence the process starting with the notification of intent.



The reporter must report the results of stack testing using the alternative method and procedure specified in the approved test plan. The report must include all methods, calculations and data used to determine F-GHG emissions.

The Administrator (or her designated representative) will review the results of the test using the alternative methods and procedure and then approve or deny the use of the results of the alternative test method and procedure no later than 120 days after they are submitted. During this 120-day period, the reporter is required to respond to any of the Administrator's questions on the test report before obtaining approval of the final test results using the alternative method. If the Administrator finds reasonable grounds to dispute the results obtained by the alternative method, the Administrator may require the use of the method specified in subpart I instead of the alternative method.

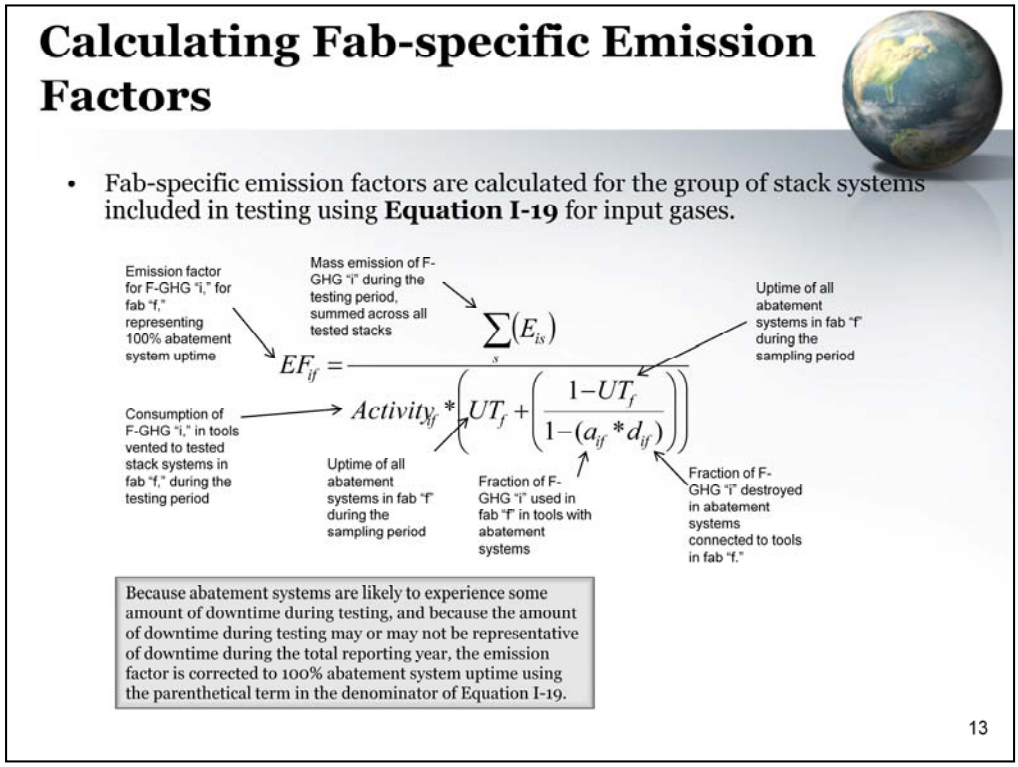
Once the Administrator approves the use of the alternative method, that method may be used by any other facility for the same F-GHGs and types of stack systems, if the approved conditions apply to that facility. In granting approval, the Administrator will limit the range of test conditions and emission characteristics for which that approval is granted and under which the alternative method may be used without seeking further approval. The Administrator will specify those limitations, if any, in the approval of the alternative method.



To convert the measured F-GHG emission rates into fab-specific emission factors, reporters must measure, and if necessary, apportion the fab-specific F-GHG consumption to the tools that are vented to the stack systems that are tested (excluding gas consumption allocated to tools venting to low-emitting stack systems that are not tested).

Reporters may measure consumption using gas flow meters, scales, or pressure measurements, but pressure measurements must be corrected for temperature variation and non-ideal gas behavior. For gases with low volume consumption for which it is infeasible to measure consumption accurately over the 8-hour testing duration, short-term consumption may be estimated by using one or more of the following:

(1) Drawing from single gas containers in cases where gas is normally supplied from multiple containers on a manifold, or
(2) Calculating consumption from pro-rated long-term consumption data (e.g., monthly), or
(3) Increasing the duration of the stack testing period beyond the minimum (i.e., 8 hours), or
(4) A combination of the above three options.



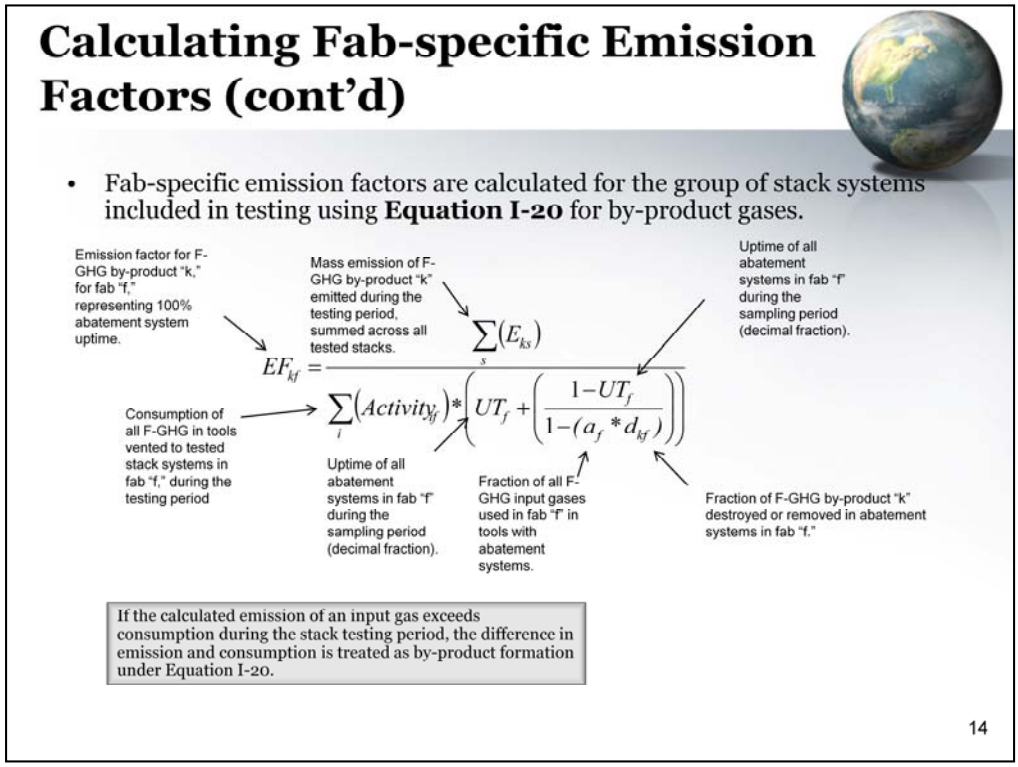
Reporters must use equation I-19 to convert the measured F-GHG emission and consumption rates into fab-specific emission factors for input gases.

Equation I-19 basically divides emissions by consumption and corrects the factor for any downtime of abatement systems during testing. For each input F-GHG, the result of Equation I-17 is used in the summation which makes up the numerator in Equation I-19.

The denominator of Equation I-19 includes two main terms. The first is the "$Activity_{if}$" which represents the consumption of the input F-GHG during the testing period. The second term, which is bracketed by parenthesis, represents a correction to 100% abatement system uptime, based on the uptime, fraction of tools abated, and the DRE for the F-GHG in the fab. The correction is necessary because abatement systems are likely to experience some amount of downtime during testing, and the amount of downtime may or may not be representative of downtime during the total reporting year. The uptime term "UT_f" is calculated using Equation I-23 and the term "d_{if}" is calculated using Equation I-24, both of which are discussed later in the presentation.

The result of Equation I-19 is a fab-specific emission factor for F-GHG "i" representing 100% abatement system uptime. The result of Equation I-19 is used in Equation I-21 (along with annual consumption and annual abatement system uptime) to calculate total annual fab emissions for the F-GHG input gas.

An additional note: if the emissions of an input gas exceed the consumption of the input gas during the sampling period, then the mass emissions term for that input gas in the numerator in Equation I-19 is set equal to consumption, and the difference between emissions and consumption is treated as a by-product emission in Equation I-20 (next slide). In this scenario, the consumption of the input gas is excluded from the activity term in Equation I-20.

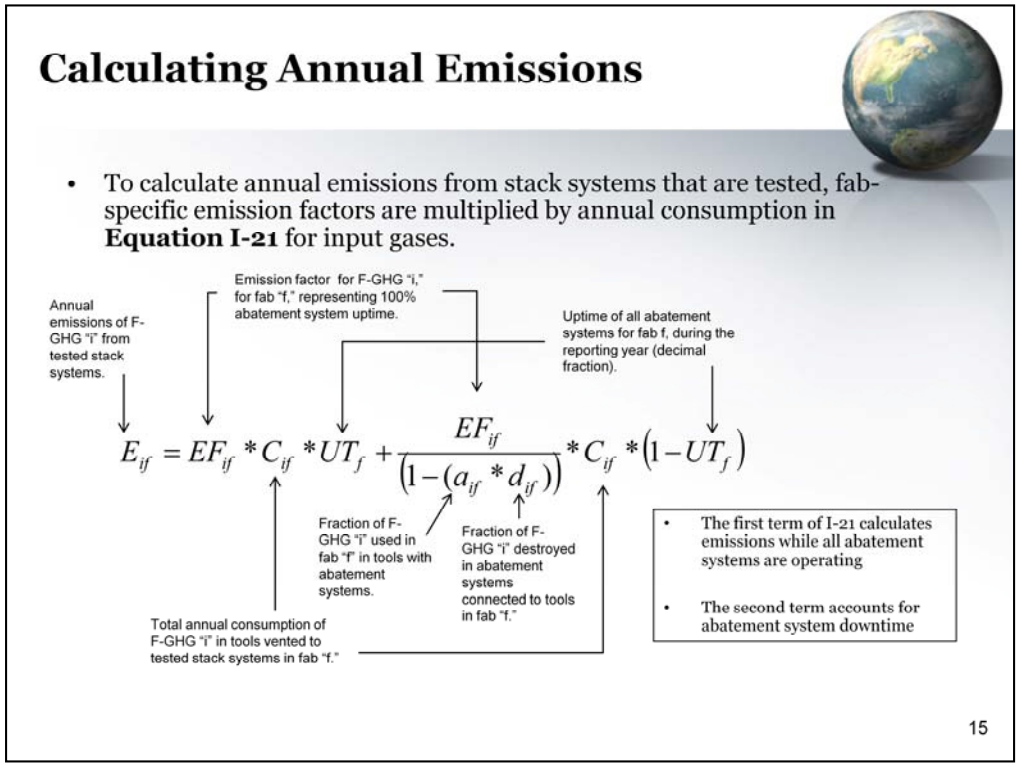


Reporters must use equation I-20 to convert the measured F-GHG emission and consumption rates into fab-specific emission factors for by-product gases.

Equation I-20 divides emissions of a particular by-product gas by the consumption of all F-GHGs in tools vented to tested stack systems and corrects the factor for any downtime of abatement systems during testing. For each by-product gas, the result of Equation I-18 is used in the summation which makes up the numerator in Equation I-20.

The denominator of Equation I-20 includes two main terms. The first is the summation of "Activity" which represents the consumption of all the input F-GHG during the testing period. However, when calculating the by-product emission factor for an input gas for which emissions exceeded its consumption, reporters must exclude the consumption of that input gas from the term "$\Sigma(Activity_{if})$." As in Equation I-19, the second term, which is bracketed by parenthesis, represents a correction to 100% abatement system uptime, based on the uptime, fraction of tools abated, and the DRE for the F-GHG in the fab. The correction is necessary because abatement systems are likely to experience some amount of downtime during testing, and the amount of downtime may or may not be representative of downtime during the total reporting year. The uptime term "UT_f" is calculated using Equation I-23 and the term "d_{kf}" is calculated using Equation I-24, both of which are discussed later in the presentation.

The result of Equation I-20 is a fab-specific emission factor for by-product "k" representing 100% abatement system uptime. The result of Equation I-20 is used in Equation I-22 (along with annual consumption and annual abatement system uptime) to calculate total annual fab emission for the by-product gas.

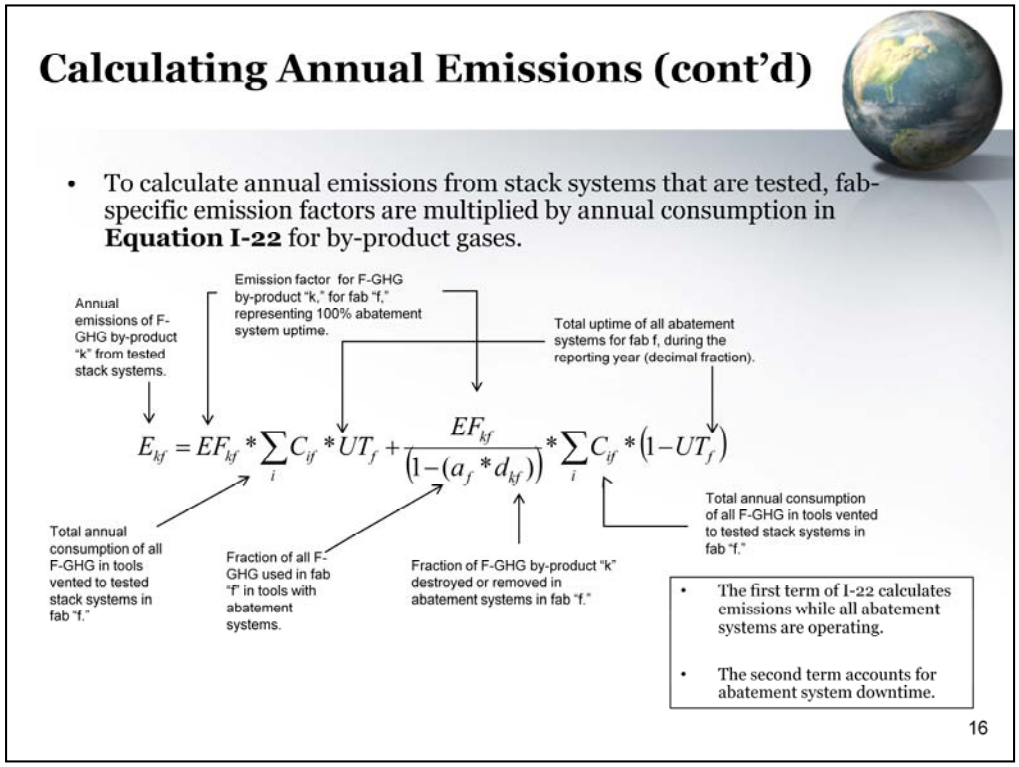


To calculate annual emissions of each input gas from stack systems that are tested, reporters must multiply the fab-specific emission factors (developed in Equation I-19) by annual consumption as prescribed in Equation I-21.

Equation I-21 consists of two basic parts. The first term on the right hand side of the equation (before the plus sign) represents emissions for the period when all abatement systems are in operational mode (this is why the emission factor in Equation I-19 was corrected to 100% uptime). The emission factor from Equation I-19 is multiplied by consumption and uptime of all abatement systems for the fab (a decimal fraction).

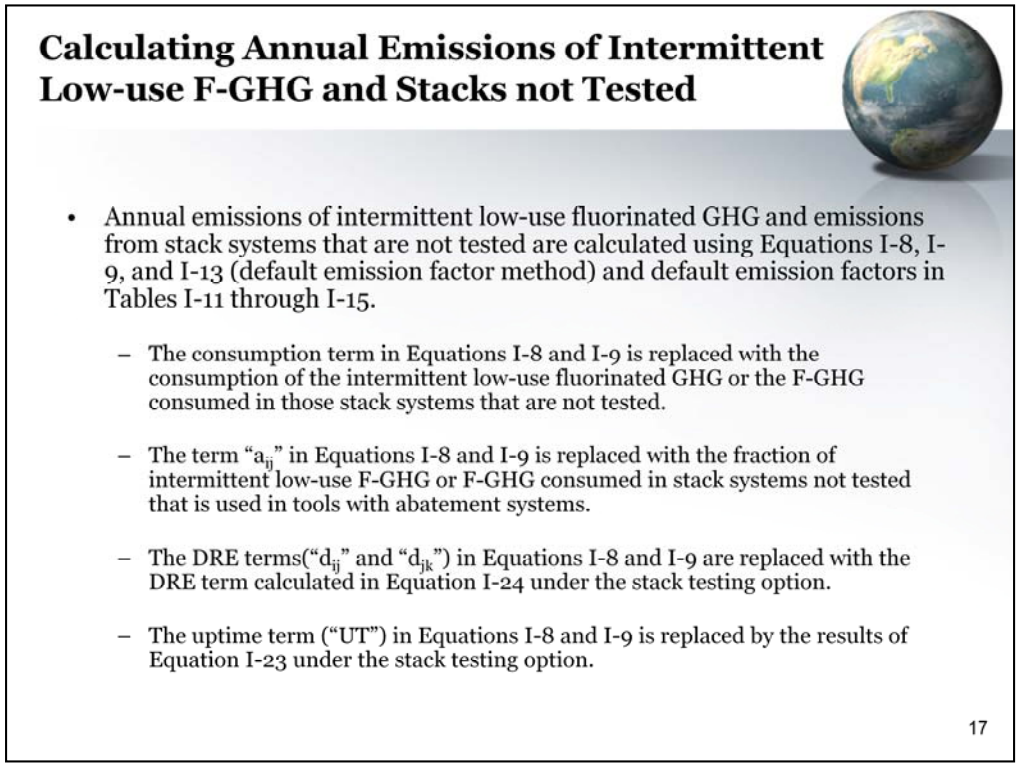
The second half of the equation (the terms to the right of the plus sign) represents the period that abatement systems are not in operation (i.e., "1-UT_f"). The emission factor calculated in Equation I-19 is divided by the term (1-(a_{if}*d_{if})) to yield an emission factor that represents unabated emissions. The left and right set of terms are added together for total annual emissions.

The uptime term "UT_f" is calculated using Equation I-23 and the term "d_{if}" is calculated using Equation I-24, both of which are discussed later in the presentation.



Equation I-22, used to calculate annual emissions of by-product gases from stack systems that are tested, is very similar to Equation I-21 for input gases.

The main difference between Equation I-22 and I-21 (except for using the by-product emission factors calculated in Equation I-20) is that the consumption term represents the total annual consumption of all F-GHG in tools vented to tested stack systems in the fab, and not just the consumption of one input gas. The denominator in the second term to adjust the by-product emission factor for unabated emissions is modified to apply to by-products instead of to input gases.



The emissions of intermittent low use gases, and the emissions from stack systems that are not tested are calculated using a method that is similar to the method used for the preliminary estimate of emissions from each stack system under 98.93(i)(4). Reporters must use Equations I-8 and I-9 and the emission factors in Tables I-11 through I-15.

When using Equations I-8 and I-9, reporters must replace the consumption term with the consumption of the low-use fluorinated GHG or the F-GHG consumed in those stack systems that are not tested, as applicable. Reporters must also replace with "a_{ij}" term in Equations I-8 and I-9 with the fraction of intermittent low-use F-GHG or F-GHG consumed in stack systems not tested that is used in tools with abatement systems.

The DRE terms ("d_{ij}" and "d_{jk}") in Equations I-8 and I-9 must be replaced with the DRE term calculated in Equation I-24 under the stack testing option and the uptime term from Equation I-15 is replaced by the results of Equation I-23 under the stack testing option.

The overall theme of all the "term replacements" is to move the calculations in I-8 and I-9 from a process type basis to a stack system/fab basis.

Calculating DRE and Abatement System Uptime Under the Stack Testing Option

- In the stack testing method, abatement system uptime is calculated as an aggregate for all tools and gases in the fab for which the stack testing method is being used.
  - Uptime is <u>not</u> determined for each gas and process type combination.
  - Reporters must collect abatement system downtime data and calculate the fraction of abatement system uptime for the fab using Equation I-23:

The average uptime factor for all abatement systems in fab "f" (expressed as a decimal fraction).

$$UT_f = 1 - \frac{\sum_p Td_{pf}}{\sum_p UT_{pf}}$$

The total time, in minutes per year, that abatement systems connected to process tools in fab "f" are not in operational mode.

The total time, in minutes per year, that the tools connected to the abatement systems in fab "f" could be in operation. (Assume 525,600 minutes per year per tool for tools installed for the whole year.)

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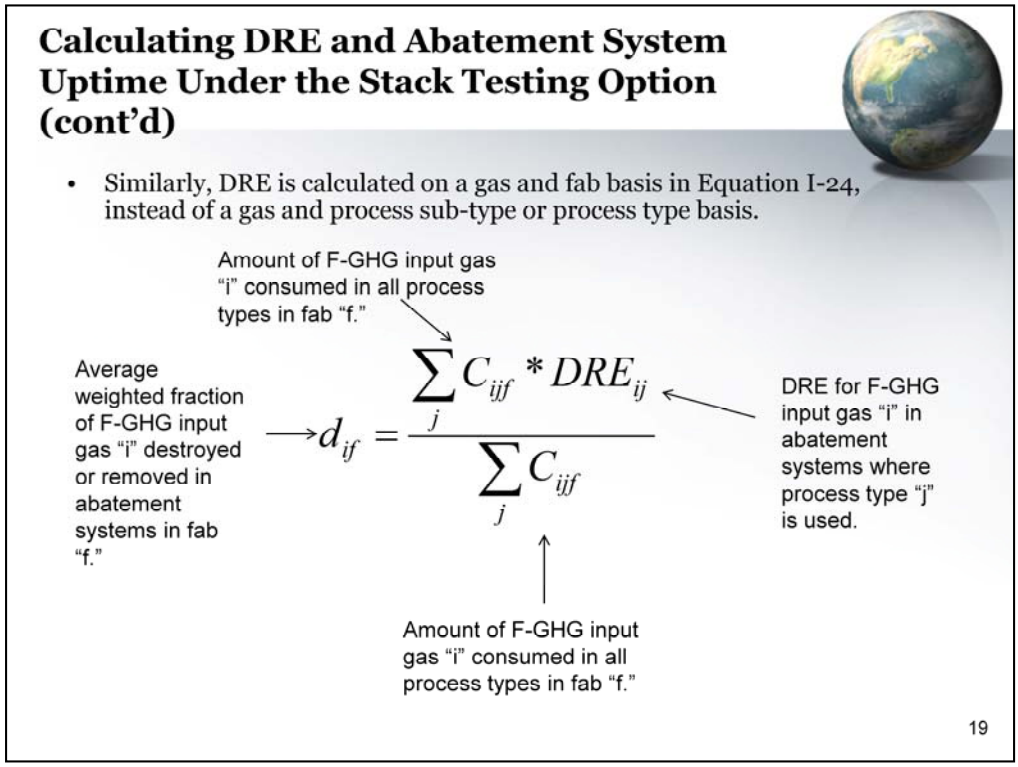
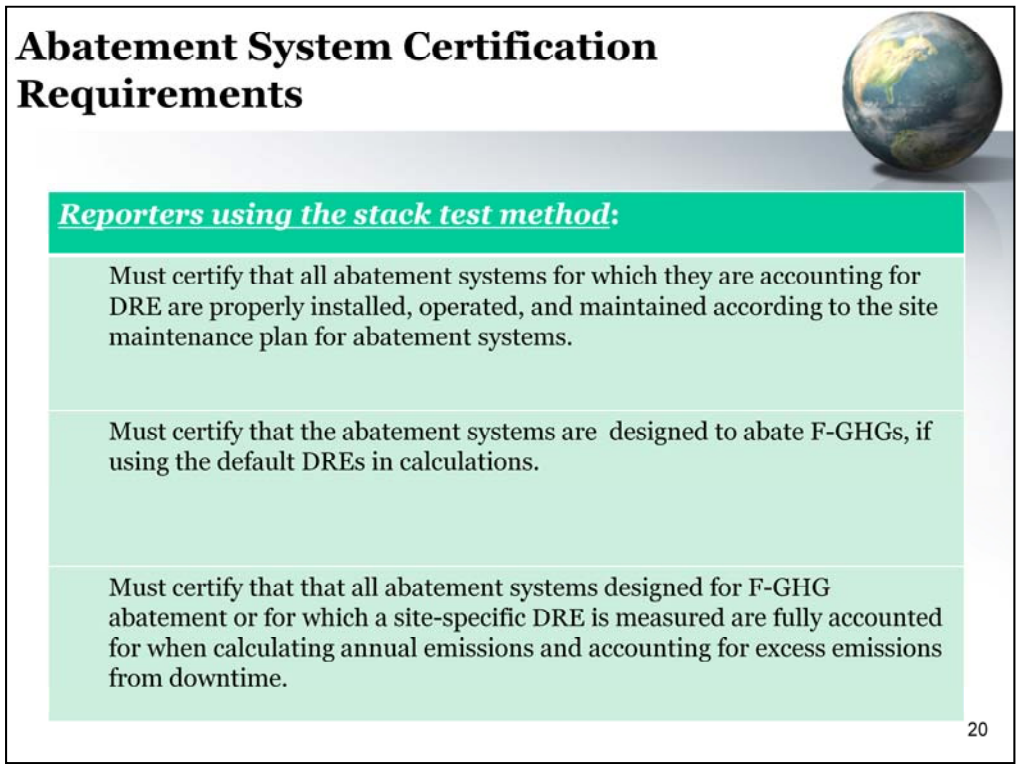
Reporters using the stack method determine an average uptime factor that is an aggregate for all abatement systems in the fab calculated using Equation I-23 in subpart I, instead of using equation I-15 for each gas and process type combination as in the default emission factor method.

The reporter must determine the sum of the time not in operation mode for all abatement systems during the year and the sum of the possible annual operating time for all of the tools connected to those abatement systems in the fab. The sum of the time not in operation mode is divided by the sum of the operating time and subtracted from a value of 1 to determine the average uptime factor.



DRE is calculated on a gas and fab basis using Equation I-24. This is different from the procedures in the default emission factor method in that DRE is calculated for each gas on a fab-wide basis for the stack method, instead of on a gas and process combination basis for the default emission factor method.

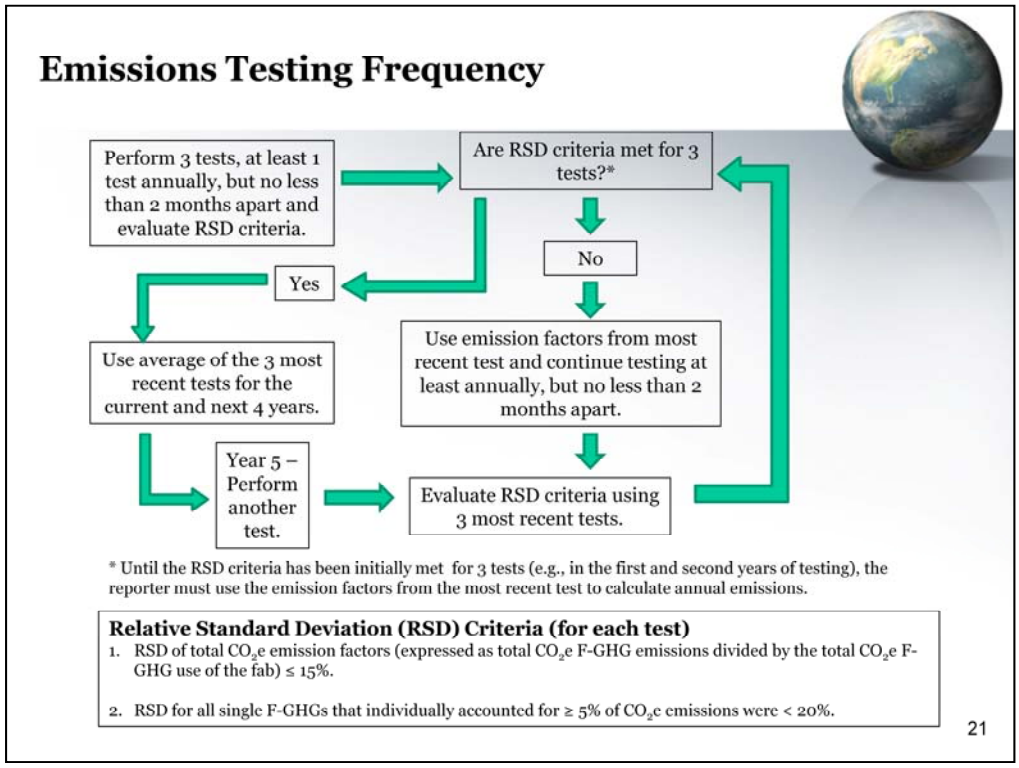


If reporters elect to use the stack testing alternative in 40 CFR 98.93(i), they must certify that all abatement systems for which they are accounting for DRE are properly installed, operated, and maintained according to the site maintenance plan for abatement systems.

If they are using the default DREs in the calculations, they must certify that those abatement systems are designed to abate F-GHGs.

If reporters are using the stack testing alternative, they do not need to account for the DRE of abatement systems that are not designed to abate F-GHG, but may account for the DRE if it has been properly measured according to 40 CFR 98.94(f).

Reporters using the stack test alternative must also certify that that all abatement systems that are designed to abate F-GHGs, or for which a site-specific DRE has been measured, are fully accounted for when calculating annual emissions and accounting for excess emissions from downtime using the methods in 40 CFR 98.93(i)(3).



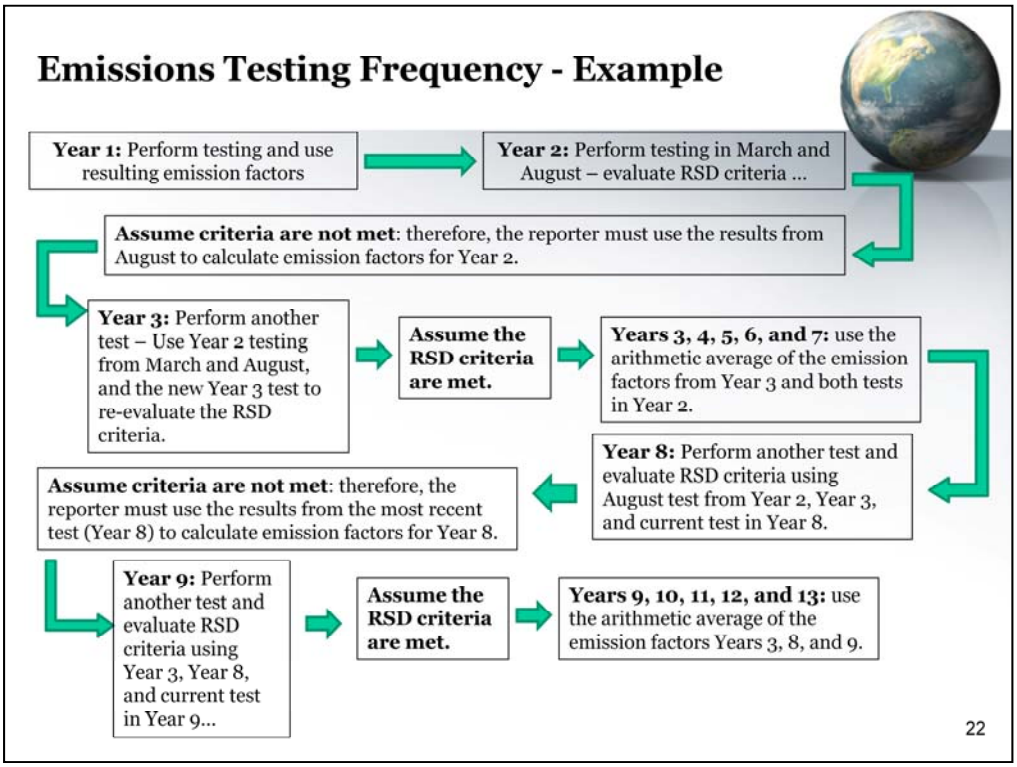
This slide presents a summary of the emissions testing frequency requirements and the option for reporters to conduct testing less frequently.

Under 40 CFR98.94(j)(5), reporters are required to conduct testing on an annual basis for each stack system that is required to be tested in the stack testing option, unless the fab meets the criteria to test less frequently.

After the first three years of testing, reporters may calculate the relative standard deviation, or RSD, of the emission factors for each F-GHG included in the test. Alternatively, a facility may conduct all three tests in less than 3 calendar years, with each test separated by at least 2 months, but this does not relieve the reporter of testing annually if the RSD criteria are not met.

If the RSD of the total CO2e emission factors calculated from each of the three tests (expressed as the total CO2e F-GHG emissions of the fab divided by the total CO2e F-GHG use of the fab) is less than or equal to 15% AND the RSD for all single F-GHGs that individually accounted for 5% or more of CO2e emissions were less than 20%, a reporter may use the arithmetic average of the three emission factors for each input F-GHG and F-GHG by-product for the current year and the next 4 years (unless the fab meets a re-test criteria, discussed in the next slide). In the 5th year, the reporter must conduct another test and repeat the RSD criteria evaluation using the results of the most recent 3 tests (i.e., the new test and the two previous tests conducted prior to the 4 year period). If the RSD criteria are not met, the reporter must use the emission factors from the most recent testing and continue testing, at least 1 test per year, but each test must be separated by at least 2 months. The reporter may repeat the RSD analysis using the most recent 3 tests to determine if they are exempt from testing for the next 4 years.

(The relative standard deviation is the standard deviation of the three tests divided by the average of the emission factors measured by the three tests, expressed as a percent of the average.)



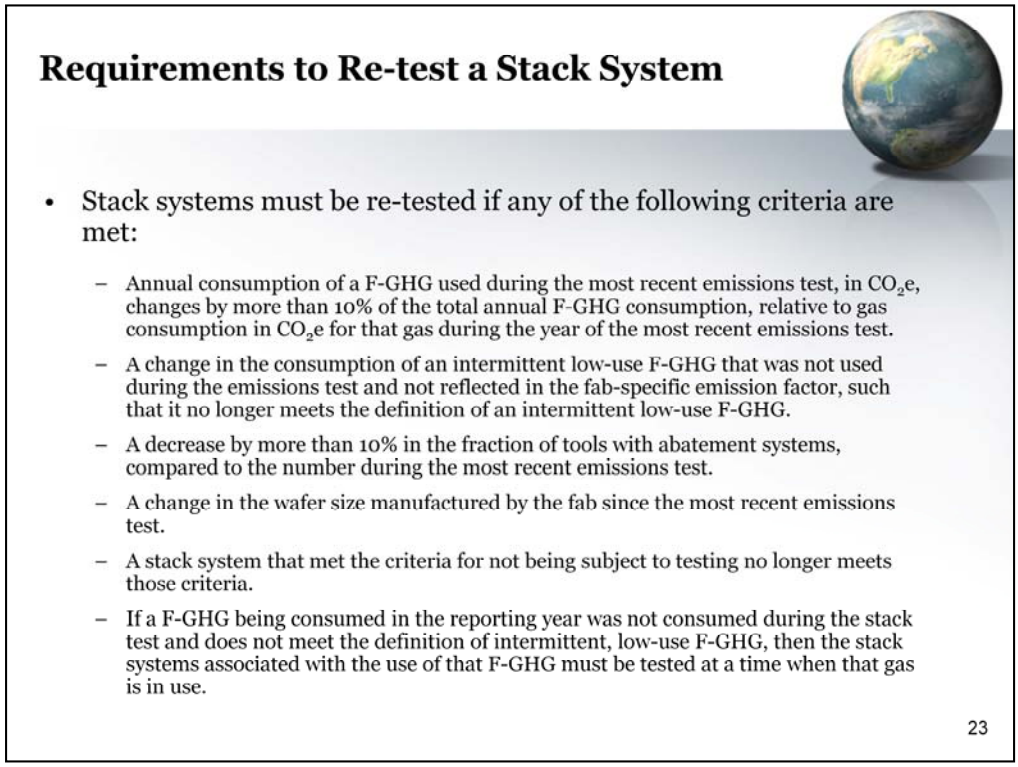
This slide provides an example of the progression of testing less frequently, using the RSD criteria presented on the last slide.

Assume that in Year 1, a reporter performs testing and develops fab specific emission factors. The reporter chooses not to perform any additional testing in Year 1, and uses the emission factors to calculate and report annual F-GHG emissions from the fab. In Year 2 the reporter chooses to conduct testing in March, and then repeat testing again in August (scheduling the testing in August so that multiple tests in the same year are separated by at least 2 months). Now that the reporter has performed 3 tests, she can evaluate the RSD criteria across the 3 tests presented on the previous slide. Assume that the RSD criteria are not met; therefore, the reporter uses the emission factors calculated using results of the August testing in Year 2 (i.e., the most recent test) to calculate and report annual F-GHG emissions for Year 2.

In Year 3, the reporter performs another test and uses the results of the Year 2 (both March and August) and Year 3 testing to evaluate the RSD criteria. For this instance, assume that the RSD criteria are met; as a result, the reporter uses the arithmetic average of the emission factors from Year 2 (both March and August) and Year 3 to calculate and report annual emissions for Years 3 through 7 (the current year and the next 4 years).

In Year 8 the reporter is required to repeat testing. She evaluates the RSD criteria using the August test from Year 2, the Year 3, and the current test in Year 8, and in this case, the RSD criteria are not met. The reporter must use the results of the most recent test (i.e., Year 8) to calculate and report annual F-GHG emissions for Year 8.

The reporter performs another test in Year 9 and evaluates the RSD criteria using the emission factors from Years 3, 8, and 9. In this instance, the criteria are met, and the reporter uses the arithmetic average of the emission factors from Years 3, 8, and 9 to calculate and report annual F-GHG emissions for Years 9 through 13. The reporter is required to repeat testing in year 14 continuing the cycle.



Reporters are required to conduct testing of each stack system that is not a low-emitting stack system, regardless of the RSD criteria, if certain changes take place in the reporter's annual consumption of F-GHGs or in the equipment and processes at the fab.

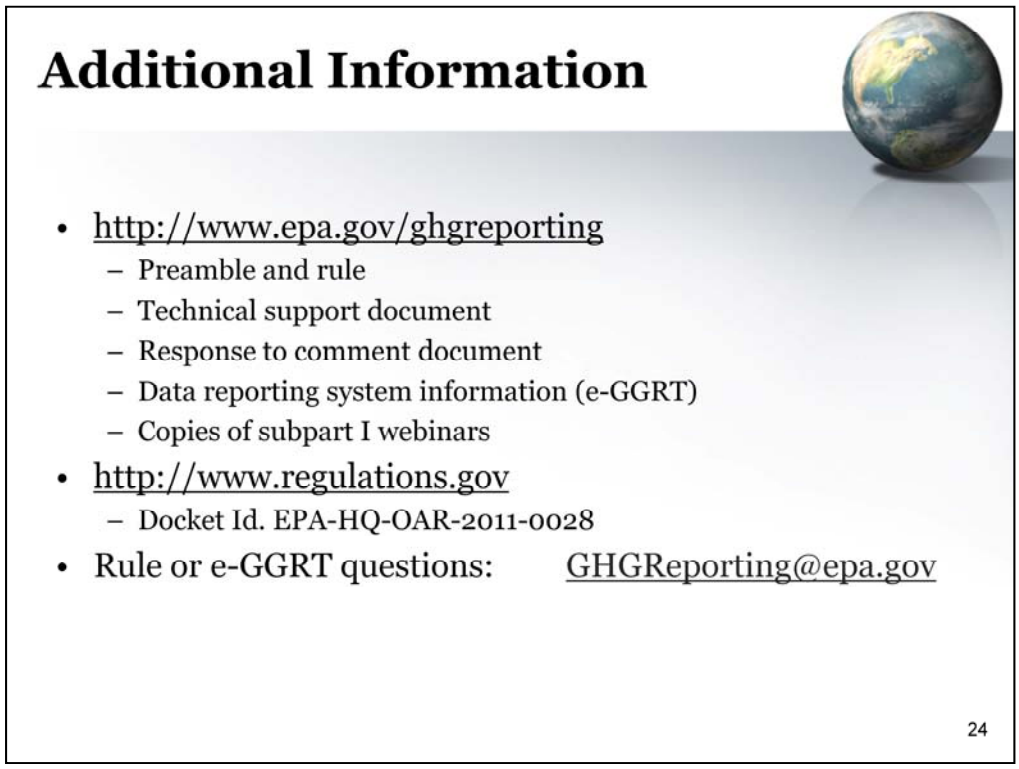
Testing must be repeated to develop a new fab-specific emission factor if annual consumption of a F-GHG used during the most recent emissions test, in CO_2e, changes by more than 10% of the total annual F-GHG consumption, relative to gas consumption in CO_2e for that gas during the year of the most recent emissions test.

If there is a change in the reporter's use of an intermittent low-use F-GHG that was not used during the emissions test and not reflected in the fab-specific emission factor, such that it no longer meets the definition of an intermittent low-use F-GHG, the reporter is required to re-test using that gas.

Additionally, if there is: (1) A decrease by more than 10 percent in the fraction of tools with abatement systems compared to the fraction of tools with abatement systems during the most recent emissions test; (2) a change in the wafer or substrate size used by the fab since the most recent emissions test: or (3) a change in a stack system that formerly met the criteria as a low-emitting stack system for not being subject to testing, such that it no longer meets those criteria, then the reporter is also required to re-test.

Last, if a F-GHG being consumed in the reporting year was not consumed during the stack test and does not meet the definition of intermittent, low-use F-GHG, then the stack systems associated with the use of that F-GHG must be tested at a time when that gas is in use.

As stacks are re-tested, reporters must update the fab-specific emission factors with the new data. If a requirement to re-test stacks is triggered, reporters must re-evaluate the RSD of the emission factors, including the most recent test results and the previous two test results, to determine if the fab still complies with the provisions that allow the fab to skip testing. If the fab does not meet those provisions, annual testing must resume and a new RSD analysis must be performed.



This slide lists resources that can be used for more information on the GHGRP and subpart I in particular.

From the link in the first bullet, you can go the resources for GHG reporting facilities, and then find information by subpart. For subpart I, you can find all of the federal register notices for subpart I, including the pre-publication version of the preamble and final rule amendments.

You can also find the technical support documents for the proposed and final rule, the EPA's response to public comments document for the final rule, information on the docket, and information on the electronic greenhouse gas reporting tool. You can also find copies of this and other subpart I webinars under the "Training and Testing Opportunities" section.

You can also visit the rulemaking docket for further information regarding subpart I.

Reporters can contact the EPA with further questions on the rule or on the reporting tool at the e-mail address listed.