

Greenhouse Gas Reporting Program

XML Reporting Instructions for Subpart D – Electricity Generation

United States Environmental Protection Agency
Climate Change Division
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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.

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Table of Contents

	<u>Page</u>
Introduction	1
1.0 Subpart D Total Emissions	6
2.0 Unit Details and Emissions	8
3.0 Fuel Details and Emissions	12
4.0 Part 75 Methodology	15
4.1 CEMS Details	15
4.2 Appendix G, Equation G-4 Details	17
4.3 Appendix G, Equation G-1 Details	18
5.0 Facility-Level Roll-up Emissions	19
Appendix A.....	21
Appendix B.....	22

List of Tables

	<u>Page</u>
Table 1 Greenhouse Gas Information Details XML Data Elements.....	6
Table 2 Unit Details and Emissions XML Data Elements.....	10
Table 3 Fuel Details and Emissions XML Data Elements.....	12
Table 4 CEMS Details XML Data Elements	16
Table 5 Appendix G, Equation G-4 Details XML Data Elements.....	17
Table 6 Appendix G, Equation G-1 Details XML Data Elements.....	18
Table 7 Facility Level Roll-up Emissions XML Data Elements	20

List of Figures

	<u>Page</u>
Figure 1 Sample Calculated Value Schema Diagram	2
Figure 2 Sample Measured Value Schema Diagram	2
Figure 3 Subpart D Reporting Diagram	3
Figure 4 Subpart D Schema Diagram	5
Figure 5 Greenhouse Gas Information Details Schema Diagram	6
Figure 6 Sample XML Excerpt for Greenhouse Gas Information Details.....	7
Figure 7 Units D Details Schema Diagram.....	8
Figure 8 Unit Details and Emissions Schema Diagram	9
Figure 9 Sample XML Excerpt for Unit Details and Emissions.....	11
Figure 10 Fuel Details and Emissions Schema Diagram	12
Figure 11 Sample XML Excerpt for Fuel Details and Emissions.....	14
Figure 12 Part 75 Methodology Schema Diagram.....	15
Figure 13 CEMS Details Schema Diagram	15
Figure 14 Sample XML Excerpt for CEMS Details	16
Figure 15 Appendix G, Equation G-4 Details Schema Diagram	17
Figure 16 Sample XML Excerpt for Appendix G, Equation G-4 Details.....	17
Figure 17 Appendix G, Equation G-1 Details Schema Diagram	18
Figure 18 Sample XML Excerpt for Appendix G, Equation G-1 Details.....	18
Figure 19 Facility-Level Roll-up Emissions Schema Diagram	19
Figure 20 Sample XML Excerpt for Facility Level Roll-up Emissions	20

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Introduction

The U.S. Environmental Protection Agency's (EPA's) electronic greenhouse gas reporting tool (e-GGRT) extensible markup language (XML) Reporting Schema, currently at version 1.2, contains all of the data elements needed to comply with the greenhouse gas reporting program (GHGRP) beginning with the 2010 data collection year. The schema defines expected data elements and attributes, allowable data types for each element, and the hierarchy and order in which elements must appear. 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 element, complex elements, and simple 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 element is the base of the XML schema.

The elements are related to each other in parent-child relationships. The root element is the parent element of the entire schema. Complex 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 only for submitting the annual GHG report. User and facility or supplier registration, and the Certificate of Representation, must be entered on-line using e-GGRT.

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

An XML submission can 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 Elements table.

The e-GGRT XML Reporting Schema v1.2 is available for download at the GHGRP web site here: http://www.epa.gov/climatechange/emissions/e-ggert_xml.html. The v1.2 zip file contains:

- **GHG_Final_v1.2.xsd and Included Files**
- **SchemaChanges.xlsx**

This topic provides a step-by-step description of how to report data for Subpart D Electricity Generation and overall total Subpart D emissions for a facility using the XML schema. Please note the following:

- **Not all data elements included in the schema must be reported.** Required or relevant data components and data elements are boxed in red in the schema diagrams and listed in the tables. If a data element is not listed, it does not need to be reported (e.g., deferred data elements, IsConfidentialBusinessInformationIndicator). Some data elements are conditional and only need to be reported if they are relevant to the reporting facility.

- **Enumerations are case sensitive.** Values must be entered exactly as they are displayed in order to be accepted by schema validation.
- **Data elements must be reported in a specific order.** The figures and tables in this document depict the specific order in which data elements must be reported in order to produce a well-formed XML report.
- **Data elements for calculated and measured values are not displayed in the schema diagrams.** The parent elements for calculated and measured values are displayed in the schema diagrams in this document, but the specific data elements to be reported are not displayed. The descriptions in the XML data elements tables include the specific data elements to report, which are commonly the calculated or measured value and the unit of measure. For some values, the number of times substitute data procedures were used may also be required. See Figure 1 for the expanded view of a sample data element which is a calculated value and Figure 2 for the expanded view of a sample data element which is a measured value.

Figure 1
Sample Calculated Value Schema Diagram

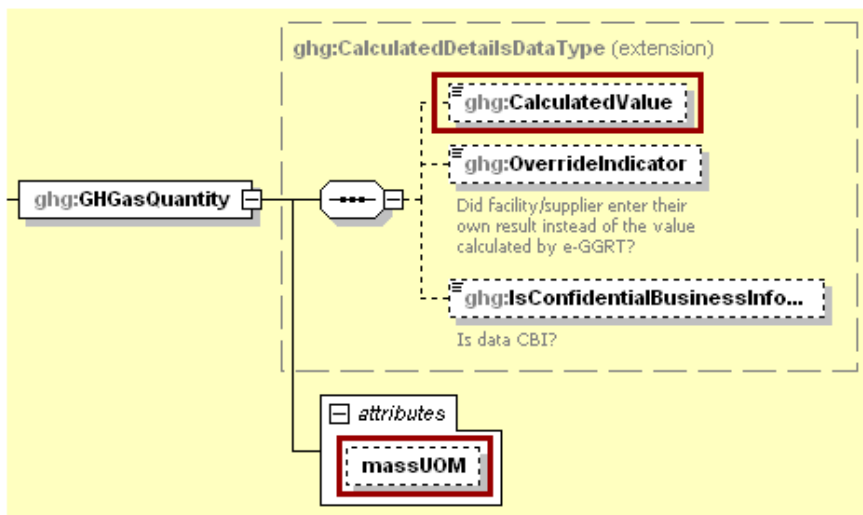


Figure 2
Sample Measured Value Schema Diagram

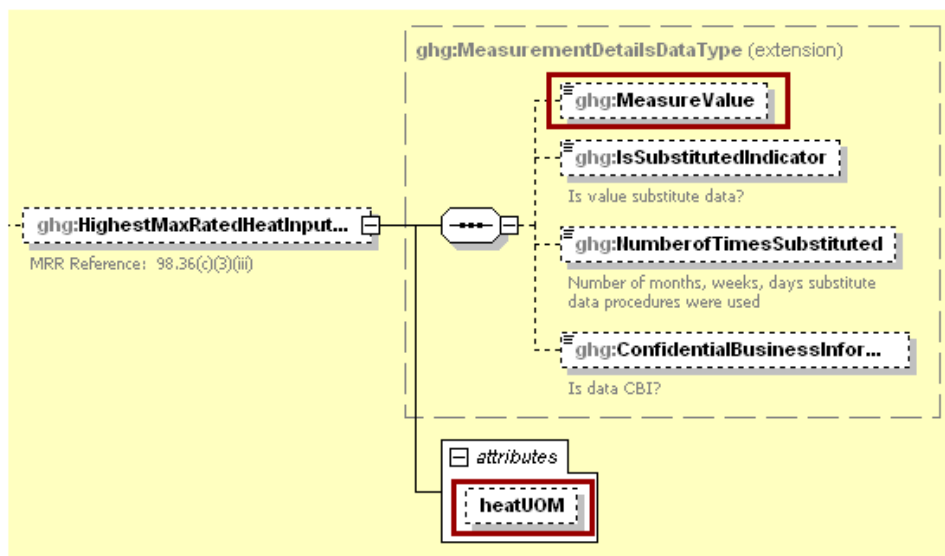
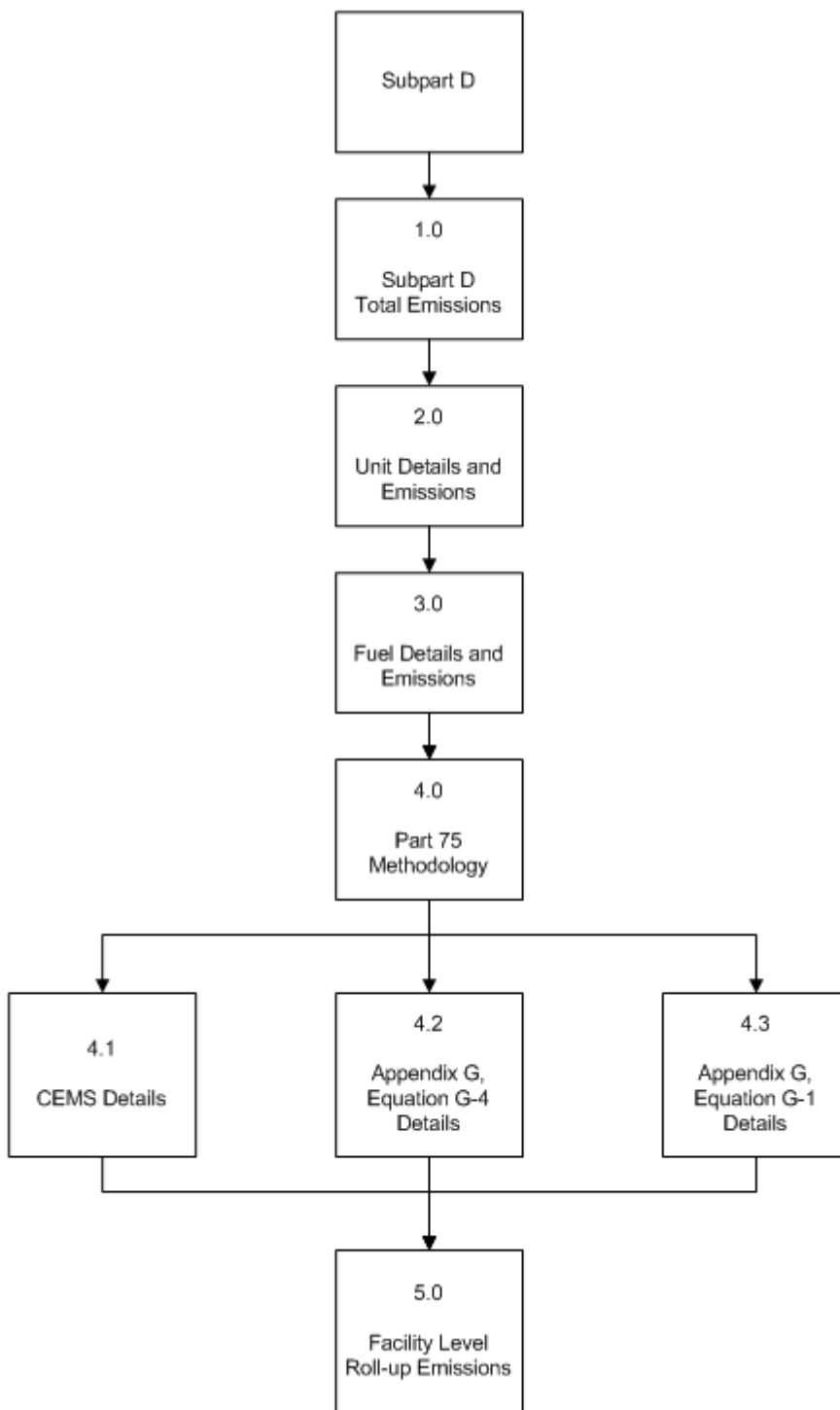


Figure 3
Subpart D Reporting Diagram



The XML schema includes the following areas for reporting for Subpart D, as displayed in Figure 3:

- 1.0 Subpart D Total Emissions: includes the total emissions for carbon dioxide, and CH₄ and N₂O combustion emissions from process units.
- 2.0 Unit Details and Emissions: includes information on unit identification, methodology used and start and end dates, whether the unit is subject to the Acid Rain Program, and CO₂ emissions.
- 3.0 Fuel Details and Emissions: includes information on fuel type and CH₄ and N₂O emissions.
- 4.0 Part 75 Methodology: includes additional information to report based on which methodology was used for the unit.
 - 4.1 CEMS Details
 - 4.2 Appendix G, Equation G-4 Details
 - 4.3 Appendix G, Equation G-1 Details
- 5.0 Facility Level Roll-up Emissions: includes information on how to report total emissions for CO₂e (excluding biogenic CO₂) and biogenic CO₂ from Subpart D at the facility level.

The following terminology is used throughout this document:

- **Namespace:** A namespace uniquely identifies a set of names such that there is no ambiguity when objects having different origins but the same names are mixed together.
- **Markup Language:** A way to combine text and extra information to show the structure and layout of a document. This information is expressed using markup, which is typically intermingled with the primary text. A commonly known markup language is HTML.
- **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. An XML schema defines the set of rules to which the XML document must conform in order to be considered "valid" according to its schema. An instance of an XML schema is an XML schema document and is a file with the extension .xsd.
- **XML Document:** An XML document is a file containing data organized into a structured document using XML markup. An XML document is considered to be "well-formed" if it conforms to all XML syntax rules. An XML document is considered to be "valid" if it conforms to all the semantic rules defined by an associated XML schema. An XML document cannot be processed if it is not well-formed or valid. XML documents have the file extension .xml.
- **XML Element:** An XML element is a unit of the XML document that is expressed as tags in the form "<tagName>." XML elements must have either a start and end tag as in <ghg:GHGasInfoDetails> </ghg:GHGasInfoDetails> or a single empty tag name as in <ghg:GHGasInfoDetails/>. XML elements may be nested within one another in a structured hierarchy and sequence specified in an XML schema.
- **XML Attribute:** An XML attribute contains additional information about an XML element placed at the start tag of the XML element. XML attributes have the form attributeName = "attributeValue," as in <ghg:GHGasQuantity massUOM="Metric Tons">. XML attributes are used to report identifying information or to help e-GGRT process the data being reported within the data elements.

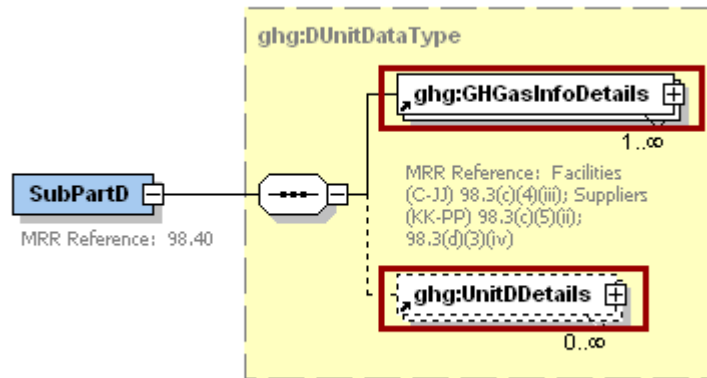
Rounded results from calculated values should be reported in the XML schema. Please use the following rounding rules:

- 1) CO₂e and CO₂ 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. This rule applies when greenhouse gases other than CO₂ are reported in metric tons CO₂e.

- 2) CH₄ emissions data expressed in metric tons should be rounded to two decimal places.
- 3) N₂O emissions data expressed in metric tons should be rounded to three decimal places.
- 4) 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.
- 5) In the case of aggregation/roll-ups, those calculations should be performed on the rounded values.

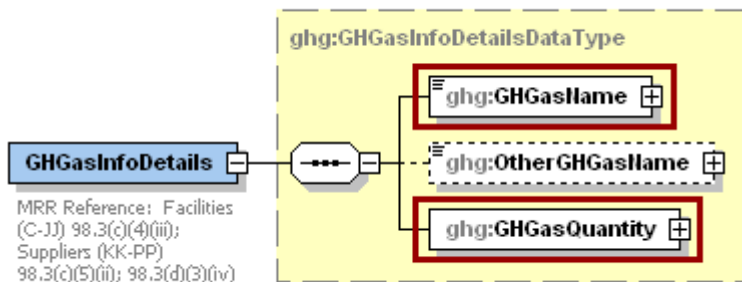
Figure 4
Subpart D Schema Diagram



1.0 Subpart D Total Emissions

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

**Figure 5
Greenhouse Gas Information Details Schema Diagram**



For Subpart D, report total emissions for biogenic carbon dioxide (CO₂), CO₂ (excluding biogenic CO₂), methane (CH₄) and nitrous oxide (N₂O). For greenhouse gas quantity, report the calculated value and mass unit of measure (Metric Tons) only according to the following guidelines:

- 1) Total CO₂ emissions (excluding biogenic CO₂): Add the annual CO₂ emissions in metric tons rounded to one decimal place minus the total biogenic CO₂ mass emissions in metric tons rounded to one decimal place for each unit.
- 2) Total biogenic CO₂ emissions: Add the total biogenic CO₂ mass emissions in metric tons rounded to one decimal place for each unit.
- 3) Total CH₄ emissions: Divide the CO₂ equivalent value for annual CH₄ emissions in metric tons rounded to one decimal place by the Global Warming Potential for CH₄ (21) for each fuel used for each unit and add the result rounded to two decimal places.
- 4) Total N₂O emissions: Divide the CO₂ equivalent value for annual N₂O emissions in metric tons rounded to one decimal place by the Global Warming Potential for N₂O (310) for each fuel used for each unit and add the result rounded to three decimal places.

**Table 1
Greenhouse Gas Information Details XML Data Elements**

Data Element Name	Description
GHGasInfoDetails	A collection of data elements containing the total annual emissions of each greenhouse gas (GHG) listed in Table A-1 of the Mandatory Reporting of GHGs, Part 98 reported under this subpart, expressed in metric tons.
GHGasName	Specify the name of the GHG. See list of allowable values: Carbon Dioxide Biogenic Carbon dioxide Methane Nitrous Oxide

Data Element Name	Description
GHGasQuantity	A collection of data elements that quantify the annual emissions from this source category. Report the calculated value only using the guidelines above.
GHGasQuantity.massUOM	Metric Tons

Figure 6
Sample XML Excerpt for Greenhouse Gas Information Details

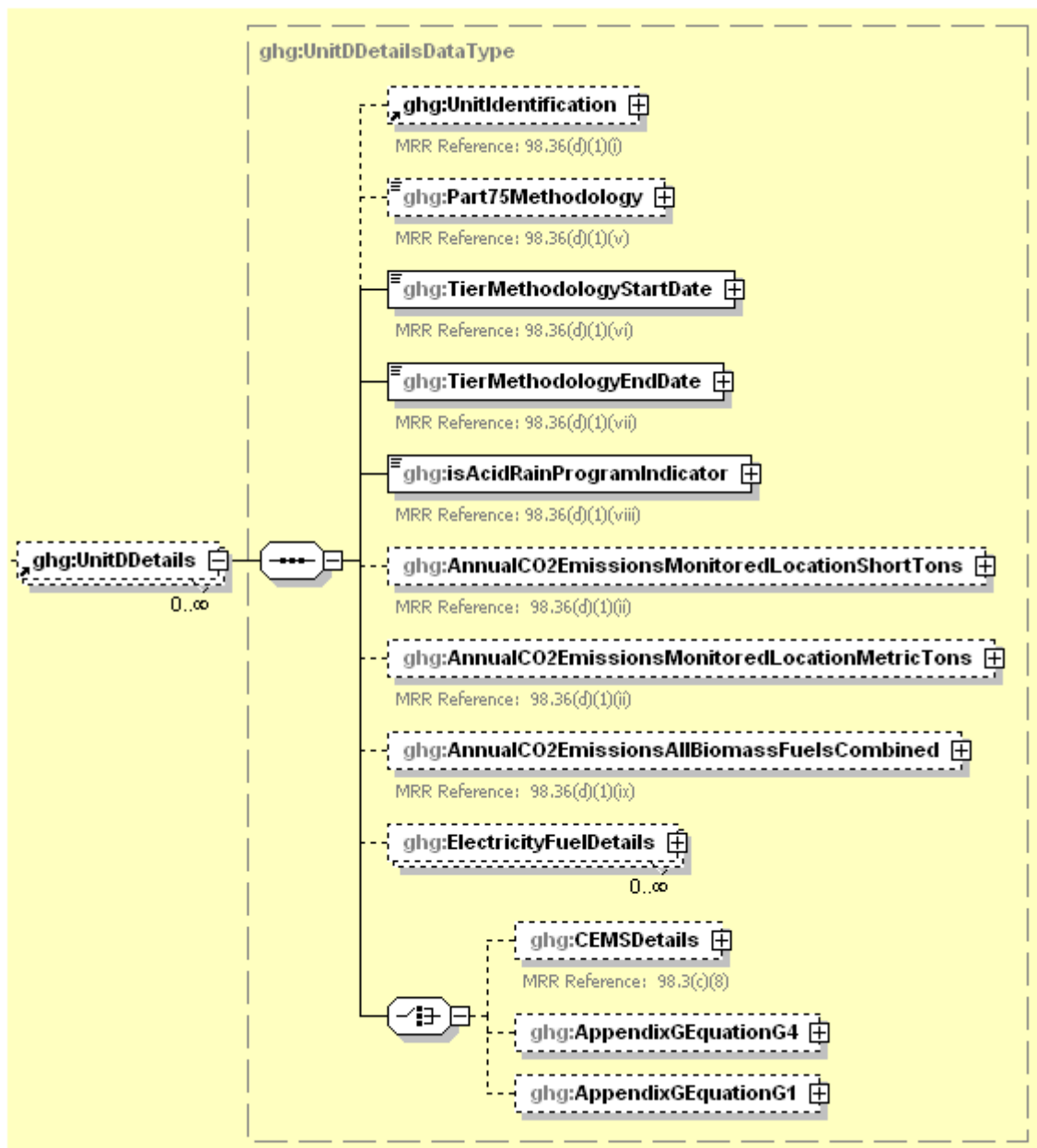
```

    <ghg:SubPartD>
      <ghg:GHGasInfoDetails>
        <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
          <ghg:CalculatedValue>1000</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
      </ghg:GHGasInfoDetails>
      <ghg:GHGasInfoDetails>
        <ghg:GHGasName>Methane</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
          <ghg:CalculatedValue>47.62</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
      </ghg:GHGasInfoDetails>
      <ghg:GHGasInfoDetails>
        <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
          <ghg:CalculatedValue>0.323</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
      </ghg:GHGasInfoDetails>
      <ghg:GHGasInfoDetails>
        <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
          <ghg:CalculatedValue>9000</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
      </ghg:GHGasInfoDetails>
    </ghg:SubPartD>
  
```

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

2.0 Unit Details and Emissions

Figure 7
Units D Details Schema Diagram



For each unit, stack, or pipe at your facility, Subpart D requires the following information:

- A unique name or identifier (e.g., a unit ID number) for the monitoring location (unit, stack, or pipe). The ID for this monitoring location should match the ID reported under §75.64 [98.36(d)(1)(i)].
- An optional description or label.
- The Part 75 methodology used to determine the CO₂ mass emissions [98.36(d)(1)(v)]:
 - CEMS
 - Appendix G, Equation G-1
 - Appendix G, Equation G-4
 - Low Mass Emissions (LME) (§75.19(c)(4)(iii))

- The methodology start date and end date [98.36(d)(1)(vi)-(vii)].
- An indication of participation in the Acid Rain Program [98.36(d)(1)(viii)].

For each unit, stack, or pipe subpart D requires the facility to provide the following aggregated emissions data:

- The total annual CO₂ emissions at the monitored location in short tons (exactly as reported under Part 75) [98.36(d)(1)(ii)].
- The total annual CO₂ emissions at the monitored location in metric tons (divide the CO₂ emissions in short tons by 1.1023 to obtain the CO₂ emissions value in metric tons) [98.36(d)(1)(ii)].
- The total annual biogenic CO₂ emissions. This includes CO₂ emissions from the combustion of biomass fuels and the biogenic fraction of CO₂ emissions from fuels with a mixed biogenic and fossil component (i.e. MSW or tires) [98.36(d)(1)(ix)]. **Note:** Report zero for this value if the facility elects to use the option specified in 98.3(c)(12) for the 2010 reporting year (where the facility chooses not to separately report biogenic CO₂ emissions from part 75 units).

Figure 8
Unit Details and Emissions Schema Diagram



Table 2
Unit Details and Emissions XML Data Elements

Data Element Name	Description
UnitDDetails	A collection of data elements containing details regarding each unit, stack, or pipe reporting under subpart D.
UnitIdentification	A collection of data elements containing the identity of each unit, stack, or pipe reported under subpart D. It includes the unit, stack, or pipe ID, a brief (optional) description and the unit type "Electricity Generator". Use the exact same unit, common stack, common pipe or multiple stack identification numbers that represent the monitored locations (e.g., 1, 2, CS001, MS1A, etc.) that are reported under §75.64.
Part75Methodology	The Part 75 methodology used to determine the CO ₂ mass emissions. See list of allowable values: CEMS Appendix G, Equation G-1 Appendix G, Equation G-4 LME (§75.19(c)(4)(iii))
TierMethodologyStartDate	The methodology start date.
TierMethodologyEndDate	The methodology end date.
isAcidRainProgramIndicator	An indication (Y/N) of whether the unit is subject to the Acid Rain Program.
AnnualCO2EmissionsMonitoredLocationShortTons	The total annual CO ₂ emissions at the monitored location in short tons. Report the calculated value only.
AnnualCO2EmissionsMonitoredLocationShortTons.massUOM	Short Tons
AnnualCO2EmissionsMonitoredLocationMetricTons	The total annual CO ₂ emissions at the monitored location in metric tons. Report the calculated value only.
AnnualCO2EmissionsMonitoredLocationMetricTons.massUOM	Metric Tons
AnnualCO2EmissionsAllBiomassFuelsCombined	The total annual biogenic CO ₂ mass emissions. Report the calculated value only.
AnnualCO2EmissionsAllBiomassFuelsCombined.massUOM	Metric Tons

Figure 9
Sample XML Excerpt for Unit Details and Emissions

```
<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>003-AG-Eq G-4</ghg:UnitName>
    <ghg:UnitDescription>Appendix G, Eq. G-4 unit</ghg:UnitDescription>
    <ghg:UnitType>Electricity Generator</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:Part75Methodology>Appendix G, Equation G-4</ghg:Part75Methodology>
  <ghg:TierMethodologyStartDate>2010-01-01</ghg:TierMethodologyStartDate>
  <ghg:TierMethodologyEndDate>2010-12-31</ghg:TierMethodologyEndDate>
  <ghg:isAcidRainProgramIndicator>Y</ghg:isAcidRainProgramIndicator>
  <ghg:AnnualCO2EmissionsMonitoredLocationShortTons massUOM="Short Tons">
    <ghg:CalculatedValue>3307.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMonitoredLocationShortTons>
  <ghg:AnnualCO2EmissionsMonitoredLocationMetricTons massUOM="Metric Tons">
    <ghg:CalculatedValue>3000.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMonitoredLocationMetricTons>
  <ghg:AnnualCO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
    <ghg:CalculatedValue>300.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsAllBiomassFuelsCombined>
</ghg:UnitDetails>
```

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

3.0 Fuel Details and Emissions

For each unit, stack, or pipe, subpart D requires the facility to name each type of fuel combusted in the configuration during the reporting year.

For each fuel type combusted in each unit, stack, or pipe, subpart D requires the facility to provide the following:

- The total annual CH₄ combustion emissions derived from Equation C-10 expressed as CO₂ equivalent (CO₂e) – this reporting element is only required for fuels listed in Table C-2.
- The total annual N₂O combustion emissions derived from Equation C-10 expressed as CO₂ equivalent (CO₂e) – this reporting element is only required for fuels listed in Table C-2.

Units that use CEMS and elect to use the provision under 98.33(c)(4)(ii)(B) need only identify the fuels for which N₂O and CH₄ emissions are calculated.

Figure 10
Fuel Details and Emissions Schema Diagram

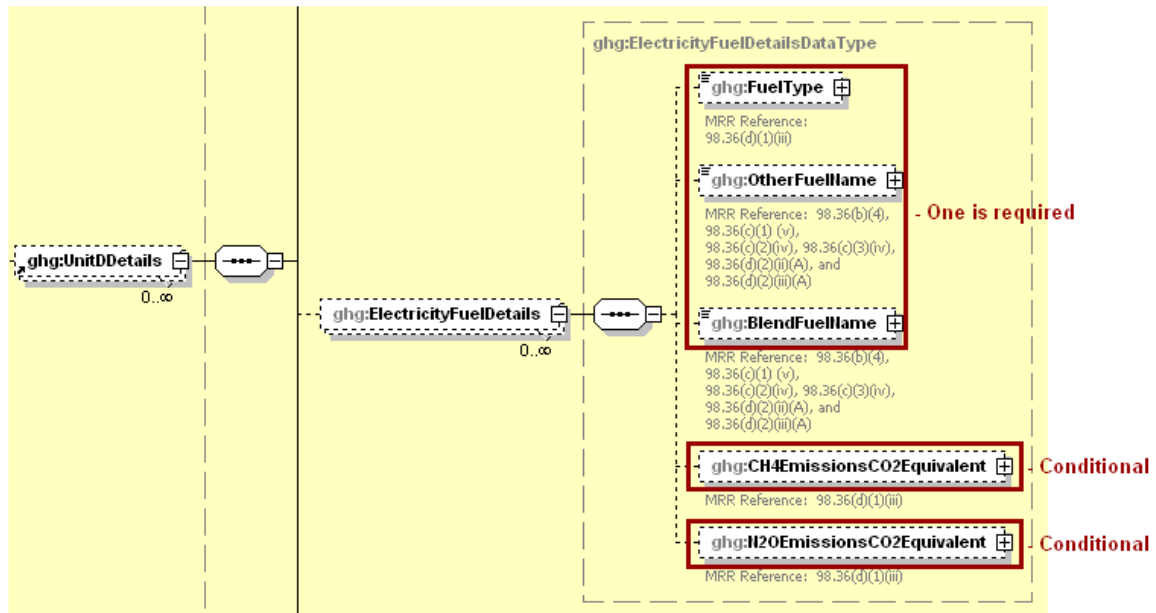


Table 3
Fuel Details and Emissions XML Data Elements

Data Element Name	Description
ElectricityFuelDetails	
FuelType	Specify separately each type of fuel combusted in the unit during the report year. See list of allowable fuel types: Anthracite Bituminous Subbituminous Lignite Coke

Data Element Name	Description
	Mixed (Commercial sector) Mixed (Industrial coking) Mixed (Industrial sector) Mixed (Electric Power sector) Mixed (Electric Power sector) Plastics Petroleum Coke Municipal Solid Waste Tires Wood and Wood Residuals Agricultural Byproducts Peat Distillate Fuel Oil No. 1 Distillate Fuel Oil No. 2 Distillate Fuel Oil No. 4 Residual Fuel Oil No. 5 Residual Fuel Oil No. 6 Used Oil Kerosene Liquefied petroleum gases (LPG) Propylene Ethane Ethanol (100%) Ethylene Isobutane Isobutylene Butane Butylene Naphtha (<401 deg F) Natural Gasoline Other Oil (>401 deg F) Pentanes Plus Petrochemical Feedstocks Petroleum Coke Special Naphtha Unfinished Oils Heavy Gas Oils Lubricants Motor Gasoline Aviation Gasoline Kerosene-Type Jet Fuel Asphalt and Road Oil Crude Oil Propane Ethanol Biodiesel Rendered Animal Fat Vegetable Oil Natural Gas (Weighted U.S. Average) Blast Furnace Gas Coke Oven Gas Propane Gas Fuel Gas Biogas (Captured methane) Solid Byproducts
OtherFuelName	Name of the specific fuel if not found in the list of allowable values.
BlendFuelName	Name of the specific fuel blend if not found in the list of allowable values and component fuels cannot be reported individually.
CH4EmissionsCO2Equivalent	Annual CH ₄ combustion emissions derived from Equation C-10 at each monitored location for the fuel specified, expressed as CO ₂ equivalent. This reporting element is only required for fuels listed in Table C-2. Report the calculated value only.
CH4EmissionsCO2Equivalent.massUOM	Metric Tons

Data Element Name	Description
N2OEmissionsCO2Equivalent	Annual N ₂ O combustion emissions derived from Equation C-10 at each monitored location for the fuel specified, expressed as CO ₂ equivalent. This reporting element is only required for fuels listed in Table C-2. Report the calculated value only.
N2OEmissionsCO2Equivalent.massUOM	Metric Tons

Figure 11
Sample XML Excerpt for Fuel Details and Emissions

```

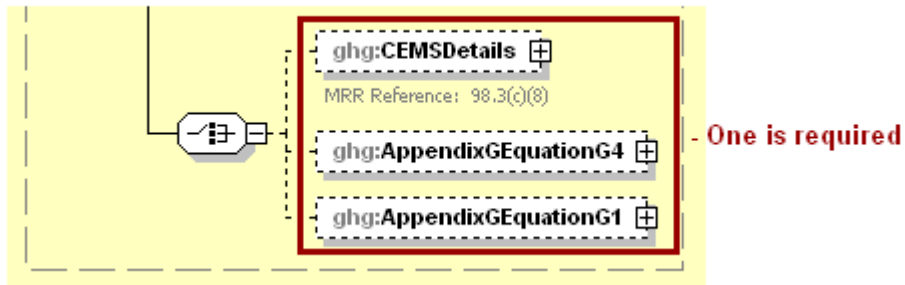
<ghg:ElectricityFuelDetails>
  <ghg:FuelType>Anthracite</ghg:FuelType>
  <ghg:CH4EmissionsCO2Equivalent massUOM="Metric Tons">
    <ghg:CalculatedValue>300.0</ghg:CalculatedValue>
  </ghg:CH4EmissionsCO2Equivalent>
  <ghg:N2OEmissionsCO2Equivalent massUOM="Metric Tons">
    <ghg:CalculatedValue>30.0</ghg:CalculatedValue>
  </ghg:N2OEmissionsCO2Equivalent>
</ghg:ElectricityFuelDetails>
```

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

4.0 Part 75 Methodology

Details about the Part 75 methodology used to determine the CO₂ mass emissions for the unit must be reported based on the methodology indicated for the data element “Part75Methodology”.

**Figure 12
Part 75 Methodology Schema Diagram**



4.1 CEMS Details

For each unit for which the facility selects "CEMS" as the Part 75 methodology used to determine CO₂ mass emissions, Subpart D requires the facility to provide the following additional information [98.3(c)(8)]:

- The total number of operating hours during the year that CO₂ concentration was missing.
- The total number of operating hours during the year that stack gas flow rate was missing.
- The total number of operating hours during the year that moisture content was missing (only if a continuous moisture monitor was in use).

**Figure 13
CEMS Details Schema Diagram**

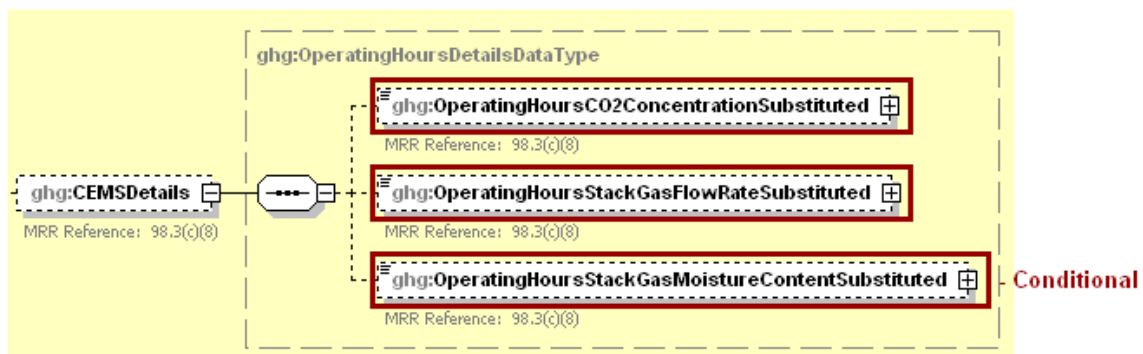


Table 4
CEMS Details XML Data Elements

Data Element Name	Description
CEMSDetails	Report if "CEMS" was indicated as the Part 75 methodology used to determine CO ₂ mass emissions.
OperatingHoursCO2ConcentrationSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the CO ₂ concentration parameter.
OperatingHoursStackGasFlowRateSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter.
OperatingHoursStackGasMoistureContentSubstituted	If moisture correction is required and a continuous moisture monitor is used, the total operating hours in which a substitute data value was used in the emissions calculations for the stack gas moisture content parameter.

Figure 14
Sample XML Excerpt for CEMS Details

```

<ghg:CEMSDetails>
  <ghg:OperatingHoursCO2ConcentrationSubstituted>1</ghg:OperatingHoursCO2Co
ncentrationSubstituted>
  <ghg:OperatingHoursStackGasFlowRateSubstituted>2</ghg:OperatingHoursStackG
asFlowRateSubstituted>
  <ghg:OperatingHoursStackGasMoistureContentSubstituted>3</ghg:OperatingHours
StackGasMoistureContentSubstituted>
</ghg:CEMSDetails>

```

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

4.2 Appendix G, Equation G-4 Details

For each unit for which the facility selects "Appendix G, Equation G-4" as the Part 75 methodology used to determine CO₂ mass emissions, Subpart D requires the facility to provide the following additional information [98.3(c)(8)]:

- The total number of operating hours during the year that fuel flow rate was missing.
- The total number of operating hours during the year that high heating value was missing.

Figure 15
Appendix G, Equation G-4 Details Schema Diagram

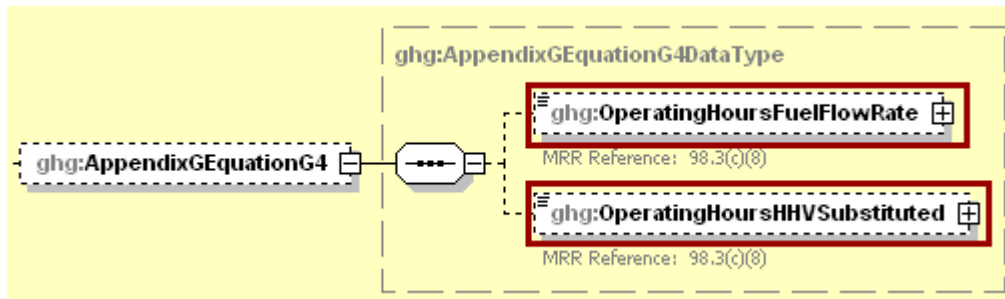


Table 5
Appendix G, Equation G-4 Details XML Data Elements

Data Element Name	Description
AppendixGEquationG4	Report if "Appendix G, Equation G-4" was indicated as the Part 75 methodology used to determine CO ₂ mass emissions.
OperatingHoursFuelFlowRate	Total number of operating hours during the year that fuel flow rate was missing
OperatingHoursHHVSubstituted	Total number of operating hours during the year that high heating value was missing.

Figure 16
Sample XML Excerpt for Appendix G, Equation G-4 Details

```

<ghg:AppendixGEquationG4>
  <ghg:OperatingHoursFuelFlowRate>1</ghg:OperatingHoursFuelFlowRate>
  <ghg:OperatingHoursHHVSubstituted>2</ghg:OperatingHoursHHVSubstituted>
</ghg:AppendixGEquationG4>
    
```

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

4.3 Appendix G, Equation G-1 Details

For each unit for which the facility selects "Appendix G, Equation G-1" as the Part 75 methodology used to determine CO₂ mass emissions, Subpart D requires the facility to provide the following additional information [98.3(c)(8)]:

- The total number of operating hours during the year that fuel carbon content was missing.

Figure 17
Appendix G, Equation G-1 Details Schema Diagram

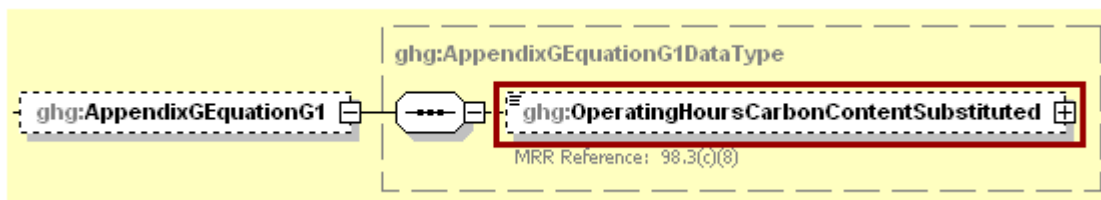


Table 6
Appendix G, Equation G-1 Details XML Data Elements

Data Element Name	Description
AppendixGEquationG1	Report if "Appendix G, Equation G-1" was indicated as the Part 75 methodology used to determine CO ₂ mass emissions.
OperatingHoursCarbonContentSubstituted	The total number of operating hours in the reporting year for which missing data substitution was used for carbon content values.

Figure 18
Sample XML Excerpt for Appendix G, Equation G-1 Details

```

<ghg:AppendixGEquationG1 >
  <ghg:OperatingHoursCarbonContentSubstituted>1</ghg:OperatingHoursCarbonContentSubstituted >
</ghg:AppendixGEquationG1 >
    
```

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

5.0 Facility-Level Roll-up Emissions

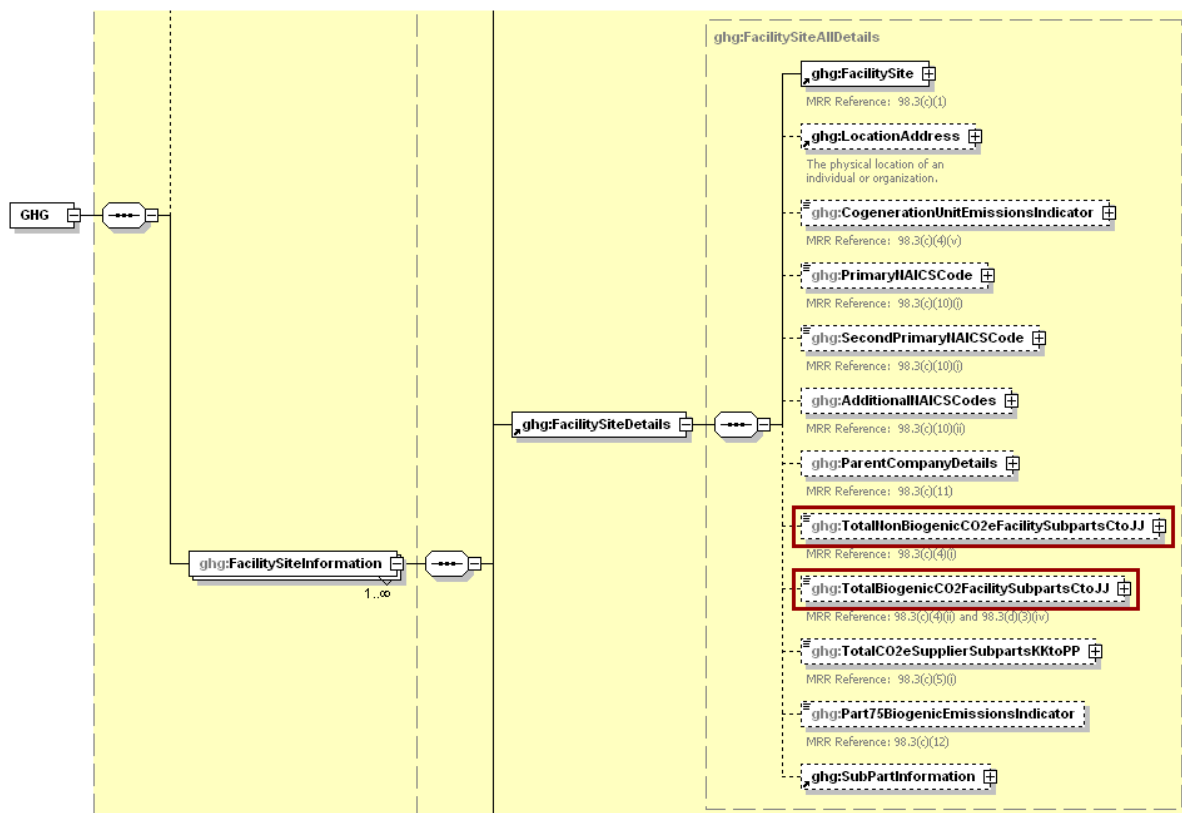
Each facility must report the following facility-level emission totals:

- Total CO₂ equivalent (CO₂e) emissions (excluding biogenic CO₂) aggregated across all direct emitter source categories (subparts C-HH) associated with the facility.
- Total biogenic CO₂ emissions aggregated across all direct emitter source categories (subparts C-HH) associated with the facility.

Each supplier must report the following supplier totals:

- Total CO₂e associated with products supplied aggregated across subparts NN, OO and PP (as applicable). Do not include subpart LL and MM totals in this data element as these values are not being collected in e-GGRT.

Figure 19
Facility-Level Roll-up Emissions Schema Diagram



1) Add the total CO₂e value for Subpart D in metric tons to the total CO₂e emissions (excluding biogenic CO₂) aggregated across all source category subparts associated with the facility according to the following guidelines:

- Add the annual CO₂ emissions in metric tons rounded to one decimal place minus the total biogenic CO₂ mass emissions in metric tons rounded to one decimal place for each unit.
- Add the CO₂ equivalent value for annual CH₄ emissions in metric tons rounded to one decimal place for each fuel used in each unit.

- Add the CO₂ equivalent value for annual N₂O emissions in metric tons rounded to one decimal place for each fuel used in each unit.
- 2) Add the total biogenic CO₂ mass emissions from each unit in metric tons rounded to one decimal place to the total biogenic CO₂ aggregated across all source category subparts associated with the facility.

Table 7
Facility Level Roll-up Emissions XML Data Elements

Data Element Name	Description
TotalNonBiogenicCO2eFacilitySubpartsCtoJJ	Add the total CO ₂ e value for Subpart D in metric tons to the total CO ₂ e emissions (excluding biogenic CO ₂) aggregated across all source category subparts associated with the facility according to the guidelines above.
TotalNonBiogenicCO2eFacilitySubpartsCtoJJ.massUOM	Metric Tons
TotalBiogenicCO2FacilitySubpartsCtoJJ	Add the total annual biogenic CO ₂ value for Subpart D in metric tons to the total biogenic CO ₂ emissions aggregated across all source category subparts associated with the facility according to the guideline above.
TotalBiogenicCO2FacilitySubpartsCtoJJ.massUOM	Metric Tons

Figure 20
Sample XML Excerpt for Facility Level Roll-up Emissions

```

<ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric
Tons"> 10100.2 </ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ >
<ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">1000 </ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ >
<ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">0 </ghg:TotalCO2eSupplierSubpartsKKtoPP >
```

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

Appendix A

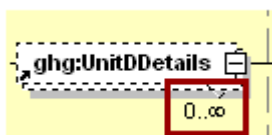
Legend for Tables

Blue = parent element

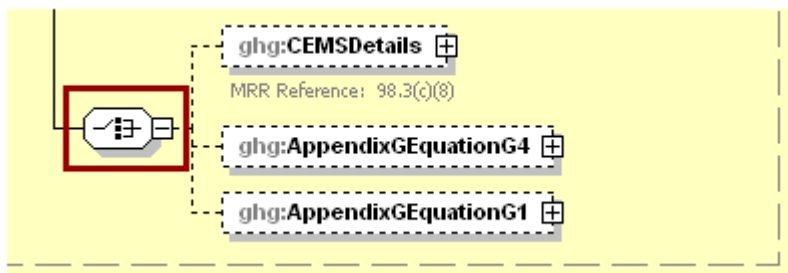
Legend for XML Schema

Red box = relevant for reporting

The following XML symbol “0..∞” means that multiple occurrences for the parent element can be reported:



The following XML symbol for “or” means that only one of the data elements following the sign can be reported for the current instance of the parent element:



Appendix B

Sample XML Document for Subpart D

(Note: Data values do not reflect an actual facility's emissions.)

```

<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>2010</ghg:ReportingYear>
    <ghg:FacilitySiteDetails>
      <ghg:FacilitySite>
        <ghg:FacilitySiteIdentifier>524477</ghg:FacilitySiteIdentifier>
        <ghg:FacilitySiteName>Test Facility D</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>237130</ghg:PrimaryNAICSCode>
      <ghg>TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric Tons">10100.2</ghg>TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
      <ghg>TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">1000</ghg>TotalBiogenicCO2FacilitySubpartsCtoJJ>
      <ghg>TotalCO2eSupplierSubpartsKktoPP massUOM="Metric Tons">0</ghg>TotalCO2eSupplierSubpartsKktoPP>
      <ghg:SubPartInformation>
        <ghg:SubPartD>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>1000</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Methane</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>47.62</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>0.323</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>9000</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:UnitDDetails>
            <ghg:UnitIdentification>
              <ghg:UnitName>004-LME</ghg:UnitName>
              <ghg:UnitDescription>LME unit</ghg:UnitDescription>
              <ghg:UnitType>Electricity Generator</ghg:UnitType>
            </ghg:UnitIdentification>
            <ghg:TierMethodologyStartDate>2010-01-01</ghg:TierMethodologyStartDate>
            <ghg:TierMethodologyEndDate>2010-12-31</ghg:TierMethodologyEndDate>
            <ghg:isAcidRainProgramIndicator>Y</ghg:isAcidRainProgramIndicator>
            <ghg:AnnualCO2EmissionsMonitoredLocationShortTons massUOM="Short Tons">
              <ghg:CalculatedValue>4409.0</ghg:CalculatedValue>
            </ghg:AnnualCO2EmissionsMonitoredLocationShortTons>
            <ghg:AnnualCO2EmissionsMonitoredLocationMetricTons massUOM="Metric Tons">
              <ghg:CalculatedValue>4000.0</ghg:CalculatedValue>
            </ghg:AnnualCO2EmissionsMonitoredLocationMetricTons>
            <ghg:AnnualCO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
              <ghg:CalculatedValue>400.0</ghg:CalculatedValue>
            </ghg:AnnualCO2EmissionsAllBiomassFuelsCombined>
            <ghg:ElectricityFuelDetails>
  
```

```

    <ghg:FuelType>Coke</ghg:FuelType>
    <ghg:CH4EmissionsCO2Equivalent massUOM="Metric Tons">
      <ghg:CalculatedValue>400.0</ghg:CalculatedValue>
    </ghg:CH4EmissionsCO2Equivalent>
    <ghg:N2OEmissionsCO2Equivalent massUOM="Metric Tons">
      <ghg:CalculatedValue>40.0</ghg:CalculatedValue>
    </ghg:N2OEmissionsCO2Equivalent>
  </ghg:ElectricityFuelDetails>
</ghg:UnitDDetails>
<ghg:UnitDDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>003-AG-Eq G-4</ghg:UnitName>
    <ghg:UnitDescription>Appendix G, Eq. G-4 unit</ghg:UnitDescription>
    <ghg:UnitType>Electricity Generator</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:Part75Methodology>Appendix G, Equation G-4</ghg:Part75Methodology>
  <ghg:TierMethodologyStartDate>2010-01-01</ghg:TierMethodologyStartDate>
  <ghg:TierMethodologyEndDate>2010-12-31</ghg:TierMethodologyEndDate>
  <ghg:isAcidRainProgramIndicator>Y</ghg:isAcidRainProgramIndicator>
  <ghg:AnnualCO2EmissionsMonitoredLocationShortTons massUOM="Short Tons">
    <ghg:CalculatedValue>3307.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMonitoredLocationShortTons>
  <ghg:AnnualCO2EmissionsMonitoredLocationMetricTons massUOM="Metric Tons">
    <ghg:CalculatedValue>3000.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMonitoredLocationMetricTons>
  <ghg:AnnualCO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
    <ghg:CalculatedValue>300.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsAllBiomassFuelsCombined>
  <ghg:ElectricityFuelDetails>
    <ghg:FuelType>Anthracite</ghg:FuelType>
    <ghg:CH4EmissionsCO2Equivalent massUOM="Metric Tons">
      <ghg:CalculatedValue>300.0</ghg:CalculatedValue>
    </ghg:CH4EmissionsCO2Equivalent>
    <ghg:N2OEmissionsCO2Equivalent massUOM="Metric Tons">
      <ghg:CalculatedValue>30.0</ghg:CalculatedValue>
    </ghg:N2OEmissionsCO2Equivalent>
  </ghg:ElectricityFuelDetails>
  <ghg:AppendixGEquationG4>
    <ghg:OperatingHoursFuelFlowRate>1</ghg:OperatingHoursFuelFlowRate>
    <ghg:OperatingHoursHHVSubstituted>2</ghg:OperatingHoursHHVSubstituted>
  </ghg:AppendixGEquationG4>
</ghg:UnitDDetails>
<ghg:UnitDDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>002-AG-Eq G-1</ghg:UnitName>
    <ghg:UnitDescription>Appendix G, Eq. G-1 unit</ghg:UnitDescription>
    <ghg:UnitType>Electricity Generator</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:Part75Methodology>Appendix G, Equation G-1</ghg:Part75Methodology>
  <ghg:TierMethodologyStartDate>2010-01-01</ghg:TierMethodologyStartDate>
  <ghg:TierMethodologyEndDate>2010-12-31</ghg:TierMethodologyEndDate>
  <ghg:isAcidRainProgramIndicator>N</ghg:isAcidRainProgramIndicator>
  <ghg:AnnualCO2EmissionsMonitoredLocationShortTons massUOM="Short Tons">
    <ghg:CalculatedValue>2205.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMonitoredLocationShortTons>
  <ghg:AnnualCO2EmissionsMonitoredLocationMetricTons massUOM="Metric Tons">
    <ghg:CalculatedValue>2000.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMonitoredLocationMetricTons>
  <ghg:AnnualCO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
    <ghg:CalculatedValue>200.0</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsAllBiomassFuelsCombined>
  <ghg:ElectricityFuelDetails>
    <ghg:FuelType>Bituminous</ghg:FuelType>
    <ghg:CH4EmissionsCO2Equivalent massUOM="Metric Tons">
      <ghg:CalculatedValue>200.0</ghg:CalculatedValue>
    </ghg:CH4EmissionsCO2Equivalent>
    <ghg:N2OEmissionsCO2Equivalent massUOM="Metric Tons">
      <ghg:CalculatedValue>20.0</ghg:CalculatedValue>
    </ghg:N2OEmissionsCO2Equivalent>
  </ghg:ElectricityFuelDetails>
  <ghg:AppendixGEquationG1>
    <ghg:OperatingHoursCarbonContentSubstituted>1</ghg:OperatingHoursCarbonContentSubstituted>
  </ghg:AppendixGEquationG1>
</ghg:UnitDDetails>
<ghg:UnitDDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>001-CEMS</ghg:UnitName>
    <ghg:UnitDescription>CEMS unit</ghg:UnitDescription>
    <ghg:UnitType>Electricity Generator</ghg:UnitType>
  </ghg:UnitIdentification>

```

```
<ghg:Part75Methodology>CEMS</ghg:Part75Methodology>
<ghg:TierMethodologyStartDate>2010-01-01</ghg:TierMethodologyStartDate>
<ghg:TierMethodologyEndDate>2010-12-31</ghg:TierMethodologyEndDate>
<ghg:isAcidRainProgramIndicator>N</ghg:isAcidRainProgramIndicator>
<ghg:AnnualCO2EmissionsMonitoredLocationShortTons massUOM="Short Tons">
  <ghg:CalculatedValue>1102.0</ghg:CalculatedValue>
</ghg:AnnualCO2EmissionsMonitoredLocationShortTons>
<ghg:AnnualCO2EmissionsMonitoredLocationMetricTons massUOM="Metric Tons">
  <ghg:CalculatedValue>1000.0</ghg:CalculatedValue>
</ghg:AnnualCO2EmissionsMonitoredLocationMetricTons>
<ghg:AnnualCO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
  <ghg:CalculatedValue>100.0</ghg:CalculatedValue>
</ghg:AnnualCO2EmissionsAllBiomassFuelsCombined>
<ghg:ElectricityFuelDetails>
  <ghg:FuelType>Mixed (Electric Power sector)</ghg:FuelType>
  <ghg:CH4EmissionsCO2Equivalent massUOM="Metric Tons">
    <ghg:CalculatedValue>100.0</ghg:CalculatedValue>
  </ghg:CH4EmissionsCO2Equivalent>
  <ghg:N2OEmissionsCO2Equivalent massUOM="Metric Tons">
    <ghg:CalculatedValue>10.0</ghg:CalculatedValue>
  </ghg:N2OEmissionsCO2Equivalent>
</ghg:ElectricityFuelDetails>
<ghg:CEMSDetails>
  <ghg:OperatingHoursCO2ConcentrationSubstituted>1</ghg:OperatingHours
CO2ConcentrationSubstituted>
  <ghg:OperatingHoursStackGasFlowRateSubstituted>2</ghg:OperatingHours
StackGasFlowRateSubstituted>
  <ghg:OperatingHoursStackGasMoistureContentSubstituted>3</ghg:Operatin
gHoursStackGasMoistureContentSubstituted>
</ghg:CEMSDetails>
</ghg:UnitDDetails>
</ghg:SubPartD>
</ghg:SubPartInformation>
</ghg:FacilitySiteDetails>
<ghg:CalculationMethodologyChangesDescription>None</ghg:CalculationMethodologyChangesDescription>
<ghg:BestAvailableMonitoringMethodsUsed>N/A</ghg:BestAvailableMonitoringMethodsUsed>
<ghg:StartDate>2010-01-01</ghg:StartDate>
<ghg:EndDate>2010-12-31</ghg:EndDate>
<ghg:DateTimeReportGenerated>2011-08-09T09:58:09</ghg:DateTimeReportGenerated>
</ghg:FacilitySiteInformation>
</ghg:GHG>
```