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Subpart HH - Municipal Solid Waste Landfills

 A printer-friendly version (pdf) (33 pp, 5,467K) of GHG reporting instructions for this subpart

Please select a help topic from the list below:

- Using e-GGRT to Prepare Your Subpart HH Report
 - Subpart HH Summary Information for this Facility
 - Subpart HH Waste Information
 - Subpart HH Emissions Information
- Using Subpart HH Calculation Spreadsheets
- Carry forward of data from previous subpart HH submissions into RY2011 forms
- Subpart HH Rule Guidance
- Subpart HH Rule Language (eCFR)

Additional Resources:

- Part 98 Terms and Definitions
- Frequently Asked Questions (FAQs)
- Webinar Slides

Using e-GGRT to Prepare Your Subpart HH Report

Subpart HH applies to municipal solid waste (MSW) landfills that accepted waste on or after January 1, 1980.

This page provides an overview of sub-topics that are central to Subpart HH reporting:

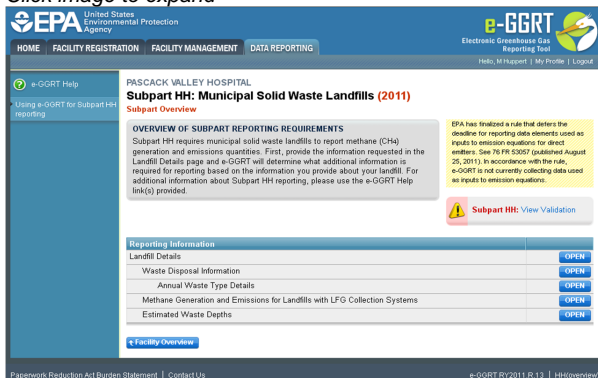
- Summary Information for this Facility
- Waste Information
- Emissions Information
- Validation Report
- Reporting Year (RY) 2010 Data Carry-over

If you previously reported for Reporting Year (RY) 2010, the Agency has carried some of your RY2010 data forward and entered it in your RY2011 forms to reduce reporting burden. It is still your responsibility to review and assure that all the information in your submission is correct, but the Agency believes that most of the data which is carried forward is unlikely to change significantly from year to year. For more information about carry forward data, please see the [Carry forward of data from previous submissions into RY2011 forms help content](#).

The end of this page contains links you can use for more information on these topics.

If you reported in RY2010, most historical data will be prepopulated in your RY2011 report. See RY2010 Data Carry-over for details.

Click image to expand



The screenshot shows the EPA e-GGRT web application interface. The top navigation bar includes 'HOME', 'FACILITY REGISTRATION', 'FACILITY MANAGEMENT', and 'DATA REPORTING'. The main content area is titled 'PASCACK VALLEY HOSPITAL' and 'Subpart HH: Municipal Solid Waste Landfills (2011)'. It features a 'Subpart Overview' section with an 'OVERVIEW OF SUBPART REPORTING REQUIREMENTS' and a table of reporting information. The table lists various reporting categories with 'OPEN' buttons next to them. A yellow warning box is visible, stating: 'EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. See 76 FR 52527 (published August 25, 2011). In accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations.'

Summary Information for this Facility

The following MSW landfill information is collected for Subpart HH:

- Indicate if the landfill was open or closed in 2011. A landfill is considered open if it is actively receiving waste in the reporting year. A

landfill that closed during the reporting year, but also received waste during the reporting year is considered open for the particular reporting year. A landfill is considered closed if it did not receive waste in the reporting year.

- If the landfill was open in 2011, indicate the year in which the landfill is expected to close.

2011 Waste Disposal Quantity Method

If the landfill was open in 2011, select the method that was used to determine the quantity of waste received at the landfill in the current reporting year for loads other than cars, light duty trucks, and loads that cannot be measured with scales due to physical or operational limitations. Choose from one of the following methods (from §98.343(a)(3)):

- Used scales to weigh each load before off-loading at the landfill and either used scales to weigh individual loads after off-loading or used a representative tare weight for the weight of the vehicle/container after off-loading at the landfill. According to §98.343(a)(3)(i)(B), the tare weight is determined by weighing no less than five of each type of vehicle or container after it has off-loaded the waste.
- Used vehicle/container working capacity, for example by using volumetric capacity and waste density measurements, for each container/vehicle used to haul waste to the landfill (§98.343(a)(3)(ii)). The working capacity means the maximum volume of mass of waste that is actually placed in the landfill from an individual or representative container (such as a tank, truck, or roll-off bin) used to convey wastes to the landfill, taking into account that the container may not be able to be 100 percent filled and/or 100 percent emptied for each load.



Per §98.343(a)(3), beginning in the first emissions reporting year, and each year thereafter, waste quantities must be determined using one of the methods listed above. If scales are in place at the landfill, they must be used to determine waste quantities for the first emissions reporting year and each year after.

Additional information about the facility is also collected in this section. Please go to [Subpart HH Summary Information for this Facility](#) for more details.

Waste Information

If you reported prior to RY2011, the historical waste information should be automatically populated and you will only need to enter data for RY2011 based on the instructions below. For more on the historical migration of data, see RY2010 Data Carry-over.

For the reporting year 2011 and each year in which you indicated on the "Landfill Details" page (see [Summary Information for this Facility](#)) that a waste quantity was determined using scales, you will be prompted to enter the following information:

- Indicate if a missing data procedure was used to determine the annual waste quantity for that year. Missing data procedures may be found in §98.345.
 - If a missing data procedure was used, enter the number of days that substitute data was used to determine the waste quantity.
- Identify each of the waste types comprising that year's waste quantity. A facility must use one of the 3 options from Table HH-1: Bulk waste option, Modified bulk MSW option, or Waste composition option. If the Modified bulk MSW or Waste Composition option is chosen, check all applicable boxes within that option:
 - Bulk waste option
 - Modified bulk MSW option:
 - Bulk MSW waste (excluding inerts and C&D waste)
 - Bulk C&D waste
 - Inerts (e.g. glass, plastics, metal, cement)
 - Waste composition option:
 - Food waste
 - Garden
 - Sewage sludge
 - Paper
 - Wood and straw
 - Textiles
 - Diapers
 - Bulk waste
 - Inerts (e.g., glass, plastics, metal, cement)

Additional information about the waste disposed at the facility is also collected in this section. Please go to [Subpart HH Waste Information](#) for more details.

Emissions Information

If there is no Gas Collection System at your Landfill:

From the Subpart Overview page, click the OPEN button located opposite "Methane Generation and Emissions for Landfills without LFG Collection Systems."

Click image to expand

Enter the value for CH₄ generation, adjusted for oxidation, from the landfill in the reporting year (in metric tons of CH₄):

- Hover over an element in the equation to read a definition of that element as needed.
- This equation may be calculated using the spreadsheet tool for Equation HH-5. Spreadsheets are also available for calculating inputs to Equation HH-5. Use the Subpart HH-1 and HH-2, HH-3 spreadsheets to calculate inputs to Equation HH-5 as needed.
- To use the spreadsheet tool, download it by clicking the link labeled "Use HH-5 spreadsheet to calculate."
- Fill in the spreadsheet completely using the instructions provided in the tool.
- After completing the spreadsheet, copy the value of CH₄ calculated by the spreadsheet to this page in the box bordered in red.

When you have entered the information, click SAVE. Then click Subpart Overview to return to the Subpart Overview page.

If there is a Gas Collection System at your Landfill:

From the Subpart Overview page, click the OPEN button located opposite "Methane Generation and Emissions for Landfills with LFG Collection systems."

Click image to expand



United States
Environmental Protection
Agency



Electronic Greenhouse Gas
Reporting Tool

HOME FACILITY REGISTRATION FACILITY MANAGEMENT DATA REPORTING
Help, Richard Richards | My Profile | Logout

DR Enterprises - TEST
Subpart HH: Municipal Solid Waste Landfills (2011)
[Subpart Overview](#) • [GHG Reporting](#)

CH₄ EMISSIONS (FOR LANDFILLS WITH A GAS COLLECTION SYSTEM)

Landfills that have a landfill gas collection system are required to report two sets of CH₄ generation and CH₄ emissions values. CH₄ generation, adjusted for oxidation, must be reported as calculated using both Equations HH-5 and HH-7, and CH₄ emissions must be reported as calculated using both Equations HH-6 and HH-8. For additional information, please use the e-GGRT help links provided.

CH₄ emissions — Eq. HH-6 (metric tons) **8031.00**

CH₄ emissions — Eq. HH-8 (metric tons) **1000.00**

EQUATION HH-5 SUMMARY AND RESULT

$$MG = G_{CH_4} \times (1 - OX)$$

Hover over an element in the equation above to reveal a definition of that element.

Modeled CH₄ generation, adjusted for oxidation (metric tons CH₄)
[Use Subpart HH-5 equation spreadsheets to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-5. Use the Subpart HH-1 and HH-2, HH-3 spreadsheets to calculate inputs to Equation HH-5 as needed.

EQUATION HH-7 SUMMARY AND RESULT

$$MG = \frac{R}{CE \times f_{Ox}} \times (1 - OX)$$

Hover over an element in the equation above to reveal a definition of that element.

Measured CH₄ generation, adjusted for oxidation (metric tons CH₄)
[Use Subpart HH-7 equation spreadsheets to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-7. Use the Subpart HH-4 spreadsheet to calculate inputs to Equation HH-7.

EQUATION HH-6 SUMMARY AND RESULT

$$Emissions = [(G_{CH_4} - R) \times (1 - OX) + R \times (1 - (DE \times f_{Ox}))]$$

Hover over an element in the equation above to reveal a definition of that element.

CH₄ emissions from the landfill in the reporting year (metric tons CH₄)
[Use Subpart HH-6 equation spreadsheets to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-6. Use the Subpart HH-1, HH-2, HH-3, and HH-4 spreadsheets to calculate inputs to Equation HH-6 as needed.

For HH-6 was the value for CH₄ generation (G_{CH₄}) modeled or measured?

Modeled (output of equation HH-1)
 Measured (output of equation HH-4)

EQUATION HH-8 SUMMARY AND RESULT

$$EMISSIONS = \left[\left(\frac{R}{CE \times f_{Ox}} - R \right) \times (1 - OX) + R \times (1 - (DE \times f_{Ox})) \right]$$

Hover over an element in the equation above to reveal a definition of that element.

CH₄ emissions from the landfill in the reporting year (metric tons CH₄)
[Use Subpart HH-8 equation spreadsheet to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-8. Use the Subpart HH-4 spreadsheet to calculate inputs to Equation HH-8.

LANDFILL GAS COLLECTED FOR DESTRUCTION

Annual volume of landfill gas collected for destruction (bd)

A missing data procedure was used to determine the volume of landfill gas collected for destruction? (check if true)

Number of days substitute data procedure was used to determine the volume of landfill gas collected for destruction (days)

Annual average CH₄ concentration of landfill gas collected for destruction (percent)

A missing data procedure was used to determine CH₄ concentration of landfill gas collected for destruction? (check if true)

If CH₄ is monitored daily, the number of days substitute data was used to determine the annual average CH₄ concentration of landfill gas collected for destruction (days)

If CH₄ is monitored weekly, the number of weeks substitute data was used to determine the annual average CH₄ concentration of landfill gas collected for destruction (weeks)

Was temperature incorporated into internal calculations run by the collection system's monitoring equipment? Yes
 No

Was pressure incorporated into internal calculations run by the collection system's monitoring equipment? Yes
 No

Was landfill gas flow measured on a wet or dry basis? Wet basis
 Dry basis

Was CH₄ concentration measured on a wet or dry basis? Wet basis
 Dry basis

Destruction occurred at the facility or off-site? At the facility (on-site)
 Off-site
 Both

A back-up destruction device is present (check if true)

[Subpart Overview](#)

Paperwork Reduction Act Burden Statement | Contact Us e-GGRT (R/2011-R-14 | HHemissions2)

Enter the following values (in metric tons of CH₄):

- Modeled CH₄ generation, adjusted for oxidation (using Equation HH-5)
- Measured CH₄ generation, adjusted for oxidation (using Equation HH-7)
- CH₄ emissions from the landfill during the reporting year (using Equation HH-6) along with an indication of whether this is a modeled (output of Equation HH-1) or measured (output of Equation HH-4) value
- CH₄ emissions from the landfill during the reporting year (using Equation HH-8)

Additional information about emissions at the facility is also collected in this section. Please go to [Subpart HH Emissions Information](#) for more details.

Validation Report

You can use the Validation Report to assist with the completeness and quality of your reporting data.

You should use the Validation Report to check your work. The Validation Report performs two types of checks:

- Data Completeness: Data that are required for reporting are missing or incomplete.
- Data Quality: Data are outside of the expected range of values.

You may view the Validation Report at any time.



Note that the Validation Report is intended to assist users in entering data, but it is not an indication that the reporter has entered all necessary information, nor is it an indication that the reporter is in compliance with part 98. Furthermore a negative finding on the validation report is not a guarantee that a data element was entered incorrectly.

RY2010 Data Carry-over

If you reported historical data prior to RY2011, your data will automatically be migrated to your RY2011 report. This includes data for the historical waste quantity estimation method, landfill gas collection system, waste disposal information, and waste type details. Historical data should be verified for completeness and accuracy. Please go to [Carry forward of data from previous subpart HH submissions into RY2011 forms](#) for more details.

Click image to expand

HISTORICAL WASTE QUANTITY ESTIMATION METHOD AND PERIOD (YEARS PRIOR TO RY2011)

Please provide the following information regarding the methods used to determine historical annual waste disposal quantities.

Were scales used to determine the annual waste quantity for any years prior to 2011 (for loads other than cars, light-duty trucks, and loads that cannot be measured with scales due to physical or operational limitations)? Yes No

Please indicate the first and last year of the period that scales were used prior to 2011.

Scales period start (year)

Scales period end (year)

Please provide the following information regarding the methods used to determine historical annual waste disposal quantities prior to the range of years associated with any waste determination method selected above.

Were tipping receipts, company records, or measured working capacities used to determine waste disposal quantity for any years prior to 2011? Yes No

If, prior to the years in which the methods identified above were used, historical annual waste disposal quantities were estimated using one of the three methods outlined in 98 343g (4), i.e. constant quantity, Equation HH-2, or Equation HH-3, please select the method used to estimate those historical annual waste disposal quantities, specify the range of years the method was used, and describe the reason the method was used. Otherwise, select "None."

Indicate the method used for estimating all annual waste quantities that are not determined with the methods above or through tipping receipts or company records

Method #1: Assume all prior year's waste disposal quantities are the same as the waste quantity in the first year for which waste quantities are available.

Method #2: Use the estimated population served by the landfill in each year, the values for national average per capita waste generation, and fraction of generated waste disposed of in solid waste disposal sites (Equation HH-2)

Method #3: Use the landfill capacity or, for operating landfills, the amount of waste-in-place to estimate a constant average waste disposal quantity (Equation HH-3)

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See Also

[Screen Errors](#)

[Subpart HH Summary Information for this Facility](#)

[Subpart HH Waste Information](#)

[Subpart HH Emissions Information](#)

[Subpart Validation Report](#)

Subpart HH Summary Information for this Facility

This page provides a step-by-step description of how to enter summary information on municipal solid waste (MSW) landfills as required by Subpart HH of the Greenhouse Gas Reporting Program.

Adding or Updating Summary Information for this Facility

Click image to expand

The screenshot shows the EPA e-GGRT web application interface. At the top, there are logos for EPA (United States Environmental Protection Agency) and e-GGRT (Electronic Greenhouse Gas Reporting Tool). Navigation tabs include HOME, FACILITY REGISTRATION, FACILITY MANAGEMENT, and DATA REPORTING. The user is logged in as 'Hello, M Huser'. The main content area is titled 'PASCACK VALLEY HOSPITAL' and 'Subpart HH: Municipal Solid Waste Landfills (2011)'. It features an 'Overview of Subpart Reporting Requirements' section with text explaining that Subpart HH requires reporting methane (CH4) generation and emissions quantities. A yellow warning box states: 'EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. See 76 FR 6267 (published August 26, 2011), in accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations.' Below this is a 'Subpart HH: View Validation' button. A table lists reporting information categories with 'OPEN' buttons: Landfill Details, Waste Disposal Information, Annual Waste Type Details, Methane Generation and Emissions for Landfills with LFG Collection Systems, and Estimated Waste Depths. A 'Facility Overview' button is at the bottom left. The footer contains 'Paperwork Reduction Act Burden Statement | Contact Us' and 'e-GGRT R/2011 R.13 | HH(Overview)'.

To add or modify Subpart HH summary information for this MSW landfill, press the OPEN button located opposite “Landfill Details.”

Landfill Details must be populated before other information about the landfill and its emissions can be entered.

Click image to expand

EPA United States Environmental Protection Agency | **e-GGRT** Electronic Greenhouse Gas Reporting Tool

HOME | FACILITY REGISTRATION | FACILITY MANAGEMENT | DATA REPORTING

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Subpart HH: Municipal Solid Waste Landfills (2011)
Subpart Overview | Landfill Details

LANDFILL DETAILS
Much of the information on the form below is necessary to determine which annual reporting requirements apply to your landfill (e.g., does your landfill have a landfill gas collection system?). The answers you provide on this screen will determine what Greenhouse gas reporting elements are made available on your Subpart HH Overview page. For additional information about the facility information required by Subpart HH, please use the e-GGRT Help links provided. * denotes a required field

In 2011, was the landfill open or closed?
 Open (actively accepting waste)
 Closed (no longer accepting waste)

If the landfill is open, the estimated year of landfill closure: 2020 (year)

2011 WASTE DISPOSAL QUANTITY METHOD
Please select the method used to determine the annual quantity of waste disposed in 2011.

Indicate the method used to determine the 2011 annual waste quantity (for loads other than cars, light duty trucks, and loads that cannot be measured with scales due to physical or operational limitations):
 Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights.
 Used working capacity for each vehicle/container

If you changed the method used for determining waste disposal quantities during the reporting year, answer the question above by reporting the method used at the end of the reporting year. In addition, please provide an explanation as to why you changed methods, e.g., you installed scales at your facility mid-year. Please provide this explanation in the Subpart A text box that requests an explanation of changes to calculation methodologies.

HISTORICAL WASTE QUANTITY ESTIMATION METHOD AND PERIOD (YEARS PRIOR TO RY2011)
Please provide the following information regarding the methods used to determine historical annual waste disposal quantities.

Were scales used to determine the annual waste quantity for any years prior to 2011 (for loads other than cars, light duty trucks, and loads that cannot be measured with scales due to physical or operational limitations)?
 Yes
 No

Please indicate the first and last year of the period that scales were used prior to 2011.
 Scales period start: 2005 (year)
 Scales period end: 2010 (year)

Please provide the following information regarding the methods used to determine historical annual waste disposal quantities prior to the range of years associated with any waste determination method selected above.

Were tipping receipts, company records, or measured working capacities used to determine waste disposal quantity for any years prior to 2011?
 Yes
 No

Tipping receipts/company records period start: 2005 (year)
 Tipping receipts/company records period end: 2010 (year)

If, prior to the years in which the methods identified above were used, historical annual waste disposal quantities were estimated using one of the three methods outlined in §9.343(a)(1), i.e., constant quantity, Equation HH-2, or Equation HH-3, please select the method used to estimate those historical annual waste disposal quantities, specify the range of years the method was used, and describe the reason the method was used. Otherwise, select "None."

Indicate the method used for estimating all annual waste quantities that are not determined with the methods above or through tipping receipts or company records:
 Method #1: Assume all prior year's waste disposal quantities are the same as the waste quantity in the first year for which waste quantities are available.
 Method #2: Use the estimated population served by the landfill in each year, the values for national average per capita waste generation, and fraction of generated waste disposed of in solid waste disposal sites (Equation HH-2).
 Method #3: Use the landfill capacity or, for operating landfills, the amount of waste in place to estimate a constant average waste disposal quantity (Equation HH-3).
 None

Estimation method period start: (year)
 Estimation method period end: (year)
 Reason for using the estimation method selected: (text area)

Landfill capacity: 2000000 (metric tons)

LANDFILL GAS COLLECTION SYSTEM
Does the landfill have a landfill gas collection system?
 Yes
 No

Manufacturer of the gas collection system: Leopold Industries, Inc.
 Capacity of the gas collection system: 10000 (acfm)
 Number of wells: 25 (wells)

Passive vents and/or flares are present (vents or flares that are not considered part of the gas collection system): (check if true)
 Leachate recirculation was used during the reporting year: (check if true)
 Scales are present at the landfill: (check if true)
 Surface area of the landfill containing waste: 10000 (square meters)

COVER MATERIALS
Identify each type of cover material used:
 Organic cover
 Sand cover
 Clay cover
 Other soil mixture

Subpart Overview | CANCEL | SAVE

Paperwork Reduction Act Burden Statement | Contact Us | e-GGRT RY2011 R.14 | HH(details)

The following MSW landfill information is collected for Subpart HH:

- Indicate if the landfill was open or closed in 2011. A landfill is considered open if it is actively receiving waste in the reporting year. A landfill that closed during the reporting year, but also received waste during the reporting year is considered open for the particular reporting year. A landfill is considered closed if it did not receive waste in the reporting year.
 - If the landfill was open in 2011, indicate the year in which the landfill is expected to close.

2011 Waste Disposal Quantity Method

If the landfill was open in 2011, select the method that was used to determine the quantity of waste received at the landfill in the current reporting year for loads other than cars, light duty trucks, and loads that cannot be measured with scales due to physical or operational limitations. Choose from one of the following methods (from §98.343(a)(3)):

- Used scales to weigh each load before off-loading at the landfill and either used scales to weigh individual loads after off-loading or used a representative tare weight for the weight of the vehicle/container after off-loading at the landfill. According to §98.343(a)(3)(i)(B), the tare weight is determined by weighing no less than five of each type of vehicle or container after it has off-loaded the waste.

- Used vehicle/container working capacity, for example by using volumetric capacity and waste density measurements, for each container/vehicle used to haul waste to the landfill (§98.343(a)(3)(ii)). The working capacity means the maximum volume of mass of waste that is actually placed in the landfill from an individual or representative container (such as a tank, truck, or roll-off bin) used to convey wastes to the landfill, taking into account that the container may not be able to be 100 percent filled and/or 100 percent emptied for each load.



Per §98.343(a)(3), beginning in the first emissions reporting year, and each year thereafter, waste quantities must be determined using one of the methods listed above. If scales are in place at the landfill, they must be used to determine waste quantities for the first emissions reporting year and each year after.

If you changed methods used for determining the waste disposal quantities during the reporting year, answer the question above by reporting the method used at the end of the reporting year. In addition, provide an explanation as to why you changed methods, for example, scales were installed at your facility mid-year. Please provide this explanation in the Subpart A text box that requests an explanation of changes to calculation methodologies.

Historical Waste Disposal Quantity Methods

If you reported prior to RY2011, the historical waste disposal quantity methods should be automatically populated and you will only need to enter data for RY 2011 based on the instructions below. For more on the historical migration of data, see [RY2010 Data Carry-over](#). There are several means by which the quantities of waste disposed of prior to 2011 may have been determined or estimated for purposes of the Greenhouse Gas Reporting Program: (1) determined using scales; (2) estimated from tipping receipts, other company records, or measured working capacities; or (3) estimated from one of the methods found in Section 98.343(a)(4), i.e., methods #1, 2, and 3 listed below. Reporters must indicate which method(s) was used to determine or estimate historical waste disposal quantities and the range of years in which that method was used.

Indicate (yes/no) if scales were used to determine waste disposal quantities for loads other than cars, light duty trucks, and loads that cannot be measured with scales due to physical or operational limitations prior to 2011.

If scales were used, indicate the year they started being used and the year they stopped being used.

Indicate (yes/no) if tipping receipts, other company records, or measured working capacities were used to estimate waste disposal quantities prior to 2011.

If tipping receipts, other company records, or measured working capacities were used to estimate waste disposal quantities prior to 2011, indicate the year in which they started being used and the year in which they stopped being used.

Indicate the method used to estimate all annual waste quantities that were not determined with scales or estimated through tipping receipts, other company records, or measured working capacities. Per §98.343(a)(4), one of the following methods may be used to estimate waste quantities, if none of these methods were used, select "None." If all waste quantities were either determined using scales or estimated using tipping receipts, other company records, or measured working capacities, select "None":

- **Method #1:** Assume all prior year's waste disposal quantities are the same as the waste quantity in the first year for which the waste quantities are available.
- **Method #2:** Use the estimated population served by the landfill in each year, the values for national average per capita waste generation, and fraction of generated waste disposed of in solid waste disposal sites (Equation HH-2).
- **Method #3:** Use the landfill capacity or, for operating landfills, the amount of waste-in-place to estimate a constant average waste disposal quantity per Equation HH-3. The amount of waste-in place is the capacity of the landfill used at the end of the year prior to the year when waste disposal data are available. The waste-in-place numbers may be derived from design drawings or engineering estimates.

If one of these methods was used (i.e., "None" was not selected), indicate the year in which the method started being used and the year in which it stopped being used.

If one of these methods was used (i.e., "None" was not selected), indicate the reason for which this particular method was selected.

If the landfill was closed in 2011 and Method #3 above was not selected as the method by which historical waste disposal quantities were estimated, indicate the year in which the landfill closed.

If Method #3 above was not selected as the method by which historical waste disposal quantities were estimated, indicate the capacity of the landfill in metric tons.

Landfill Gas Collection System

A landfill gas collection system means a system of pipes used to collect landfill gas from different locations in the landfill by means of a fan or similar mechanical draft equipment to a single location for treatment or use. A single landfill may have multiple gas collection systems. Landfill gas collection systems do not include "passive" systems, whereby landfill gas flows naturally to the surface of the landfill where an opening or pipe (vent) is installed to allow for natural gas flow.

Indicate if the landfill has a gas collection system (check the box if there is a gas collection system).

If the landfill has a landfill gas collection system, indicate the manufacturer of the gas collection system, the capacity of the system in actual cubic

feet per minute (acfm), and the number of wells present at the landfill. For manufacturer of the gas collection system, indicate the entity that designed the gas collection system and the entity that installed the gas collection system. If this information is not available, report the manufacturer of the blower. Do not use this space to indicate the manufacturer of the flares in the place at the landfill. Also do not use this space to indicate the brand of measurement equipment used to monitor landfill gas flow or methane concentration.

Indicate if passive vents and/or flares are present (other than as part of a gas collection system, as defined above) (check the box if passive vents and/or flares are present).

Indicate if leachate recirculation is used at the landfill during the emissions reporting year (check the box if leachate recirculation is used).

If leachate recirculation is used, indicate the typical frequency with which it is used over the past 10 years. Choose one of the following:

- Used several times a year for the past 10 years
- Used at least once a year for the past 10 years
- Used occasionally (but not every year) over the past 10 years

Indicate if scales are present at the landfill in the reporting year (check box if scales are present)

Enter the surface area of the landfill containing waste in square meters

Cover Materials

Identify each type of cover material in use at the landfill. Choose from the following (more than one type of cover may be selected):

- Organic
- Clay
- Sand
- Other soil mixture (this should be selected for any cover type other than organic, clay, or sand)

When you have entered the required information, click SAVE. You will be brought back to the top of the Landfill Details page at which time you may check over the information you entered. When you have completed your check, click SUBPART OVERVIEW to return to the Subpart Overview page.

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See Also

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[Using e-GGRT to Prepare Your Subpart HH Report](#)

[Subpart HH Waste Information](#)

[Subpart HH Emissions Information](#)

[Subpart Validation Report](#)

Subpart HH Waste Information

This page provides a step-by-step description of how to enter and edit information on the waste disposed of in municipal solid waste (MSW) landfills as required by Subpart HH of the Greenhouse Gas Reporting Program (GHGRP).

Click image to expand

The screenshot shows the EPA e-GGRT interface. At the top, there are navigation tabs: HOME, FACILITY REGISTRATION, FACILITY MANAGEMENT, and DATA REPORTING. The user is logged in as M Huggart. The main heading is "PASCACK VALLEY HOSPITAL Subpart HH: Municipal Solid Waste Landfills (2011)". Below this is an "OVERVIEW OF SUBPART REPORTING REQUIREMENTS" section, which includes a note about EPA's finalized rule regarding methane (CH₄) reporting. A table titled "Reporting Information" lists several categories: Landfill Details, Waste Disposal Information, Annual Waste Type Details, Methane Generation and Emissions for Landfills with LFG Collection Systems, and Estimated Waste Depths. Each category has an "OPEN" button next to it. A "Subpart HH: View Validation" button is also visible.

From the Subpart HH Overview page, press the OPEN button located opposite "Waste Disposal Information."

Click image to expand

EPA United States Environmental Protection Agency

e-GGRT Electronic Greenhouse Gas Reporting Tool

HOME FACILITY REGISTRATION FACILITY MANAGEMENT DATA REPORTING

Help, Richard Roberts | My Profile | Logout

e-GGRT Help
Using e-GGRT for Subpart HH Reporting

DR Enterprises - TEST
Subpart HH: Municipal Solid Waste Landfills (2011)
Subpart Overview • Waste Disposal Information

ANNUAL QUANTITIES OF WASTE DISPOSED AND WASTE TYPES
Use this page to provide information about missing data and waste types for the annual quantity of waste disposed in 2011 (and any prior year in which waste quantities were determined according to the methods described by 98.343(a)(3)). For additional information about the data reported on this page, please use the e-GGRT Help links(s) provided.

2011 WASTE QUANTITY

(check if true)
A missing data procedure was used to determine 2011 waste quantity
Number of days substitute data was used to determine the 2011 waste quantity: _____ (days)

Identify the option used (from Table HH-1) to select the waste type(s) disposed of at the landfill:
 Bulk waste option
 Modified bulk MSW option
 Waste composition option

2010 WASTE QUANTITY

(check if true)
A missing data procedure was used to determine 2010 waste quantity
Number of days substitute data was used to determine the 2010 waste quantity: _____ (days)

Identify the option used (from Table HH-1) to select the waste type(s) disposed of at the landfill:
 Bulk waste option
 Modified bulk MSW option
 Waste composition option

Identify each of the waste types that comprises the 2010 waste quantity:
 food waste
 sewage sludge
 wood and straw
 diapers
 inerts (e.g. glass, plastics, metal, cement)
 garden
 paper
 textiles
 bulk waste

2009 WASTE QUANTITY

(check if true)
A missing data procedure was used to determine 2009 waste quantity
Number of days substitute data was used to determine the 2009 waste quantity: _____ (days)

Identify the option used (from Table HH-1) to select the waste type(s) disposed of at the landfill:
 Bulk waste option
 Modified bulk MSW option
 Waste composition option

2008 WASTE QUANTITY

(check if true)
A missing data procedure was used to determine 2008 waste quantity
Number of days substitute data was used to determine the 2008 waste quantity: _____ (days)

Identify the option used (from Table HH-1) to select the waste type(s) disposed of at the landfill:
 Bulk waste option
 Modified bulk MSW option
 Waste composition option

2007 WASTE QUANTITY

(check if true)
A missing data procedure was used to determine 2007 waste quantity
Number of days substitute data was used to determine the 2007 waste quantity: _____ (days)

Identify the option used (from Table HH-1) to select the waste type(s) disposed of at the landfill:
 Bulk waste option
 Modified bulk MSW option
 Waste composition option

2006 WASTE QUANTITY

(check if true)
A missing data procedure was used to determine 2006 waste quantity
Number of days substitute data was used to determine the 2006 waste quantity: _____ (days)

Identify the option used (from Table HH-1) to select the waste type(s) disposed of at the landfill:
 Bulk waste option
 Modified bulk MSW option
 Waste composition option

2005 WASTE QUANTITY

(check if true)
A missing data procedure was used to determine 2005 waste quantity
Number of days substitute data was used to determine the 2005 waste quantity: _____ (days)

Identify the option used (from Table HH-1) to select the waste type(s) disposed of at the landfill:
 Bulk waste option
 Modified bulk MSW option
 Waste composition option

[Subpart Overview](#)

Paperwork Reduction Act Burden Statement | Contact Us e-GGRT RY2011 R.14 | H1(determined/waste)

If you reported prior to RY2011, the historical waste information should be automatically populated and you will only need to enter data for RY2011 based on the instructions below. For more on the historical migration of data, see RY2010 Data Carry-over.

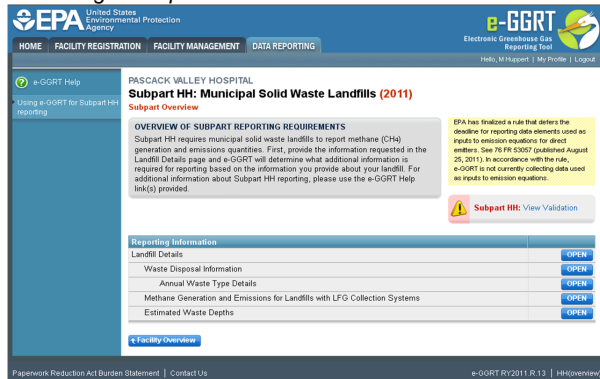
For the reporting year 2011 and each year in which you indicated on the "Landfill Details" page (see [Summary Information for this Facility](#)) that a waste quantity was determined using scales, you will be prompted to enter the following information:

- Indicate if a missing data procedure was used to determine the annual waste quantity for that year. Missing data procedures may be found in §98.345.
 - If a missing data procedure was used, enter the number of days that substitute data was used to determine the waste quantity.
- Identify each of the waste types comprising that year's waste quantity. A facility must use one of the 3 options from Table HH-1: Bulk waste option, Modified bulk MSW option, or Waste composition option. If the Modified bulk MSW or Waste Composition option is chosen, check all applicable boxes within that option:
 - Bulk waste option
 - Modified bulk MSW option:
 - Bulk MSW waste (excluding inerts and C&D waste)
 - Bulk C&D waste
 - Inerts (e.g. glass, plastics, metal, cement)
 - Waste composition option:
 - Food waste
 - Garden

- Sewage sludge
- Paper
- Wood and straw
- Textiles
- Diapers
- Bulk waste
- Inerts (e.g., glass, plastics, metal, cement)

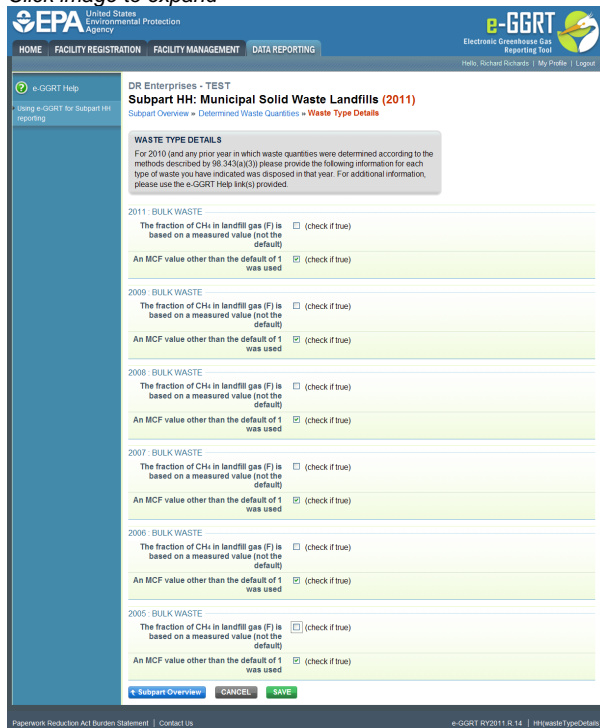
When you have entered the missing data and waste type information for each year listed, click SAVE. You will be brought back to the top of the Waste Disposal Information page at which time you may check over the information you entered. When you have completed your check, click SUBPART OVERVIEW to return to the Subpart Overview page.

Click image to expand



From the Subpart HH Overview page, press the OPEN button located opposite “Annual Waste Type Details.”

Click image to expand



If you reported prior to RY2011, the historical waste type details should be automatically populated and you will only need to enter data for RY2011 based on the instructions below. For more on the historical migration of data, see RY2010 Data Carry-over.

For each combination of Year and Waste Type entered on the “Waste Disposal Information” page, you will be prompted to enter the following information:

- If the fraction of CH₄ in the landfill gas (F) is based on a measured value rather than using the default value of 0.5. (Check the box if the default value was not used.)
- If a Methane Correction Factor (MCF) other than the default of 1 was used. (Check the box if the default value was not used.) An MCF value other than the default may only be used if active aeration is in use at your landfill, in which case you must enter information about

the aeration system.

Both F and MCF are terms found in Equation HH-1 for calculating the modeled methane generation rate at the landfill.

When you have entered the information, click SAVE. You will be brought back to the top of the "Waste Type Details" page at which time you may check over the information you entered. When you have completed your check, click SUBPART OVERVIEW to return to the Subpart Overview page.

If you indicated that an MCF value other than the default was used for any year/waste type combination, the "Active Aeration Information" page will become available on the Subpart HH Overview screen.

Click image to expand

PASCACK VALLEY HOSPITAL
Subpart HH: Municipal Solid Waste Landfills (2011)
Subpart Overview

OVERVIEW OF SUBPART REPORTING REQUIREMENTS
Subpart HH requires municipal solid waste landfills to report methane (CH₄) generation and emissions quantities. First, provide the information requested in the Landfill Details page and e-GGRT will determine what additional information is required for reporting based on the information you provide about your landfill. For additional information about Subpart HH reporting, please use the e-GGRT Help link(s) provided.

EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emissions. See 76 FR 62027 (published August 25, 2011). In accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations.

Subpart HH: View Validation

Reporting Information	
Landfill Details	OPEN
Waste Disposal Information	OPEN
Annual Waste Type Details	OPEN
Methane Generation and Emissions for Landfills with LFG Collection Systems	OPEN
Estimated Waste Depths	OPEN

Facility Overview

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From the Subpart HH Overview page, press the OPEN button located opposite "Active Aeration Information."

Click image to expand

DR Enterprises - TEST
Subpart HH: Municipal Solid Waste Landfills (2011)
Subpart Overview » Annual Waste Type Details » **Aeration Information**

ACTIVE AERATION OF WASTE
Because you have indicated that you have used something other than the default methane correction factor (MCF) value of 1 for a waste type on the Annual Waste Type Details page, please provide the following information about active aeration of waste at your landfill. For additional information about active aeration of waste information, please use the e-GGRT Help link(s) provided. * denotes a required field

Aeration blower capacity (scfm)

Fraction of the landfill containing waste affected by the aeration (percentage expressed as decimal fraction)

Total hours during the year aeration blower was operated (hours)

Other factors used as a basis for the selected MCF value

Any additional description of the aeration system

Subpart Overview | CANCEL | SAVE

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Because you indicated that a value other than the default was used for Methane Correction Factor (MCF), you must enter the following information about the aeration system in use at your landfill:

- The aeration blower capacity in standard cubic feet per minute (scfm). Include the total capacity of all blowers.
- The fraction of the landfill containing waste that is affected by the aeration as a percentage expressed as a decimal fraction between 0 and 1
- The total number of hours during the year in which the aeration blower was operated
- Other factors that were used as a basis for the MCF value that was used in the calculation
- Any additional description of the aeration system that the facility would like to provide (e.g., the number of blowers and other relevant information).

When you have entered the required information, click SAVE. You will be brought back to the top of the "Aeration Information" page at which time you may check over the information you entered. When you have completed your check, click SUBPART OVERVIEW to return to the Subpart Overview page.

[Back to Top](#)

See Also

[Screen Errors](#)
[Using e-GGRT to Prepare Your Subpart HH Report](#)
[Subpart HH Summary Information for this Facility](#)
[Subpart HH Emissions Information](#)
[Subpart Validation Report](#)

Subpart HH Emissions Information

This page provides a step-by-step description of how to enter data on the methane generation and emissions from municipal solid waste (MSW) landfills as required by Subpart HH of the Greenhouse Gas Reporting Program (GHGRP).

Before entering emissions information, you must provide detailed information about your MSW landfill including whether or not your landfill has a Gas Collection System (see "Landfill Details" Summary Information for this Facility)

Click image to expand

PASCACK VALLEY HOSPITAL
Subpart HH: Municipal Solid Waste Landfills (2011)
Subpart Overview

OVERVIEW OF SUBPART REPORTING REQUIREMENTS
Subpart HH requires municipal solid waste landfills to report methane (CH₄) generation and emissions quantities. First, provide the information requested in the Landfill Details page and e-GGRT will determine what additional information is required for reporting based on the information you provide about your landfill. For additional information about Subpart HH reporting, please use the e-GGRT Help link(s) provided.

EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. See 76 FR 6507 published August 25, 2011. In accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations.

Subpart HH: View Validation

Reporting Information	Button
Landfill Details	OPEN
Waste Disposal Information	OPEN
Annual Waste Type Details	OPEN
Methane Generation and Emissions for Landfills with LFG Collection Systems	OPEN
Estimated Waste Depths	OPEN

Facility Overview

If there is no Gas Collection System at your Landfill:

From the Subpart Overview page, click the OPEN button located opposite "Methane Generation and Emissions for Landfills without LFG Collection Systems."

Click image to expand

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Subpart HH: Municipal Solid Waste Landfills (2011)
Subpart Overview • GHG Reporting

CH₄ EMISSIONS (FOR LANDFILLS WITHOUT A GAS COLLECTION SYSTEM)
Landfills that do not have a landfill gas collection system, are required to report annual CH₄ emissions (i.e., the CH₄ generation, adjusted for oxidation, calculated using Equation HH-5 of this subpart), reported in metric tons of CH₄. For additional information, please use the e-GGRT Help links provided.

EQUATION HH-5 SUMMARY AND RESULT

$$MG = G_{CH_4} \times (1 - CX)$$

Hover over an element in the equation above to reveal a definition of that element.

CH₄ generation, adjusted for oxidation, from the landfill in the reporting year (metric tons CH₄)

Use Subpart HH-5 equation spreadsheet to calculate

Methane generation, adjusted for oxidation, from the landfill in the reporting year (metric tons CH₄)

Spreadsheets are also available for calculating inputs to Equation HH-5. Use the Subpart HH-1 and HH-2, HH-3 spreadsheets to calculate inputs to Equation HH-5 as needed.

Subpart Overview CANCEL SAVE

Enter the value for CH₄ generation, adjusted for oxidation, from the landfill in the reporting year (in metric tons of CH₄):

- Hover over an element in the equation to read a definition of that element as needed.
- This equation may be calculated using the spreadsheet tool for Equation HH-5. Spreadsheets are also available for calculating inputs to Equation HH-5. Use the Subpart HH-1 and HH-2, HH-3 spreadsheets to calculate inputs to Equation HH-5 as needed.
- To use the spreadsheet tool, download it by clicking the link labeled "Use HH-5 spreadsheet to calculate."
- Fill in the spreadsheet completely using the instructions provided in the tool.
- After completing the spreadsheet, copy the value of CH₄ calculated by the spreadsheet to this page in the box bordered in red.

When you have entered the information, click SAVE. Then click Subpart Overview to return to the Subpart Overview page.

If there is a Gas Collection System at your Landfill:

From the Subpart Overview page, click the OPEN button located opposite "Methane Generation and Emissions for Landfills with LFG Collection systems."

Click image to expand



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Environmental Protection
Agency



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Reporting Tool

HOME FACILITY REGISTRATION FACILITY MANAGEMENT DATA REPORTING
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DR Enterprises - TEST
Subpart HH: Municipal Solid Waste Landfills (2011)
 Subpart Overview • GHG Reporting

CH₄ EMISSIONS (FOR LANDFILLS WITH A GAS COLLECTION SYSTEM)
 Landfills that have a landfill gas collection system are required to report two sets of CH₄ generation and CH₄ emissions values. CH₄ generation, adjusted for oxidation, must be reported as calculated using both Equations HH-5 and HH-7, and CH₄ emissions must be reported as calculated using both Equations HH-6 and HH-8. For additional information, please use the e-GGRT help links provided.

8031.00
CH₄ emissions — Eq. HH-6 (metric tons)

1000.00
CH₄ emissions — Eq. HH-8 (metric tons)

EQUATION HH-5 SUMMARY AND RESULT

$$MG = G_{CH_4} \times (1 - OX)$$

Hover over an element in the equation above to reveal a definition of that element.

Modeled CH₄ generation, adjusted for oxidation: (metric tons CH₄)
[Use Subpart HH-5 equation spreadsheets to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-5. Use the Subpart HH-1 and HH-2, HH-3 spreadsheets to calculate inputs to Equation HH-5 as needed.

EQUATION HH-7 SUMMARY AND RESULT

$$MG = \frac{R}{CE \times f_{Ox}} \times (1 - OX)$$

Hover over an element in the equation above to reveal a definition of that element.

Measured CH₄ generation, adjusted for oxidation: (metric tons CH₄)
[Use Subpart HH-7 equation spreadsheets to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-7. Use the Subpart HH-4 spreadsheet to calculate inputs to Equation HH-7.

EQUATION HH-6 SUMMARY AND RESULT

$$Emissions = [(G_{CH_4} - R) \times (1 - OX) + R \times (1 - (DE \times f_{Ox}))]$$

Hover over an element in the equation above to reveal a definition of that element.

CH₄ emissions from the landfill in the reporting year: (metric tons CH₄)
[Use Subpart HH-6 equation spreadsheets to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-6. Use the Subpart HH-1, HH-2, HH-3, and HH-4 spreadsheets to calculate inputs to Equation HH-6 as needed.

For HH-6 was the value for CH₄ generation (G_{CH₄}) modeled or measured?
 Modeled (output of equation HH-1)
 Measured (output of equation HH-4)

EQUATION HH-8 SUMMARY AND RESULT

$$EMISSIONS = \left[\left(\frac{R}{CE \times f_{Ox}} - R \right) \times (1 - OX) + R \times (1 - (DE \times f_{Ox})) \right]$$

Hover over an element in the equation above to reveal a definition of that element.

CH₄ emissions from the landfill in the reporting year: (metric tons CH₄)
[Use Subpart HH-8 equation spreadsheet to calculate.](#)

Spreadsheets are also available for calculating inputs to Equation HH-8. Use the Subpart HH-4 spreadsheet to calculate inputs to Equation HH-8.

LANDFILL GAS COLLECTED FOR DESTRUCTION

Annual volume of landfill gas collected for destruction: (bd)

A missing data procedure was used to determine the volume of landfill gas collected for destruction? (check if true)

Number of days substitute data procedure was used to determine the volume of landfill gas collected for destruction: (days)

Annual average CH₄ concentration of landfill gas collected for destruction: (percent)

A missing data procedure was used to determine CH₄ concentration of landfill gas collected for destruction? (check if true)

If CH₄ is monitored daily, the number of days substitute data was used to determine the annual average CH₄ concentration of landfill gas collected for destruction: (days)

If CH₄ is monitored weekly, the number of weeks substitute data was used to determine the annual average CH₄ concentration of landfill gas collected for destruction: (weeks)

Was temperature incorporated into internal calculations run by the collection system's monitoring equipment? Yes
 No

Was pressure incorporated into internal calculations run by the collection system's monitoring equipment? Yes
 No

Was landfill gas flow measured on a wet or dry basis?
 Wet basis
 Dry basis

Was CH₄ concentration measured on a wet or dry basis?
 Wet basis
 Dry basis

Destruction occurred at the facility or off-site?
 At the facility (on-site)
 Off-site
 Both

A back-up destruction device is present: (check if true)

Subpart Overview
CANCEL
SAVE

Paperwork Reduction Act Burden Statement | Contact Us e-GGRT (R/2011-R14 | HHemissions2)

Enter the following values (in metric tons of CH₄):

- Modeled CH₄ generation, adjusted for oxidation (using Equation HH-5)
- Measured CH₄ generation, adjusted for oxidation (using Equation HH-7)
- CH₄ emissions from the landfill during the reporting year (using Equation HH-6) along with an indication of whether this is a modeled (output of Equation HH-1) or measured (output of Equation HH-4) value
- CH₄ emissions from the landfill during the reporting year (using Equation HH-8)

For each equation:

- Hover over an element in the equation to read a definition of that element as needed.
- The equation may be calculated using the spreadsheet tool provided. Spreadsheets are also available for calculating inputs to the equations. Use the Subpart HH-1, HH-2, HH-3, and HH-4 spreadsheets to calculate inputs as needed.
- Download the spreadsheet tool by clicking the link labeled "Use HH-n spreadsheet to calculate."
- Fill in the spreadsheet completely using the instructions provided in the tool.

- After completing the spreadsheet, copy the value of CH₄ calculated by the spreadsheet to this page in the box bordered in red.



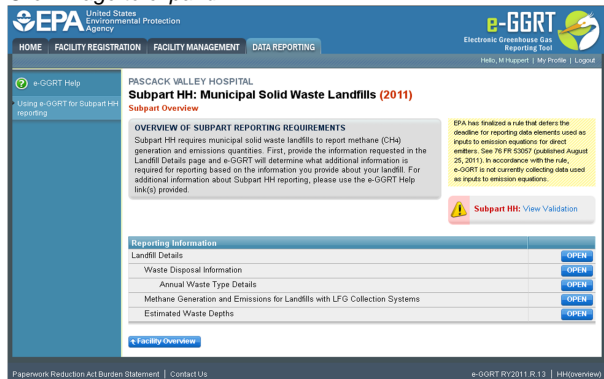
Note for Equations HH-6, HH-7, and HH-8: The calculation spreadsheet file for Equations HH-6, HH-7, and HH-8 has several tabs which are appropriate for different numbers of destruction devices and monitoring/measurement locations at the landfill. Please consult the "Using Subpart HH Calculation Spreadsheets" help screens to ensure appropriate use of the various tabs.

In addition, the following information is collected:

- Annual volume of landfill gas collected for destruction (in scf)
- Indicate if a missing data procedure was used to determine the volume of the landfill gas collected for destruction (information about appropriate procedures for estimating missing data is found in §98.345)
 - If a missing data procedure was used, enter the number of days when substitute data were used to determine the volume of the landfill gas collected for destruction
- Annual average concentration of CH₄ of landfill gas collected for destruction
- Indicate if a missing data procedure was used to determine the concentration of CH₄ in landfill gas collected for destruction (information about appropriate procedures for estimating missing data are found in §98.345)
 - If a missing data procedure was used and the CH₄ concentration is monitored continuously, enter the number of days substitute data were used to determine the annual average CH₄ concentration of landfill gas collected for destruction
 - If a missing data procedure was used and the CH₄ concentration is monitored weekly, enter the number of weeks substitute data were used to determine the annual average CH₄ concentration of landfill gas collected for destruction
 - In the case of multiple measurement locations, you may enter values for both days and weeks when CH₄ concentration is measured continuously at some locations, and weekly at others.
- Indicate (yes/no) if temperature was incorporated into internal calculations run by the collection system's monitoring equipment
 - If temperature was not incorporated into the internal calculations run by the collection system's monitoring equipment, enter the average monthly temperature at which the landfill gas flow was measured (in degrees Rankine) for each month of the reporting year.
- Indicate (yes/no) if pressure was incorporated into internal calculations run by the collection system's monitoring equipment
 - If pressure was not incorporated into the internal calculations run by the collection system's monitoring equipment, enter the average monthly pressure at which the landfill gas flow was measured (in atmospheres) for each month of the reporting year.
- Indicate whether landfill gas flow was measured on a wet or a dry basis and whether CH₄ concentration was measured on a wet or a dry basis
 - If landfill gas flow was measured on a wet basis and CH₄ concentration was measured on a dry basis, or gas flow was measured on a dry basis and CH₄ concentration was measured on a wet basis, provide the monthly average moisture content (expressed as a decimal fraction) for each month of the reporting year.
- Indicate whether landfill gas destruction occurred at the facility (on-site), off-site, or both
 - If any landfill gas destruction occurred at the facility (you answered 'on-site' or 'both' to the previous questions), indicate if a back-up destruction device is present at the facility

When you have entered the information, click SAVE. You will be brought back to the top of the "GHG Reporting" page at which time you may check over the information entered. When you have completed your check, click Subpart Overview to return to the Subpart Overview page.

Click image to expand



From the Subpart Overview page, press the OPEN button located opposite "Estimated Waste Depths."

Click image to expand

For landfills with a gas collection system in place, the following information must be entered on the estimate waste depths (in meters) for each area below (as listed in Table HH-3):

- Depth of area with no waste in place (A1, in meters). Note: In many cases, the depth of area with no waste in place will be zero.
- Depth of area without active gas collection, regardless of cover type (A2, in meters)
- Depth of area with daily soil cover and active gas collection (A3, in meters)
- Depth of area with an intermediate soil cover, or a final soil cover not meeting the criteria for A5 (A4, in meters)
- Depth of area with a final soil cover of 3 feet or thicker of clay and/or geomembrane cover system and active gas collection (A5, in meters)

When you have entered the information, click SAVE. You will be brought back to the top of the “GHG Reporting” page at which time you may check over the information you entered. When you have completed your check, click Subpart Overview to return to the Subpart Overview page.

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See Also

[Screen Errors](#)

[Using e-GGRT to Prepare Your Subpart HH Report](#)

[Subpart HH Summary Information for this Facility](#)

[Subpart HH Waste Information](#)

[Subpart Validation Report](#)

Using Subpart HH Calculation Spreadsheets



These optional spreadsheets are provided to assist reporters in calculating emissions and in keeping records of these calculations.

Reporters are required to keep records of these calculations under 40 CFR 98.3(g) and additional subpart-specific provisions, but are not required to use these spreadsheets or to submit any spreadsheets to EPA.

Spreadsheets may include inputs to emission equations, reporting of which EPA has deferred (See 76 FR 53057, published August 25, 2011, <http://www.gpo.gov/fdsys/pkg/FR-2011-08-25/pdf/2011-21727.pdf>).

Overview

This help page provides guidance for working with the supplemental Subpart HH calculation spreadsheets. The guidance provides step-by-step instructions for the following tasks:

- [Selecting the Appropriate Calculation Spreadsheet](#)
- [Downloading a Calculation Spreadsheet](#)
- [General Information on Using a Calculation Spreadsheet](#)
- [Using the Equation HH-1 Calculation Spreadsheet](#)
- [Using the Equation HH-2, HH-3 Calculation Spreadsheet](#)
- [Using the Equation HH-4 Calculation Spreadsheet](#)
- [Using the Equation HH-5 Calculation Spreadsheet](#)
- [Using the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet](#)

Specific information on each of the calculation spreadsheets is provided below:

Calculation Spreadsheet (click to download)	Calculation Result	Spreadsheet Applicability	Instructions (click to view)
Equation HH-1 Calculation Spreadsheet.xls	Modeled methane generation rate in reporting year	All landfills	HH-1 Help
Equation HH-2, HH-3 Calculation Spreadsheet.xls	Quantity of waste placed in the landfill in year x (wet basis)	Landfills where historical waste disposal quantity data are not readily available	HH-2, HH-3 Help
Equation HH-4 Calculation Spreadsheet.xls	Annual quantity of recovered CH ₄	Landfills with landfill gas collection systems	HH-4 Help
Equation HH-5 Calculation Spreadsheet.xls	Methane generation, adjusted for oxidation, from the landfill in the reporting year	All landfills	HH-5 Help
Equation HH-6, HH-7, HH-8 Calculation Spreadsheet.xls	Methane generation, adjusted for oxidation, from the landfill in the reporting year (by Equation HH-7) and Methane emissions from the landfill in the reporting year by two different ways (by Equation HH-6 and by Equation HH-8)	Landfills with landfill gas collection systems	HH-6, HH-7, HH-8 Help

Selecting the Appropriate Calculation Spreadsheet

For all landfills subject to the reporting requirements of Subpart HH, calculate annual modeled CH₄ generation using the Equation HH-1 Calculation Spreadsheet and according to the requirements in 98.343(a)(1) through 98.343(a)(3). Equation HH-1 is provided below.

(Equation HH-1)	$G_{CH_4} = \left[\sum_{x=S}^{T-1} \left\{ W_x \times MCF \times DOC \times DOC_F \times F \times \frac{16}{12} \times \left(e^{-k(T-x-1)} - e^{-k(T-x)} \right) \right\} \right]$
------------------------	--

Per 98.343(a)(3), beginning in the first emissions reporting year, and each year thereafter, waste quantities must be determined using scales or the working capacity for each vehicle/container, for loads other than cars, light-duty trucks, and loads that cannot be measured with scales due to physical or operational limitations. If scales are in place at the landfill, they must be used to determine waste quantities for the first emissions reporting year and each year thereafter. Scales and/or working capacity may also have been used for any previous years for which waste disposal quantities were measured. Tipping receipts and company records may also be used to determine waste disposal quantities prior to 2010. For the range of years prior to 2010, for which measurement data, tipping receipts or company records are not available, estimate historical annual waste disposal quantities using one of the following methods:

1. Assume all prior year's waste disposal quantities are the same as the waste quantity in the first year for which waste quantities were measured and data are available.
2. Use Equation HH-2 and the Equation HH-2, HH-3 Calculation Spreadsheet which is based on the estimated population served by the landfill in each year and the values for average per capita waste disposal rate.
3. Use Equation HH-3 and the Equation HH-2, HH-3 Calculation Spreadsheet which is based on the landfill capacity or, for operating landfills, the amount of waste-in-place, and the number of years waste was received to estimate a constant average waste disposal quantity.

Equations HH-2 and HH-3 are provided below.

(Equation HH-2)	$W_x = POP_x \times WDR_x$
(Equation HH-3)	$W_x = \frac{LFC}{(YrData - YrOpen + 1)}$

For landfills that do not collect and destroy landfill gas, adjust the modeled annual CH₄ generation (result of Equation HH-1) to account for soil

oxidation (CH₄ that is converted to CO₂ as it passes through the landfill cover before being emitted) using the Equation HH-5 Calculation Spreadsheet. The resulting value represents both CH₄ generation (adjusted for oxidation) and CH₄ emissions for landfills that do not collect and destroy landfill gas. For landfills that do collect and control landfill gas, the result of Equation HH-5 and the Equation HH-5 Calculation Spreadsheet represents only CH₄ generation (adjusted for oxidation). Equation HH-5 is provided below.

(Equation HH-5)	$MG = G_{CH_4} \times (1 - OX)$
------------------------	---------------------------------

For landfills that collect and control landfill gas, calculate the annual quantity of CH₄ recovered and destroyed using Equation HH-4 and the Equation HH-4 Calculation Spreadsheet which is based on continuous monitoring of gas flow rate and continuous or weekly monitoring of CH₄ concentration, temperature, pressure, and moisture content of the collected gas prior to the destruction device. Equation HH-4 is provided below.

(Equation HH-4)	$R = \sum_{n=1}^N \left((V)_n \times (K_{MC})_n \times \frac{(C)_n}{100\%} \times 0.0423 \times \frac{520^\circ R}{(T)_n} \times \frac{(P)_n}{1 \text{ atm}} \times \frac{0.454}{1,000} \right)$
------------------------	---

Facilities that collect and control landfill gas must then calculate CH₄ generation (adjusted for oxidation) and CH₄ emissions in two ways each and report all four results. CH₄ generation (adjusted for oxidation) and CH₄ emissions should be calculated by:

1. First using Equation HH-5 and the Equation HH-5 Calculation Spreadsheet to determine CH₄ generation (adjusted for oxidation) and then using Equation HH-6 and the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet which subtracts the measured amount of CH₄ recovered from the modeled annual CH₄ generation (with adjustments for soil oxidation and destruction efficiency of the destruction device).
2. Using Equations HH-7 and HH-8 and the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet which applies a gas collection efficiency to the measured amount of CH₄ recovered and accounts for CH₄ that is emitted through the landfill surface (adjusted for soil oxidation). Default collection efficiencies that take into account collection system coverage and landfill cover materials are specified in Table HH-3 found in a separate tab within the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet. If a single measurement location is used to determine gas recovery for multiple destruction devices, the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet also provides equations for computing destruction efficiency and fraction of hours destruction devices were operating in the "MultiDD_per_MeasLocation" tab.

Equation HH-5 is provided above. Equations HH-6, HH-7 and HH-8 are provided below.

(Equation HH-6)	$\text{Emissions} = \left[(G_{CH_4} - R) \times (1 - OX) + R \times (1 - (DE \times f_{Dest})) \right]$
(Equation HH-7)	$MG = \frac{R}{CE \times f_{Rec}} \times (1 - OX)$
(Equation HH-8)	$\text{Emissions} = \left[\left(\frac{R}{CE \times f_{Rec}} - R \right) \times (1 - OX) + R \times (1 - (DE \times f_{Dest})) \right]$

The Equation HH-6, HH-7, HH-8 Calculation Spreadsheet also provides alternate equations to implement Equations HH-6, HH-7, and HH-8 when multiple gas recovery measurement locations are used (in tab "Equation HH-6,HH-7,HH-8_Multi"). These alternate forms of Equations HH-6, HH-7, and HH-8 are provided below.

(Equation HH-6)	$\text{Emissions} = \left[\left(G_{CH_4} - \sum_{n=1}^N R_n \right) \times (1 - OX) + \sum_{n=1}^N \left\{ R_n \times (1 - (DE_n \times f_{Dest,n})) \right\} \right]$
(Equation HH-7)	$MG = \frac{1}{CE} \sum_{n=1}^N \left[\frac{R_n}{f_{Rec,n}} \right] \times (1 - OX)$

(Equation HH-8)

$$\text{Emissions} = \left[\left(\frac{1}{\text{CE}} \left\{ \sum_{n=1}^N \left[\frac{R_n}{f_{\text{Rec},n}} \right] \right\} - \sum_{n=1}^N R_n \right) \times (1 - \text{OX}) + \sum_{n=1}^N \left\{ R_n \times (1 - (\text{DE}_n \times f_{\text{Dest},n})) \right\} \right]$$

Downloading a Calculation Spreadsheet

Calculation spreadsheets for Subpart HH may be downloaded by clicking one of the links in the first column of the table below. Users may also jump to instructions for each calculation spreadsheet by clicking one of the links in the fourth column.

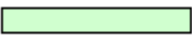




Calculation Spreadsheet (click to download)	Calculation Result	Spreadsheet Applicability	Instructions (click to view)
Equation HH-1 Calculation Spreadsheet.xls	Modeled methane generation rate in reporting year	All landfills	HH-1 Help
Equation HH-2, HH-3 Calculation Spreadsheet.xls	Quantity of waste placed in the landfill in year x (wet basis)	Landfills where historical waste disposal quantity data are not readily available	HH-2, HH-3 Help
Equation HH-4 Calculation Spreadsheet.xls	Annual quantity of recovered CH ₄	Landfills with landfill gas collection systems	HH-4 Help
Equation HH-5 Calculation Spreadsheet.xls	Methane generation, adjusted for oxidation, from the landfill in the reporting year	All landfills	HH-5 Help
Equation HH-6, HH-7, HH-8 Calculation Spreadsheet.xls	Methane generation, adjusted for oxidation, from the landfill in the reporting year (by Equation HH-7) and Methane emissions from the landfill in the reporting year and Methane emissions from the landfill in the reporting year by two different ways (by Equation HH-6 and by Equation HH-8)	Landfills with landfill gas collection systems	HH-6, HH-7, HH-8 Help

Using a Calculation Spreadsheet to Make Calculations

The guidance provided in this section applies to each of the calculation spreadsheets for Subpart HH. Additional guidance is provided for each individual calculation spreadsheet in the sections below.

Color Coding

The calculation spreadsheets contain green input cells, gray informational cells and red-bordered results cells. Users should use green input cells to enter all data specific to their facility, unit, or process. As you progress through a reporting form, you may notice some green input cells changing to black deactivated cells. Black deactivated cells are not applicable to the user based on previous data entries in the form. Users should not enter data into these cells. Gray informational cells contain parameter names, column and row headings, equation constants and subtotals. Calculation results are displayed in red-bordered results cells. Values displayed in red-bordered cells with yellow fill should be entered into another cell within the same calculation spreadsheet or in another calculation spreadsheet as directed by spreadsheet instructions. Values displayed in red-bordered cells with white fill should be entered directly into e-GGRT. All cells that are not green input cells are locked and cannot be modified.

	Green input cell (data entry)
	Black deactivated cell (not applicable, no data required)
	Gray informational cells (locked)
	Red-bordered/yellow fill results cells (enter into another spreadsheet)
	Red-bordered/white fill results cells (enter into e-GGRT)

Stop and Warning Messages

The calculation spreadsheets will display a stop message if the user enters a value that is invalid or a warning message if the user enters a value outside the EPA estimated range for a particular data element. For invalid data entries, the stop messages will not allow a user to proceed and the user must reenter valid data before moving forward. For data entries that are outside the EPA estimated range for a particular data element, the warning messages will allow a user to proceed if the user deems the entered value to be accurate.

Using the Equation HH-1 Calculation Spreadsheet

Calculate the annual modeled CH₄ generation using Equation HH-1 and the Equation HH-1 Calculation Spreadsheet for a landfill. Use the appropriate parameter values for k, DOC, MCF, DOC_F, and F shown in Table HH-1 within the calculation spreadsheet. For years when waste composition data are not available, use either the bulk waste or the modified bulk MSW parameter values for k and DOC in Table HH-1 for the total quantity of waste disposed in those years.

If, prior to 2010, the quantity of waste disposed each year (W_x) is estimated using Equation HH-2 or HH-3, use the Equation HH-2, HH-3 Calculation Spreadsheet first and enter the resulting W_x values in the appropriate column in the Equation HH-1 Calculation Spreadsheet.

Equation HH-1 is provided below:

(Equation HH-1)	$G_{CH_4} = \left[\sum_{x=S}^{T-1} \left\{ W_x \times MCF \times DOC \times DOC_F \times F \times \frac{16}{12} \times \left(e^{-k(T-x-1)} - e^{-k(T-x)} \right) \right\} \right]$
------------------------	--

Begin by entering the facility name, your name, the unit name or identifier, the reporting period, and any additional comments in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill

Next, enter the requested information in the green input cells in the Input Data table.

Input Data

[S] = Start year of calculation. Use the year 1960 or the opening year of the landfill, whichever is more recent.	1960	
[T] = Reporting year for which emissions are calculated.	2010	
[MCF] = Methane correction factor (fraction). Use the default value of 1 unless there is active aeration of waste within the landfill during the reporting year. If there is active aeration of waste within the landfill during the reporting year, use either the default value of 1 or select an alternative value no less than 0.5 based on site-specific aeration parameters.	1.	The default value for MCF is 1
[DOC] = Degradable organic carbon from Table HH-1 of this subpart or measurement data, if available [fraction (metric tons C/metric ton waste)].		
[DOC _F] = Fraction of DOC dissimilated (fraction). Use the default value of 0.5.	0.5	
[F] = Fraction by volume of CH ₄ in landfill gas from measurement data on a dry basis, if available (fraction); default is 0.5.	0.5	The default value for F is 0.5
[16/12] = Constant	16/12	
[k] = Rate constant from Table HH-1 of this subpart (yr ⁻¹). Select the most applicable k value for the majority of the past 10 years (or operating life, whichever is shorter).		

[x] = Year in which waste was disposed.	[W _x] = Quantity of waste disposed in the landfill in year x from measurement data, tipping fee receipts, or other company records (metric tons, as received (wet weight)).	[G _{CH₄}] in year T from waste disposed in year x (metric tons CH ₄). Value is calculated for years between S and T-1, inclusive.
1960		0.0
1961		0.0
1962		0.0
1963		0.0

The calculation spreadsheet will calculate the modeled CH₄ generation from the landfill in the reporting year. The calculated value will be displayed in a red-bordered cell with yellow fill at the bottom of the spreadsheet. This value should be entered in the Equation HH-5 Calculation Spreadsheet for this landfill.

Annual Modeled CH₄ Generation (metric tons) from Equation HH-1

[G _{CH₄}] = Modeled methane generation rate in reporting year T (metric tons CH ₄).	0.00
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Use this value in Equation HH-5

Using the Equation HH-2, HH-3 Calculation Spreadsheet

Estimate historical annual waste disposal quantities for the range of years prior to 2010 in which measurement data was not available using proxy year measurement data or the Equation HH-2, HH-3 Calculation Spreadsheet. This spreadsheet is only needed when following the methodologies in 98.343(a)(4)(ii) or 98.343(a)(4)(iii). This spreadsheet performs the calculation using Equation HH-2 or Equation HH-3, which are provided below. Equation HH-2 is based on the estimated population served by the landfill in each year and the values for average per capita waste disposal rate and should be used when applying the methodology described in 98.343(a)(4)(ii); Equation HH-3 is based on the landfill capacity or, for operating landfills, the amount of waste-in-place to estimate a constant average waste disposal quantity and should be used when applying the methodology described in 98.343(a)(4)(iii). The result from either equation is entered into the Equation HH-1 Calculation Spreadsheet for this landfill.

(Equation HH-2)	$W_x = POP_x \times WDR_x$
(Equation HH-3)	$W_x = \frac{LFC}{(YrData - YrOpen + 1)}$

Begin by entering the facility name, your name, the unit name or identifier, the reporting period, any additional comments, and the equation you wish to use (HH-2 or HH-3) in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill
Equation Used	

Next, enter the requested information in the green input cells in the Annual Calculated W_x table for either Equation HH-2 or HH-3, but not both.

Annual Calculated W_x Using Equation HH-2

[x] = Year in which waste was disposed.	[POP] _x = Population served by the landfill in year x from city population, census data, or other estimates (capita).	[VDR] _x = Average per capita waste disposal rate for year x from Table HH-2 (metric tons per capita per year, wet basis).	[W] _x = Quantity of waste placed in the landfill in year x (metric tons, wet basis).
1960		0.63	0.0
1961		0.64	0.0
1962		0.64	0.0
1963		0.65	0.0
1964		0.65	0.0
1965		0.66	0.0
1966		0.66	0.0
1967		0.67	0.0
1968		0.68	0.0
1969		0.68	0.0
1970		0.69	0.0
1971		0.69	0.0
1972		0.7	0.0
1973		0.71	0.0
1974		0.71	0.0
1975		0.72	0.0
1976		0.73	0.0
1977		0.73	0.0
1978		0.74	0.0
1979		0.75	0.0
1980		0.75	0.0
1981		0.76	0.0
1982		0.77	0.0
1983		0.77	0.0
1984		0.78	0.0
1985		0.79	0.0
1986		0.79	0.0
1987		0.8	0.0
1988		0.8	0.0
1989		0.83	0.0
1990		0.82	0.0
1991		0.76	0.0
1992		0.74	0.0
1993		0.76	0.0
1994		0.75	0.0
1995		0.7	0.0
1996		0.68	0.0
1997		0.69	0.0
1998		0.75	0.0
1999		0.75	0.0
2000		0.8	0.0
2001		0.91	0.0
2002		1.02	0.0
2003		1.02	0.0
2004		1.01	0.0
2005		0.98	0.0
2006		0.95	0.0
2007		0.95	0.0
2008		0.95	0.0
2009		0.95	0.0
2010			0.0
2011			0.0
2012			0.0
2013			0.0
2014			0.0
2015			0.0

Use these values in Equation HH-1

Annual Calculated W_x Using Equation HH-3

[LFC] = Landfill capacity or, for operating landfills, capacity of the landfill used (or the total quantity of waste-in-place) at the end of the year prior to the year when waste disposal data are available from design drawings or engineering estimates (metric tons)	[YrData] = Year in which the landfill last received waste or, for operating landfills, the year prior to the first reporting year when waste disposal data is first available from company records, or best available data.	[YrOpen] = Year in which the landfill first received waste from company records or best available data. If no data are available for estimating YrOpen for a closed landfill, use 30 years as the default operating life of the landfill.	[W_x] = Quantity of waste placed in the landfill in year x (metric tons, wet basis).
			0.0

Use this value in Equation HH-1

The calculation spreadsheet will calculate the quantity of waste placed in the landfill in year x using either Equation HH-2 or HH-3.

If Equation HH-2 was used, the calculated values will be displayed in red-bordered cells with yellow fill in the fourth column of the Annual Calculated W_x Using Equation HH-2 table. These values should be entered in the Equation HH-1 Calculation Spreadsheet for this landfill (see above).

If Equation HH-3 was used, the calculated value will be displayed in a red-bordered cell with yellow fill in the fourth column of the Annual Calculated W_x Using Equation HH-3 table. This value should be entered in the Equation HH-1 Calculation Spreadsheet for this landfill (see above).

Using the Equation HH-4 Calculation Spreadsheet

For landfills that collect and control landfill gas, calculate the annual quantity of CH_4 recovered and destroyed using Equation HH-4 and the Equation HH-4 Calculation Spreadsheet. If you do not continuously monitor according to paragraph 98.343(b)(1), you must determine the flow rate, CH_4 concentration, temperature, pressure, and moisture content of the landfill gas that is collected and routed to a destruction device (before any treatment equipment) according to the requirements in paragraphs 98.343(b)(2)(i) through 98.343(b)(2)(iii). Equation HH-4 is provided below.

(Equation HH-4)	$R = \sum_{n=1}^N \left((V)_n \times (K_{MC})_n \times \frac{(C)_n}{100\%} \times 0.0423 \times \frac{520^\circ R}{(T)_n} \times \frac{(P)_n}{1 \text{ atm}} \times \frac{0.454}{1,000} \right)$
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Begin by entering the facility name, your name, the unit name or identifier, the reporting period, and any additional comments in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill

Next, enter the requested information in the green input cells in the Input Data table. Based on your entries in the first Input Data table, required cells will be activated to green input cells in the second Input Data table.

Click image to expand

Input Data

Basis for (V) _i								
Basis for (C) _i								
[N] = Total number of measurement periods in a year. Use daily averaging periods for a continuous monitoring system and N = 365 (or N = 366 for leap years). For weekly sampling, as provided in paragraph (b)(2) of this section, use N=52.	100							
[n] = Index for Measurement Period	[V] _i = Cumulative volumetric flow for the measurement period in actual cubic feet (acft). If the flow rate meter automatically corrects for temperature and pressure, replace 520°R(T) _i × (P) _i /1 atm' with '1'	[C] _i = Average CH ₄ concentration of landfill gas for the measurement period (volume %)	[T] _i = Average temperature at which flow is measured for the measurement period (°R)	[P] _i = Average pressure at which flow is measured for the measurement period (atm)	[f _{wet}] _i = Average moisture content of landfill gas during the measurement period, volumetric basis (cubic feet water per cubic feet landfill gas)	[K _{wet}] _i = Moisture correction term for the measurement period, volumetric basis, as follows: (K _{wet}) _i = 1 when (V) _i and (C) _i are both measured on a dry basis or if both are measured on a wet basis. (K _{wet}) _i = [1 - (f _{wet}) _i] when (V) _i is measured on a wet basis and (C) _i is measured on a dry basis, and (K _{wet}) _i = 1/[1 - (f _{wet}) _i] when (V) _i is measured on a dry basis and (C) _i is measured on a wet basis.	[R] = Equation value R for period n	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								

The calculation spreadsheet will calculate the annual quantity of CH₄ recovered from the landfill. The calculated value will be displayed in a red-bordered cell with yellow fill at the bottom of the spreadsheet. This value should be entered in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet for this landfill.

Methane Recovery (metric tons) from Equation HH-4

[R] = Annual quantity of recovered CH₄ (metric tons CH₄).

Use this value in Equation HH-6, HH-7, HH-8

Using the Equation HH-5 Calculation Spreadsheet

Calculate the annual CH₄ generation (adjusted for oxidation) using Equation HH-5 and the Equation HH-5 Calculation Spreadsheet for a landfill. For landfills that do not have landfill gas collection systems, the annual CH₄ emissions are equal to the CH₄ generation (MG) calculated using Equation HH-5 (calculate CH₄ emissions using the Equation HH-6 Calculation Spreadsheet for landfills with landfill gas collection systems). Equation HH-5 is provided below.

(Equation HH-5)

$$MG = G_{CH4} \times (1 - OX)$$

Begin by entering the facility name, your name, the unit name or identifier, the reporting period, and any additional comments in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill

Next, enter the requested information in the green input cells in the Input Data table, including the result of Equation HH-1 as calculated using the Equation HH-1 Calculation Spreadsheet.

Input Data

<p>[G_{CH4}] = Modeled methane generation rate in reporting year from Equation HH-1 (metric tons CH₄).</p>	
<p>[OX] = Oxidation fraction. Use the default value of 0.1.</p>	0.1

The calculation spreadsheet will calculate the CH₄ generation (adjusted for oxidation) from the landfill in the reporting year. For landfills that do not have landfill gas collection systems, the annual CH₄ emissions are equal to the annual CH₄ generation (adjusted for oxidation). The calculated value will be displayed in a red-bordered cell with white fill at the bottom of the spreadsheet. This value should be entered into e-GGRT for this landfill.

Methane Generation Adjusted for Oxidation (metric tons) from Equation HH-5

[MG] = Methane generation, adjusted for oxidation, from the landfill in the reporting year (metric tons CH ₄).	0.00
--	------

Enter this value in e-GGRT

NOTE: Facilities that collect and control landfill gas must calculate CH₄ generation (adjusted for oxidation) and CH₄ emissions in two ways each and report all four results. Calculate CH₄ generation (adjusted for oxidation) using both Equation HH-5 (above) and Equation HH-7 (below). Calculate CH₄ emissions using both Equation HH-6 and Equation HH-8 (both are below). Calculation spreadsheets are provided for each of these equations. Enter all resulting values into e-GGRT.

Using the Equation HH-6 Tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet

Calculate the annual CH₄ emissions from the modeled CH₄ generation and measured CH₄ recovery using Equation HH-6 and the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet for a landfill. This tab only applies to landfills with landfill gas collection systems with a single gas recovery measurement location. If multiple gas recovery measurement locations are used, see "Using the Equation HH-6, HH-7, HH-8_Multi Tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet." Equation HH-6 is provided below.

(Equation HH-6)	$\text{Emissions} = \left[\left(G_{\text{CH}_4} - R \right) \times \left(1 - \text{OX} \right) + R \times \left(1 - \left(\text{DE} \times f_{\text{Dest}} \right) \right) \right]$
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Begin by entering the facility name, your name, the unit name or identifier, the reporting period, and any additional comments in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill

Next, enter the requested information in the green input cells in the Input Data table, including the result of Equation HH-1 as calculated using the Equation HH-1 Calculation Spreadsheet and the result of Equation HH-4 as calculated using the Equation HH-4 Calculation Spreadsheet. If gas recovery measurements are made at a single location for multiple destruction devices, use the "MultiDD_per_MeasLocation" tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet to determine appropriate values for the destruction efficiency DE and the fraction of hours the destruction device was operating fDest. See section below for further explanation on using the "MultiDD_per_MeasLocation" tab.

Input Data

[G _{CH₄}] = Modeled methane generation rate in reporting year from Equation HH-1 or the quantity of recovered CH ₄ from Equation HH-4, whichever is greater (metric tons CH ₄).	
[R] = Quantity of recovered CH ₄ from Equation HH-4 (metric tons CH ₄).	
[OX] = Oxidation fraction. Use the default value of 0.1.	0.1
[DE] = Destruction efficiency (lesser of manufacturer's specified destruction efficiency and 0.99). If the gas is transported offsite for destruction, use DE = 1.	
[f _{Dest}] = Fraction of hours the destruction device was operating (annual operating hours / 8760 hours per year). If the gas is destroyed in a back-up flare (or similar device) or if the gas is transported off-site for destruction, used f _{Dest} = 1.	

The calculation spreadsheet will calculate the CH₄ emissions from the landfill in the reporting year. The calculated value will be displayed in a red-bordered cell with white fill at the bottom of the spreadsheet. This value should be entered into e-GGRT for this landfill.

Methane Emissions (metric tons) from Equation HH-6

[Emissions] = Methane emissions from the landfill in the reporting year (metric tons CH ₄).	0.00
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 Enter this value in e-GGRT

Using the Equation HH-7, HH-8 Tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet

Calculate CH₄ generation and CH₄ emissions from a landfill using measured CH₄ recovery and estimated gas collection efficiency. These calculations employ Equations HH-7 and HH-8 and the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet. This tab only applies to landfills with landfill gas collection systems with a single gas recovery measurement location. If multiple gas recovery measurement locations are used, see "Using the Equation HH-6, HH-7, HH-8_Multi Tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet." Equations HH-7 and HH-8 are provided below.

(Equation HH-7)	$MG = \frac{R}{CE \times f_{Rec}} \times (1 - OX)$
(Equation HH-8)	$Emissions = \left[\left(\frac{R}{CE \times f_{Rec}} - R \right) \times (1 - OX) + R \times (1 - (DE \times f_{Dest})) \right]$

Begin by entering the facility name, your name, the unit name or identifier, the reporting period, and any additional comments in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill

Then, enter the requested information in the green input cells in the Input Data for Calculating Weighted Average for CE table to estimate the collection efficiency at the landfill, taking into account system coverage, operation, and cover system materials from Table HH-3. Table HH-3 may be found in a separate tab within the Equation HH-7, HH-8 Calculation Spreadsheet. The calculated area-weighted collection efficiency will be displayed in a red-bordered cell with yellow fill below the table. This value should be entered into the Input Data table below. If area by soil cover type information is not available, use a default value of 0.75 for all areas under active influence of the collection system.

Input Data for Calculating Weighted Average for CE (if multiple cover systems are present)

Surface Area, square meters		Landfill gas collection efficiency (Value from Table HH-3)	
[A1] = Area with no waste in-place		Not applicable: do not use this area in the calculation	Not applicable: do not use this area in the calculation
[A2] = Area without active gas collection, regardless of cover type		CE2: 0%	0%
[A3] = Area with daily soil cover and active gas collection		CE3: 60%	60%
[A4] = Area with an intermediate soil cover, or a final soil cover not meeting the criteria for A5 below, and active gas collection		CE4: 75%	75%
[A5] = Area with a final soil cover of 3 feet or thicker of clay and/or geomembrane cover system and active gas collection		CE5: 95%	95%
Area weighted average collection efficiency for landfills			

Use this value as CE, below

Next, enter the requested information in the green input cells in the Input Data table, including the result of Equation HH-4 as calculated using the Equation HH-4 Calculation Spreadsheet. If gas recovery measurements are made at a single location for multiple destruction devices, use the "MultiDD_per_MeasLocation" tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet to determine appropriate values for the destruction efficiency DE and the fraction of hours the destruction device was operating f_{Dest} .

Input Data

[R] = Quantity of recovered CH ₄ from Equation HH-4 (metric tons CH ₄).		<p>Enter value calculated above, or value from Table HH-3, or enter default value of 0.75</p>
[CE] = Collection efficiency estimated at landfill, taking into account system coverage, operation, and cover system materials from Table HH-3 of this subpart. If area by soil cover type information is not available, use default value of 0.75 (CE4 in table HH-3 of this subpart) for all areas under active influence of the collection system.		
[f _{Rec}] = Fraction of hours the recovery system was operating (annual operating hours/8760 hours per year).		
[OX] = Oxidation fraction. Use the default value of 0.1.	0.1	
[DE] = Destruction efficiency (lesser of manufacturer's specified destruction efficiency and 0.99). If the gas is transported offsite for destruction, use DE = 1.		
[f _{Dest}] = Fraction of hours the destruction device was operating (annual operating hours / 8760 hours per year). If the gas is destroyed in a back-up flare (or similar device) or if the gas is transported off-site for destruction, used $f_{Dest} = 1$.		

The calculation spreadsheet will calculate the CH₄ generation and CH₄ emissions from this landfill in the reporting year. The calculated values will be displayed in red-bordered cells with white fill at the bottom of the spreadsheet. These values should be entered into e-GGRT for this landfill.

Methane Generation Adjusted for Oxidation (metric tons) from Equation HH-7

[MG] = Methane generation, adjusted for oxidation, from the landfill in the reporting year (metric tons CH₄).

Enter this value in e-GGRT

Methane Emissions (metric tons) from Equation HH-8

[Emissions] = Methane emissions from the landfill in the reporting year (metric tons CH₄).

Enter this value in e-GGRT

Using the Equation HH-6, HH-7, HH-8 Multi Tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet

The Equation HH-6, HH-7, HH-8_Multi tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet provides the appropriate application of Equations HH-6, HH-7, and HH-8 when multiple gas recovery measurement locations are used at a single MSW landfill facility. Equations HH-6, HH-7 and HH-8 suitable for facilities with multiple landfill gas recovery measurement locations are provided below.

(Equation HH-6)	$\text{Emissions} = \left[\left(G_{\text{CH}_4} - \sum_{n=1}^M R_n \right) \times (1 - \text{OX}) + \sum_{n=1}^M \left\{ R_n \times (1 - (\text{DE}_n \times f_{\text{Dest},n})) \right\} \right]$
(Equation HH-7)	$\text{MG} = \frac{1}{\text{CE}} \sum_{n=1}^N \left[\frac{R_n}{f_{\text{Rec},n}} \right] \times (1 - \text{OX})$
(Equation HH-8)	$\text{Emissions} = \left[\left(\frac{1}{\text{CE}} \left\{ \sum_{n=1}^N \left[\frac{R_n}{f_{\text{Rec},n}} \right] \right\} - \sum_{n=1}^N R_n \right) \times (1 - \text{OX}) + \sum_{n=1}^N \left\{ R_n \times (1 - (\text{DE}_n \times f_{\text{Dest},n})) \right\} \right]$

Begin by entering the facility name, your name, the unit name or identifier, the reporting period, and any additional comments in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill

Then, enter the requested information in the green input cells in the Input Data table, including the result of Equation HH-1 as calculated using the Equation HH-1 Calculation Spreadsheet, the result of Equation HH-4 as calculated using the Equation HH-4 Calculation Spreadsheet for each of the different gas recovery measurement locations, and the result of the collection efficiency at the landfill taking into account system coverage, operation, and cover system materials from Table HH-3 using the Equation HH-7, HH-8 tab of the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet.

Input Data

This calculation spreadsheet can be used for up to 10 monitoring locations.

[N] = Number of measurement locations	3			
[TotAnnualHrs] = The total number of hours in the reporting year (hours) Enter 8,760 (or 8,784 for leap year)	8,760			
[G_{CH4}] = Modeled methane generation rate in reporting year from Equation HH-1 or the quantity of recovered CH ₄ from Equation HH-4 for all locations, whichever is greater (metric tons CH ₄).	200,000			
[CE] = Collection efficiency estimated at landfill, taking into account system coverage, operation, and cover system materials from Table HH-3 of this subpart. If area by soil cover type information is not available, use default value of 0.75 (CE4 in table HH-3 of this subpart) for all areas under active influence of the collection system.	0.9	Enter value calculated in Table HH-3 tab		
[OX] = Oxidation fraction. Use the default value of 0.1	0.1			
[n] = Measurement location index:	[(R)_n] = Quantity of recovered CH ₄ from Equation HH-4 (metric tons CH ₄) for this measurement location.	[(DE)_n] = destruction efficiency for this measurement location.	[(f_{dest})_n] = fraction hours destruction occurs for this measurement location.	[(CollOpHrs)_n] = collection system operating hours for this measurement location.
1	40,000	0.99	0.97	4,000
2	30,000	0.98	0.98	8,600
3	50,000	0.95	0.95	8,700
4				
5				
6				
7				
8				
9				
10				

Enter data for each measurement location

The calculation spreadsheet will calculate the CH₄ generation and CH₄ emissions from this landfill in the reporting year. The calculated values will be displayed in red-bordered cells with white fill at the bottom of the spreadsheet. These values should be entered into e-GGRT for this landfill.

Methane Emissions (metric tons) from Equation HH-6

[Emissions] = Methane emissions from the landfill in the reporting year (metric tons CH ₄).	79,651.00
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Enter this value in e-GGRT

Methane Generation Adjusted for Oxidation (metric tons) from Equation HH-7

[MG] = Methane generation, adjusted for oxidation, from the landfill in the reporting year (metric tons CH ₄).	168,502.97
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Enter this value in e-GGRT

Methane Emissions (metric tons) from Equation HH-8

[Emissions] = Methane emissions from the landfill in the reporting year (metric tons CH ₄).	56,153.97
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Enter this value in e-GGRT

Using the MultiDD_per_MeasLocation Tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet

The MultiDD_per_MeasLocation tab in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet provides the appropriate calculation of destruction efficiency DE and fraction of hours the destruction device was operating fDest for when a single gas recovery measurement location is used but the gas is destroyed via multiple destruction devices.

Begin by entering the facility name, your name, the unit name or identifier, the reporting period, and any additional comments in the green input cells of the general information table located immediately below the equation in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	Municipal Solid Waste Landfill

Then, enter the requested information in the green input cells in the Input Data table.

Input Data

This calculation spreadsheet can be used for up to 10 destruction devices for a given measurement location.

Enter data for each destruction device	[NDD] = Number of destruction devices associated with this measurement location; treat gas sent off-site as one destruction device	3	
	[CollOpHrs] = The total hours the gas collection system associated with this measurement location was operating during the reporting year (hours)	8,725	
	[TotAnnualHrs] = The total number of hours in the reporting year (hours) Enter 8,760 (or 8,784 for leap year)	8,760	
	[n] = Destruction device index		[(DE)_n] = destruction efficiency (lesser of manufacturer's specified destruction efficiency and 0.99). If the gas is transported offsite for destruction, use DE = 1.
			[(DestOpHrs)_n] = Total total hours the destruction device was operating during the reporting year while the collection system was also operating or, for gas sent off-site, the total hours the gas collection system was operating (hours)
	1	0.99	8,000
	2	0.98	8,400
	3	0.95	8,500
	4		
	5		
6			
7			
8			
9			
10			

The calculation spreadsheet will calculate the destruction efficiency DE and the fraction of hours the destruction devices were operating fDest. The calculated values will be displayed in red-bordered cells with white fill at the bottom of the spreadsheet. These values should be entered into the appropriate input data tables for Equations HH-6, HH-7, and HH-8 in the Equation HH-6, HH-7, HH-8 Calculation Spreadsheet.

Intermediate Output

[(DE)_{ave}] = average destruction efficiency	0.9733
[(f_{Dest})] = fraction hours, on average, destruction devices were operated	0.9513

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Carry forward of data from previous subpart HH submissions into RY2011 forms

If you previously reported under subpart HH for Reporting Year (RY) 2010, the Agency has carried some of your RY2010 data forward and entered it in your RY2011 forms to reduce reporting burden. The data that are carried forward are data elements that the Agency believes are unlikely to significantly change from year to year. The Agency has not carried forward data for data elements that typically change each year. It is still your responsibility to review and ensure that all the information in your submission is correct, including data elements that are carried forward from the previous reporting year.

Please visit the [Carry forward of data from previous submissions into RY2011 forms](#) page for a general discussion of how e-GGRT will roll forward data from RY2010 to RY2011.

- For additional details on the specific RY2010 data that were carried over to RY2011, please refer to the [Data Elements Rollover Tables](#).



The reporter is responsible for ensuring all data are accurate before submitting their report. Consistent with 98.4(a), it is the designated representative (DR) for the facility or supplier that is responsible for reporting for the facility or supplier. The current facility owner is responsible for identifying and authorizing a DR and the DR is responsible for timely and accurate reporting. With respect to accurate reporting, 98.4(e)(1) of the rule requires that your report is certified "to the best of my knowledge and belief true, accurate, and complete."

Please Note: If you previously reported under subpart HH for RY 2010 and are developing a RY2011 report, wastes disposed of in 2010 are now considered "Historical Waste Quantities." Therefore:

- If you selected that your landfill was **OPEN in 2010** and that **YES**, scales were used to determine the annual waste quantity in 2010, then

in your RY2011 report under HISTORICAL WASTE QUANTITY ESTIMATION METHOD AND PERIOD:

- The scales period END year will be set to the year 2010. (The scales period START year will be carried over as it exists in the RY2010 report.)
 - All other data will be carried over as they exist for 2010 except data under 2010 WASTE DISPOSAL QUANTITY METHOD. You will instead be required to select the appropriate 2011 WASTE DISPOSAL QUANTITY METHOD.
- If you selected that your landfill was **OPEN in 2010**, that **NO**, scales were not used to determine the annual waste quantity under HISTORICAL WASTE QUANTITY ESTIMATION METHOD AND PERIOD, but that scales were used to determine the annual quantity of waste disposed of in 2010:
 - Your RY2011 report will indicate that scales were used to determine the annual waste quantity prior to RY2011. That is, the answer to "Were scales used to determine the annual waste quantity for any years prior to 2011?" will be turned to "Yes".
 - The scales period START and END year will both be set to the year 2010.
 - All other data will be carried over as they exist for 2010 except data under 2010 WASTE DISPOSAL QUANTITY METHOD. You will instead be required to select the appropriate 2011 WASTE DISPOSAL QUANTITY METHOD.
- If you selected that your landfill was **OPEN in 2010** and that **YES**, tipping receipts, company records, or measured working capacities were used to determine the annual waste quantity under HISTORICAL WASTE QUANTITY ESTIMATION METHOD AND PERIOD, and that working capacity for each vehicle/container was used to determine the annual quantity of waste disposed of in 2010:
 - The tipping receipts/company records period END year will be set to the year 2010. (The tipping receipts/company records period START year will be carried over as it exists in the RY2010 report.)
 - All other data will be carried over as they exist for 2010 except data under 2010 WASTE DISPOSAL QUANTITY METHOD. You will instead be required to select the appropriate 2011 WASTE DISPOSAL QUANTITY METHOD.
- If you selected that your landfill was **OPEN in 2010**, that **NO**, tipping receipts, company records, or measured working capacities were not used to determine the annual waste quantity under HISTORICAL WASTE QUANTITY ESTIMATION METHOD AND PERIOD, and that the working capacity for each vehicle/container was used to determine the annual quantity of waste disposed of in 2010:
 - Your RY2011 report will indicate that tipping receipts, company records, or measured working capacities were used to determine the annual waste quantity prior to RY2011. That is, the answer to "Were tipping receipts, company records, or measured working capacities used to determine the annual waste quantity for any years prior to 2011...?" will be turned to "Yes"
 - The tipping receipts/company records period START and END year will both be set to the year 2010.
 - All other data will be carried over as they exist for 2010 except data under 2010 WASTE DISPOSAL QUANTITY METHOD. You will instead be required to select the appropriate 2011 WASTE DISPOSAL QUANTITY METHOD.
- If you selected that your landfill was **CLOSED in 2010**, the 2011 record will be created as it exists for 2010. In particular, all methods indicated in your RY2010 report for how you determined or estimated your waste quantities, as well as the start and end years for each method, will carry over onto your RY2011 report.