

Greenhouse Gas Reporting Program

XML Reporting Instructions for Subpart K - Ammonia Manufacturing

United States Environmental Protection Agency
Climate Change Division
Washington, DC

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

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

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Table of Contents

	<u>Page</u>
I. Introduction	1
II. Summary of Changes	8
III. Subpart K Overview	9
1.0 Subpart K Total Emissions	12
2.0 Subpart K Summary Data.....	14
3.0 CEMS Unit Details	15
4.0 Tier 4 CEMS Emissions Details	17
5.0 Non-CEMS Unit and Emissions Details.....	24
6.0 Facility-Level Roll-up Emissions	28
IV. Appendix A: Sample XML Document for Subpart K.....	30

List of Tables

	<u>Page</u>
Table 1 Reporting Numbers.....	2
Table 2 Calculated Details Data Element Definitions	5
Table 3 Measurement Details Data Element Definitions	6
Table 4 Unit Identification Details Data Element Definitions.....	6
Table 5 Summary of Changes to the Schema for Subpart K	8
Table 6 Greenhouse Gas Information Details XML Data Element Definitions	13
Table 7 Facility Level Details XML Data Element Definitions	14
Table 8 CEMS Unit Details XML Data Element Definitions	15
Table 9 Tier 4 CML and Emissions Details XML Data Element Definitions.....	19
Table 10 Tier 4 CML Quarter and Additional Details XML Data Element Definitions	21
Table 11 CEMS Unit Details XML Data Element Definitions	25
Table 12 EAF Inputs and Outputs XML Data Element Definitions.....	26
Table 13 Facility Level Roll-up Emissions Data Element Definitions.....	29

List of Figures

	<u>Page</u>
Figure 1 Example of an XML Tree.....	3
Figure 2 Calculated Details Data Type Schema Diagram.....	5
Figure 3 Measurement Details Data Type Schema Diagram.....	5
Figure 4 Unit Identification Details Data Type Schema Diagram.....	6
Figure 5 “Unbounded” Symbol in Schema Diagram.....	7
Figure 6 Logical “Or” Symbol in Schema Diagram.....	7
Figure 7 Subpart K Reporting Diagram.....	9
Figure 8 Subpart K Schema Diagram.....	11
Figure 9 Greenhouse Gas Information Details Schema Diagram.....	12
Figure 10 Sample XML Excerpt for Greenhouse Gas Information Details.....	13
Figure 11 Facility Level Details Schema Diagram.....	14
Figure 12 CEMS Unit Details Schema Diagram.....	15
Figure 13 Tier 4 CEMS Details Schema Diagram.....	17
Figure 14 Tier 4 CML and Emissions Details Schema Diagram.....	18
Figure 15 Tier 4 CML Quarter and Additional Details Schema Diagram.....	21
Figure 16 Non-CEMS Unit Details Schema Diagram.....	24
Figure 17 EAF Inputs and Outputs Schema Diagram.....	26
Figure 18 Facility-Level Roll-up Emissions Schema Diagram.....	28

List of XML Excerpts

	<u>Page</u>
XML Excerpt 1	Example for “Unbounded” Parent Element..... 7
XML Excerpt 2	Sample XML Excerpt for Facility Level Details..... 14
XML Excerpt 3	Sample XML Excerpt for CEMS Unit Details 16
XML Excerpt 4	Sample XML Excerpt for Tier 4 CML and Emissions Details..... 19
XML Excerpt 5	Sample XML Excerpt for Tier 4 CML Quarter and Additional Details..... 23
XML Excerpt 6	Sample XML Excerpt for CEMS Unit Details 25
XML Excerpt 7	Sample XML Excerpt for EAF Inputs and Outputs 27
XML Excerpt 8	Sample XML Excerpt for Facility Level Roll-up Emissions 29

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.cdssupport.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	<ul style="list-style-type: none"> • CO₂e and CO₂ emissions data expressed in metric tons should be rounded to one decimal place. This should be done regardless of the level of data collection (e.g., unit-level, facility-level). Quantities less than 0.05 metric tons would round to 0.0 and be reported as such. Quantities greater than or equal to 0.05 metric tons would round up to 0.1 and be reported as such. • CH₄ emissions data expressed in metric tons should be rounded to two decimal places. • N₂O emissions data expressed in metric tons should be rounded to three decimal places. • Emissions data for all GHGs other than CO₂, N₂O and CH₄ 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

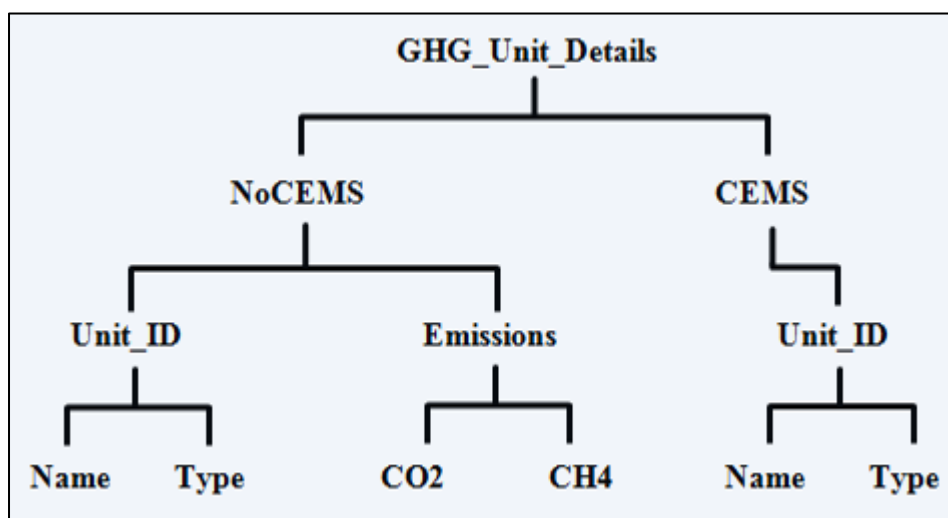
number: `<FacilitySiteIdentifier>23222</FacilitySiteIdentifier>`. The information shaded in blue represents the data element's value.

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.

XML data elements are sometimes referenced in terms of how they relate to each other, e.g., parent-child relationships, within the schema's tree structure, also known as 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



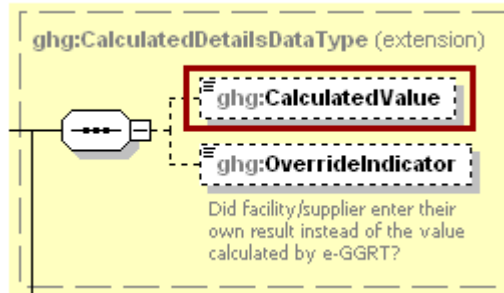
This document provides a step-by-step description of how to report emissions data using the XML schema. Please note the following:

- **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 to 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

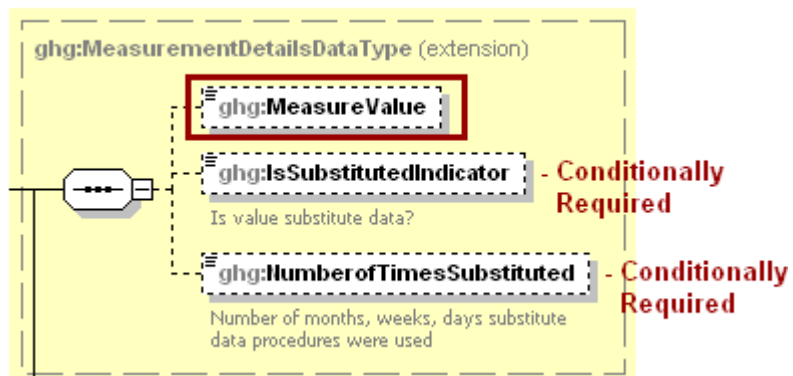


Note: Data elements boxed in red are required.

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

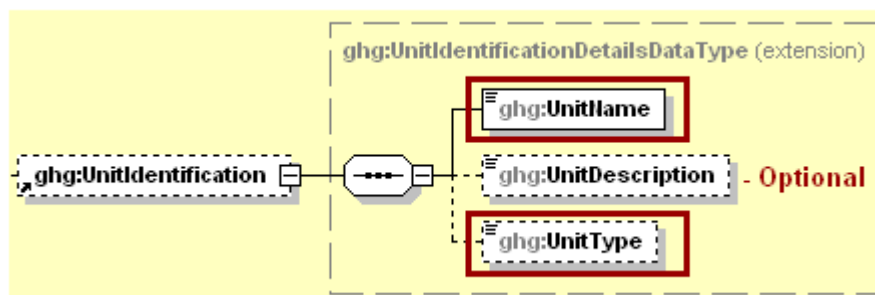


Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

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



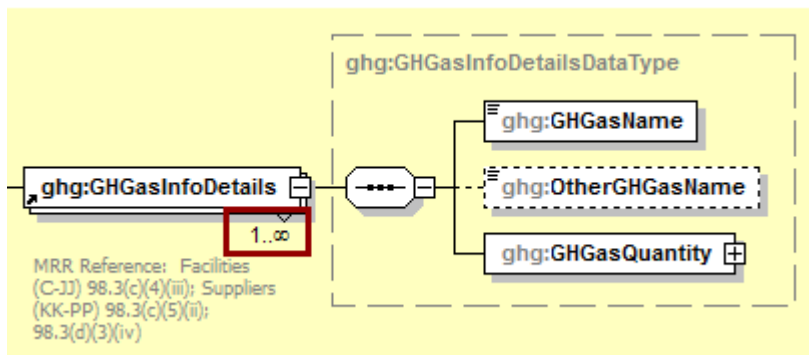
Note: Data elements boxed in red are required.

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

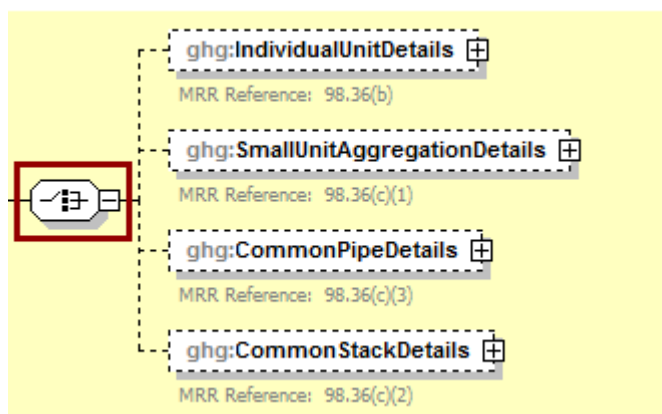
```

<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>
    
```

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

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 K (GHG_SubPartK_v2.0.xsd).

Table 5
Summary of Changes to the Schema for Subpart K

No.	Change Description
1	Added unit of measure “ massUOM ” for data element “ AnnualFerroAlloyProductionCapacity ”. Xpath = SubPartK/AnnualFerroAlloyProductionCapacity
2	Changed the MRR Reference for data element “ MassOfQuantityOfCarbonMaterial ” from [98.116(e)(7)] to [98.116(e)(4)] Xpath = SubPartK/NoCemsFerroAlloyDetails/EAFInputOutput/MassOfQuantityOfCarbonMaterial
3	Changed the MRR Reference for data element “ AverageCarbonContent ” from [98.116(e)(7)] to [98.116(e)(5)] Xpath = SubPartK/NoCemsFerroAlloyDetails/EAFInputOutput/AverageCarbonContent

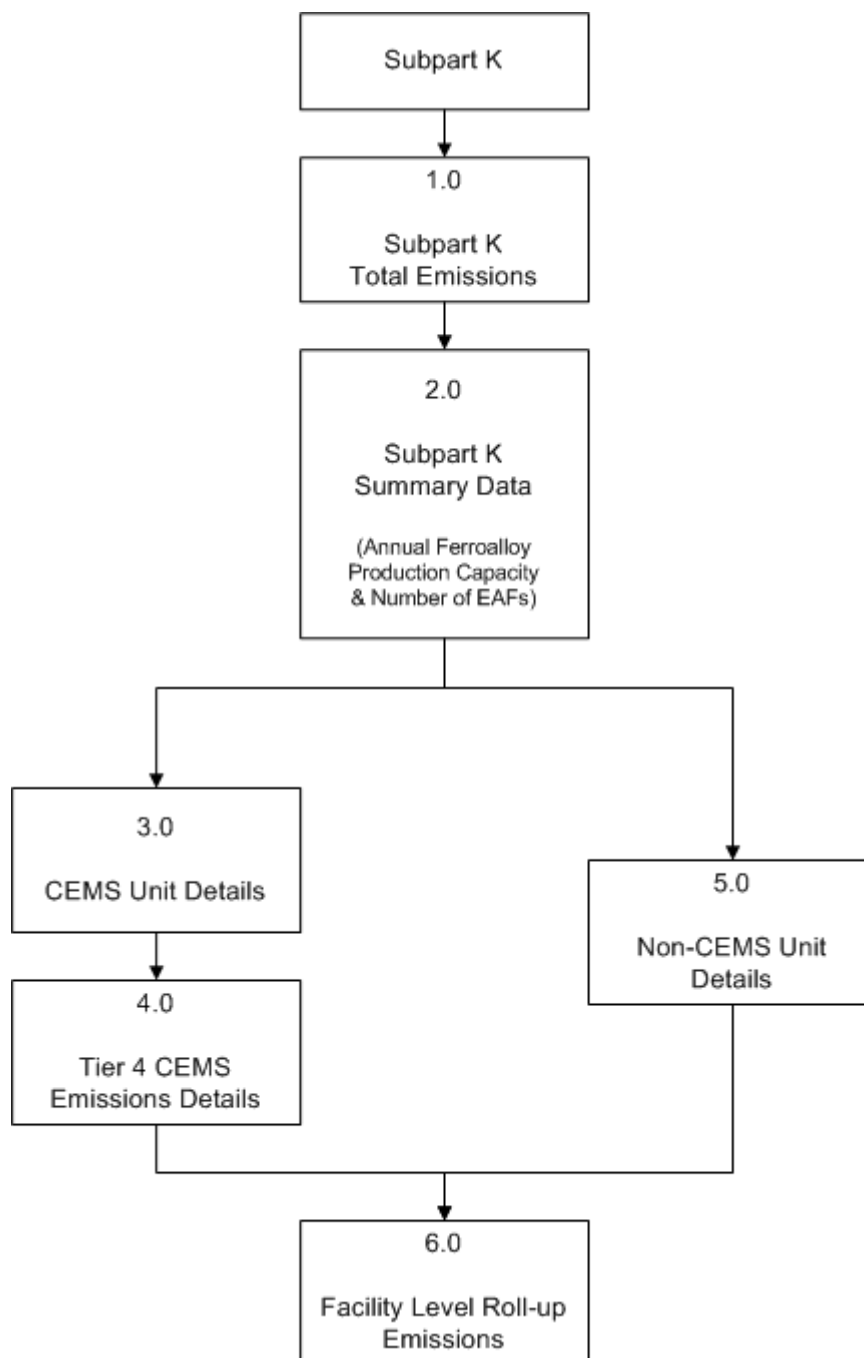
Document Changes:

3-20-2012 – Modified some of the emissions values within the XML excerpts to emphasize the rounding rules. Added “ParentCompanyDetails” and deleted “Part75BiogenicEmissionsIndicator” in sample XML document. Corrected instructions for subpart and facility level roll-up emissions. Deleted reporting instructions for data elements “TotalCH4CombustionEmissions” and “TotalN2OCombustionEmissions”. Corrected instructions for “NoCemsFerroAlloyDetails”.

III. Subpart K Overview

This document provides a step-by-step description of how to report data for Subpart K Ferroalloy Production and overall total Subpart K emissions for a facility using the XML schema.

Figure 7
Subpart K Reporting Diagram



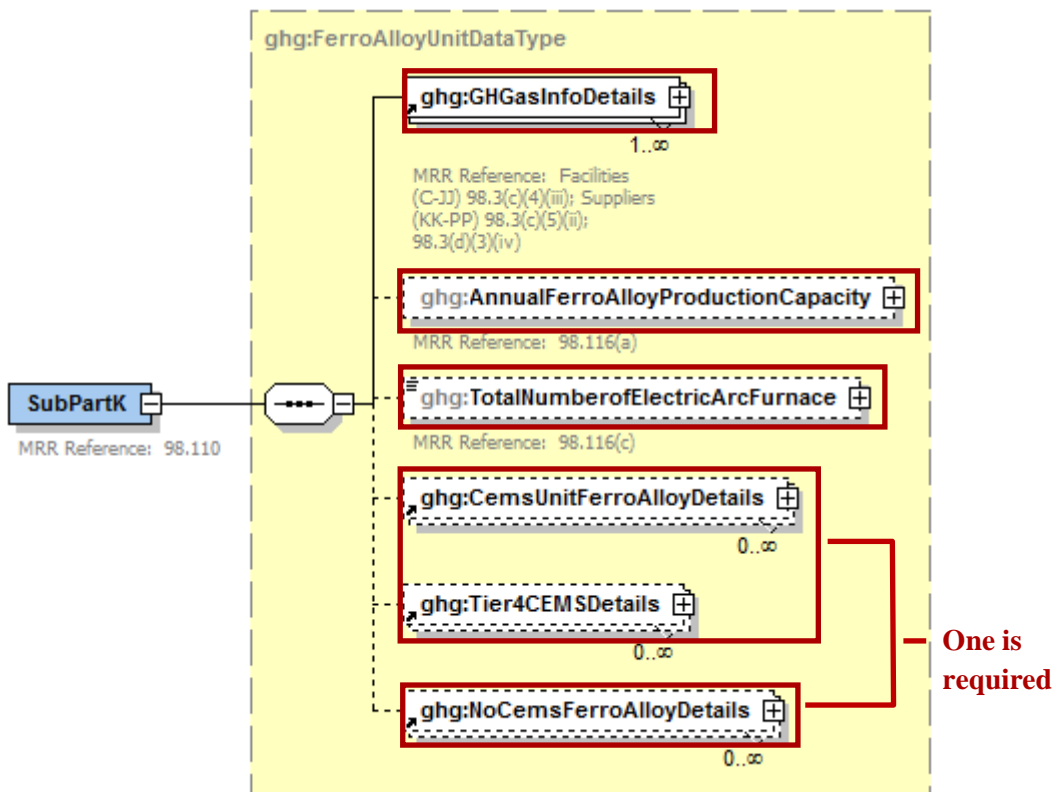
The XML schema includes the following areas for reporting for Subpart K, as displayed in the reporting diagram:

- 1.0 Subpart K Total Emissions: includes the total emissions for greenhouse gases required to be reported.
- 2.0 Subpart K Summary Data: includes the total annual ferroalloy production capacity of the facility and total number of electric arc furnaces at the facility.
- 3.0 Tier 4 CEMS Emissions Details: includes information on each continuous emission monitoring system (CEMS) monitoring location (CML) and emissions (CO₂ and biogenic CO₂) details.
- 4.0 CEMS Unit Details: includes unit identification and process CH₄ emissions data.
- 5.0 Non-CEMS Unit and Emissions Details: includes information on unit identification, process CO₂ and CH₄ emissions, quantities of each material included for the calculation of annual process CO₂ emissions, and the number of months that missing data procedures were used to determine the mass of carbon-containing inputs and outputs.
- 6.0 Facility Level Roll-up Emissions: includes information on how to report total emissions for CO₂e (excluding biogenic CO₂) and total biogenic CO₂.

The ferroalloy production source category consists of any facility that uses pyrometallurgical techniques to produce any of the following metals: ferrochromium, ferromanganese, ferromolybdenum, ferronickel, ferrosilicon, ferrotitanium, ferrotungsten, ferrovanadium, silicomanganese, or silicon metal.

Note: If your facility is subject to reporting under Subpart K (Ferroalloy Production), EPA recommends that you also consider Subpart C (General Stationary Fuel Combustion) in your facility applicability determination. This source category is only provided as a suggestion - additional subparts may be relevant for a given facility/supplier and the listed subpart may not be relevant for all facilities/suppliers.

**Figure 8
Subpart K Schema Diagram**

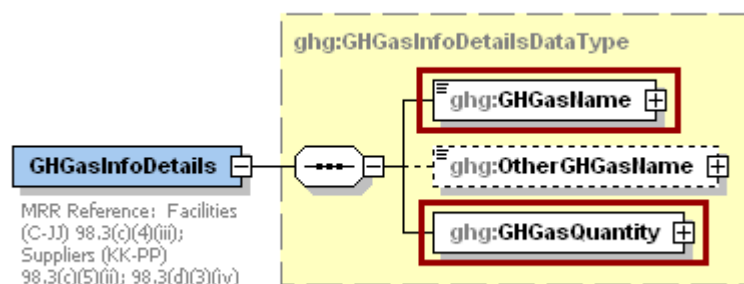


Note: Data elements boxed in red are required.

1.0 Subpart K Total Emissions

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

Figure 9
Greenhouse Gas Information Details Schema Diagram



Note: Data elements boxed in red are required.

For Subpart K, report total emissions for carbon dioxide (excluding biogenic CO₂), biogenic carbon dioxide (CO₂) and methane (CH₄). For greenhouse gas quantity, report the calculated value and mass unit of measure (metric tons) only according to the following guidelines:

- For carbon dioxide, report the sum of the following:
 - The total annual process CO₂ emissions in metric tons from each non-CEMS unit.
 - The total annual CO₂ mass emissions measured by the CEMS in metric tons minus the total annual biogenic CO₂ mass emissions in metric tons (the difference between the total CO₂ mass emissions and the total biogenic CO₂ mass emissions measured by the CEMS) for each CEMS monitoring location (CML).
- For biogenic carbon dioxide, report the sum of the total annual biogenic CO₂ mass emissions in metric tons for each CML.
- For methane, report the sum of the total process CH₄ emissions in metric tons for each unit (CEMS and non-CEMS).

Note: You must follow the rounding rules found in [Table 1](#).

Table 6
Greenhouse Gas Information Details XML Data Element Definitions

Data Element Name	Description
GHGasInfoDetails	A collection of data elements containing the total annual emissions of each greenhouse gas (GHG) listed in Table A-1 of the Mandatory Reporting of GHG, Part 98 reported under this subpart, expressed in metric tons.
GHGasName	Specify the name of the greenhouse gas. Below is the list of allowable values. Carbon Dioxide Biogenic Carbon dioxide Methane
GHGasQuantity	A collection of data elements that quantify the annual emissions from this source category. Report the calculated value only according to the guidelines above.
GHGasQuantity.massUOM	Metric Tons

Figure 10
Sample XML Excerpt for Greenhouse Gas Information Details

```

<ghg:GHGasInfoDetails>
  <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
  <ghg:GHGasQuantity massUOM="Metric Tons">
    <ghg:CalculatedValue>100341.4</ghg:CalculatedValue>
  </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
  <ghg:GHGasName>Methane</ghg:GHGasName>
  <ghg:GHGasQuantity massUOM="Metric Tons">
    <ghg:CalculatedValue>58350.33</ghg:CalculatedValue>
  </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
  <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
  <ghg:GHGasQuantity massUOM="Metric Tons">
    <ghg:CalculatedValue>340897.9</ghg:CalculatedValue>
  </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>

```

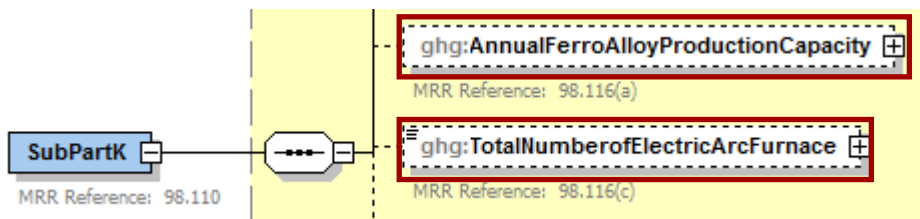
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

2.0 Subpart K Summary Data

Subpart K requires that the facility report the following:

- The facility’s total annual ferroalloy product production capacity in short tons [98.116(a)].
- The total number of electric arc furnaces [98.116(c)].

Figure 11
Facility Level Details Schema Diagram



Note: Data elements boxed in red are required.

Table 7
Facility Level Details XML Data Element Definitions

Data Element Name	Description
AnnualFerroAlloyProductionCapacity	A collection of data elements containing information about the facility’s annual ferroalloy product production capacity. Report the value in the child data element MeasureValue . Set the units of measure to “Short Tons” in the attribute massUOM . [98.116(a)]
TotalNumberOfElectricArcFurnace	The total number of electric arc furnaces (EAFs) at facility used for the production of ferroalloy products. [98.116(c)]

XML Excerpt 2
Sample XML Excerpt for Facility Level Details

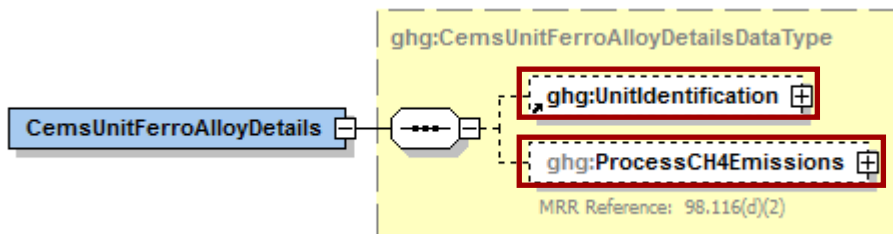
```
<ghg:AnnualFerroAlloyProductionCapacity massUOM="Short Tons">
  <ghg:MeasureValue>3234532.555</ghg:MeasureValue>
</ghg:AnnualFerroAlloyProductionCapacity>
<ghg:TotalNumberOfElectricArcFurnace>1</ghg:TotalNumberOfElectricArcFurnace>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting facility-level data for Subpart K.

3.0 CEMS Unit Details

This section describes unit information that must be reported for electric arc furnaces if a continuous emissions monitoring system (CEMS) was in use during the reporting year to measure CO₂ emissions.

Figure 12
CEMS Unit Details Schema Diagram



Note: Data elements boxed in red are required.

Subpart K requires the following identification information for each electric arc furnace that had emissions monitored using a CEMS:

- A unique unit name or identifier (e.g., a unit ID number).
- An optional unit description or label.
- The type of unit: "Electric Arc Furnace (EAF)".

For each electric arc furnace used for the production of any ferroalloy listed in Table K-1 and monitored by CEMS, Subpart K requires you to report the annual process CH₄ emissions in metric tons (the output of Equation K-3). [98.116(d)(2)]

Table 8
CEMS Unit Details XML Data Element Definitions

Data Element Name	Description
CemsUnitFerroAlloyDetails	A collection of data elements containing information on electric arc furnaces monitored using CEMS.
UnitIdentification	A collection of data elements that identify a specific electric arc furnace. It includes the unit ID, an optional description, and the type of unit: "Electric Arc Furnace (EAF)". [98.116(d)(3)]
ProcessCH4Emissions	The annual process CH ₄ emissions from the specified EAF (the output of Equation K-3). [98.116(d)(2)]
ProcessCH4Emissions.massUOM	Metric Tons

XML Excerpt 3

Sample XML Excerpt for CEMS Unit Details

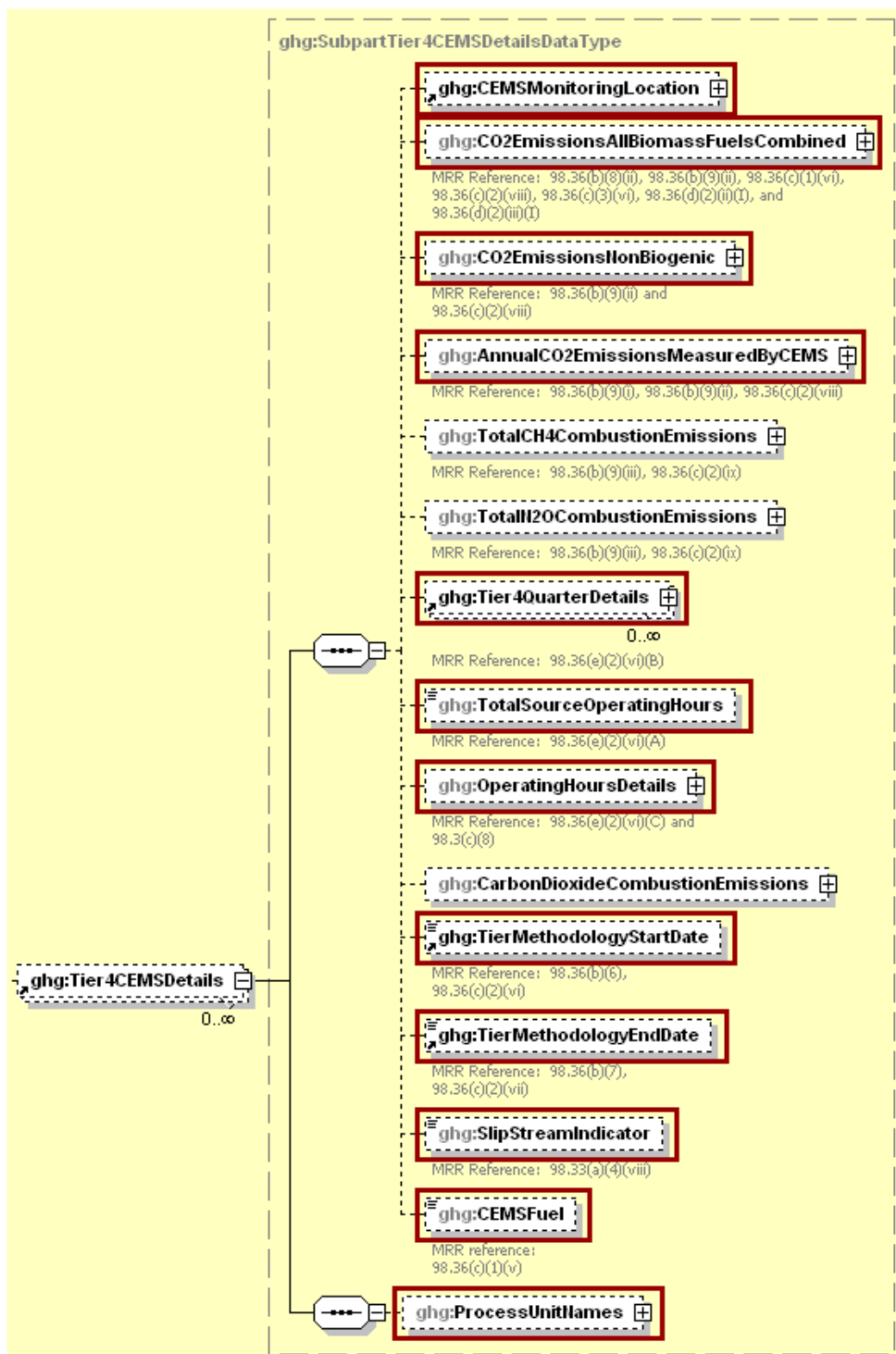
```
<ghg:CemsUnitFerroAlloyDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>FER-CEMS-01</ghg:UnitName>
    <ghg:UnitDescription>Ferroalloy production unit monitored by a CEMS</ghg:UnitDescription>
    <ghg:UnitType>Electric Arc Furnace (EAF)</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:ProcessCH4Emissions massUOM="Metric Tons">
    <ghg:MeasureValue>34563.34</ghg:MeasureValue >
  </ghg:ProcessCH4Emissions>
</ghg:CemsUnitFerroAlloyDetails>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting CEMS unit identification and process emissions data.

4.0 Tier 4 CEMS Emissions Details

This section provides a description of how to report Subpart K information for CEMS monitoring locations.

Figure 13
Tier 4 CEMS Details Schema Diagram



Note: Data elements boxed in red are required.

For Subpart K, information on each CEMS monitoring location (CML) is required including:

- A unique unit name or identifier for the CML.
- An optional description or label for the CML.
- The configuration of processes or process units that are monitored by the CML from the following list:
 - Single industrial process or process unit that exhausts to a dedicated stack.
 - Multiple industrial processes or process units which share a common stack.
 - Industrial process or process unit which shares a common stack with one or more stationary fuel combustion units.

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

- The total annual CO₂ emissions from the combustion of all biomass fuels combined if biomass fuels are combusted in the configuration. [98.36(b)(8)(ii)]
- The total annual non-biogenic CO₂ emissions (i.e. CO₂ emissions from fossil fuels, sorbent use, and process CO₂ emissions). [98.36(b)(9)(ii)]
- The total annual CO₂ emissions measured by the CEMS. [98.36(b)(9)(i)-(ii)].

Note: Do not report total CH₄ combustion emissions or total N₂O combustions emissions for the CML.

**Figure 14
Tier 4 CML and Emissions Details Schema Diagram**



Note: Data elements boxed in red are required.

Table 9
Tier 4 CML and Emissions Details XML Data Element Definitions

Data Element Name	Description
Tier4CEMSDetails	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). It includes the name, an optional description, and the configuration type. Below is the list of allowable values. 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 CML. Report the calculated value and mass unit of measure only.
CO2EmissionsAllBiomassFuelsCombined.massUOM	Metric Tons
CO2EmissionsNonBiogenic	A collection of data elements containing information on the total annual non-biogenic CO ₂ mass emissions for the CML. Report the calculated value and mass unit of measure only.
CO2EmissionsNonBiogenic.massUOM	Metric Tons
AnnualCO2EmissionsMeasuredByCEMS	A collection of data elements containing information on the total annual CO ₂ mass emissions measured by the CEMS at the monitoring location. Report the calculated value and mass unit of measure only.
AnnualCO2EmissionsMeasuredByCEMS.massUOM	Metric Tons

XML Excerpt 4
Sample XML Excerpt for Tier 4 CML and Emissions Details

```

<ghg:Tier4CEMSDetails>
  <ghg:CEMSMonitoringLocation>
    <ghg:Name>CML-01</ghg:Name>
    <ghg:Description>monitoring location - east building</ghg:Description>
    <ghg:Type>Single process/process unit exhausts to dedicated stack</ghg:Type>
  </ghg:CEMSMonitoringLocation>
  <ghg:CO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
    <ghg:CalculatedValue>100341.4</ghg:CalculatedValue>
  </ghg:CO2EmissionsAllBiomassFuelsCombined>
  <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
    <ghg:CalculatedValue>35000.5</ghg:CalculatedValue>
  </ghg:CO2EmissionsNonBiogenic>
  <ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
    <ghg:CalculatedValue>135341.9</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMeasuredByCEMS>

```

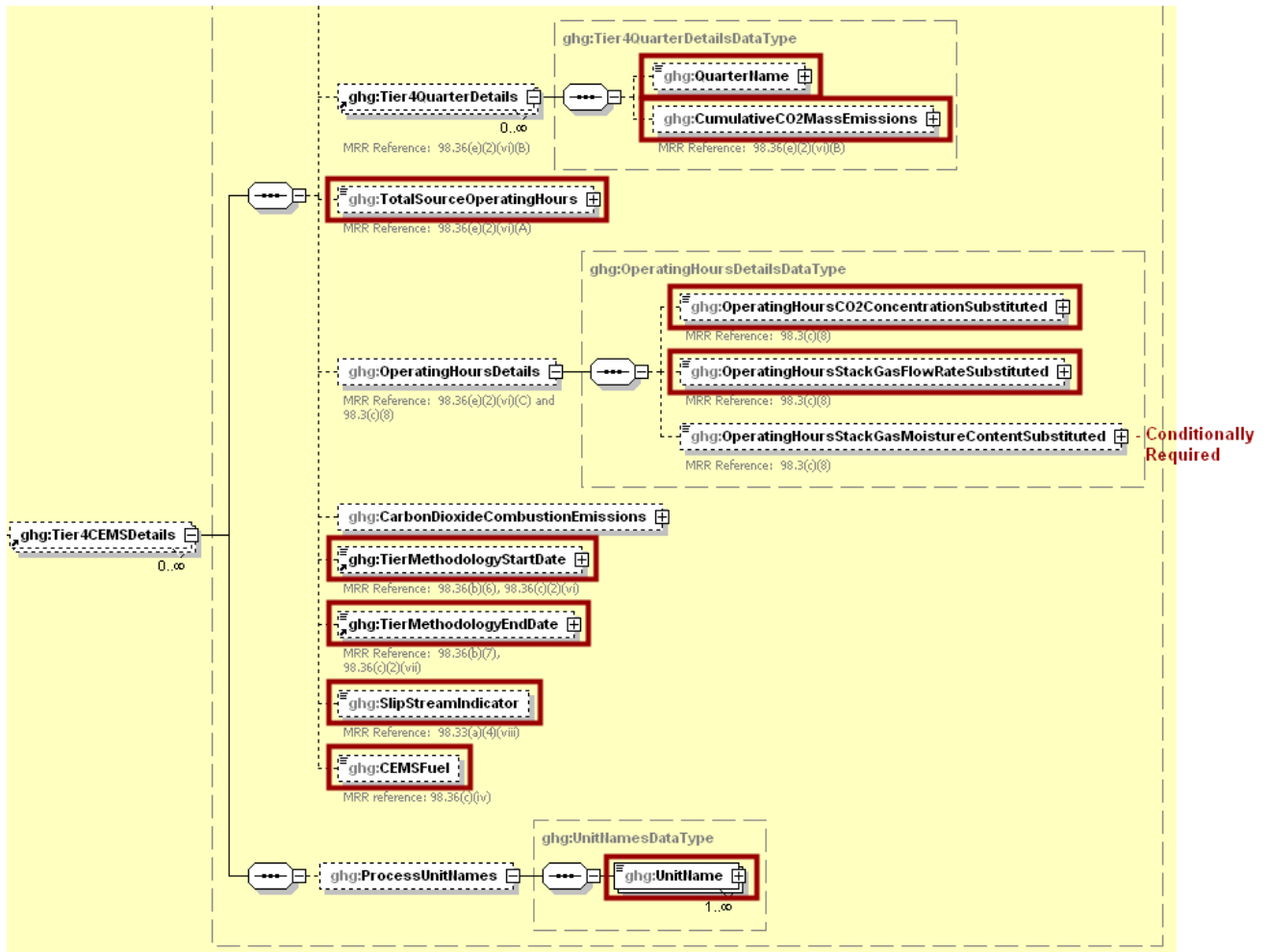
Note: The code excerpt above is presented here to demonstrate the concept of reporting Tier 4 CEMS emissions data.

For each quarter of the reporting year, the facility must provide the cumulative CO₂ 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 CO₂ concentration parameter [98.36(e)(2)(vi)(C) and 98.3(c)(8)].
- The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter [98.36(e)(2)(vi)(C) and 98.3(c)(8)].
- If moisture correction is required and a continuous moisture monitor is used, the total operating hours in which a substitute data value was used in the emissions calculations for the stack gas moisture content parameter [98.36(e)(2)(vi)(C) and 98.3(c)(8)].
- The Tier 4 methodology start date [98.36(b)(6), 98.36(c)(2)(vi)].
- The Tier 4 methodology end date [98.36(b)(7), 98.36(c)(2)(vii)].
- Specify if emissions reported for the CEMS include emissions calculated according to 98.33(a)(4)(viii) for a slipstream that bypassed the CEMS [98.33(a)(4)(viii)].
- Each type of fuel combusted in the group of units during the reporting year [98.36(c)(1)(v)].
- An indication of the process units monitored by the CML.

Figure 15
Tier 4 CML 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 10
Tier 4 CML Quarter and Additional Details XML Data Element Definitions

Data Element Name	Description
Tier4QuarterDetails	A collection of data elements containing Tier 4 quarterly information.
QuarterName	The name of the quarter. Below is the list of allowable values. First Quarter Second Quarter Third Quarter Fourth Quarter

Data Element Name	Description
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 calculated value only.
CumulativeCO2MassEmissions.massUOM	Metric Tons
TotalSourceOperatingHours	The total number of source operating hours in the reporting year.
OperatingHoursDetails	A collection of data elements containing information on the number of operating hours in which substitute data values were used.
OperatingHoursCO2ConcentrationSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the CO ₂ concentration parameter.
OperatingHoursStackGasFlowRateSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter.
OperatingHoursStackGasMoistureContentSubstituted	If moisture correction is required and a continuous moisture monitor is used, the total operating hours in which a substitute data value was used in the emissions calculations for the stack gas moisture content parameter.
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	A collection of data elements identifying each ammonia manufacturing process unit which was monitored at the specified CEMS monitoring location.
UnitName	The unit ID for each ammonia manufacturing process unit which was monitored at the specified CEMS monitoring location.

XML Excerpt 5

Sample XML Excerpt for Tier 4 CML Quarter and Additional Details

```

<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>First Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>23212.2</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Second Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>23452.4</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Third Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>34224.2</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>54453.1</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg>TotalSourceOperatingHours>8502</ghg>TotalSourceOperatingHours>
<ghg:OperatingHoursDetails>
  <ghg:OperatingHoursCO2ConcentrationSubstituted>960</ghg:OperatingHoursCO2ConcentrationSubstituted>
  <ghg:OperatingHoursStackGasFlowRateSubstituted>720</ghg:OperatingHoursStackGasFlowRateSubstituted>
  <ghg:OperatingHoursStackGasMoistureContentSubstituted>480</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>coke</ghg:CEMSFuel>
<ghg:ProcessUnitNames>
  <ghg:UnitName>FER-CEMS-01</ghg:UnitName>
</ghg:ProcessUnitNames>
</ghg:Tier4CEMSDetails>

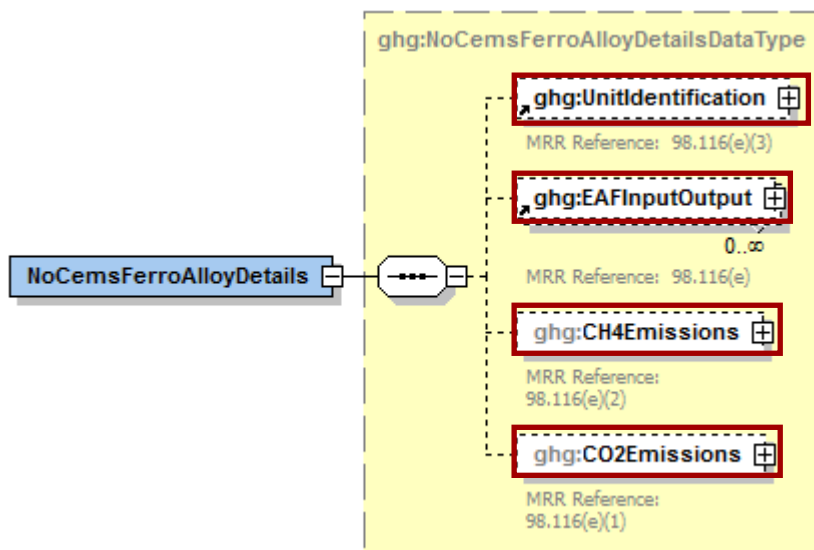
```

Note: The code excerpt above is presented here to demonstrate the concept of report quarterly CEMS data and additional details.

5.0 Non-CEMS Unit and Emissions Details

This section describes information that must be reported for units which were not monitored by CEMS during the reporting year.

Figure 16
Non-CEMS Unit Details Schema Diagram



Note: Data elements boxed in red are required.

Subpart K requires the following identification information for electric arc furnace unit which was not monitored by CEMS:

- A unique unit name or identifier (e.g., a unit ID number).
- An optional unit description or label.
- The type of unit: "Electric Arc Furnace (EAF)".

You are required to calculate and report the annual CH₄ process emissions (in metric tons) from each EAF (the output of Equation K-3) [98.113(e)(2)].

You are required to calculate and report the annual CO₂ process emissions (in metric tons) from each EAF (the output of Equation K-1) [98.116(e)(1)].

Table 11
CEMS Unit Details XML Data Element Definitions

Data Element Name	Description
NoCemsFerroAlloyDetails	A collection of data elements containing information on electric arc furnaces monitored using CEMS.
UnitIdentification	A collection of data elements that identify a specific electric arc furnace. It includes the unit ID, an optional description, and the type of unit: "Electric Arc Furnace (EAF)". [98.116(d)(3)]
EAInputOutput	See Table 12, " EAF Inputs and Outputs XML Data Elements ".
CH4Emissions	The annual CH ₄ process emissions from the specified EAF (the output of Equation K-3). [98.116(e)(2)]
CH4Emissions.massUOM	Metric Tons
CO2Emissions	The annual CO ₂ process emissions from the specified EAF (the output of Equation K-1). [98.116(e)(1)]
CO2Emissions.massUOM	Metric Tons

XML Excerpt 6
Sample XML Excerpt for CEMS Unit Details

```

<ghg:NoCemsFerroAlloyDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>FER-01</ghg:UnitName>
    <ghg:UnitDescription>Ferroalloy production unit</ghg:UnitDescription>
    <ghg:UnitType>Electric Arc Furnace (EAF)</ghg:UnitType>
  </ghg:UnitIdentification>

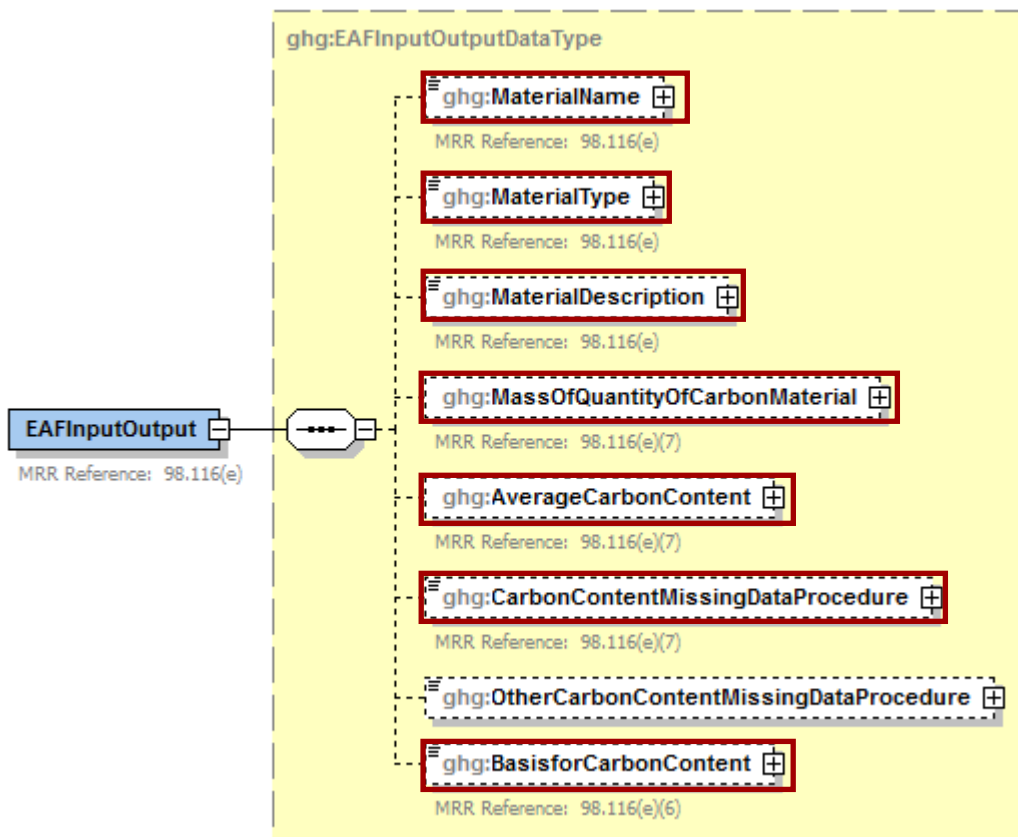
  See excerpt for "EAF Inputs and Outputs"

  <ghg:CH4Emissions massUOM="Metric Tons">
    <ghg:CalculatedValue>3453.76</ghg:CalculatedValue>
  </ghg:CH4Emissions>
  <ghg:CO2Emissions massUOM="Metric Tons">
    <ghg:CalculatedValue>305897.4</ghg:CalculatedValue>
  </ghg:CO2Emissions>
</ghg:NoCemsFerroAlloyDetails>

```

Note: The code excerpt above is presented here to demonstrate the concept of reporting CEMS-related ferroalloy data.

Figure 17
EAF Inputs and Outputs Schema Diagram



Note: Data elements boxed in red are required.

Table 12
EAF Inputs and Outputs XML Data Element Definitions

Data Element Name	Description
EAFInputOutput	A collection of data elements containing information about the carbon-containing input and output materials for each EAF.
MaterialName	The name of the material included for the calculation of annual process CO ₂ emissions for each EAF. [98.116(e)]
MaterialType	The type of material. [98.116(e)] Below is the list of allowable values. Input Output Reducing Agent Electrode Ore Flux Non-Product Outgoing Product

Data Element Name	Description
MaterialDescription	A description of the material. [98.116(e)(4)] Below is the list of allowable values. Input Output
MassOfQuantityOfCarbonMaterial	The annual material quantity for each material included for the calculation of annual process CO ₂ emissions for each EAF. [98.116(e)(4)]
AverageCarbonContent	The annual average of the carbon content determinations for each material included for the calculation of annual process CO ₂ emissions for each EAF. [98.116(e)(5)]
CarbonContentMissingDataProcedure	If you used the missing data procedures in §98.115(b), you must report how monthly mass of carbon-containing inputs and outputs with missing data was determined. [98.116(e)(7)] Below is the list of allowable values. Purchase records Company records Other (specify)
OtherCarbonContentMissingDataProcedure	Report how the monthly mass of carbon-containing inputs and outputs with missing data was determined if “Other (specify)” was reported above. [98.116(e)(7)]
BasisforCarbonContent	The method used for the determination of carbon content for each material reported in paragraph (e)(5) of this section. [98.116(e)(6)] Below is the list of allowable values. Provided by supplier ASTM E1941-04 ASTM D5373-08 ASTM C25-06

XML Excerpt 7 Sample XML Excerpt for EAF Inputs and Outputs

```

<ghg:EAFInputOutput>
  <ghg:MaterialName>Manganese</ghg:MaterialName>
  <ghg:MaterialType>Ore</ghg:MaterialType>
  <ghg:MaterialDescription>Input</ghg:MaterialDescription>
  <ghg:MassOfQuantityOfCarbonMaterial>
    <ghg:NumberofTimesSubstituted>3</ghg:NumberofTimesSubstituted>
  </ghg:MassOfQuantityOfCarbonMaterial>
  <ghg:AverageCarbonContent>
    <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
  </ghg:AverageCarbonContent>
  <ghg:CarbonContentMissingDataProcedure>Purchase records</ghg:CarbonContentMissingDataProcedure>
  <ghg:BasisforCarbonContent>ASTM E1941-04</ghg:BasisforCarbonContent>
</ghg:EAFInputOutput>

```

Note: The code excerpt above is presented here to demonstrate the concept of reporting an EAF input.

6.0 Facility-Level Roll-up Emissions

Required Subpart-Level Summary Data

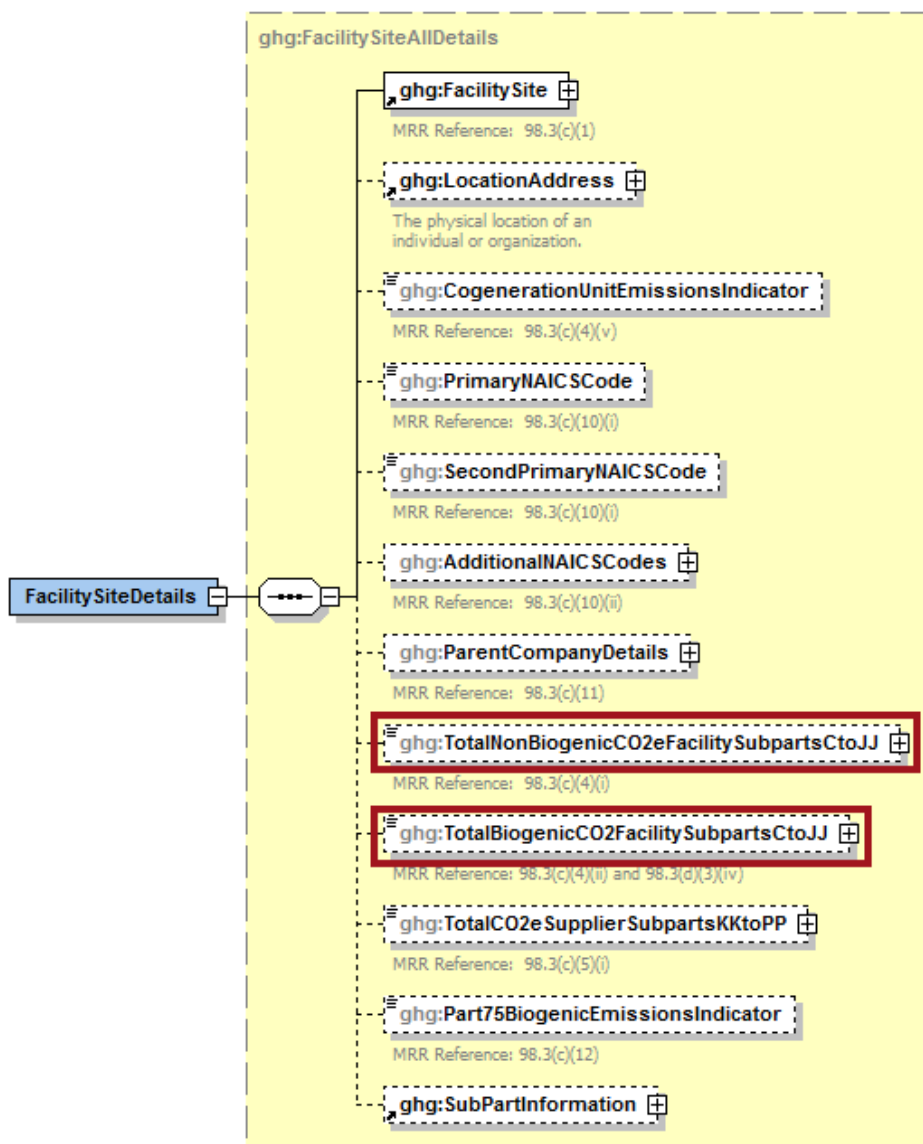
Each facility must report the following facility-level emission totals:

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

Each supplier must report the following supplier totals:

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

Figure 18
Facility-Level Roll-up Emissions Schema Diagram



Note: Data elements boxed in red are required.

- 1) Add the total CO₂e value for Subpart K in metric tons to the total CO₂e emissions (excluding biogenic CO₂) aggregated across all source category subparts associated with the facility according to the following guidelines:
 - Add the subpart-level total CO₂ (excluding biogenic CO₂) emissions value in metric tons.
 - Multiply the subpart-level total CH₄ emissions value in metric tons by the Global Warming Potential for CH₄ (21) and add the result.
- 2) Add the subpart-level total biogenic CO₂ emissions value to the total biogenic CO₂ aggregated across all source category subparts associated with the facility.

Note: You must follow the rounding rules found in [Table 1](#).

Table 13
Facility Level Roll-up Emissions Data Element Definitions

Data Element Name	Description
TotalNonBiogenicCO2eFacilitySubpartsCtoJJ	Add the total CO ₂ e value for Subpart K in metric tons to the total CO ₂ e emissions (excluding biogenic CO ₂) aggregated across all source category Subparts associated with the facility according to the guidelines above. Set the units of measure to “Metric Tons” in the attribute massUOM .
TotalBiogenicCO2FacilitySubpartsCtoJJ	Add the total annual biogenic CO ₂ value for Subpart K 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 8
Sample XML Excerpt for Facility Level Roll-up Emissions

```

<ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric Tons">2627671.2</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
<ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">100341.4</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 K

(Note: Data values do not reflect an actual facility's emissions. Additional sample XML files for Subpart K are posted on the e-GGRT help site.)

```
<ghg:GHG xmlns:ghg="http://www.ccdsupport.com/schema/ghg" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.ccdsupport.com/schema/ghg
file:///L:/XML_Schema/GHG_schema_08012011/GHG_Final_v1.2.xsd">
  <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
    &quot;SUBMIT&quot;; 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>524037</ghg:FacilitySiteIdentifier>
        <ghg:FacilitySiteName>GRIFFIN STEEL COMPANY</ghg:FacilitySiteName>
      </ghg:FacilitySite>
      <ghg:LocationAddress>
        <ghg:LocationAddressText>1224 HOLLAND ROAD</ghg:LocationAddressText>
        <ghg:LocalityName>SUFFOLK</ghg:LocalityName>
        <ghg:StateIdentity>
          <ghg:StateCode>VA</ghg:StateCode>
        </ghg:StateIdentity>
        <ghg:AddressPostalCode>23434</ghg:AddressPostalCode>
      </ghg:LocationAddress>
      <ghg:CogenerationUnitEmissionsIndicator>N</ghg:CogenerationUnitEmissionsIndicator>
      <ghg:PrimaryNAICSCode>331111</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">2627671.2</ghg>TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
      <ghg>TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">100341.4</ghg>TotalBiogenicCO2FacilitySubpartsCtoJJ>
      <ghg>TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">0</ghg>TotalCO2eSupplierSubpartsKKtoPP>
    <ghg:SubPartInformation>
      <ghg:SubPartK>
        <ghg:GHGasInfoDetails>
          <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
          <ghg:GHGasQuantity massUOM="Metric Tons">
            <ghg:CalculatedValue>100341.4</ghg:CalculatedValue>
          </ghg:GHGasQuantity>
        </ghg:GHGasInfoDetails>
        <ghg:GHGasInfoDetails>
          <ghg:GHGasName>Methane</ghg:GHGasName>

```

```

    <ghg:GHGasQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>58350.33</ghg:CalculatedValue>
    </ghg:GHGasQuantity>
  </ghg:GHGasInfoDetails>
</ghg:GHGasInfoDetails>
  <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
  <ghg:GHGasQuantity massUOM="Metric Tons">
    <ghg:CalculatedValue>340897.9</ghg:CalculatedValue>
  </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>
<ghg:AnnualFerroAlloyProductionCapacity massUOM="Short Tons">
  <ghg:MeasureValue>3234532.555</ghg:MeasureValue>
</ghg:AnnualFerroAlloyProductionCapacity>
<ghg:TotalNumberOfElectricArcFurnace>1</ghg:TotalNumberOfElectricArcFurnace>
<ghg:CemsUnitFerroAlloyDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>FER-CEMS-01</ghg:UnitName>
    <ghg:UnitDescription>Ferroalloy production unit monitored by a CEMS</ghg:UnitDescription>
    <ghg:UnitType>Electric Arc Furnace (EAF)</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:ProcessCH4Emissions massUOM="Metric Tons">
    <ghg:MeasureValue>34563.34</ghg:MeasureValue>
  </ghg:ProcessCH4Emissions>
</ghg:CemsUnitFerroAlloyDetails>
<ghg:Tier4CEMSDetails>
  <ghg:CEMSMonitoringLocation>
    <ghg:Name>CML-01</ghg:Name>
    <ghg:Description>monitoring location - east building</ghg:Description>
    <ghg:Type>Single process/process unit exhausts to dedicated stack</ghg:Type>
  </ghg:CEMSMonitoringLocation>
  <ghg:CO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
    <ghg:CalculatedValue>100341.4</ghg:CalculatedValue>
  </ghg:CO2EmissionsAllBiomassFuelsCombined>
  <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
    <ghg:CalculatedValue>35000.5</ghg:CalculatedValue>
  </ghg:CO2EmissionsNonBiogenic>
  <ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
    <ghg:CalculatedValue>135341.9</ghg:CalculatedValue>
  </ghg:AnnualCO2EmissionsMeasuredByCEMS>
  <ghg:Tier4QuarterDetails>
    <ghg:QuarterName>First Quarter</ghg:QuarterName>
    <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
      <ghg:CalculatedValue>23212.2</ghg:CalculatedValue>
    </ghg:CumulativeCO2MassEmissions>
  </ghg:Tier4QuarterDetails>
  <ghg:Tier4QuarterDetails>
    <ghg:QuarterName>Second Quarter</ghg:QuarterName>
    <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
      <ghg:CalculatedValue>23452.4</ghg:CalculatedValue>
    </ghg:CumulativeCO2MassEmissions>
  </ghg:Tier4QuarterDetails>
  <ghg:Tier4QuarterDetails>
    <ghg:QuarterName>Third Quarter</ghg:QuarterName>
    <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">

```

```

    <ghg:CalculatedValue>34224.2</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
  <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
  <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
    <ghg:CalculatedValue>54453.1</ghg:CalculatedValue>
  </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg>TotalSourceOperatingHours>8502</ghg>TotalSourceOperatingHours>
<ghg:OperatingHoursDetails>
  <ghg:OperatingHoursCO2ConcentrationSubstituted>960</ghg:OperatingHoursCO2ConcentrationSubstituted>
  <ghg:OperatingHoursStackGasFlowRateSubstituted>720</ghg:OperatingHoursStackGasFlowRateSubstituted>
  <ghg:OperatingHoursStackGasMoistureContentSubstituted>480</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>coke</ghg:CEMSFuel>
<ghg:ProcessUnitNames>
  <ghg:UnitName>FER-CEMS-01</ghg:UnitName>
</ghg:ProcessUnitNames>
</ghg:Tier4CEMSDetails>
<ghg>NoCemsFerroAlloyDetails>
  <ghg:UnitIdentification>
    <ghg:UnitName>FER-01</ghg:UnitName>
    <ghg:UnitDescription>Ferroalloy production unit</ghg:UnitDescription>
    <ghg:UnitType>Electric Arc Furnace (EAF)</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:EAFInputOutput>
    <ghg:MaterialName>Manganese</ghg:MaterialName>
    <ghg:MaterialType>Ore</ghg:MaterialType>
    <ghg:MaterialDescription>Input</ghg:MaterialDescription>
    <ghg:MassOfQuantityOfCarbonMaterial>
      <ghg:NumberOfTimesSubstituted>3</ghg:NumberOfTimesSubstituted>
    </ghg:MassOfQuantityOfCarbonMaterial>
    <ghg:AverageCarbonContent>
      <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
    </ghg:AverageCarbonContent>
    <ghg:CarbonContentMissingDataProcedure>Purchase records</ghg:CarbonContentMissingDataProcedure>
    <ghg:BasisforCarbonContent>ASTM E1941-04</ghg:BasisforCarbonContent>
  </ghg:EAFInputOutput>
  <ghg:EAFInputOutput>
    <ghg:MaterialName>input 2</ghg:MaterialName>
    <ghg:MaterialType>Electrode</ghg:MaterialType>
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    </ghg:AverageCarbonContent>
    <ghg:CarbonContentMissingDataProcedure>Purchase records</ghg:CarbonContentMissingDataProcedure>
    <ghg:BasisforCarbonContent>Provided by supplier</ghg:BasisforCarbonContent>
  </ghg:EAFInputOutput>

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<ghg:EAFInputOutput>
  <ghg:MaterialName>Chromium</ghg:MaterialName>
  <ghg:MaterialType>Product</ghg:MaterialType>
  <ghg:MaterialDescription>Output</ghg:MaterialDescription>
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  <ghg:CarbonContentMissingDataProcedure>Purchase records</ghg:CarbonContentMissingDataProcedure>
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  <ghg:MaterialType>Non-Product Outgoing</ghg:MaterialType>
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  </ghg:AverageCarbonContent>
  <ghg:CarbonContentMissingDataProcedure>Other (specify)</ghg:CarbonContentMissingDataProcedure>
  <ghg:OtherCarbonContentMissingDataProcedure>Method 123</ghg:OtherCarbonContentMissingDataProcedure>
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