Greenhouse Gas Reporting Program

XML Reporting Instructions for Subpart HH - Landfills

United States Environmental Protection Agency
Climate Change Division
Washington, DC

March 21, 2012

These instructions explain how to report the required data for the applicable regulations. Owners and operators of units should refer to the applicable regulations for information about what data are required to be reported.

EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. (See http://www.epa.gov/climatechange/emissions/notices.html for a pre-publication version of the rule). In accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations.

[This page intentionally left blank]

Table of Contents

Page

List of Tables

Page

List of Figures

List of XML Excerpts

Page

I. Introduction

The U.S. Environmental Protection Agency's (EPA's) electronic greenhouse gas reporting tool (e-GGRT) extensible markup language (XML) Reporting Schema contains all of the data elements needed to comply with the Greenhouse Gas Reporting Program (GHGRP) beginning with the 2010 data collection year. The XML schema defines expected data elements and attributes, allowable data formats for each data element, and the hierarchical structure and sequence in which data elements must appear in the XML file. Similar to an architectural blueprint that describes the structural design of a house, an XML schema describes the structural design of an XML file. In some cases, it also defines which elements are optional and which are required and the maximum number of occurrences allowed for each element.

The e-GGRT XML schema is made up of a root data element (GHG) and complex and simple data elements. A simple element is a single piece of data. A complex element is a group of simple elements which are logically grouped together. The root data element is the base of the XML schema.

The data elements are related to each other in parent-child relationships. The root data element is the parent of the entire schema. Complex data elements are children of the root element, and complex elements can also be children of other complex elements. If a complex element is dependent on a parent complex element, the child complex element cannot be included in the XML file unless the appropriate parent complex element is also included.

The XML upload method may be used for reporting a facility or supplier's annual greenhouse gas (GHG) data; however, the following actions can only be performed using 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

All XML files submitted to e-GGRT must be well formed and will be accepted only if they conform to the current version of the e-GGRT XML schema.

An XML submission must only contain GHG data for a single facility or supplier. All data for a facility or supplier must be submitted in a single file as a complete report and must include all of the relevant Subparts. It is not possible to submit a subset of any portion of a facility's data to add, delete, correct or update. The entire report must be resubmitted to make any modification at all. Each subsequent submission for the same facility replaces all of the previously submitted data.

The e-GGRT XML 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 e-GGRT XML Reporting Schema is available for download at the e-GGRT help website: http://www.ccdsupport.com/confluence/display/help/XML+Reporting+Instructions. The zip file contains:

- **GHG_Final.xsd and Included Files**
- **SchemaChanges.xlsx**

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 must be reported as a percentage, then the number should be within the range of 0 to 100 (percent), e.g. 85.5% should be 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

- **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

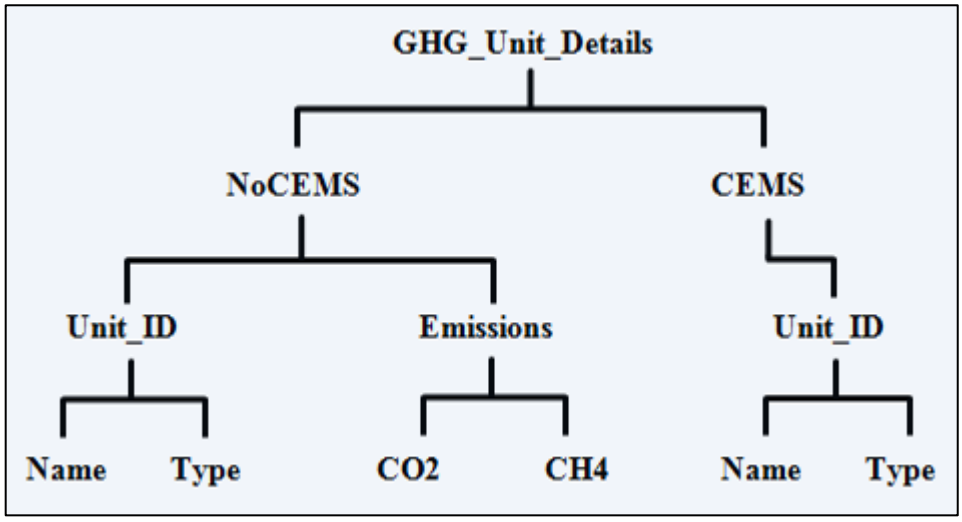
number: <FacilitySiteIdentifier>23222</FacilitySiteIdentifier>. The information shaded in blue represents the data element's value.

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 can be thought of as 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, e.g., parent-child relationships, within the schema's tree structure, also known are hierarchy. 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:

- **Non-applicable data elements should not be included in the 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 a data element is not referenced in the instructions (definition tables), then **do not** report or include it in the facility's XML file.

- **Data elements must be reported in a specific order.** The figures and tables in this document depict the specific sequence in which data elements must be arranged in the facility's XML file in order 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. Values for enumerations must be entered exactly as they are defined within the schema (including punctuation marks) in order to be accepted by schema validation. 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.

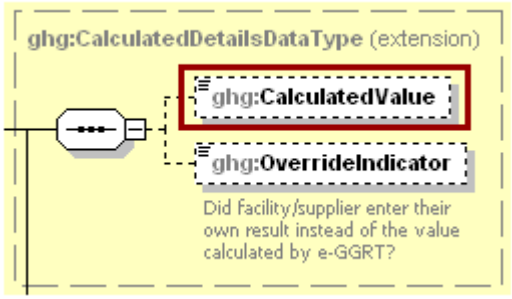
- **Commonly used data types are not depicted in the schema diagrams nor listed separately in the definition tables.** The schema diagrams display almost every data element in the schema except those that are associated with the three most commonly occurring data types:

    - Calculated Details
    - Measurement Details
    - Unit Identification Details

  Once defined, these data types (static collection of data elements) are then 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 tables in the description of their parent data element. See Figures 2-4 and Tables 2-4.

- **Some data elements are conditionally required.** Data elements which are conditionally required 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 report it in the 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. If a parent element is not required, then **do not** include any of its child data elements in the facility's XML file.

Figure 2
Calculated Details Data Type Schema Diagram

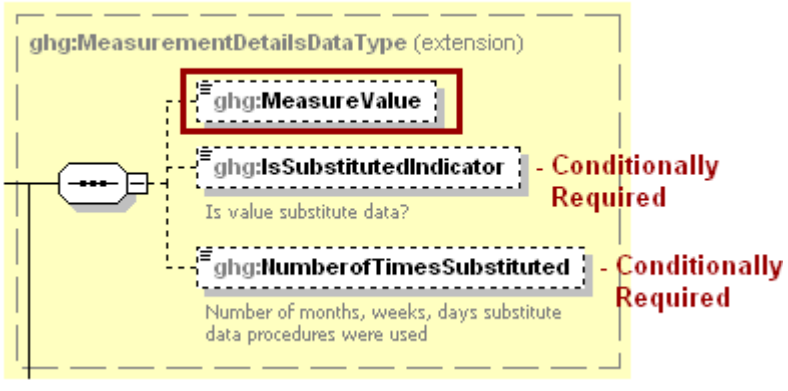


Note: Data elements boxed in red are required.

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

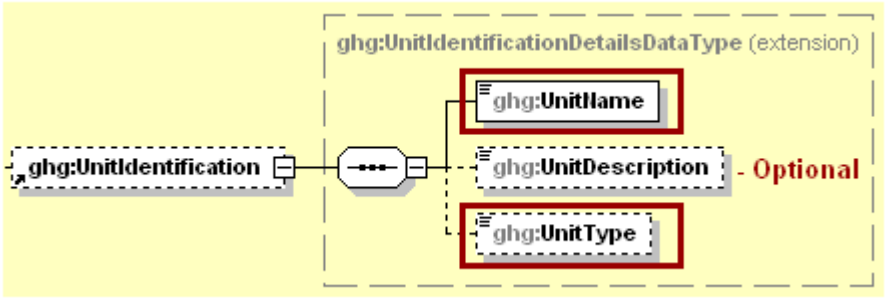


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Table 3
Measurement Details Data Element Definitions

Data Element Name	Description
MeasurementDetailsDataType	
MeasureValue	Measured value (decimal).
IsSubstitutedIndicator	An indication (Y/N) that the measure 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



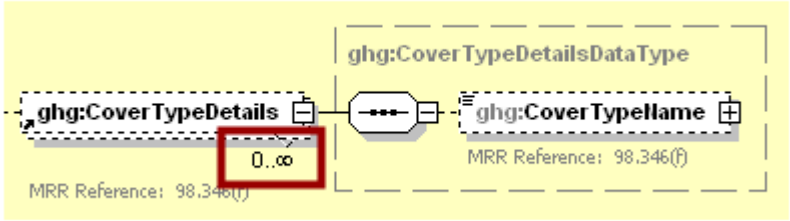
Note: Data elements boxed in red are required.

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

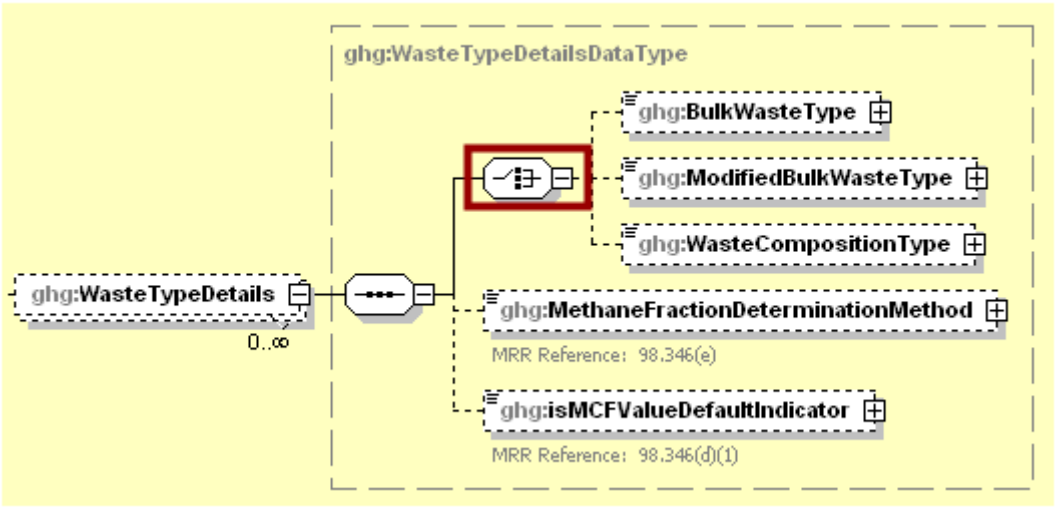


XML Excerpt 1
Example for "Unbounded" Parent Element

```
<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

The following modifications were applied to the previous version of the GHG XML schema in relation to Subpart HH (GHG_SubPartHH_v2.0.xsd) for reporting year 2011.

Table 5
Summary of Changes to the Schema for Subpart HH

No.	Change Description
	Subpart HH Root
1	Corrected typo. Renamed data element "**LeachRateRecirculationFrequency**" to "**LeachateRecirculationFrequency**". (XPath = LeachateRecirculationFrequency)
2	Corrected typo. Renamed data element "**LeachRateRecirculationIndicator**" to "**LeachateRecirculationIndicator**". (XPath = LeachateRecirculationIndicator)
3	Corrected typo. Renamed data element "**LandFilledGasCollectionSystemIndicator**" to "**LandfillGasCollectionSystemIndicator**". (XPath = LandfillGasCollectionSystemIndicator)
4	Added enumerated values for data element "**CoverTypeName**". (XPath = CoverTypeDetails/CoverTypeName)
	Prior Waste Quantity Details Changes
5	Renamed data element "**PriorAnnualWasteQuantityMethod**" to "**PriorScalesWasteQuantityMethod**". (XPath = PriorWasteQuantityDetails/PriorScalesWasteQuantityMethod)

Document Changes:

3-9-2012 – Modified some of the emissions values within the XML excerpts to emphasize the rounding rules, see Table 1.

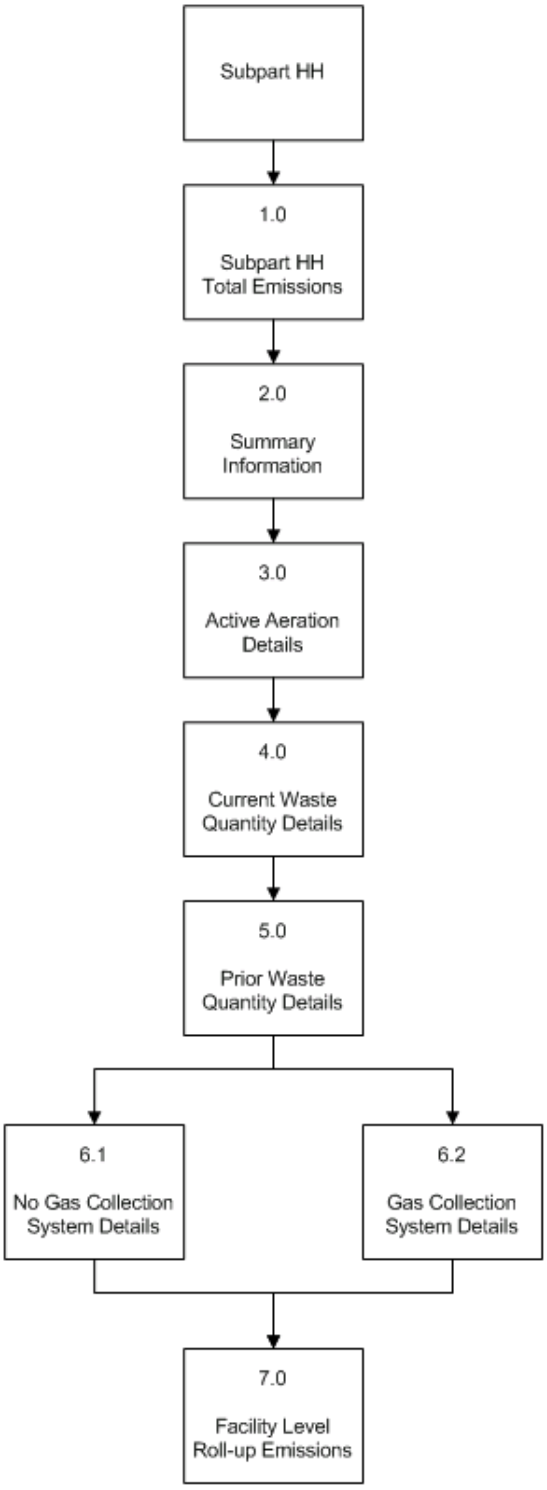
3-15-2012 – Added schema change for data element "LandfillGasCollectionSystemIndicator" (see Table 5). Added "ParentCompanyDetails" to sample XML document.

3-21-2012 – Added clarification to the instructions for landfills with landfill gas collections. For example, "…report the emissions equation result that you deem is more accurate based on site-specific conditions at your landfill."

III. Subpart HH Overview

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

Figure 7
Subpart HH Reporting Diagram



This source category applies to municipal solid waste (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 municipal solid waste (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 if the landfill was open during the reporting year and if so, the estimated year of landfill closure, if leachate recirculation is used during the reporting year and its typical frequency of use over the last 10 years, if scales are present at the landfill in the reporting year, if the landfill uses a gas collection system, if passive vents and/or passive flares are present at the landfill, the surface area of the landfill containing waste and the type of cover material.

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 Current Waste Quantity Details: includes information on the method used to determine the quantity of waste received at the landfill, type of waste and other details for the reporting year.

5.0 Prior Waste Quantity Details: includes information on the method(s) used to determine and/or estimate the quantity of waste received at the landfill, type of waste and other details for years prior to the reporting year.

6.0 Gas Collection Systems:

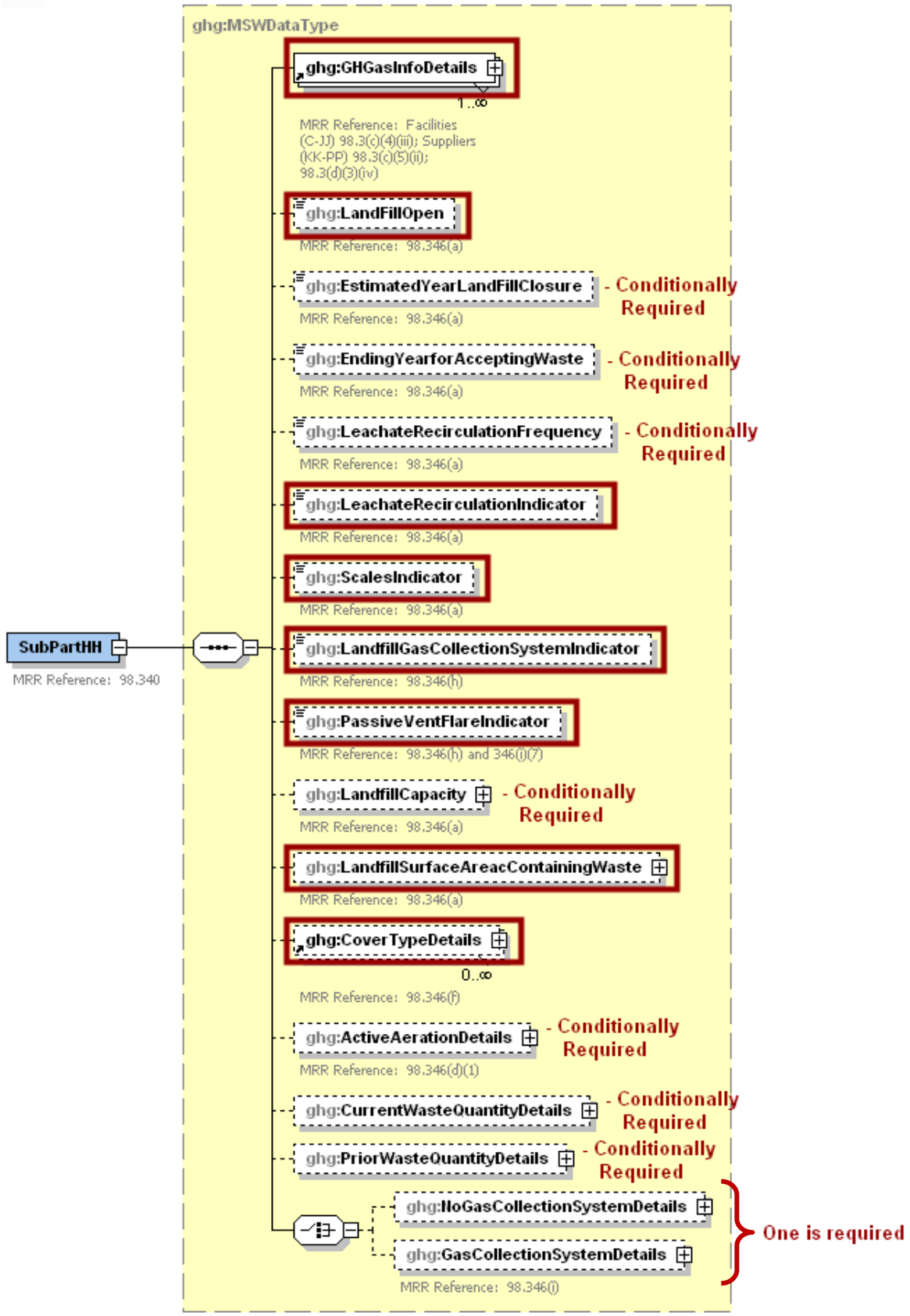
6.1 No Gas Collection System Details: includes annual methane emissions for landfills which do not have a gas collection system.

6.2 Gas Collection System Details: includes annual volume of landfill gas collected for destruction, the concentration of methane, temperature and pressure details, if destruction occurred on-site or off-site, depths of areas of the landfill, details about the gas collection system, modeled and measured methane generation and methane emissions.

7.0 Facility Level Roll-up Emissions: includes which emission value 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 the listed Subpart may not be relevant for all facilities/suppliers.

Figure 8
Subpart HH Schema Diagram

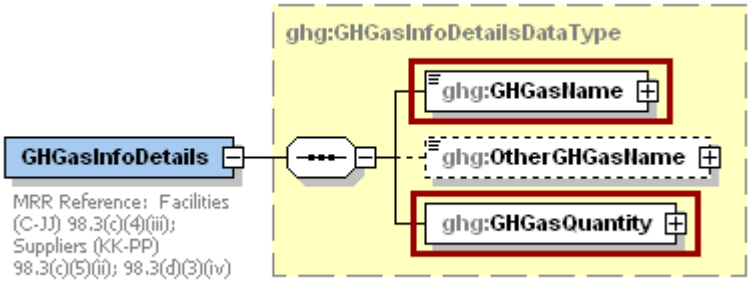


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

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 total emissions for methane (CH_4) only. 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**. .

XML Excerpt 2
Example for Greenhouse Gas Information Details

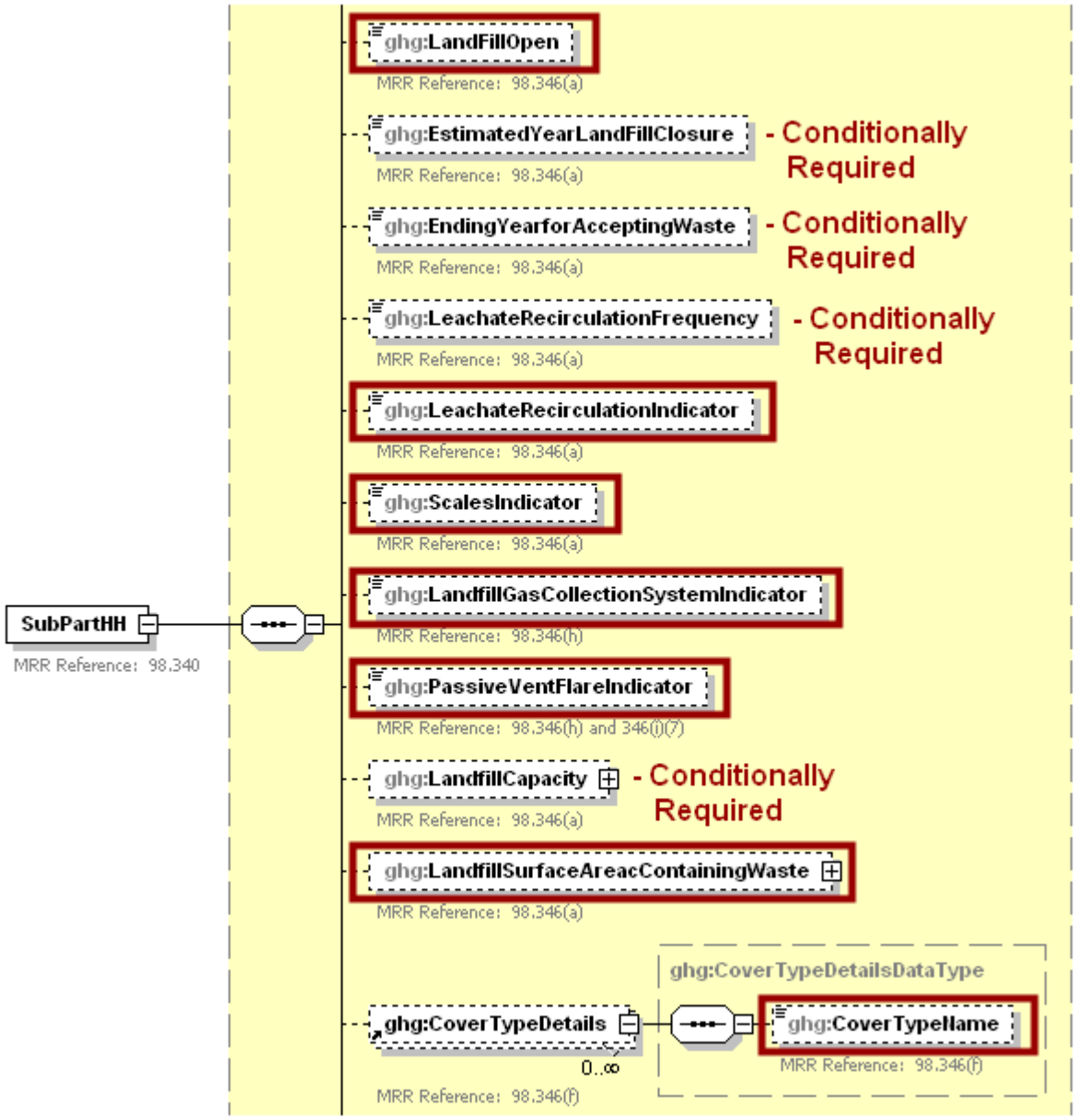
```
<ghg:SubPartHH>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Methane</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                  <ghg:CalculatedValue>4000.23</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>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

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 municipal solid waste 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 if the landfill was open in the reporting year. A landfill is considered open if it is actively receiving waste in the reporting year. A landfill that closed during the reporting year, but also received waste during the reporting year is considered 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)].
- **Conditionally Required:** If the landfill was closed during the reporting year and Method #3 (which corresponds to Equation HH-3) is not used for the data element "HistoricalWasteQuantityMethod" (see Figure 17 and Table 12), then report the last year the landfill accepted waste [98.346(a)].
- **Conditionally Required:** If leachate recirculation is used, then indicate the typical frequency with which it is 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
- Indicate if leachate recirculation is used at the landfill during the emissions reporting year [98.346(a)].
- Indicate if scales are present at the landfill for the current reporting year [98.346(a)].
- Indicate if the landfill uses 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 if 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)].
- **Conditionally Required:** If not using Method #3 (which corresponds to Equation HH-3) for the data element "HistoricalWasteQuantityMethod" (see Figure 17 and Table 12), then report the capacity of the landfill in metric tons [98.346(a)]. **Note:** The reporting of landfill capacity is deferred only if it is used as an input to Equation HH-3 (Method #3) regardless of whether the landfill is open or closed.
- Report the surface area of the landfill containing waste in square meters [98.346(f)].
- Identify each type of cover material in use at the landfill [98.346(f)]:
  - Organic
  - Clay
  - Sand
  - Other soil mixture

Table 7
Summary Information Data Element Definitions

Data Element Name	Description
LandFillOpen	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.

Data Element Name	Description
EndingYearforAcceptingWaste	**Conditionally Required:** If the landfill was closed during the reporting year and Method #3 (which corresponds to Equation HH-3) is not used for the data element "HistoricalWasteQuantityMethod" (see Figure 17 and Table 12), then report the last year the landfill accepted waste (YYYY). Otherwise, do not report this data element.
LeachateRecirculationFrequency	**Conditionally Required:** If leachate recirculation is used, then report the frequency with which leachate recirculation is used over the past 10 years. Otherwise, do not report this data element. 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
LeachateRecirculationIndicator	An indication (Y/N) of whether leachate recirculation is used during the reporting year.
ScalesIndicator	An indication (Y/N) as to whether scales are present at the landfill in the current reporting year.
LandfillGasCollectionSystemIndicator	An indication (Y/N) of whether the landfill uses a gas collection system.
PassiveVentFlareIndicator	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	**Conditionally Required:** A collection of data elements containing information on the capacity of the landfill. If the landfill is not using Method #3 (which corresponds to Equation HH-3) for the data element "HistoricalWasteQuantityMethod" (see **Figure 17** and **Table 12**), then report the capacity of the landfill in metric tons. Otherwise, do not report this data element. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
LandfillSurfaceAreacContainingWaste	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 the cover types applicable to the landfill.
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

XML Excerpt 3
Example for Summary Information

```
<ghg:LandFillOpen>Y</ghg:LandFillOpen>
<ghg:EstimatedYearLandFillClosure>2015</ghg:EstimatedYearLandFillClosure>
<ghg:LeachateRecirculationFrequency>Used several times a year for the past 10 years</ghg:LeachateRecirculationFrequency>
<ghg:LeachateRecirculationIndicator>Y</ghg:LeachateRecirculationIndicator>
<ghg:ScalesIndicator>Y</ghg:ScalesIndicator>
<ghg:LandfillGasCollectionSystemIndicator>Y</ghg:LandfillGasCollectionSystemIndicator>
<ghg:PassiveVentFlareIndicator>Y</ghg:PassiveVentFlareIndicator>
<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.

3.0 Active Aeration Details

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. **Conditionally Required:** If a Methane Correction Factor (MCF) other than the default of 1.0 was used for any year/waste type combination, then the following information about the aeration system must be reported [98.346(d)(1)]:

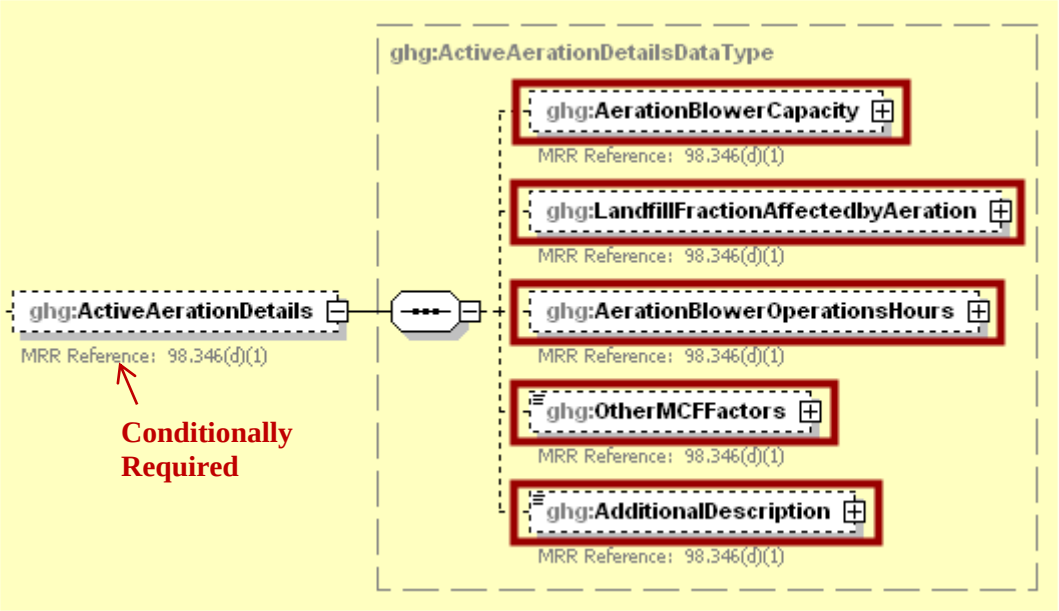
- The aeration blower capacity in standard cubic feet per minute (scfm). Include total capacity of all blowers.
- The fraction of the landfill containing waste that is affected by the aeration as a percentage expressed as a decimal fraction between 0 and 1.
- The total number of hours during the year in which the aeration blower was operated.
- Other factors that were used as a basis for the MCF value used in the calculation.
- A 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.

Was a Methane Correction Factor (MCF) other than the default of 1.0 used for any year/waste combination?

If the default value of 1 for MCF was used for every year/waste type combination, 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.

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**.
OtherMCFFactors	Other factors used as a basis for the selected MCF value.
AdditionalDescription	A 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>
```

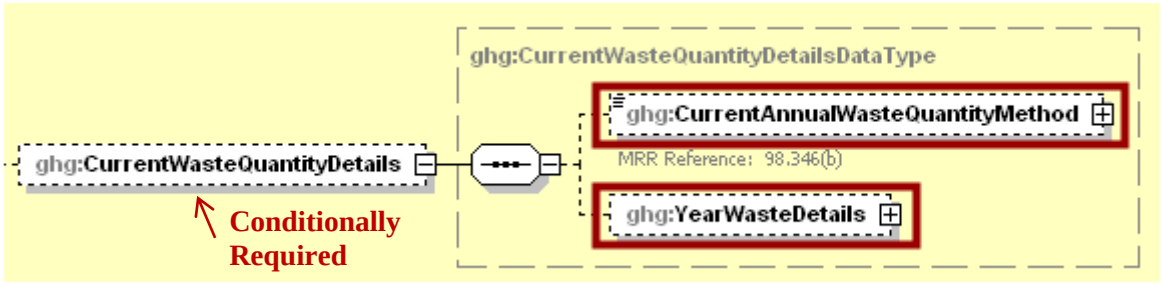
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

4.0 Current Waste Quantity Details

Was the landfill open in the reporting year?

If the landfill was not open in the reporting year, then do not report for the parent element "CurrentWasteQuantityDetails." Proceed to Section 5.0 for instructions on how to report prior waste quantity details.

Figure 12
Current Year 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 the landfill was open for any part of the reporting year, the method that was used to determine the quantity of waste received at the landfill in the reporting year for loads other than cars, light duty trucks and loads that cannot be measured with scales due to physical or operational limitations must be reported [98.346(b)]. The waste quantity is considered "determined," as opposed to "estimated," if one of the following methods was used to measure the waste quantity [98.343(a)(3)]:

- Scales were used to weigh each load before off-loading at the landfill and either scales were used to weigh each load after off-loading or a representative tare weight was used for the weight of the vehicle/container after off-loading at the landfill. The tare weight is determined by weighing no less than five of each type of vehicle or container after it has off-loaded the waste [98.343(a)(3)(i)(B)].

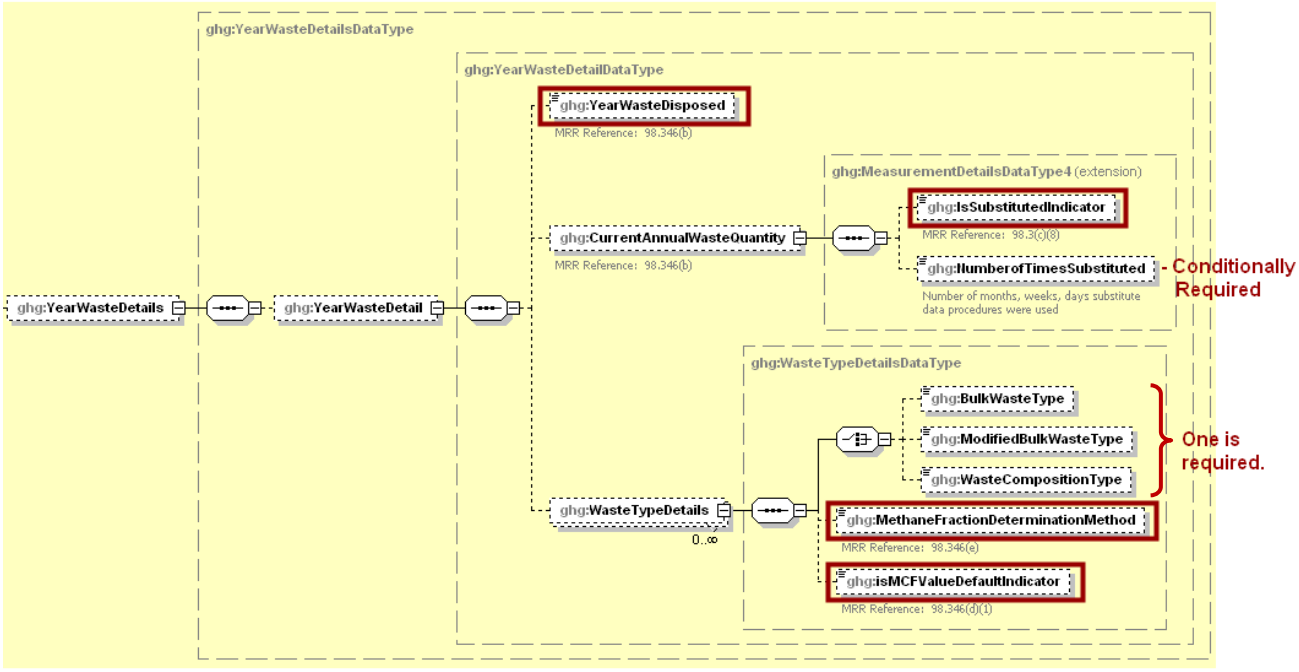
- Used vehicle/container working capacity, for example by using volumetric capacity and waste density measurements for each container/vehicle used to haul waste to the landfill [98.343(a)(3)(i)(C)]. The working capacity means the maximum volume of mass of waste that is actually placed in the landfill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

Note: Per 98.343(a)(3), beginning in the first emissions reporting year and each year thereafter, the waste quantities must be determined using one of the methods listed above. If scales are in place at the landfill, they must be used to determine waste quantities for the first emissions reporting year and each year after. The methods listed above may also be used for years prior to the first emissions reporting year, if such data is available.

If you changed methods used for determining the waste disposal quantities during the reporting year, report the method used at the end of the reporting year. In addition, provide an explanation as to why

you changed methods, for example, scales were installed at your facility mid-year. Please provide this explanation in the Subpart A data element "CalculationMethodologyChangesDescription".

Figure 13
Current 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.

For the current reporting year, 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)
        - Bulk 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
- Bulk Waste

For each waste type reported, indicate:

- If the fraction of CH_4 in the landfill gas (F) is based on a measured value rather than using the default value of 0.5 [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.

Table 9
Current Year Waste Quantity Data Element Definitions

Data Element Name	Description
CurrentWasteQuantityDetails	**Parent Element (Conditionally Required):** A collection of data elements that identify the method for determining waste disposal quantities for the reporting year. If the landfill was open during the reporting year, then the following information is required. Otherwise, do not report this parent element.
CurrentAnnualWasteQuantityMethod	The method used to determine the annual waste quantity for the current reporting year. 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
YearWasteDetails	**Parent Element:** Details about the waste disposed for the current reporting year.
YearWasteDetail	**Parent Element:** Details for the current year.
YearWasteDisposed	The current reporting year (YYYY).
CurrentAnnualWasteQuantity	A collection of data elements containing information on the current 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.

Data Element Name	Description
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 the waste disposed was bulk waste, then report "Bulk waste". Otherwise, do not report this data element.
ModifiedBulkWasteType	**Conditionally Required:** If the waste disposed was modified bulk MSW waste, 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) bulk C&D waste inerts
WasteCompositionType	**Conditionally Required:** If the waste disposed is on the following list, 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 bulk waste
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. See list of allowable values: default measured
isMCFValueDefaultIndicator	An indication (Y/N) of whether a value other than the default value of 1.0 was used for the methane correction factor (MCF) for the specified waste type in Equation HH-1. Report "Y" if the default of 1.0 was not used. Report "N" if the default value was used.

XML Excerpt 5
Example for Current Year Waste Quantity

```
<ghg:CurrentWasteQuantityDetails>
        <ghg:CurrentAnnualWasteQuantityMethod>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:CurrentAnnualWasteQuantityMethod>
        <ghg:YearWasteDetails>
                <ghg:YearWasteDetail>
                        <ghg:YearWasteDisposed>2011</ghg:YearWasteDisposed>
                        <ghg:CurrentAnnualWasteQuantity>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                                <ghg:NumberofTimesSubstituted>10</ghg:NumberofTimesSubstituted>
                        </ghg:CurrentAnnualWasteQuantity>
                        <ghg:WasteTypeDetails>
                                <ghg:ModifiedBulkWasteType>bulk MSW waste (excluding inerts and C&amp;amp;D
                                waste)</ghg:ModifiedBulkWasteType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDet
                                erminationMethod>
                                <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
        </ghg:YearWasteDetails>
</ghg:CurrentWasteQuantityDetails>
```

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

5.0 Prior Waste Quantity Details

Was the landfill operational prior to the reporting year?

If the landfill was not operational prior to the reporting year, then do not report for the parent element "PriorWasteQuantityDetails." Proceed to Section 6.0 for instructions on how to report for landfills with or without gas collection systems.

There are several means by which the quantities of waste disposed of prior to the current reporting year may have been determined or estimated for purposes of the GHGRP:

- Determined using scales as described in Section 4.0 above (see data element "PriorScalesWasteQuantityMethod");
- Estimated from tipping receipts, other company records or measured working capacities (measured working capacities are described in Section 4.0 above); or
- Estimated from one of the methods found in 98.343(a)(4) (see data element "HistoricalWasteQuantityMethod").

Reporters must indicate the method(s) used to determine or estimate historical waste disposal quantities and the range of years in which each method was used.

Was the waste quantity in years prior to the current reporting year determined using scales or estimated?

If the waste quantity was determined using scales, report "Y" for the data element "PriorScalesWasteQuantityMethod" and report the data elements contained in the parent element "PriorYearWasteDetails" [98.346(b)].

If the waste quantity was estimated, report "N" for the data element "PriorScalesWasteQuantityMethod" and do not report for the parent element "PriorYearWasteDetails" [98.346(b)]. Proceed to Figure 16 for the parent element "TippingReceiptsDetails".

Conditionally Required: If scales were used to determine waste quantities for years prior to the current reporting year, report the following information for each applicable year:

- 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 each 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

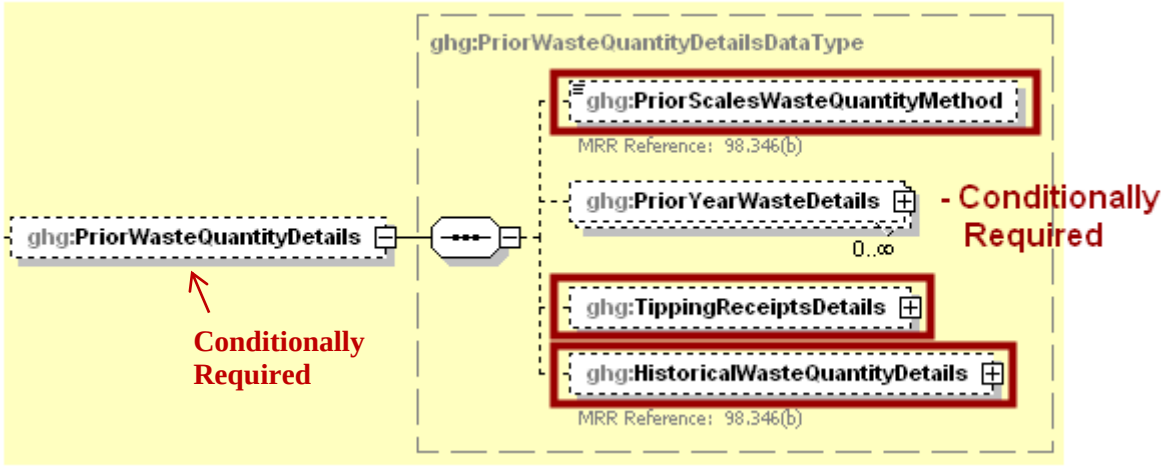
- Bulk MSW waste (excluding inerts and C&D waste)
- Bulk C&D waste
- Inerts (e.g. glass, plastics, metal, cement)

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

For each waste type reported, indicate:

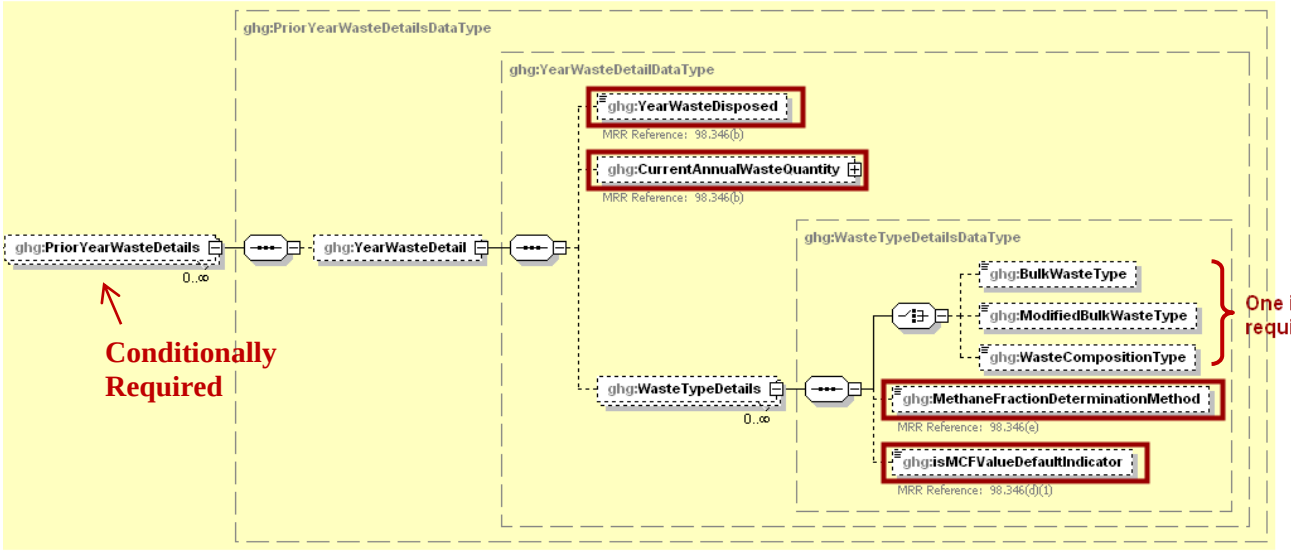
- If the fraction of CH_4 in the landfill gas (F) is based on a measured value rather than using the default value of 0.5 [98.346(e)].
- If a Methane Conversion Factor (MCF) other than the default of 1.0 was used in Equation HH-1 [98.346(d)(1)]. If the default value of 1.0 was not used, indicate "Y" 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.

Figure 14
Prior Year 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.

Figure 15
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.

Table 10
Prior Year Waste Quantity Data Element Definitions

Data Element Name	Description
PriorWasteQuantityDetails	**Parent Element (Conditionally Required):** A collection of data elements that identify the method for determining or estimating historical waste disposal quantities, reason for its selection and the range of years it is applied.
PriorScalesWasteQuantityMethod	An indication (Y/N) if scales were used to determine the annual waste disposal quantities for any years prior to the reporting year for loads other than cars, light duty trucks and loads that cannot be measured with scales due to physical or operational limitations.
PriorYearWasteDetails	**Parent Element (Conditionally Required):** Details about the quantity of waste disposed in years prior to the current reporting year if the quantity was determined using scales. If the quantity of waste disposed in years prior to the current reporting year was determined using scales, the following information is required. Otherwise, do not report this parent element.
YearWasteDetail	**Parent Element:** Details for a single year in which scales were used for determining prior year annual waste disposal quantities. Report each year separately.

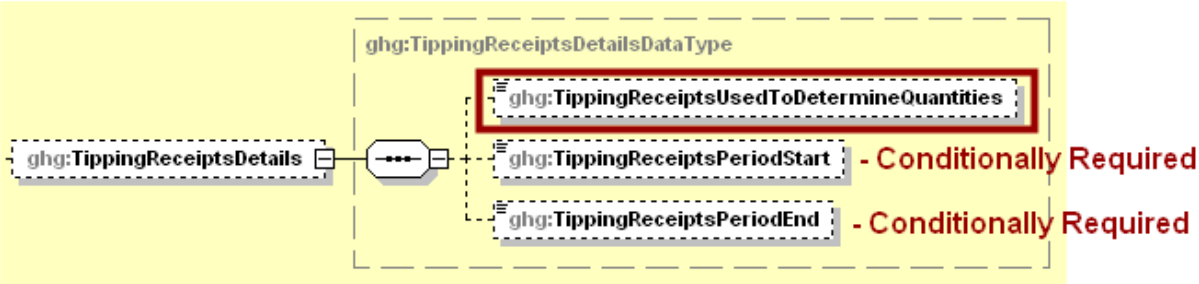
Data Element Name	Description
YearWasteDisposed	The year(s) scales were used to determine the annual waste disposal quantity for loads other than cars, light duty trucks and loads that could not be measured with scales due to physical or operational limitations. Report each year separately (YYYY).
CurrentAnnualWasteQuantity	A collection of data elements containing information on the annual waste quantity for the year specified. 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 the waste disposed was bulk waste, then report "Bulk waste". Otherwise, do not report this data element.
ModifiedBulkWasteType	**Conditionally Required:** If the waste disposed was modified bulk MSW waste, 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) bulk C&D waste inerts
WasteCompositionType	**Conditionally Required:** If the waste disposed is on the following list, 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 bulk waste
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. See list of allowable values: default measured
isMCFValueDefaultIndicator	An indication (Y/N) of whether a value other than the default value of 1.0 was used for the methane correction factor (MCF) for the specified waste type in Equation HH-1. Report "Y" if the default of 1.0 was not used. Report "N" if the default value was used.

XML Excerpt 6
Example for Prior Year Waste Quantity

```
<ghg:PriorWasteQuantityDetails>
        <ghg:PriorScalesWasteQuantityMethod>Y</ghg:PriorScalesWasteQuantityMethod>
        <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                        <ghg:YearWasteDisposed>2009</ghg:YearWasteDisposed>
                        <ghg:CurrentAnnualWasteQuantity>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                                <ghg:NumberofTimesSubstituted>20</ghg:NumberofTimesSubstituted>
                        </ghg:CurrentAnnualWasteQuantity>
                        <ghg:WasteTypeDetails>
                                <ghg:WasteCompositionType>food waste</ghg:WasteCompositionType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDet
                                erminationMethod>
                                <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                        <ghg:WasteTypeDetails>
                                <ghg:WasteCompositionType>wood and straw</ghg:WasteCompositionType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDet
                                erminationMethod>
                                <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                        <ghg:WasteTypeDetails>
                                <ghg:WasteCompositionType>diapers</ghg:WasteCompositionType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDet
                                erminationMethod>
                                <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                        <ghg:WasteTypeDetails>
                                <ghg:WasteCompositionType>sewage sludge</ghg:WasteCompositionType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDet
                                erminationMethod>
                                <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                        <ghg:WasteTypeDetails>
                                <ghg:WasteCompositionType>inerts</ghg:WasteCompositionType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDet
                                erminationMethod>
                                <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
        </ghg:PriorYearWasteDetails>
        <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                        <ghg:YearWasteDisposed>2008</ghg:YearWasteDisposed>
                        <ghg:CurrentAnnualWasteQuantity>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                                <ghg:NumberofTimesSubstituted>30</ghg:NumberofTimesSubstituted>
                        </ghg:CurrentAnnualWasteQuantity>
                        <ghg:WasteTypeDetails>
                                <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDet
                                erminationMethod>
                                <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
        </ghg:PriorYearWasteDetails>
```

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

Figure 16
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.

Indicate if tipping receipts, other company records or measured working capacities were used to estimate quantities of waste for years prior to the current reporting year [98.346(b)].

Conditionally Required: If tipping receipts, other company records or measured working capacities 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 up until the year before the current reporting year for new reporters. That is, for reporting year 2011, a new reporter at an open landfill may only use tipping receipts until 2010. Starting in 2011, that new reporter will have to use scales or measured working capacities, as described in Section 4.0, to determine annual waste quantities.

Table 11
Tipping Receipts Data Element Definitions

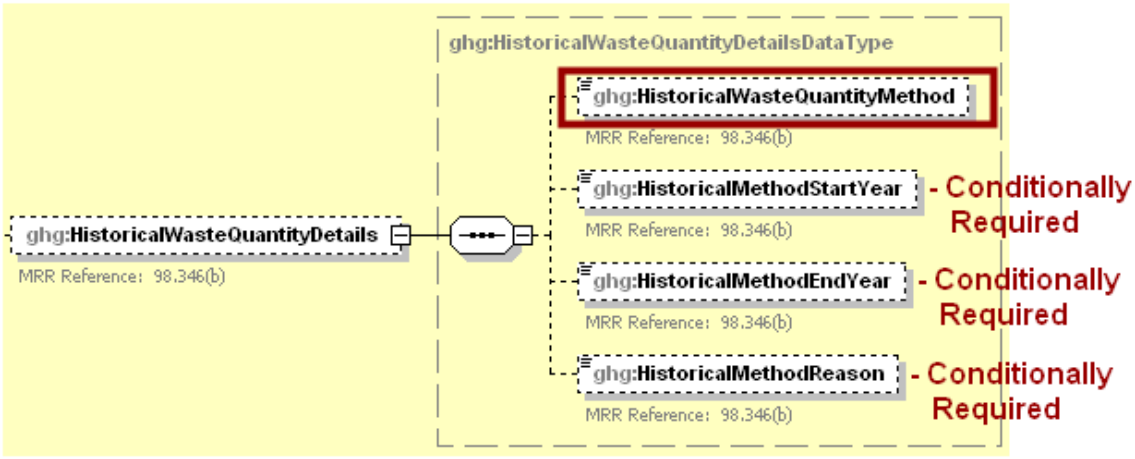
Data Element Name	Description
TippingReceiptsDetails	**Parent Element:** A collection of data elements containing details about the use of tipping receipts, other company records or measured working capacities.
TippingReceiptsUsedToDetermineQuantities	An indication (Y/N) of whether tipping receipts, other company records or measured working capacities were used to estimate quantities of waste for years prior to the current reporting year.
TippingReceiptsPeriodStart	**Conditionally Required:** If tipping receipts/company records were used to estimate the quantities of waste, then report the starting year for using tipping receipts (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 ending year for using tipping receipts (YYYY). Otherwise, do not report this data element. For new reporters tipping receipts may only be used until the year before the current reporting year.

XML Excerpt 7
Example for Tipping Receipts

```
<ghg:TippingReceiptsDetails>
        <ghg:TippingReceiptsUsedToDetermineQuantities>Y</ghg:TippingReceiptsUsedToDetermineQuantities>
        <ghg:TippingReceiptsPeriodStart>1991</ghg:TippingReceiptsPeriodStart>
        <ghg:TippingReceiptsPeriodEnd>2000</ghg:TippingReceiptsPeriodEnd>
</ghg:TippingReceiptsDetails>
```

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

Figure 17
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.

Were any other methods used to estimate waste quantities in years prior to the reporting year other than those previously reported?

Indicate the method used to estimate all annual waste quantities that were not determined using scales, estimated through tipping receipts, other company records or measured working capacities [98.346(b)]. Only waste quantities for years prior to the facility's first emissions reporting year may be estimated. 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 the waste quantities are available.
- Method #2: Use the estimated population served by the landfill in each year multiplied by the values for national average per capita waste disposal rates found in Table HH-2, to calculate the waste quantity landfilled per Equation HH-2.
- Method #3: Use the landfill capacity or, for operating landfills, the amount of waste-in-place to estimate a constant average waste disposal quantity per Equation HH-3. The amount of waste-in place is the capacity of the landfill used at the end of the year prior to the year when waste disposal data are available. The waste-in-place numbers may be derived from design drawings or engineering estimates.

- None: If all waste quantities were either determined using scales or estimated using tipping receipts, other company records or measured working capacities, report "None".

Conditionally Required: If one of these methods was used (i.e., "None" was not reported), indicate the first year in which the method was used, the last year in which it was used and the reason this particular method was selected [98.346(b)].

Table 12
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 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 starting 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 ending year that the method specified was used to estimate the quantity of waste (YYYY). Otherwise, do not report this data element.
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 8
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>This was the best method to use.</ghg:HistoricalMethodReason>
      </ghg:HistoricalWasteQuantityDetails>
</ghg:PriorWasteQuantityDetails>
```

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

6.0 Gas Collection Systems

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

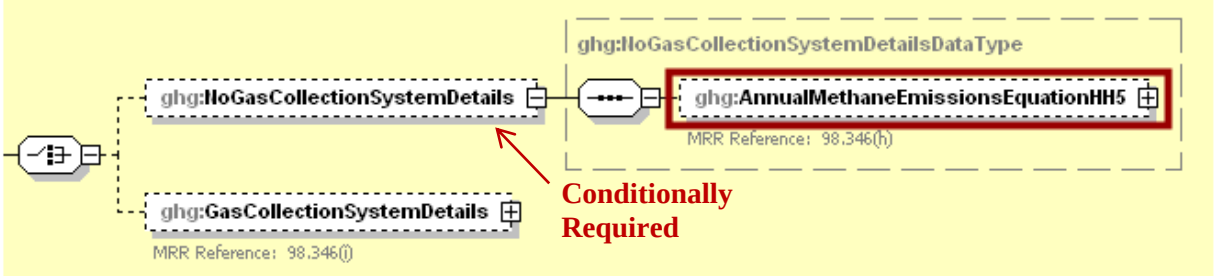
Does the landfill have a landfill gas collection system?

- 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

Conditionally Required: If the landfill does not have a gas collection system, then report the value for CH_4 generation, adjusted for oxidation, 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.

Figure 18
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.

Table 13
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.
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 9
Example for No Gas Collection System

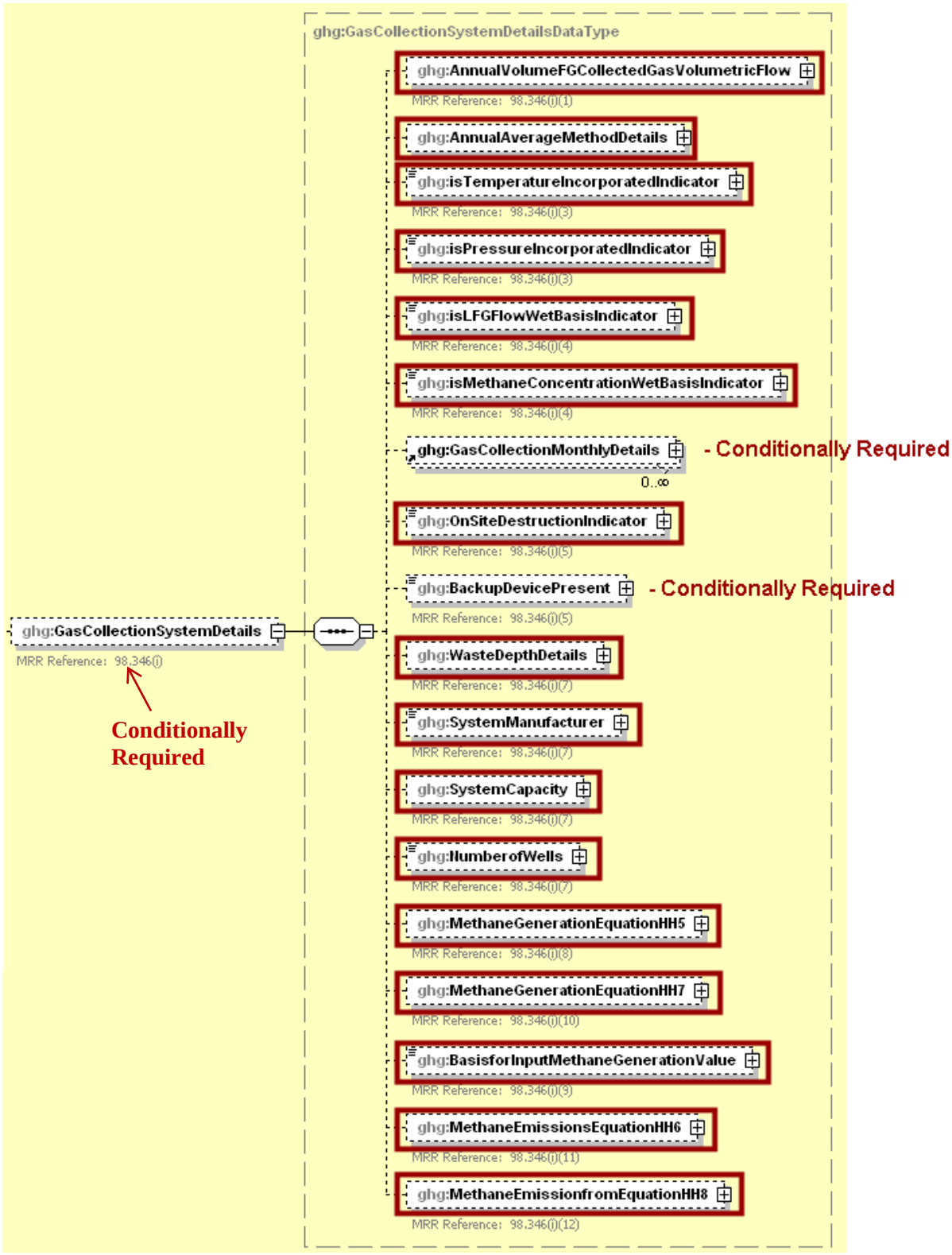
```
<ghg:NoGasCollectionSystemDetails>
        <ghg:AnnualMethaneEmissionsEquationHH5 massUOM="Metric Tons">
                <ghg:CalculatedValue>100.89</ghg:CalculatedValue>
        </ghg:AnnualMethaneEmissionsEquationHH5>
</ghg:NoGasCollectionSystemDetails>
```

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

6.2 Gas Collection System Details

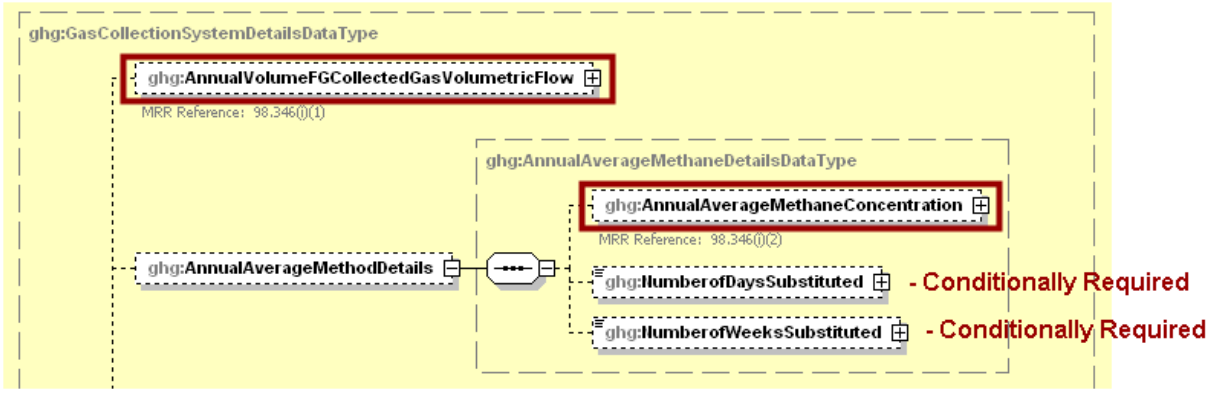
A landfill gas collection system means a system of pipes used to collect landfill gas from different locations in the landfill by means of a fan or similar mechanical draft equipment to a single location for treatment or use. A single landfill may have multiple gas collection systems. Landfill gas collection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

Figure 19
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 20
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:** 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.

Table 14
Landfill Gas Volume and CH_4 Concentration Details Data Element Definitions

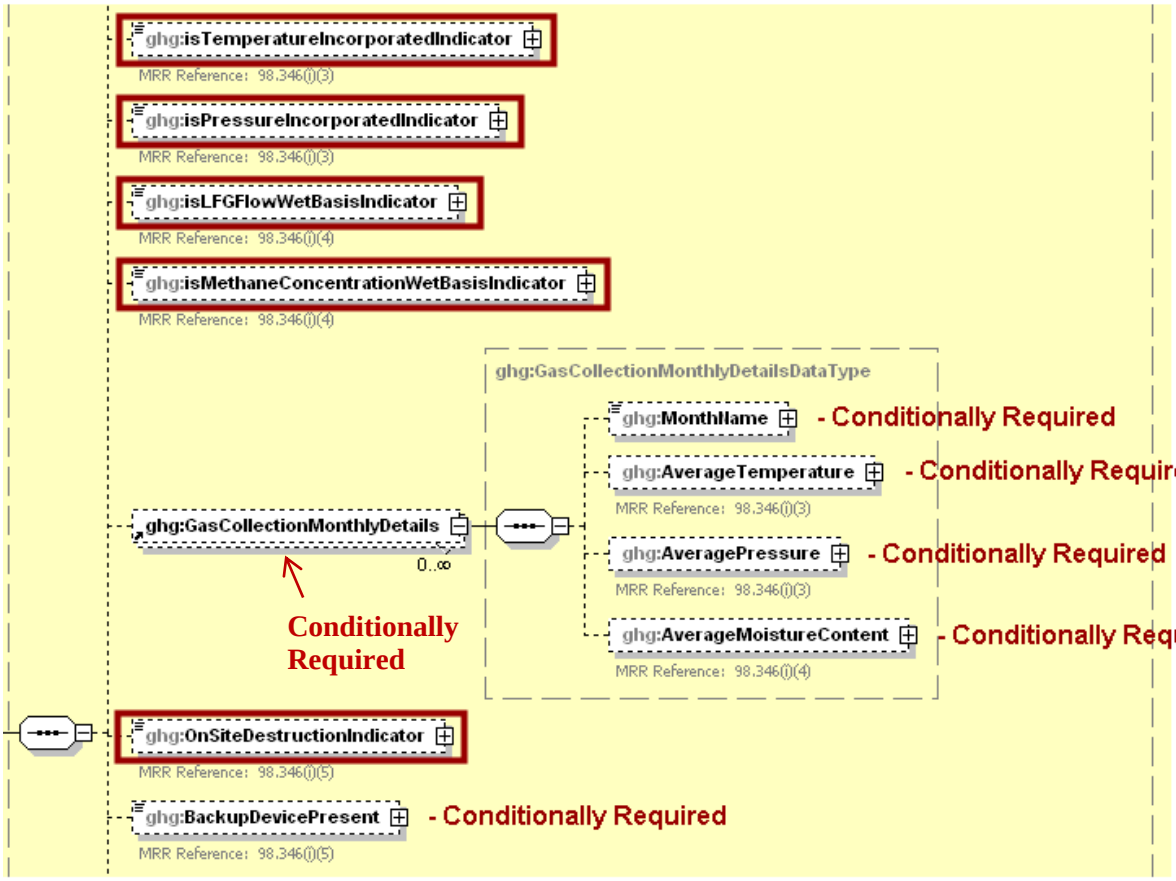
Data Element Name	Description
GasCollectionSystemDetails	**Parent Element (Conditionally Required):** A collection of data elements for landfills with gas collection systems. If the landfill has a gas collection system, then report the following information. Otherwise, do not report this parent element.
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 was 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 "".
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 was 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:** If CH_4 concentration was monitored weekly and missing data procedures were used, then report the number of weeks substitute data was used to determine the annual average CH_4 concentration of landfill gas collected for destruction (integer). Otherwise, do not report this data element.

XML Excerpt 10
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:NumberofWeeksSubstituted>7</ghg:NumberofWeeksSubstituted>
        </ghg:AnnualAverageMethodDetails>
```

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

Figure 21
Monthly Details and On-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:** If landfill gas destruction occurred at the facility, then indicate if a back-up destruction device is present at the facility [98.346(i)(5)].

Table 15
Monthly Details and On-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.

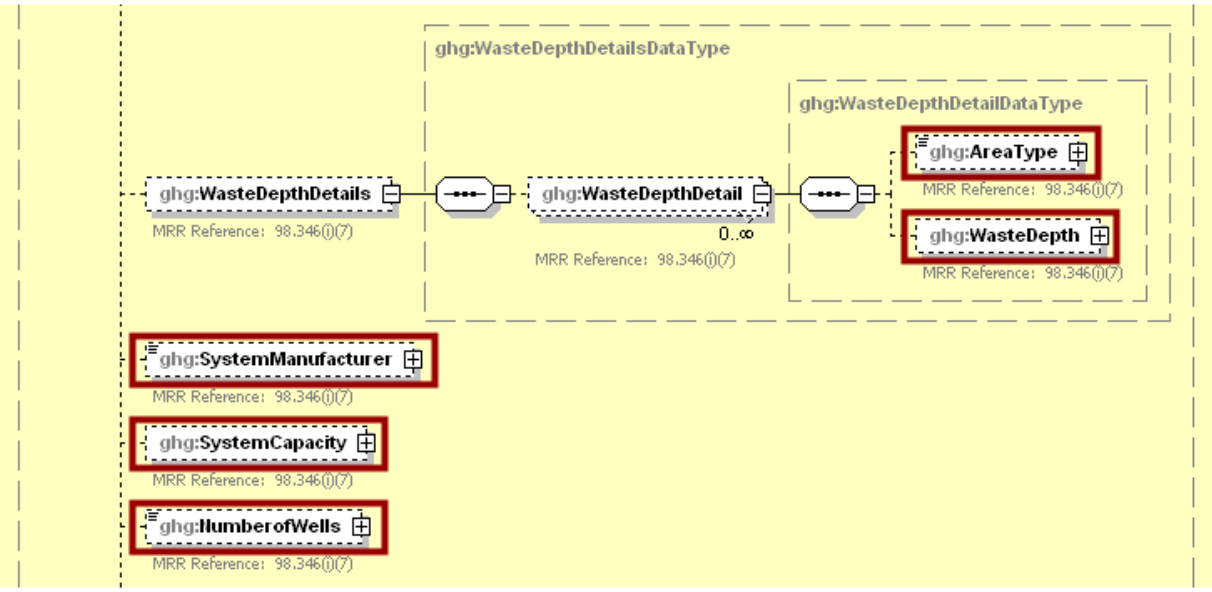
Data Element Name	Description
GasCollectionMonthlyDetails	**Parent Element (Conditionally Required):** A collection of data elements with information about temperature, pressure and moisture content for each month. If the temperature or pressure was not incorporated into internal calculations or either 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.
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.
OnSiteDestructionIndicator	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
BackupDevicePresent	**Conditionally Required:** If any destruction occurs onsite at the landfill facility, then indicate (Y/N) whether a back-up destruction device is present at the landfill. Otherwise, do not report this data element.

XML Excerpt 11
Example for Monthly Details and On-site Destruction Details

```
<ghg:isTemperatureIncorporatedIndicator>N</ghg:isTemperatureIncorporatedIndicator>
<ghg:isPressureIncorporatedIndicator>N</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>560</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>570</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>580</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>590</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:GasCollectionMonthlyDetails>
        <ghg:MonthName>December</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>530</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>210</ghg:MeasureValue>
        </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.13</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:OnSiteDestructionIndicator>Both</ghg:OnSiteDestructionIndicator>
<ghg:BackupDevicePresent>Y</ghg:BackupDevicePresent>
```

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

Figure 22
Waste Depth and System Details Schema Diagram



Note: Data elements boxed in red are required.

For landfills with a gas collection system in place, the following information must be reported on the estimated waste depths (in meters) for each area below (as listed in Table HH-3) [98.346(i)(7)]:

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

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)].

Table 16
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 A2 A3 A4 A5
WasteDepth	For the area 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**.
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.
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).

XML Excerpt 12
Example for Waste Depth and System Details

```
<ghg:WasteDepthDetails>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A1</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>500</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A2</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>400</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
        <ghg:AreaType>A3</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>300</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A4</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>200</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A5</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>100</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
</ghg:WasteDepthDetails>
<ghg:SystemManufacturer>Acme Corporation</ghg:SystemManufacturer>
<ghg:SystemCapacity flowUOM="acfm">
        <ghg:MeasureValue>987654321</ghg:MeasureValue>
</ghg:SystemCapacity>
<ghg:NumberofWells>1000</ghg:NumberofWells>
```

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

Figure 23
Methane Generation 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..46(i)(11)].
- CH_4 emissions from the landfill during the reporting year (using Equation HH-8) [98.346(i)(12)].

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

Table 17
Methane Generation 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 13
Example for Methane Generation Details

```
                <ghg:MethaneGenerationEquationHH5 massUOM="Metric Tons">
                        <ghg:CalculatedValue>1000</ghg:CalculatedValue>
                </ghg:MethaneGenerationEquationHH5>
                <ghg:MethaneGenerationEquationHH7 massUOM="Metric Tons">
                        <ghg:CalculatedValue>2000</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 Facility-Level Roll-up Emissions

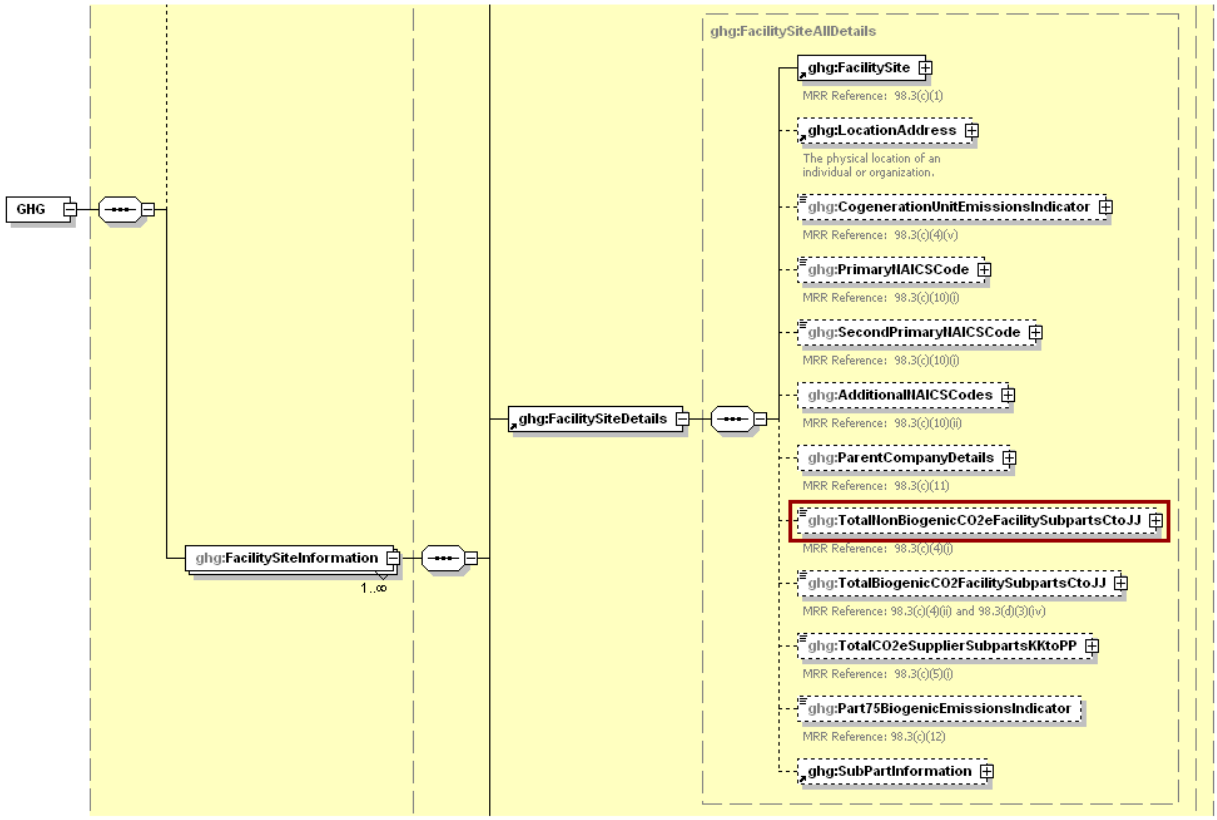
Each facility must report the following facility-level emission totals:

- 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 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 and MM totals in this data element as these values are not being collected in e-GGRT.

Figure 24
Facility-Level Roll-up Emissions Schema Diagram



Note: Data elements boxed in red are required.

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 (21) 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 (21) 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 18
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 14
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: Data values do not reflect an actual facility's emissions. Additional sample XML files for Subpart HH are posted on the e-GGRT help site. http://www.ccdsupport.com/confluence/display/help/Additional+XML+Examples)

```
<ghg:GHG xmlns="http://www.ccdsupport.com/schema/ghg">
  <ghg:FacilitySiteInformation>
    <ghg:CertificationStatement>The designated representative or alternate designated representative must sign (i.e., agree to) this certification statement. If you are an agent and you click on "SUBMIT", you are not agreeing to the certification statement, but are submitting the certification statement on behalf of the designated representative or alternate designated representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on behalf of the designated representative, not to sign (i.e., agree to) the certification statement.</ghg:CertificationStatement>
    <ghg:ReportingYear>2011</ghg:ReportingYear>
    <ghg:FacilitySiteDetails>
        <ghg:FacilitySite>
            <ghg:FacilitySiteIdentifier>524297</ghg:FacilitySiteIdentifier>
            <ghg:FacilitySiteName>Test Facility HH</ghg:FacilitySiteName>
        </ghg:FacilitySite>
        <ghg:LocationAddress>
        <ghg:LocationAddressText>1 Main St.</ghg:LocationAddressText>
        <ghg:LocalityName>Charlottesville</ghg:LocalityName>
        <ghg:StateIdentity>
            <ghg:StateCode>VA</ghg:StateCode>
        </ghg:StateIdentity>
            <ghg:AddressPostalCode>22911</ghg:AddressPostalCode>
        </ghg:LocationAddress>
        <ghg:CogenerationUnitEmissionsIndicator>N</ghg:CogenerationUnitEmissionsIndicator>
        <ghg:PrimaryNAICSCode>562212</ghg:PrimaryNAICSCode>
        <ghg:ParentCompanyDetails>
          <ghg:ParentCompany>
            <ghg:ParentCompanyLegalName>Soda Ash Corporation</ghg:ParentCompanyLegalName>
            <ghg:StreetAddress>108 Hillcrest Street</ghg:StreetAddress>
            <ghg:City>Sandpoint</ghg:City>
            <ghg:State>ID</ghg:State>
            <ghg:Zip>83864</ghg:Zip>
            <ghg:PercentOwnershipInterest>100.0</ghg:PercentOwnershipInterest>
          </ghg:ParentCompany>
        </ghg:ParentCompanyDetails>
        <ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric Tons">84000.8</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
        <ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">0</ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ>
        <ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">0</ghg:TotalCO2eSupplierSubpartsKKtoPP>
        <ghg:SubPartInformation>
            <ghg:SubPartHH>
                <ghg:GHGasInfoDetails>
                    <ghg:GHGasName>Methane</ghg:GHGasName>
                    <ghg:GHGasQuantity massUOM="Metric Tons">
                      <ghg:CalculatedValue>4000.04</ghg:CalculatedValue>
                    </ghg:GHGasQuantity>
                </ghg:GHGasInfoDetails>
                <ghg:LandFillOpen>Y</ghg:LandFillOpen>
```

```
<ghg:EstimatedYearLandFillClosure>2015</ghg:EstimatedYearLandFillClosure>
<ghg:LeachateRecirculationFrequency>Used several times a year for the past 10 years</ghg:LeachateRecirculationFrequency>
<ghg:LeachateRecirculationIndicator>Y</ghg:LeachateRecirculationIndicator>
<ghg:ScalesIndicator>Y</ghg:ScalesIndicator>
<ghg:LandfillGasCollectionSystemIndicator>Y</ghg:LandfillGasCollectionSystemIndicator>
<ghg:PassiveVentFlareIndicator>Y</ghg:PassiveVentFlareIndicator>
<ghg:LandfillCapacity massUOM="Metric Tons">
        <ghg:MeasureValue>123456789.34444</ghg:MeasureValue>
</ghg:LandfillCapacity>
<ghg:LandfillSurfaceAreacContainingWaste areaUOM="Square Meters">
        <ghg:MeasureValue>963852741.258</ghg:MeasureValue>
</ghg:LandfillSurfaceAreacContainingWaste>
<ghg:CoverTypeDetails>
        <ghg:CoverTypeName>Organic cover</ghg:CoverTypeName>
</ghg:CoverTypeDetails>
<ghg:ActiveAerationDetails>
        <ghg:AerationBlowerCapacity flowUOM="scfm">
                <ghg:MeasureValue>741852963.456</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>
<ghg:CurrentWasteQuantityDetails>
        <ghg:CurrentAnnualWasteQuantityMethod>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:CurrentAnnualWasteQuantityMethod>
        <ghg:YearWasteDetails>
                <ghg:YearWasteDetail>
                        <ghg:YearWasteDisposed>2011</ghg:YearWasteDisposed>
                        <ghg:CurrentAnnualWasteQuantity>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                                <ghg:NumberofTimesSubstituted>10</ghg:NumberofTimesSubstituted>
                        </ghg:CurrentAnnualWasteQuantity>
                        <ghg:WasteTypeDetails>
                                <ghg:ModifiedBulkWasteType>bulk MSW waste (excluding inerts and C&amp;amp;D waste)</ghg:ModifiedBulkWasteType>
                                <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                                <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                        </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
        </ghg:YearWasteDetails>
</ghg:CurrentWasteQuantityDetails>
<ghg:PriorWasteQuantityDetails>
        <ghg:PriorScalesWasteQuantityMethod>Y</ghg:PriorScalesWasteQuantityMethod>
        <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                        <ghg:YearWasteDisposed>2010</ghg:YearWasteDisposed>
                        <ghg:CurrentAnnualWasteQuantity>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                                <ghg:NumberofTimesSubstituted>20</ghg:NumberofTimesSubstituted>
```

```
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>food waste</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>wood and straw</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>diapers</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>sewage sludge</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>inerts</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                    <ghg:YearWasteDisposed>2009</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>20</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>food waste</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>wood and straw</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>diapers</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>sewage sludge</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
```

```
                    </ghg:WasteTypeDetails>
                    <ghg:WasteTypeDetails>
                        <ghg:WasteCompositionType>inerts</ghg:WasteCompositionType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                    <ghg:YearWasteDisposed>2008</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>30</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                        <ghg:MethaneFractionDeterminationMethod>measured</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                    <ghg:YearWasteDisposed>2007</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>40</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                        <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                    <ghg:YearWasteDisposed>2006</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>50</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                        <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                    <ghg:YearWasteDisposed>2005</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
```

```
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>60</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                        <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>Y</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                    <ghg:YearWasteDisposed>2004</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>70</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                        <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                <ghg:YearWasteDisposed>2003</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>80</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                        <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
                    <ghg:YearWasteDisposed>2002</ghg:YearWasteDisposed>
                    <ghg:CurrentAnnualWasteQuantity>
                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        <ghg:NumberofTimesSubstituted>90</ghg:NumberofTimesSubstituted>
                    </ghg:CurrentAnnualWasteQuantity>
                    <ghg:WasteTypeDetails>
                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                        <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                    </ghg:WasteTypeDetails>
                </ghg:YearWasteDetail>
            </ghg:PriorYearWasteDetails>
            <ghg:PriorYearWasteDetails>
                <ghg:YearWasteDetail>
```

```
                                    <ghg:YearWasteDisposed>2001</ghg:YearWasteDisposed>
                                    <ghg:CurrentAnnualWasteQuantity>
                                        <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                                        <ghg:NumberofTimesSubstituted>100</ghg:NumberofTimesSubstituted>
                                    </ghg:CurrentAnnualWasteQuantity>
                                    <ghg:WasteTypeDetails>
                                        <ghg:BulkWasteType>Bulk waste</ghg:BulkWasteType>
                                        <ghg:MethaneFractionDeterminationMethod>default</ghg:MethaneFractionDeterminationMethod>
                                        <ghg:isMCFValueDefaultIndicator>N</ghg:isMCFValueDefaultIndicator>
                                    </ghg:WasteTypeDetails>
                                </ghg:YearWasteDetail>
                            </ghg:PriorYearWasteDetails>
                            <ghg:TippingReceiptsDetails>
                                <ghg:TippingReceiptsUsedToDetermineQuantities>Y</ghg:TippingReceiptsUsedToDetermineQuantities>
                                <ghg:TippingReceiptsPeriodStart>1991</ghg:TippingReceiptsPeriodStart>
                                <ghg:TippingReceiptsPeriodEnd>2000</ghg:TippingReceiptsPeriodEnd>
                            </ghg:TippingReceiptsDetails>
                            <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>This was the best method to use.</ghg:HistoricalMethodReason>
                            </ghg:HistoricalWasteQuantityDetails>
                        </ghg:PriorWasteQuantityDetails>
                        <ghg:GasCollectionSystemDetails>
                            <ghg:AnnualVolumeFGCollectedGasVolumetricFlow volUOM="scf">
                                <ghg:MeasureValue>963852741.1238764</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:AnnualAverageMethodDetails>
                            <ghg:isTemperatureIncorporatedIndicator>N</ghg:isTemperatureIncorporatedIndicator>
                            <ghg:isPressureIncorporatedIndicator>N</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>560</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>570</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>580</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>590</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:GasCollectionMonthlyDetails>
        <ghg:MonthName>May</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>600</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>140</ghg:MeasureValue>
        </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.5</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:GasCollectionMonthlyDetails>
        <ghg:MonthName>June</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>590</ghg:MeasureValue>
                </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
```

```
                <ghg:MeasureValue>150</ghg:MeasureValue>
            </ghg:AveragePressure>
            <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.6</ghg:MeasureValue>
            </ghg:AverageMoistureContent>
        </ghg:GasCollectionMonthlyDetails>
        <ghg:GasCollectionMonthlyDetails>
            <ghg:MonthName>July</ghg:MonthName>
            <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>580</ghg:MeasureValue>
            </ghg:AverageTemperature>
            <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>160</ghg:MeasureValue>
            </ghg:AveragePressure>
            <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.7</ghg:MeasureValue>
            </ghg:AverageMoistureContent>
        </ghg:GasCollectionMonthlyDetails>
        <ghg:GasCollectionMonthlyDetails>
            <ghg:MonthName>August</ghg:MonthName>
            <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>570</ghg:MeasureValue>
            </ghg:AverageTemperature>
            <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>170</ghg:MeasureValue>
            </ghg:AveragePressure>
            <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.8</ghg:MeasureValue>
            </ghg:AverageMoistureContent>
        </ghg:GasCollectionMonthlyDetails>
        <ghg:GasCollectionMonthlyDetails>
            <ghg:MonthName>September</ghg:MonthName>
            <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>560</ghg:MeasureValue>
            </ghg:AverageTemperature>
            <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>180</ghg:MeasureValue>
            </ghg:AveragePressure>
            <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.9</ghg:MeasureValue>
            </ghg:AverageMoistureContent>
        </ghg:GasCollectionMonthlyDetails>
        <ghg:GasCollectionMonthlyDetails>
            <ghg:MonthName>October</ghg:MonthName>
            <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>550</ghg:MeasureValue>
            </ghg:AverageTemperature>
            <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>190</ghg:MeasureValue>
            </ghg:AveragePressure>
            <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.11</ghg:MeasureValue>
            </ghg:AverageMoistureContent>
        </ghg:GasCollectionMonthlyDetails>
```

```
<ghg:GasCollectionMonthlyDetails>
        <ghg:MonthName>November</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>540</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>200</ghg:MeasureValue>
        </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.12</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:GasCollectionMonthlyDetails>
        <ghg:MonthName>December</ghg:MonthName>
        <ghg:AverageTemperature tempUOM="Rankine">
                <ghg:MeasureValue>530</ghg:MeasureValue>
        </ghg:AverageTemperature>
        <ghg:AveragePressure pressureUOM="atmosphere">
                <ghg:MeasureValue>210</ghg:MeasureValue>
        </ghg:AveragePressure>
        <ghg:AverageMoistureContent fractionUOM="fraction (number between 0 and 1)">
                <ghg:MeasureValue>0.13</ghg:MeasureValue>
        </ghg:AverageMoistureContent>
</ghg:GasCollectionMonthlyDetails>
<ghg:OnSiteDestructionIndicator>Both</ghg:OnSiteDestructionIndicator>
<ghg:BackupDevicePresent>Y</ghg:BackupDevicePresent>
<ghg:WasteDepthDetails>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A1</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>500</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A2</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>400</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
        <ghg:AreaType>A3</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>300</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A4</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
                        <ghg:MeasureValue>200</ghg:MeasureValue>
                </ghg:WasteDepth>
        </ghg:WasteDepthDetail>
        <ghg:WasteDepthDetail>
                <ghg:AreaType>A5</ghg:AreaType>
                <ghg:WasteDepth heightUOM="Meters">
```

```
                                                    <ghg:MeasureValue>100</ghg:MeasureValue>
                                                </ghg:WasteDepth>
                                            </ghg:WasteDepthDetail>
                                        </ghg:WasteDepthDetails>
                                        <ghg:SystemManufacturer>Acme Corporation</ghg:SystemManufacturer>
                                        <ghg:SystemCapacity flowUOM="acfm">
                                            <ghg:MeasureValue>987654321.9789</ghg:MeasureValue>
                                        </ghg:SystemCapacity>
                                        <ghg:NumberofWells>1000</ghg:NumberofWells>
                                        <ghg:MethaneGenerationEquationHH5 massUOM="Metric Tons">
                                            <ghg:CalculatedValue>1000.5675</ghg:CalculatedValue>
                                        </ghg:MethaneGenerationEquationHH5>
                                        <ghg:MethaneGenerationEquationHH7 massUOM="Metric Tons">
                                            <ghg:CalculatedValue>2000.2342</ghg:CalculatedValue>
                                        </ghg:MethaneGenerationEquationHH7>
                                        <ghg:BasisforInputMethaneGenerationValue>Equation HH-1</ghg:BasisforInputMethaneGenerationValue>
                                        <ghg:MethaneEmissionsEquationHH6 massUOM="Metric Tons">
                                            <ghg:CalculatedValue>3000.45</ghg:CalculatedValue>
                                        </ghg:MethaneEmissionsEquationHH6>
                                        <ghg:MethaneEmissionfromEquationHH8 massUOM="Metric Tons">
                                            <ghg:CalculatedValue>4000.78</ghg:CalculatedValue>
                                        </ghg:MethaneEmissionfromEquationHH8>
                                    </ghg:GasCollectionSystemDetails>
                                </ghg:SubPartHH>
                            </ghg:SubPartInformation>
                        </ghg:FacilitySiteDetails>
                        <ghg:CalculationMethodologyChangesDescription>None</ghg:CalculationMethodologyChangesDescription>
                        <ghg:BestAvailableMonitoringMethodsUsed>N/A</ghg:BestAvailableMonitoringMethodsUsed>
                        <ghg:StartDate>2011-01-01</ghg:StartDate>
                        <ghg:EndDate>2011-12-31</ghg:EndDate>
                        <ghg:DateTimeReportGenerated>2012-02-20T10:16:31</ghg:DateTimeReportGenerated>
                    </ghg:FacilitySiteInformation>
                </ghg:GHG>
```