Greenhouse Gas Reporting Program

XML Reporting Instructions for Subpart Q – Iron and Steel Production

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

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

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I. Introduction

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

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

The schema's structure can be thought of as a family tree. 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.

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

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

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

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

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

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

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

Table 1
Reporting Numbers

Number Format	Description
Rounding	• CO_2e and CO_2 emissions data expressed in metric tons should be rounded to one decimal place. This should be done regardless of the level of data collection (e.g., unit-level, facility-level). Quantities less than 0.05 metric tons would round to 0.0 and be reported as such. Quantities greater than or equal to 0.05 metric tons would round up to 0.1 and be reported as such. • CH_4 emissions data expressed in metric tons should be rounded to two decimal places. • N_2O emissions data expressed in metric tons should be rounded to three decimal places. • Emissions data for all GHGs other than CO_2, N_2O and CH_4 expressed in metric tons should be rounded to the fourth digit to the right of the decimal (one tenth of a kilogram, or 1 ten thousandth of a metric ton). This rounding should be applied regardless of the level of data collection (unit, facility, etc.). • Other (non-emissions) quantitative data reported by the user (e.g., a monthly HHV sample result, an annual production quantity) will not need to be rounded. • In the case of aggregation/roll-ups, those calculations should be performed on the rounded values.
Percentages	If a value must be reported as a percentage, then the number should be within the range of 0 to 100 (percent), e.g. 85.5% should be reported as 85.5.
Fractions	If a value must be reported as a decimal fraction, then the number should be within the range of 0 and 1, e.g., 1/4 should be reported as 0**.**25. Leading zeroes are optional.

Key XML Terms

- XML: A markup language for documents containing structured information. The XML specification defines a standard way to add markup to documents. Its primary purpose is to facilitate the sharing of structured data across different information systems, particularly via the internet.
- XML Schema: An XML schema describes the structure of an XML document. The schema also defines the set of rules to which the XML document must conform in order to be considered "valid".
- XML file: A file containing data organized into a structured document using XML markup.
- Data Element: An XML data element is used for storing and classifying data in an XML file. Opening and closing tags represent the start and end of a data element. An opening tag looks like <elementName>, while a closing tag has a slash that is placed before the element's name </elementName>. The following example shows how to report the facility's identification

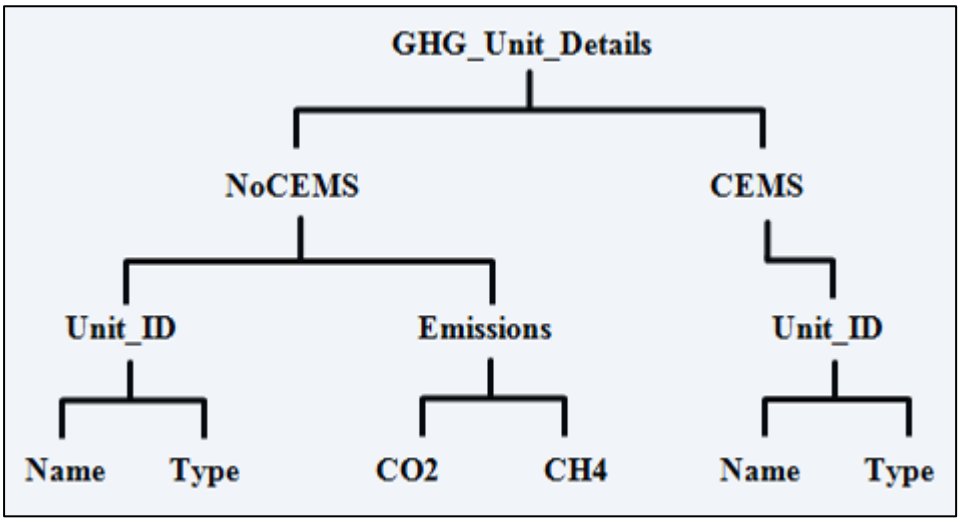
number: <FacilitySiteIdentifier>23222</FacilitySiteIdentifier>. The information shaded in blue represents the data element's value.

If a data element does not contain a value, then a single empty tag name may be used. An empty tag has a slash placed after the element's name <FacilitySiteIdentifier/>. **Note:** If you do not intend to report a value for a particular data element, then it is recommended that you do not include the data element in the XML file.

- **Attribute:** An XML attribute contains additional information about a specific data element. An attribute for a data element is placed within the opening tag. The syntax for including an attribute in an element is <elementName attributeName="value">. For example, <TotalCH4CombustionEmissionsmassUOM="Metric Tons">.
- **Root/Parent/Child Element:** The schema's structure can be thought of as a family tree. At the top of the tree is some early ancestor and at the bottom of the tree are the latest children. With a tree structure you can see which children belong to which parents and many other relationships.

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

Figure 1
Example of an XML Tree



This document provides a step-by-step description of how to report emissions data using the XML schema. Please note the following:

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

- **Data elements must be reported in a specific order.** The figures and tables in this document depict the specific sequence in which data elements must be arranged in the facility's XML file in order to produce a well-formed XML report.

- **Enumerations are case sensitive.** Many data elements have a defined set of allowable values, also known as enumerations. Values for enumerations must be entered exactly as they are defined within the schema (including punctuation marks) in order to be accepted by schema validation. See the definition tables for a complete list of enumerations.

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

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

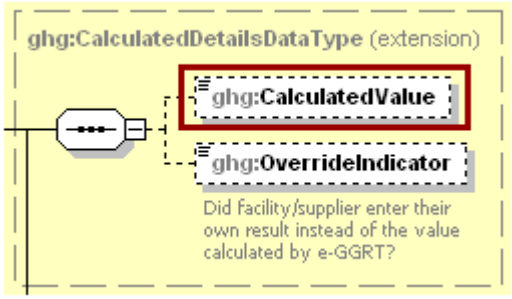
- **Commonly used data types are not depicted in the schema diagrams nor listed separately in the definition tables.** The schema diagrams display almost every data element in the schema except those that are associated with the three most commonly occurring data types:

    - Calculated Details
    - Measurement Details
    - Unit Identification Details

  Once defined, these data types (static collection of data elements) are then associated as children to every data element in the schema containing a measured or calculated value or unit details. These child data elements do not appear in the diagrams and are not listed on separate rows in the definition tables in order reduce their redundancy. They are however, referenced in the tables in the description of their parent data element. See Figures 2-4 and Tables 2-4.

- **Some data elements are conditionally required.** Data elements which are conditionally required are noted in the schema diagrams and the data element definitions tables. If your facility meets the condition specified for the data element, then the data element is required and you must report it in the facility's XML file. If your facility does not meet the condition specified for the data element, then **do not** include the data element in the facility's XML file. If a parent element is not required, then **do not** include any of its child data elements in the facility's XML file.

Figure 2
Calculated Details Data Type Schema Diagram

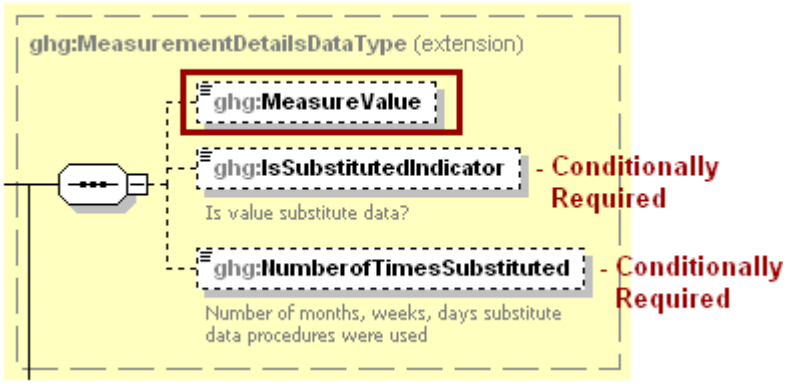


Note: Data elements boxed in red are required.

Table 2
Calculated Details Data Element Definitions

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

Figure 3
Measurement Details Data Type Schema Diagram

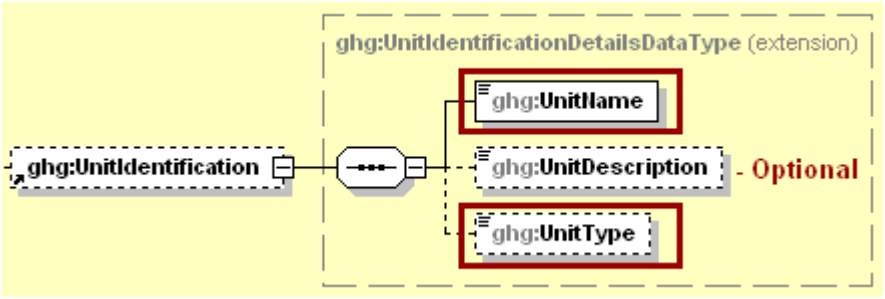


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Table 3
Measurement Details Data Element Definitions

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

Figure 4
Unit Identification Details Data Type Schema Diagram



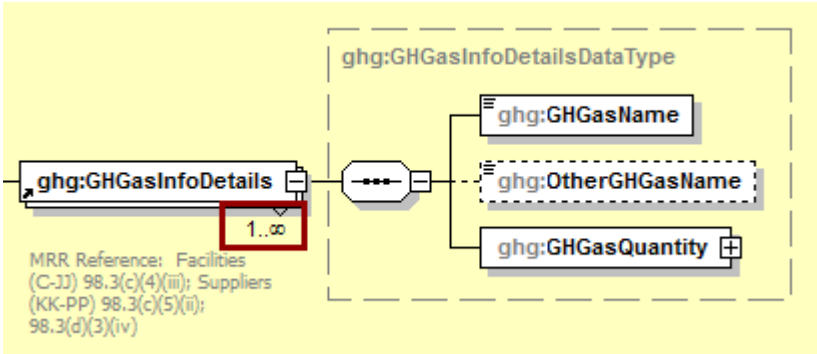
Note: Data elements boxed in red are required.

Table 4
Unit Identification Details Data Element Definitions

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

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

Figure 5
"Unbounded" Symbol in Schema Diagram

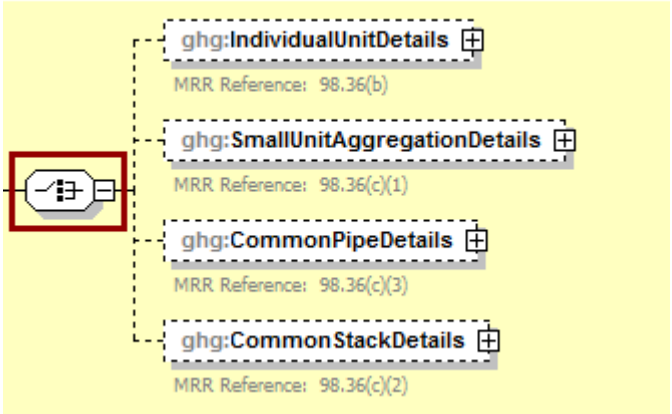


XML Excerpt 1
Example for "Unbounded" Parent Element

```
<ghg:GHGasInfoDetails>
        <ghg:GHGasName>Carbon Dioxide </ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
                <ghg:CalculatedValue>384781.2</ghg:CalculatedValue>
        </ghg:GHGasQuantity></ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
        <ghg:GHGasName>Methane</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
                <ghg:CalculatedValue>4004.12</ghg:CalculatedValue>
        </ghg:GHGasQuantity></ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
```

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

Figure 6
Logical "Or" Symbol in Schema Diagram



II. Summary of Changes

The following modifications were applied to the GHG XML schema in relation to Subpart Q (GHG_SubPartQ_v2.0.xsd).

Table 5
Summary of Changes to the Schema for Subpart Q

No.	Change Description
1	A dash has been removed from each enumerated value for the data element "CO2EmissionsCalculationMethod". (XPath = SubPartQ/UnitDetails/FlareGasDetails/FlareGasUnitDetails/EmissionsDetails/ CO2EmissionsCalculationMethod)
2	Added enumerated values to data element "FlareGasConditions". (XPath = SubPartQ/UnitDetails/FlareGasDetails/FlareGasUnitDetails/Y2EquationDetails/ FlareGasConditions)
3	Added enumerated values to data element "HeatingValueConditions". (XPath = SubPartQ/UnitDetails/FlareGasDetails/FlareGasUnitDetails/Y2EquationDetails/ HeatingValueConditions)

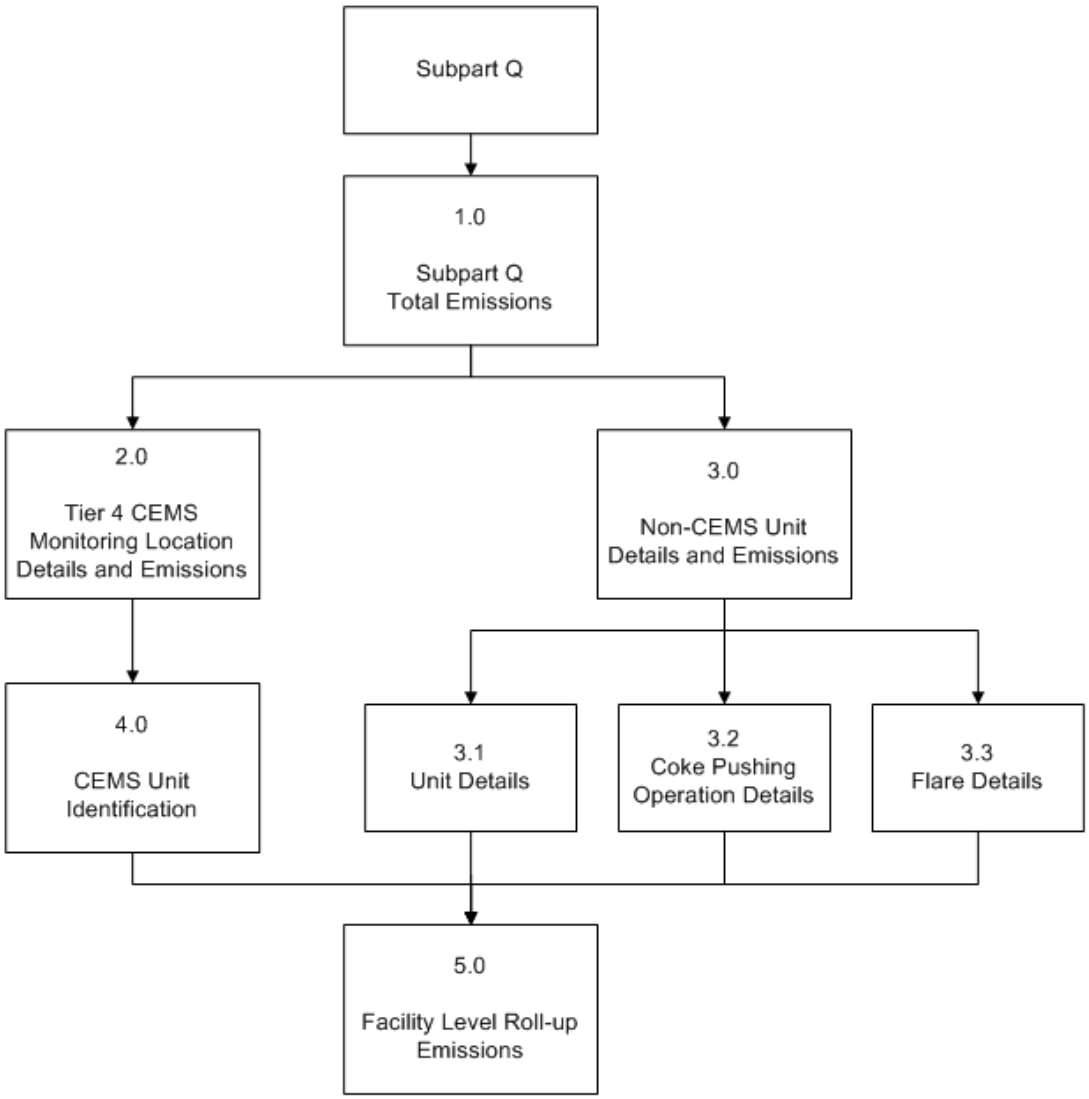
Document Changes:

3-15-2012 – Modified some of the emissions values within the XML excerpts to emphasize the rounding rules. Added "ParentCompanyDetails" to sample XML document.

III. Subpart Q Overview

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.

Figure 7
Subpart Q Reporting Diagram



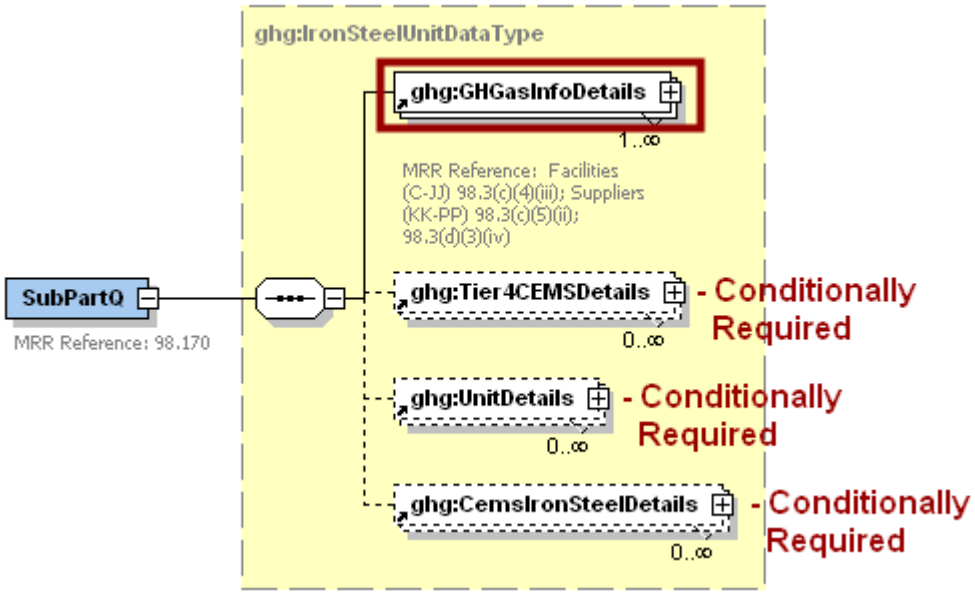
Subpart Q consists of facilities with any of the following processes: taconite iron ore processing, integrated iron and steel manufacturing, coke making not collocated with an integrated iron and steel manufacturing process, and electric arc furnace (EAF) steelmaking not collocated with an integrated 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.

If your facility is subject to reporting under Subpart Q (Iron and Steel Production), EPA recommends that you also consider the following source categories in your facility applicability determination: Subpart C (General Stationary Fuel Combustion) and Subpart PP (Suppliers of Carbon Dioxide). These source categories are only provided as suggestions - additional Subparts may be relevant for a given facility/supplier and not all listed Subparts are relevant for all facilities/suppliers.

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

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 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_2e (excluding biogenic CO_2) and biogenic CO_2 from Subpart Q at the facility level.

Figure 8
Subpart Q Schema Diagram

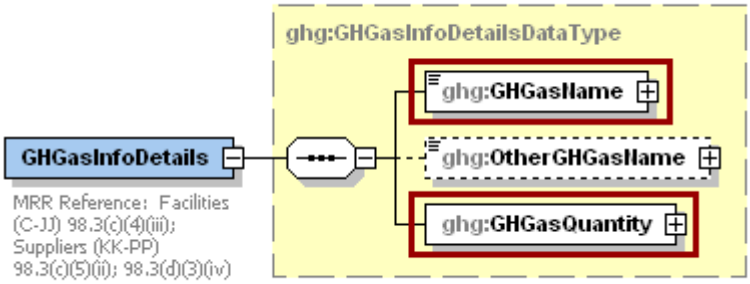


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

1.0 Subpart 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 40 CFR 98 Mandatory Reporting of Greenhouse Gases reported under Subpart Q, expressed in metric tons.

Figure 9
Greenhouse Gas Information Details Schema Diagram



Note: Data elements boxed in red are required.

For Subpart Q, report total emissions for carbon dioxide (excluding biogenic CO_2), biogenic carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). For greenhouse gas quantity, report the calculated value and mass unit of measure (metric tons) only according to the following guidelines:

1) Total CO_2 emissions (excluding biogenic CO_2) [98.3(c)(4)(iii)(B)]:

- Add the annual CO_2 mass emissions from each non-CEMS taconite indurating furnace (calculated using Equation Q-1) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS basic oxygen process furnace (calculated using Equation Q-2) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS non-recovery coke oven battery (calculated using Equation Q-3) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS sinter process (calculated using Equation Q-4) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS electric arc furnace (calculated using Equation Q-5) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS decarburization vessel (calculated using Equation Q-6) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS direct reduction furnace (calculated using Equation Q-7) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS unit (calculated using the site specific calculation methodology) in metric tons.
- Add the annual CO_2 mass emissions from each coke pushing operation in metric tons.
- Add the annual CO_2 mass emissions from each flare in metric tons.
- Add the total annual CO_2 mass emissions measured by each CEMS in metric tons. Then subtract the total annual biogenic CO_2 mass emissions for each CEMS monitoring location in metric tons (the difference between the total CO_2 monitored by each CEMS and the total biogenic CO_2).

2) Total biogenic CO_2 emissions [98.3(c)(4)(iii)(A)]:

- Add the total annual biogenic CO_2 mass emissions for each CEMS monitoring location in metric tons.

3) Total CH_4 emissions [98.33(c)(2)]:

- Add the annual CH_4 mass emissions from each flare in metric tons.
- Add the total CH_4 emissions for each CEMS monitoring location in metric tons.

4) Total N_2O emissions [98.33(c)(2)]:

- Add the annual N_2O mass emissions from each flare in metric tons.
- Add the total N_2O emissions for each CEMS monitoring location in metric tons.

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

Table 6
Greenhouse Gas Information Details Data Element Definitions

Data Element Name	Description
GHGasInfoDetails	**Parent Element:** A collection of data elements containing the total annual emissions of each greenhouse gas (GHG) listed in Table A-1 of 40 CFR 98 Mandatory Reporting of Greenhouse Gases reported under this Subpart, expressed in metric tons.
GHGasName	Specify the name of the GHG. 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 value in the child data element **CalculatedValue** using the guidelines above. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 2
Example for Greenhouse Gas Information Details

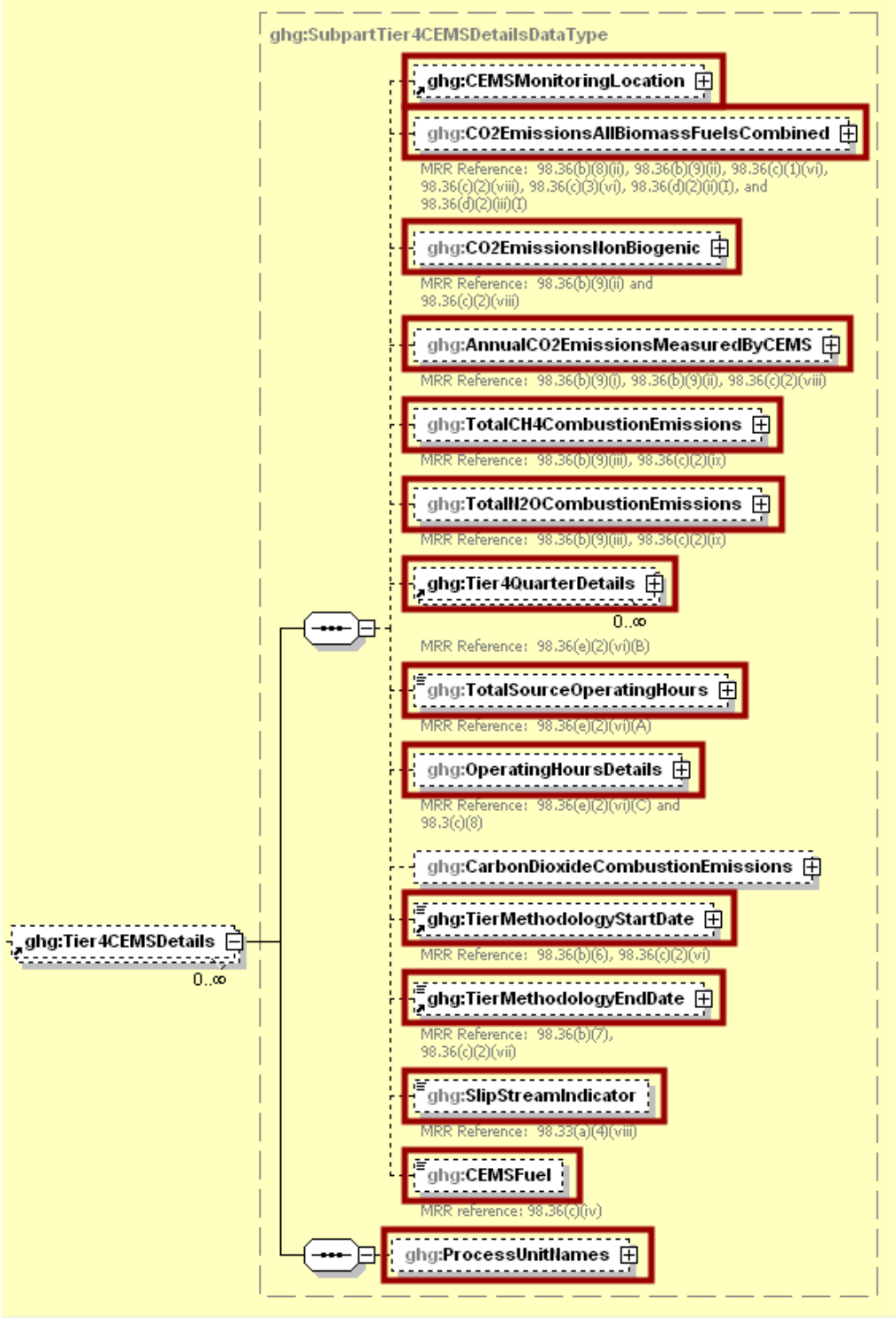
```
<ghg:SubPartQ>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                        <ghg:CalculatedValue>600.1</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Methane</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                        <ghg:CalculatedValue>280.23</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                        <ghg:CalculatedValue>29.456</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                        <ghg:CalculatedValue>130509.7</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
```

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

2.0 Tier 4 CEMS Monitoring Location Details and Emissions

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

Figure 10
Tier 4 CEMS Details Schema Diagram



Note: Data elements boxed in red are required.

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_2 mass emissions from combustion of all biomass fuels combined [98.36(b)(9)(ii), 98.36(c)(2)(viii)].
- The total annual non-biogenic CO_2 mass emissions (i.e., CO_2 mass emissions from fossil fuels, sorbent use and process emissions) [98.36(b)(9)(ii), 98.36(c)(2)(viii)].
- The total annual CO_2 mass emissions (biogenic and non-biogenic) measured by the CEMS [98.36(b)(9)(i)-(ii) , 98.36(c)(2)(viii)].
- The total annual CH_4 mass emissions derived from Equation C-10, in metric tons CH_4 [98.36(b)(9)(iii), 98.36(c)(2)(ix)].
- The total annual N_2O mass emissions derived from Equation C-10, in metric tons N_2O [98.36(b)(9)(iii), 98.36(c)(2)(ix)].

Figure 11
Tier 4 CEMS Location and Emission Details Schema Diagram

Note: Data elements boxed in red are required.

Table 7
Tier 4 CEMS Location and Emission Details Data Element Definitions

Data Element Name	Description
Tier4CEMSDetails	**Parent Element (Conditionally Required):** A collection of data elements containing information on emissions from combustion sources monitored with Tier 4 CEMS methodology.
CEMSMonitoringLocation	A collection of data elements containing information on each CEMS monitoring location (CML). Report a unique CML name (ID) in the child data element **Name**, an optional brief description in the child data element **Description** and the type of configuration in the child data element **Type**. See the list of allowable configuration types: Single process/process unit exhausts to dedicated stack Multiple processes/process units share common stack Process/stationary combustion units share common stack
CO2EmissionsAllBiomassFuelsCombined	A collection of data elements containing information on the total annual biogenic CO_2 mass emissions for the specified CML. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
CO2EmissionsNonBiogenic	A collection of data elements containing information on the total annual non-biogenic CO_2 mass emissions (includes fossil fuel, sorbent and process CO_2 emissions) for the specified CML. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
AnnualCO2EmissionsMeasuredByCEMS	A collection of data elements containing information on the total annual CO_2 mass emissions measured by the CEMS at the specified monitoring location. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
TotalCH4CombustionEmissions	A collection of data elements containing information on the annual CH_4 mass emissions from combustion in the CML configuration during the reporting year calculated using Equation C-10 expressed in mass of CH_4. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
TotalN2OCombustionEmissions	A collection of data elements containing information on the annual N_2O mass emissions from combustion in the CML configuration during the reporting year calculated using Equation C-10 expressed in mass of N_2O. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 3
Example 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>600.2</ghg:CalculatedValue>
        </ghg:CO2EmissionsAllBiomassFuelsCombined>
        <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
                <ghg:CalculatedValue>700.6</ghg:CalculatedValue>
        </ghg:CO2EmissionsNonBiogenic>
        <ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
                <ghg:CalculatedValue>10000.8</ghg:CalculatedValue>
        </ghg:AnnualCO2EmissionsMeasuredByCEMS>
        <ghg:TotalCH4CombustionEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>80.35</ghg:CalculatedValue>
        </ghg:TotalCH4CombustionEmissions>
        <ghg:TotalN2OCombustionEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>9.123</ghg:CalculatedValue>
        </ghg:TotalN2OCombustionEmissions>
```

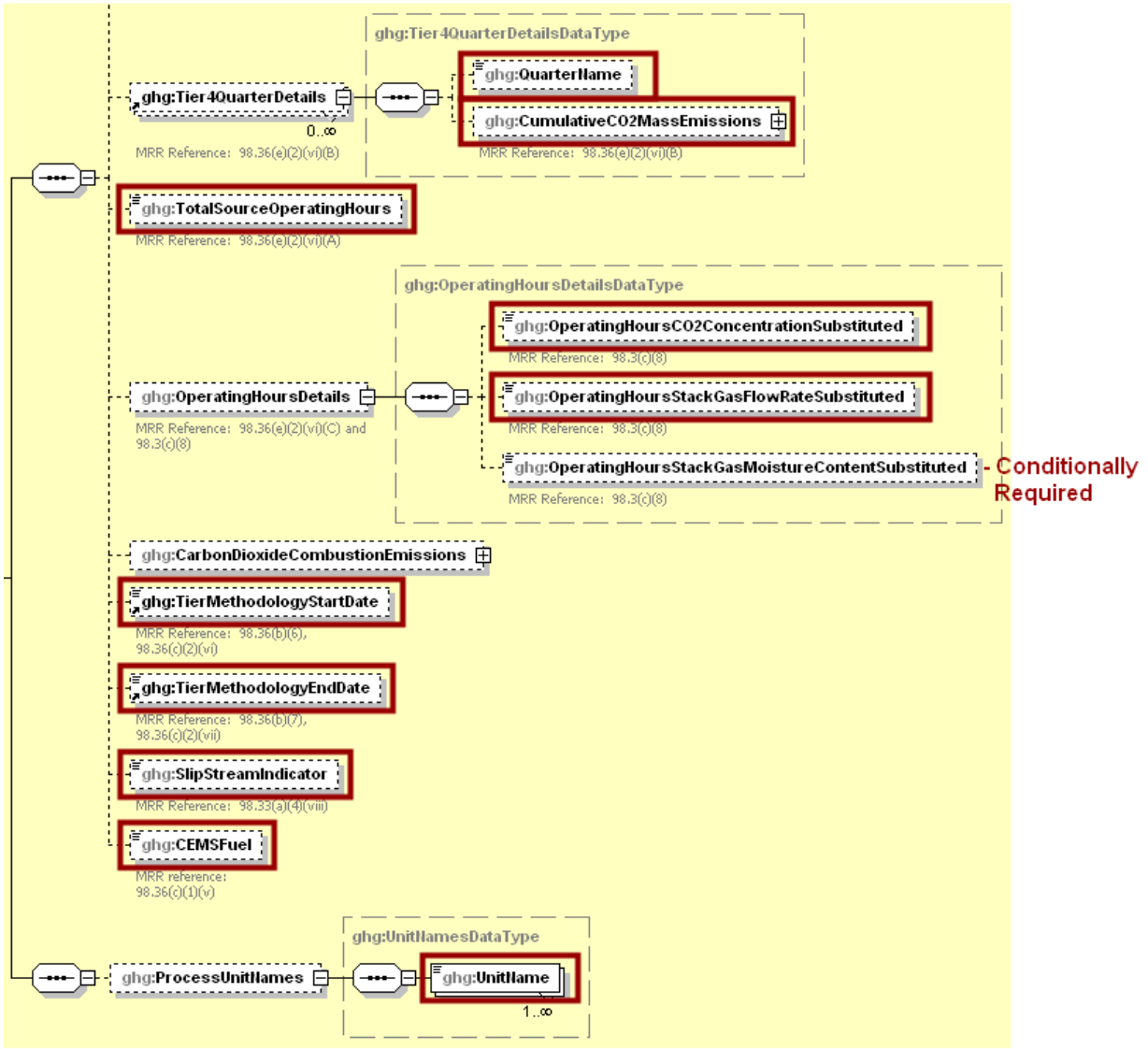
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

For each quarter of the reporting year, the facility must provide the cumulative CO_2 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_2 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)].
- **Conditionally Required:** 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(b)(4), 98.36(c)(2)(iv)].
- The name of each process unit sharing the stack. **Note:** Use the same identification for each unit as is used for the parent element "CemsIronSteelDetails".

Figure 12
Tier 4 CEMS Quarter and Additional Details Schema Diagram



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

Table 8
Tier 4 CEMS Quarter and Additional Details Data Element Definitions

Data Element Name	Description
Tier4QuarterDetails	**Parent Element:** 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_2 mass emissions for the specified quarter of the reporting year. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
TotalSourceOperatingHours	The total number of source operating hours in the reporting year.
OperatingHoursDetails	**Parent Element:** 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_2 concentration parameter.
OperatingHoursStackGasFlowRateSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter.
OperatingHoursStackGasMoistureContentSubstituted	**Conditionally Required:** 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 (YYYY-MM-DD).
TierMethodologyEndDate	The tier methodology end date for the specified CEMS monitoring location (YYYY-MM-DD).
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	**Parent Element:** A collection of data elements identifying each unit or furnace which was monitored at the specified CEMS monitoring location.

Data Element Name	Description
UnitName	The unit ID for each unit or furnace which was monitored at the specified CEMS monitoring location. **Note:** Use the same identification for each unit as is used for the parent element "CemsIronSteelDetails".

XML Excerpt 4
Example for Tier 4 CEMS Quarter and Additional Details

```
        <ghg:Tier4QuarterDetails>
                <ghg:QuarterName>First Quarter</ghg:QuarterName>
                <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                        <ghg:CalculatedValue>10100.2</ghg:CalculatedValue>
                </ghg:CumulativeCO2MassEmissions>
        </ghg:Tier4QuarterDetails>
        <ghg:Tier4QuarterDetails>
                <ghg:QuarterName>Second Quarter</ghg:QuarterName>
                <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                        <ghg:CalculatedValue>22000.4</ghg:CalculatedValue>
                </ghg:CumulativeCO2MassEmissions>
        </ghg:Tier4QuarterDetails>
        <ghg:Tier4QuarterDetails>
                <ghg:QuarterName>Third Quarter</ghg:QuarterName>
                <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                        <ghg:CalculatedValue>30050.7</ghg:CalculatedValue>
                </ghg:CumulativeCO2MassEmissions>
        </ghg:Tier4QuarterDetails>
        <ghg:Tier4QuarterDetails>
                <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
                <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                        <ghg:CalculatedValue>40300.6</ghg:CalculatedValue>
                </ghg:CumulativeCO2MassEmissions>
        </ghg:Tier4QuarterDetails>
        <ghg:TotalSourceOperatingHours>7300</ghg:TotalSourceOperatingHours>
        <ghg:OperatingHoursDetails>
                <ghg:OperatingHoursCO2ConcentrationSubstituted>66</ghg:OperatingHoursCO2ConcentrationSubstitut
                ed>
                <ghg:OperatingHoursStackGasFlowRateSubstituted>55</ghg:OperatingHoursStackGasFlowRateSubstitut
                ed>
                <ghg:OperatingHoursStackGasMoistureContentSubstituted>44</ghg:OperatingHoursStackGasMoistureCo
                ntentSubstituted>
        </ghg:OperatingHoursDetails>
        <ghg:TierMethodologyStartDate>2011-01-01</ghg:TierMethodologyStartDate>
        <ghg:TierMethodologyEndDate>2011-12-31</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.

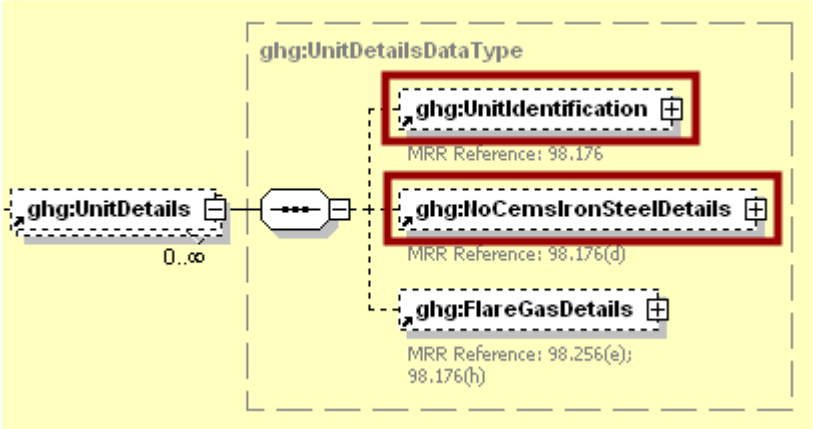
3.0 Non-CEMS Unit Details and Emissions

Conditionally Required: 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

Conditionally Required: 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 13
Non-CEMS Unit Details Schema Diagram



Note: Data elements boxed in red are required.

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: For the 2010 reporting year, the information required for decarburization vessels applies only to argon-oxygen decarburization vessels. However, for 2011 and subsequent reporting 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 9
Unit Identification Data Element Definitions

Data Element Name	Description
UnitDetails	**Parent Element (Conditionally Required):** A collection of data elements containing details about each unit configuration that does not use a CEMS to measure CO_2.
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_2. Report a unique unit name (ID) in the child data element **UnitName**, an optional brief description in the child data element **UnitDescription** and the type of unit in the child data element **UnitType**. See list of allowable unit types: 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 **Note:** The last unit type listed does not apply to the carbon mass balance calculation methodology.

XML Excerpt 5
Example for Unit Identification

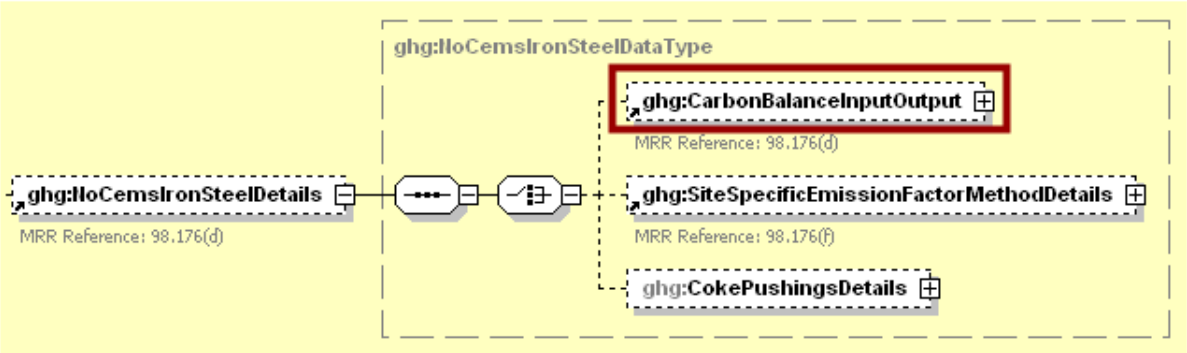
```
<ghg:UnitDetails>
        <ghg:UnitIdentification>
                <ghg:UnitName>007- DV</ghg:UnitName>
                <ghg:UnitType>Decarburization Vessel</ghg:UnitType>
        </ghg:UnitIdentification>
```

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

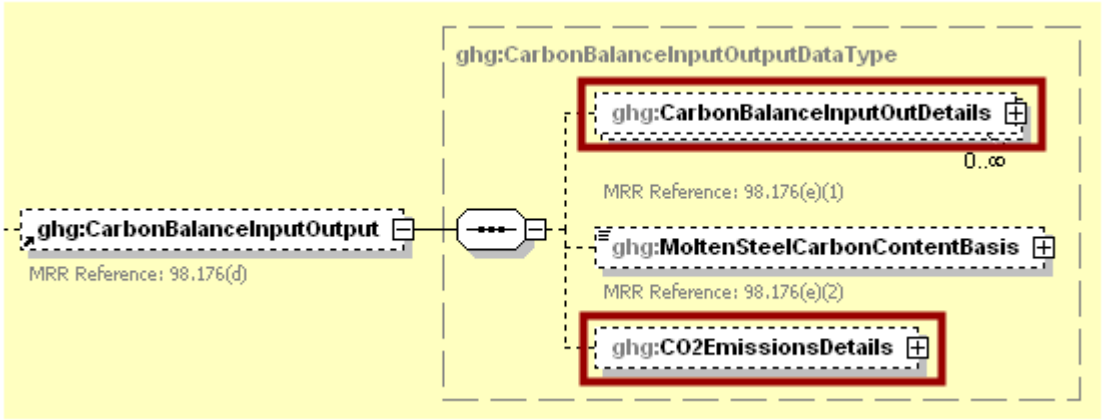
Conditionally Required: This section describes the information to report for each unit for which the carbon mass balance calculation methodology was used to calculate emissions.

Figure 14
Non-CEMS Unit Calculation Methodology Schema Diagram



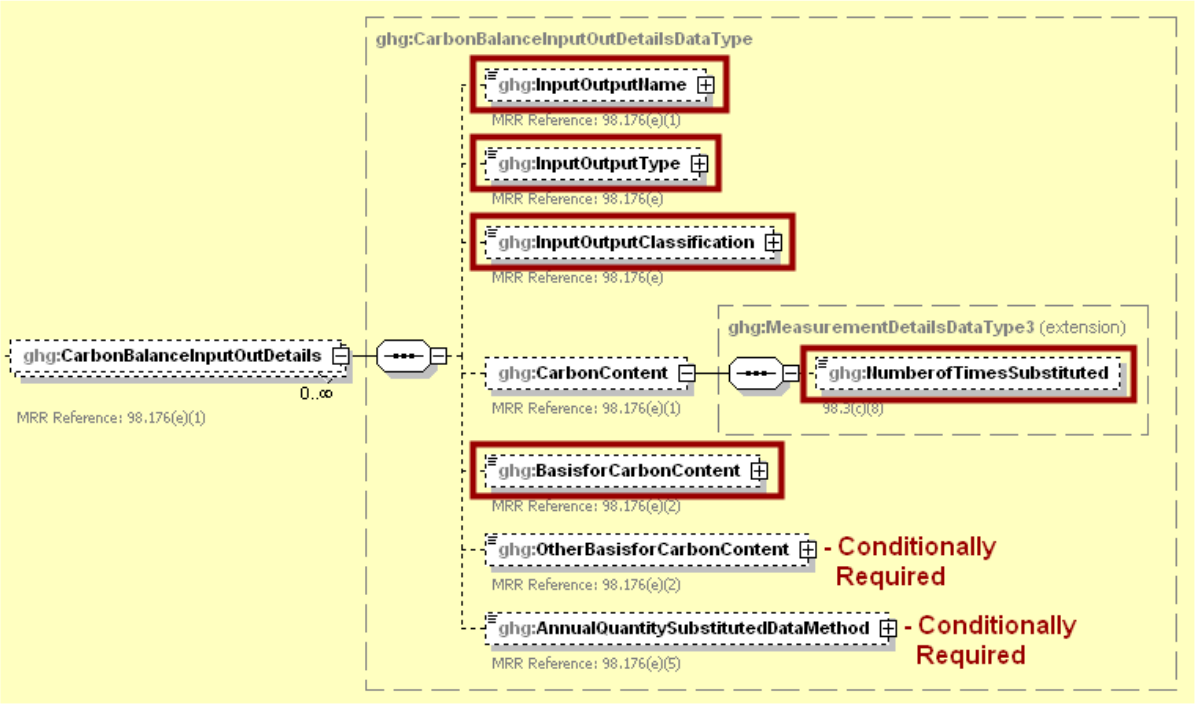
Note: Data elements boxed in red are required.

Figure 15
Carbon Mass Balance Calculation Methodology Details Schema Diagram



Note: Data elements boxed in red are required.

Figure 16
Carbon Mass Balance Input/Output Details Schema Diagram



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

For 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)
- **Conditionally Required:** 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 10
Carbon Mass Balance Input/Output Details Data Element Definitions

Data Element Name	Description
NoCemsIronSteelDetails	**Parent Element:** A collection of data elements containing information about the unit specified.
CarbonBalanceInputOutput	**Parent Element (Conditionally Required):** 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	**Parent Element:** 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	The type of each process input and output for the specified unit. See list of allowable values: Solid Fuel Liquid Fuel Gaseous Fuel Solid Greenball Taconite Pellets Other - Solid Other - Liquid Other - Gas Solid Fired Pellets Produces Solid Air Pollution Control Residue Molten Iron Ferrous Scrap Flux Material Carbonaceous Material Coal Mixed Sinter Feed that form the Bed Direct Reduced Iron Carbon Electrode Consumed Molten Steel Other Solid Input Gaseous Fuel Iron Ore Iron ore Pellets Slag Produced Molten Steel Produced Air Pollution Control Residue Coke Sinter Produced Other Solid Output Iron Produced Non-metallic Materials Produced Solid Fired Pellets Produces Solid Air Pollution Control Residue
InputOutputClassification	An indication of whether the material specified is an input or output. See list of allowable values: Input Output

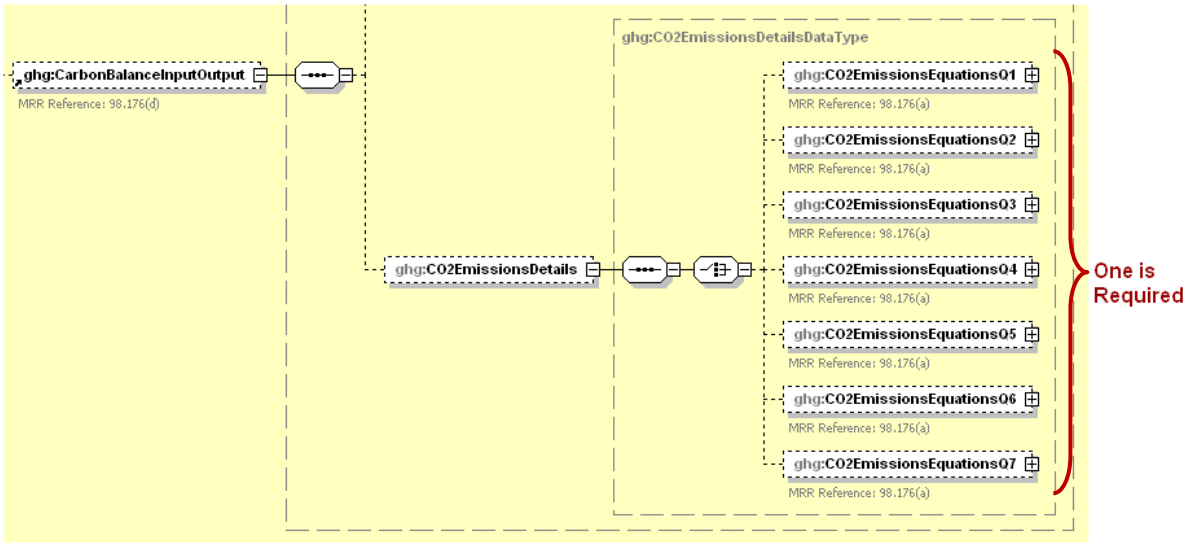
Data Element Name	Description
CarbonContent	**Parent Element:** A parent data element containing information on the carbon content of the specified input or output.
NumberofTimesSubstituted	The number of months that missing data procedures were followed or analysis was repeated to determine the carbon content of the specified process input or output.
BasisforCarbonContent	The carbon content determination method. See list of allowable values: 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)
OtherBasisforCarbonContent	**Conditionally Required:** The carbon content determination method if "Other (specify)" was reported for BasisforCarbonContent.
AnnualQuantitySubstitutedDataMethod	**Conditionally Required:** 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.

XML Excerpt 6
Example 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: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>
```

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

Figure 17
Carbon Mass Balance Emissions Details Schema Diagram



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

For each unit or process using the carbon mass balance calculation methodology, the facility must report the CO_2 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 11
Carbon Mass Balance Emissions Details Data Element Definitions

Data Element Name	Description
CO2EmissionsDetails	**Parent Element:** A collection of data elements containing information on calculated annual emissions for CO_2 for the specified process/process unit.
CO2EmissionsEquationsQ1	**Conditionally Required:** Annual CO_2 mass emissions for each taconite indurating furnace using the carbon mass balance method (the output of Equation Q-1). Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

Data Element Name	Description
CO2EmissionsEquationsQ2	**Conditionally Required:** Annual CO_2 mass emissions for each basic oxygen process furnace using the carbon mass balance method (the output of Equation Q-2). Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
CO2EmissionsEquationsQ3	**Conditionally Required:** Annual CO_2 mass emissions for each non-recovery coke oven battery using the carbon mass balance method (the output of Equation Q-3). Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
CO2EmissionsEquationsQ4	**Conditionally Required:** Annual CO_2 mass emissions for each sinter process using the carbon mass balance method (the output of Equation Q-4). Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
CO2EmissionsEquationsQ5	**Conditionally Required:** Annual CO_2 mass emissions for each electric arc furnace (EAF) using the carbon mass balance method (the output of Equation Q-5). Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
CO2EmissionsEquationsQ6	**Conditionally Required:** Annual CO_2 mass emissions for each decarburization vessel using the carbon mass balance method (the output of Equation Q-6). Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
CO2EmissionsEquationsQ7	**Conditionally Required:** Annual CO_2 mass emissions for each direct reduction furnace using the carbon mass balance method (the output of Equation Q-7). Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 7
Example for Carbon Mass Balance Emissions Details

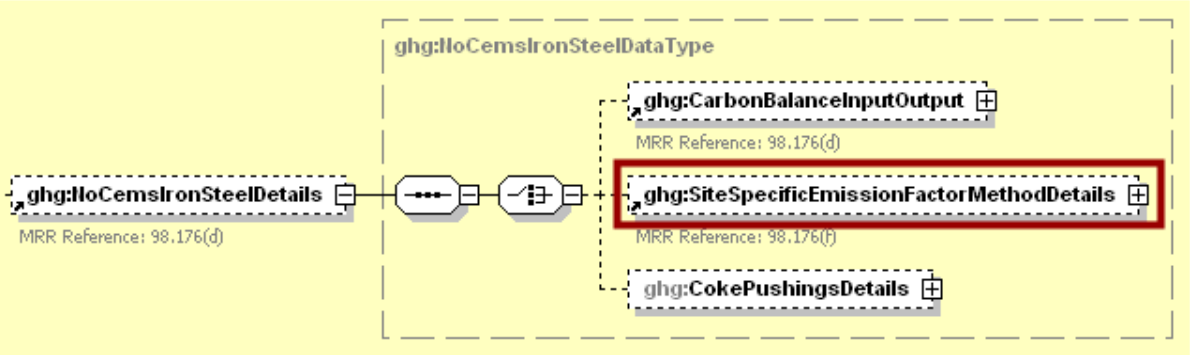
```
                        <ghg:CO2EmissionsDetails>
                            <ghg:CO2EmissionsEquationsQ6 massUOM="Metric Tons">
                                <ghg:CalculatedValue>9999.1</ghg:CalculatedValue>
                            </ghg:CO2EmissionsEquationsQ6>
                        </ghg:CO2EmissionsDetails>
                    </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

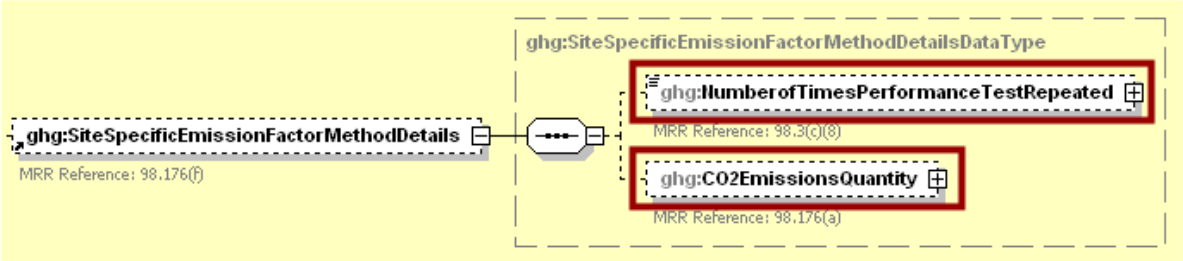
Conditionally Required: This section describes the information to report for each unit or process for which the site-specific emissions factor calculation methodology was used to calculate emissions.

Figure 18
Non-CEMS Unit Calculation Methodology Schema Diagram



Note: Data elements boxed in red are required.

Figure 19
Site-Specific Emission Factor Calculation Methodology Schema Diagram



Note: Data elements boxed in red are required.

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_2 mass emissions calculated using the site-specific emission factor method [98.176(a)].

Table 12
Site-Specific Emission Factor Calculation Methodology Data Element Definitions

Data Element Name	Description
NoCemsIronSteelDetails	**Parent Element:** A collection of data elements containing information about the unit specified.
SiteSpecificEmissionFactorMethodDetails	**Parent Element (Conditionally Required):** 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_2 emissions for each production process or process unit for which the facility is using the site-specific emission factor method. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 8
Example for Site-Specific Emission Factor Calculation Methodology Details

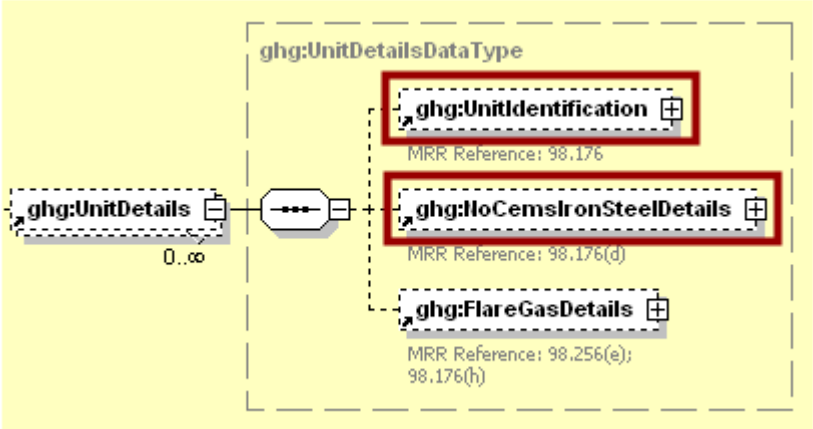
```
        <ghg:NoCemsIronSteelDetails>
                <ghg:SiteSpecificEmissionFactorMethodDetails>
                        <ghg:NumberofTimesPerformanceTestRepeated>2</ghg:NumberofTimesPerformanceTestRepe
                        ated>
                        <ghg:CO2EmissionsQuantity massUOM="Metric Tons">
                                <ghg:CalculatedValue>22622.4</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

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

Figure 20
Coke Pushing Operation Identification Schema Diagram



Note: Data elements boxed in red are required.

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 13
Coke Pushing Operation Identification Data Element Definitions

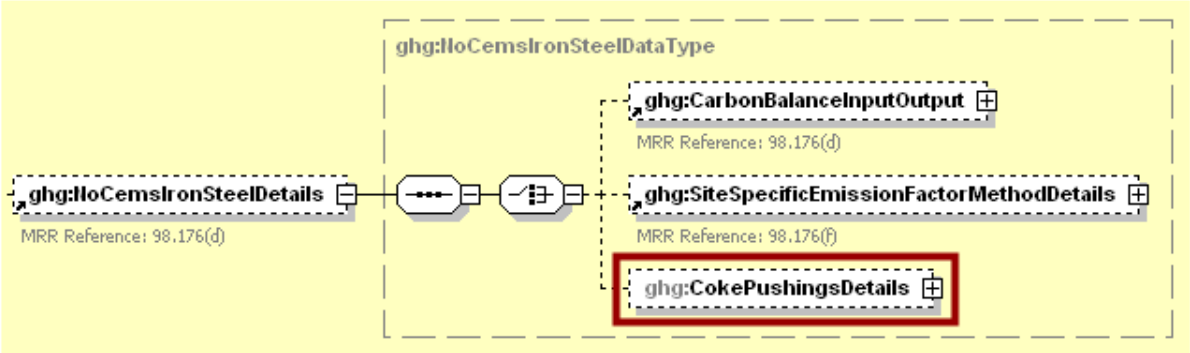
Data Element Name	Description
UnitDetails	**Parent Element:** A collection of data elements containing details about each unit configuration that does not use a CEMS to measure CO_2.
UnitIdentification	A collection of data elements containing the identity of each iron and/or steel production process/process unit that does not use a CEMS to measure CO_2. Report a unique unit name (ID) in the child data element **UnitName**, an optional brief description in the child data element **UnitDescription** and the type of unit in the child data element **UnitType**: "Coke Pushing Operation"

XML Excerpt 9
Example 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>
```

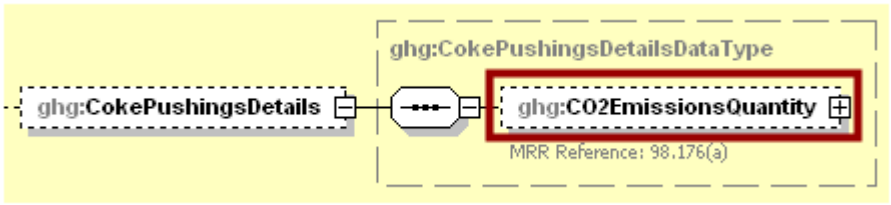
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

Figure 21
Coke Pushing Operation Details Schema Diagram



Note: Data elements boxed in red are required.

Figure 22
Coke Pushing Operation Emission Details Schema Diagram



Note: Data elements boxed in red are required.

For each coke pushing process, the facility must report the CO_2 mass emissions [98.176(a)].

Table 14
Coke Pushing Operation Emission Details Data Element Definitions

Data Element Name	Description
NoCemsIronSteelDetails	**Parent Element:** A collection of data elements containing information about the unit specified.
CokePushingsDetails	**Parent Element (Conditionally Required):** A collection of data elements containing details for coke pushing operations.
CO2EmissionsQuantity	The CO_2 mass emissions for the specified coke pushing process. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 10
Example for Coke Pushing Operation Emission Details

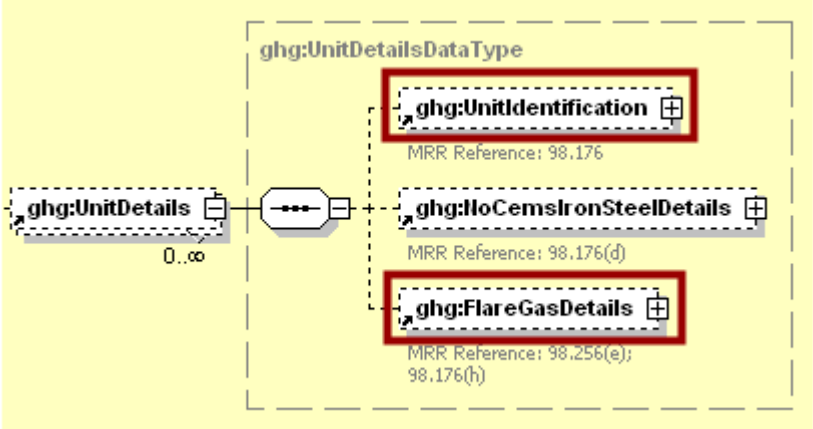
```
        <ghg:NoCemsIronSteelDetails>
            <ghg:CokePushingsDetails>
                <ghg:CO2EmissionsQuantity massUOM="Metric Tons">
                    <ghg:CalculatedValue>33333.9</ghg:CalculatedValue>
                </ghg:CO2EmissionsQuantity>
            </ghg:CokePushingsDetails>
        </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

Conditionally Required: This section includes information to report CO_2 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_4 and N_2O emissions from flares, follow procedures in 98.33(c)(2).

Figure 23
Flare Details Schema Diagram



Note: Data elements boxed in red are required.

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 15
Coke Pushing Operation Identification Data Element Definitions

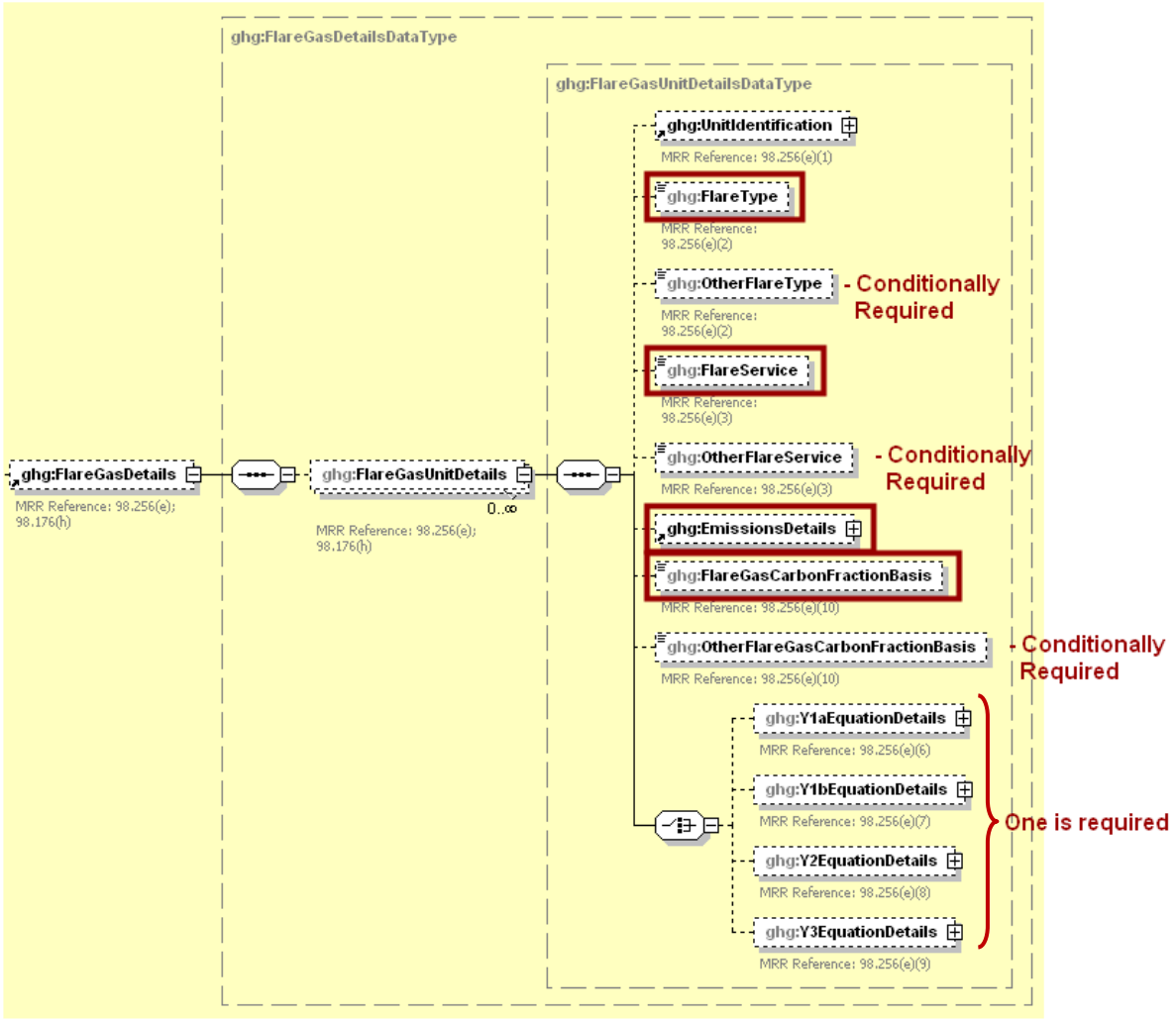
Data Element Name	Description
UnitDetails	**Parent Element:** A collection of data elements containing details about each unit configuration that does not use a CEMS to measure CO_2.
UnitIdentification	A collection of data elements containing the identity of each iron and/or steel production process/process unit that does not use a CEMS to measure CO_2. Report a unique unit name (ID) in the child data element **UnitName**, an optional brief description in the child data element **UnitDescription** and the type of unit in the child data element **UnitType**: "Flare".

XML Excerpt 11
Example 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 24
Flare Gas Details Schema Diagram



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

For 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 16
Flare Gas Unit Details Data Element Definitions

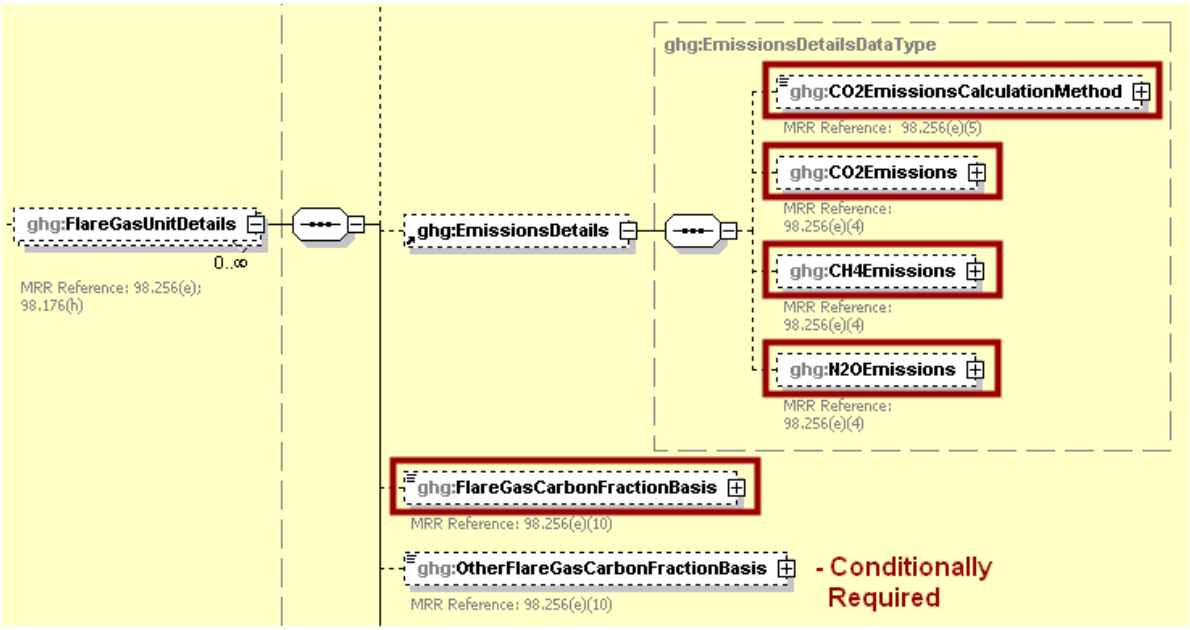
Data Element Name	Description
FlareGasDetails	**Parent Element (Conditionally Required):** A collection of data elements containing details about emissions from flares that burn blast furnace gas and coke oven gas.
FlareGasUnitDetails	**Parent Element:** A collection of data elements containing details for a specific flare.
FlareType	Type of flare. See list of allowable values: Steam assisted Air-assisted Unassisted Other (specify)
OtherFlareType	**Conditionally Required:** Specify the flare service if "Other (specify)" is reported for FlareType.
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	**Conditionally Required:** Specify the flare service if "Other (specify)" is reported for FlareService.

XML Excerpt 12
Example 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 25
Flare Gas Unit Emissions and Carbon Fraction Basis Schema Diagram



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

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

- The method used to calculate the CO_2 emissions (e.g., reference section and equation number) [98.256(e)(5)].
- Estimated CO_2 emissions [98.256(e)(4)].
- Estimated CH_4 emissions [98.256(e)(4)].
- Estimated N_2O emissions [98.256(e)(4)].
- The basis for the fraction of carbon in the flare gas contributed by methane value [98.256(e)(10)].

Table 17
Flare Gas Unit Emissions and Carbon Fraction Basis Data Element Definitions

Data Element Name	Description
EmissionsDetails	**Parent Element:** A collection of data elements containing information the calculated annual emissions for the specified flare.
CO2EmissionsCalculationMethod	The method used to calculate the CO_2 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

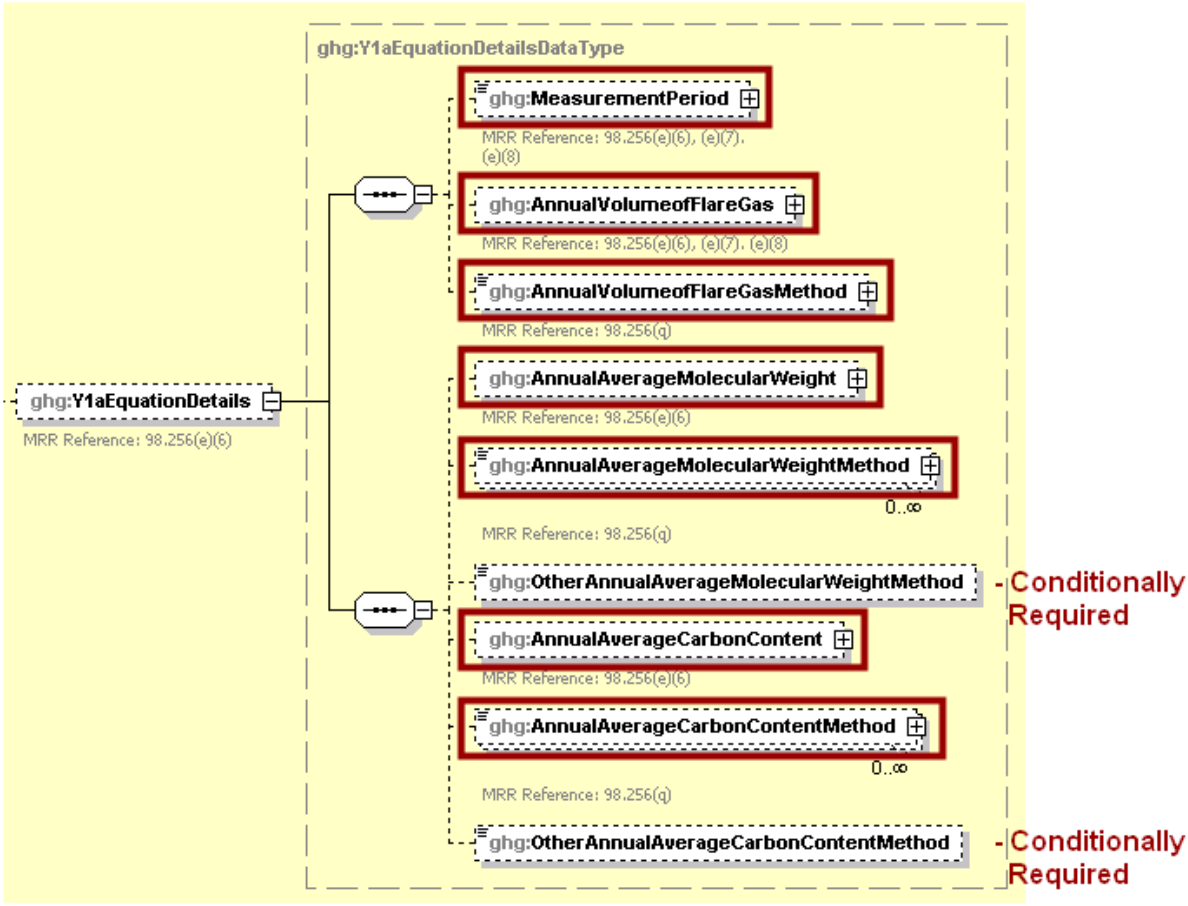
Data Element Name	Description
CO2Emissions	A collection of data elements containing information on the annual CO_2 emissions for the specified flare. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
CH4Emissions	A collection of data elements containing information on the annual CH_4 emissions for the specified flare. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
N2OEmissions	A collection of data elements containing information on the annual N_2O emissions for the specified flare. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
FlareGasCarbonFractionBasis	Basis for the fraction of carbon in the flare gas contributed by methane. See list of allowable values: Default Value 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 Engineering calculations Other (specify)
OtherFlareGasCarbonFractionBasis	**Conditionally Required:** Specify the basis for the fraction of carbon in the flare gas contributed by methane if "Other (specify)" is reported for FlareGasCarbonFractionBasis.

XML Excerpt 13
Example 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>44444.2</ghg:CalculatedValue>
        </ghg:CO2Emissions>
        <ghg:CH4Emissions massUOM="Metric Tons">
                <ghg:CalculatedValue>200.45</ghg:CalculatedValue>
        </ghg:CH4Emissions>
        <ghg:N2OEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>20.547</ghg:CalculatedValue>
        </ghg:N2OEmissions>
</ghg:EmissionsDetails>
<ghg:FlareGasCarbonFractionBasis>ASTM D1946-90 (Reapproved 2006)</ghg:FlareGasCarbonFractionBasis>
```

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

Figure 26
Equation Y-1a Details Schema Diagram



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

For 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 [98.3(c)(8)].
- 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)].
- The number of days missing data procedures were used to measure the molecular weight [98.3(c)(8)].
- 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 [98.3(c)(8)].
- The method(s) used to measure carbon content of the flare gas [98.256(q)].

Table 18
Equation Y-1a Details Data Element Definitions

Data Element Name	Description
Y1aEquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if Equation Y-1a was used to calculate the CO_2 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 value in the child data element **MeasureValue**. Set the units of measure to "scf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the annual volume of flare gas combusted in the child data element **NumberofTimesSubstituted**.
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 value in the child data element **MeasureValue**. Set the units of measure to "kg/kg-mole" in the attribute **molewtUOM**. Also report the number of days that missing data procedures were used in measuring the annual average molecular weight of the flare gas in the child data element **NumberofTimesSubstituted**.
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	**Conditionally Required:** 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 value in the child data element **MeasureValue**. Set the units of measure to "decimal fraction; kg carbon/kg flare gas" in the attribute **carboncontentUOM**. Also report the number of days that missing data procedures were used in measuring the annual average carbon content of the flare gas in the child data element **NumberofTimesSubstituted**.
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	**Conditionally Required:** Report the method used to determine the annual average carbon content of the flare gas if "Other (specify)" was reported above.

XML Excerpt 14
Example for Equation Y-1a Details

```
                        <ghg:Y1aEquationDetails>
                                <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
                                <ghg:AnnualVolumeofFlareGas volUOM="scf">
                                        <ghg:MeasureValue>555.8795675</ghg:MeasureValue>
                                        <ghg:NumberofTimesSubstituted>14</ghg:NumberofTimesSubstituted>
                                </ghg:AnnualVolumeofFlareGas>
                                <ghg:AnnualVolumeofFlareGasMethod>Method
                                A</ghg:AnnualVolumeofFlareGasMethod>
                                <ghg:AnnualAverageMolecularWeight molewtUOM="kg/kg-mole">
                                        <ghg:MeasureValue>25.23457</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: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 27
Equation Y-1b Details Schema Diagram

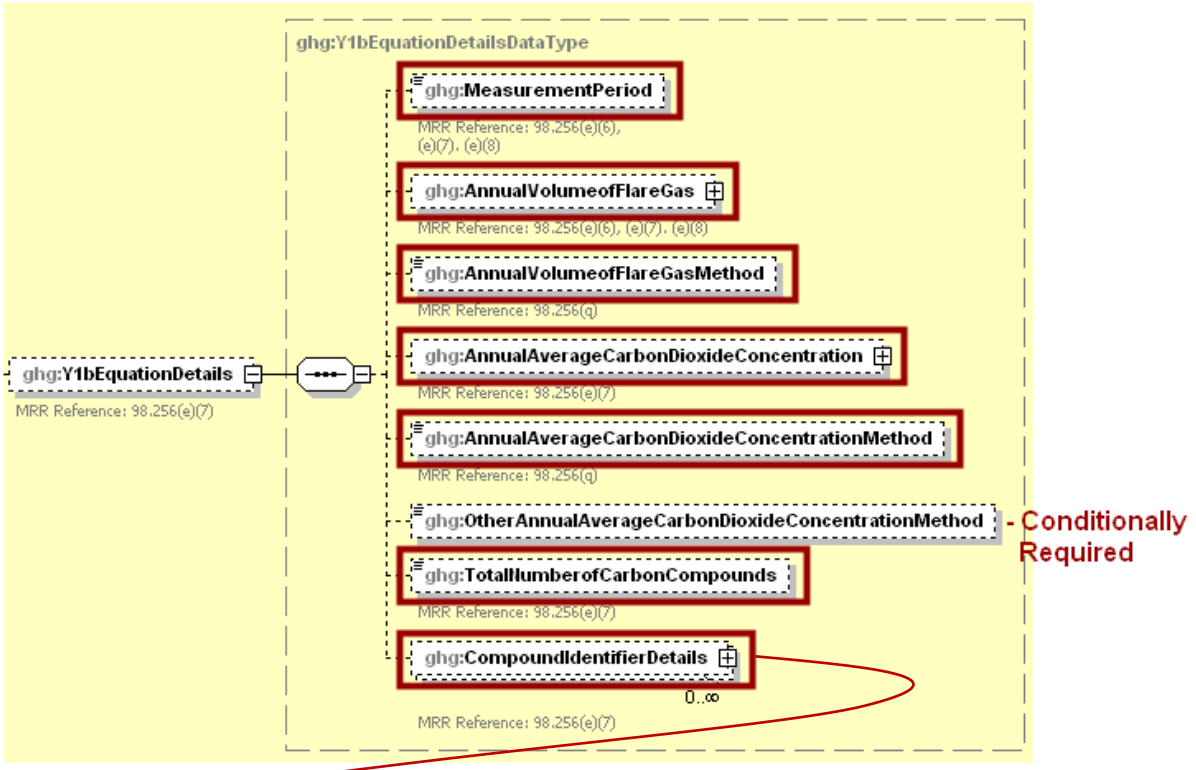
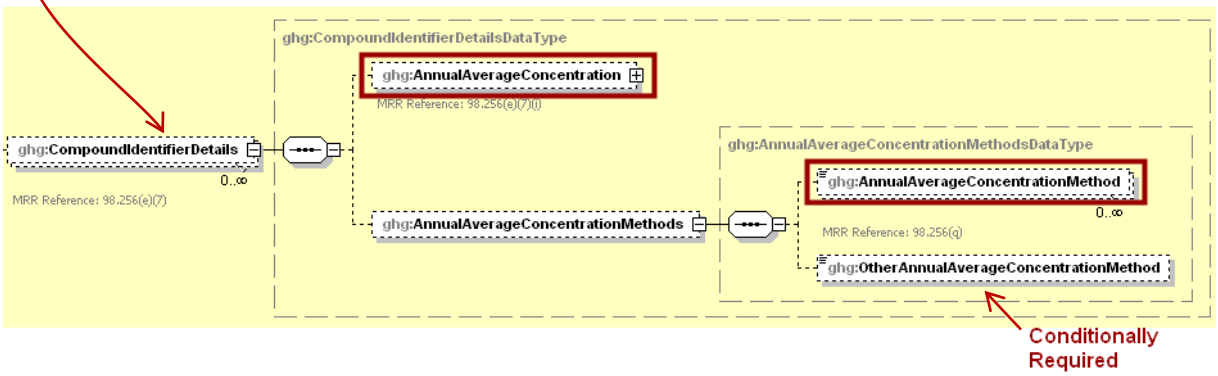


Figure 28
Equation Y-1b Compound Identifier Details Schema Diagram



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

Conditionally Required: 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 [98.3(c)(8)].

- 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_2 concentration [98.256(e)(7)].
- The number of days missing data procedures were used to determine CO_2 concentration [98.3(c)(8)].
- The method used to measure CO_2 concentration [98.256(q)].
- The total number of carbon containing compounds other than CO_2 that are in the flare gas stream [98.256(e)(7)].

For each carbon containing compound other than CO_2 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 [98.3(c)(8)].
- The method(s) used to measure the concentration of the compound [98.256(q)].

Table 19
Equation Y-1b Details Data Element Definitions

Data Element Name	Description
Y1bEquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if Equation Y-1b was used to calculate the CO_2 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 value in the child data element **MeasureValue**. Set the units of measure to "scf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the annual volume of flare gas combusted in the child data element **NumberofTimesSubstituted**.
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_2 content of the flare gas. Report the value in the child data element **MeasureValue**. Set the units of measure to "percent by volume or mole" in the attribute **concentrationUOM**. Also report the number of days that missing data procedures were used in measuring the annual average CO_2 content of the flare gas in the child data element **NumberofTimesSubstituted**.

Data Element Name	Description
AnnualAverageCarbonDioxideConcentration Method	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	**Conditionally Required:** 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_2 in the flare gas stream (integer).
CompoundIdentifierDetails	**Parent Element:** A collection of data elements to report for each carbon containing compound (other than CO_2) in the flare gas stream.
AnnualAverageConcentration	A collection of data elements containing information on the annual average concentration of a specific carbon containing compound (other than CO_2) in the flare gas stream for the specified flare. Report the value in the child data element **MeasureValue**. Set the units of measure to "percent by volume or mole" in the attribute **concentrationUOM**. Also report the number of days that missing data procedures were used in measuring the annual average concentration in the child data element **NumberofTimesSubstituted**.
AnnualAverageConcentrationMethods	**Parent Element:** 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_2).
AnnualAverageConcentrationMethod	Report each method used to determine the annual average concentration of the specific carbon containing compound (other than CO_2). 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)
OtherAnnualAverageConcentrationMethod	**Conditionally Required:** Report the method used to determine the annual average concentration of the specific carbon containing compound (other than CO_2) if "Other (specify)" was reported above

XML Excerpt 15
Example for Equation Y-1b Details

```
                        <ghg:Y1bEquationDetails>
                            <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
                            <ghg:AnnualVolumeofFlareGas volUOM="scf">
                                <ghg:MeasureValue>400.234324</ghg:MeasureValue>
                                <ghg:NumberofTimesSubstituted>30</ghg:NumberofTimesSubstituted>
                            </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:NumberofTimesSubstituted>
                            </ghg:AnnualAverageCarbonDioxideConcentration>
                            <ghg:AnnualAverageCarbonDioxideConcentrationMethod>ASTM D1945-
                            03</ghg:AnnualAverageCarbonDioxideConcentrationMethod>
                            <ghg:TotalNumberofCarbonCompounds>1</ghg:TotalNumberofCarbonCompounds>
                            <ghg:CompoundIdentifierDetails>
                                <ghg:AnnualAverageConcentration concentrationUOM="percent by volume
                                or mole">
                                    <ghg:MeasureValue>15</ghg:MeasureValue>
                                    <ghg:NumberofTimesSubstituted>25</ghg:NumberofTimesSub
                                    stituted>
                                </ghg:AnnualAverageConcentration>
                                <ghg:AnnualAverageConcentrationMethods>
                                    <ghg:AnnualAverageConcentrationMethod>ASTM D1945-
                                    03</ghg:AnnualAverageConcentrationMethod>
                                    <ghg:AnnualAverageConcentrationMethod>Chromatographic
                                    analysis: manufacturer's
                                    instructions</ghg:AnnualAverageConcentrationMethod>
                                </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 29
Equation Y-2 Details Schema Diagram

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

Conditionally Required: 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 [98.3(c)(8)].
- 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 [98.3(c)(8)].
- 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 ºF and 14.7 psia or 60 ºF 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 ºF and 14.7 psia or 60 ºF and 14.7 psia [98.256(e)(8)].

Table 20
Equation Y-2 Details Data Element Definitions

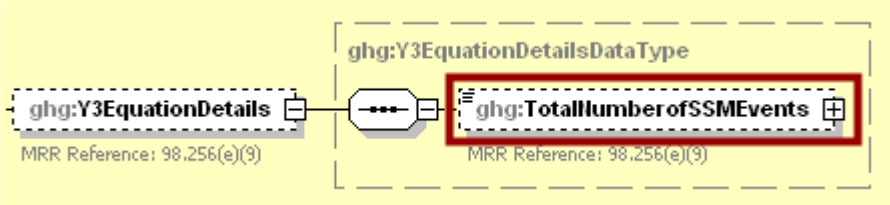
Data Element Name	Description
Y2EquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if Equation Y-2 was used to calculate the CO_2 emissions for the specified flare gas unit.
MeasurementPeriod	Frequency of measurement data. See list of allowable values: Daily Weekly
AnnualVolumeofFlareGas	A collection of data elements containing information on the annual volume of flare gas combusted. Report the value in the child data element **MeasureValue**. Set the units of measure to "MMscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the annual volume of flare gas combusted in the child data element **NumberofTimesSubstituted**.
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 value in the child data element **MeasureValue**. Set the units of measure to "MMBtu/MMscf" in the attribute **heatUOM**. Also report the number of days that missing data procedures were used in measuring the annual average higher heating value in the child data element **NumberofTimesSubstituted**.
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	**Conditionally Required:** 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. See list of allowable values. 60 degrees F and 14.7 psia 68 degrees F and 14.7 psia
HeatingValueConditions	Conditions at which the annual average higher heating value was determined. See list of allowable values. 60 degrees F and 14.7 psia 68 degrees F and 14.7 psia

XML Excerpt 16
Example for Equation Y-2 Details

```
                        <ghg:Y2EquationDetails>
                                <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
                                <ghg:AnnualVolumeofFlareGas volUOM="MMscf">
                                        <ghg:MeasureValue>900.2221342</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 30
Equation Y-3 Details Schema Diagram



Note: Data elements boxed in red are required.

Conditionally Required: 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 21
Equation Y-3 Details Data Element Definitions

Data Element Name	Description
Y3EquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if Equation Y-3 was used to calculate the CO_2 emissions for the specified flare.
TotalNumberofSSMEvents	Report the total number of start-up, shutdown or malfunction (SSM) events exceeding 500,000 scf/day (integer).

XML Excerpt 17
Example for Equation Y-3 Details

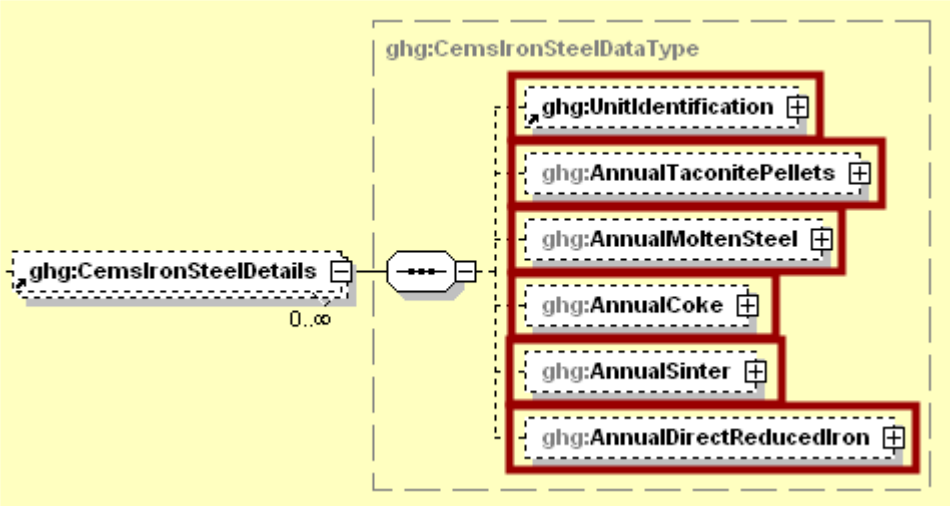
```
<ghg:Y3EquationDetails>
        <ghg:TotalNumberofSSMEvents>25</ghg:TotalNumberofSSMEvents>
</ghg:Y3EquationDetails>
```

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

4.0 CEMS Unit Identification

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

Figure 31
CEMS Unit Identification Schema Diagram



Note: Data elements boxed in red are required.

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). **Note:** Use the same identification for each unit as was used for the parent element "ProcessUnitNames".
- 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: For the 2010 reporting year, the information required for decarburization vessels applies only to argon-oxygen decarburization vessels. However, for 2011 and subsequent reporting 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 22
CEMS Unit Identification Data Element Definitions

Data Element Name	Description
CemsIronSteelDetails	**Parent Element (Conditionally Required):** 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	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. Report a unique unit name (ID) in the child data element **UnitName**, an optional brief description in the child data element **UnitDescription** and the type of unit in the child data element **UnitType**. See list of allowable unit types: Taconite Indurating Furnace Basic Oxygen Process Furnace Non-Recovery Coke Oven Battery Sinter Process Electric Arc Furnace (EAF) Decarburization Vessel Direct Reduction Furnace **Note:** Use the same identification for each unit as was used for the parent element "ProcessUnitNames".
AnnualTaconitePellets	A collection of data elements containing information on the annual production of taconite pellets for the specified unit. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
AnnualMoltenSteel	A collection of data elements containing information on the annual production of raw steel for the specified unit. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
AnnualCoke	A collection of data elements containing information on the annual production of coke for the specified unit. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
AnnualSinter	A collection of data elements containing information on the annual production of sinter for the specified unit. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
AnnualDirectReducedIron	A collection of data elements containing information on the annual production of direct reduced iron for the specified unit. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 18
Example 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>1000.56774</ghg:MeasureValue>
        </ghg:AnnualTaconitePellets>
        <ghg:AnnualMoltenSteel massUOM="Metric Tons">
                <ghg:MeasureValue>2000.234046</ghg:MeasureValue>
        </ghg:AnnualMoltenSteel>
        <ghg:AnnualCoke massUOM="Metric Tons">
                <ghg:MeasureValue>3000.12</ghg:MeasureValue>
        </ghg:AnnualCoke>
        <ghg:AnnualSinter massUOM="Metric Tons">
                <ghg:MeasureValue>4000.5689</ghg:MeasureValue>
        </ghg:AnnualSinter>
        <ghg:AnnualDirectReducedIron massUOM="Metric Tons">
                <ghg:MeasureValue>5000.98</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

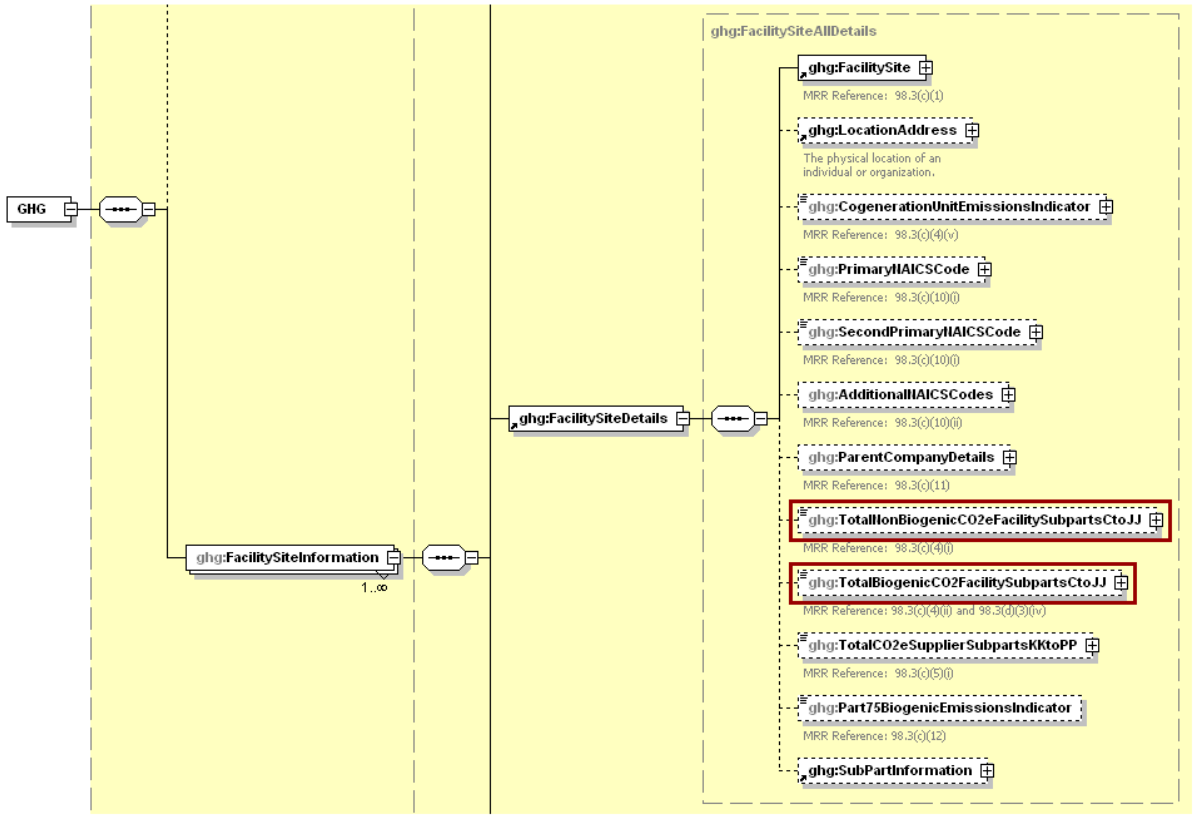
Each facility must report the following facility-level emission totals:

- Total CO_2 equivalent (CO_2e) emissions (excluding biogenic CO_2) aggregated across all direct emitter source categories (Subparts C-HH) associated with the facility.
- Total biogenic CO_2 emissions aggregated across all direct emitter source categories (Subparts C-HH) associated with the facility.

Each supplier must report the following supplier totals:

- Total CO_2e associated with products supplied aggregated across Subparts NN, OO and PP (as applicable). **Note:** Do not include Subpart LL and MM totals in this data element as these values are not being collected in e-GGRT.

Figure 32
Facility-Level Roll-up Emissions Schema Diagram



Note: Data elements boxed in red are required.

For Subpart Q, report total emissions for CO_2e (excluding biogenic CO_2) and biogenic CO_2 using the following guidelines.

1) Add the total CO_2e value for Subpart Q in metric tons to the total CO_2e emissions (excluding biogenic CO_2) aggregated across all source category Subparts associated with the facility as follows:
   - Add the annual CO_2 mass emissions from each non-CEMS taconite indurating furnace (calculated using Equation Q-1) in metric tons.
   - Add the annual CO_2 mass emissions from each non-CEMS basic oxygen process furnace (calculated using Equation Q-2) in metric tons.

- Add the annual CO_2 mass emissions from each non-CEMS non-recovery coke oven battery (calculated using Equation Q-3) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS sinter process (calculated using Equation Q-4) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS electric arc furnace (calculated using Equation Q-5) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS decarburization vessel (calculated using Equation Q-6) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS direct reduction furnace (calculated using Equation Q-7) in metric tons.
- Add the annual CO_2 mass emissions from each non-CEMS unit (calculated using the site specific calculation methodology) in metric tons.
- Add the annual CO_2 mass emissions from each coke pushing operation in metric tons.
- Add the annual CO_2 mass emissions from each flare in metric tons.
- Multiply the annual CH_4 mass emissions from each flare in metric tons by the Global Warming Potential for CH_4 (21) and add the resulting value.
- Multiply the annual N_2O mass emissions from each flare in metric tons by the Global Warming Potential for N_2O (310) and add the resulting value.
- Add the total annual CO_2 mass emissions measured by each CEMS in metric tons minus the total annual biogenic CO_2 mass emissions for each CEMS monitoring location in metric tons (the difference between the total CO_2 monitored by each CEMS and the total biogenic CO_2).
- Multiply the total CH_4 emissions for each CEMS monitoring location in metric tons by the Global Warming Potential for CH_4 (21) and add the resulting value.
- Multiply the total N_2O emissions for each CEMS monitoring location in metric tons by the Global Warming Potential for N_2O (310) and add the resulting value.

2) Add the total annual biogenic CO_2 mass emissions in metric tons for each CEMS monitoring location to the total biogenic CO_2 aggregated across all source category Subparts associated with the facility.

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

Table 23
Facility Level Roll-up Emissions Data Element Definitions

Data Element Name	Description
TotalNonBiogenicCO2eFacilitySubpartsCtoJJ	Add the total CO_2e value for Subpart Q in metric tons to the total CO_2e emissions (excluding biogenic CO_2) aggregated across all source category Subparts associated with the facility according to the guidelines above. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
TotalBiogenicCO2FacilitySubpartsCtoJJ	Add the total annual biogenic CO_2 value for Subpart Q in metric tons to the total biogenic CO_2 emissions aggregated across all source category Subparts associated with the facility according to the guideline above. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 19
Example for Facility Level Roll-up Emissions

```
<ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric Tons">14537.9</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
<ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">600.1</ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ>
```

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

IV. Appendix A Sample XML Document for Subpart 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>2011</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:ParentCompanyDetails>
               <ghg:ParentCompany>
                     <ghg:ParentCompanyLegalName>Soda Ash Corporation</ghg:ParentCompanyLegalName>
                     <ghg:StreetAddress>108 Hillcrest Street</ghg:StreetAddress>
                     <ghg:City>Sandpoint</ghg:City>
                     <ghg:State>ID</ghg:State>
                     <ghg:Zip>83864</ghg:Zip>
                     <ghg:PercentOwnershipInterest>100.0</ghg:PercentOwnershipInterest>
               </ghg:ParentCompany>
         </ghg:ParentCompanyDetails>
         <ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric Tons">145379.9</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
         <ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">600.1</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>600.1</ghg:CalculatedValue>
                              </ghg:GHGasQuantity>
                     </ghg:GHGasInfoDetails>
                     <ghg:GHGasInfoDetails>
                              <ghg:GHGasName>Methane</ghg:GHGasName>
                              <ghg:GHGasQuantity massUOM="Metric Tons">
```

```
                    <ghg:CalculatedValue>280.23</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                    <ghg:CalculatedValue>29.456</ghg:CalculatedValue>
                </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
        <ghg:GHGasInfoDetails>
                <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
                <ghg:GHGasQuantity massUOM="Metric Tons">
                    <ghg:CalculatedValue>130509.7</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>600.5</ghg:CalculatedValue>
                </ghg:CO2EmissionsAllBiomassFuelsCombined>
                <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
                    <ghg:CalculatedValue>700.4</ghg:CalculatedValue>
                </ghg:CO2EmissionsNonBiogenic>
                <ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
                    <ghg:CalculatedValue>10000.9</ghg:CalculatedValue>
                </ghg:AnnualCO2EmissionsMeasuredByCEMS>
                <ghg:TotalCH4CombustionEmissions massUOM="Metric Tons">
                    <ghg:CalculatedValue>80.34</ghg:CalculatedValue>
                </ghg:TotalCH4CombustionEmissions>
                <ghg:TotalN2OCombustionEmissions massUOM="Metric Tons">
                    <ghg:CalculatedValue>9.354</ghg:CalculatedValue>
                </ghg:TotalN2OCombustionEmissions>
                <ghg:Tier4QuarterDetails>
                    <ghg:QuarterName>First Quarter</ghg:QuarterName>
                    <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                        <ghg:CalculatedValue>10000.8</ghg:CalculatedValue>
                    </ghg:CumulativeCO2MassEmissions>
                </ghg:Tier4QuarterDetails>
                <ghg:Tier4QuarterDetails>
                    <ghg:QuarterName>Second Quarter</ghg:QuarterName>
                    <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                        <ghg:CalculatedValue>20000.2</ghg:CalculatedValue>
                    </ghg:CumulativeCO2MassEmissions>
                </ghg:Tier4QuarterDetails>
                <ghg:Tier4QuarterDetails>
                    <ghg:QuarterName>Third Quarter</ghg:QuarterName>
                    <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                        <ghg:CalculatedValue>30000.1</ghg:CalculatedValue>
                    </ghg:CumulativeCO2MassEmissions>
```

```
                </ghg:Tier4QuarterDetails>
                <ghg:Tier4QuarterDetails>
                        <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
                        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                                <ghg:CalculatedValue>40000.7</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>2011-01-01</ghg:TierMethodologyStartDate>
                <ghg:TierMethodologyEndDate>2011-12-31</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>33333.6</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: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>9999.3</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>22222.4</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>44444.2</ghg:CalculatedValue>
                                        </ghg:CO2Emissions>
                                        <ghg:CH4Emissions massUOM="Metric Tons">
                                                <ghg:CalculatedValue>200.84</ghg:CalculatedValue>
                                        </ghg:CH4Emissions>
                                        <ghg:N2OEmissions massUOM="Metric Tons">
```

```
                                        <ghg:CalculatedValue>20.982</ghg:CalculatedValue>
                                    </ghg:N2OEmissions>
                                </ghg:EmissionsDetails>
                                <ghg:Y1aEquationDetails>
                                    <ghg:MeasurementPeriod>Daily</ghg:MeasurementPeriod>
                                    <ghg:AnnualVolumeofFlareGas volUOM="scf">
                                        <ghg:MeasureValue>555.9854211</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: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:InputOutputClassification>
                                    <ghg:CarbonContent>
                                        <ghg:NumberofTimesSubstituted>2</ghg:NumberofTimesSubstituted>
                                    </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:InputOutputClassification>
                                    <ghg:CarbonContent>
                                        <ghg:NumberofTimesSubstituted>1</ghg:NumberofTimesSubstituted>
                                    </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>11111.8</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>1900.2345234</ghg:MeasureValue>
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                        <ghg:AnnualMoltenSteel massUOM="Metric Tons">
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