Greenhouse Gas Reporting Program

XML Reporting Instructions for Subpart HH - Landfills

United States Environmental Protection Agency
Climate Change Division
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These instructions explain how to report the required data. Reporters should refer to the applicable regulations for information about what data are required to be reported.

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I. Introduction

This document provides a step-by-step description of how to report emissions data to the EPA electronic greenhouse gas reporting tool (e-GGRT) using the Greenhouse Gas (GHG) XML schema. The GHG XML schema contains all of the data elements needed to comply with the Greenhouse Gas Reporting Program (GHGRP). The schema defines expected data elements and attributes, allowable data formats for each data element, and the hierarchical structure and sequence in which data elements are placed within the XML file. These reporting instructions reflect the version of e-GGRT as of January 31, 2015.

The GHG XML schema's root data element is "GH12G". The data elements within the schema are related to each other in parent-child relationships. The root data element is the parent of the entire schema.

The e-GGRT XML upload method may be used for reporting a facility or supplier's annual GHG data. However, the following actions must be performed using only the e-GGRT web forms:

- User, facility and supplier registration
- Certificate of Representation and Notice of Delegation signing
- Facility representative and agent changes
- Facility and supplier address changes
- Notice of intent to not submit an annual GHG report

Every XML file submitted to e-GGRT must be well-formed and conform to the current version of the GHG schema. Every XML file must contain GHG data only for a single facility or supplier. Reporters are required to submit a single XML file containing all emissions data for a facility or supplier as a complete report. The XML file must include all of the relevant Subparts. Reporters cannot submit a portion of a facility's data to add, delete, correct or update. To make any modification to previously submitted emissions data, a reporter must resubmit the entire set of emissions data. Each subsequent submission for the same facility replaces all of the previously submitted data.

The schema contains enumerated lists of the units of measures for some data elements and allowable values for some data elements. For rules regarding the unit of measure or allowable values for a specific data element, please refer to the appropriate Data Element Definitions table.

The reporting schema is available for download at the e-GGRT help website: http://www.ccdsupport.com/confluence/display/help/XML+Reporting+Instructions The page includes:

- **Schema zip file with the master GHG_Final_v*N.n*.xsd and supporting subpart and component xsd files for the current reporting year**
- **Schema change log files and year to year comparison reports.**

Table 1
Reporting Numbers

Number Format	Description
Rounding	• CO_2e and CO_2 emissions data expressed in metric tons should be rounded to one decimal place. This should be done regardless of the level of data collection (e.g., unit-level, facility-level). Quantities less than 0.05 metric tons would round to 0.0 and be reported as such. Quantities greater than or equal to 0.05 metric tons would round up to 0.1 and be reported as such. • CH_4 emissions data expressed in metric tons should be rounded to two decimal places. • N_2O emissions data expressed in metric tons should be rounded to three decimal places. • Emissions data for all GHGs other than CO_2, N_2O and CH_4 expressed in metric tons should be rounded to the fourth digit to the right of the decimal (one tenth of a kilogram, or 1 ten thousandth of a metric ton). This rounding should be applied regardless of the level of data collection (unit, facility, etc.). • Other (non-emissions) quantitative data reported by the user (e.g., a monthly HHV sample result, an annual production quantity) will not need to be rounded. • In the case of aggregation/roll-ups, those calculations should be performed on the rounded values.
Percentages	If a value is reported as a percentage, then the number should be within the range of 0 to 100 (percent). For example, 85.5% is reported as 85.5.
Fractions	If a value must be reported as a decimal fraction, then the number should be within the range of 0 and 1, (e.g., 1/4 should be reported as 0.25). Leading zeroes are optional.

Key XML Terms

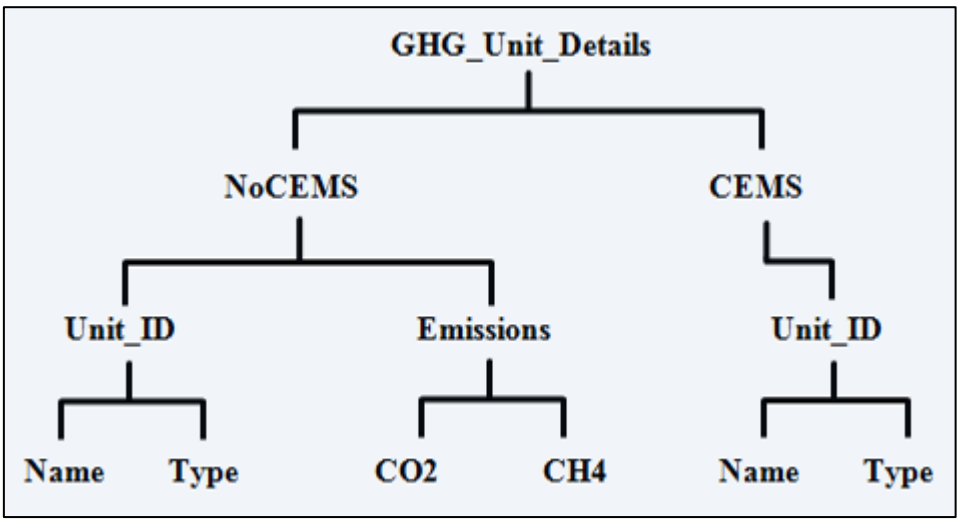
- **MRR:** Greenhouse Gas Reporting Rule reference.
- **XML:** A markup language for documents containing structured information. The XML specification defines a standard way to add markup to documents. Its primary purpose is to facilitate the sharing of structured data across different information systems, particularly via the internet.
- **XML Schema:** An XML schema describes the structure of an XML document. The schema also defines the set of rules to which the XML document must conform in order to be considered "valid".

- **XML file:** A file containing data organized into a structured document using XML markup.
- **Data Element:** An XML data element is used for storing and classifying data in an XML file. Opening and closing tags represent the start and end of a data element. An opening tag looks like <elementName>, while a closing tag has a slash that is placed before the element's name </elementName>. The following example shows how to report the facility's identification number: <FacilitySiteIdentifier>23222</FacilitySiteIdentifier>. The information shaded in blue represents the data element's value.

  If a data element does not contain a value, then a single empty tag name may be used. An empty tag has a slash placed after the element's name <FacilitySiteIdentifier/>. **Note:** If you do not intend to report a value for a particular data element, then it is recommended that you do not include the data element in the XML file.
- **Attribute:** An XML attribute contains additional information about a specific data element. An attribute for a data element is placed within the opening tag. The syntax for including an attribute in an element is <elementName attributeName="value">. For example, <TotalCH4CombustionEmissions massUOM="Metric Tons">.
- **Root/Parent/Child Element:** The schema's structure is like a family tree. At the top of the tree is some early ancestor and at the bottom of the tree are the latest children. With a tree structure you can see which children belong to which parents and many other relationships.

  XML data elements are sometimes referenced in terms of how they relate to each other, such as in a parent-to-child relationship. The top of the XML tree is considered the root – it is the parent to all data elements within the schema. In the example below, "GHG_Unit_Details" is the root, and just like in many other family trees, there is more than one item with the same name (e.g., "Unit_ID"). The easiest way to distinguish these items is by referencing them in terms of their parent-child relationships, e.g., NoCEMS /Unit_ID vs. CEMS/Unit_ID.

Figure 1
Example of an XML Tree



This document provides a step-by-step description of how to report emissions data using the XML schema. Please note the following seven tips on preparing your XML file:

- **Do not include non-applicable data elements in your facility's XML file.** The schema contains many data elements, some of which may not be applicable to XML reporters in general or to a particular situation. If the instructions (definition tables) do not reference a particular data element, then **do not** report or include it in your facility's XML file.

- **Sequence data elements in the order specified by the schema.** The figures and tables in this document depict the proper sequence in which data elements are arranged in the XML file to produce a well-formed XML report.

- **Enumerations are case sensitive.** Many data elements have a defined set of allowable values, also known as enumerations. Report values for enumerations exactly as they are defined within the schema, including punctuation marks. See the definition tables for a complete list of enumerations.

- **Schema diagrams depict the hierarchy (or tree structure).** The primary purpose of the schema diagrams is to indicate the sequence in which data elements must appear within the facility's XML file and to identify the data elements that are required (must be reported) and conditionally required (see last bullet). Required data elements are boxed in red and conditionally required data elements are noted.

- **Definition tables provide details for required and conditionally required data elements.** The tables are designed to provide unique instructions for reporting a given data element, including the list of enumerations and required units of measure, if defined. As noted above, there are some data elements in the schema that are not applicable to XML reporters or to a particular situation. For example, the "OverrideIndicator" data element is used solely by e-GGRT to indicate that the web form reporter chose to override the system's calculated value with their own. These non-applicable data elements **are not** included in the definition tables. If a data element is not referenced in a definition table, then **do not** report or include it in the facility's XML file.

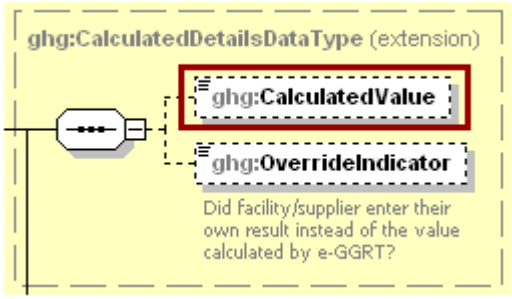
- **The schema diagrams do not depict commonly used data types.** The schema diagrams display almost every data element in the schema except the data elements that are associated with the three most commonly occurring data types:

    - Calculated Details
    - Measurement Details
    - Unit Identification Details

  Once defined, these commonly used data types (static collection of data elements) are associated as children to every data element in the schema containing a measured or calculated value or unit details. These child data elements do not appear in the diagrams and are not listed on separate rows in the definition tables in order reduce their redundancy. They are however, referenced in the definition tables in the description of their parent data element.

- **Conditionally required data elements.** Conditionally required data elements are noted in the schema diagrams and the data element definitions tables. If your facility meets the condition specified for the data element, then the data element is required and you must include it in your facility's XML file. If your facility does not meet the condition specified for the data element, then **do not** include the data element in the facility's XML file. **Do not** include a parent element that is not required, nor include any of its child data elements in your facility's XML file.

Figure 2
Calculated Details Data Type Schema Diagram

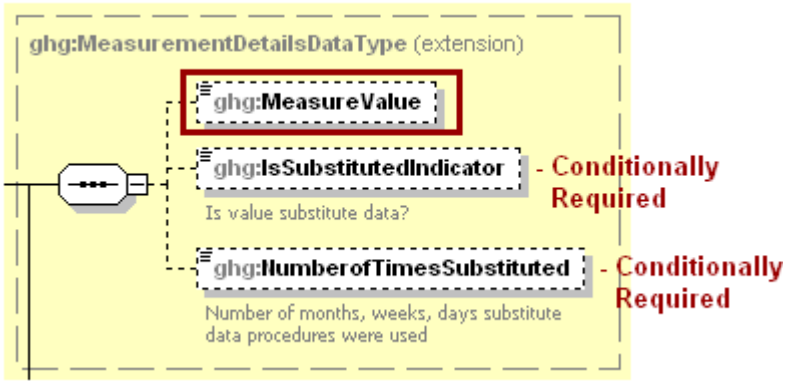


Note: Data elements boxed in red are required.

Table 2
Calculated Details Data Element Definitions

Data Element Name	Description
CalculatedDetailsDataType	
CalculatedValue	Calculated value (decimal).
OverrideIndicator	**Note:** Do not include this data element in the facility's XML file because it only applies to web form reporters. It is a flag set by e-GGRT to indicate that the system-calculated value was overridden with the web form reporter's value.

Figure 3
Measurement Details Data Type Schema Diagram

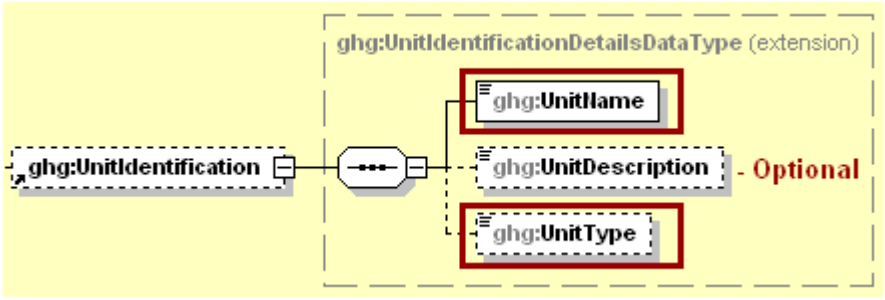


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Table 3
Measurement Details Data Element Definitions

Data Element Name	Description
MeasurementDetailsDataType	
MeasureValue	Measured value (decimal).
IsSubstitutedIndicator	An indication (Y/N) that the measured value contains substituted data. **Note:** Do not include this data element in your XML file unless noted in the instructions for the particular measured value.
NumberofTimesSubstituted	The number (integer) of days, months, weeks, or hours in the reporting year that missing data procedures were followed. **Note:** Do not include this data element in your XML file unless noted in the instructions for the particular measured value.

Figure 4
Unit Identification Details Data Type Schema Diagram



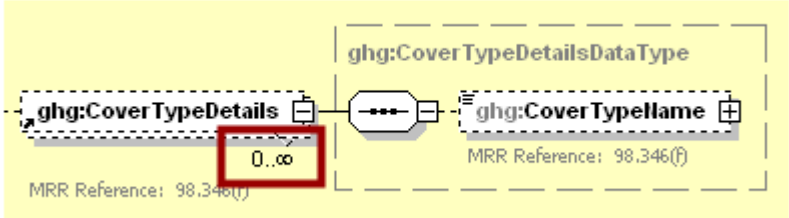
Note: Data elements boxed in red are required.

Table 4
Unit Identification Details Data Element Definitions

Data Element Name	Description
UnitIdentificationDetails	
UnitName	A unique name (ID) for each unit so that the data for different units can be recorded, maintained and retrieved clearly.
UnitDescription	Optional brief description of the unit.
UnitType	The type of unit. The list of allowable values varies. For more information, see the instructions for the specific unit process to be reported. For example, if reporting Flare Gas details, the unit type would be “Flare”.

The XML symbol "0..∞" shown in Figure 5 means that the parent element is "unbounded" so that multiple instances of the parent element can be reported. XML Excerpt 1 shows an example of reporting multiple instances of a parent element.

Figure 5
"Unbounded" Symbol in Schema Diagram

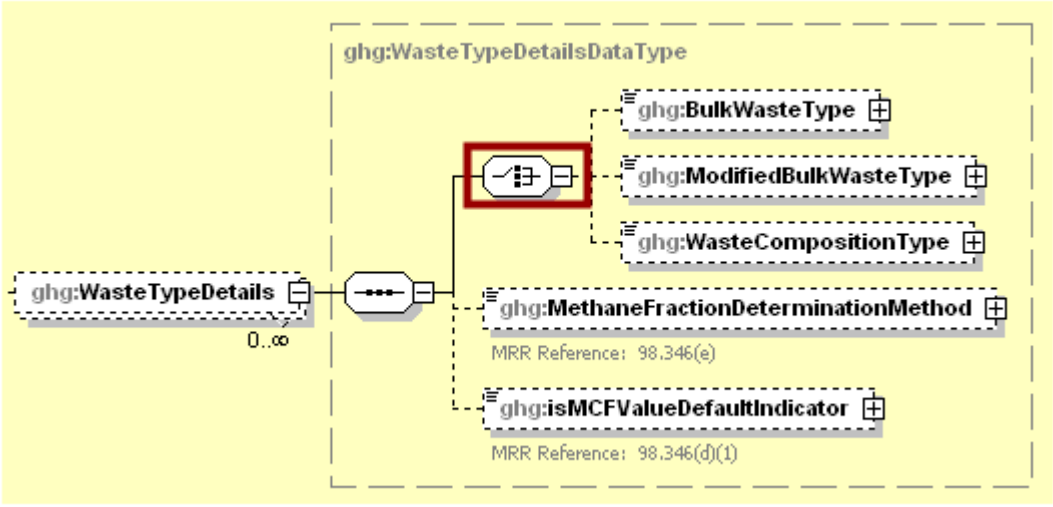


XML Excerpt 1
Example for "Unbounded" Parent Element

```
<ghg:CoverTypeDetails>
        <ghg:CoverTypeName>Organic cover</ghg:CoverTypeName>
</ghg:CoverTypeDetails>
<ghg:CoverTypeDetails>
        <ghg:CoverTypeName>Clay cover</ghg:CoverTypeName>
</ghg:CoverTypeDetails>
<ghg:CoverTypeDetails>
        <ghg:CoverTypeName>Sand cover</ghg:CoverTypeName>
</ghg:CoverTypeDetails>
```

The XML symbol for a logical "Or" shown in Figure 6 means that **only one** of the data elements following the symbol can be reported for the current instance of the parent element.

Figure 6
Logical "Or" Symbol in Schema Diagram



II. Summary of Changes

Please note that example screen images and XML examples sourced from or labeled with a prior reporting year are accurate for Reporting Year 2017.

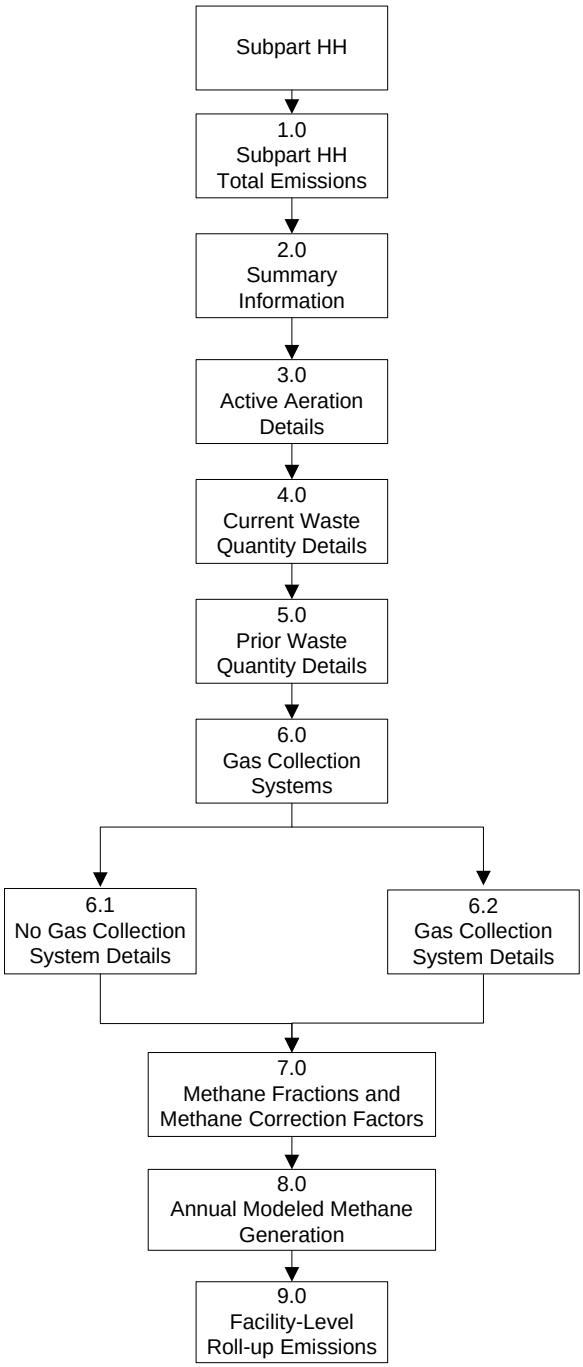
Table 5
Summary of Changes to the Schema for Subpart HH

No.	Change Description	Applicable Reporting Years
1	New data elements in the GHGasInfoDetails node (GHGasCASRegistryNumber, GHGasLinearChemicalFormula, OtherGHGasCASRegistryNumber, and OtherGHGaslinearChemicalFormula) now appear in the schema but are only applicable to gases other than Carbon Dioxide, Methane, Nitrous Oxide, and Biogenic Carbon Dioxide so they **should NOT be used in the reporting of Subpart HH** (see Section 1, Subpart HH Total Emissions).	RY17 and later

III. Subpart HH Overview

This section provides a step-by-step description of how to report emissions data from municipal solid waste (MSW) landfills as required by Subpart HH of the GHGRP using the XML schema.

Figure 7
Subpart HH Reporting Diagram



This source category applies to MSW landfills that accepted waste on or after January 1, 1980. This source category does not include Resource Conservation and Recovery Act (RCRA) Subtitle C or Toxic Substances Control Act (TSCA) hazardous waste landfills, construction and demolition landfills, or industrial landfills. This source category consists of the following sources at MSW landfills: landfills, landfill gas collection systems and landfill gas destruction devices (including flares).

The XML schema includes the following areas for reporting for Subpart HH, as displayed in the reporting diagram:

1.0 Subpart HH Total Emissions: includes the total emissions for methane.

2.0 Summary Information: includes an indication of whether the landfill was open (actively received waste during the reporting year), and if so, the estimated year of landfill closure (for closed landfills, the last year the landfill accepted waste), the year in which the landfill first started accepting waste for disposal, an indication of whether leachate recirculation was used during the reporting year and its typical frequency of use over the past 10 years, an indication as to whether scales were present at the landfill, if the landfill used a gas collection system, if passive vents and/or passive flares were present at the landfill, the capacity of the landfill, the surface area of the landfill containing waste, the type of cover material, and if multiple cover types were used, the surface area associated with each cover type.

3.0 Active Aeration Details: includes information about the aeration system used by the landfill. These data elements must only be included in your XML file if a methane correction factor (MCF) value other than the default of 1.0 was used in Equation HH-1.

4.0 Waste Quantities from First Emissions Reporting Year to Current Year Details: includes information about the landfill's waste disposal quantities estimated using the method(s) specified in § 98.343(a)(3), the types of waste disposed, and other details for each year, starting from the facility's first year of emissions reporting (i.e., 2010 or later) to the current reporting year.

5.0 Prior Years Waste Quantity Details: includes information about the landfill's waste disposal quantities for years prior to the landfill's first emissions reporting year including the method(s) used to determine the annual waste disposal quantities, the types of waste disposed, and other details for each year, starting from the year in which the landfill first accepted waste to the year immediately prior to the first year of emissions reporting (e.g., 2010 and earlier for facilities first reporting in 2011). If waste disposal quantity data are readily available for the years prior to the landfill's first emissions reporting year, the schema includes data elements for reporting the landfill's waste disposal quantities estimated using the method(s) specified in § 98.343(a)(3).

For years when waste disposal quantity data are not readily available, the schema includes data elements for reporting the landfill's waste disposal quantities estimated using the method(s) specified in § 98.343(a)(4), the historical population served by the landfill for each year Equation HH-2 is used, and for open landfills using Equation HH-3, the historical landfill working capacity (LFC).

6.0 Gas Collection Systems:

6.1 No Gas Collection System Details: includes annual methane emissions calculated using Equation HH-5 for landfills which do not have a gas collection system.

Note: The schema is ordered such that the information reported for modeled annual CH_4 generation comes after data reported for no gas collection system details. However, you will need to first calculate the modeled annual CH_4 generation using Equation HH-1 in order to determine values reported for this section.

6.2 Gas Collection System Details: includes annual volume of landfill gas collected for destruction; the annual average methane concentration of the landfill gas; temperature, pressure, and moisture content details; the location where destruction occurred (at the facility, off-site, or both); waste depth and surface area for each area specified in Table HH-3; details about the gas collection system; annual quantity of methane recovered; methane generation adjusted for oxidation, methane emissions, and estimated gas collection efficiency for landfills that have gas collection systems. Starting in RY2013, the schema includes details about all measurement location(s) and destruction device(s) at the facility. For reports submitted for RY2010, RY2011, and/or RY2012, the schema includes details about the location where destruction occurred (at the facility, off-site, or both);and additional destruction details (if destruction occurs on-site);

Note: The schema is ordered such that the information reported for modeled annual CH_4 generation comes after data reported for gas collection system details. However, you will need to first calculate the modeled annual CH_4 generation using Equation HH-1 in order to determine some of the values reported for this section.

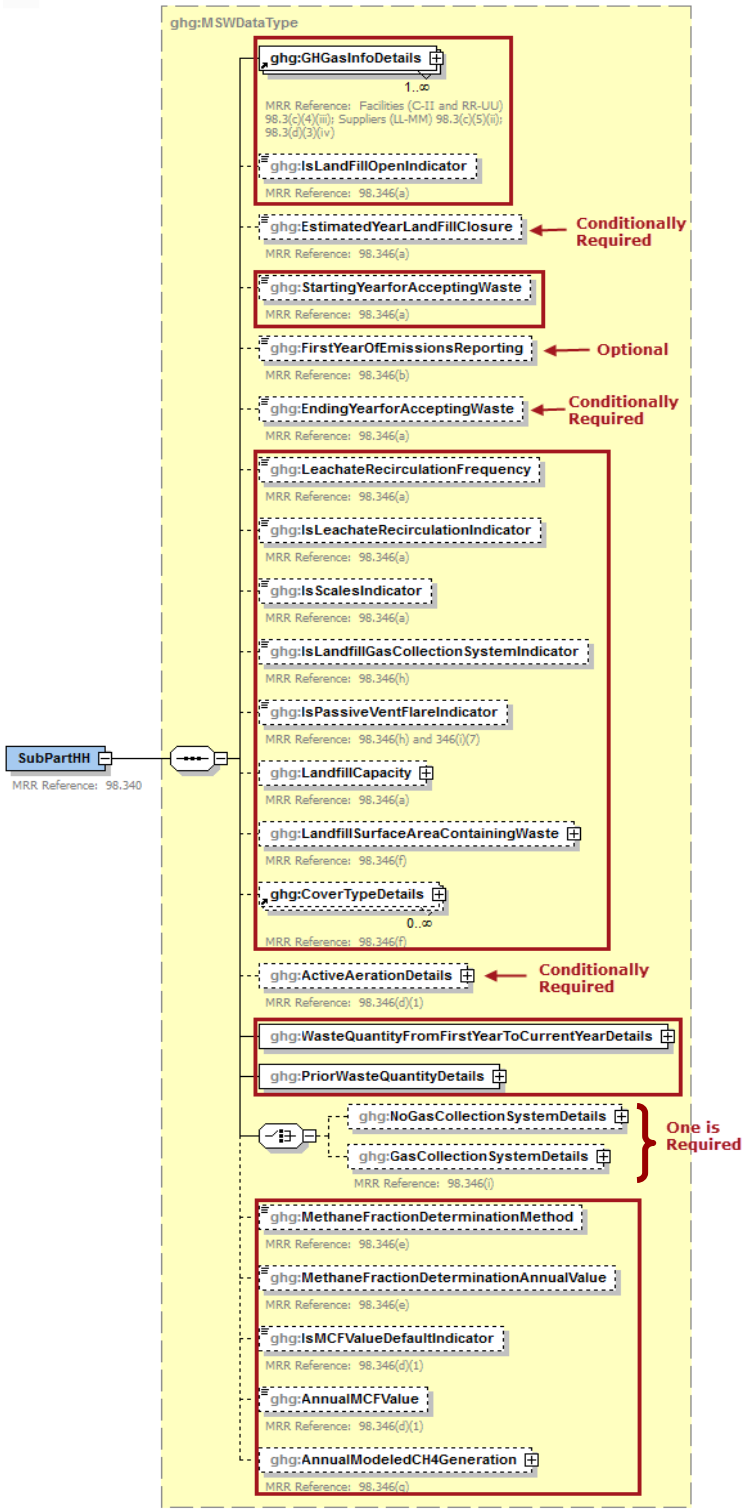
7.0 Modeled annual methane generation for the reporting year calculated using Equation HH-1 for landfills with and without gas collection systems.

Note: The schema is ordered such that the information reported for modeled annual CH_4 generation comes after data reported for gas collection systems. However, you will need to first calculate the modeled annual CH_4 generation using Equation HH-1 in order to determine the values reported for each gas collection systems subsection.

8.0 Facility Level Roll-up Emissions: includes which emission value for Subpart HH to add to the total emissions for the facility.

If your facility is subject to reporting under Subpart HH (Municipal Solid Waste Landfills), EPA recommends that you also consider Subpart C (General Stationary Fuel Combustion) in your facility applicability determination. This source category is only provided as a suggestion - additional Subparts may be relevant for a given facility/supplier and Subpart C may not be relevant for all facilities.

Figure 8
Subpart HH Schema Diagram

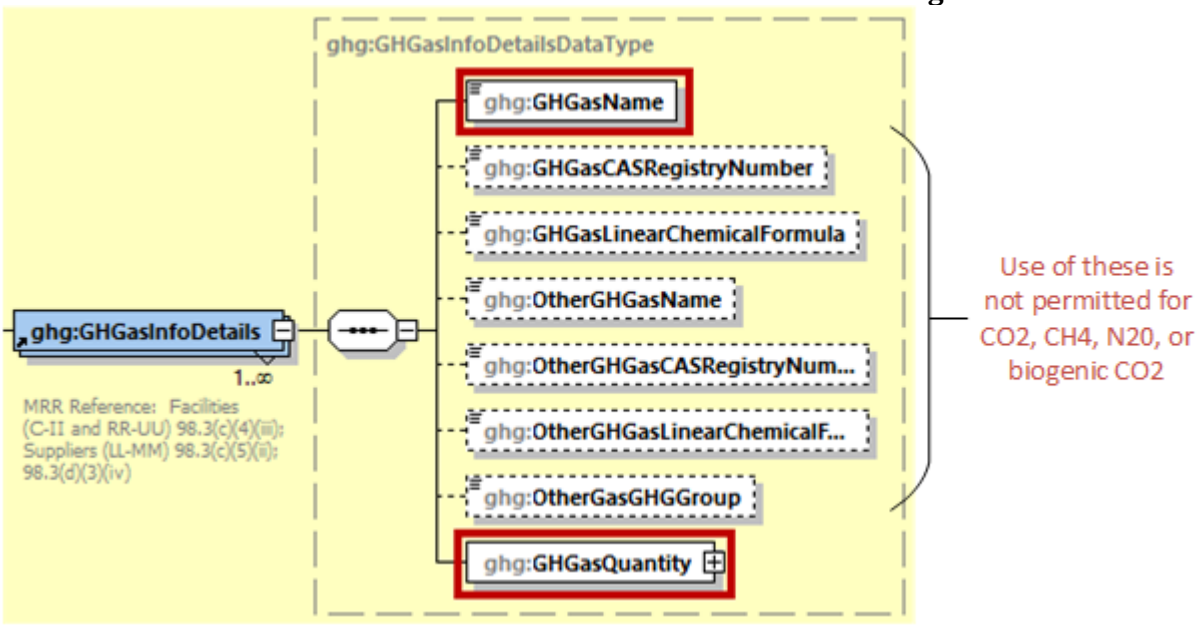


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

1.0 Subpart HH Total Emissions

Greenhouse gas information details comprise a collection of data elements to report the total annual emissions of each relevant greenhouse gas (GHG) listed in Table A-1 of 40 CFR 98 Mandatory Reporting of Greenhouse Gases, reported under Subpart HH, expressed in metric tons.

Figure 9
Greenhouse Gas Information Details Schema Diagram



Note: Data elements boxed in red are required.

For Subpart HH, report the gas name and emissions for methane (CH4) only; do NOT report the CAS Registry Number, Linear Chemical Formula, or the other gas data elements for CH4. For greenhouse gas quantity, report the calculated value and mass unit of measure (metric tons) only according to the following guidelines:

- For landfills without landfill gas collection systems, report annual CH_4 emissions calculated from Equation HH-5.
- For landfills with landfill gas collection, report the emissions equation result that you deem is more accurate based on site-specific conditions at your landfill. You must choose one of the following:
  - CH_4 emissions from the landfill in the reporting year calculated from Equation HH-6
  - CH_4 emissions from the landfill in the reporting year calculated from Equation HH-8.

Note: You must follow the rounding rules found in Table 1.

Table 6
Greenhouse Gas Information Details Data Element Definitions

Data Element Name	Description
GHGasInfoDetails	**Parent Element:** A collection of data elements containing the total annual emissions of each greenhouse gas (GHG) listed in Table A-1 of 40 CFR 98 Mandatory Reporting of Greenhouse Gases, reported under this Subpart, expressed in metric tons.
GHGasName	Specify the name of the GHG: Methane
GHGasQuantity	A collection of data elements that quantify the annual emissions from this source category. Report the value in the child data element **CalculatedValue** using the guidelines above. Set the units of measure to "Metric Tons" in the attribute **massUOM**. **Note:** Details about which calculated value to report are included in Section 8.0 of this document.

XML Excerpt 2
Example for Greenhouse Gas Information Details

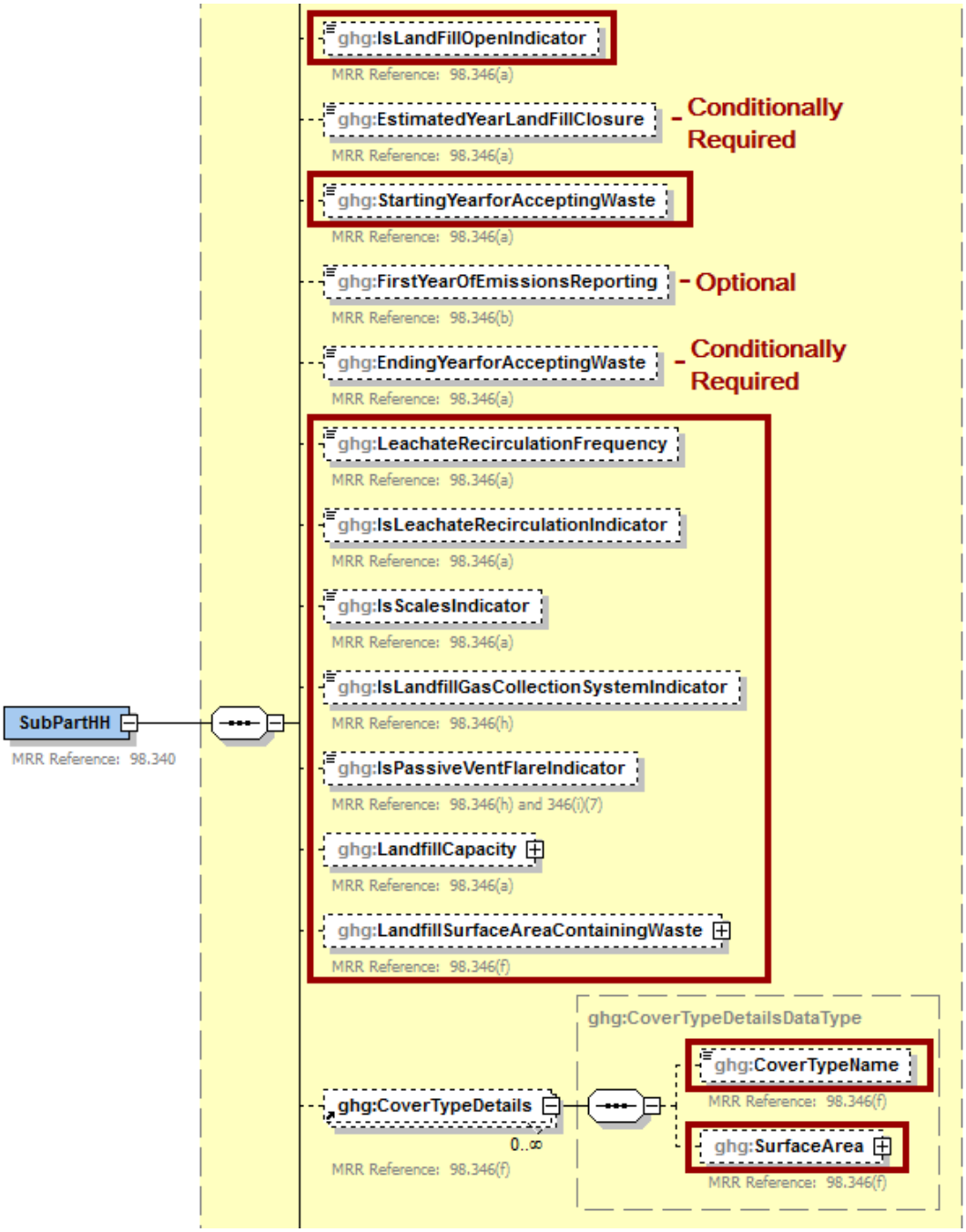
```
<ghg:SubPartHH>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Methane</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                  <ghg:CalculatedValue>4000.23</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

2.0 Summary Information

This section provides a step-by-step description of how to report Subpart HH MSW landfill summary information.

Figure 10
Summary Information Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

The following landfill information must be reported:

- Indicate whether the landfill was open during the reporting year. A landfill is considered open if it is actively receiving waste during the reporting year. A landfill that closed during the reporting year, but also received waste during the reporting year is considered an open landfill for the particular reporting year. A landfill is considered closed if it did not receive waste in the reporting year [98.346(a)].
- **Conditionally Required:** If the landfill was open during the reporting year, then report the estimated year of landfill closure [98.346(a)].
- Report the year in which the landfill first started accepting waste for disposal [98.346(a)].
- **Optional:** The year in which the landfill first started reporting under Part 98. This information is not referenced in the rule and is not required for XML reporters. The purpose of this information is to automate the process of entering annual waste quantities and methods using the web forms in e-GGRT. When a reporter enters this information on the web form, the system automatically generates an annual record for each year, starting with the landfill's first year of emissions reporting under Part 98 to the current reporting year. This automated process is only available to web form reporters.
- **Conditionally Required:** If the landfill was closed during the reporting year then report the last year the landfill accepted waste [98.346(a)].
- Indicate the typical frequency with which leachate recirculation was used over the past 10 years [98.346(a)]. Report 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
    - Not used for the past 10 years.
- Indicate whether leachate recirculation was used at the landfill during the emissions reporting year [98.346(a)].
- Indicate whether scales are present at the landfill [98.346(a)].
- Indicate whether the landfill has a gas collection system [98.346(h)]. A landfill gas collection system is defined as 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 whether passive vents and/or flares are present (other than as part of a gas collection system, see previous item) [98.346(h), 98.346(i)(7)].
- Report the capacity of the landfill in metric tons [98.346(a)].
- Report the surface area of the landfill containing waste in square meters[98.346(f)].
- Report each cover material type used and report the surface area in square meters for each cover type. If multiple cover material types are used, then report the surface area associated with each cover type. [98.346(f)].
    - Organic
    - Clay
    - Sand

- Other soil mixture

Table 7
Summary Information Data Element Definitions

Data Element Name	Description
IsLandFillOpenIndicator	An indication (Y/N) that the landfill was open during the reporting year.
EstimatedYearLandFillClosure	**Conditionally Required:** If the landfill was open during the reporting year, then report the estimated year of landfill closure (YYYY). Otherwise, do not report this data element.
StartingYearforAcceptingWaste	The year in which the landfill first started accepting waste for disposal (YYYY).
FirstYearOfEmissionsReporting	**Optional:** The year in which the landfill first started reporting under Part 98 (YYYY). This information is not referenced in the rule and is not required for XML reporters. The purpose of this information is to automate the process of entering annual waste quantities and methods using the web forms in e-GGRT. When a reporter enters this information on the web form, the system automatically generates an annual record for each year, starting with the landfill's first year of emissions reporting under Part 98 to the current year. This automated process is only available to web form reporters.
EndingYearforAcceptingWaste	**Conditionally Required:** If the landfill was closed during the reporting year then report the last year the landfill accepted waste (YYYY). Otherwise, do not report this data element.
LeachateRecirculationFrequency	Report the frequency with which leachate recirculation is used over the past 10 years. See list of allowable values: 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 Not used for the past 10 years
IsLeachateRecirculationIndicator	An indication (Y/N) of whether leachate recirculation is used during the reporting year.
IsScalesIndicator	An indication (Y/N) as to whether scales are present at the landfill.

Data Element Name	Description
IsLandfillGasCollectionSystemIndicator	An indication (Y/N) of whether the landfill has a gas collection system [98.346(h)]. A landfill gas collection system is defined as 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.
IsPassiveVentFlareIndicator	An indication (Y/N) of whether passive vents and/or passive flares (vents or flares that are not considered part of the gas collection system as defined in §98.6) are present at the landfill.
LandfillCapacity	A collection of data elements containing information about the capacity of the landfill. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
LandfillSurfaceAreaContainingWaste	A collection of data elements containing information about the surface area of the landfill containing waste (in square meters). Report the value in the child data element **MeasureValue**. Set the units of measure to "Square Meters" in the attribute **areaUOM**.
CoverTypeDetails	**Parent Element:** A collection of data elements containing details about the surface area of the landfill containing waste (expressed in square meters), and the type of cover material used. If multiple cover types are used, the surface area associated with each cover type.
CoverTypeName	The type of cover material used. Report each cover type separately. See list of allowable values: Organic cover Clay cover Sand cover Other soil mixture
SurfaceArea	The surface area of the landfill associated with each specified cover type. Report the value in the child data element MeasureValue. Set the units of measure to "Square Meters" in the attribute areaUOM. Note: this data element is required for RY15 and prior years but should not be reported for RY16 and later.

XML Excerpt 3
Example for Summary Information

```
<ghg:IsLandFillOpen>Y</ghg:IsLandFillOpen>
<ghg:EstimatedYearLandFillClosure>2015</ghg:EstimatedYearLandFillClosure>
<ghg:LeachateRecirculationFrequency>Used several times a year for the past 10 years</ghg:LeachateRecirculationFrequency>
<ghg:IsLeachateRecirculationIndicator>Y</ghg:IsLeachateRecirculationIndicator>
<ghg:IsScalesIndicator>Y</ghg:IsScalesIndicator>
<ghg:IsLandfillGasCollectionSystemIndicator>Y</ghg:IsLandfillGasCollectionSystemIndicator>
<ghg:IsPassiveVentFlareIndicator>Y</ghg:IsPassiveVentFlareIndicator>
<ghg:LandfillCapacity massUOM="Metric Tons">
        <ghg:MeasureValue>123456789</ghg:MeasureValue>
</ghg:LandfillCapacity>
<ghg:LandfillSurfaceAreacContainingWaste areaUOM="Square Meters">
        <ghg:MeasureValue>963852741</ghg:MeasureValue>
</ghg:LandfillSurfaceAreacContainingWaste>
<ghg:CoverTypeDetails>
        <ghg:CoverTypeName>Organic cover</ghg:CoverTypeName>
</ghg:CoverTypeDetails>
<ghg:CoverTypeDetails>
        <ghg:CoverTypeName>Clay cover</ghg:CoverTypeName>
</ghg:CoverTypeDetails>
<ghg:CoverTypeDetails>
        <ghg:CoverTypeName>Sand cover</ghg:CoverTypeName>
</ghg:CoverTypeDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data. As described above Surface Area values are not longer reported as of RY16

3.0 Active Aeration Details

This section provides a step-by-step description of how to report Subpart HH active aeration information. In Equation HH-1, a Methane Correction Factor (MCF) value other than the default may only be used if active aeration is in use at the landfill.

Was a Methane Correction Factor (MCF) other than the default of 1.0 used in Equation HH-1 ?

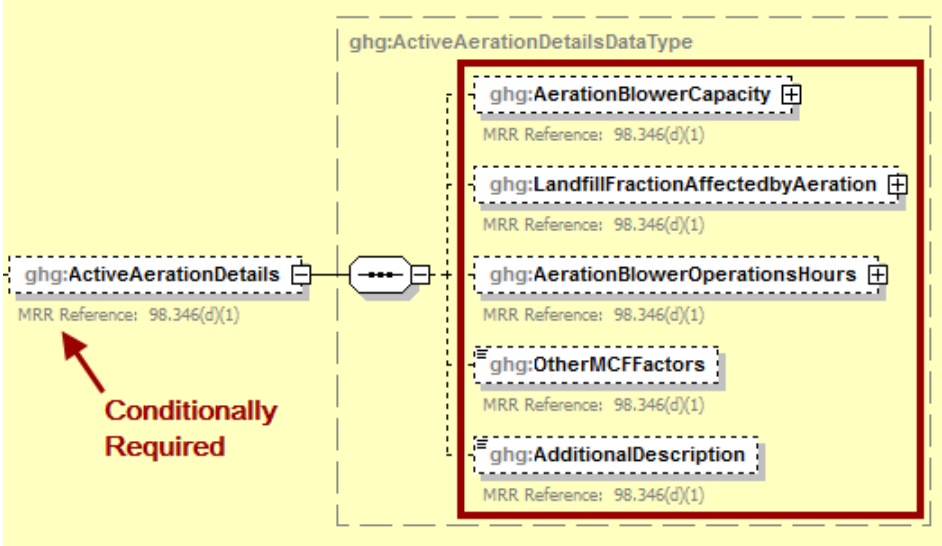
If the default value of 1 for MCF was used in Equation HH-1, then do not report or include the "ActiveAerationDetails" section in the facility's XML file. Proceed to Section 4.0 for instructions on how to report current waste quantity details.

Conditionally Required: If a Methane Correction Factor (MCF) other than the default of 1.0 was used, then the following information about the aeration system in use at the landfill must be reported [98.346(d)(1)]:

- The aeration blower capacity in standard cubic feet per minute (scfm). Include 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 used in the calculation.
- Additional description of the aeration system (e.g., the number of blowers and other relevant information).

More details on the reporting of the MCF value used in Equation HH-1 follow in Section 4.0 of this document.

Figure 11
Active Aeration Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements

Table 8
Active Aeration Data Element Definitions

Data Element Name	Description
ActiveAerationDetails	**Parent Element (Conditionally Required):** A collection of data elements containing details about the aeration system. Report only if an MCF value other than the default value of 1.0 was used in Equation HH-1. Otherwise, do not report this parent element or any of the elements below.
AerationBlowerCapacity	A collection of data elements containing information about the aeration blower capacity. Report the value in the child data element **MeasureValue**. Set the units of measure to "scfm" in the attribute **flowUOM**.
LandfillFractionAffectedbyAeration	A collection of data elements containing information about the fraction of the landfill containing waste affected by the aeration. Report the value in the child data element **MeasureValue**. Set the units of measure to "fraction (number between 0 and 1)" in the attribute **fractionUOM**.
AerationBlowerOperationsHours	A collection of data elements containing information about the total number of hours during the reporting year in which the aeration blower was operated. Report the value in the child data element **MeasureValue**. Set the units of measure to "Hours" in the attribute **timeUOM**.

Data Element Name	Description
OtherMCFFactors	Other factors used as a basis for the selected MCF value.
AdditionalDescription	Additional description of the aeration system (e.g., the number of blowers and other relevant information).

XML Excerpt 4
Example for Active Aeration

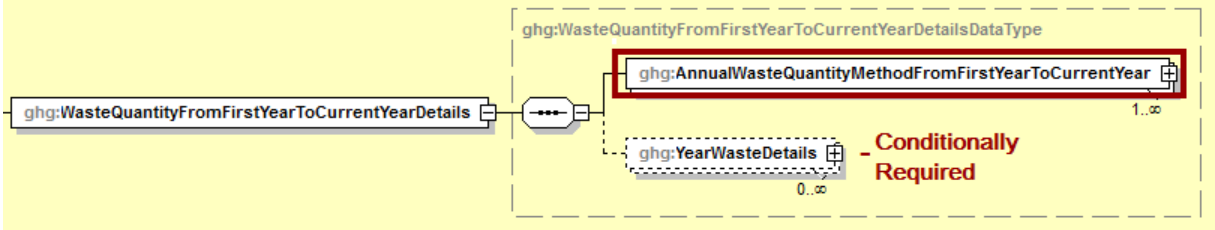
```
<ghg:ActiveAerationDetails>
        <ghg:AerationBlowerCapacity flowUOM="scfm">
                <ghg:MeasureValue>741852963</ghg:MeasureValue>
        </ghg:AerationBlowerCapacity>
        <ghg:LandfillFractionAffectedbyAeration fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.25</ghg:MeasureValue>
        </ghg:LandfillFractionAffectedbyAeration>
        <ghg:AerationBlowerOperationsHours timeUOM="Hours">
                <ghg:MeasureValue>123</ghg:MeasureValue>
        </ghg:AerationBlowerOperationsHours>
        <ghg:OtherMCFFactors>Factors X and Y</ghg:OtherMCFFactors>
        <ghg:AdditionalDescription>Description Z</ghg:AdditionalDescription>
</ghg:ActiveAerationDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

4.0 Waste Quantities from First Emissions Reporting Year to Current Reporting Year Details

This section provides a step-by-step description of how to report Subpart HH waste disposal quantities for each year since the landfill's first year of emissions reporting under Part 98. Data reporting requirements vary slightly for years prior to the first year the landfill was required to report under Part 98 – for more information, see section 5.0.

Figure 12
Waste Quantities From First Emissions Reporting Year to Current Reporting Year Details Schema Diagram

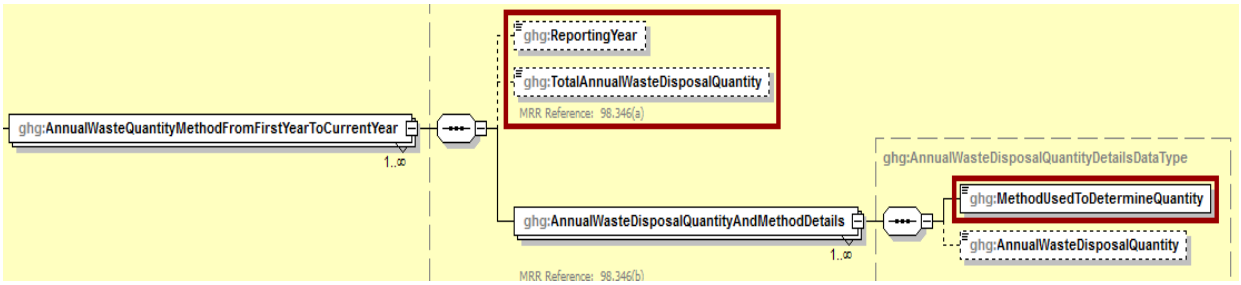


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

4.1 Annual Waste Quantities and Methods

This subsection provides step-by-step instructions for reporting the methods used to determine waste disposal quantities for each year since the landfill's first emissions reporting year under Part 98. Note that the requirement to report annual waste quantities and methods applies only for years during which the landfill was open.

Figure 13
Annual Waste Quantity Method From First Emissions Reporting Year to Current Year Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Beginning with the first year the landfill was required to report under Part 98, and for each year thereafter, report the following information:

- The total annual waste disposal quantity. This value must equal the sum of annual waste disposal quantities determined using the methods specified in § 98.343(a)(3).
- The method(s) used to determine the landfill's annual waste disposal quantities for each specified year [98.343(a)(3)]:

    - Scales
    - Working Capacities
    - Other

    Please note that the 'other' method is only applicable for certain facilities in RY2010 that obtained approval to use best available monitoring methods (BAMM) to determine their waste quantities. After RY2010, either scales or working capacity must have been used to determine annual waste quantities.

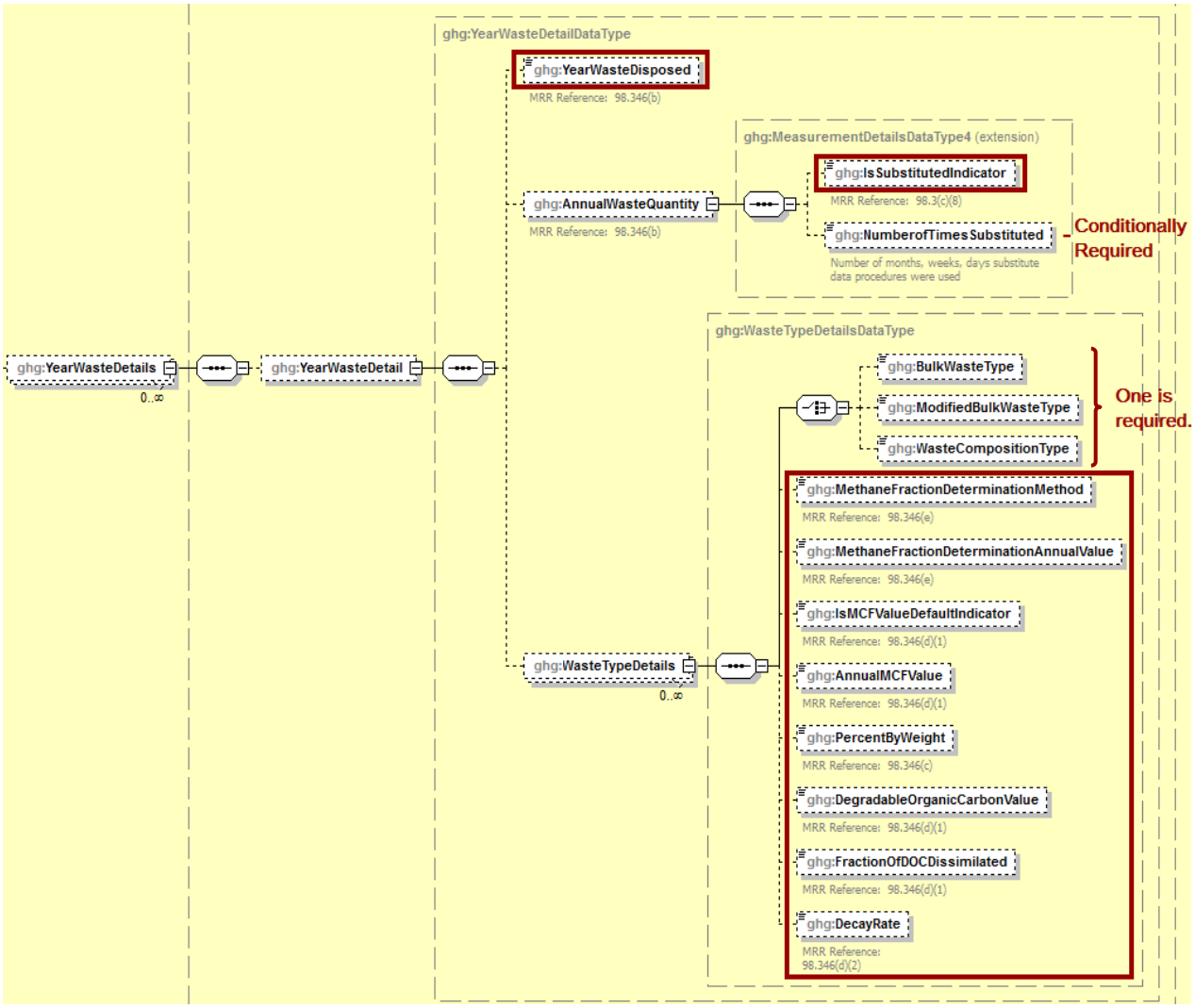
- **Conditionally Required:** Annual waste disposal quantity. Report the quantity of waste determined using either scales or working capacities separately. If in RY2010 you used the 'other' method because you were approved to use BAMM, do not report data element "AnnualWasteDisposalQuantity" for RY2010 only.

Note: If you changed the methods used for determining waste disposal quantities during a given year, report each method & quantity (pair) separately, and an explanation as to why you changed methods. For example, "scales were installed at the landfill mid-year." Please provide this explanation in the Subpart A data element "CalculationMethodologyChangesDescription".

4.2 Year Waste Details

This subsection provides step-by-step instructions for reporting waste disposal types and composition details for each year since the landfill's first emissions reporting year under Part 98. Note that the requirement to report year waste details applies only for years during which the landfill was open.

Figure 14
Year Waste Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Beginning with the first year the landfill was required to report under Part 98 and for each year thereafter, report the following information:

- Indicate if a missing data procedure was used to determine the annual waste quantity [98.3(c)(8)]. Missing data procedures may be found in § 98.345.
- **Conditionally Required:** If a missing data procedure was used, then report the number of days that substitute data was used to determine the waste quantity [98.3(c)(8)].
- Identify each of the waste types comprising that year's waste quantity [98.346(c)]. A facility must report one of the three options from Table HH-1 (Bulk waste option, Modified bulk MSW option, or Waste composition option). Report all applicable waste types within the option chosen:
    - Bulk waste option
    - Modified bulk MSW option
        - Bulk MSW waste (excluding inerts and C&D waste)
        - C&D waste
        - Inerts (e.g. glass, plastics, metal, cement)
    - Waste composition option
        - Food waste
        - Garden
        - Paper
        - Wood and straw
        - Textiles
        - Diapers
        - Inerts (e.g., glass, plastics, metal, cement)
        - Sewage sludge

For each waste type reported, indicate:

- For RY 2010, 2011, and 2012 only:
    - Whether the fraction of CH_4 in the landfill gas (F) is based on a measured value or the default value of 0.5 [98.346(e)].
    - The fraction of CH_4 in the landfill gas (F) [98.346(e)].
    - If a Methane Correction Factor (MCF) other than the default of 1.0 was used in Equation HH-1 [98.346(d)(1)]. If the default value of 1.0 was not used, indicate "Y" for Yes. If the default value of 1.0 was used, indicate "N" for No. **Note:** If you indicate "Y," that a value other than the default value was used for MCF in Equation HH-1, active aeration must exist at your landfill and your report must include details about this aeration system. See Section 3.0 of this document for how to report details about the aeration system.
    - The methane correction factor (MCF) value used in the calculations [98.346(d)(1)].
- The waste composition for each year required for Equation HH-1, in percentage by weight, for each waste category listed in Table HH-1 of this subpart used to calculate the annual modeled CH_4 generation [98.346(c)].
- The degradable organic carbon (DOC) value used in the calculations [98.346(d)(1)].
- The fraction of DOC dissimilated (DOC_F) value used in the calculations [98.346(d)(1)].
- The decay rate (k) value used in the calculations[98.346(d)(2)].

Table 9
Waste Quantities from First Emissions Reporting Year to Current Reporting Year Details Data Element Definitions

Data Element Name	Description
AnnualWasteQuantityMethodFromFirstYear ToCurrentYearDetails	**Parent Element:** A collection of data elements that identify the waste disposal quantities determined using the methods in § 98.343(a)(3) for each year, starting from the facility's first year of emissions reporting to the current reporting year; and waste type details.
AnnualWasteQuantityMethodFromFirstYear ToCurrentYear	**Parent Element:** Details about the annual waste disposal quantities for each year of landfilling, starting from the facility's first year of emissions reporting to the current reporting year; and the specific determination methods used: 98.343(a)(3)(i) or 98.343(a)(3)(ii). **Note:** Include a separate instance of this parent data element for each year reported.
ReportingYear	The year in which the landfill reported emissions for Part 98 (YYYY).
TotalAnnualWasteDisposalQuantity	The total annual waste quantity disposed of at the landfill during the reporting year (in metric tons, wet weight). This amount must equal the sum of the annual waste disposal quantities determined for each method used.
AnnualWasteDisposalQuantityAndMethodDetails	**Parent Element:** The annual waste disposal quantities determined using the methods in 98.343(a)(3)(i) and the annual waste disposal quantities determined using the methods in 98.343(a)(3)(ii). Include a separate instance of this data element in the XML file for each method used during the reporting year.
MethodUsedToDetermineQuantity	A description of the methods used for determining the annual waste quantity for the current reporting year [98.343(a)(3)(i) or 98.343(a)(3)(ii)]. See list of allowable values: 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 Other **Note:** "Other" is only a valid value for RY2010 if facilities were approved to use Best Available Monitoring Methods (BAMM).

Data Element Name	Description
AnnualWasteDisposalQuantity	The annual quantity of waste disposed of at the landfill determined using each specified method (in metric tons, wet weight).
YearWasteDetails	**Parent Element:** Details about the waste disposed for the specified reporting year.
YearWasteDetail	**Parent Element:** Details for the current year.
YearWasteDisposed	The specified reporting year (YYYY).
AnnualWasteQuantity	A collection of data elements containing information on the reporting year's annual waste quantity. Report an indication (Y/N) of whether missing data procedures were used to determine the waste quantity data in the child data element **IsSubstitutedIndicator**. **Conditionally Required:** If missing data procedures were used, then report the number of days that substitute data was used to determine the waste quantity data in the child data element **NumberofTimesSubstituted**. Otherwise, do not report this child data element.
WasteTypeDetails	**Parent Element:** A collection of data elements containing details about the types of waste disposed. At least one is required. Report each type separately.
BulkWasteType	**Conditionally Required:** If you used the values in the Bulk waste option in Table HH-1 of the rule to calculate methane generation, then report "Bulk waste". Otherwise, do not report this data element.
ModifiedBulkWasteType	**Conditionally Required:** If you used the values in the Modified bulk waste option in Table HH-1 of the rule to calculate methane generation, then indicate the modified bulk MSW waste types disposed. Otherwise, do not report this data element. See list of allowable values: bulk MSW waste (excluding inerts and C&D waste) C&D waste inerts

Data Element Name	Description
WasteCompositionType	**Conditionally Required:** If you used the values in the Waste composition option in Table HH-1 of the rule to calculate methane generation, then indicate the waste composition types disposed. Otherwise, do not report this data element. See list of allowable values: food waste garden paper wood and straw textiles diapers inerts sewage sludge
MethaneFractionDeterminationMethod	For the specified waste type, an indication of whether the fraction of CH_4 in landfill gas (F) was determined based on measured values or the default value. For RY 2010 through 2012 only. See list of allowable values: default measured
MethaneFractionDeterminationAnnualValue	The fraction of CH_4 in the landfill gas (F). For RY 2010 through 2012 only.
IsMCFValueDefaultIndicator	For each waste type, an indication (Y/N) of whether a value other than the default value of 1.0 was used for the methane correction factor (MCF) in Equation HH-1. Report "Y" if the default of 1.0 was not used. Report "N" if the default value was used. For RY 2010 through 2012 only.
AnnualMCFValue	For each waste type used to calculate CH_4 generation using Equation HH-1, report the methane correction factor (MCF) values used in the calculations. For RY 2010 through 2012 only.
PercentByWeight	The waste composition for each year required for Equation HH-1, in percentage by weight, for each waste category listed in Table HH-1 of this subpart used to calculate the annual modeled CH_4 generation.
DegradableOrganicCarbonValue	For each waste type used to calculate methane generation using Equation HH-1, report the degradable organic carbon (DOC) value used in the calculations.
FractionOfDOCDissimilated	For each waste type used to calculate CH_4 generation using Equation HH-1, report the fraction of DOC dissimilated (DOC_F) value used in the calculations.
DecayRate	For each waste type used to calculate methane generation using Equation HH-1, report the decay rate (k) value used in the calculations.

XML Excerpt 5
Example for Waste Quantities from First Emissions Reporting Year to Current Year Details

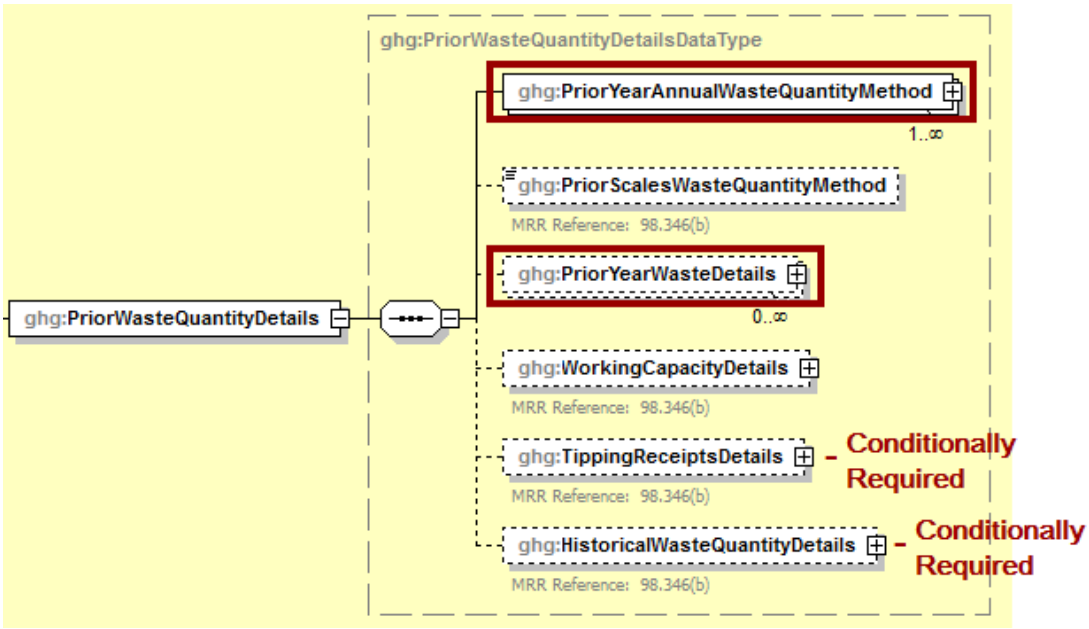
```
<WasteQuantityFromFirstYearToCurrentYearDetails>
  <AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
    <ReportingYear>2012</ReportingYear>
    <TotalAnnualWasteDisposalQuantity>4001</TotalAnnualWasteDisposalQuantity>
    <AnnualWasteDisposalQuantityAndMethodDetails>
      <MethodUsedToDetermineQuantity>Used 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</MethodUsedToDetermineQuantity>
      <AnnualWasteDisposalQuantity>4001</AnnualWasteDisposalQuantity>
    </AnnualWasteDisposalQuantityAndMethodDetails>
  </AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
  <AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
    <ReportingYear>2011</ReportingYear>
    <TotalAnnualWasteDisposalQuantity>3805</TotalAnnualWasteDisposalQuantity>
    <AnnualWasteDisposalQuantityAndMethodDetails>
      <MethodUsedToDetermineQuantity>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</MethodUsedToDetermineQuantity>
      <AnnualWasteDisposalQuantity>2000</AnnualWasteDisposalQuantity>
    </AnnualWasteDisposalQuantityAndMethodDetails>
    <AnnualWasteDisposalQuantityAndMethodDetails>
      <MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</MethodUsedToDetermineQuantity>
      <AnnualWasteDisposalQuantity>1805</AnnualWasteDisposalQuantity>
    </AnnualWasteDisposalQuantityAndMethodDetails>
  </AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
  <YearWasteDetails>
    <YearWasteDetail>
      <YearWasteDisposed>2012</YearWasteDisposed>
      <AnnualWasteQuantity>
        <IsSubstitutedIndicator>Y</IsSubstitutedIndicator>
        <NumberofTimesSubstituted>5</NumberofTimesSubstituted>
      </AnnualWasteQuantity>
      <WasteTypeDetails>
        <WasteCompositionType>food waste</WasteCompositionType>
        <MethaneFractionDeterminationMethod>default</MethaneFractionDeterminationMethod>
        <MethaneFractionDeterminationAnnualValue>0.5</MethaneFractionDeterminationAnnualValue>
        <IsMCFValueDefaultIndicator>Y</IsMCFValueDefaultIndicator>
        <AnnualMCFValue>1.0</AnnualMCFValue>
        <PercentByWeight>0.60</PercentByWeight>
        <DegradableOrganicCarbonValue>0.5</DegradableOrganicCarbonValue>
        <FractionOfDOCDissimilated>0.5</FractionOfDOCDissimilated>
        <DecayRate>0.01</DecayRate>
      </WasteTypeDetails>
      <WasteTypeDetails>
        <WasteCompositionType>sewage sludge</WasteCompositionType>
        <MethaneFractionDeterminationMethod>default</MethaneFractionDeterminationMethod>
        <MethaneFractionDeterminationAnnualValue>0.5</MethaneFractionDeterminationAnnualValue>
        <IsMCFValueDefaultIndicator>Y</IsMCFValueDefaultIndicator>
        <AnnualMCFValue>1.0</AnnualMCFValue>
        <PercentByWeight>0.40</PercentByWeight>
        <DegradableOrganicCarbonValue>0.6</DegradableOrganicCarbonValue>
        <FractionOfDOCDissimilated>0.6</FractionOfDOCDissimilated>
        <DecayRate>0.02</DecayRate>
      </WasteTypeDetails>
    </YearWasteDetail>
  </YearWasteDetails>
  <YearWasteDetails>
    <YearWasteDetail>
      <YearWasteDisposed>2011</YearWasteDisposed>
      <AnnualWasteQuantity>
        <IsSubstitutedIndicator>N</IsSubstitutedIndicator>
      </AnnualWasteQuantity>
      <WasteTypeDetails>
        <BulkWasteType>bulk waste</BulkWasteType>
        <MethaneFractionDeterminationMethod>default</MethaneFractionDeterminationMethod>
        <MethaneFractionDeterminationAnnualValue>0.5</MethaneFractionDeterminationAnnualValue>
        <IsMCFValueDefaultIndicator>Y</IsMCFValueDefaultIndicator>
        <AnnualMCFValue>1.0</AnnualMCFValue>
        <PercentByWeight>0.41</PercentByWeight>
        <DegradableOrganicCarbonValue>0.5</DegradableOrganicCarbonValue>
        <FractionOfDOCDissimilated>0.5</FractionOfDOCDissimilated>
        <DecayRate>0.2</DecayRate>
      </WasteTypeDetails>
    </YearWasteDetail>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

5.0 Prior Years Waste Quantities

This section provides step-by-step instructions for reporting waste disposal quantities for each year prior to the landfill's first emissions reporting year under Part 98.

Figure 15
Prior Years Waste Quantity Details Schema Diagram

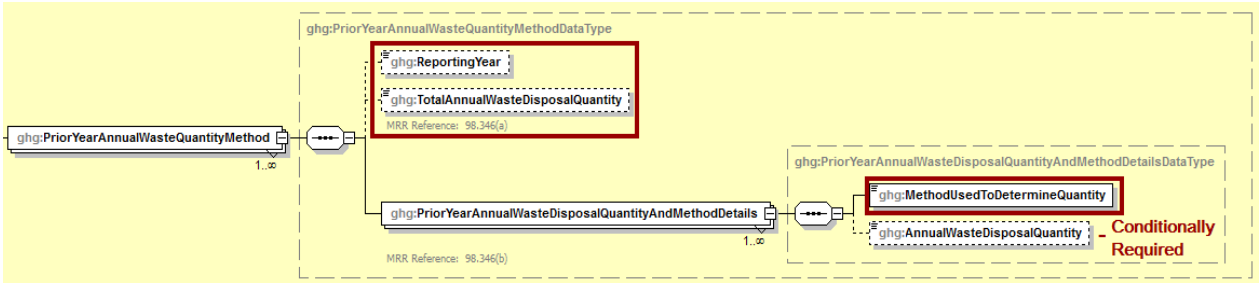


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

5.1 Prior Years Annual Waste Quantities and Methods

This subsection provides step-by-step instructions for reporting the methods used to determine waste disposal quantities for each year prior to the landfill's first emissions reporting year under Part 98.

Figure 16
Prior Years Annual Waste Quantity Method Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

For each year prior to the landfill's first emissions reporting year under Part 98, report the following information:

- The total annual waste disposal quantity. This value must equal the sum of annual waste disposal quantities if determined using the methods specified in § 98.343(a)(3).

- The method type(s) used to determine the landfill's annual waste disposal quantities for each specified year [98.343(a)(3)]:

    - Scales
    - Working Capacities
    - Other

    Please note that 'other' has a different meaning when reporting emissions data for a prior (historical) year. In this context, it indicates that the landfill used tipping receipts, business records, or other historical methods, as specified in § 98.343(a)(4).

- **Conditionally Required:** Annual waste disposal quantity. If scales or working capacities were used for the specified year, then report the quantity of waste determined using either method separately. For all other methods, report the combined annual waste disposal quantity determined using these other methods as one value.

Note: If you changed the methods used for determining waste disposal quantities during a given year, report the waste disposal quantity determined using each method type separately, and an explanation as to why you changed methods. For example, "scales were installed at the landfill mid-year." Please provide this explanation in the Subpart A data element "CalculationMethodologyChangesDescription".

Table 10
Prior Years Annual Waste Quantity Method Data Element Definitions

Data Element Name	Description
PriorWasteQuantityDetails	**Parent Element:** A collection of data elements that identify the waste disposal quantities determined using the methods for each year prior to the landfill's first year of emissions reporting under Part 98.
PriorYearAnnualWasteQuantityMethod	**Parent Element:** Details about the methods used to determine annual waste disposal quantities. It also include the specific waste quantities determined for each method used [specified in § 98.343(a)(3)]. Report the following information for each year, starting from the year the landfill first accepted waste until the year immediately prior to the first year of emissions reporting under Part 98. **Note:** Include a separate instance of this parent data element for each year specified.

Data Element Name	Description
ReportingYear	The year in which the following waste type details are applicable (YYYY).
TotalAnnualWasteDisposalQuantity	The total annual waste quantity disposed of at the landfill during the reporting year (in metric tons, wet weight). This amount must equal the sum of the annual waste disposal quantities determined for each method used.
AnnualWasteDisposalQuantityAndMethodDetails	**Parent Element:** The annual waste disposal quantities determined using the methods in 98.343(a)(3)(i) and the annual waste disposal quantities determined using the methods in 98.343(a)(3)(ii). Include a separate instance of this data element in the XML file for each method used during the reporting year.
MethodUsedToDetermineQuantity	A description of the methods used for determining the annual waste quantity for the current reporting year [98.343(a)(3)(i) or 98.343(a)(3)(ii)]. See list of allowable values: 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 Other **Note:** the method type 'other' has a different meaning when reporting emissions data for a prior (historical) year. In this context, it indicates that the landfill used tipping receipts, business records, or other historical methods, as specified in § 98.343(a)(4).
AnnualWasteDisposalQuantity	**Conditionally Required:** The annual quantity of waste disposed of at the landfill determined using each specified method type (scales or working capacity) in metric tons, wet weight. **Note:** You are not required to separately report the annual waste quantity determined using "other" method(s). However, you are required to report the landfill's total annual waste disposal quantity for the specified reporting year. This must equal the sum of all waste quantities determined using eac h reported method (scales and/or working capacity), plus the sum of quantities determined using "other" methods.

XML Excerpt 6
Example for Prior Year Annual Waste Quantity Method

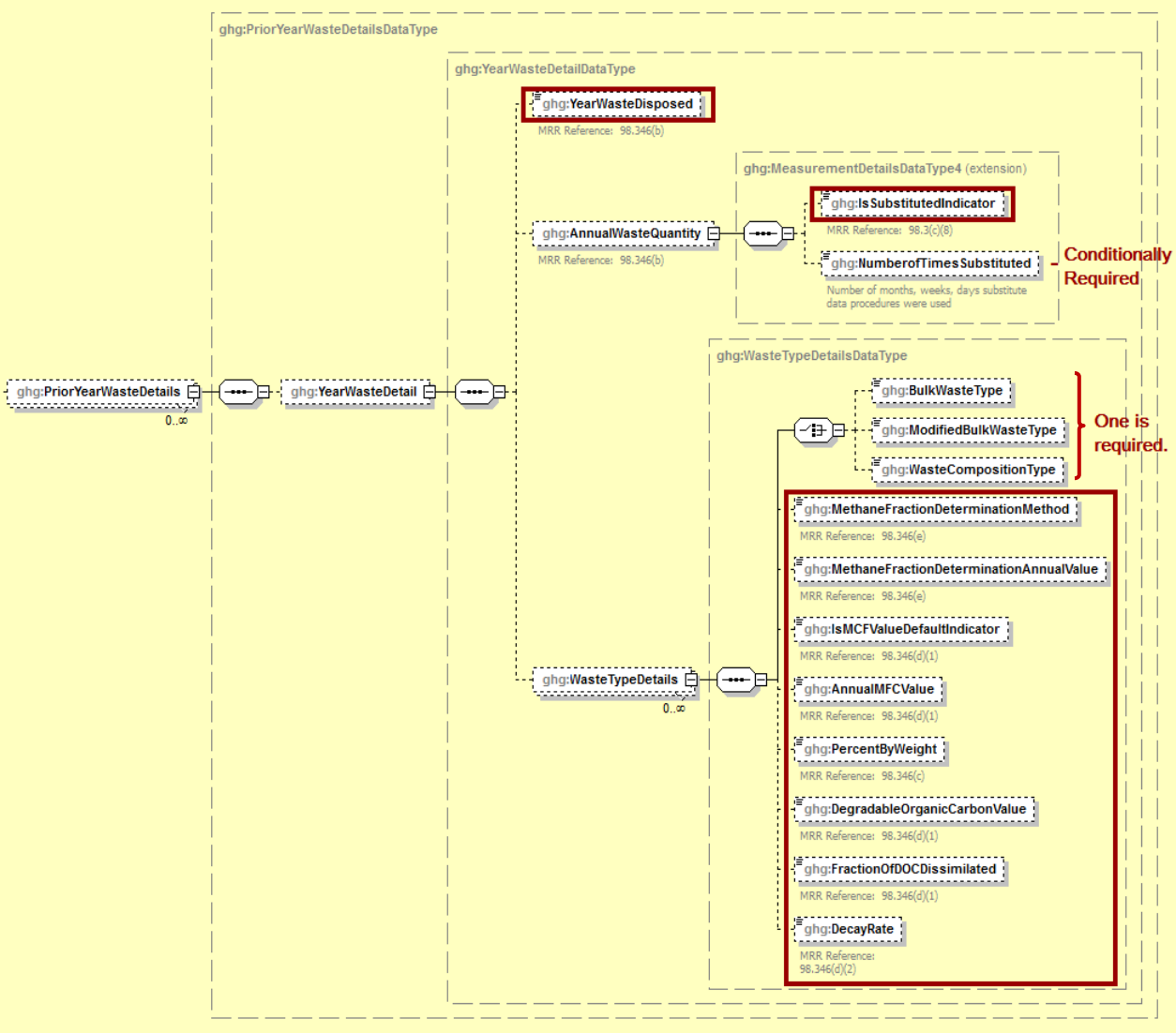
```
<PriorYearAnnualWasteQuantityMethod>
  <ReportingYear>2010</ReportingYear>
  <TotalAnnualWasteDisposalQuantity>3756400</TotalAnnualWasteDisposalQuantity>
  <PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
    <MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</MethodUsedToDetermineQuantity>
    <AnnualWasteDisposalQuantity>3756400</AnnualWasteDisposalQuantity>
  </PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
</PriorYearAnnualWasteQuantityMethod>
<PriorYearAnnualWasteQuantityMethod>
  <ReportingYear>2009</ReportingYear>
  <TotalAnnualWasteDisposalQuantity>2342003</TotalAnnualWasteDisposalQuantity>
  <PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
    <MethodUsedToDetermineQuantity>other</MethodUsedToDetermineQuantity>
  </PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
</PriorYearAnnualWasteQuantityMethod>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

5.2 Year Waste Details

This subsection provides step-by-step instructions for reporting waste types for each year prior to the landfill's first emissions reporting year under Part 98.

Figure 17
Prior Year Waste Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

You must report details about the waste types accepted at the landfill for each applicable year, regardless of the method(s) used to determine the landfill's annual waste disposal quantities. For each year prior to the landfill's first emissions reporting year under Part 98, report the following information:

- The year in which the specified waste type details are applicable (YYYY).
- Indicate if a missing data procedure was used to determine the annual waste quantity. Missing data procedures may be found in 98.345].
- **Conditionally Required:** If a missing data procedure was used, then report the number of days that substitute data was used to determine the waste quantity.
- Identify each of the waste types comprising the specified year's waste separately [98.346(c)]. A facility must report one of the three options from Table HH-1 (Bulk waste option, Modified bulk MSW option or Waste composition option). Report all applicable waste types within the option chosen:
    - Bulk waste
    - Modified bulk MSW
        - Bulk MSW waste (excluding inerts and C&D waste)
        - C&D waste
        - Inerts (e.g. glass, plastics, metal, cement)
    - Waste Composition
        - Food waste
        - Garden
        - Paper
        - Wood and straw
        - Textiles
        - Diapers
        - Inerts (e.g., glass, plastics, metal, cement)
        - Sewage sludge

For each waste type reported, indicate:

- For RY 2010, 2011, and 2012:
    - Whether the fraction of CH_4 in the landfill gas (F) is based on a measured value or the default value of 0.5 [98.346(e)].
    - The annual fraction of CH_4 in the landfill gas (F) [98.346(e)].
    - If a Methane Conversion Factor (MCF) other than the default of 1.0 was used in Equation HH-1 [98.346(d)(1)]. If the default value of 1.0 was not used, indicate "Y" for Yes. If the default value of 1.0 was used indicate "N" for No. **Note:** If you indicate "Y" that a value other than the default was used for MCF in Equation HH-1, active aeration must exist at your landfill and your report must include details about this aeration system. See Section 3.0 of this document for how to report details about the aeration system.
    - The methane correction factor (MCF) value used in the calculations [98.346(d)(1)].
- The waste composition required for Equation HH-1, in percentage by weight, for each waste option and/or sub-option listed in Table HH-1 of this subpart used to calculate the annual modeled CH_4 generation [98.346(c)].
- The degradable organic carbon (DOC) value used in the calculations [98.346(d)(1)].
- The fraction of DOC dissimilated (DOC_F) values used in the calculations [98.346(d)(1)].
- The decay rate (k) value used in the calculations [98.346(d)(2)].

Table 11
Prior Year Waste Quantity Data Element Definitions

Data Element Name	Description
PriorYearWasteDetails	**Parent Element:** Details about the quantity of waste disposed in years prior to the landfill's first reporting year
YearWasteDetail	**Parent Element:** Details for a single year. Report each year separately.
YearWasteDisposed	The year(s), prior to the landfill's first emissions reporting year. Report each year separately (YYYY).
AnnualWasteQuantity	A collection of data elements containing information about the annual waste types for the specified year. Report an indication (Y/N) of whether missing data procedures were used to determine the waste quantity data in the child data element **IsSubstitutedIndicator**. **Conditionally Required:** If missing data procedures were used, then report the number of days that substitute data was used to determine the waste quantity data in the child data element **NumberofTimesSubstituted**. Otherwise, do not report this child data element.
WasteTypeDetails	**Parent Element:** A collection of data elements containing details about the types of waste disposed. At least one is required. Report each type separately.
BulkWasteType	**Conditionally Required:** If you used the values in the bulk waste option in Table HH-1 of the rule to calculate methane generation, then report "Bulk waste". Otherwise, do not report this data element.
ModifiedBulkWasteType	**Conditionally Required:** If you used the values in the modified bulk MSW waste option in Table HH-1 of the rule to calculate methane generation, then indicate the type of modified bulk MSW waste disposed. Otherwise, do not report this data element. See list of allowable values: bulk MSW waste (excluding inerts and C&D waste) C&D waste inerts

Data Element Name	Description
WasteCompositionType	**Conditionally Required:** If you used the values in the waste composition option in Table HH-1 of the rule to calculate methane generation then indicate the waste composition type. Otherwise, do not report this data element. See list of allowable values: food waste garden paper wood and straw textiles diapers inerts sewage sludge
MethaneFractionDeterminationMethod	For the specified waste type, an indication of whether the fraction of CH_4 in landfill gas (F) was determined based on measured values or the default value. For RY 2010, 2011, and 2012. See list of allowable values: default measured
MethaneFractionDeterminationAnnualValue	The fraction of CH4 in the landfill gas (F). For RY 2010, 2011, and 2012.
IsMCFValueDefaultIndicator	For each waste type, an indication (Y/N) of whether a value other than the default value of 1.0 was used for the methane correction factor (MCF) in Equation HH-1. Report "Y" if the default of 1.0 was not used. Report "N" if the default value was used. For RY 2010, 2011, and 2012.
AnnualMCFValue	For each waste type used to calculate CH4 generation using Equation HH-1, report the methane correction factor (MCF) value used in the calculations. For RY 2010, 2011, and 2012.
PercentByWeight	The waste composition for each year required for Equation HH-1, in percentage by weight, for each waste category listed Table HH-1 of this subpart used to calculate the annual modeled CH4 generation. **Note:** You must follow the rounding rules found in Table 1.
DegradableOrganicCarbonValue	For each waste type used to calculate methane generation using Equation HH-1, report the degradable organic carbon (DOC) value used in the calculations.
FractionOfDOCDissimilated	For each waste type used to calculate CH4 generation using Equation HH-1, report the fraction of DOC dissimilated (DOC_F) value used in the calculations.
DecayRate	For each waste type used to calculate methane generation using Equation HH-1, report the decay rate (k) value used in the calculations.

XML Excerpt 7
Example for Prior Year Waste Quantity

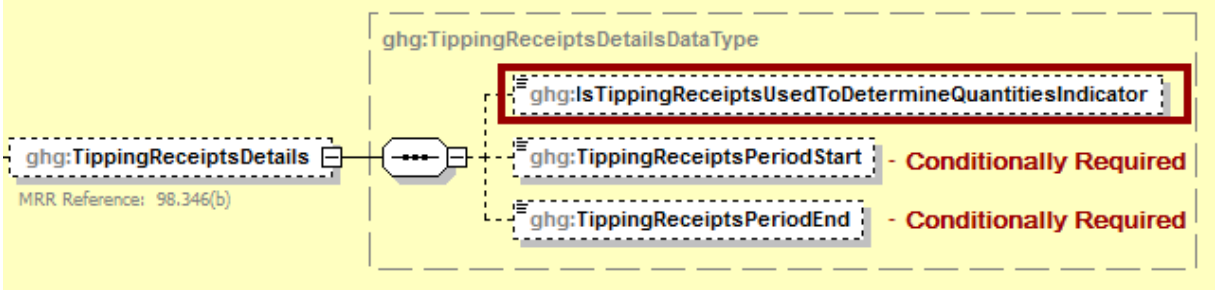
```
<PriorYearWasteDetails>
  <YearWasteDetail>
    <YearWasteDisposed>2010</YearWasteDisposed>
    <AnnualWasteQuantity>
      <IsSubstitutedIndicator>Y</IsSubstitutedIndicator>
      <NumberofTimesSubstituted>7</NumberofTimesSubstituted>
    </AnnualWasteQuantity>
    <WasteTypeDetails>
      <ModifiedBulkWasteType>inerts</ModifiedBulkWasteType>
      <MethaneFractionDeterminationMethod>default</MethaneFractionDeterminationMethod>
      <MethaneFractionDeterminationAnnualValue>0.5</MethaneFractionDeterminationAnnualValue>
      <IsMCFValueDefaultIndicator>Y</IsMCFValueDefaultIndicator>
      <AnnualMCFValue>1.0</AnnualMCFValue>
      <PercentByWeight>1</PercentByWeight>
      <DegradableOrganicCarbonValue>0.0</DegradableOrganicCarbonValue>
      <FractionOfDOCDissimilated>0.5</FractionOfDOCDissimilated>
      <DecayRate>0.0</DecayRate>
    </WasteTypeDetails>
  </YearWasteDetail>
</PriorYearWasteDetails>
<PriorYearWasteDetails>
  <YearWasteDetail>
    <YearWasteDisposed>2009</YearWasteDisposed>
    <AnnualWasteQuantity>
      <IsSubstitutedIndicator>Y</IsSubstitutedIndicator>
      <NumberofTimesSubstituted>8</NumberofTimesSubstituted>
    </AnnualWasteQuantity>
    <WasteTypeDetails>
      <BulkWasteType>bulk waste</BulkWasteType>
      <MethaneFractionDeterminationMethod>default</MethaneFractionDeterminationMethod>
      <MethaneFractionDeterminationAnnualValue>0.5</MethaneFractionDeterminationAnnualValue>
      <IsMCFValueDefaultIndicator>Y</IsMCFValueDefaultIndicator>
      <AnnualMCFValue>1.0</AnnualMCFValue>
      <PercentByWeight>1</PercentByWeight>
      <DegradableOrganicCarbonValue>0.2</DegradableOrganicCarbonValue>
      <FractionOfDOCDissimilated>0.5</FractionOfDOCDissimilated>
      <DecayRate>0.02</DecayRate>
    </WasteTypeDetails>
  </YearWasteDetail>
</PriorYearWasteDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

5.3 Historical 'Other' Methods

This subsection provides step-by-step instructions for reporting 'other' methods used to determine the total annual waste disposal quantity, as specified in § 98.343(a)(4). These estimation methods should only be used if the landfill's waste disposal quantity data are not readily available. In addition, they can only be used for years prior to the first year the landfill was required to report under Part 98.

Figure 18
Tipping Receipts Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Conditionally Required: If you did not use scales or working capacity to determine the landfill's annual waste disposal quantities (i.e., method type "other") for **any** historical year, then report the following information.

- Indicate if tipping receipts or other company records were used to estimate quantities of waste for years prior to the first year of emissions reporting [98.346(b)].
- **Conditionally Required:** If tipping receipts or other company records were used, indicate the first year in which these receipts/records were used and the last year in which they were used [98.346(b)].

Note: For new reporters, tipping receipts may only be used to calculate annual waste disposal quantities until the year prior to the first year the landfill was required to report under Part 98. For the first reporting year and all years after, scales or working capacities, as discussed in Section 4.0, must be used to determine annual waste disposal quantities.

Table 12
Tipping Receipts Data Element Definitions

Data Element Name	Description
TippingReceiptsDetails	**Parent Element:** A collection of data elements containing details about the use of tipping receipts, other company records or measured working capacities.
IsTippingReceiptsUsedToDetermineQuantities Indicator	An indication (Y/N) of whether tipping receipts or other company records were used to estimate quantities of waste for years prior to the current reporting year.

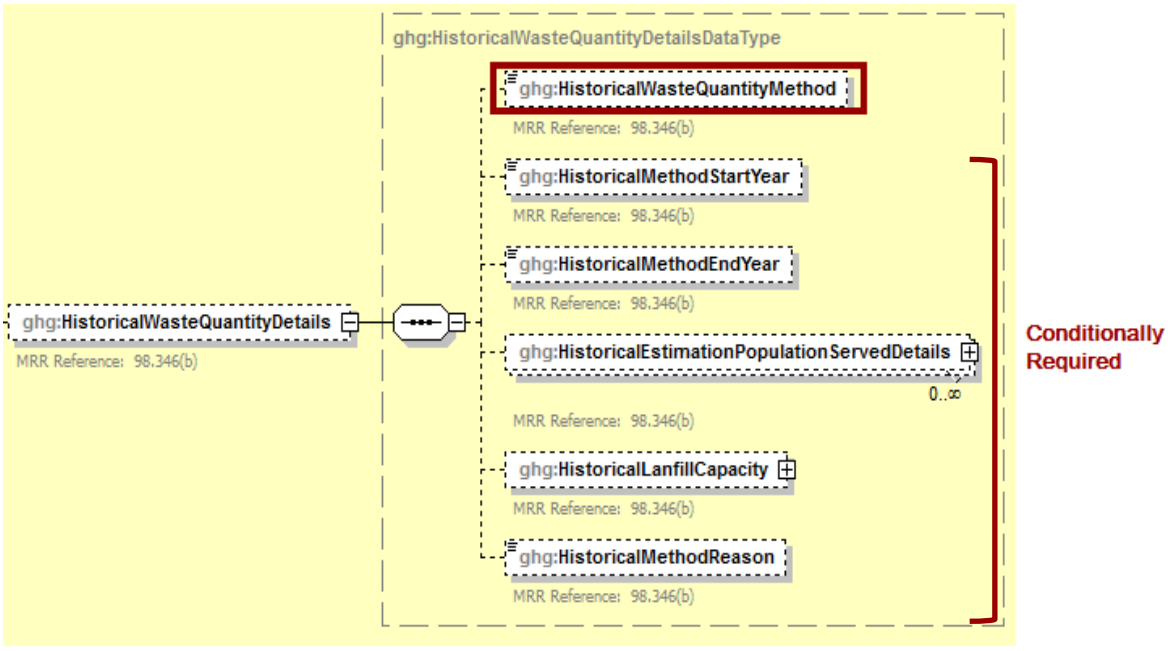
Data Element Name	Description
TippingReceiptsPeriodStart	**Conditionally Required:** If tipping receipts/company records were used to estimate the quantities of waste, then report the first year tipping receipts/company records were used (YYYY). Otherwise, do not report this data element.
TippingReceiptsPeriodEnd	**Conditionally Required:** If tipping receipts/company records were used to estimate the quantities of waste, then report the last year tipping receipts/company records were used (YYYY). Otherwise, do not report this data element. For new reporters tipping receipts may only be used until the year before the first year the landfill was required to report under Part 98.

XML Excerpt 8
Example for Tipping Receipts

```
<ghg:TippingReceiptsDetails>
        <ghg:TippingReceiptsUsedToDetermineQuantities>Y</ghg:TippingReceiptsUsedToDetermineQuantities>
        <ghg:TippingReceiptsPeriodStart>2009</ghg:TippingReceiptsPeriodStart>
        <ghg:TippingReceiptsPeriodEnd>2010</ghg:TippingReceiptsPeriodEnd>
</ghg:TippingReceiptsDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

Figure 19
Historical Waste Quantity Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

If you did not use scales, working capacities, tipping receipts, or other company records to determine or estimate the landfill's annual waste disposal quantities (i.e., method type "other") for **any** historical year (i.e., any year prior to the first emissions reporting year under Part 98), then report the following information:

- Indicate the method used to estimate all annual waste quantities that were not determined using scales or measured working capacities or estimated through tipping receipts or other company records[98.346(b)]. Per 98.343(a)(4), one of the following methods may be used to estimate waste quantities:
    - 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 the 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: If all waste quantities were either determined using scales or working capacities or estimated using tipping receipts or other company records, report "None".
- **Conditionally Required:** If a historical method (other than "None") was reported above, then provide the start and end years (the range) in which the method was used. Otherwise, do not report these two data elements.
- **Conditionally Required:** If Equation HH-2 (Method #2) was used to calculate the landfill's annual waste disposal quantities, then report the following information:
    - The specified historical year.
    - The applicable estimated population served by the landfill in the specified historical year from city population, census data, or other estimates (capita).
- **Conditionally Required:** If Equation HH-3 (Method #3) was used to calculate the landfill's annual waste disposal quantities, then report the landfill's capacity; for operating landfills, report the 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).
- **Conditionally Required:** If a historical method (other than "None") was reported above, then provide an explanation for choosing the specified method to estimate the historical quantity of waste. Otherwise, do not report this data element.

Table 13
Historical Waste Quantity Data Element Definitions

Data Element Name	Description
HistoricalWasteQuantityDetails	**Parent Element:** A collection of data elements containing details about the method used to estimate the historical quantity of waste.
HistoricalWasteQuantityMethod	Indicate the method used to estimate the historical quantity of waste. See list of allowable values: 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 the 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
HistoricalMethodStartYear	**Conditionally Required:** If "None" was not reported above, then report the first year that the method specified was used to estimate the quantity of waste (YYYY). Otherwise, do not report this data element.
HistoricalMethodEndYear	**Conditionally Required:** If "None" was not reported above, then report the last year that the method specified was used to estimate the quantity of waste (YYYY). Otherwise, do not report this data element.
HistoricalEstimationPopulationServedDetails	**Conditionally Required (Parent Element):** A collection of data elements containing details about the method used to estimate the historical waste disposal quantities by estimating the population served by the landfill in each year (Equation HH-2). **Note:** Report only if using Equation HH-2; otherwise, do not report this data element (or its two child data elements listed below).
ReportingYear	The historical reporting year (YYYY).
EstimatedPopulationServedByLandfill	The estimated population served by the landfill in the specified historical year from city population, census data, or other estimates (capita).

Data Element Name	Description
HistoricalLandfillCapacity	**Conditionally Required:** The landfill's 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). **Note:** Report only if using Equation HH-3.
HistoricalMethodReason	**Conditionally Required:** If "None" was not reported above, then explain the reason that the method specified was chosen to estimate the historical quantity of waste. Otherwise, do not report this data element.

XML Excerpt 9
Example for Historical Waste Quantity

```
<ghg:HistoricalWasteQuantityDetails>
    <ghg:HistoricalWasteQuantityMethod>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.</ghg:HistoricalWasteQuantityMethod>
    <ghg:HistoricalMethodStartYear>1981</ghg:HistoricalMethodStartYear>
    <ghg:HistoricalMethodEndYear>1990</ghg:HistoricalMethodEndYear>
    <ghg:HistoricalMethodReason>No other data was available to use in estimating historical waste
    quantities.</ghg:HistoricalMethodReason>
</ghg:HistoricalWasteQuantityDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

6.0 Gas Collection Systems

This section provides step-by-step instructions for reporting methane emissions for landfills with and without gas collection systems. A landfill gas collection system consists of 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 and route the gas 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.

Does the landfill have a landfill gas collection system?

If the landfill does not have a landfill gas collection system, see Section 6.1 for instructions on how to report for the parent element "NoGasCollectionSystemDetails."

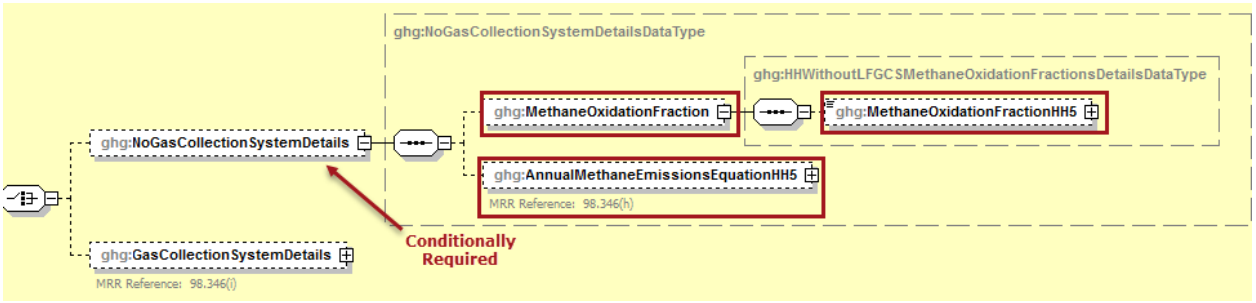
If the landfill has a landfill gas collection system, see Section 6.2 for instructions on how to report for the parent element "GasCollectionSystemDetails."

6.1 No Gas Collection System Details

This subsection provides step-by-step instructions for reporting CH_4 emissions for landfills that do not have a gas collection system.

Note: The schema is ordered such that data regarding the annual modeled CH_4 generation are reported after data regarding gas collection systems. However, you will need to first calculate the annual modeled CH_4 generation, using Equation HH-1, in order to determine quantities to report for this section. See Section 7.0 for instructions for calculating the annual modeled CH_4 generation.

Figure 20
No Gas Collection System Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Conditionally Required: If the landfill does not have a gas collection system, then report the oxidation fraction used in Equation HH-5 and the calculated value for CH_4 generation, adjusted for oxidation, which is also the value for CH_4 emissions, from the landfill in the reporting year (in metric tons of CH_4) calculated using Equation HH-5[98.346(h)]. 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, HH-2 and HH-3 spreadsheets to calculate inputs to Equation HH-5 as needed.

Table 14
No Gas Collection System Data Element Definitions

Data Element Name	Description
NoGasCollectionSystemDetails	**Parent Element (Conditionally Required):** A collection of data elements for landfills without gas collection systems. If the landfill does not have a gas collection system, then the following information is required. Otherwise, do not report this parent element.
MethaneOxidationFraction	**Parent Element (Required):** If the landfill does not have a gas collection system, the methane oxidation fraction must be reported.
MethaneOxidationFractionHH5	The oxidation fraction used in the calculation using Equation HH-5. Report for landfills that do not have a landfill gas collection system. Set the units of measure to "kg-mole C/kg-molegas" in the attribute **fractionUOM.** See list of allowable values. 0.00 0.10 0.25 0.35
AnnualMethaneEmissionsEquationHH5	A collection of data elements containing information about the annual CH_4 emissions, i.e., the annual methane generation, adjusted for oxidation, calculated using Equation HH-5. Report only for landfills that do not have a landfill gas collection system. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**

XML Excerpt 10
Example for No Gas Collection System

```
<ghg:NoGasCollectionSystemDetails>
  <ghg:MethaneOxidationFraction>
    <ghg:MethaneOxidationFractionHH5 fractionUOM="kg-mole C/kg-molegas">0.10</ghgMethaneOxidationFractionHH5>
  <ghg:MethaneOxidationFraction>
<ghg:AnnualMethaneEmissionsEquationHH5 massUOM="Metric Tons">
     <ghg:CalculatedValue>100.89</ghg:CalculatedValue>
  </ghg:AnnualMethaneEmissionsEquationHH5>
</ghg:NoGasCollectionSystemDetails>
```

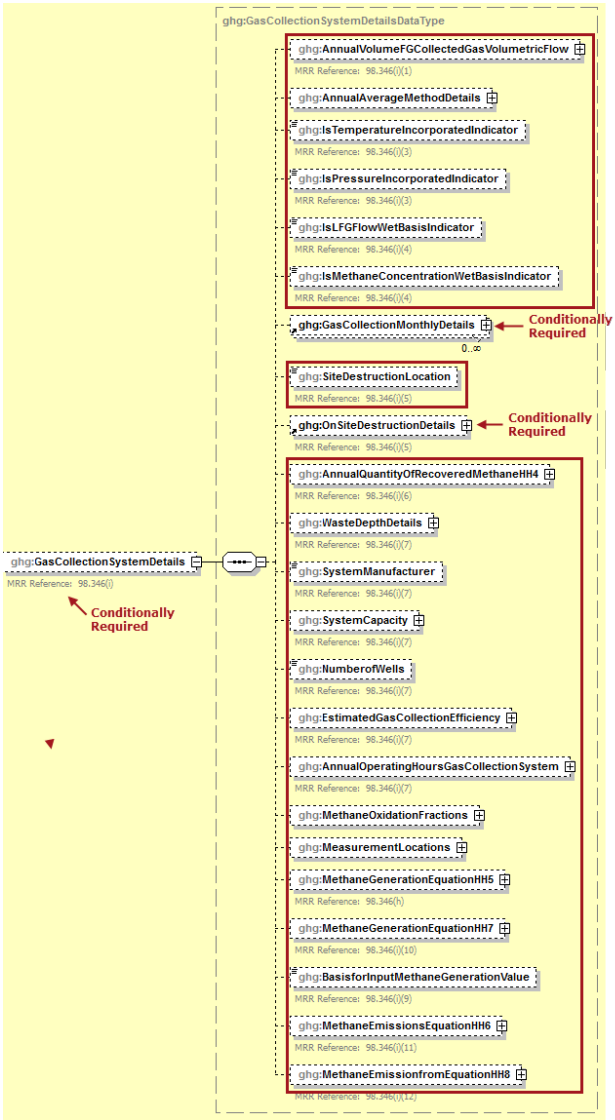
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

6.2 Gas Collection System Details

This subsection provides step-by-step instructions for reporting CH_4 emissions for landfills that have a gas collection system(s). Figure 21 shows the schema diagram for Gas Collection System Details and subsequently, Figures 22 through 25 show the more detailed schema diagram for the relevant components followed by a description of the data being reported and summary tables with the data element definitions.

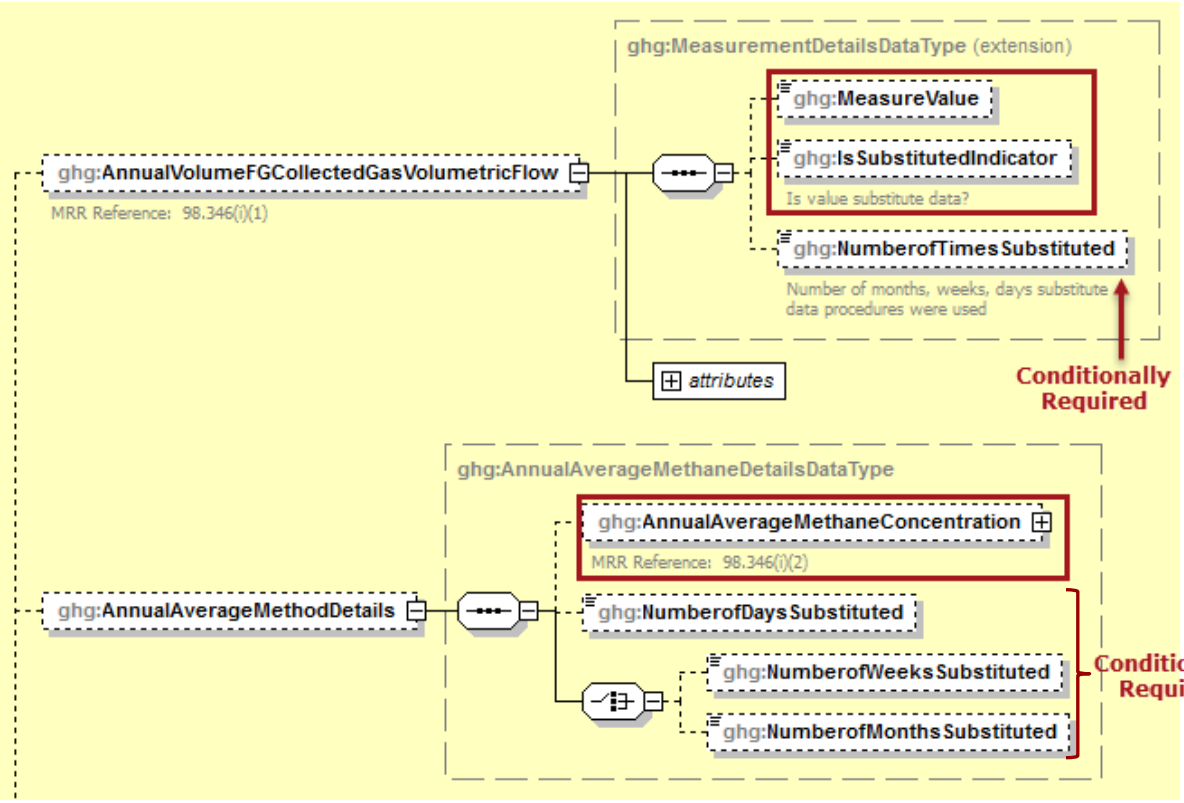
Note: The schema is ordered such that data regarding the annual modeled CH_4 generation are reported after data regarding gas collection systems. However, you will need to first calculate the annual modeled CH_4 generation, using Equation HH-1, in order to determine quantities to report for this section. See Section 7.0 for instructions for calculating the annual modeled CH_4 generation.

Figure 21
Gas Collection System Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements

Figure 22
Landfill Gas Volume and CH_4 Concentration Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Conditionally Required: If the landfill has a gas collection system, then the following information must be reported:

- Annual volume of landfill gas collected for destruction (in scf) [98.346(i)(1)].
  - 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) [98.3(c)(8)].
  - **Conditionally Required:** If a missing data procedure was used, report the number of days when a substitute data procedure was used to determine the volume of the landfill gas collected for destruction [98.3(c)(8)].

- Annual average concentration of CH_4 in landfill gas collected for destruction [98.346(i)(2)].
  - Indicate if a missing data procedure was used to determine the concentration of CH_4 of landfill gas collected for destruction (information about appropriate procedures for estimating missing data are found in 98.345) [98.3(c)(8)].

- **Conditionally Required:** If a missing data procedure was used and the CH_4 concentration is monitored continuously, report the number of days substitute data was used to determine the annual average CH_4 concentration of landfill gas collected for destruction [98.3(c)(8)].
- **Conditionally Required (RY2010, RY2011, and RY2012 ONLY):** If a missing data procedure was used and the CH_4 concentration is monitored weekly, the number of weeks substitute data was used to determine the annual average CH_4 concentration of landfill gas collected for destruction [98.3(c)(8)].

  Note: In the case of multiple measurement locations, you may report values for both days and weeks when CH_4 concentration is measured continuously at some locations and weekly at others.
- **Conditionally Required (RY2013 and after ONLY):** If a missing data procedure was used and the CH_4 concentration is monitored monthly, the number of months substitute data was used to determine the annual average CH_4 concentration of landfill gas collected for destruction [98.3(c)(8)].

  Note: In the case of multiple measurement locations, you may report values for both days and months when CH_4 concentration is measured continuously at some locations and monthly at others.

Table 15
Landfill Gas Volume and CH_4 Concentration Details Data Element Definitions

Data Element Name	Description
GasCollectionSystemDetails	**Parent Element (Conditionally Required):** A collection of data elements for landfills with gas collection systems. If the landfill has a gas collection system, then report the following information. Otherwise, do not report this parent element.
AnnualVolumeFGCollectedGasVolumetricFlow	A collection of data elements containing information about the total volume of landfill gas collected for destruction for the reporting year (cubic feet at 520°R or 60° F and 1 atm). Report the measured value in the child data element **MeasureValue** and an indication (Y/N) of whether missing data procedures were used to determine the total annual volume of landfill gas collected for destruction in the child data element **IsSubstitutedIndicator**. Set the units of measure to "scf" in the attribute **volUOM**. **Conditionally Required:** If missing data procedures were used, then report the number of days that substitute data were used to determine the total annual volume of landfill gas collected for destruction in the child data element **NumberofTimesSubstituted**. Otherwise, do not report this child data element.

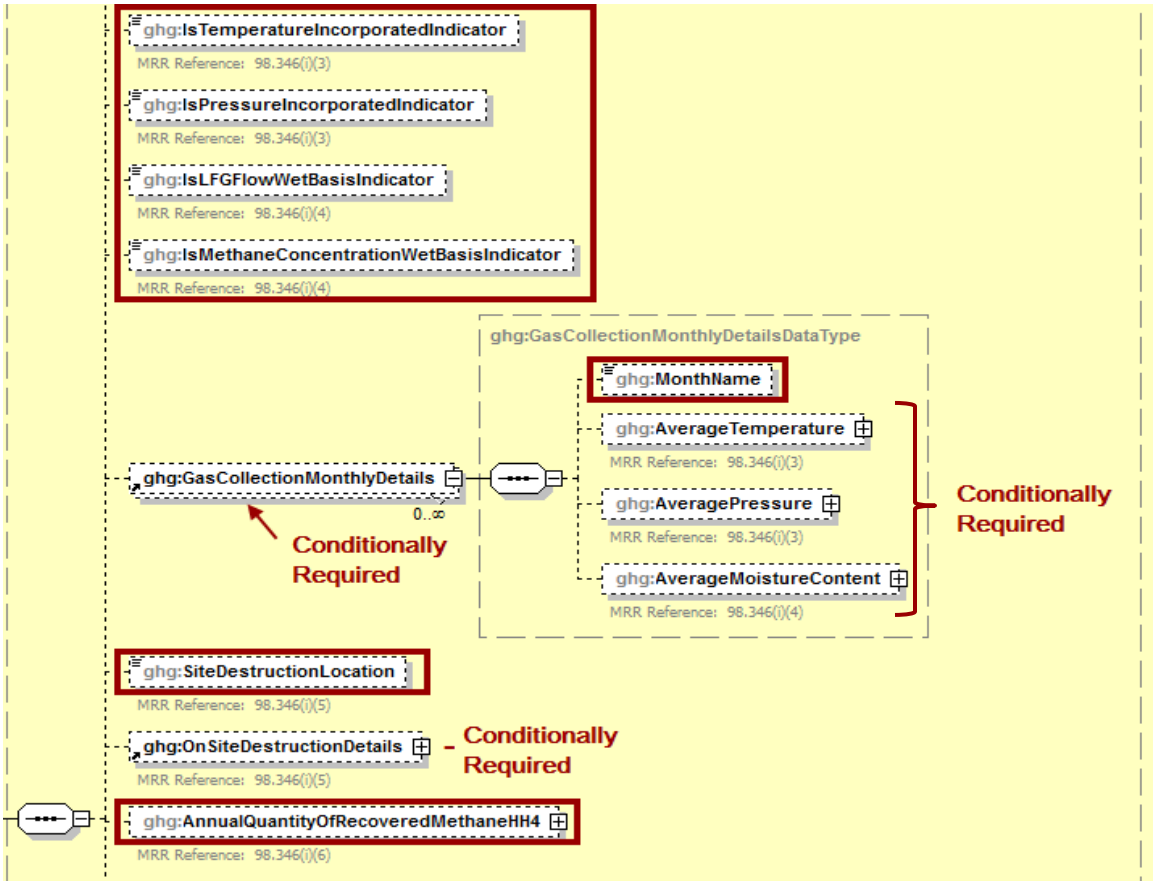
Data Element Name	Description
AnnualAverageMethodDetails	**Parent Element:** A collection of data elements containing information about the annual average CH_4 concentration of landfill gas collected for destruction.
AnnualAverageDailyMethaneConcentration	A collection of data elements containing information about the annual average CH_4 concentration of landfill gas collected for destruction. Report the measured value in percent in the child data element **MeasureValue** and an indication (Y/N) of whether missing data procedures were used to determine the annual average CH_4 concentration of landfill gas collected for destruction in the child data element **IsSubstitutedIndicator**. Set the units of measure to "Number (between 0 and 100)" in the attribute **percentUOM**. **Note:** Do not report the child data element **NumberofTimesSubstituted**.
NumberofDaysSubstituted	**Conditionally Required:** If CH_4 concentration was monitored continuously and missing data procedures were used, then report the number of days substitute data were used to determine the annual average CH_4 concentration of landfill gas collected for destruction (integer). Otherwise, do not report this data element.
NumberofWeeksSubstituted	**Conditionally Required (for RY2010, RY2011, and RY2012 ONLY):** If CH_4 concentration was monitored weekly and missing data procedures were used, then report the number of weeks substitute data were used to determine the annual average CH_4 concentration of landfill gas collected for destruction (integer). Otherwise, do not report this data element. **Note:** In the case of multiple measurement locations, you may report values for both days and weeks when CH_4 concentration is measured continuously at some locations and weekly at others.
NumberofMonthsSubstituted	**Conditionally Required (for RY 2013 and after ONLY):** If CH_4 concentration was monitored monthly and missing data procedures were used, then report the number of weeks substitute data were used to determine the annual average CH_4 concentration of landfill gas collected for destruction (integer). Otherwise, do not report this data element. **Note:** In the case of multiple measurement locations, you may report values for both days and months when CH_4 concentration is measured continuously at some locations and monthly at others.

XML Excerpt 11
Example for Landfill Gas Volume and CH_4 Concentration Details

```
<ghg:GasCollectionSystemDetails>
        <ghg:AnnualVolumeFGCollectedGasVolumetricFlow volUOM="scf">
                <ghg:MeasureValue>963852741</ghg:MeasureValue>
                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                <ghg:NumberofTimesSubstituted>100</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeFGCollectedGasVolumetricFlow>
        <ghg:AnnualAverageMethodDetails>
                <ghg:AnnualAverageMethaneConcentration percentUOM="Number (between 0 and 100)">
                        <ghg:MeasureValue>50</ghg:MeasureValue>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                </ghg:AnnualAverageMethaneConcentration>
                <ghg:NumberofDaysSubstituted>60</ghg:NumberofDaysSubstituted>
                <ghg:NumberofMonthsSubstituted>7</ghg:NumberofMonthsSubstituted>
        </ghg:AnnualAverageMethodDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data for RY 2013.

Figure 23
Monthly Details and Site Destruction Details Schema Diagram



Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

For landfills that have a gas collection system, the following information must be reported:

- Indicate if temperature was incorporated into internal calculations run by the collection system's monitoring equipment [98.346(i)(3)].
- Indicate if pressure was incorporated into internal calculations run by the collection system's monitoring equipment [98.346(i)(3)].
- Indicate whether landfill gas flow was measured on a wet or a dry basis [98.346(i)(4)].
- Indicate whether CH_4 concentration was measured on a wet or a dry basis [98.346(i)(4)].
- **Conditionally Required:** If temperature was not incorporated into the internal calculations run by the collection system's monitoring equipment, then report the average monthly temperature at which the landfill gas flow was measured (in degrees Rankine) for each month of the reporting year [98.346(i)(3)].
- **Conditionally Required:** If pressure was not incorporated into the internal calculations run by the collection system's monitoring equipment, then report the average monthly pressure at which the landfill gas flow was measured (in atmospheres) for each month of the reporting year [98.346(i)(3)].
- **Conditionally Required:** If landfill gas flow was measured on a wet basis and CH_4 concentration was measured on a dry basis, or gas flow was measured on a dry basis and CH_4 concentration was measured on a wet basis, then provide the monthly average moisture content (expressed as a decimal fraction) for each month of the reporting year [98.346(i)(4)].
- Indicate whether landfill gas destruction occurred at the facility (on-site), off-site or both [98.346(i)(5)].
- **Conditionally Required (for RY2010, RY2011, and RY2012 ONLY):** If destruction occurs on-site at the landfill facility, then report the following information: [98.346(i)(5)]
  - an indication of whether a back-up destruction device is present at the landfill.
  - the annual operating hours for the primary destruction device.
  - the annual operating hours for the back-up destruction device (if present).
  - the destruction efficiency used (percent).

  Note: Landfills with gas collection systems that destroy gas on-site are identified by those that report "at the facility" or "both" when indicating where landfill gas destruction occurred.

  Note: Starting in RY2013, details about the measurement location(s) and destruction device(s) are reported separately for each measurement location and destruction device. See Figure 25, Table 18,a nd XML Excerpt 14 for more information.

- Report the annual quantity of recovered CH_4 (in metric tons of CH_4) calculated using Equation HH-4. [98.346(i)(6)].

  Note: Starting in RY2013, the annual quantity of recovered CH_4 (in metric tons of CH_4) calculated using Equation HH-4 must be reported for each measurement location. If the facility has more than one measurement location, the values for Equation HH-4 should be summed across all measurement locations and reported here.

Table 16
Monthly Details and Site Destruction Details Data Element Definitions

Data Element Name	Description
IsTemperatureIncorporatedIndicator	An indication (Y/N) of whether temperature is incorporated into internal calculations run by the collection system's monitoring equipment.
IsPressureIncorporatedIndicator	An indication (Y/N) of whether pressure is incorporated into internal calculations run by the collection system's monitoring equipment.
IsLFGFlowWetBasisIndicator	An indication (Y/N) of whether the landfill gas flow was measured on a wet basis.
IsMethaneConcentrationWetBasisIndicator	An indication (Y/N) of whether CH_4 concentration was measured on a wet basis.
GasCollectionMonthlyDetails	**Parent Element (Conditionally Required):** A collection of data elements containing information about temperature, pressure and moisture content for each month. If the temperature or pressure was not incorporated into internal calculations or either the landfill gas flow was measured on a wet basis and the methane concentration was measured on a dry basis or the methane concentration was measured on a wet basis and the landfill gas flow was measured on a dry basis, then report the following information for each month of the reporting year. Otherwise, do not report this parent element.
MonthName	The name of each month. Report data for each month separately.
AverageTemperature	For the month specified, a collection of data elements about the average temperature at which flow is measured. **Conditionally Required:** If temperature is not incorporated into internal calculations run by the collection system's monitoring equipment, then report the value in the child data element **MeasureValue**. Set the units of measure to "Rankine" in the attribute **tempUOM**. Otherwise, do not report this data element.
AveragePressure	For the month specified, a collection of data elements about the average pressure at which flow is measured. **Conditionally Required:** If pressure is not incorporated into internal calculations run by the collection system's monitoring equipment, then report the value in the child data element **MeasureValue**. Set the units of measure to "atmosphere" in the attribute **pressureUOM**. Otherwise, do not report this data element.

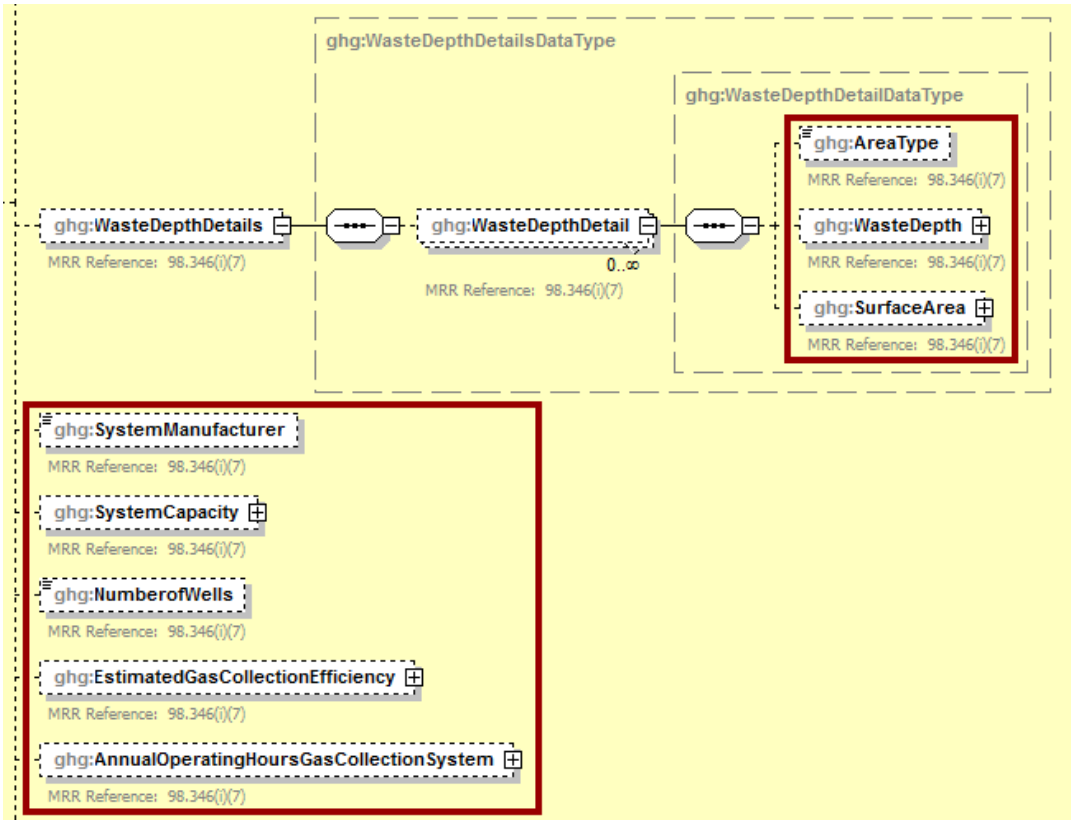
Data Element Name	Description
AverageMoistureContent	For the month specified a collection of data elements about the average moisture content. **Conditionally Required:** If landfill gas flow was measured on a wet basis and CH_4 concentration was measured on a dry basis, or gas flow was measured on a dry basis and CH_4 concentration was measured on a wet basis, then report the value in the child data element **MeasureValue**. Set the units of measure to "decimal fraction" in the attribute **fractionUOM**. Otherwise, do not report this data element.
SiteDestructionLocation	An indication of whether destruction occurred onsite at the landfill facility, off-site or both. See list of allowable values. On-site Off-site Both
OnSiteDestructionDetails	**Parent Element (Conditionally Required for RY2010, RY2011, and RY2012 ONLY):** A collection of data elements containing information about destruction activities performed at the landfill facility. Do not report this data element if there is no destruction occurring onsite at the landfill facility.
IsBackupDevicePresentIndicator	An indication (Y/N) of whether a back-up destruction device is present at the landfill.
DestructionEfficiencyPercent	Destruction efficiency used (percent).
PrimaryDeviceAnnualOperatingHours	The annual operating hours for the primary destruction device.
BackupDeviceAnnualOperatingHours	**Conditionally Required:** If a back-up destruction device is present at the landfill, then report the annual operating hours for annual operating hours for the back-up destruction device.
AnnualQuantityOfRecoveredMethaneHH4	The annual quantity of recovered CH_4 (in metric tons of CH_4) calculated using Equation HH-4. Note: Starting in RY2013, the annual quantity of recovered CH_4 (in metric tons of CH_4) calculated using Equation HH-4 must be reported for each measurement location. If the facility has more than one measurement location, the values for Equation HH-4 should be summed across all measurement locations and reported here.

XML Excerpt 12
Example for Monthly Details and Site Destruction Details\

```
<ghg:isTemperatureIncorporatedIndicator>Y</ghg:isTemperatureIncorporatedIndicator>
<ghg:isPressureIncorporatedIndicator>Y</ghg:isPressureIncorporatedIndicator>
<ghg:isLFGFlowWetBasisIndicator>Y</ghg:isLFGFlowWetBasisIndicator>
<ghg:isMethaneConcentrationWetBasisIndicator>N</ghg:isMethaneConcentrationWetBasisIndicator>
<ghg:GasCollectionMonthlyDetails>
        <ghg:MonthName>January</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>160</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>100</ghg:MeasureValue>
                </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.1</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:GasCollectionMonthlyDetails>
        <ghg:MonthName>February</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>170</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>110</ghg:MeasureValue>
        </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.2</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:GasCollectionMonthlyDetails>
        <ghg:MonthName>March</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>180</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>120</ghg:MeasureValue>
        </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.3</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:GasCollectionMonthlyDetails>
        <ghg:MonthName>April</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>190</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>130</ghg:MeasureValue>
        </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.4</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:SiteDestructionLocation>Both</ghg:SiteDestructionLocation>
<ghg:OnSiteDestructionDetails>
        <ghg:IsBackupDevicePresentIndicator>Y</ghg:IsBackupDevicePresentIndicator>
        <ghg:DestructionEfficiencyPercent effUOM="Percent">50</ghg:DestructionEfficiencyPercent>
        <ghg:PrimaryDeviceAnnualOperatingHours timeUOM="Hours">3644</ghg:PrimaryDeviceAnnualOperatingHours>
        <ghg:BackupDeviceAnnualOperatingHours timeUOM="Hours">100</ghg:BackupDeviceAnnualOperatingHours>
</ghg:OnSiteDestructionDetails>
<ghg:AnnuaQuantityOfRecoveredMethaneHH4 massUOM="Metric Tons">
        <ghg:MeasureValue>17200</ghg:MeasureValue>
</ghg:AnnuaQuantityOfRecoveredMethaneHH4>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

Figure 24
Waste Depth and System Details Schema Diagram



Note: Data elements boxed in red are required.

Landfills with a gas collection system in place must report the surface area (in square meters) and estimated waste depths (in meters) for each area listed below (as referenced in Table HH-3) [98.346(i)(7)].

Note: Report the waste depth and surface for each area type (A1-A5), even if the values are 0 meters or 0 square meters.

- Depth of area with no waste in place (A1, in meters).
- Surface area of area with no waste in place (A1, in square meters).
- Depth of area without active gas collection, regardless of cover type (A2, in meters).
- Surface area of area without active gas collection, regardless of cover type (A2, in square meters).
- Depth of area with daily soil cover and active gas collection (A3, in meters).
- Surface area of area with daily soil cover and active gas collection (A3, in square meters).
- Depth of area with an intermediate soil cover, or a final soil cover not meeting the criteria for A5 (A4, in meters).
- Surface area of area with an intermediate soil cover, or a final soil cover not meeting the criteria not meeting the criteria for A5 (A4, in square meters).

- Depth of area with a final soil cover of three feet or thicker of clay and/or geomembrane cover system and active gas collection (A5, in meters).
- Surface area of area with a final soil cover of three feet or thicker of clay and/or geomembrane cover system and active gas collection (A5, in square meters).

Provide the following information about the landfill gas collection system:

- The entity that designed the gas collection system and the entity that installed the gas collection system [98.346(i)(7)]. If this information is not available, report the manufacturer of the blower. **Note:** Do not use this space to indicate the manufacturer of the flares 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.
- The capacity of the landfill gas collection system (actual cubic feet per minute, acfm) [98.346(i)(7)].
- The number of wells that are part of the landfill gas collection system [98.346(i)(7)].
- The estimated gas collection efficiency of the gas collection system calculated using the criteria in Table HH-3 [98.346(i)(7)].
- The annual operating hours of the gas collection system [98.346(i)(7)].

Table 17
Waste Depth and System Details Data Element Definitions

Data Element Name	Description
WasteDepthDetails	**Parent Element:** Details about the waste depth in each area the landfill as specified in Table HH-3.
WasteDepthDetail	**Parent Element:** Details about a specific area. Report each area separately.
AreaType	The specific area type from Table HH-3. See list of allowable values: A1 Area with no waste in place A2 Area without active gas collection, regardless of cover type A3 Area with daily soil cover and active gas collection A4 Area with an intermediate soil cover, or a final soil cover not meeting the criteria not meeting the criteria for A5 A5 Area with a final soil cover of three feet or thicker of clay and/or geomembrane cover system and active gas collection
WasteDepth	For each area type specified, a collection of data elements about the waste depth. Report the value in the child data element **MeasureValue**. Set the units of measure to "Meters" in the attribute **heightUOM**. Note: A value for the waste depth must be reported for each area type even if that value is 0 meters.

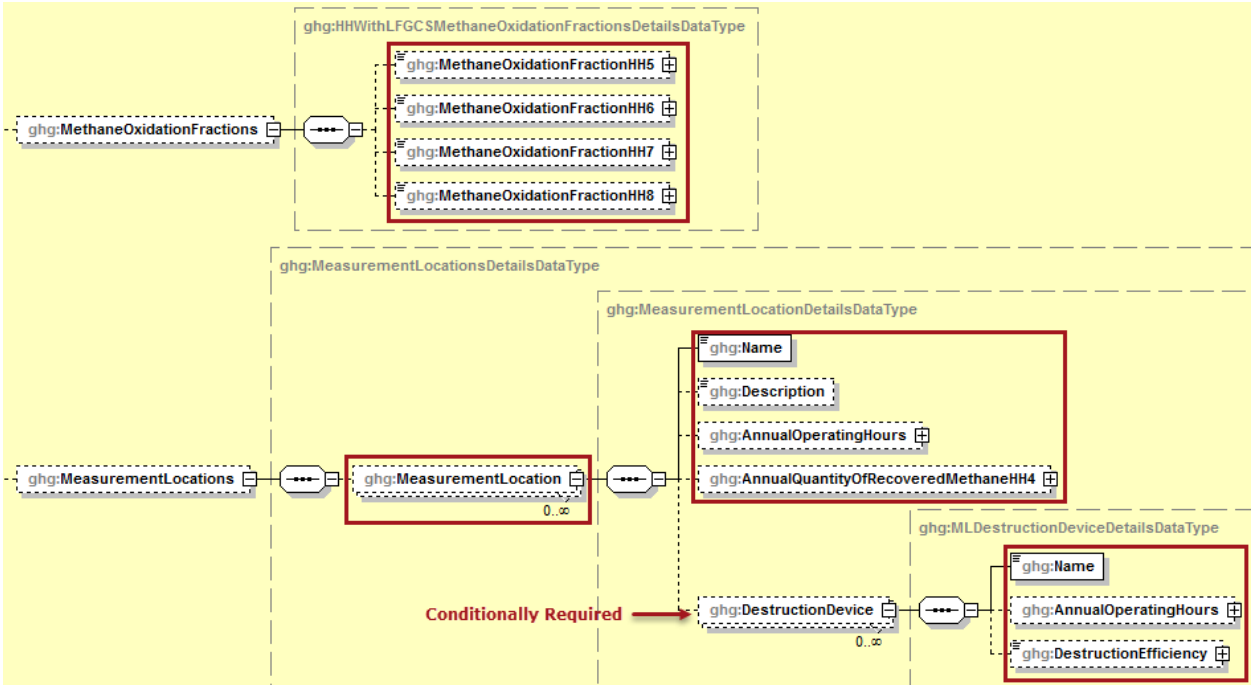
Data Element Name	Description
SurfaceArea	For each area type specified, a collection of data elements about the surface area. Report the value in the child data element **MeasureValue**. Set the units of measure to "Square Meters" in the attribute **areaUOM**. Note: A value for the surface area must be reported for each area type even if that value is 0 square meters.
SystemManufacturer	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. **Note:** Do not use this space to indicate the manufacturer of the flares 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.
SystemCapacity	A collection of data elements about the system capacity of the gas collection system in actual cubic feet per minute. Report the value in the child data element **MeasureValue**. Set the units of measure to "acfm" in the attribute **flowUOM**.
NumberofWells	The number of wells used in the gas collection system (integer).
EstimatedGasCollectionEfficiency	The estimated gas collection efficiency of the gas collection system calculated using the criteria in Table HH-3. Report the value in the child data element **CalculatedValue**. Set the units of measure to "decimal fraction" in the attribute **fractionUOM**.
AnnualOperatingHoursGasCollectionSystem	The annual operating hours of the gas collection system (in hours). Report the value in the child data element **MeasureValue**. Set the units of measure to "hours" in the attribute **timeUOM**.

XML Excerpt 13
Example for Waste Depth and System Details

```
<WasteDepthDetails>
  <WasteDepthDetail>
    <AreaType>A1</AreaType>
    <WasteDepth heightUOM="Meters">
      <MeasureValue>0</MeasureValue>
    </WasteDepth>
    <SurfaceArea areaUOM="Square Meters">
      <MeasureValue>0</MeasureValue>
    </SurfaceArea>
  </WasteDepthDetail>
  <WasteDepthDetail>
    <AreaType>A2</AreaType>
    <WasteDepth heightUOM="Meters">
      <MeasureValue>15</MeasureValue>
    </WasteDepth>
    <SurfaceArea areaUOM="Square Meters">
      <MeasureValue>10</MeasureValue>
    </SurfaceArea>
  </WasteDepthDetail>
  <WasteDepthDetail>
    <AreaType>A3</AreaType>
    <WasteDepth heightUOM="Meters">
      <MeasureValue>15</MeasureValue>
    </WasteDepth>
    <SurfaceArea areaUOM="Square Meters">
      <MeasureValue>10</MeasureValue>
    </SurfaceArea>
  </WasteDepthDetail>
  <WasteDepthDetail>
    <AreaType>A4</AreaType>
    <WasteDepth heightUOM="Meters">
      <MeasureValue>15</MeasureValue>
    </WasteDepth>
    <SurfaceArea areaUOM="Square Meters">
      <MeasureValue>10</MeasureValue>
    </SurfaceArea>
  </WasteDepthDetail>
  <WasteDepthDetail>
    <AreaType>A5</AreaType>
    <WasteDepth heightUOM="Meters">
      <MeasureValue>15</MeasureValue>
    </WasteDepth>
    <SurfaceArea areaUOM="Square Meters">
      <MeasureValue>10</MeasureValue>
    </SurfaceArea>
  </WasteDepthDetail>
</WasteDepthDetails>
<SystemManufacturer>John Zink Systems</SystemManufacturer>
<SystemCapacity flowUOM="acfm">
  <MeasureValue>25000</MeasureValue>
</SystemCapacity>
<NumberofWells>30</NumberofWells>
<EstimatedGasCollectionEfficiency fractionUOM="decimal fraction">
  <CalculatedValue>0.57</CalculatedValue>
  <OverrideIndicator>N</OverrideIndicator>
</EstimatedGasCollectionEfficiency>
<AnnualOperatingHoursGasCollectionSystem timeUOM="Hours">
  <MeasureValue>8760</MeasureValue>
</AnnualOperatingHoursGasCollectionSystem>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

Figure 25
Methane Oxidation Fractions and Measurement Locations Diagram



Landfills with a gas collection system in place must (**for RY2013 and later**):

- Report the methane generation corrected for oxidation and the associated methane oxidation fractions used in Equations HH-5 [98.346(i)(8)], HH-7 [98.346(i)(10)], HH-6 [98.346(i)(11)], and HH-8 [98.346(i)(12)].

- Report information on each gas collection system measurement location, including the name, description, annual operating hours, and the annual quantity of recovered methane (using Equation HH-4) for each measurement location associated with the gas collection system. [98.346(i)(6); 98.346(i)(7)].

- Report information on the destruction device(s) associated with each measurement location, including the name, annual operating hours, and destruction efficiency (percent) of the device. [98.346(i)(5)].

Table 18
Methane Oxidation Fractions and Measurement Location and Destruction Device Details

Data Element Name	Description
MethaneOxidationFractions	**Parent Element:** Includes details about the oxidation fractions used in the calculation of methane generation and emissions (Equations HH5, HH6, HH7, and HH8).
MethaneOxidationFractionHH5	**Required:** Enter the oxidation fraction used in the Equation HH5 calculations. [98.346(i)(8)]
MethaneOxidationFractionHH6	**Required:** Enter the oxidation fraction used in the Equation HH6 calculations. [98.346(i)(11)]
MethaneOxidationFractionHH7	**Required:** Enter the oxidation fraction used in the Equation HH7 calculations. [98.346(i)(10)]
MethaneOxidationFractionHH8	**Required:** Enter the oxidation fraction used in the Equation HH8 calculations. [98.346(i)(12)]
MeasurementLocations	**Parent Element:** Includes details about the measurement location(s) and destruction device(s) for the landfill gas collection system.
MeasurementLocation	**Parent Element:** Includes details about the measurement location(s) for the landfill gas collection system.
Name	**Required:** Enter a unique identifier name for the gas collection system measurement location. Note: More than one measurement location can be associated with a gas collection system. A unique identifier must be reported for each measurement location.
Description	**Required:** Enter a description for the gas collection system measurement location.
AnnualOperatingHours	**Required:** Enter the annual operating hours (≤ 8760 or ≤ 8784 if reporting year is a leap year) associated with the gas collection system measurement location. [98.346(i)(7)] Note: More than one measurement location can be associated with a gas collection system. The annual operating hours must be reported for each measurement location.
AnnualQuantityof RecoveredMethaneHH4	**Required:** Enter the annual quantity of recovered methane for the gas collection system measurement location (in metric tons) using Equation HH-4. [98.346(i)(6)] Note: More than one measurement location can be associated with a gas collection system. The annual quantity of recovered methane must be reported for each measurement location.

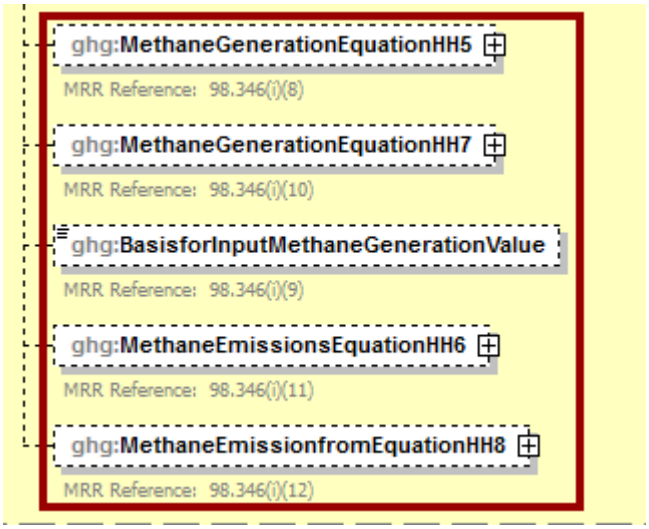
Data Element Name	Description
DestructionDevice	**Parent Element:** Includes details about each destruction device associated with each measurement location.
Name	**Conditionally Required:** Enter a unique identifier name for each destruction device. [98.346(i)(5)] Note: More than one destruction device can be associated with a measurement location. A unique identifier must be reported for each destruction device. If the destruction device is located off-site, you may indicate this in the name, but it is not required.
AnnualOperatingHours	**Conditionally Required:** For each destruction device, enter the annual operating hours for the device (≤ 8760 or ≤ 8784 if reporting year is a leap year). [98.346(i)(5)] Note: More than one destruction device can be associated with a measurement location. The annual operating hours must be reported for each destruction device. If a specific destruction device is located off-site, a value of 8760 (or 8784 if a leap year) should be entered for the annual operating hours if the actual annual operating hours are unknown.
DestructionEfficiency	**Conditionally Required:** For each destruction device, enter the destruction efficiency (percent) for the device. [98.346(i)(5)] Note: More than one destruction device can be associated with a measurement location. A destruction efficiency must be reported for each destruction device. If a specific destruction device is located off-site, a value of 1 should be entered for the destruction efficiency. Otherwise, the lesser of the manufacturer's specified destruction efficiency and 0.99 should be entered.

XML Excerpt 14
Example for Methane Oxidation Fractions and Measurement Locations Details

```
<MethaneOxidationFractions>
        <MethaneOxidationFractionHH5 fractionUOM="fraction (number between 0 and
1)">0.10</MethaneOxidationFractionHH5>
        <MethaneOxidationFractionHH6 fractionUOM="fraction (number between 0 and
1)">0.10</MethaneOxidationFractionHH6>
        <MethaneOxidationFractionHH7 fractionUOM="fraction (number between 0 and
1)">0.10</MethaneOxidationFractionHH7>
        <MethaneOxidationFractionHH8 fractionUOM="fraction (number between 0 and
1)">0.10</MethaneOxidationFractionHH8>
</MethaneOxidationFractions>
<MeasurementLocations>
        <MeasurementLocation>
                <Name>ML NW #1</Name>
                <Description>measurement location in northwest corner</Description>
                <AnnualOperatingHours timeUOM="Hours">
                <MeasureValue>320</MeasureValue>
                </AnnualOperatingHours>
                <AnnualQuantityOfRecoveredMethaneHH4 massUOM="Metric Tons">
                <MeasureValue>200</MeasureValue>
                </AnnualQuantityOfRecoveredMethaneHH4>
                <DestructionDevice>
                        <Name>NW Destruction Device1</Name>
                        <AnnualOperatingHours timeUOM="Hours">
                        <MeasureValue>100</MeasureValue>
                        </AnnualOperatingHours>
                        <DestructionEfficiency fractionUOM="fraction (number between 0 and
                        1)">0.92</DestructionEfficiency>
                </DestructionDevice>
                <DestructionDevice>
                        <Name>NW Destruction Device2</Name>
                        <AnnualOperatingHours timeUOM="Hours">
                        <MeasureValue>243</MeasureValue>
                        </AnnualOperatingHours>
                        <DestructionEfficiency fractionUOM="fraction (number between 0 and
                        1)">0.89</DestructionEfficiency>
                        </DestructionDevice>
        </MeasurementLocation>
        <MeasurementLocation>
                <Name>ML SW#1</Name>
                <Description>measurement location on the southwest side of the landfill</Description>
                <AnnualOperatingHours timeUOM="Hours">
                <MeasureValue>2450</MeasureValue>
                </AnnualOperatingHours>
                <AnnualQuantityOfRecoveredMethaneHH4 massUOM="Metric Tons">
                <MeasureValue>328</MeasureValue>
                </AnnualQuantityOfRecoveredMethaneHH4>
                <DestructionDevice>
                        <Name>SW Destruction Device1</Name>
                        <AnnualOperatingHours timeUOM="Hours">
                        <MeasureValue>539</MeasureValue>
                        </AnnualOperatingHours>
                        <DestructionEfficiency fractionUOM="fraction (number between 0 and
                1)">0.93</DestructionEfficiency>
                </DestructionDevice>
                <DestructionDevice>
                        <Name>SW Destruction Device2</Name>
                        <AnnualOperatingHours timeUOM="Hours">
                        <MeasureValue>340</MeasureValue>
                        </AnnualOperatingHours>
                        <DestructionEfficiency fractionUOM="fraction (number between 0 and
                1)">0.89</DestructionEfficiency>
                </DestructionDevice>
        </MeasurementLocation>
</MeasurementLocations>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

Figure 26
Methane Generation and Emissions Details Schema Diagram



Note: Data elements boxed in red are required.

Report the following values (in metric tons of CH_4):

- Modeled CH_4 generation, adjusted for oxidation (using Equation HH-5) [98.346(i)(8)].
- Measured CH_4 generation, adjusted for oxidation (using Equation HH-7) [98.346(i)(10)].
- CH_4 emissions from the landfill during the reporting year (using Equation HH-6) along with an indication of whether the methane generation value used as an input to Equation HH-6 is a measured (output of Equation HH-4) or modeled (output of Equation HH-1) value [98.346(i)(9) and 98.346(i)(11)].
- CH_4 emissions from the landfill during the reporting year (using Equation HH-8) [98.346(i)(12)].

Note: For annual recovered CH_4, (using Equation HH-4) [98.346(i)(6)], see Section 6.2, Gas Collection Systems Details, Table 16.

The equations may be calculated using the spreadsheet tool provided. Spreadsheets are also available for calculating inputs to the equations. Use the Equation HH-1, HH-2, HH-3 and HH-4 spreadsheets to calculate inputs as needed.

Table 19
Methane Generation and Emissions Details Data Element Definitions

Data Element Name	Description
MethaneGenerationEquationHH5	A collection of data elements about the modeled methane generation adjusted for oxidation calculated using Equation HH-5. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
MethaneGenerationEquationHH7	A collection of data elements about the annual methane generation adjusted for oxidation calculated using Equation HH-7. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
BasisforInputMethaneGenerationValue	Indicate if the value of methane generation used as an input to Equation HH-6 was modeled from Equation HH-1 or measured from Equation HH-4. See list of allowable values: Equation HH-1 Equation HH-4
MethaneEmissionsEquationHH6	A collection of data elements about the annual CH_4 emissions calculated using Equation HH-6. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
MethaneEmissionfromEquationHH8	A collection of data elements about the annual CH_4 emissions calculated using Equation HH-8. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 15
Example for Methane Generation and Emissions Details

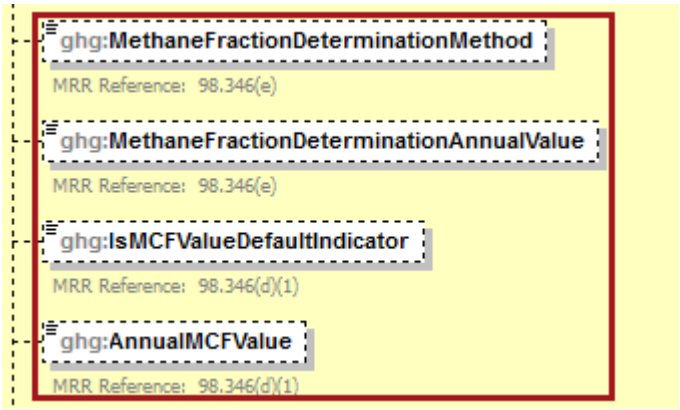
```
                <ghg:MethaneGenerationEquationHH5 massUOM="Metric Tons">
                        <ghg:CalculatedValue>1000.23</ghg:CalculatedValue>
                </ghg:MethaneGenerationEquationHH5>
                <ghg:MethaneGenerationEquationHH7 massUOM="Metric Tons">
                        <ghg:CalculatedValue>2000.15</ghg:CalculatedValue>
                </ghg:MethaneGenerationEquationHH7>
                <ghg:BasisforInputMethaneGenerationValue>Equation HH-1</ghg:BasisforInputMethaneGenerationValue>
                <ghg:MethaneEmissionsEquationHH6 massUOM="Metric Tons">
                        <ghg:CalculatedValue>3000.03</ghg:CalculatedValue>
                </ghg:MethaneEmissionsEquationHH6>
                <ghg:MethaneEmissionfromEquationHH8 massUOM="Metric Tons">
                        <ghg:CalculatedValue>4000.08</ghg:CalculatedValue>
                </ghg:MethaneEmissionfromEquationHH8>
        </ghg:GasCollectionSystemDetails>
</ghg:SubPartHH>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

7.0 Methane Fractions and Methane Correction Factors

This section provides a description of how to report the fraction of CH_4 in landfill gas (the value and the determination method) and the methane correction factor. This section applies to RY2013 and later only.

Figure 27
Methane Fraction and Methane Correction Factor Schema Diagram



Note: Data elements boxed in red are required.

Report the following values (**for RY2013 and later only**) [98.346(e)]:

- An indication of whether the fraction of CH_4 in landfill gas (F) was determined based on measured values or the default value of 0.5.
- F for the reporting year.
- An indication of whether the methane correction factor (MCF) used was the default value of 1.
- The MCF used in the calculations for the reporting year (decimal value between 0.5 and 1.0).

Note that in accordance with 98.346(e), if an MCF other than the default value of 1.0 is used, information on active aeration of the waste in the landfill must be reported (see Section 5).

Table 20
Methane Fraction and Methane Correction Factor Data Element Definitions

Data Element Name	Description
MethaneFractionDeterminationMethod	An indication of whether the fraction of CH_4 in landfill gas (F) for the reporting year was determined based on measured values or the default value of 0.5.
MethaneFractionDeterminationAnnualValue	The value for F used in the calculations for the reporting year (decimal value between 0 and 1).

Data Element Name	Description
IsMCFValueDefaultIndicator	An indication of whether the methane correction factor (MCF) for the reporting year was determined based on measured values or the default value of 1.0.
AnnualMCFValue	The value for MCF used in the calculations for the reporting year (decimal value between 0 and 1).

XML Excerpt 16
Methane Fraction and Methane Correction Factor Schema Diagram

```
<ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
<ghg:MethaneFractionDeterminationAnnualValue>0.5</ghg:MethaneFractionDeterminationAnnualValue>
<ghg:IsMCFValueDefaultIndicator>N</ghg:IsMCFValueDefaultIndicator>
<ghg:AnnualMCFValue>1.0</ghg:AnnualMCFValue>
```

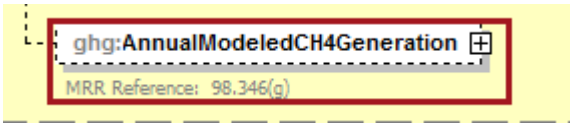
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

8.0 Annual Modeled Methane Generation

This section provides a description of how to report the annual modeled methane generation information for municipal solid waste landfills under subpart HH.

Note: The schema is ordered such that data regarding gas collection systems are reported before data regarding the annual modeled CH_4 generation. However, you will need to first calculate the annual modeled CH_4 generation, using Equation HH-1, in order to determine quantities to report for the gas collection systems section. See Section 6.0 for instructions on reporting for gas collection systems

Figure 28
Annual Modeled Methane Generation Schema Diagram



Note: Data elements boxed in red are required.

Report the following values (in metric tons of CH_4):

- Modeled CH_4 generation rate for the reporting year (using Equation HH-1) [98.346(g)].

The equations may be calculated using the Equation HH-1 spreadsheet tool available online. Spreadsheets are also available for calculating inputs to the equations. Use the Equation HH-2 and/or HH-3 spreadsheets to calculate inputs to Equation HH-1 as needed.

Table 21
Annual Modeled Methane Generation Data Element Definitions

Data Element Name	Description
AnnualModeledCH4Generation	The annual modeled methane generation for the landfill as calculated using Equation HH-1. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 17
Annual Modeled Methane Generation Schema Diagram

```
<ghg:AnnualModeledCH4Generation massUOM="Metric Tons">
        <ghg:CalculatedValue>18700.23</ghg:CalculatedValue>
</ghg:AnnualModeledCH4Generation>
```

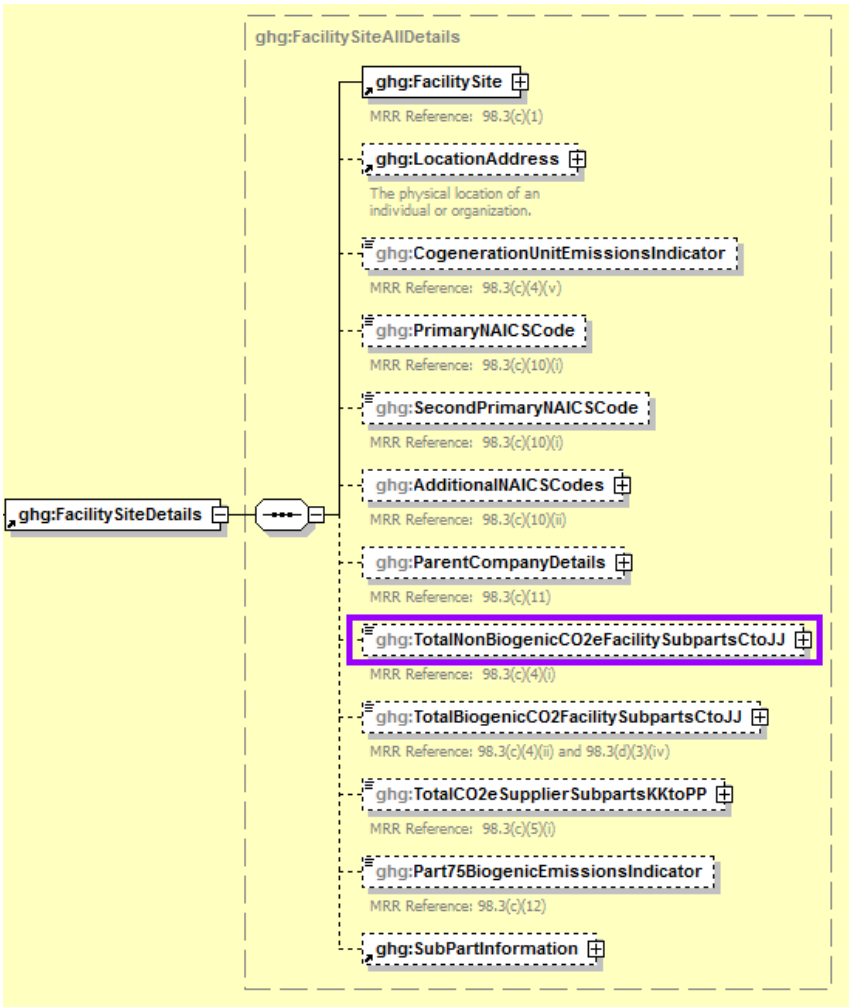
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

9.0 Facility-Level Roll-up Emissions

This section provides a description of how to roll up Subpart HH emissions totals into the facility's total CO_2e emissions, reported under Subpart A.

- Each facility must report the following facility-level emission totals :
  - Total CO_2 equivalent (CO_2e) emissions (excluding biogenic CO_2) aggregated across all direct emitter source categories (Subparts C-HH) associated with the facility.
  - Total biogenic CO_2 emissions aggregated across all direct emitter source categories (Subparts C-HH) associated with the facility.
- Each supplier, if applicable, must report the following supplier totals:
  - Total CO_2e associated with products supplied aggregated across Subparts NN, OO and PP (as applicable). **Note:** Do not include Subpart LL totals as these values are not collected in e-GGRT.

Figure 29
Facility-Level Roll-up Emissions Schema Diagram



Note: Subpart HH emissions totals roll up into the data element boxed in purple (Subpart A).

Add the total CO_2e value for Subpart HH in metric tons to the total CO_2e emissions (excluding biogenic CO_2) aggregated across all source category Subparts associated with the facility according to the following guidelines:

- For landfills without landfill gas collection systems, multiply the annual CH_4 emissions in metric tons (calculated from Equation HH-5) by the Global Warming Potential for methane in Table A-1 of the rule to arrive at the total CO_2e value.

- For landfills with landfill gas collection, multiply the emissions equation result that you deem is more accurate based on site-specific conditions at your landfill by the Global Warming Potential for methane in Table A-1 of the rule to arrive at the total CO_2e value. You must choose one of the following:

  - CH_4 emissions from the landfill in the reporting year in metric tons (calculated from Equation HH-6).
  - CH_4 emissions from the landfill in the reporting year in metric tons (calculated from Equation HH-8).

Note: You must follow the rounding rules found in Table 1.

Table 22
Facility Level Roll-up Emissions Data Element Definitions

Data Element Name	Description
TotalNonBiogenicCO2eFacilitySubpartsCtoJJ	Add the total CO_2e value for Subpart HH in metric tons to the total CO_2e emissions (excluding biogenic CO_2) aggregated across all source category Subparts associated with the facility according to the guidelines above. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 18
Example for Facility Level Roll-up Emissions

```
<ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric Tons">84000.7</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

IV. Appendix A – Sample XML Document for Subpart HH

(Note: The following example demonstrates CoverTypeDetails consistent with requirements for RY2016 and later . Data values do not reflect an actual facility's emissions.)

```
<ghg:SubPartHH>
  <ghg:GHGasInfoDetails>
    <ghg:GHGasName>Methane</ghg:GHGasName>
    <ghg:GHGasQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>550</ghg:CalculatedValue>
    </ghg:GHGasQuantity>
  </ghg:GHGasInfoDetails>
  <ghg:IsLandFillOpenIndicator>Y</ghg:IsLandFillOpenIndicator>
  <ghg:EstimatedYearLandFillClosure>2030</ghg:EstimatedYearLandFillClosure>
  <ghg:StartingYearforAcceptingWaste>2006</ghg:StartingYearforAcceptingWaste>
  <ghg:FirstYearOfEmissionsReporting>2011</ghg:FirstYearOfEmissionsReporting>
  <ghg:LeachateRecirculationFrequency>Not used for the past 10 years</ghg:LeachateRecirculationFrequency>
  <ghg:IsLeachateRecirculationIndicator>N</ghg:IsLeachateRecirculationIndicator>
  <ghg:IsScalesIndicator>Y</ghg:IsScalesIndicator>
  <ghg:IsLandfillGasCollectionSystemIndicator>Y</ghg:IsLandfillGasCollectionSystemIndicator>
  <ghg:IsPassiveVentFlareIndicator>Y</ghg:IsPassiveVentFlareIndicator>
  <ghg:LandfillCapacity massUOM="Metric Tons">
    <ghg:MeasureValue>5000</ghg:MeasureValue>
  </ghg:LandfillCapacity>
  <ghg:LandfillSurfaceAreaContainingWaste areaUOM="Square Meters">
    <ghg:MeasureValue>900</ghg:MeasureValue>
  </ghg:LandfillSurfaceAreaContainingWaste>
  <ghg:CoverTypeDetails>
    <ghg:CoverTypeName>Organic cover</ghg:CoverTypeName>
  </ghg:CoverTypeDetails>
  <ghg:CoverTypeDetails>
    <ghg:CoverTypeName>Sand cover</ghg:CoverTypeName>
  </ghg:CoverTypeDetails>
  <ghg:CoverTypeDetails>
    <ghg:CoverTypeName>Clay cover</ghg:CoverTypeName>
  </ghg:CoverTypeDetails>
```

```
<ghg:WasteQuantityFromFirstYearToCurrentYearDetails>
  <ghg:AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
    <ghg:ReportingYear>2013</ghg:ReportingYear>
    <ghg:TotalAnnualWasteDisposalQuantity>4261</ghg:TotalAnnualWasteDisposalQuantity>
    <ghg:AnnualWasteDisposalQuantityAndMethodDetails>
      <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
      <ghg:AnnualWasteDisposalQuantity>3150</ghg:AnnualWasteDisposalQuantity>
    </ghg:AnnualWasteDisposalQuantityAndMethodDetails>
    <ghg:AnnualWasteDisposalQuantityAndMethodDetails>
      <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
      <ghg:AnnualWasteDisposalQuantity>1111</ghg:AnnualWasteDisposalQuantity>
    </ghg:AnnualWasteDisposalQuantityAndMethodDetails>
  </ghg:AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
  <ghg:AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
    <ghg:ReportingYear>2012</ghg:ReportingYear>
    <ghg:TotalAnnualWasteDisposalQuantity>3453</ghg:TotalAnnualWasteDisposalQuantity>
    <ghg:AnnualWasteDisposalQuantityAndMethodDetails>
      <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
      <ghg:AnnualWasteDisposalQuantity>2342</ghg:AnnualWasteDisposalQuantity>
    </ghg:AnnualWasteDisposalQuantityAndMethodDetails>
    <ghg:AnnualWasteDisposalQuantityAndMethodDetails>
      <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
      <ghg:AnnualWasteDisposalQuantity>1111</ghg:AnnualWasteDisposalQuantity>
    </ghg:AnnualWasteDisposalQuantityAndMethodDetails>
  </ghg:AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
  <ghg:AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
    <ghg:ReportingYear>2011</ghg:ReportingYear>
    <ghg:TotalAnnualWasteDisposalQuantity>14444</ghg:TotalAnnualWasteDisposalQuantity>
    <ghg:AnnualWasteDisposalQuantityAndMethodDetails>
      <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
      <ghg:AnnualWasteDisposalQuantity>11111</ghg:AnnualWasteDisposalQuantity>
    </ghg:AnnualWasteDisposalQuantityAndMethodDetails>
    <ghg:AnnualWasteDisposalQuantityAndMethodDetails>
      <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
      <ghg:AnnualWasteDisposalQuantity>3333</ghg:AnnualWasteDisposalQuantity>
```

```
    </ghg:AnnualWasteDisposalQuantityAndMethodDetails>
  </ghg:AnnualWasteQuantityMethodFromFirstYearToCurrentYear>
  <ghg:YearWasteDetails>
    <ghg:YearWasteDetail>
      <ghg:YearWasteDisposed>2013</ghg:YearWasteDisposed>
      <ghg:AnnualWasteQuantity>
        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
        <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
      </ghg:AnnualWasteQuantity>
      <ghg:WasteTypeDetails>
        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
        <ghg:PercentByWeight>1.0</ghg:PercentByWeight>
        <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
        <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
        <ghg:DecayRate>0.038</ghg:DecayRate>
      </ghg:WasteTypeDetails>
    </ghg:YearWasteDetail>
  </ghg:YearWasteDetails>
  <ghg:YearWasteDetails>
    <ghg:YearWasteDetail>
      <ghg:YearWasteDisposed>2012</ghg:YearWasteDisposed>
      <ghg:AnnualWasteQuantity>
        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
        <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
      </ghg:AnnualWasteQuantity>
      <ghg:WasteTypeDetails>
        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
        <ghg:PercentByWeight>1</ghg:PercentByWeight>
        <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
        <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
        <ghg:DecayRate>0.038</ghg:DecayRate>
      </ghg:WasteTypeDetails>
    </ghg:YearWasteDetail>
  </ghg:YearWasteDetails>
  <ghg:YearWasteDetails>
    <ghg:YearWasteDetail>
      <ghg:YearWasteDisposed>2011</ghg:YearWasteDisposed>
      <ghg:AnnualWasteQuantity>
```

```
            <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
            <ghg:NumberofTimesSubstituted>1</ghg:NumberofTimesSubstituted>
          </ghg:AnnualWasteQuantity>
          <ghg:WasteTypeDetails>
            <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
            <ghg:PercentByWeight>1</ghg:PercentByWeight>
            <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
            <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
            <ghg:DecayRate>0.038</ghg:DecayRate>
          </ghg:WasteTypeDetails>
        </ghg:YearWasteDetail>
      </ghg:YearWasteDetails>
    </ghg:WasteQuantityFromFirstYearToCurrentYearDetails>
    <ghg:PriorWasteQuantityDetails>
      <ghg:PriorYearAnnualWasteQuantityMethod>
        <ghg:ReportingYear>2010</ghg:ReportingYear>
        <ghg:TotalAnnualWasteDisposalQuantity>233</ghg:TotalAnnualWasteDisposalQuantity>
        <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
          <ghg:AnnualWasteDisposalQuantity>233</ghg:AnnualWasteDisposalQuantity>
        </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
        <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
        </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
      </ghg:PriorYearAnnualWasteQuantityMethod>
      <ghg:PriorYearAnnualWasteQuantityMethod>
        <ghg:ReportingYear>2009</ghg:ReportingYear>
        <ghg:TotalAnnualWasteDisposalQuantity>503</ghg:TotalAnnualWasteDisposalQuantity>
        <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
          <ghg:AnnualWasteDisposalQuantity>50</ghg:AnnualWasteDisposalQuantity>
        </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
        <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
          <ghg:AnnualWasteDisposalQuantity>453</ghg:AnnualWasteDisposalQuantity>
        </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
```

```
        </ghg:PriorYearAnnualWasteQuantityMethod>
        <ghg:PriorYearAnnualWasteQuantityMethod>
          <ghg:ReportingYear>2008</ghg:ReportingYear>
          <ghg:TotalAnnualWasteDisposalQuantity>222</ghg:TotalAnnualWasteDisposalQuantity>
          <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
            <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
          </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
            <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
            <ghg:AnnualWasteDisposalQuantity>222</ghg:AnnualWasteDisposalQuantity>
          </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
        </ghg:PriorYearAnnualWasteQuantityMethod>
        <ghg:PriorYearAnnualWasteQuantityMethod>
          <ghg:ReportingYear>2007</ghg:ReportingYear>
          <ghg:TotalAnnualWasteDisposalQuantity>123</ghg:TotalAnnualWasteDisposalQuantity>
          <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
            <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
          </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
            <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
            </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
            <ghg:MethodUsedToDetermineQuantity>other</ghg:MethodUsedToDetermineQuantity>
            <ghg:AnnualWasteDisposalQuantity>123</ghg:AnnualWasteDisposalQuantity>
          </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
        </ghg:PriorYearAnnualWasteQuantityMethod>
        <ghg:PriorYearAnnualWasteQuantityMethod>
          <ghg:ReportingYear>2006</ghg:ReportingYear>
          <ghg:TotalAnnualWasteDisposalQuantity>45</ghg:TotalAnnualWasteDisposalQuantity>
          <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
            <ghg:MethodUsedToDetermineQuantity>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</ghg:MethodUsedToDetermineQuantity>
          </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
          <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
            <ghg:MethodUsedToDetermineQuantity>Used working capacity for each vehicle/container</ghg:MethodUsedToDetermineQuantity>
          </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
```

```
    <ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
      <ghg:MethodUsedToDetermineQuantity>other</ghg:MethodUsedToDetermineQuantity>
      <ghg:AnnualWasteDisposalQuantity>45</ghg:AnnualWasteDisposalQuantity>
    </ghg:PriorYearAnnualWasteDisposalQuantityAndMethodDetails>
  </ghg:PriorYearAnnualWasteQuantityMethod>
  <ghg:PriorScalesWasteQuantityMethod>Y</ghg:PriorScalesWasteQuantityMethod>
  <ghg:PriorYearWasteDetails>
    <ghg:YearWasteDetail>
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      <ghg:AnnualWasteQuantity>
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      </ghg:AnnualWasteQuantity>
      <ghg:WasteTypeDetails>
        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
        <ghg:PercentByWeight>1</ghg:PercentByWeight>
        <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
        <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
        <ghg:DecayRate>0.038</ghg:DecayRate>
      </ghg:WasteTypeDetails>
    </ghg:YearWasteDetail>
  </ghg:PriorYearWasteDetails>
  <ghg:PriorYearWasteDetails>
    <ghg:YearWasteDetail>
      <ghg:YearWasteDisposed>2009</ghg:YearWasteDisposed>
      <ghg:AnnualWasteQuantity>
        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
        <ghg:NumberofTimesSubstituted>2</ghg:NumberofTimesSubstituted>
      </ghg:AnnualWasteQuantity>
      <ghg:WasteTypeDetails>
        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
        <ghg:PercentByWeight>1</ghg:PercentByWeight>
        <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
        <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
        <ghg:DecayRate>0.038</ghg:DecayRate>
      </ghg:WasteTypeDetails>
    </ghg:YearWasteDetail>
  </ghg:PriorYearWasteDetails>
```

```
<ghg:PriorYearWasteDetails>
  <ghg:YearWasteDetail>
    <ghg:YearWasteDisposed>2008</ghg:YearWasteDisposed>
    <ghg:AnnualWasteQuantity>
      <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
      <ghg:NumberofTimesSubstituted>1</ghg:NumberofTimesSubstituted>
    </ghg:AnnualWasteQuantity>
    <ghg:WasteTypeDetails>
      <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
      <ghg:PercentByWeight>1</ghg:PercentByWeight>
      <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
      <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
      <ghg:DecayRate>0.038</ghg:DecayRate>
    </ghg:WasteTypeDetails>
  </ghg:YearWasteDetail>
</ghg:PriorYearWasteDetails>
<ghg:PriorYearWasteDetails>
  <ghg:YearWasteDetail>
    <ghg:YearWasteDisposed>2007</ghg:YearWasteDisposed>
    <ghg:AnnualWasteQuantity>
      <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
      <ghg:NumberofTimesSubstituted>30</ghg:NumberofTimesSubstituted>
    </ghg:AnnualWasteQuantity>
    <ghg:WasteTypeDetails>
      <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
      <ghg:PercentByWeight>1</ghg:PercentByWeight>
      <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
      <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
      <ghg:DecayRate>0.038</ghg:DecayRate>
    </ghg:WasteTypeDetails>
  </ghg:YearWasteDetail>
</ghg:PriorYearWasteDetails>
<ghg:PriorYearWasteDetails>
  <ghg:YearWasteDetail>
    <ghg:YearWasteDisposed>2006</ghg:YearWasteDisposed>
    <ghg:AnnualWasteQuantity>
      <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
      <ghg:NumberofTimesSubstituted>2</ghg:NumberofTimesSubstituted>
```

```
            </ghg:AnnualWasteQuantity>
            <ghg:WasteTypeDetails>
              <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
              <ghg:PercentByWeight>1</ghg:PercentByWeight>
              <ghg:DegradableOrganicCarbonValue>0.02</ghg:DegradableOrganicCarbonValue>
              <ghg:FractionOfDOCDissimilated>0.5</ghg:FractionOfDOCDissimilated>
              <ghg:DecayRate>0.038</ghg:DecayRate>
            </ghg:WasteTypeDetails>
          </ghg:YearWasteDetail>
        </ghg:PriorYearWasteDetails>
        <ghg:WorkingCapacityDetails>
          <ghg:IsWorkingCapacityUsedToDetermineQuantitiesIndicator>Y</ghg:IsWorkingCapacityUsedToDetermineQuantitiesIndicator>
          <ghg:WorkingCapacityPeriodStart>2008</ghg:WorkingCapacityPeriodStart>
          <ghg:WorkingCapacityPeriodEnd>2009</ghg:WorkingCapacityPeriodEnd>
        </ghg:WorkingCapacityDetails>
        <ghg:TippingReceiptsDetails>
          <ghg:IsTippingReceiptsUsedToDetermineQuantitiesIndicator>N</ghg:IsTippingReceiptsUsedToDetermineQuantitiesIndicator>
        </ghg:TippingReceiptsDetails>
        <ghg:HistoricalWasteQuantityDetails>
          <ghg:HistoricalWasteQuantityMethod>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).</ghg:HistoricalWasteQuantityMethod>
          <ghg:HistoricalMethodStartYear>2006</ghg:HistoricalMethodStartYear>
          <ghg:HistoricalMethodEndYear>2007</ghg:HistoricalMethodEndYear>
          <ghg:HistoricalEstimationPopulationServedDetails>
            <ghg:ReportingYear>2007</ghg:ReportingYear>
            <ghg:EstimatedPopulationServedByLandfill>240432</ghg:EstimatedPopulationServedByLandfill>
          </ghg:HistoricalEstimationPopulationServedDetails>
          <ghg:HistoricalEstimationPopulationServedDetails>
            <ghg:ReportingYear>2006</ghg:ReportingYear>
            <ghg:EstimatedPopulationServedByLandfill>235890</ghg:EstimatedPopulationServedByLandfill>
          </ghg:HistoricalEstimationPopulationServedDetails>
          <ghg:HistoricalMethodReason>test reason for method</ghg:HistoricalMethodReason>
        </ghg:HistoricalWasteQuantityDetails>
      </ghg:PriorWasteQuantityDetails>
      <ghg:GasCollectionSystemDetails>
        <ghg:AnnualVolumeFGCollectedGasVolumetricFlow volUOM="scf">
          <ghg:MeasureValue>300</ghg:MeasureValue>
```

```
<ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
<ghg:NumberofTimesSubstituted>30</ghg:NumberofTimesSubstituted>
</ghg:AnnualVolumeFGCollectedGasVolumetricFlow>
  <ghg:AnnualAverageMethodDetails>
    <ghg:AnnualAverageMethaneConcentration percentUOM="Number (between 0 and 100)">
      <ghg:MeasureValue>36</ghg:MeasureValue>
      <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
    </ghg:AnnualAverageMethaneConcentration>
    <ghg:NumberofMonthsSubstituted>5</ghg:NumberofMonthsSubstituted>
  </ghg:AnnualAverageMethodDetails>
  <ghg:IsTemperatureIncorporatedIndicator>Y</ghg:IsTemperatureIncorporatedIndicator>
  <ghg:IsPressureIncorporatedIndicator>Y</ghg:IsPressureIncorporatedIndicator>
  <ghg:IsLFGFlowWetBasisIndicator>N</ghg:IsLFGFlowWetBasisIndicator>
  <ghg:IsMethaneConcentrationWetBasisIndicator>N</ghg:IsMethaneConcentrationWetBasisIndicator>
  <ghg:SiteDestructionLocation>On-site</ghg:SiteDestructionLocation>
  <ghg:AnnualQuantityOfRecoveredMethaneHH4 massUOM="Metric Tons">
    <ghg:MeasureValue>528.00</ghg:MeasureValue>
  </ghg:AnnualQuantityOfRecoveredMethaneHH4>
  <ghg:WasteDepthDetails>
    <ghg:WasteDepthDetail>
      <ghg:AreaType>A1</ghg:AreaType>
      <ghg:WasteDepth heightUOM="Meters">
      <ghg:MeasureValue>10</ghg:MeasureValue>
      </ghg:WasteDepth>
      <ghg:SurfaceArea areaUOM="Square Meters">
      <ghg:MeasureValue>100</ghg:MeasureValue>
      </ghg:SurfaceArea>
    </ghg:WasteDepthDetail>
    <ghg:WasteDepthDetail>
      <ghg:AreaType>A2</ghg:AreaType>
      <ghg:WasteDepth heightUOM="Meters">
      <ghg:MeasureValue>11</ghg:MeasureValue>
      </ghg:WasteDepth>
      <ghg:SurfaceArea areaUOM="Square Meters">
      <ghg:MeasureValue>150</ghg:MeasureValue>
      </ghg:SurfaceArea>
    </ghg:WasteDepthDetail>
    <ghg:WasteDepthDetail>
```

```
      <ghg:AreaType>A3</ghg:AreaType>
      <ghg:WasteDepth heightUOM="Meters">
      <ghg:MeasureValue>8</ghg:MeasureValue>
      </ghg:WasteDepth>
      <ghg:SurfaceArea areaUOM="Square Meters">
      <ghg:MeasureValue>85</ghg:MeasureValue>
      </ghg:SurfaceArea>
    </ghg:WasteDepthDetail>
    <ghg:WasteDepthDetail>
      <ghg:AreaType>A4</ghg:AreaType>
      <ghg:WasteDepth heightUOM="Meters">
      <ghg:MeasureValue>15</ghg:MeasureValue>
      </ghg:WasteDepth>
      <ghg:SurfaceArea areaUOM="Square Meters">
      <ghg:MeasureValue>188</ghg:MeasureValue>
      </ghg:SurfaceArea>
    </ghg:WasteDepthDetail>
    <ghg:WasteDepthDetail>
      <ghg:AreaType>A5</ghg:AreaType>
      <ghg:WasteDepth heightUOM="Meters">
      <ghg:MeasureValue>17</ghg:MeasureValue>
      </ghg:WasteDepth>
      <ghg:SurfaceArea areaUOM="Square Meters">
      <ghg:MeasureValue>145</ghg:MeasureValue>
      </ghg:SurfaceArea>
    </ghg:WasteDepthDetail>
  </ghg:WasteDepthDetails>
  <ghg:SystemManufacturer>stegura industries</ghg:SystemManufacturer>
  <ghg:SystemCapacity flowUOM="acfm">
    <ghg:MeasureValue>2000</ghg:MeasureValue>
  </ghg:SystemCapacity>
  <ghg:NumberofWells>4</ghg:NumberofWells>
  <ghg:EstimatedGasCollectionEfficiency fractionUOM="decimal fraction">
    <ghg:CalculatedValue>0.60</ghg:CalculatedValue>
    <ghg:OverrideIndicator>N</ghg:OverrideIndicator>
  </ghg:EstimatedGasCollectionEfficiency>
  <ghg:MethaneOxidationFractions>
    <ghg:MethaneOxidationFractionHH5 fractionUOM="fraction (number between 0 and 1)">0.10</ghg:MethaneOxidationFractionHH5>
```

```
  <ghg:MethaneOxidationFractionHH6 fractionUOM="fraction (number between 0 and 1)">0.10</ghg:MethaneOxidationFractionHH6>
  <ghg:MethaneOxidationFractionHH7 fractionUOM="fraction (number between 0 and 1)">0.10</ghg:MethaneOxidationFractionHH7>
  <ghg:MethaneOxidationFractionHH8 fractionUOM="fraction (number between 0 and 1)">0.10</ghg:MethaneOxidationFractionHH8>
</ghg:MethaneOxidationFractions>
<ghg:MeasurementLocations>
<ghg:MeasurementLocation>
  <ghg:Name> ML NW #1</ghg:Name>
  <ghg:Description> measurement location in northwest corner </ghg:Description>
  <ghg:AnnualOperatingHours timeUOM="Hours">
    <ghg:MeasureValue>320</ghg:MeasureValue>
  </ghg:AnnualOperatingHours>
  <ghg:AnnualQuantityOfRecoveredMethaneHH4 massUOM="Metric Tons">
    <ghg:MeasureValue>200</ghg:MeasureValue>
  </ghg:AnnualQuantityOfRecoveredMethaneHH4>
      <ghg:DestructionDevice>
        <ghg:Name>NW Destruction Device1</Name>
        <ghg:AnnualOperatingHours timeUOM="Hours">
        <ghg:MeasureValue>100</MeasureValue>
        </ghg:AnnualOperatingHours>
        <ghg:DestructionEfficiency fractionUOM="fraction (number between 0 and 1)">0.92</DestructionEfficiency>
    </ghg:DestructionDevice>
    <ghg:DestructionDevice>
      <ghg:Name>NW Destruction Device2</Name>
      <ghg:AnnualOperatingHours timeUOM="Hours">
      <ghg:MeasureValue>243</MeasureValue>
      </ghg:AnnualOperatingHours>
      <ghg:DestructionEfficiency fractionUOM="fraction (number between 0 and 1)">0.89</DestructionEfficiency>
      </ghg:DestructionDevice>
  </ghg:MeasurementLocation>
  <ghg:MeasurementLocation>
    <ghg:Name>ML SW#1</Name>
    <ghg:Description>measurement location on the southwest side of the landfill</Description>
    <ghg:AnnualOperatingHours timeUOM="Hours">
    <ghg:MeasureValue>2450</MeasureValue>
    </ghg:AnnualOperatingHours>
    <ghg:AnnualQuantityOfRecoveredMethaneHH4 massUOM="Metric Tons">
    <ghg:MeasureValue>328</MeasureValue>
    </ghg:AnnualQuantityOfRecoveredMethaneHH4>
```

```
            <ghg:DestructionDevice>
               <ghg:Name>SW Destruction Device1</Name>
               <ghg:AnnualOperatingHours timeUOM="Hours">
               <ghg:MeasureValue>539</MeasureValue>
               </ghg:AnnualOperatingHours>
               <ghg:DestructionEfficiency fractionUOM="fraction (number between 0 and 1)">0.93</DestructionEfficiency>
            </ghg:DestructionDevice>
            <ghg:DestructionDevice>
               <ghg:Name>SW Destruction Device2</Name>
               <ghg:AnnualOperatingHours timeUOM="Hours">
               <ghg:MeasureValue>340</MeasureValue>
               </ghg:AnnualOperatingHours>
               <ghg:DestructionEfficiency fractionUOM="fraction (number between 0 and 1)">0.89</DestructionEfficiency>
            </ghg:DestructionDevice>
         </ghg:MeasurementLocation>
      </ghg:MeasurementLocations>
      <ghg:MethaneGenerationEquationHH5 massUOM="Metric Tons">
         <ghg:CalculatedValue>43.99</ghg:CalculatedValue>
         <ghg:OverrideIndicator>N</ghg:OverrideIndicator>
      </ghg:MethaneGenerationEquationHH5>
      <ghg:MethaneGenerationEquationHH7 massUOM="Metric Tons">
         <ghg:CalculatedValue>250.00</ghg:CalculatedValue>
         <ghg:OverrideIndicator>N</ghg:OverrideIndicator>
      </ghg:MethaneGenerationEquationHH7>
      <ghg:BasisforInputMethaneGenerationValue>Equation HH-4</ghg:BasisforInputMethaneGenerationValue>
      <ghg:MethaneEmissionsEquationHH6 massUOM="Metric Tons">
         <ghg:CalculatedValue>133.00</ghg:CalculatedValue>
         <ghg:OverrideIndicator>N</ghg:OverrideIndicator>
      </ghg:MethaneEmissionsEquationHH6>
      <ghg:MethaneEmissionfromEquationHH8 massUOM="Metric Tons">
         <ghg:CalculatedValue>550.00</ghg:CalculatedValue>
         <ghg:OverrideIndicator>N</ghg:OverrideIndicator>
      </ghg:MethaneEmissionfromEquationHH8>
   </ghg:GasCollectionSystemDetails>
   <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
   <ghg:MethaneFractionDeterminationAnnualValue>0.5</ghg:MethaneFractionDeterminationAnnualValue>
   <ghg:IsMCFValueDefaultIndicator>N</ghg:IsMCFValueDefaultIndicator>
   <ghg:AnnualMCFValue>1.0</ghg:AnnualMCFValue>
```

```
    <ghg:AnnualModeledCH4Generation massUOM="Metric Tons">
      <ghg:CalculatedValue>48.88</ghg:CalculatedValue>
      <ghg:OverrideIndicator>N</ghg:OverrideIndicator>
    </ghg:AnnualModeledCH4Generation>
  </ghg:SubPartHH>
```