

# Greenhouse Gas Reporting Program

## XML Reporting Instructions for Subpart Q – Iron and Steel Production

United States Environmental Protection Agency  
Climate Change Division  
Washington, DC

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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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## 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 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 includes 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 is available for download at the GHGRP web site here: [http://www.epa.gov/climatechange/emissions/e-ggrr\\_xml.html](http://www.epa.gov/climatechange/emissions/e-ggrr_xml.html). The zip file contains:

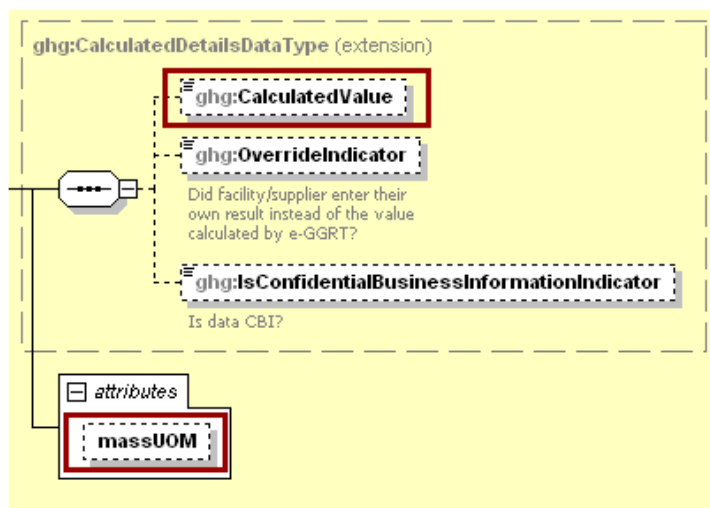
- **GHG\_Final.xsd and Included Files**
- **SchemaChanges.xlsx**

This document provides a step-by-step description of how to report data for Subpart Q Iron and Steel Production and overall total Subpart Q greenhouse gas data for a facility using the XML schema. Please note the following:

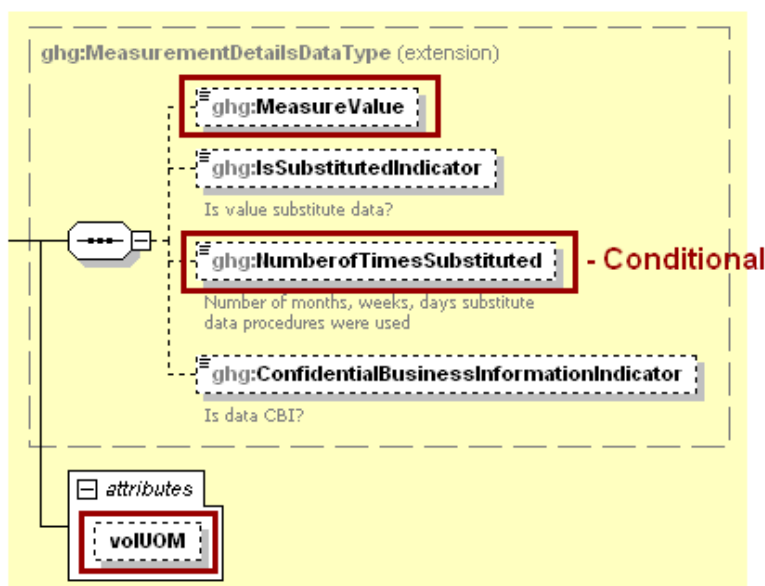
- **Not all data elements included in the schema must be reported.** Required or relevant data components and data elements are boxed in red in the schema diagrams and listed in the tables. If a data element is not listed, it does not need to be reported (e.g., deferred data elements, IsConfidentialBusinessInformationIndicator).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

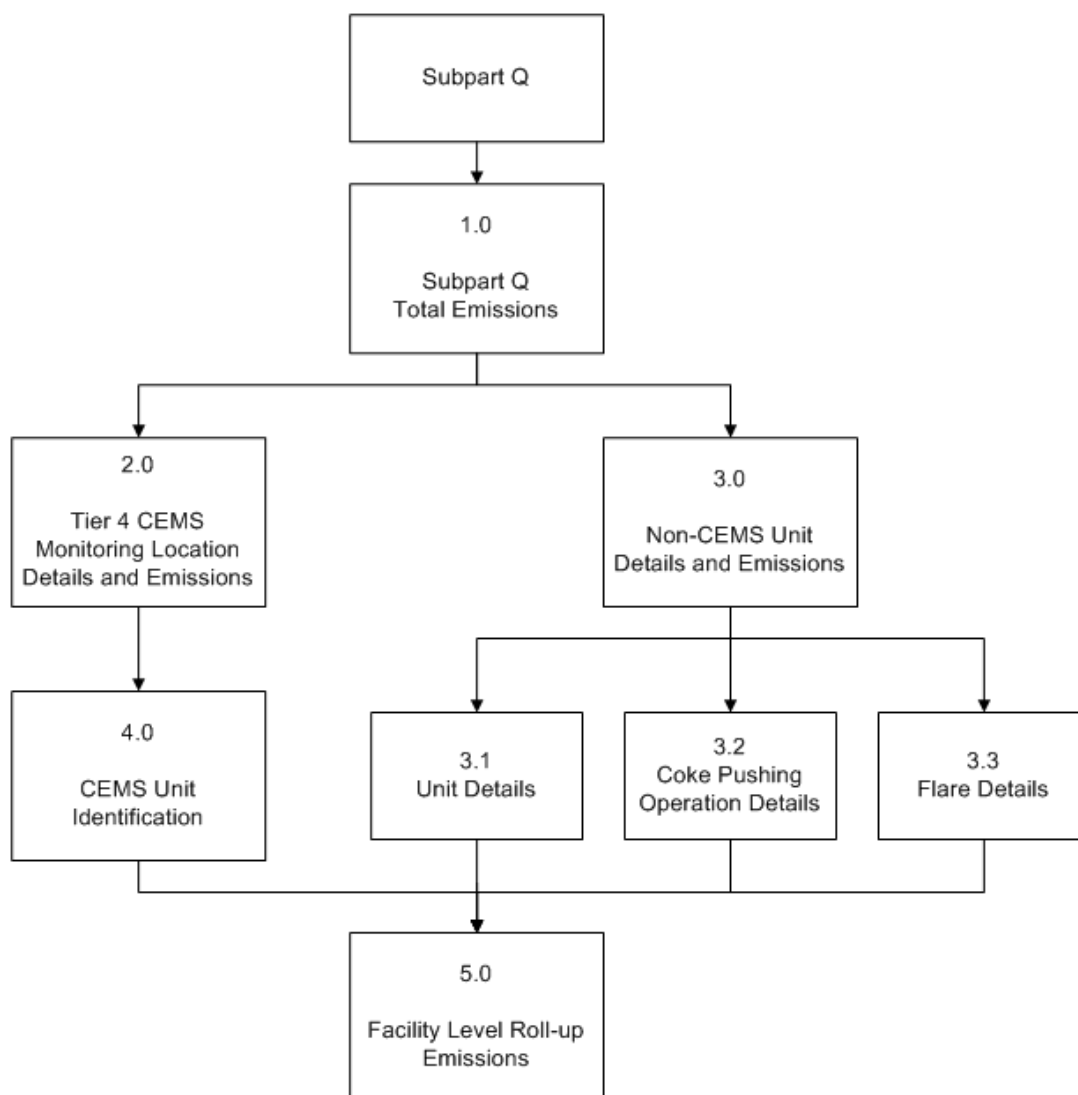


**Figure 2**  
**Sample Measured Value Schema Diagram**





**Figure 3**  
**Subpart Q Reporting Diagram**



Subpart Q consists of facilities with any of the following processes: taconite iron ore processing, integrated iron and steel manufacturing, coke making not collocated with an integrated iron and steel manufacturing process, and electric arc furnace (EAF) steelmaking not collocated with an integrated iron and steel manufacturing process. Integrated iron and steel manufacturing means the production of steel from iron ore or iron ore pellets. At a minimum, an integrated iron and steel manufacturing process has a basic oxygen furnace for refining molten iron into steel. Each cokemaking process and EAF process located at a facility with an integrated iron and steel manufacturing process is part of the integrated iron and steel manufacturing facility.

The XML schema includes the following areas for reporting for Subpart Q, as diagramed in Figure 3 above:

- 1.0 Subpart Q Total Emissions: includes the total greenhouse gas emissions required to be reported for Subpart Q.

- 2.0 Tier 4 CEMS Monitoring Location Details and Emissions: includes information on each continuous emission monitoring system (CEMS) monitoring location.
- 3.0 Non-CEMS Unit Details and Emissions: includes information on each unit and process for which a CEMS was not used to monitor emissions.
  - 3.1 Unit Details: includes information on each taconite indurating furnace, basic oxygen furnace, non-recovery coke oven battery combustion stack, sinter process, electric arc furnace, decarburization vessel (limited to argon oxygen decarburization vessels in 2010) and direct reduction furnace.
  - 3.2 Coke Pushing Operation Details: includes information for each coke pushing operation.
  - 3.3 Flare Details: includes information for flares that burn blast furnace gas and coke oven gas according to procedures set out in Subpart Y of Part 98.
- 4.0 CEMS Unit Identification: includes identification and production information for each taconite indurating furnace, basic oxygen furnace, non-recovery coke oven battery combustion stack, sinter process, electric arc furnace, decarburization vessel and direct reduction furnace for which a CEMS was used to monitor emissions.
- 5.0 Facility Level Roll-up Emissions: includes information on how to report total emissions for CO<sub>2</sub>e (excluding biogenic CO<sub>2</sub>) and biogenic CO<sub>2</sub> from Subpart Q at the facility level.

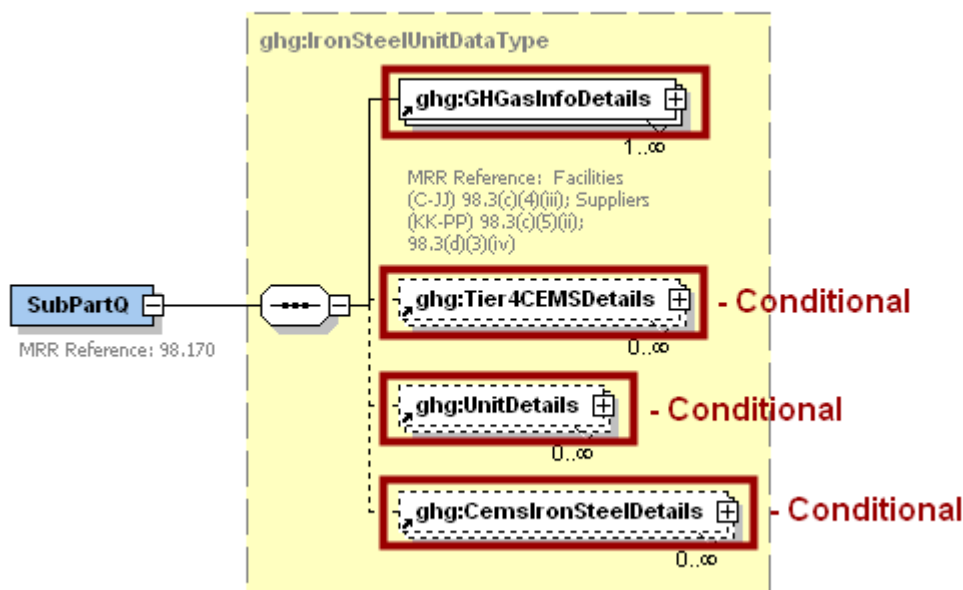
The following terminology is used throughout this document:

- 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) CO<sub>2</sub>e and CO<sub>2</sub> 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.
- 2) CH<sub>4</sub> emissions data expressed in metric tons should be rounded to two decimal places.
- 3) N<sub>2</sub>O emissions data expressed in metric tons should be rounded to three decimal places.
- 4) Emissions data for all greenhouse gases other than CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> 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.).
- 5) 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.
- 6) In the case of aggregation/roll-ups, those calculations should be performed on the rounded values.

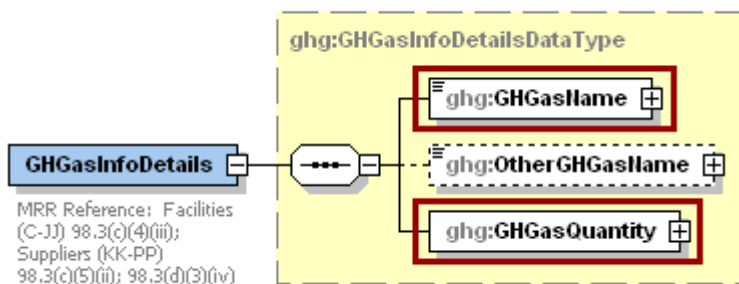
**Figure 4**  
**Subpart Q Schema Diagram**



## 1.0 Subpart Q 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 Q, expressed in metric tons.

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



For Subpart Q, report total emissions for carbon dioxide (excluding biogenic CO<sub>2</sub>), biogenic carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). For greenhouse gas quantity, report the calculated value and mass unit of measure (metric tons) only according to the following guidelines:

- 1) Total CO<sub>2</sub> emissions (excluding biogenic CO<sub>2</sub>) [98.3(c)(4)(iii)(B)]:
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS taconite indurating furnace (calculated using Equation Q-1) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS basic oxygen process furnace (calculated using Equation Q-2) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS non-recovery coke oven battery (calculated using Equation Q-3) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS sinter process (calculated using Equation Q-4) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS electric arc furnace (calculated using Equation Q-5) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS decarburization vessel (calculated using Equation Q-6) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS direct reduction furnace (calculated using Equation Q-7) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS unit (calculated using the site specific calculation methodology) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each coke pushing operation in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each flare in metric tons rounded to one decimal place.
  - Add the total annual CO<sub>2</sub> mass emissions measured by each CEMS in metric tons rounded to one decimal place. Then subtract the total annual biogenic CO<sub>2</sub> mass emissions for each CEMS monitoring location in metric tons rounded to one decimal place (the difference between the total CO<sub>2</sub> monitored by each CEMS and the total biogenic CO<sub>2</sub>).

- 2) Total biogenic CO<sub>2</sub> emissions [98.3(c)(4)(iii)(A)]:
- Add the total annual biogenic CO<sub>2</sub> mass emissions for each CEMS monitoring location in metric tons rounded to one decimal place.
- 3) Total CH<sub>4</sub> emissions [98.33(c)(2)]:
- Add the annual CH<sub>4</sub> mass emissions from each flare in metric tons rounded to two decimal places.
  - Add the total CH<sub>4</sub> emissions for each CEMS monitoring location in metric tons rounded to two decimal places.
- 4) Total N<sub>2</sub>O emissions [98.33(c)(2)]:
- Add the annual N<sub>2</sub>O mass emissions from each flare in metric tons rounded to three decimal places.
  - Add the total N<sub>2</sub>O emissions for each CEMS monitoring location in metric tons 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
GHGasQuantity	A collection of data elements that quantify the annual emissions from this facility category. Report the calculated value only using the guidelines above.
GHGasQuantity.massUOM	Metric Tons

**Figure 6**  
**Sample XML Excerpt for Greenhouse Gas Information Details**

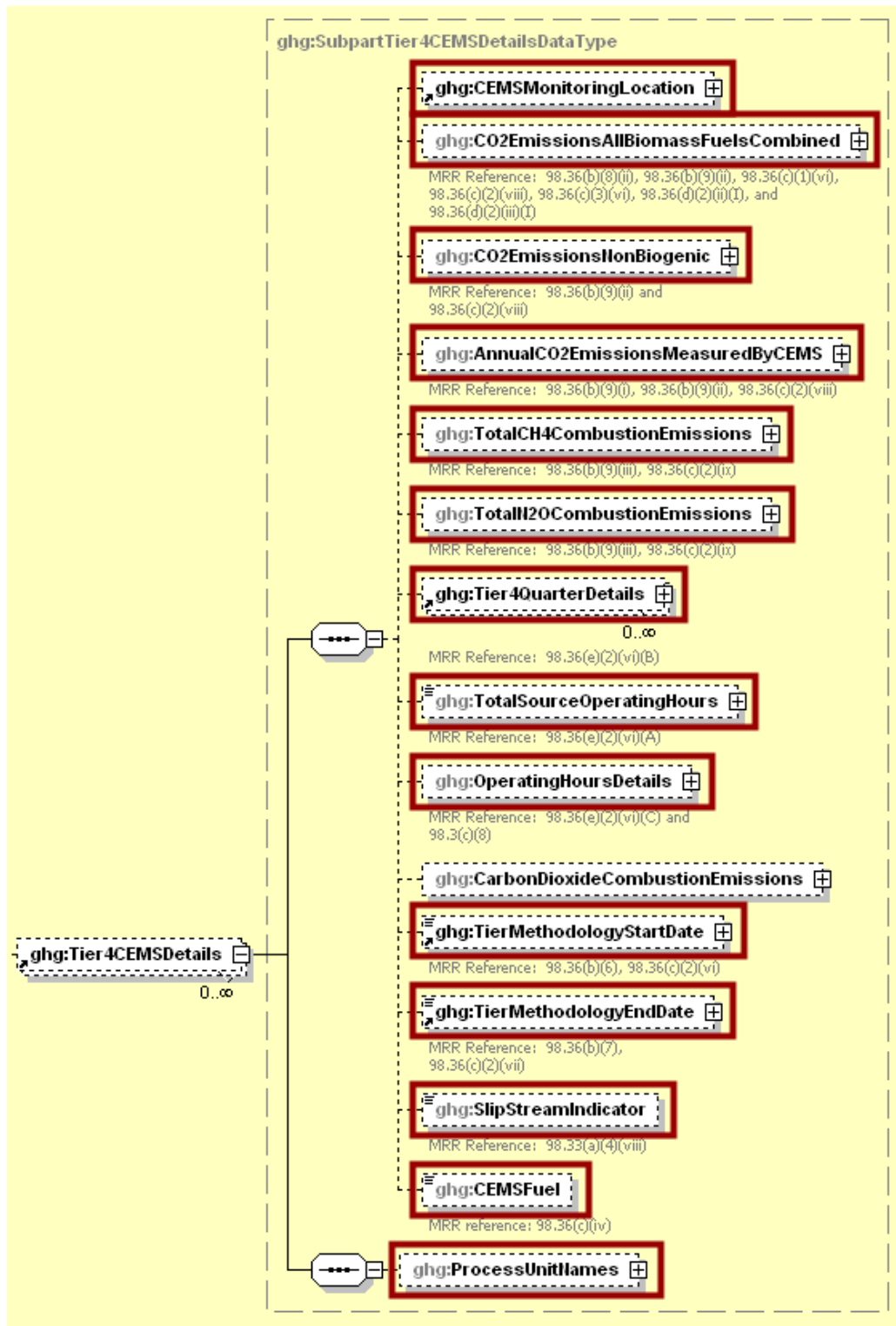
```
<ghg:SubPartQ>
  <ghg:GHGasInfoDetails>
    <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
    <ghg:GHGasQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>600</ghg:CalculatedValue>
    </ghg:GHGasQuantity>
  </ghg:GHGasInfoDetails>
  <ghg:GHGasInfoDetails>
    <ghg:GHGasName>Methane</ghg:GHGasName>
    <ghg:GHGasQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>280</ghg:CalculatedValue>
    </ghg:GHGasQuantity>
  </ghg:GHGasInfoDetails>
  <ghg:GHGasInfoDetails>
    <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
    <ghg:GHGasQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>29</ghg:CalculatedValue>
    </ghg:GHGasQuantity>
  </ghg:GHGasInfoDetails>
  <ghg:GHGasInfoDetails>
    <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
    <ghg:GHGasQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>130509</ghg:CalculatedValue>
    </ghg:GHGasQuantity>
  </ghg:GHGasInfoDetails>
</ghg:SubPartQ>
```

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

## 2.0 Tier 4 CEMS Monitoring Location Details and Emissions

This section includes information to be reported for each CEMS monitoring location (CML).

**Figure 7**  
**Tier 4 CEMS Details Schema Diagram**



For Subpart Q, information on each CEMS monitoring location (CML) is required including the name, an optional description and the configuration type. For each CML identified by the facility, the facility must specify the configuration type from the following list [98.176(e)]:

- Single industrial process or process unit that exhausts to a dedicated stack.
- Multiple industrial processes or process units share a common stack.
- Industrial process or process unit shares a common stack with a Tier 4 stationary fuel combustion unit.

For each CEMS monitoring location identified, the following emissions data must be reported:

- The total annual biogenic CO<sub>2</sub> mass emissions from combustion of all biomass fuels combined [98.36(b)(8)(ii)].
- The total annual non-biogenic CO<sub>2</sub> mass emissions (i.e., CO<sub>2</sub> mass emissions from fossil fuels, sorbent use, and process emissions) [98.36(b)(9)(ii)].
- The total annual CO<sub>2</sub> mass emissions measured by the CEMS [98.36(b)(9)(i)-(ii)].
- The total annual CH<sub>4</sub> mass emissions derived from Equation C-10, in metric tons CH<sub>4</sub> [98.36(b)(9)(iii), 98.36(c)(2)(ix)].
- The total annual N<sub>2</sub>O mass emissions derived from Equation C-10, in metric tons N<sub>2</sub>O [98.36(b)(9)(iii), 98.36(c)(2)(ix)].

**Figure 8**  
**Tier 4 CEMS Location and Emission Details Schema Diagram**





**Table 2**  
**Tier 4 CEMS Location and Emission Details XML Data Elements**

Data Element Name	Description
Tier4CEMSDetails	A collection of data elements containing information on emissions from combustion sources monitored with Tier 4 CEMS methodology.
CEMSMonitoringLocation	<p>A collection of data elements containing information on each CEMS monitoring location (CML). It includes the name, an optional description and the configuration type. See the list of allowable configuration types:</p> <p>Single process/process unit exhausts to dedicated stack  Multiple processes/process units share common stack  Process/stationary combustion units share common stack</p>
CO2EmissionsAllBiomassFuelsCombined	A collection of data elements containing information on the total annual biogenic CO <sub>2</sub> mass emissions for the specified CML. Report the calculated value and mass unit of measure only.
CO2EmissionsAllBiomassFuelsCombined.massUOM	Metric Tons
CO2EmissionsNonBiogenic	A collection of data elements containing information on the total annual non-biogenic CO <sub>2</sub> mass emissions (includes fossil fuel, sorbent, and process CO <sub>2</sub> emissions) for the specified CML. Report the calculated value and mass unit of measure only.
CO2EmissionsNonBiogenic.massUOM	Metric Tons
AnnualCO2EmissionsMeasuredByCEMS	A collection of data elements containing information on the total annual CO <sub>2</sub> mass emissions measured by the CEMS at the specified monitoring location. Report the calculated value and mass unit of measure only.
AnnualCO2EmissionsMeasuredByCEMS.massUOM	Metric Tons
TotalCH4CombustionEmissions	A collection of data elements containing information on the annual CH <sub>4</sub> mass emissions from combustion in the CML configuration during the reporting year calculated using Equation C-10 expressed in mass of CH <sub>4</sub> . Report the calculated value and mass unit of measure only.
TotalCH4CombustionEmissions.massUOM	Metric Tons
TotalN2OCombustionEmissions	A collection of data elements containing information on the annual N <sub>2</sub> O mass emissions from combustion in the CML configuration during the reporting year calculated using Equation C-10 expressed in mass of N <sub>2</sub> O. Report the calculated value and mass unit of measure only.
TotalN2OCombustionEmissions.massUOM	Metric Tons

### Figure 9 Sample XML Excerpt for Tier 4 CEMS Location and Emission Details

```

<ghg:Tier4CEMSDetails>
  <ghg:CEMSMonitoringLocation>
    <ghg:Name>006-CML</ghg:Name>
    <ghg:Description>CEMS monitoring location</ghg:Description>
    <ghg:Type>Single process/process unit exhausts to dedicated stack</ghg:Type>
  </ghg:CEMSMonitoringLocation>
  <ghg:CO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
    <ghg:CalculatedValue>600</ghg:CalculatedValue>
  </ghg:CO2EmissionsAllBiomassFuelsCombined>
  <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
    <ghg:CalculatedValue>700</ghg:CalculatedValue>
  </ghg:CO2EmissionsNonBiogenic>
  <ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
    <ghg:CalculatedValue>10000</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMeasuredByCEMS>
  <ghg>TotalCH4CombustionEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>80</ghg:CalculatedValue>
  </ghg>TotalCH4CombustionEmissions>
  <ghg>TotalN2OCombustionEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>9</ghg:CalculatedValue>
  </ghg>TotalN2OCombustionEmissions>

```

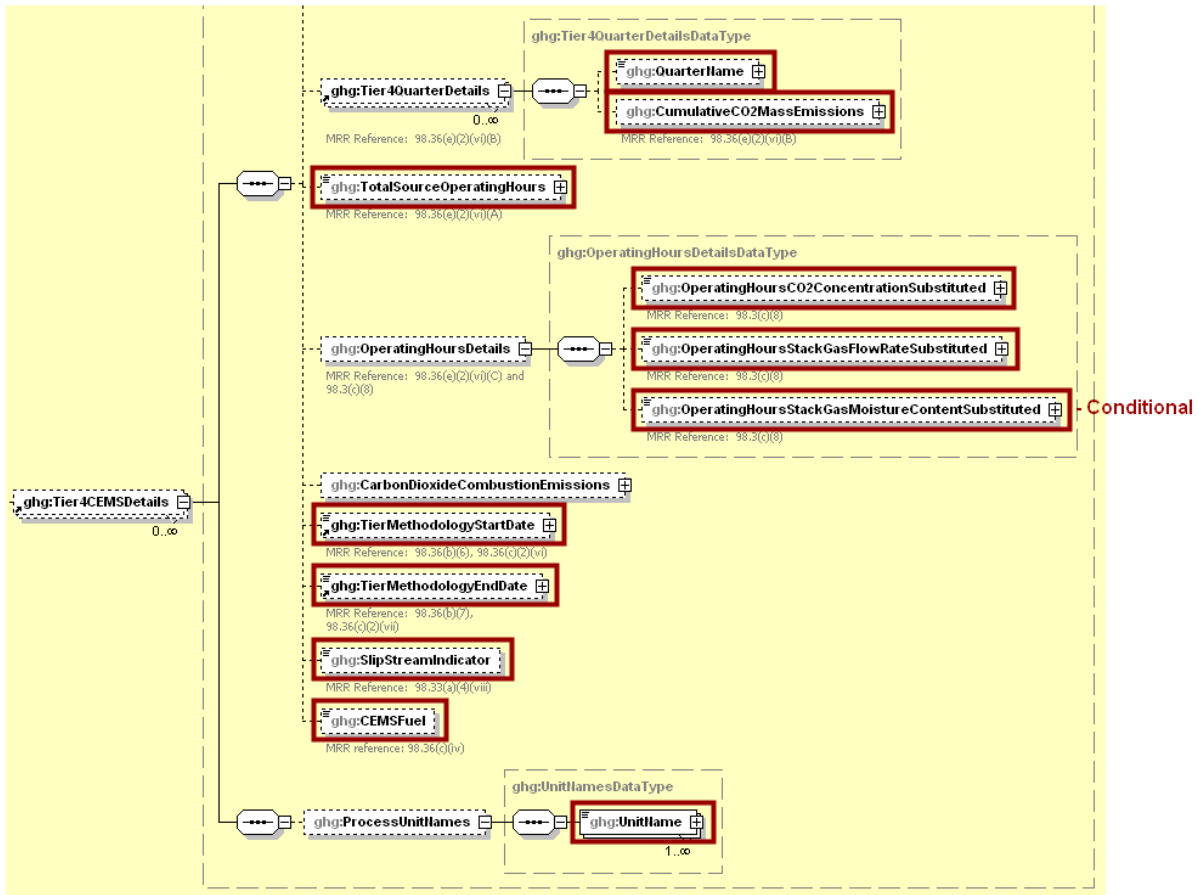
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

For each quarter of the reporting year, the facility must provide the cumulative CO<sub>2</sub> mass emissions for each CML [98.36(e)(2)(vi)(B)].

The facility must provide the following additional information for each CML:

- The total number of source operating hours in the reporting year [98.36(e)(2)(vi)(A)].
- The total operating hours in which a substitute data value was used in the emissions calculations for the CO<sub>2</sub> concentration parameter [98.36(e)(2)(vi)(C) and 98.3(c)(8)].
- The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter [98.36(e)(2)(vi)(C) and 98.3(c)(8)].
- 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 [98.36(e)(2)(vi)(C) and 98.3(c)(8)].
- The Tier 4 methodology start date [98.36(b)(6), 98.36(c)(2)(vi)].
- The Tier 4 methodology end date [98.36(b)(7), 98.36(c)(2)(vii)].
- Specify if emissions reported for the CEMS include emissions calculated according to 98.33(a)(4)(viii) for a slipstream that bypassed the CEMS [98.33(a)(4)(viii)].
- Each type of fuel combusted in the group of units during the reporting year [98.36(c)(1)(v)].
- The name of each process unit sharing the stack.

**Figure 10**  
**Tier 4 CEMS Quarter and Additional Details Schema Diagram**



**Table 3**  
**Tier 4 CEMS Quarter and Additional Details XML Data Elements**

Data Element Name	Description
Tier4QuarterDetails	A collection of data elements containing Tier 4 quarterly information.
QuarterName	The name of the quarter. See list of allowable values:  First Quarter Second Quarter Third Quarter Fourth Quarter
CumulativeCO2MassEmissions	A collection of data elements containing information on the cumulative CO <sub>2</sub> mass emissions for the specified quarter of the reporting year. Report the calculated value and mass unit of measure only.
CumulativeCO2MassEmissions.massUOM	Metric Tons

Data Element Name	Description
TotalSourceOperatingHours	The total number of source operating hours in the reporting year.
OperatingHoursDetails	A collection of data elements containing information on the number of operating hours in which substitute data values were used.
OperatingHoursCO2ConcentrationSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the CO <sub>2</sub> 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.
TierMethodologyStartDate	The tier methodology start date for the specified CEMS monitoring location.
TierMethodologyEndDate	The tier methodology end date for the specified CEMS monitoring location.
SlipStreamIndicator	An indication (Y/N) that the emissions reported for the CEMS include emissions calculated according to 98.33(a)(4)(viii) for a slipstream that bypassed the CEMS.
CEMSFuel	Each type of fuel combusted in the group of units during the reporting year.
ProcessUnitNames	A collection of data elements identifying each unit or furnace which was monitored at the specified CEMS monitoring location.
UnitName	The unit ID for each unit or furnace which was monitored at the specified CEMS monitoring location.

**Figure 11**  
**Sample XML Excerpt for Tier 4 CEMS Quarter and Additional Details**

```

<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>First Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>10000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Second Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>20000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Third Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>30000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>40000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:TotalSourceOperatingHours>7300</ghg:TotalSourceOperatingHours>
<ghg:OperatingHoursDetails>
  <ghg:OperatingHoursCO2ConcentrationSubstituted>66</ghg:OperatingHoursCO2Co
ncentrationSubstituted>
  <ghg:OperatingHoursStackGasFlowRateSubstituted>55</ghg:OperatingHoursStackG
asFlowRateSubstituted>
  <ghg:OperatingHoursStackGasMoistureContentSubstituted>44</ghg:OperatingHours
StackGasMoistureContentSubstituted>
</ghg:OperatingHoursDetails>
<ghg:TierMethodologyStartDate>2010-01-01-00:05</ghg:TierMethodologyStartDate>
<ghg:TierMethodologyEndDate>2010-12-31-00:05</ghg:TierMethodologyEndDate>
<ghg:SlipStreamIndicator>Y</ghg:SlipStreamIndicator>
<ghg:CEMSFuel>natural gas, coal</ghg:CEMSFuel>
<ghg:ProcessUnitNames>
  <ghg:UnitName>003-CEMS- NRCOB</ghg:UnitName>
</ghg:ProcessUnitNames>
</ghg:Tier4CEMSDetails>

```

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

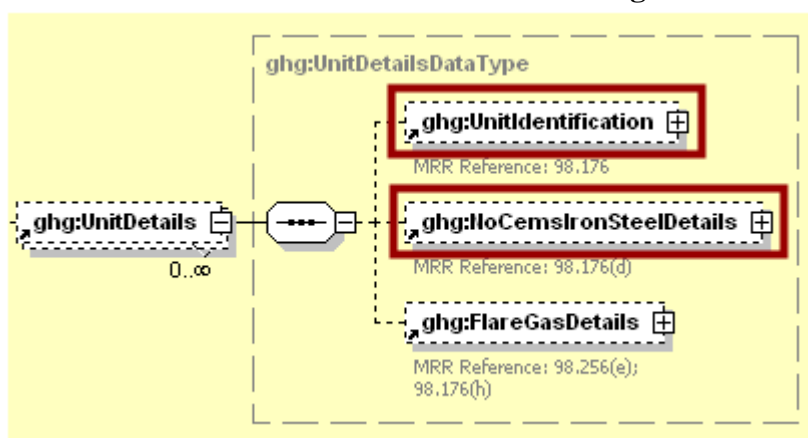
### 3.0 Non-CEMS Unit Details and Emissions

This section describes information which must be reported for each unit and process for which a CEMS was not used to monitor emissions.

#### 3.1 Unit Details

This section includes information to report for each taconite indurating furnace, basic oxygen process furnace, non-recovery coke oven battery, sinter process, electric arc furnace, decarburization vessel and direct reduction furnace for which a CEMS was not used to monitor emissions.

**Figure 12**  
**Non-CEMS Unit Details Schema Diagram**



Subpart Q requires the following identification information for each unit or process for which the carbon mass balance calculation methodology or the site-specific emission factor calculation methodology was used to calculate emissions:

- A unique unit name or identifier (e.g., a unit ID number).
- An optional unit description or label.
- The type of unit from the following:
  - Taconite Indurating Furnace
  - Basic Oxygen Process Furnace
  - Non-Recovery Coke Oven Battery
  - Sinter Process
  - Electric Arc Furnace (EAF)
  - Decarburization Vessel
  - Direct Reduction Furnace
  - EAF/Decarburization Vessel Exhausting to Common Stack/Vent (Note: This unit type does not apply to the carbon mass balance calculation methodology.)

Note: In 2010, the information required for decarburization vessels applies only to argon-oxygen decarburization vessels. However, for 2011 and subsequent calendar years, the reporting requirements apply to other decarburization vessels used to refine molten steel with the primary intent of removing carbon content of steel including, but not limited to, argon-oxygen decarburization vessels and vacuum oxygen decarburization vessels. This amendment was finalized in October 2010 (75 FR 66434).

**Table 4  
Unit Identification XML Data Elements**

Data Element Name	Description
UnitDetails	A collection of data elements containing details about each unit configuration that does not use a CEMS to measure CO <sub>2</sub> .
UnitIdentification	<p>A collection of data elements containing the identity of each iron and/or steel production process/process unit that does not use a CEMS to measure CO<sub>2</sub>. It includes the unit ID, an optional description, and the type of unit. See list of allowable unit types:</p> <p>Taconite Indurating Furnace                      Basic Oxygen Process Furnace                      Non-Recovery Coke Oven Battery                      Sinter Process                      Electric Arc Furnace (EAF)                      Decarburization Vessel                      Direct Reduction FurnaceEAF/Decarburization Vessel Exhausting to Common Stack/Vent</p> <p>Note: The last unit type listed does not apply to the carbon mass balance calculation methodology.</p>

**Figure 13  
Sample XML Excerpt for Unit Identification**

```

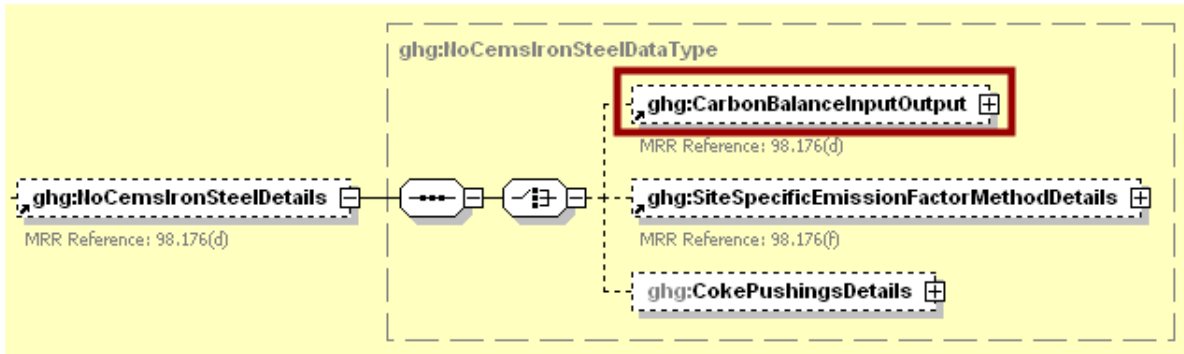
    <ghg:UnitDetails>
      <ghg:UnitIdentification>
        <ghg:UnitName>007- DV</ghg:UnitName>
        <ghg:UnitType>Decarburization Vessel</ghg:UnitType>
      </ghg:UnitIdentification>
    </ghg:UnitDetails>
  
```

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

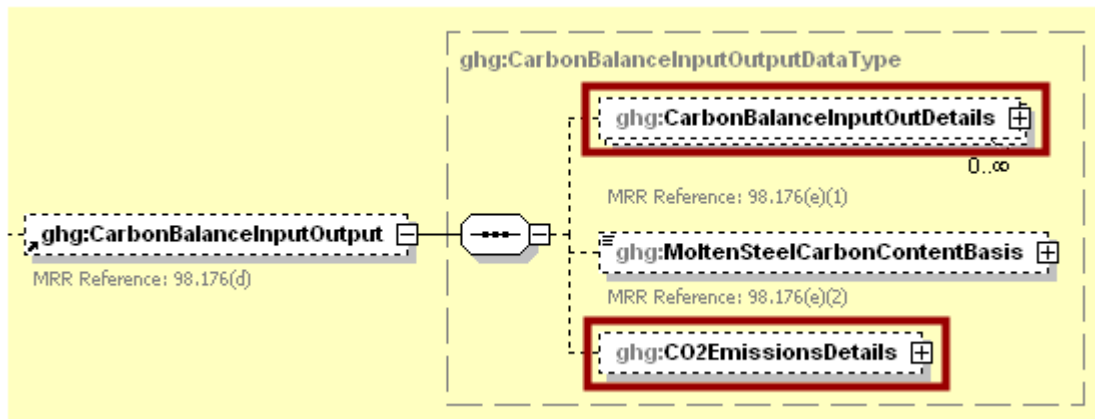
### 3.1.1 Carbon Mass Balance Calculation Methodology Details

This section describes the information to report for each unit for which the carbon mass balance calculation methodology was used to calculate emissions.

**Figure 14**  
**Non-CEMS Unit Calculation Methodology Schema Diagram**

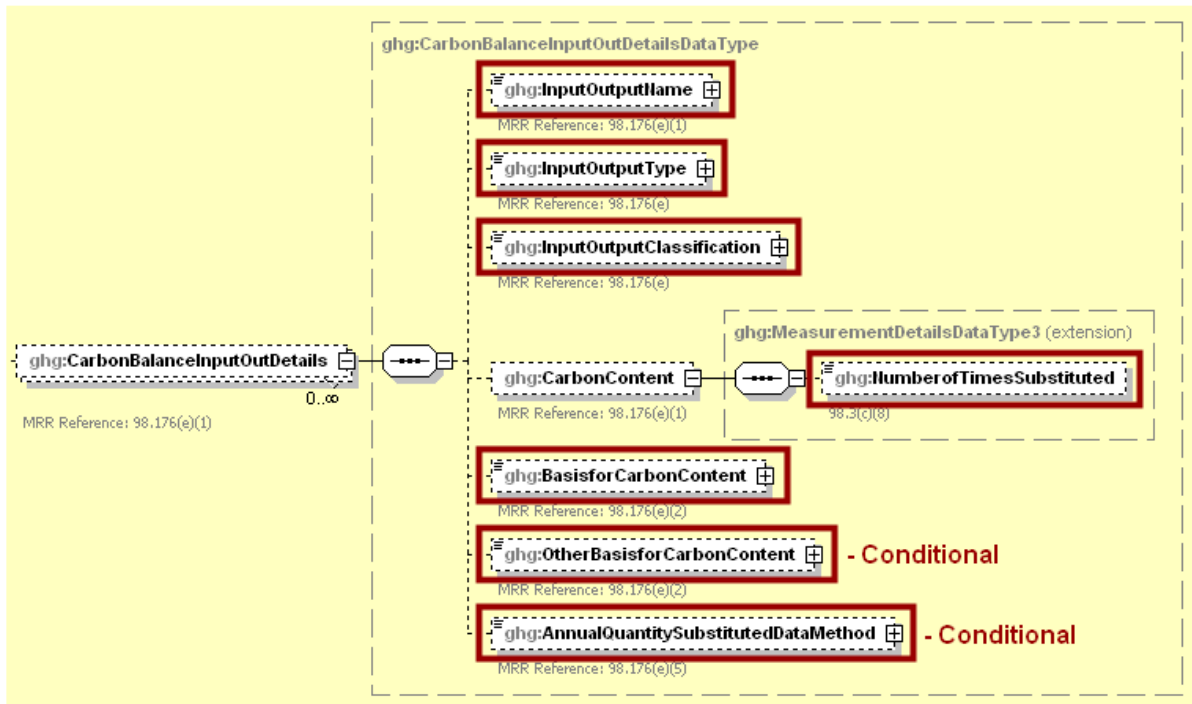


**Figure 15**  
**Carbon Mass Balance Calculation Methodology Details Schema Diagram**





**Figure 16**  
**Carbon Mass Balance Input/Output Details Schema Diagram**



For each input or output associated with a unit, Subpart Q requires you to report the following data:

- A unique name or identifier for the input or output.
- Type of input or output.
- Input or output classification.

For each input and output, the following information is required:

- The number of times that missing data procedures were followed or analysis was repeated to determine the carbon content [98.3(c)(8)].
- Carbon content determination method [98.176(e)(2)]:
  - Supplier provided information
  - ASTM C25-06
  - ASTM D5373-08
  - ASTM E1915-07a
  - ASTM E1019-08
  - ASM CS-104 UNS No. G10460
  - ISO/TR 15349-3:1998
  - Other (specify)
- If the annual mass or volume value of the process input or output was based on one or more substitute monthly data values calculated per the procedures described in §98.175(b), report:
  - the number of months that missing data procedures were followed to measure monthly mass or volume [98.176(e)(5)] and
  - the method used to develop the substitute data value [98.176(e)(5)].

**Table 5**  
**Carbon Mass Balance Input/Output Details XML Data Elements**

Data Element Name	Description
NoCemIronSteelDetails	A collection of data elements containing information about the unit specified.
CarbonBalanceInputOutput	A collection of data elements containing details about each process or process unit that uses the carbon mass balance calculation methodology to determine emissions.
CarbonBalanceInputOutDetails	A collection of data elements containing details about the specific carbon mass balance inputs and outputs.
InputOutputName	The name of each process input and output for the specified unit.
InputOutputType	<p>The type of each process input and output for the specified unit. See list of allowable values:</p> <ul style="list-style-type: none"> <li>Solid Fuel</li> <li>Liquid Fuel</li> <li>Gaseous Fuel</li> <li>Solid Greenball Taconite Pellets</li> <li>Other - Solid</li> <li>Other - Liquid</li> <li>Other - Gas</li> <li>Solid Fired Pellets Produces</li> <li>Solid Air Pollution Control Residue</li> <li>Molten Iron</li> <li>Ferrous Scrap</li> <li>Flux Material</li> <li>Carbonaceous Material</li> <li>Coal</li> <li>Mixed Sinter Feed that form the Bed</li> <li>Direct Reduced Iron</li> <li>Carbon Electrode Consumed</li> <li>Molten Steel</li> <li>Other Solid Input</li> <li>Gaseous Fuel</li> <li>Iron Ore Iron ore Pellets</li> <li>Slag Produced</li> <li>Molten Steel Produced</li> <li>Air Pollution Control Residue</li> <li>Coke</li> <li>Sinter Produced</li> <li>Other Solid Output</li> <li>Iron Produced</li> <li>Non-metallic Materials Produced</li> <li>Solid Fired Pellets Produces</li> <li>Solid Air Pollution Control Residue</li> </ul>
InputOutputClassification	<p>An indication of whether the material specified is an input or output. See list of allowable values:</p> <ul style="list-style-type: none"> <li>Input</li> <li>Output</li> </ul>

Data Element Name	Description
CarbonContent	A parent data element containing information on the carbon content of the specified input or output.
NumberofTimesSubstituted	The number of months that missing data procedures were followed or analysis was repeated to determine the carbon content of the specified process input or output.
BasisforCarbonContent	<p>The carbon content determination method. See list of allowable values:</p> <p>Supplier                      ASTM C25-06                      ASTM D5373-08                      ASTM E1915-07a                      ASTM E1019-08                      ASM CS-104 UNS No. G10460                      ISO/TR 15349-3:1998                      Other (specify)</p>
OtherBasisforCarbonContent	The carbon content determination method if "Other (specify)" was reported for BasisforCarbonContent.
AnnualQuantitySubstitutedDataMethod	If the missing data procedures in §98.175(b) were used, report the number of months that missing data procedures were followed to measure monthly mass or volume and how the monthly mass or volume for each process input or output with missing data was determined.

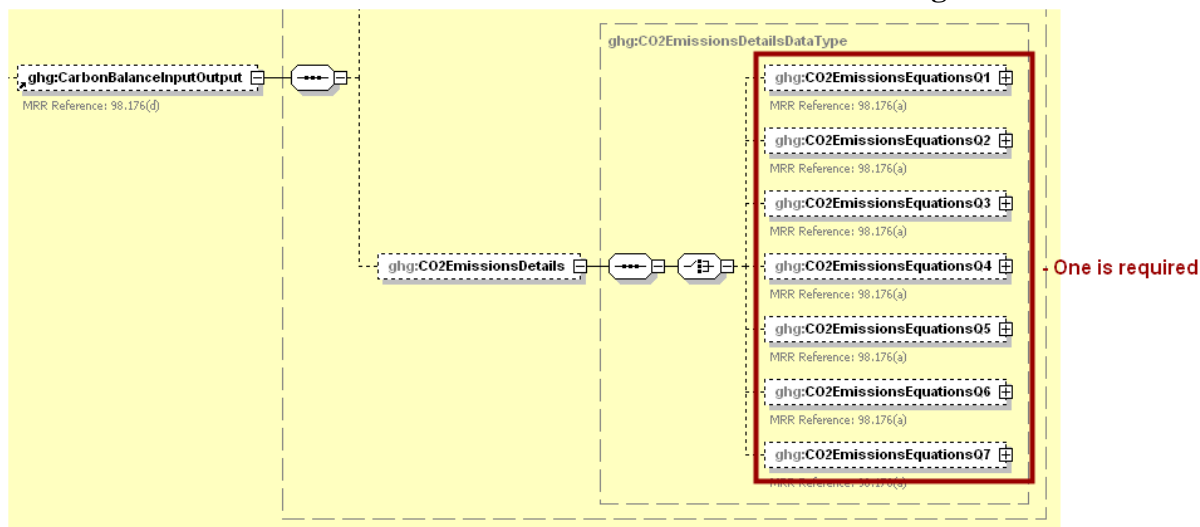
**Figure 17**  
**Sample XML Excerpt for Carbon Mass Balance Input/Output Details**

```

    <ghg:NoCemsIronSteelDetails>
      <ghg:CarbonBalanceInputOutput>
        <ghg:CarbonBalanceInputOutDetails>
          <ghg:InputOutputName>Molten Steel
          Input</ghg:InputOutputName>
          <ghg:InputOutputType>Molten Steel</ghg:InputOutputType>
          <ghg:InputOutputClassification>Input</ghg:InputOutputClassification>
          <ghg:CarbonContent>
            <ghg:NumberofTimesSubstituted>9</ghg:NumberofTimesSubstituted>
          </ghg:CarbonContent>
          <ghg:BasisforCarbonContent>ISO/TR 15349-3:1998</ghg:BasisforCarbonContent>
          <ghg:AnnualQuantitySubstitutedDataMethod>3 months, Method 9</ghg:AnnualQuantitySubstitutedDataMethod>
        </ghg:CarbonBalanceInputOutDetails>
      </ghg:CarbonBalanceInputOutput>
      <ghg:CarbonBalanceInputOutDetails>
        <ghg:InputOutputName>Gas Output</ghg:InputOutputName>
        <ghg:InputOutputType>Other - Gas</ghg:InputOutputType>
        <ghg:InputOutputClassification>Output</ghg:InputOutputClassification>
        <ghg:CarbonContent>
          <ghg:NumberofTimesSubstituted>8</ghg:NumberofTimesSubstituted>
        </ghg:CarbonContent>
        <ghg:BasisforCarbonContent>ASM CS-104 UNS No. G10460</ghg:BasisforCarbonContent>
        <ghg:AnnualQuantitySubstitutedDataMethod>2 months, Method 8</ghg:AnnualQuantitySubstitutedDataMethod>
      </ghg:CarbonBalanceInputOutDetails>
    </ghg:NoCemsIronSteelDetails>
  
```

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

**Figure 18**  
**Carbon Mass Balance Emissions Details Schema Diagram**



For each unit or process using the carbon mass balance calculation methodology, the facility must report the CO<sub>2</sub> mass emissions according to the following guidelines [98.176(a)]:

- For each taconite indurating furnace, use the output of Equation Q-1.
- For each basic oxygen process furnace, use the output of Equation Q-2.
- For each non-recovery coke oven battery, use the output of Equation Q-3.
- For each sinter process, use the output of Equation Q-4.
- For each electric arc furnace (EAF), use the output of Equation Q-5.
- For each decarburization vessel, use the output of Equation Q-6.
- For each direct reduction furnace, use the output of Equation Q-7.

**Table 6**  
**Carbon Mass Balance Emissions Details XML Data Elements**

Data Element Name	Description
CO2EmissionsDetails	A collection of data elements containing information on calculated annual emissions for CO <sub>2</sub> for the specified process/process unit.
CO2EmissionsEquationsQ1	Annual CO <sub>2</sub> mass emissions for each taconite indurating furnace using the carbon mass balance method (the output of Equation Q-1). Report the calculated value and mass unit of measure only.
CO2EmissionsEquationsQ1.massUOM	Metric Tons
CO2EmissionsEquationsQ2	Annual CO <sub>2</sub> mass emissions for each basic oxygen process furnace using the carbon mass balance method (the output of Equation Q-2). Report the calculated value and mass unit of measure only.

Data Element Name	Description
CO2EmissionsEquationsQ2.massUOM	Metric Tons
CO2EmissionsEquationsQ3	Annual CO <sub>2</sub> mass emissions for each non-recovery coke oven battery using the carbon mass balance method (the output of Equation Q-3). Report the calculated value and mass unit of measure only.
CO2EmissionsEquationsQ3.massUOM	Metric Tons
CO2EmissionsEquationsQ4	Annual CO <sub>2</sub> mass emissions for each sinter process using the carbon mass balance method (the output of Equation Q-4). Report the calculated value and mass unit of measure only.
CO2EmissionsEquationsQ4.massUOM	Metric Tons
CO2EmissionsEquationsQ5	Annual CO <sub>2</sub> mass emissions for each electric arc furnace (EAF) using the carbon mass balance method (the output of Equation Q-5). Report the calculated value and mass unit of measure only.
CO2EmissionsEquationsQ5.massUOM	Metric Tons
CO2EmissionsEquationsQ6	Annual CO <sub>2</sub> mass emissions for each decarburization vessel using the carbon mass balance method (the output of Equation Q-6). Report the calculated value and mass unit of measure only.
CO2EmissionsEquationsQ6.massUOM	Metric Tons
CO2EmissionsEquationsQ7	Annual CO <sub>2</sub> mass emissions for each direct reduction furnace using the carbon mass balance method (the output of Equation Q-7). Report the calculated value and mass unit of measure only.
CO2EmissionsEquationsQ7.massUOM	Metric Tons

**Figure 19**  
**Sample XML Excerpt for Carbon Mass Balance Emissions Details**

```

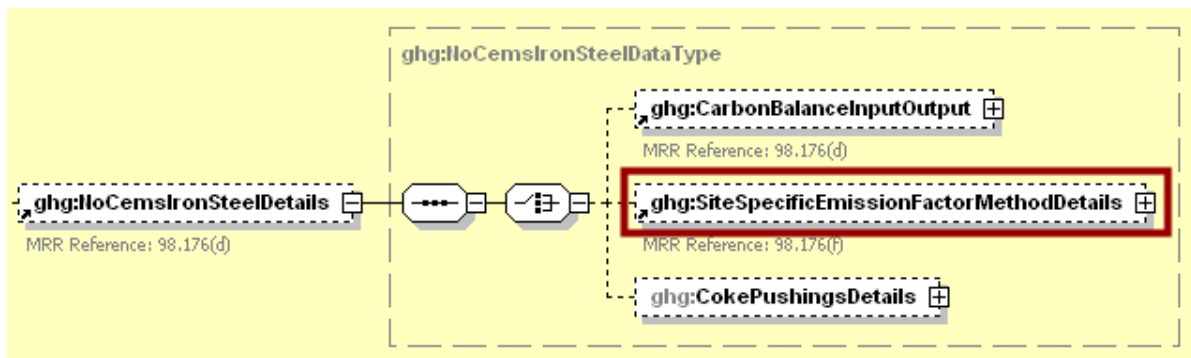
<ghg:CO2EmissionsDetails>
  <ghg:CO2EmissionsEquationsQ6 massUOM="Metric Tons">
    <ghg:CalculatedValue>9999</ghg:CalculatedValue>
  </ghg:CO2EmissionsEquationsQ6>
</ghg:CO2EmissionsDetails>
  </ghg:CarbonBalanceInputOutput>
</ghg:NoCemsIronSteelDetails>
</ghg:UnitDetails>
    
```

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

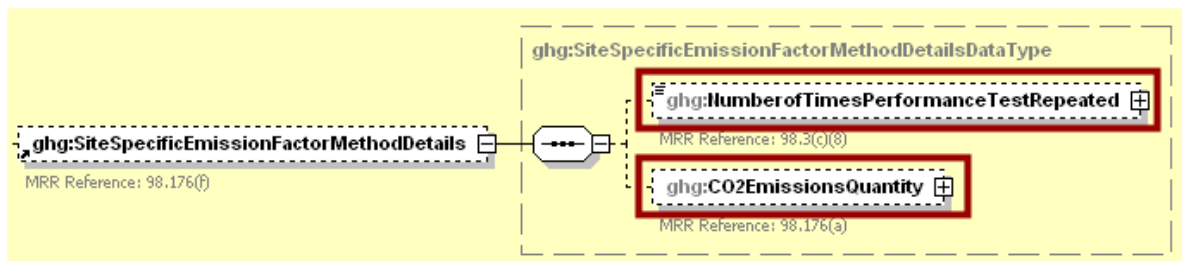
**3.1.2 Site-Specific Emission Factor Calculation Methodology Details**

This section describes the information to report for each unit or process for which the site-specific emissions factor calculation methodology was used to calculate emissions.

**Figure 20**  
**Non-CEMS Unit Calculation Methodology Schema Diagram**



**Figure 21**  
**Site-Specific Emission Factor Calculation Methodology Details Schema Diagram**



For each production process or process unit for which the facility is using the site-specific emission factor method, the following data is required:

- The number of months that missing data procedures were followed and the performance test was repeated to determine the site-specific emission factor [98.3(c)(8)].
- The annual CO<sub>2</sub> mass emissions calculated using the site-specific emission factor method [98.176(a)].

**Table 7**  
**Site-Specific Emission Factor Calculation Methodology Details XML Data Elements**

Data Element Name	Description
NoCemsIronSteelDetails	A collection of data elements containing information about the unit specified.
SiteSpecificEmissionFactorMethodDetails	A collection of data elements containing details about each process or process unit that uses the site-specific emission factor method to determine emissions.
NumberofTimesPerformanceTestRepeated	The number of months that missing data procedures were followed and the performance test was repeated to determine the site-specific emission factor.
CO2EmissionsQuantity	A collection of data elements containing the calculated annual CO <sub>2</sub> emissions for each production process or process unit for which the facility is using the site-specific emission factor method. Report the calculated value and mass unit of measure only.
CO2EmissionsQuantity.massUOM	Metric Tons

**Figure 22**  
**Sample XML Excerpt for Site-Specific Emission Factor Calculation Methodology Details**

```

    <ghg:NoCemsIronSteelDetails>
      <ghg:SiteSpecificEmissionFactorMethodDetails>
        <ghg:NumberofTimesPerformanceTestRepeated>2</ghg:NumberofTimesP
        erformanceTestRepeated>
        <ghg:CO2EmissionsQuantity massUOM="Metric Tons">
          <ghg:CalculatedValue>22222</ghg:CalculatedValue>
        </ghg:CO2EmissionsQuantity>
      </ghg:SiteSpecificEmissionFactorMethodDetails>
    </ghg:NoCemsIronSteelDetails>
  </ghg:UnitDetails>

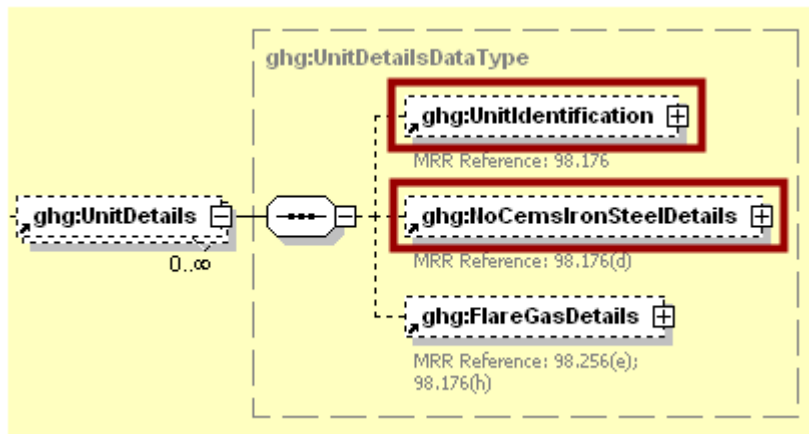
```

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

### 3.2 Coke Pushing Operation Details

This section includes information to report for emissions for each coke pushing operation.

**Figure 23**  
**Coke Pushing Operation Identification Schema Diagram**



Subpart Q requires the following identification information for each coke pushing operation:

- A unique unit name or identifier (e.g., a unit ID number).
- An optional unit description or label.
- The type of unit: “Coke Pushing Operation”.

**Table 8**  
**Coke Pushing Operation Identification XML Data Elements**

Data Element Name	Description
UnitDetails	A collection of data elements containing details about each unit configuration that does not use a CEMS to measure CO <sub>2</sub> .
UnitIdentification	A collection of data elements containing the identity of each iron and/or steel production process/process unit that does not use a CEMS to measure CO <sub>2</sub> . It includes the unit ID, an optional description, and the type of unit: “Coke Pushing Operation”.

**Figure 24**  
**Sample XML Excerpt for Coke Pushing Operation Identification**

```

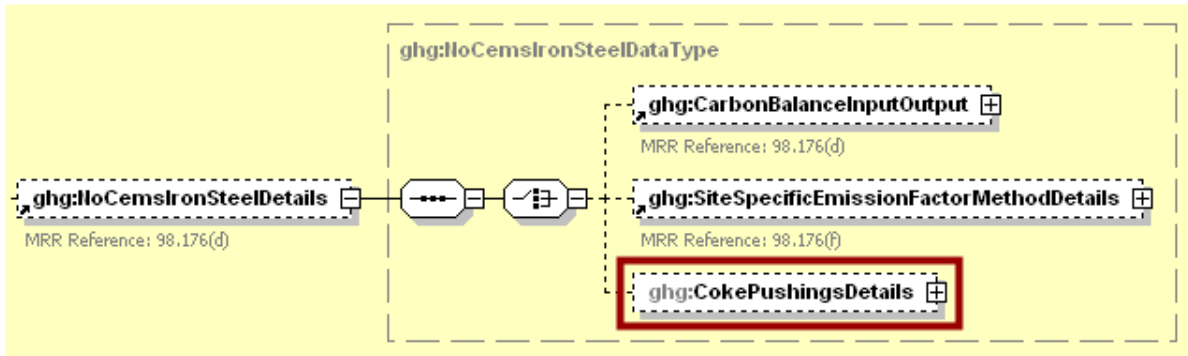
<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>004-CPO</ghg:UnitName>
    <ghg:UnitDescription>coke pushing operation</ghg:UnitDescription>
    <ghg:UnitType>Coke Pushing Operation</ghg:UnitType>
  </ghg:UnitIdentification>

```

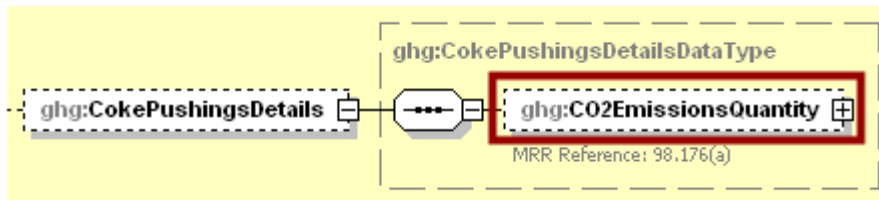
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.



**Figure 25**  
**Coke Pushing Operation Details Schema Diagram**



**Figure 26**  
**Coke Pushing Operation Emission Details Schema Diagram**



For each coke pushing process, the facility must report the CO<sub>2</sub> mass emissions [98.176(a)].

**Table 9**  
**Coke Pushing Operation Emission Details XML Data Elements**

Data Element Name	Description
NoCemsIronSteelDetails	A collection of data elements containing information about the unit specified.
CokePushingsDetails	A collection of data elements containing details for coke pushing operations.
CO2EmissionsQuantity	The CO <sub>2</sub> mass emissions for the specified coke pushing process. Report calculated value and mass unit of measure only.
CO2EmissionsQuantity.massUOM	Metric Tons

**Figure 27**  
**Sample XML Excerpt for Coke Pushing Operation Emission Details**

```

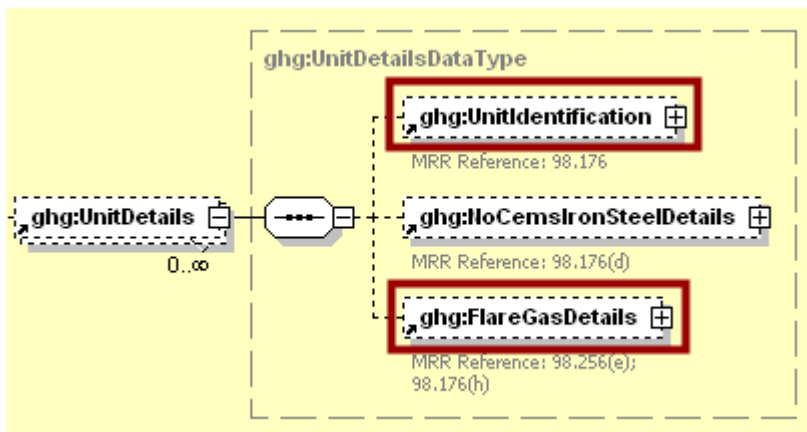
<ghg:NoCemsIronSteelDetails>
  <ghg:CokePushingsDetails>
    <ghg:CO2EmissionsQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>33333</ghg:CalculatedValue>
    </ghg:CO2EmissionsQuantity>
  </ghg:CokePushingsDetails>
</ghg:NoCemsIronSteelDetails>
</ghg:UnitDetails>
    
```

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

### 3.3 Flare Details

This section includes information to report CO<sub>2</sub> emissions for flares that burn blast furnace gas and coke oven gas according to procedures set out in Subpart Y of Part 98. For CH<sub>4</sub> and N<sub>2</sub>O emissions from flares, follow procedures in 98.33(c)(2).

**Figure 28  
Flare Details Schema Diagram**



Subpart Q requires the following identification information for each flare:

- A unique unit name or identifier (e.g., a unit ID number).
- An optional unit description or label.
- The type of unit: “Flare”.

**Table 10  
Coke Pushing Operation Identification XML Data Elements**

Data Element Name	Description
UnitDetails	A collection of data elements containing details about each unit configuration that does not use a CEMS to measure CO <sub>2</sub> .
UnitIdentification	A collection of data elements containing the identity of each iron and/or steel production process/process unit that does not use a CEMS to measure CO <sub>2</sub> . It includes the unit ID, an optional description, and the type of unit: “Flare”.

**Figure 29  
Sample XML Excerpt for Coke Pushing Operation Identification**

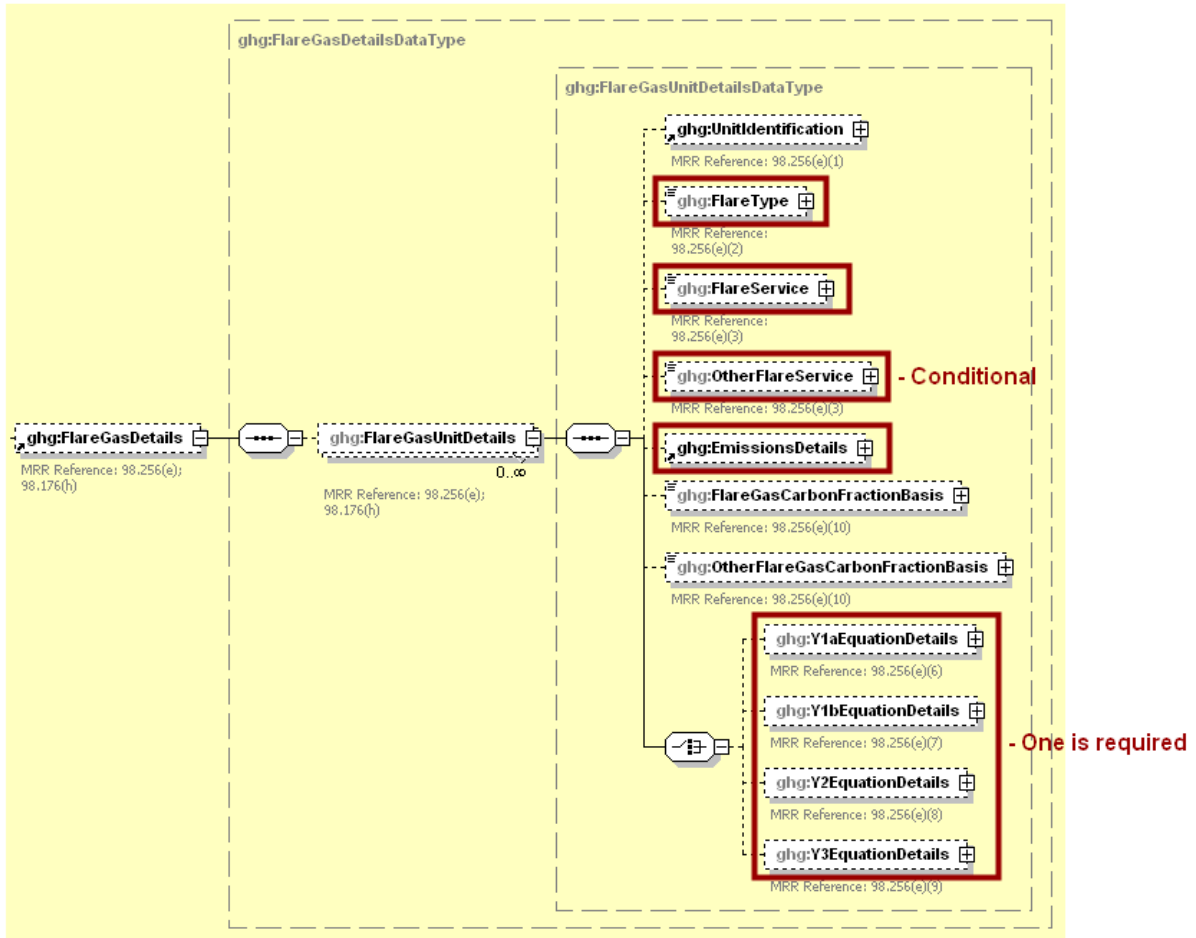
```

<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>005- Flare</ghg:UnitName>
    <ghg:UnitDescription>FLARE</ghg:UnitDescription>
    <ghg:UnitType>Flare</ghg:UnitType>
  </ghg:UnitIdentification>

```

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

**Figure 30  
Flare Gas Details Schema Diagram**



**Figure 31  
Flare Gas Unit Details Schema Diagram**



For each flare, the facility is required to report the following:

- The type of flare [98.256(e)(2)].
- The flare service type [98.256(e)(3)].

**Table 11**  
**Flare Gas Unit Details XML Data Elements**

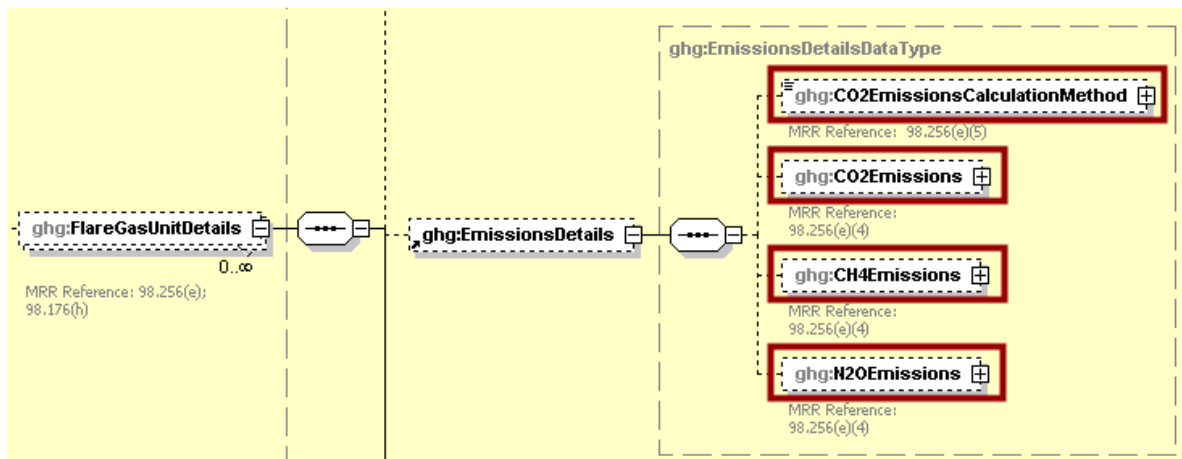
Data Element Name	Description
FlareGasDetails	A collection of data elements containing details about emissions from flares that burn blast furnace gas and coke oven gas.
FlareGasUnitDetails	A collection of data elements containing details for a specific flare.
FlareType	Type of flare. See list of allowable values:  Steam assisted Air-assisted Unassisted Other
FlareService	The type of flare service. See list of allowable values:  General facility flare Unit flare Emergency only flare Back-up flare Other (specify)
OtherFlareService	Specify the flare service if "Other (specify)" is reported for FlareService.

**Figure 32**  
**Sample XML Excerpt for Flare Gas Unit Details**

```
<ghg:FlareGasDetails>
  <ghg:FlareGasUnitDetails>
    <ghg:FlareType>Steam assisted</ghg:FlareType>
    <ghg:FlareService>General facility flare</ghg:FlareService>
```

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

**Figure 33  
Flare Gas Unit Emissions Schema Diagram**



For each flare, the facility is required to report the following:

- The method used to calculate the CO<sub>2</sub> emissions (e.g., reference section and equation number) [98.256(e)(5)].
- Estimated CO<sub>2</sub> emissions [98.256(e)(4)].
- Estimated CH<sub>4</sub> emissions [98.33(c)(2)].
- Estimated N<sub>2</sub>O emissions [98.33(c)(2)].

**Table 12  
Flare Gas Unit Emissions XML Data Elements**

Data Element Name	Description
EmissionsDetails	A collection of data elements containing information the calculated annual emissions for the specified flare.
CO2EmissionsCalculationMethod	The method used to calculate the CO <sub>2</sub> emissions for the specified flare. See list of allowable values:  98.253(b)(1)(ii)(A) – Equation Y-1a – Gas Composition Monitored 98.253(b)(1)(ii)(A) – Equation Y-1b – Gas Composition Monitored 98.253(b)(1)(ii)(B) – Equation Y-2 – Heat Content Monitored 98.253(b)(1)(iii) – Equation Y-3 – Start-up, Shutdown, Malfunction
CO2Emissions	A collection of data elements containing information on the annual CO <sub>2</sub> emissions for the specified flare. Report the calculated value and mass unit of measure only.
CO2Emissions.massUOM	Metric Tons
CH4Emissions	A collection of data elements containing information on the annual CH <sub>4</sub> emissions for the specified flare. Report the calculated value and mass unit of measure only.
CH4Emissions.massUOM	Metric Tons

Data Element Name	Description
N2OEmissions	A collection of data elements containing information on the annual N <sub>2</sub> O emissions for the specified flare. Report the calculated value and mass unit of measure only.
N2OEmissions.massUOM	Metric Tons

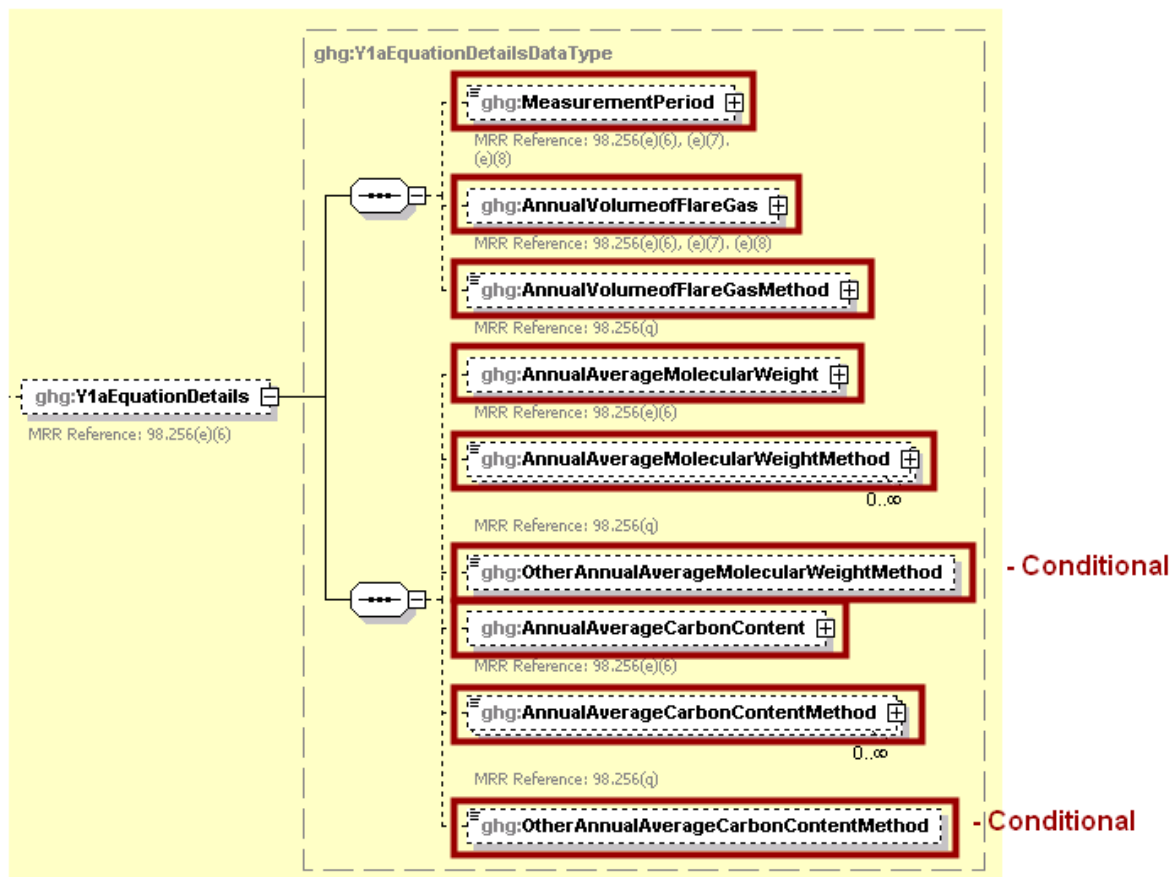
**Figure 34**  
**Sample XML Excerpt for Flare Gas Unit Emissions**

```

    <ghg:EmissionsDetails>
      <ghg:CO2EmissionsCalculationMethod>98.253(b)(1)(ii)(A) -
      Equation Y-1a - Gas Composition
      Monitored</ghg:CO2EmissionsCalculationMethod>
      <ghg:CO2Emissions massUOM="Metric Tons">
        <ghg:CalculatedValue>44444</ghg:CalculatedValue>
      </ghg:CO2Emissions>
      <ghg:CH4Emissions massUOM="Metric Tons">
        <ghg:CalculatedValue>200</ghg:CalculatedValue>
      </ghg:CH4Emissions>
      <ghg:N2OEmissions massUOM="Metric Tons">
        <ghg:CalculatedValue>20</ghg:CalculatedValue>
      </ghg:N2OEmissions>
    </ghg:EmissionsDetails>
  
```

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

**Figure 35**  
**Equation Y-1a Details Schema Diagram**



For each flare using the Equation Y-1a calculation method, the facility is required to report the following:

- An indication of whether daily or weekly measurement periods are used [98.256(e)(6)].
- The annual volume of flare gas combusted [98.256(e)(6)].
- The number of days missing data procedures were used to measure volume of flare gas combusted.
- Indicate the specific consensus-based standard method number or describe the procedure specified by the flow meter manufacturer used to measure the annual volume of flare gas combusted [98.256(q)].
- The annual average molecular weight [98.256(e)(6)].
- Number of days missing data procedures were used to measure the molecular weight.
- The method(s) used to measure annual average molecular weight [98.256(q)].
- Annual average carbon content of the flare gas [98.256(e)(6)].
- Number of days missing data procedures were used to measure carbon content of the flare gas.
- The method(s) used to measure carbon content of the flare gas [98.256(q)].

**Table 13**  
**Equation Y-1a Details XML Data Elements**

Data Element Name	Description
Y1aEquationDetails	A collection of data elements to report if Equation Y-1a was used to calculate the CO <sub>2</sub> emissions for the specified flare.
MeasurementPeriod	Frequency of measurement data. See list of allowable values:  Daily Weekly
AnnualVolumeofFlareGas	A collection of data elements containing information on the annual volume of flare gas combusted. Report the measured value, volume unit of measure, and the number of days missing data procedures were used for annual volume of flare gas combusted only.
AnnualVolumeofFlareGas.volUOM	scf
AnnualVolumeofFlareGasMethod	Specific consensus-based standard method number used to measure the volume of flare gas or describe the procedure specified by the flow meter manufacturer.
AnnualAverageMolecularWeight	A collection of data elements containing information on the annual average molecular weight of the flare gas. Report the measured value, mole weight unit of measure and the number of days missing data procedures were used for annual average molecular weight of the flare gas only.
AnnualAverageMolecularWeight.molewtUOM	kg/kg-mole
AnnualAverageMolecularWeightMethod	Report each method used to determine the annual average molecular weight of the flare gas. See the list of allowable values:  Method 18 at 40 CFR part 60, appendix A-6 ASTM D1945-03 ASTM D1946-90 (Reapproved 2006) GPA 2261-00 UOP539-97 ASTM D2503-92 (Reapproved 2007) Chromatographic analysis: manufacturer's instructions Other (specify)
OtherAnnualAverageMolecularWeightMethod	Report the method used to determine the annual average molecular weight of the flare gas if "Other (specify)" was reported above.



Data Element Name	Description
AnnualAverageCarbonContent	A collection of data elements containing information on the annual average carbon content of the flare gas. Report the measured value, the carbon content unit of measure and the number of days missing data procedures were used for average carbon content of the flare gas only.
AnnualAverageCarbonContent.carboncontentUOM	decimal fraction; kg carbon/kg flare gas
AnnualAverageCarbonContentMethod	Report each method used to determine the annual average carbon content of the flare gas. See the list of allowable values:  Method 18 at 40 CFR part 60, appendix A-6 ASTM D1945-03 ASTM D1946-90 (Reapproved 2006) GPA 2261-00 UOP539-97 ASTM D2503-92 (Reapproved 2007) Chromatographic analysis: manufacturer's instructions Other (specify)
OtherAnnualAverageCarbonContentMethod	Report the method used to determine the annual average carbon content of the flare gas if "Other (specify)" was reported above.

**Figure 36**  
**Sample XML Excerpt for Equation Y-1a Details**

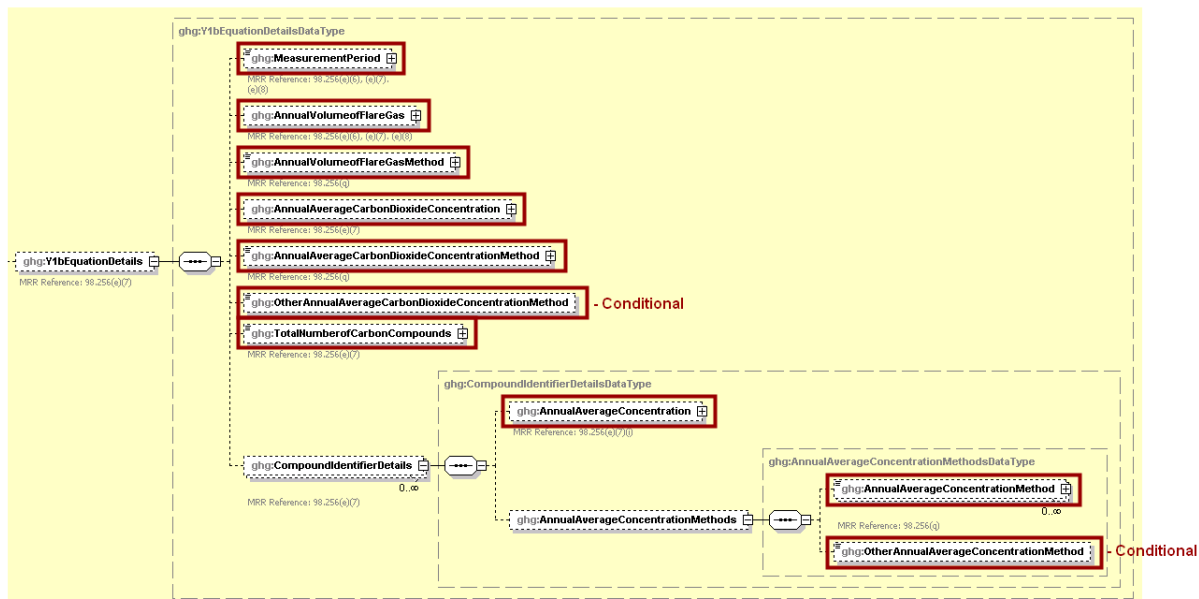
```

<ghg:Y1aEquationDetails>
  <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
  <ghg:AnnualVolumeofFlareGas volUOM="scf">
    <ghg:MeasureValue>555</ghg:MeasureValue>
    <ghg:NumberofTimesSubstituted>14</ghg:NumberofT
imesSubstituted>
  </ghg:AnnualVolumeofFlareGas>
  <ghg:AnnualVolumeofFlareGasMethod>Method
A</ghg:AnnualVolumeofFlareGasMethod>
  <ghg:AnnualAverageMolecularWeight molewtUOM="kg/kg-
mole">
    <ghg:MeasureValue>25</ghg:MeasureValue>
    <ghg:NumberofTimesSubstituted>15</ghg:NumberofT
imesSubstituted>
  </ghg:AnnualAverageMolecularWeight>
  <ghg:AnnualAverageMolecularWeightMethod>Method 18 at 40
CFR part 60, appendix A-
6</ghg:AnnualAverageMolecularWeightMethod>
  <ghg:AnnualAverageCarbonContent carboncontentUOM="decimal
fraction; kg carbon/kg flare gas">
    <ghg:MeasureValue>0.35</ghg:MeasureValue>
    <ghg:NumberofTimesSubstituted>16</ghg:NumberofT
imesSubstituted>
  </ghg:AnnualAverageCarbonContent>
  <ghg:AnnualAverageCarbonContentMethod>ASTM D1945-
03</ghg:AnnualAverageCarbonContentMethod>
</ghg:Y1aEquationDetails>
</ghg:FlareGasUnitDetails>
</ghg:FlareGasDetails>
</ghg:UnitDetails>

```

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

**Figure 37**  
**Equation Y-1b Details Schema Diagram**



For each flare using the Equation Y-1b calculation method, the facility is required to report the following:

- An indication of whether daily or weekly measurement periods are used [98.256(e)(7)].
- The annual volume of flare gas combusted [98.256(e)(7)].
- The number of days missing data procedures were used to determine the volume of flare gas combusted.
- Indicate the specific consensus-based standard method number or describe the procedure specified by the flow meter manufacturer [98.256(q)].
- The annual average CO<sub>2</sub> concentration [98.256(e)(7)].
- The number of days missing data procedures were used to determine CO<sub>2</sub> concentration.
- The method used to measure CO<sub>2</sub> concentration [98.256(q)].
- The total number of carbon containing compounds other than CO<sub>2</sub> that are in the flare gas stream [98.256(e)(7)].

For each carbon containing compound other than CO<sub>2</sub> in the flare gas stream identified by the facility, and for each flare using the Equation Y-1b, the facility must report the following:

- The annual average concentration of the compound [98.256(e)(7)(i)].
- Number of days missing data procedures were used to determine the concentration of the compound.
- The method(s) used to measure the concentration of the compound [98.256(q)].

**Table 14**  
**Equation Y-1b Details XML Data Elements**

Data Element Name	Description
Y1bEquationDetails	A collection of data elements to report if Equation Y-1b was used to calculate the CO <sub>2</sub> emissions for the specified flare.
MeasurementPeriod	Frequency of measurement data. See list of allowable values:  Daily Weekly
AnnualVolumeofFlareGas	A collection of data elements containing information on the annual volume of flare gas combusted. Report the measured value, volume unit of measure, and the number of days missing data procedures were used for annual volume of flare gas combusted only.
AnnualVolumeofFlareGas.volUOM	scf
AnnualVolumeofFlareGasMethod	Specific consensus-based standard method number used to measure the volume of flare gas or describe the procedure specified by the flow meter manufacturer.
AnnualAverageCarbonDioxideConcentration	A collection of data elements containing information on the annual average CO <sub>2</sub> content of the flare gas. Report the measured value, concentration unit of measure and number of days missing data procedures were used for annual average carbon dioxide concentration of the flare gas only.
AnnualAverageCarbonDioxideConcentration.concentrationUOM	percent by volume or mole
AnnualAverageCarbonDioxideConcentrationMethod	The method used to determine the carbon dioxide concentration of the flare gas. See list of allowable values:  Method 18 at 40 CFR part 60, appendix A-6 ASTM D1945-03 ASTM D1946-90 (Reapproved 2006) GPA 2261-00 UOP539-97 ASTM D2503-92 (Reapproved 2007) Chromatographic analysis: manufacturer's instructions Other (specify)
OtherAnnualAverageCarbonDioxideConcentrationMethod	The method used to determine the carbon dioxide concentration of the flare gas if "Other (specify)" was reported above.
TotalNumberofCarbonCompounds	The number of carbon containing compounds other than CO <sub>2</sub> in the flare gas stream (integer).
CompoundIdentifierDetails	A collection of data elements to report for each carbon containing compound (other than CO <sub>2</sub> ) in the flare gas stream.

Data Element Name	Description
AnnualAverageConcentration	A collection of data elements containing information on the annual average concentration of a specific carbon containing compound (other than CO <sub>2</sub> ) in the flare gas stream for the specified flare. Report the measured value, concentration unit of measure and the number of days missing data procedures were used for annual average concentration of the compound only.
AnnualAverageConcentration.concentration UOM	percent by volume or mole
AnnualAverageConcentrationMethods	A collection of data elements containing the method(s) used to determine the annual average concentration of the specific carbon containing compound (other than CO <sub>2</sub> ).
AnnualAverageConcentrationMethod	<p>Report each method used to determine the annual average concentration of the specific carbon containing compound (other than CO<sub>2</sub>). See list of allowable values:</p> <p>Method 18 at 40 CFR part 60, appendix A-6  ASTM D1945-03  ASTM D1946-90 (Reapproved 2006)  GPA 2261-00  UOP539-97  ASTM D2503-92 (Reapproved 2007)  Chromatographic analysis: manufacturer's instructions  Other (specify)</p>
OtherAnnualAverageConcentrationMethod	Report the method used to determine the annual average concentration of the specific carbon containing compound (other than CO <sub>2</sub> ) if "Other (specify)" was reported above

**Figure 38**  
**Sample XML Excerpt for Equation Y-1b Details**

```

<ghg:Y1bEquationDetails>
  <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
  <ghg:AnnualVolumeofFlareGas volUOM="scf">
    <ghg:MeasureValue>400</ghg:MeasureValue>
    <ghg:NumberofTimesSubstituted>30</ghg:Numberof
      TimesSubstituted>
  </ghg:AnnualVolumeofFlareGas>
  <ghg:AnnualVolumeofFlareGasMethod>Specific consensus-
    based standard method
  A</ghg:AnnualVolumeofFlareGasMethod>
  <ghg:AnnualAverageCarbonDioxideConcentration
    concentrationUOM="percent by volume or mole">
    <ghg:MeasureValue>20</ghg:MeasureValue>
    <ghg:NumberofTimesSubstituted>10</ghg:Numberof
      TimesSubstituted>
  </ghg:AnnualAverageCarbonDioxideConcentration>
  <ghg:AnnualAverageCarbonDioxideConcentrationMethod>ASTM
    D1945-
    03</ghg:AnnualAverageCarbonDioxideConcentrationMethod>
  <ghg:TotalNumberOfCarbonCompounds>1</ghg:TotalNumberOf
    CarbonCompounds>
  <ghg:CompoundIdentifierDetails>
    <ghg:AnnualAverageConcentration
      concentrationUOM="percent by volume or mole">
      <ghg:MeasureValue>15</ghg:MeasureValu
        e>
      <ghg:NumberofTimesSubstituted>25</ghg:
        NumberofTimesSubstituted>
    </ghg:AnnualAverageConcentration>
    <ghg:AnnualAverageConcentrationMethods>
      <ghg:AnnualAverageConcentrationMethod>
        ASTM D1945-
        03</ghg:AnnualAverageConcentrationMetho
          d>
      <ghg:AnnualAverageConcentrationMethod>
        Chromatographic analysis: manufacturer's
        instructions</ghg:AnnualAverageConcentrat
          ionMethod>
    </ghg:AnnualAverageConcentrationMethods>
  </ghg:CompoundIdentifierDetails>
</ghg:Y1bEquationDetails>
  </ghg:FlareGasUnitDetails>
</ghg:FlareGasDetails>
</ghg:UnitDetails>

```

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

**Figure 39**  
**Equation Y-2 Details Schema Diagram**



For each flare using the Equation Y-2 calculation method, the facility must identify the following:

- An indication of whether daily or weekly measurement periods are used [98.256(e)(8)].
- The annual volume of flare gas combusted [98.256(e)(8)].
- The number of days missing data procedures were used to determine the volume of flare gas combusted.
- The specific consensus-based standard method number or describe the procedure specified by the flow meter manufacturer [98.256(q)].
- The annual average higher heating value of the flare gas [98.256(e)(8)].
- The number of days missing data procedures were used to determine the annual average higher heating value of the flare gas.
- The method used to measure the annual average higher heating value of the flare gas [98.256(q)].
- An indication of whether the annual volume of flare gas combusted was determined using standard conditions of 68 °F and 14.7 psia or 60 °F and 14.7 psia [98.256(e)(8)].
- An indication of whether the annual average higher heating value of the flare gas was determined using standard conditions of 68 °F and 14.7 psia or 60 °F and 14.7 psia [98.256(e)(8)].

**Table 15**  
**Equation Y-2 Details XML Data Elements**

Data Element Name	Description
Y2EquationDetails	A collection of data elements to report if Equation Y-2 was used to calculate the CO <sub>2</sub> emissions for the specified flare gas unit.
MeasurementPeriod	Frequency of measurement data. See list of allowable values:  Daily Weekly
AnnualVolumeofFlareGas	A collection of data elements containing information on the annual volume of flare gas combusted. Report the measured value, volume unit of measure, and the number of days missing data procedures were used for annual volume of flare gas combusted only.
AnnualVolumeofFlareGas.volUOM	MMscf
AnnualVolumeofFlareGasMethod	Specific consensus-based standard method number or describe the procedure specified by the flow meter manufacturer.
AnnualAverageHigherHeatingValue	A collection of data elements containing information on the annual average higher heating value of the flare gas. Report the measured value and the number of days missing data procedures were used for annual average higher heating value only.
AnnualAverageHigherHeatingValue.heatUOM	MMBtu/MMscf
AnnualAverageHigherHeatingValueMethod	The method used to determine the annual average higher heating value of the flare gas. See list of allowable values:  ASTM D4809-06 ASTM D240-02 (Reapproved 2007) ASTM D1826-94 (Reapproved 2003) ASTM D3588-98 (Reapproved 2003) ASTM D4891-89 (Reapproved 2006) Chromatographic analysis: manufacturer's instructions Other (specify)
OtherAnnualAverageHigherHeatingValueMethod	The method used to determine the annual average higher heating value of the flare gas if "Other (specify)" was reported above.
FlareGasConditions	Conditions at which the annual volume of flare gas was determined: by using standard conditions of 68 degrees F and 14.7 psia or 60 degrees F and 14.7 psia.
HeatingValueConditions	Conditions at which the annual average higher heating value was determined: by using standard conditions of 68 degrees F and 14.7 psia or 60 degrees F and 14.7 psia.

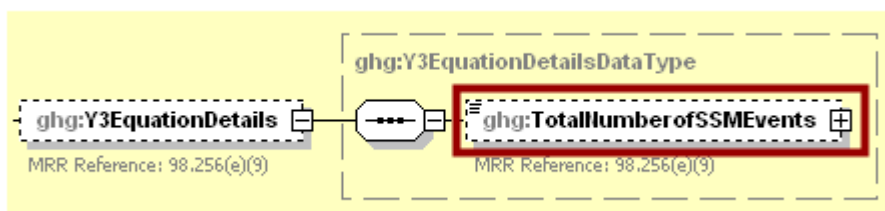
**Figure 40**  
**Sample XML Excerpt for Equation Y-2 Details**

```

    <ghg:Y2EquationDetails>
      <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
      <ghg:AnnualVolumeofFlareGas volUOM="MMscf">
        <ghg:MeasureValue>900</ghg:MeasureValue>
        <ghg:NumberOfTimesSubstituted>80</ghg:NumberOfTimesSubstituted>
      </ghg:AnnualVolumeofFlareGas>
      <ghg:AnnualVolumeofFlareGasMethod>Specific consensus-based standard method B</ghg:AnnualVolumeofFlareGasMethod>
      <ghg:AnnualAverageHigherHeatingValue heatUOM="MMBtu/MMscf">
        <ghg:MeasureValue>70</ghg:MeasureValue>
        <ghg:NumberOfTimesSubstituted>60</ghg:NumberOfTimesSubstituted>
      </ghg:AnnualAverageHigherHeatingValue>
      <ghg:AnnualAverageHigherHeatingValueMethod>ASTM D240-02 (Reapproved 2007)</ghg:AnnualAverageHigherHeatingValueMethod>
      <ghg:FlareGasConditions>68 degrees F and 14.7 psia</ghg:FlareGasConditions>
      <ghg:HeatingValueConditions>68 degrees F and 14.7 psia</ghg:HeatingValueConditions>
    </ghg:Y2EquationDetails>
  </ghg:FlareGasUnitDetails>
</ghg:FlareGasDetails>
</ghg:UnitDetails>
  
```

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

**Figure 41**  
**Equation Y-3 Details Schema Diagram**



For each flare using the Equation Y-3 calculation method, the facility must identify the total number of start-up, shutdown, or malfunction (SSM) events exceeding 500,000 scf/day [98.256(e)(9)].

**Table 16**  
**Equation Y-3 Details XML Data Elements**

Data Element Name	Description
Y3EquationDetails	A collection of data elements to report if Equation Y-3 was used to calculate the CO <sub>2</sub> emissions for the specified flare.
TotalNumberofSSMEvents	Report the total number of start-up, shutdown, or malfunction (SSM) events exceeding 500,000 scf/day (integer).

**Figure 42**  
**Sample XML Excerpt for Equation Y-3 Details**

```

    <ghg:Y3EquationDetails>
      <ghg:TotalNumberofSSMEvents>25</ghg:TotalNumberofSSMEvents>
    </ghg:Y3EquationDetails>
  
```

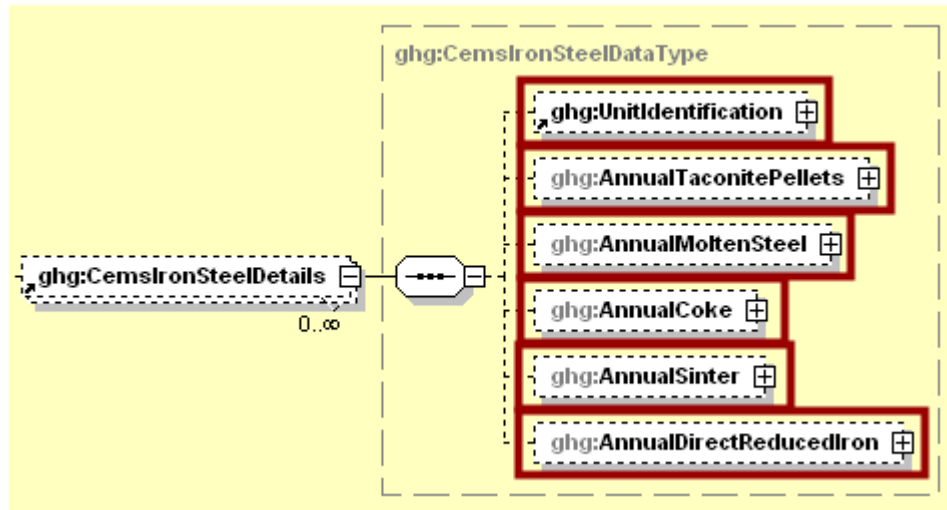
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.



#### 4.0 CEMS Unit Identification

This section describes information which must be reported for each unit and process for which a CEMS was used to monitor emissions.

**Figure 43**  
**CEMS Unit Identification Schema Diagram**



Subpart Q requires the following identification information for each unit or process for which a CEMS was used to monitor emissions:

- A unique unit name or identifier (e.g., a unit ID number).
- An optional unit description or label.
- The type of unit from the following:
  - Taconite Indurating Furnace
  - Basic Oxygen Process Furnace
  - Non-Recovery Coke Oven Battery
  - Sinter Process
  - Electric Arc Furnace (EAF)
  - Decarburization Vessel
  - Direct Reduction Furnace

Note: In 2010, the information required for decarburization vessels applies only to argon-oxygen decarburization vessels. However, for 2011 and subsequent calendar years, the reporting requirements apply to other decarburization vessels used to refine molten steel with the primary intent of removing carbon content of steel including, but not limited to, argon-oxygen decarburization vessels and vacuum oxygen decarburization vessels. This amendment was finalized in October 2010 (75 FR 66434).

For each unit monitored by CEMS, the system shall require the user to report the following in metric tons [98.176(b)]:

- Annual production of taconite pellets for the unit.
- Annual production of raw steel for the unit.
- Annual production of coke for the unit.
- Annual production of sinter for the unit.
- Annual production of direct reduced iron for the unit.

**Table 17**  
**CEMS Unit Identification XML Data Elements**

Data Element Name	Description
CemIronSteelDetails	A collection of data elements containing the identity of iron and/or steel production process/process units that use a CEMS to measure emissions.
UnitIdentification	<p>A collection of data elements containing the identity of each iron and/or steel production process/process unit that uses a CEMS to measure emissions. It includes the unit ID, an optional description, and the type of unit. See list of allowable unit types:</p> <p>Taconite Indurating Furnace  Basic Oxygen Process Furnace  Non-Recovery Coke Oven Battery  Sinter Process  Electric Arc Furnace (EAF)  Decarburization Vessel  Direct Reduction Furnace</p>
AnnualTaconitePellets	A collection of data elements containing information on the annual production of taconite pellets for the specified unit. Report the measured value and mass unit of measure only.
AnnualTaconitePellets.massUOM	Metric Tons
AnnualMoltenSteel	A collection of data elements containing information on the annual production of raw steel for the specified unit. Report the measured value and mass unit of measure only.
AnnualMoltenSteel.massUOM	Metric Tons
AnnualCoke	A collection of data elements containing information on the annual production of coke for the specified unit. Report the measured value and mass unit of measure only.
AnnualCoke.massUOM	Metric Tons
AnnualSinter	A collection of data elements containing information on the annual production of sinter for the specified unit. Report the measured value and mass unit of measure only.
AnnualSinter.massUOM	Metric Tons
AnnualDirectReducedIron	A collection of data elements containing information on the annual production of direct reduced iron for the specified unit. Report the measured value and mass unit of measure only.
AnnualDirectReducedIron.massUOM	Metric Tons

**Figure 44**  
**Sample XML Excerpt for CEMS Unit Identification**

```
<ghg:CemsIronSteelDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>003-CEMS</ghg:UnitName>
    <ghg:UnitDescription>CEMS unit</ghg:UnitDescription>
    <ghg:UnitType>Taconite Indurating Furnace</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:AnnualTaconitePellets massUOM="Metric Tons">
    <ghg:MeasureValue>1000</ghg:MeasureValue>
  </ghg:AnnualTaconitePellets>
  <ghg:AnnualMoltenSteel massUOM="Metric Tons">
    <ghg:MeasureValue>2000</ghg:MeasureValue>
  </ghg:AnnualMoltenSteel>
  <ghg:AnnualCoke massUOM="Metric Tons">
    <ghg:MeasureValue>3000</ghg:MeasureValue>
  </ghg:AnnualCoke>
  <ghg:AnnualSinter massUOM="Metric Tons">
    <ghg:MeasureValue>4000</ghg:MeasureValue>
  </ghg:AnnualSinter>
  <ghg:AnnualDirectReducedIron massUOM="Metric Tons">
    <ghg:MeasureValue>5000</ghg:MeasureValue>
  </ghg:AnnualDirectReducedIron>
</ghg:CemsIronSteelDetails>
```

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

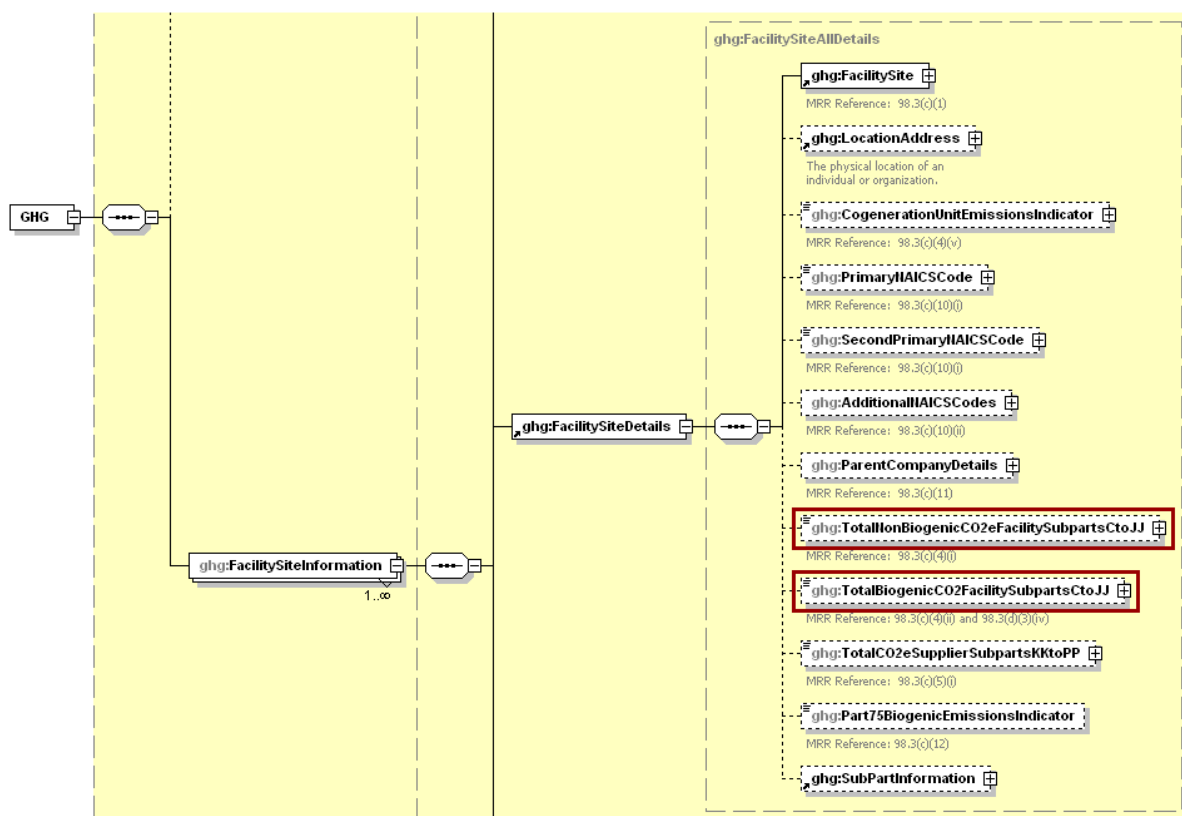
Each facility must report the following facility-level emission totals:

- Total CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions (excluding biogenic CO<sub>2</sub>) aggregated across all direct emitter source categories (subparts C-HH) associated with the facility.
- Total biogenic CO<sub>2</sub> 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<sub>2</sub>e 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 45**  
**Facility-Level Roll-up Emissions Schema Diagram**



For Subpart Q, report total emissions for CO<sub>2</sub>e (excluding biogenic CO<sub>2</sub>) and biogenic CO<sub>2</sub> using the following guidelines.

- 1) Add the total CO<sub>2</sub>e value for Subpart Q in metric tons to the total CO<sub>2</sub>e emissions (excluding biogenic CO<sub>2</sub>) aggregated across all source category subparts associated with the facility as follows:
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS taconite indurating furnace (calculated using Equation Q-1) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS basic oxygen process furnace (calculated using Equation Q-2) in metric tons rounded to one decimal place.

- Add the annual CO<sub>2</sub> mass emissions from each non-CEMS non-recovery coke oven battery (calculated using Equation Q-3) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS sinter process (calculated using Equation Q-4) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS electric arc furnace (calculated using Equation Q-5) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS decarburization vessel (calculated using Equation Q-6) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS direct reduction furnace (calculated using Equation Q-7) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each non-CEMS unit (calculated using the site specific calculation methodology) in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each coke pushing operation in metric tons rounded to one decimal place.
  - Add the annual CO<sub>2</sub> mass emissions from each flare in metric tons rounded to one decimal place.
  - Multiply the annual CH<sub>4</sub> mass emissions from each flare in metric tons rounded to two decimal places by the Global Warming Potential for CH<sub>4</sub> (21) and add the resulting value rounded to one decimal place.
  - Multiply the annual N<sub>2</sub>O mass emissions from each flare in metric tons rounded to three decimal places by the Global Warming Potential for N<sub>2</sub>O (310) and add the resulting value rounded to one decimal place.
  - Add the total annual CO<sub>2</sub> mass emissions measured by each CEMS in metric tons rounded to one decimal place minus the total annual biogenic CO<sub>2</sub> mass emissions for each CEMS monitoring location in metric tons rounded to one decimal place (the difference between the total CO<sub>2</sub> monitored by each CEMS and the total biogenic CO<sub>2</sub>).
  - Multiply the total CH<sub>4</sub> emissions for each CEMS monitoring location in metric tons rounded to two decimal places by the Global Warming Potential for CH<sub>4</sub> (21) and add the resulting value.
  - Multiply the total N<sub>2</sub>O emissions for each CEMS monitoring location in metric tons rounded to three decimal places by the Global Warming Potential for N<sub>2</sub>O (310) and add the resulting value.
- 2) Add the total annual biogenic CO<sub>2</sub> mass emissions in metric tons rounded to one decimal place for each CEMS monitoring location to the total biogenic CO<sub>2</sub> aggregated across all source category subparts associated with the facility.

**Table 18**  
**Facility Level Roll-up Emissions XML Data Elements**

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

**Figure 46**  
**Sample XML Excerpt for Facility Level Roll-up Emissions**

```
<ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric  
Tons">145379</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>  
<ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">600</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**

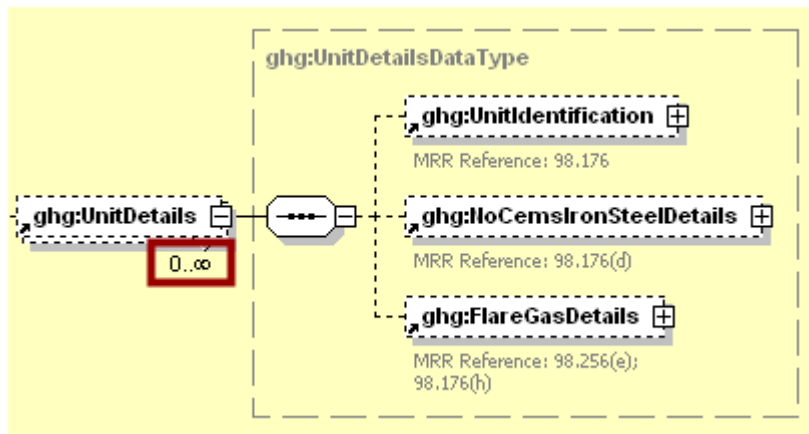
**Legend for Tables**

Blue = parent element

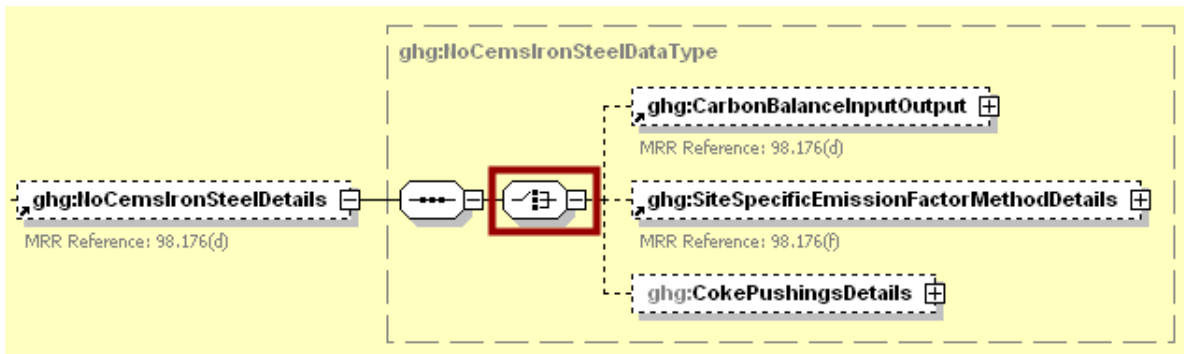
**Legend for XML Schema**

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 Q

(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>523060</ghg:FacilitySiteIdentifier>
        <ghg:FacilitySiteName>Test Facility 3</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>211111</ghg:PrimaryNAICSCode>
      <ghg>TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric Tons">145379</ghg>TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
      <ghg>TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">600</ghg>TotalBiogenicCO2FacilitySubpartsCtoJJ>
      <ghg>TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">0</ghg>TotalCO2eSupplierSubpartsKKtoPP>
      <ghg:SubPartInformation>
        <ghg:SubPartQ>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>600</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Methane</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>280</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>29</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>130509</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:Tier4CEMSDetails>
            <ghg:CEMSMonitoringLocation>
              <ghg>Name>006-CML</ghg>Name>
              <ghg>Description>CEMS monitoring location</ghg>Description>
              <ghg>Type>Single process/process unit exhausts to dedicated stack</ghg>Type>
            </ghg:CEMSMonitoringLocation>
            <ghg:CO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
              <ghg:CalculatedValue>600</ghg:CalculatedValue>
            </ghg:CO2EmissionsAllBiomassFuelsCombined>
            <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
              <ghg:CalculatedValue>700</ghg:CalculatedValue>
            </ghg:CO2EmissionsNonBiogenic>
            <ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
              <ghg:CalculatedValue>10000</ghg:CalculatedValue>
            </ghg:AnnualCO2EmissionsMeasuredByCEMS>
            <ghg>TotalCH4CombustionEmissions massUOM="Metric Tons">
              <ghg:CalculatedValue>80</ghg:CalculatedValue>
            </ghg>TotalCH4CombustionEmissions>
            <ghg>TotalN2OCombustionEmissions massUOM="Metric Tons">
              <ghg:CalculatedValue>9</ghg:CalculatedValue>
            </ghg>TotalN2OCombustionEmissions>
          </ghg:Tier4CEMSDetails>
        </ghg:SubPartQ>
      </ghg:SubPartInformation>
    </ghg:FacilitySiteDetails>
  </ghg:FacilitySiteInformation>
</ghg:GHG>

```



```

<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>First Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>10000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Second Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>20000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Third Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>30000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>40000</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg>TotalSourceOperatingHours>7300</ghg>TotalSourceOperatingHours>
<ghg:OperatingHoursDetails>
  <ghg:OperatingHoursCO2ConcentrationSubstituted>66</ghg:OperatingHoursCO2ConcentrationSubstituted>
  <ghg:OperatingHoursStackGasFlowRateSubstituted>55</ghg:OperatingHoursStackGasFlowRateSubstituted>
  <ghg:OperatingHoursStackGasMoistureContentSubstituted>44</ghg:OperatingHoursStackGasMoistureContentSubstituted>
</ghg:OperatingHoursDetails>
<ghg:TierMethodologyStartDate>2010-01-01-00:05</ghg:TierMethodologyStartDate>
<ghg:TierMethodologyEndDate>2010-12-31-00:05</ghg:TierMethodologyEndDate>
<ghg:SlipStreamIndicator>Y</ghg:SlipStreamIndicator>
<ghg:CEMSFuel>natural gas, coal</ghg:CEMSFuel>
<ghg:ProcessUnitNames>
  <ghg:UnitName>003-CEMS- NRCOB</ghg:UnitName>
</ghg:ProcessUnitNames>
</ghg:Tier4CEMSDetails>
<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>004-CPO</ghg:UnitName>
    <ghg:UnitDescription>coke pushing operation</ghg:UnitDescription>
    <ghg:UnitType>Coke Pushing Operation</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg>NoCemsIronSteelDetails>
    <ghg:CokePushingsDetails>
      <ghg:CO2EmissionsQuantity massUOM="Metric Tons">
        <ghg:CalculatedValue>33333</ghg:CalculatedValue>
      </ghg:CO2EmissionsQuantity>
    </ghg:CokePushingsDetails>
  </ghg>NoCemsIronSteelDetails>
</ghg:UnitDetails>
<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>007- DV</ghg:UnitName>
    <ghg:UnitType>Decarburization Vessel</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg>NoCemsIronSteelDetails>
    <ghg:CarbonBalanceInputOutput>
      <ghg:CarbonBalanceInputOutDetails>
        <ghg:InputOutputName>Molten Steel Input</ghg:InputOutputName>
        <ghg:InputOutputType>Molten Steel</ghg:InputOutputType>
        <ghg:InputOutputClassification>Input</ghg:InputOutputClassification>
        <ghg:CarbonContent>
          <ghg:NumberOfTimesSubstituted>9</ghg:NumberOfTimesSubstituted>
        </ghg:CarbonContent>
        <ghg:BasisforCarbonContent>ISO/TR 15349-3:1998</ghg:BasisforCarbonContent>
        <ghg:AnnualQuantitySubstitutedDataMethod>2 months, Method 9</ghg:AnnualQuantitySubstitutedDataMethod>
      </ghg:CarbonBalanceInputOutDetails>
      <ghg:CarbonBalanceInputOutDetails>
        <ghg:InputOutputName>Gas Output</ghg:InputOutputName>
        <ghg:InputOutputType>Other - Gas</ghg:InputOutputType>
        <ghg:InputOutputClassification>Output</ghg:InputOutputClassification>
      </ghg:CarbonBalanceInputOutDetails>
    </ghg:CarbonBalanceInputOutput>
  </ghg>NoCemsIronSteelDetails>

```

```

        <ghg:CarbonContent>
          <ghg:NumberofTimesSubstituted>8</ghg:NumberofTimesSubstituted>
        </ghg:CarbonContent>
        <ghg:BasisforCarbonContent>ASM CS-104 UNS No. G10460</ghg:BasisforCarbonContent>
        <ghg:AnnualQuantitySubstitutedDataMethod>4 months, Method 8</ghg:AnnualQuantitySubstitutedDataMethod>
      </ghg:CarbonBalanceInputOutDetails>
      <ghg:CO2EmissionsDetails>
        <ghg:CO2EmissionsEquationsQ6 massUOM="Metric Tons">
          <ghg:CalculatedValue>9999</ghg:CalculatedValue>
        </ghg:CO2EmissionsEquationsQ6>
      </ghg:CO2EmissionsDetails>
    </ghg:CarbonBalanceInputOutput>
  </ghg:NoCemsIronSteelDetails>
</ghg:UnitDetails>
<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>002-SSEFM- BOPF</ghg:UnitName>
    <ghg:UnitDescription>furnace unit</ghg:UnitDescription>
    <ghg:UnitType>Basic Oxygen Process Furnace</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:NoCemsIronSteelDetails>
    <ghg:SiteSpecificEmissionFactorMethodDetails>
      <ghg:NumberofTimesPerformanceTestRepeated>2</ghg:NumberofTimesPerformanceTestRepeated>
      <ghg:CO2EmissionsQuantity massUOM="Metric Tons">
        <ghg:CalculatedValue>22222</ghg:CalculatedValue>
      </ghg:CO2EmissionsQuantity>
    </ghg:SiteSpecificEmissionFactorMethodDetails>
  </ghg:NoCemsIronSteelDetails>
</ghg:UnitDetails>
<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>005- Flare</ghg:UnitName>
    <ghg:UnitDescription>FLARE</ghg:UnitDescription>
    <ghg:UnitType>Flare</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:FlareGasDetails>
    <ghg:FlareGasUnitDetails>
      <ghg:FlareType>Steam assisted</ghg:FlareType>
      <ghg:FlareService>General facility flare</ghg:FlareService>
      <ghg:EmissionsDetails>
        <ghg:CO2EmissionsCalculationMethod>98.253(b)(1)(ii)(A) - Equation Y-1a - Gas Composition Monitored</ghg:CO2EmissionsCalculationMethod>
        <ghg:CO2Emissions massUOM="Metric Tons">
          <ghg:CalculatedValue>44444</ghg:CalculatedValue>
        </ghg:CO2Emissions>
        <ghg:CH4Emissions massUOM="Metric Tons">
          <ghg:CalculatedValue>200</ghg:CalculatedValue>
        </ghg:CH4Emissions>
        <ghg:N2OEmissions massUOM="Metric Tons">
          <ghg:CalculatedValue>20</ghg:CalculatedValue>
        </ghg:N2OEmissions>
      </ghg:EmissionsDetails>
      <ghg:Y1aEquationDetails>
        <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
        <ghg:AnnualVolumeofFlareGas volUOM="scf">
          <ghg:MeasureValue>555</ghg:MeasureValue>
          <ghg:NumberofTimesSubstituted>14</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeofFlareGas>
        <ghg:AnnualVolumeofFlareGasMethod>Method A</ghg:AnnualVolumeofFlareGasMethod>
        <ghg:AnnualAverageMolecularWeight molewtUOM="kg/kg-mole">
          <ghg:MeasureValue>25</ghg:MeasureValue>
          <ghg:NumberofTimesSubstituted>15</ghg:NumberofTimesSubstituted>
        </ghg:AnnualAverageMolecularWeight>
        <ghg:AnnualAverageMolecularWeightMethod>Method 18 at 40 CFR part 60, appendix A-6</ghg:AnnualAverageMolecularWeightMethod>
        <ghg:AnnualAverageCarbonContent carboncontentUOM="decimal fraction; kg carbon/kg flare gas">
          <ghg:MeasureValue>0.35</ghg:MeasureValue>
          <ghg:NumberofTimesSubstituted>16</ghg:NumberofTimesSubstituted>
        </ghg:AnnualAverageCarbonContent>
      </ghg:Y1aEquationDetails>
    </ghg:FlareGasUnitDetails>
  </ghg:FlareGasDetails>
</ghg:UnitDetails>

```

```

        <ghg:AnnualAverageCarbonContentMethod>ASTM D1945-
        03</ghg:AnnualAverageCarbonContentMethod>
      </ghg:Y1aEquationDetails>
    </ghg:FlareGasUnitDetails>
  </ghg:FlareGasDetails>
</ghg:UnitDetails>
<ghg:UnitDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>001- CMBM- TIF</ghg:UnitName>
    <ghg:UnitDescription>furnace unit</ghg:UnitDescription>
    <ghg:UnitType>Taconite Indurating Furnace</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:NoCemsIronSteelDetails>
    <ghg:CarbonBalanceInputOutput>
      <ghg:CarbonBalanceInputOutDetails>
        <ghg:InputOutputName>Pellet Output</ghg:InputOutputName>
        <ghg:InputOutputType>Solid Fired Pellets
        Produces</ghg:InputOutputType>
        <ghg:InputOutputClassification>Output</ghg:InputOutputClassific
        ation>
        <ghg:CarbonContent>
          <ghg:NumberOfTimesSubstituted>2</ghg:NumberOfTim
          esSubstituted>
        </ghg:CarbonContent>
        <ghg:BasisforCarbonContent>ASTM D5373-
        08</ghg:BasisforCarbonContent>
        <ghg:AnnualQuantitySubstitutedDataMethod>2 months, Method
        B</ghg:AnnualQuantitySubstitutedDataMethod>
      </ghg:CarbonBalanceInputOutDetails>
      <ghg:CarbonBalanceInputOutDetails>
        <ghg:InputOutputName>Pellet Input</ghg:InputOutputName>
        <ghg:InputOutputType>Solid Greenball Taconite
        Pellets</ghg:InputOutputType>
        <ghg:InputOutputClassification>Input</ghg:InputOutputClassifica
        tion>
        <ghg:CarbonContent>
          <ghg:NumberOfTimesSubstituted>1</ghg:NumberOfTim
          esSubstituted>
        </ghg:CarbonContent>
        <ghg:BasisforCarbonContent>ASTM C25-
        06</ghg:BasisforCarbonContent>
        <ghg:AnnualQuantitySubstitutedDataMethod>3 months, Method
        A</ghg:AnnualQuantitySubstitutedDataMethod>
      </ghg:CarbonBalanceInputOutDetails>
    </ghg:CO2EmissionsDetails>
      <ghg:CO2EmissionsEquationsQ1 massUOM="Metric Tons">
        <ghg:CalculatedValue>11111</ghg:CalculatedValue>
      </ghg:CO2EmissionsEquationsQ1>
    </ghg:CO2EmissionsDetails>
  </ghg:CarbonBalanceInputOutput>
</ghg:NoCemsIronSteelDetails>
</ghg:UnitDetails>
<ghg:CemsIronSteelDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>003-CEMS</ghg:UnitName>
    <ghg:UnitDescription>CEMS unit</ghg:UnitDescription>
    <ghg:UnitType>Taconite Indurating Furnace</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:AnnualTaconitePellets massUOM="Metric Tons">
    <ghg:MeasureValue>1000</ghg:MeasureValue>
  </ghg:AnnualTaconitePellets>
  <ghg:AnnualMoltenSteel massUOM="Metric Tons">
    <ghg:MeasureValue>2000</ghg:MeasureValue>
  </ghg:AnnualMoltenSteel>
  <ghg:AnnualCoke massUOM="Metric Tons">
    <ghg:MeasureValue>3000</ghg:MeasureValue>
  </ghg:AnnualCoke>
  <ghg:AnnualSinter massUOM="Metric Tons">
    <ghg:MeasureValue>4000</ghg:MeasureValue>
  </ghg:AnnualSinter>
  <ghg:AnnualDirectReducedIron massUOM="Metric Tons">
    <ghg:MeasureValue>5000</ghg:MeasureValue>
  </ghg:AnnualDirectReducedIron>
</ghg:CemsIronSteelDetails>
</ghg:SubPartQ>
</ghg:SubPartInformation>
</ghg:FacilitySiteDetails>
<ghg:StartDate>2010-01-01</ghg:StartDate>
<ghg:EndDate>2010-12-31</ghg:EndDate>
<ghg:DateTimeReportGenerated>2011-07-20T15:32:21</ghg:DateTimeReportGenerated>
</ghg:FacilitySiteInformation>
</ghg:GHG>

```