Greenhouse Gas Reporting Program

Draft XML Reporting Instructions for Subpart P – Hydrogen Production

United States Environmental Protection Agency
Climate Change Division
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Introduction

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

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

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

The XML upload method may be used only for submitting the annual GHG report. User and facility or supplier registration and the Certificate of Representation must be entered on-line using e-GGRT.

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

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

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

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

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

This document provides a step-by-step description of how to report data for Subpart P Hydrogen Production and overall total Subpart P emissions for a facility using the XML schema. Please note the following:

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

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

**Figure 1
Sample Calculated Value Schema Diagram**
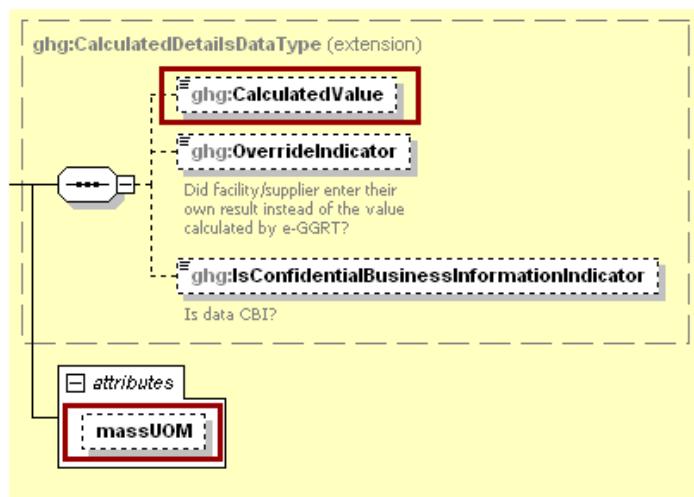
**Figure 2
Sample Measured Value Schema Diagram**
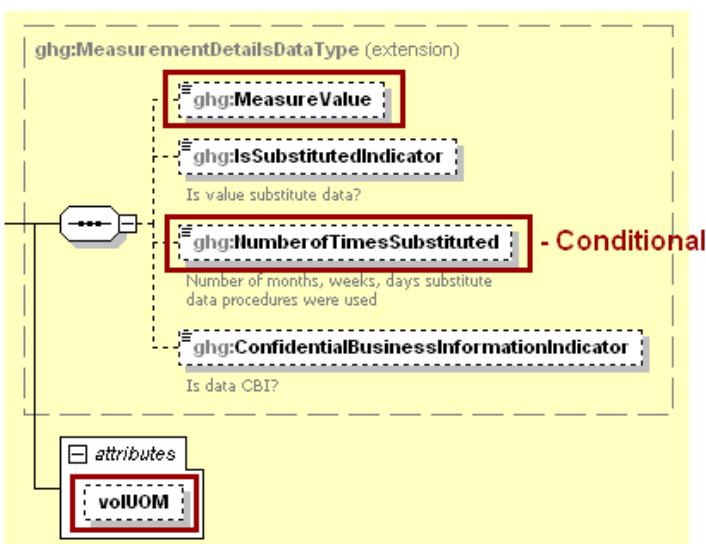
Figure 3
Subpart P Reporting Diagram
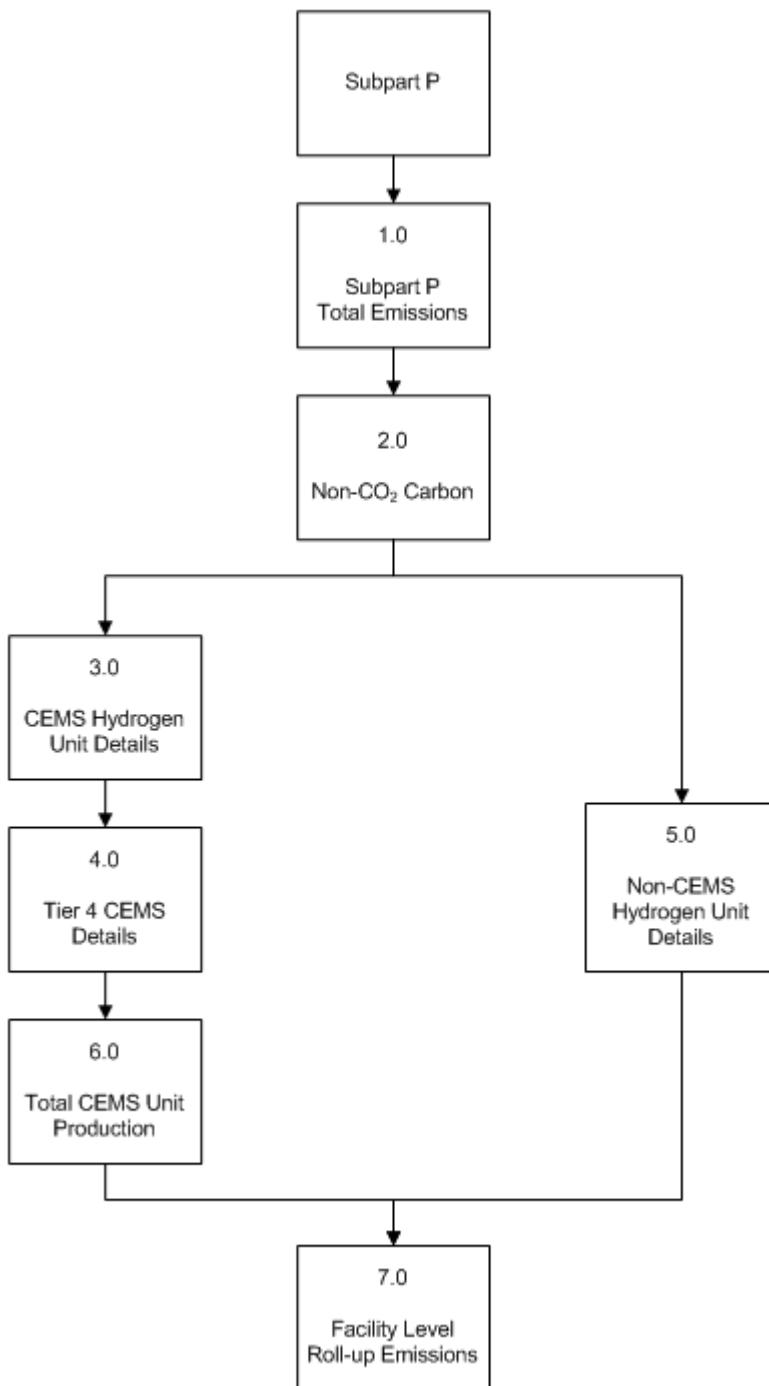
Subpart P is comprised of process units that produce hydrogen by reforming, gasification, oxidation, reaction, or other transformations of feedstock, and that sell the hydrogen gas or liquid as a product to other entities. Hydrogen production units that are located within other facilities are included in this source category if they are not owned by or under the direct control of the other facility's owner and operator.

The XML schema includes the following areas for reporting for Subpart P, as is diagramed in Figure 1 above:

1.0 Subpart P Total Emissions: includes the total emissions for greenhouse gases required to be reported.
2.0 Non-CO_2 Carbon: annual quantity of carbon other than CO_2 collected and transferred off site.
3.0 Continuous emissions monitoring system (CEMS) Hydrogen Unit Details: includes information on unit identification and the quantity of hydrogen and ammonia produced.
4.0 Tier 4 CEMS Details: includes information on each CEMS monitoring location and emissions details.
5.0 Non-CEMS Hydrogen Unit Details: includes information on unit identification, fuel and feedstock details, the quantity of hydrogen and ammonia produced and annual CO_2 emissions.
6.0 Total CEMS Unit Production: includes hydrogen and ammonia produced by all units monitored by CEMS combined.
7.0 Facility Level Roll-up Emissions: includes information on how to report total emissions for CO_2e (excluding biogenic CO_2) and biogenic CO_2.

The following terminology is used throughout this document:

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

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

1) CO_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.
2) 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.
3) In the case of aggregation/roll-ups, those calculations should be performed on the rounded values.

Figure 4
Subpart P Schema Diagram
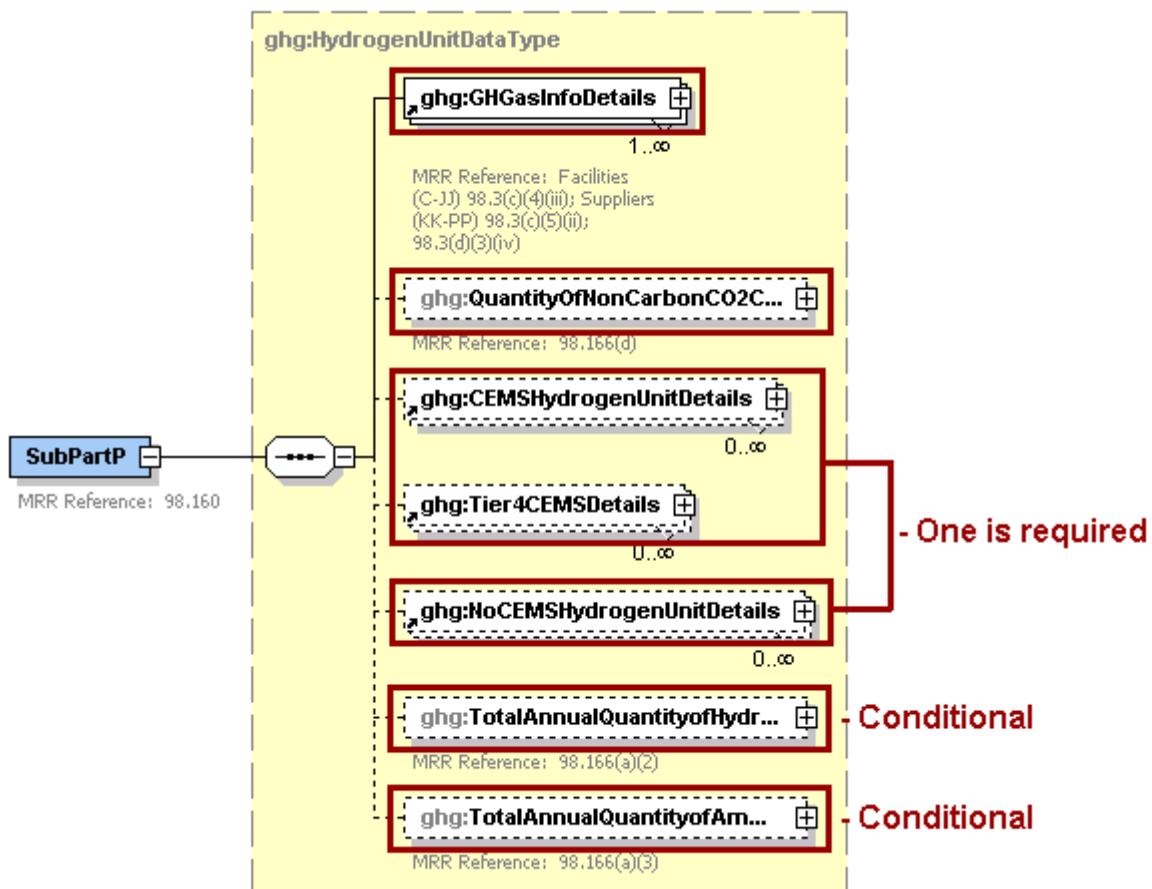
1.0 Subpart P Total Emissions

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 P, expressed in metric tons.

Figure 5
Greenhouse Gas Information Details Schema Diagram
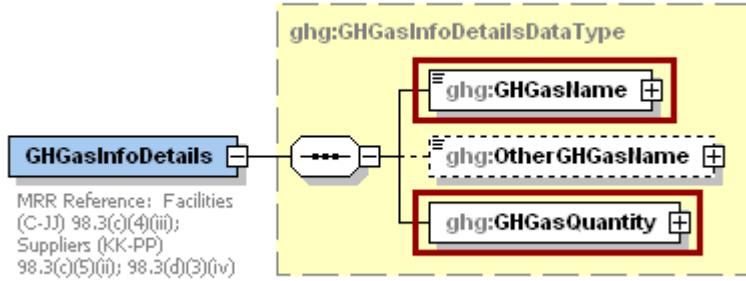
For Subpart P, report total emissions for carbon dioxide (excluding biogenic CO_2), biogenic CO_2, using the following guidelines.

1) Total CO_2 emissions (excluding biogenic CO_2):
   - Add the annual CO_2 emissions from each hydrogen processing unit in metric tons rounded to nearest whole number.
   - Add the total annual CO_2 mass emissions measured by the CEMS in metric tons rounded to nearest whole number for each CEMS monitoring location (CML).
   - Subtract the total annual biogenic CO_2 mass emissions in metric tons rounded to nearest whole number for each CML.
2) Total biogenic CO_2 emissions: Add the total annual biogenic CO_2 mass emissions in metric tons rounded to nearest whole number for each CML.

For greenhouse gas quantity, report the calculated value and mass unit of measure (Metric Tons) only.

Table 1
Greenhouse Gas Information Details XML Data Elements

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

Figure 6
Sample XML Excerpt for Greenhouse Gas Information Details

```
<ghg:SubPartP>
    <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
                    <ghg:CalculatedValue>150</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
    </ghg:GHGasInfoDetails>
    <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
                    <ghg:CalculatedValue>102350</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 Non-CO$_2$ Carbon

Subpart P requires that the facility report the annual quantity of carbon other than CO$_2$ collected and transferred off site in either gas, liquid, or solid forms (kg carbon) [98.166(d)].

Figure 7
Non-CO$_2$ Carbon Schema Diagram
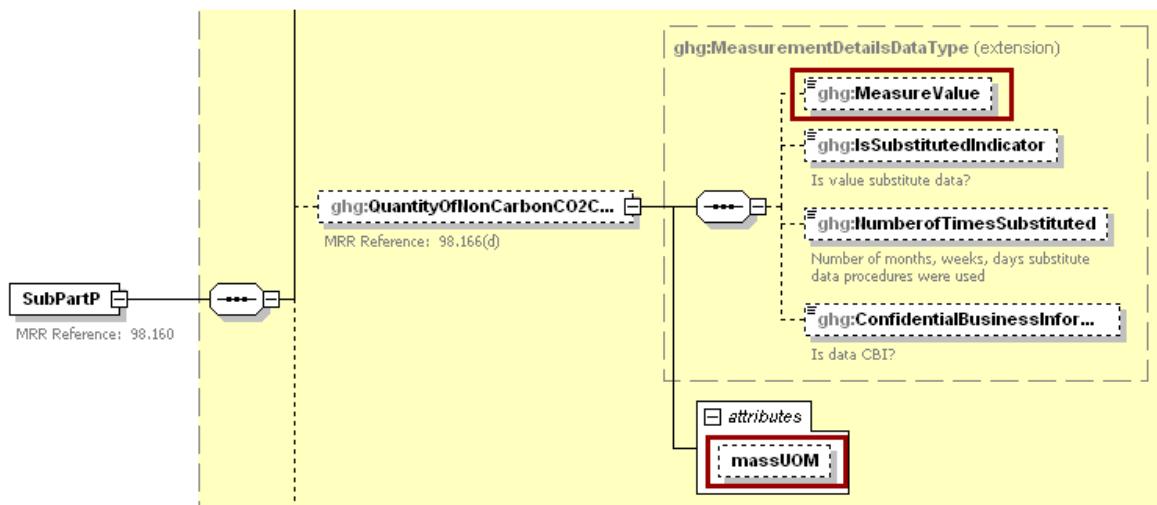
Table 2
Non-CO$_2$ Carbon XML Data Elements

Data Element Name	Description
QuantityOfNonCarbonCO2CollectedTransfered	A collection of data elements containing information on the quantity of non-CO$_2$ carbon collected and transferred offsite. It includes the annual quantity of carbon other than CO$_2$ collected and transferred off site in either gas, liquid, or solid forms (kg carbon). Report the measured value only.
QuantityOfNonCarbonCO2CollectedTransfered@massUOM	Kilograms

Figure 8
Sample XML Excerpt for Non-CO$_2$ Carbon

```
<ghg:QuantityOfNonCarbonCO2CollectedTransferred massUOM="Kilograms">
        <ghg:MeasureValue>10000</ghg:MeasureValue>
</ghg:QuantityOfNonCarbonCO2CollectedTransferred>
```

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

3.0 CEMS Hydrogen Unit Details

For each hydrogen production processing unit for which CEMS is used to measure greenhouse gas emissions, report the following:

- A unique name or identifier, an optional description and the unit type, "Hydrogen production process unit" [98.166(a)(1)].
- Annual quantity of hydrogen produced (metric tons) [98.166(a)(2)].
- Annual quantity of ammonia produced, if applicable (metric tons) [98.166(a)(3)].

Figure 9
CEMS Hydrogen Unit Details Schema Diagram
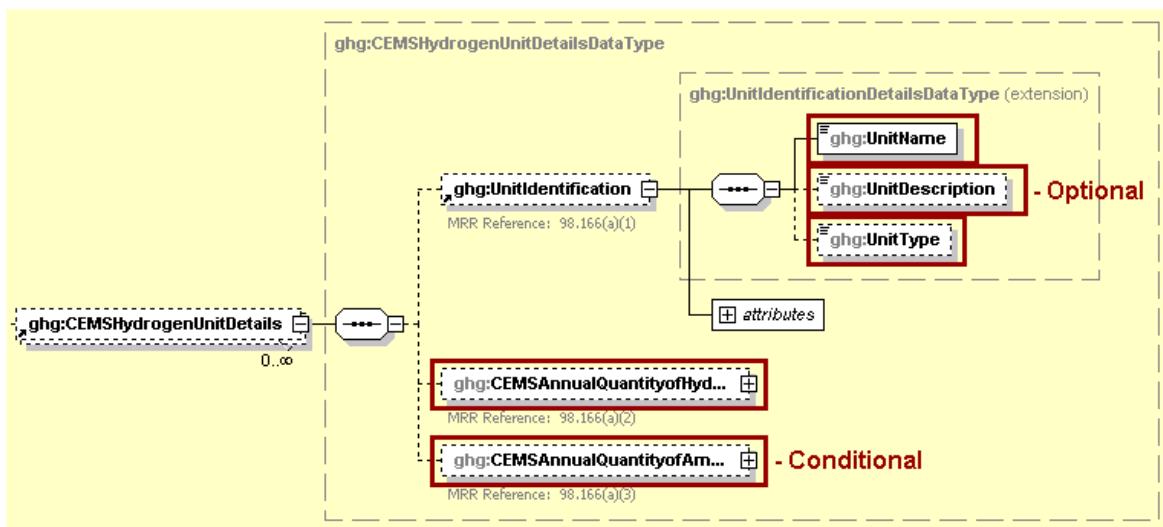
Table 3
CEMS Unit Details XML Data Elements

Data Element Name	Description
CEMSHydrogenUnitDetails	A collection of data elements containing details about units which were monitored using a CEMS.
UnitIdentification	A collection of data elements containing the identity of each hydrogen processing unit monitored by a CEMS. It includes the unit ID, an optional description, and the type of unit: "Hydrogen production process unit".
CEMSAnnualQuantityofHydrogenProduced	A collection of data elements containing information on the quantity of hydrogen produced by the specified unit. It includes the annual quantity of hydrogen produced. Report the measured value only.
CEMSAnnualQuantityofHydrogenProduced.massUOM	Metric Tons

Data Element Name	Description
CEMSAnnualQuantityofAmmoniaProduced	A collection of data elements for the specified hydrogen production process unit containing information on the annual quantity of ammonia produced, if applicable. Report the measured value only.
CEMSAnnualQuantityofAmmoniaProduced.massUOM	Metric Tons

Figure 10
Sample XML Excerpt for CEMS Unit Details

```
<ghg:CEMSHydrogenUnitDetails>
        <ghg:UnitIdentification>
                <ghg:UnitName>002- CEMS</ghg:UnitName>
                <ghg:UnitDescription>CEMS unit</ghg:UnitDescription>
                <ghg:UnitType>Hydrogen production process unit</ghg:UnitType>
        </ghg:UnitIdentification>
        <ghg:CEMSAnnualQuantityofHydrogenProduced massUOM="Metric Tons">
                <ghg:MeasureValue>3300</ghg:MeasureValue>
        </ghg:CEMSAnnualQuantityofHydrogenProduced>
        <ghg:CEMSAnnualQuantityofAmmoniaProduced massUOM="Metric Tons">
                <ghg:MeasureValue>4400</ghg:MeasureValue>
        </ghg:CEMSAnnualQuantityofAmmoniaProduced>
</ghg:CEMSHydrogenUnitDetails>
```

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

4.0 Tier 4 CEMS Details

This section describes emissions information that must be reported if a continuous emissions monitoring system (CEMS) was in use during the reporting year.

Figure 11
Tier 4 CEMS Details Schema Diagram
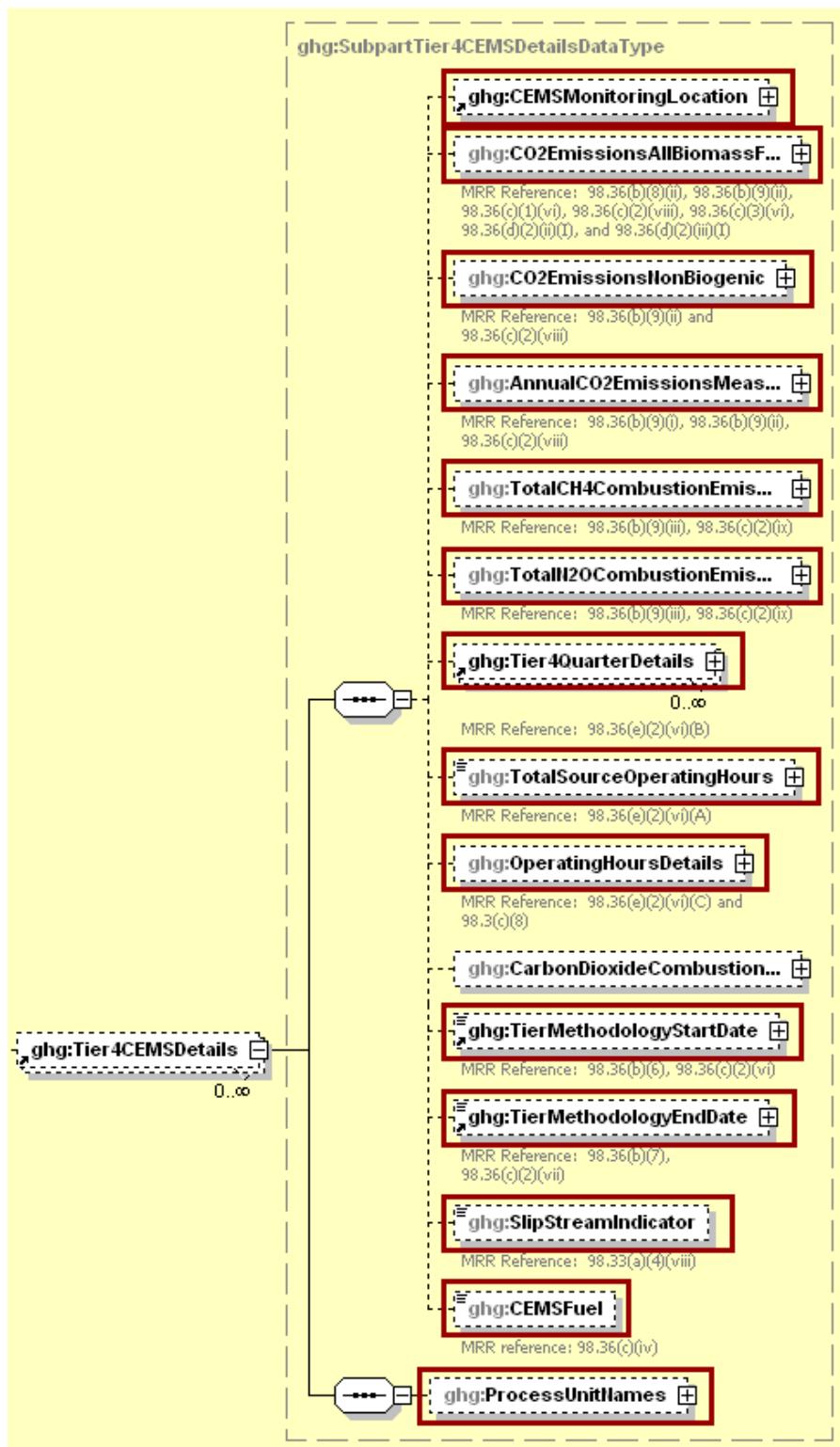
Figure 12
Tier 4 CEMS Location and Emissions Details Schema Diagram
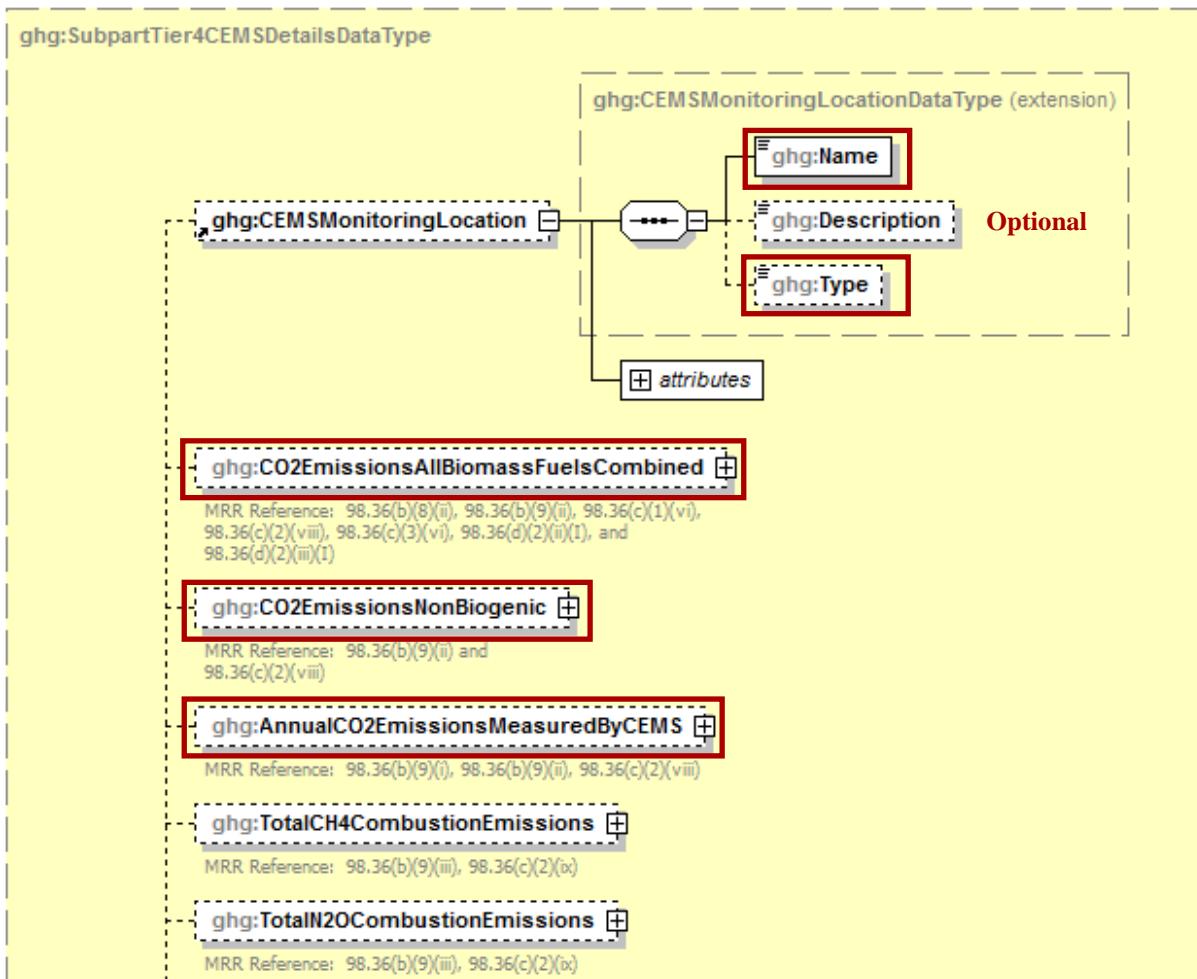
For subpart P, information on each CEMS monitoring location (CML) is required including the name, an optional description, and the configuration type. For each CML identified by the facility, the facility must specify the configuration type from the following list:

- 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)(8)(ii)]
- 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)]
- The total annual CO_2 mass emissions (biogenic and non-biogenic) measured by the CEMS [98.36(b)(9)(i)-(ii)]

Table 4
Tier 4 CEMS Location and Emissions Details XML Data Elements

Data Element Name	Description
Tier4CEMSDetails	A collection of data elements containing information about a CEMS monitoring location.
CEMSMonitoringLocation	A collection of data elements containing the identity of each CEMS monitoring location. It includes the location's name, which must begin with "CS", an optional description and configuration 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	Total annual biogenic CO_2 mass emissions for the specified CEMS monitoring location. Report the calculated value only.
CO2EmissionsAllBiomassFuelsCombined.massUOM	Metric Tons
CO2EmissionsNonBiogenic	The total annual non-biogenic CO_2 mass emissions for the specified CEMS monitoring location. Report the calculated value only.
CO2EmissionsNonBiogenic.massUOM	Metric Tons
AnnualCO2EmissionsMeasuredByCEMS	The total annual CO_2 mass emissions measured by the CEMS at the specified CEMS monitoring location. Report the calculated value only.
AnnualCO2EmissionsMeasuredByCEMS.massUOM	Metric Tons

Figure 13
Sample XML Excerpt for Tier 4 CEMS Location and Emissions Details

```xml
<ghg:Tier4CEMSDetails>
        <ghg:CEMSMonitoringLocation>
                <ghg:Name>003- CML</ghg:Name>
                <ghg:Description>CML</ghg:Description>
                <ghg:Type>Single process/process unit exhausts to dedicated stack</ghg:Type>
        </ghg:CEMSMonitoringLocation>
        <ghg:CO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
                <ghg:CalculatedValue>150</ghg:CalculatedValue>
        </ghg:CO2EmissionsAllBiomassFuelsCombined>
        <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
                <ghg:CalculatedValue>140</ghg:CalculatedValue>
        </ghg:CO2EmissionsNonBiogenic>
        <ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
                <ghg:CalculatedValue>100000</ghg:CalculatedValue>
        </ghg:AnnualCO2EmissionsMeasuredByCEMS>
```

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

Figure 14
Tier 4 CEMS Quarter and Additional Details Schema Diagram
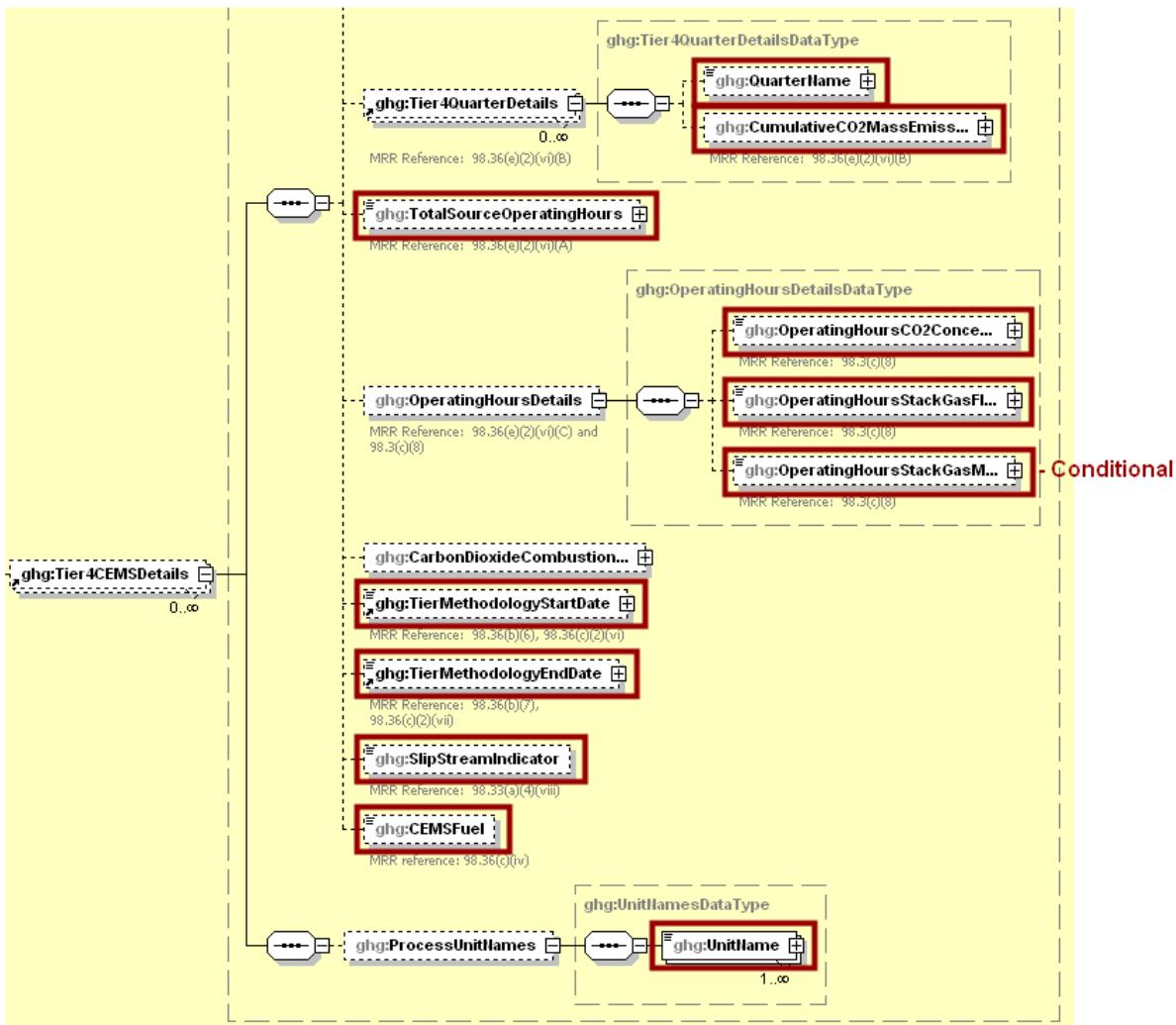
For each quarter of the reporting year, the facility must provide the cumulative CO_2 mass emissions for each CML [98.36(e)(2)(vi)(B)].

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)]
- If moisture correction is required and a continuous moisture monitor is used, the total operating hours in which a substitute data value was used in the emissions calculations for the stack gas moisture content parameter [98.36(e)(2)(vi)(C) and 98.3(c)(8)]
- The Tier 4 methodology start date [98.36(b)(6), 98.36(c)(2)(vi)]
- The Tier 4 methodology end date [98.36(b)(7), 98.36(c)(2)(vii)]
- Specify if emissions reported for the CEMS include emissions calculated according to 98.33(a)(4)(viii) for a slipstream that bypassed the CEMS [98.33(a)(4)(viii)]

- Each type of fuel combusted in the group of units during the reporting year [98.36(c)(1)(v)]
- The name of each hydrogen production process unit sharing the stack.

Table 5
Tier 4 CEMS Quarter and Additional Details XML Data Elements

Data Element Name	Description
Tier4QuarterDetails	
QuarterName	The name of the quarter. See list of allowable values: First Quarter Second Quarter Third Quarter Fourth Quarter
CumulativeCO2MassEmissions	The cumulative CO_2 mass emissions for the specified CEMS monitoring location 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 for the specified CEMS monitoring location.
OperatingHoursDetails	
OperatingHoursCO2ConcentrationSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the CO_2 concentration parameter at the specified CEMS monitoring location.
OperatingHoursStackGasFlowRateSubstituted	The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter at the specified CEMS monitoring location.
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 at the specified CEMS monitoring location.
TierMethodologyStartDate	The tier methodology start date for the specified CEMS monitoring location.
TierMethodologyEndDate	The tier methodology end date for the specified CEMS monitoring location.
SlipStreamIndicator	An indication (Y/N) that the emissions reported for the CEMS include emissions calculated according to 98.33(a)(4)(viii) for a slipstream that bypassed the CEMS.
CEMSFuel	Each type of fuel combusted in the group of units during the reporting year.

Data Element Name	Description
ProcessUnitNames	A collection of data elements identifying each unit or furnace which was monitored at the specified CEMS monitoring location.
UnitName	The name of each hydrogen production process unit that is monitored at the specified CEMS Monitoring Location. Use the exact unit name(s) as for "UnitIdentification". Report each unit separately.

Figure 15
Sample XML Excerpt for Tier 4 CEMS Quarter and Additional Details

```xml
<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>First Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>10000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>Second Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>20000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>Third Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>30000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>40000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:TotalSourceOperatingHours>8400</ghg:TotalSourceOperatingHours>
<ghg:OperatingHoursDetails>
        <ghg:OperatingHoursCO2ConcentrationSubstituted>20</ghg:OperatingHoursCO2ConcentrationSubstituted>
        <ghg:OperatingHoursStackGasFlowRateSubstituted>30</ghg:OperatingHoursStackGasFlowRateSubstituted>
        <ghg:OperatingHoursStackGasMoistureContentSubstituted>40</ghg:OperatingHoursStackGasMoistureContentSubstituted>
</ghg:OperatingHoursDetails>
<ghg:TierMethodologyStartDate>2010-01-01</ghg:TierMethodologyStartDate>
<ghg:TierMethodologyEndDate>2010-12-31</ghg:TierMethodologyEndDate>
<ghg:SlipStreamIndicator>Y</ghg:SlipStreamIndicator>
<ghg:CEMSFuel>coal, coke, natural gas</ghg:CEMSFuel>
<ghg:ProcessUnitNames>
        <ghg:UnitName>002- CEMS</ghg:UnitName>
</ghg:ProcessUnitNames>
</ghg:Tier4CEMSDetails>
```

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

5.0 Non-CEMS Hydrogen Unit Details and Emissions

If a CEMS is not used to measure CO_2 emissions, then you must report the following information for each hydrogen production process unit:

- A unique name or identifier, an optional description and the unit type, "Hydrogen production process unit" for each unit [98.166(b)(1)].
- A unique name or identifier plus the phase for each fuel or feedstock.
- Indicate if any monthly values used for your emissions calculation are based on substitute data values for each feedstock for each unit. For each month, indicate if:
  - Consumption is based on one or more substitute data values.
  - Carbon content is based on one or more substitute data values.
  - Molecular weight is based on one or more substitute data values (gaseous feedstock only).
- Annual quantity of hydrogen produced (metric tons) [98.166(b)(3)].
- Annual quantity of ammonia produced, if applicable (metric tons) [98.166(b)(4)].
- Total annual CO_2 emissions for each feedstock processing unit [98.166(b)(1)]. The annual CO_2 emissions value for the unit is the sum of annual emissions associated with each fuel and feedstock calculated using the following equations:
  - For each gaseous fuel and feedstock, use Equation P-1 [98.163(b)(1)].
  - For each liquid fuel and feedstock, use Equation P-2 [98.163(b)(2)].
  - For each solid fuel and feedstock, use Equation P-3 [98.163(b)(3)].

Figure 16
Non-CEMS Hydrogen Unit Details and Emissions Schema Diagram
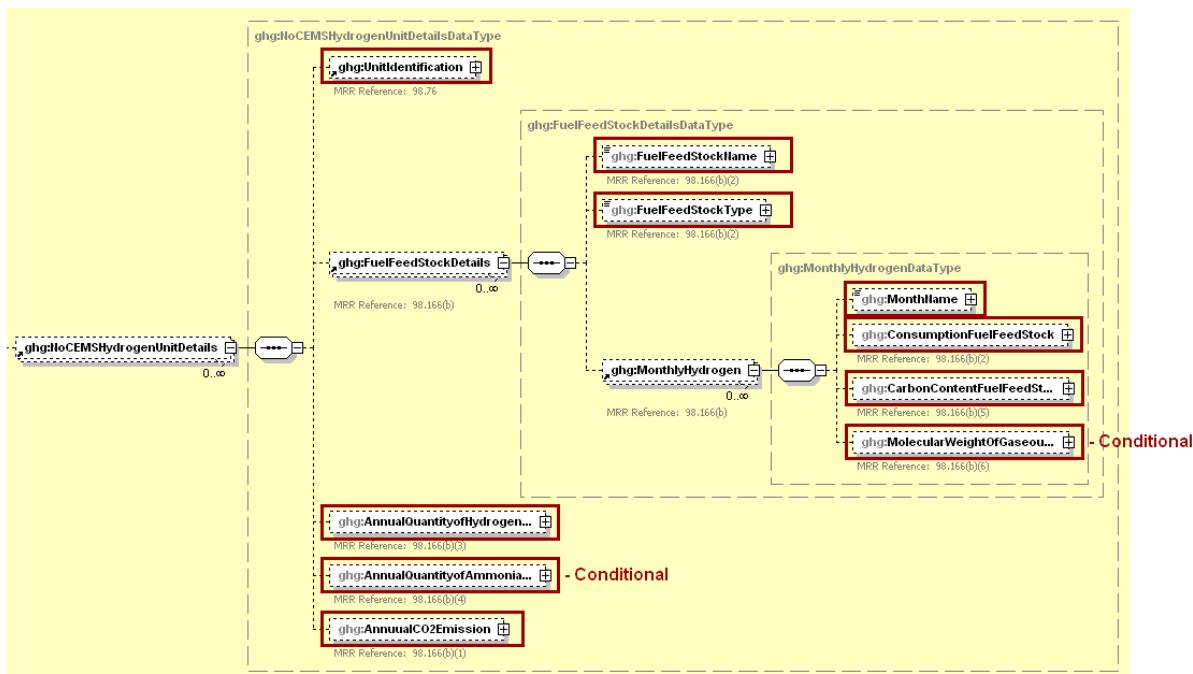
Table 6
Non-CEMS Hydrogen Unit Details and Emissions Factors XML Data Elements

Data Element Name	Description
NoCEMSHydrogenUnitDetails	A collection of data elements containing details for units which were not monitored using a CEMS.
UnitIdentification	A collection of data elements containing the identity each hydrogen unit which were not monitored using a CEMS. It includes the unit ID, an optional description and the type of unit, "Hydrogen production process unit".
FuelFeedStockDetails	A collection of data elements containing information on each fuel and or feedstock used in the specified unit.
FuelFeedStockName	A name/description for each fuel/feedstock used in the specified hydrogen production process unit during the reporting year.
FuelFeedStockType	The phase of each fuel/feedstock used in the specified hydrogen production process unit during the reporting year. See list of allowable values: gaseous feedstock liquid feedstock solid feedstock
MonthlyHydrogen	A collection of data elements containing information on whether substitute data values were used for data for the specified fuel/feedstock for the specified unit for each month.
MonthName	Month name. See list of allowable values: January February March April May June July August September October November December
ConsumptionFuelFeedStock	For the specified fuel/feedstock, an indication (Y/N) that the consumption for the specified month is based on one or more substitute data values.
CarbonContentFuelFeedStock	For the specified fuel/feedstock, an indication (Y/N) that the carbon content for the specified month is based on one or more substitute data values.

Data Element Name	Description
MolecularWeightOfGaseousFuel	For the specified fuel/feedstock, if of the gaseous phase, an indication (Y/N) that the molecular weight for the specified month is based on one or more substitute data values.
AnnualQuantityofHydrogenProduced	A collection of data elements for the specified hydrogen production process unit containing information on the annual quantity of hydrogen produced. Report the measured value only.
AnnualQuantityofHydrogenProduced.massUOM	Metric Tons
AnnualQuantityofAmmoniaProduced	A collection of data elements for the specified hydrogen production process unit containing information on the annual quantity of ammonia produced, if applicable. Report the measured value only.
AnnualQuantityofAmmoniaProduced.massUOM	Metric Tons
AnnuualCO2Emission	A collection of data elements for the total annual CO_2 emissions from the specified hydrogen production process unit. Report the calculated value only.
AnnuualCO2Emission.massUOM	Metric Tons

Figure 17
Sample XML Excerpt for Non-CEMS Hydrogen Unit Details and Emissions

```xml
<ghg:NoCEMSHydrogenUnitDetails>
    <ghg:UnitIdentification>
        <ghg:UnitName>001- Non-CEMS</ghg:UnitName>
        <ghg:UnitDescription>Non-CEMS unit</ghg:UnitDescription>
        <ghg:UnitType>Hydrogen production process unit</ghg:UnitType>
    </ghg:UnitIdentification>
    <ghg:FuelFeedStockDetails>
        <ghg:FuelFeedStockName>Fuel A</ghg:FuelFeedStockName>
        <ghg:FuelFeedStockType>gaseous feedstock</ghg:FuelFeedStockType>
        <ghg:MonthlyHydrogen>
            <ghg:MonthName>January</ghg:MonthName>
            <ghg:ConsumptionFuelFeedStock>
                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
            </ghg:ConsumptionFuelFeedStock>
            <ghg:CarbonContentFuelFeedStock>
                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
            </ghg:CarbonContentFuelFeedStock>
            <ghg:MolecularWeightOfGaseousFuel>
                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
            </ghg:MolecularWeightOfGaseousFuel>
        </ghg:MonthlyHydrogen>
        <ghg:MonthlyHydrogen>
            <ghg:MonthName>February</ghg:MonthName>
            <ghg:ConsumptionFuelFeedStock>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:ConsumptionFuelFeedStock>
            <ghg:CarbonContentFuelFeedStock>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:CarbonContentFuelFeedStock>
            <ghg:MolecularWeightOfGaseousFuel>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:MolecularWeightOfGaseousFuel>
        </ghg:MonthlyHydrogen>
        <ghg:MonthlyHydrogen>
            <ghg:MonthName>March</ghg:MonthName>
            <ghg:ConsumptionFuelFeedStock>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:ConsumptionFuelFeedStock>
            <ghg:CarbonContentFuelFeedStock>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:CarbonContentFuelFeedStock>
            <ghg:MolecularWeightOfGaseousFuel>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:MolecularWeightOfGaseousFuel>
        </ghg:MonthlyHydrogen>
        <ghg:MonthlyHydrogen>
            <ghg:MonthName>April</ghg:MonthName>
            <ghg:ConsumptionFuelFeedStock>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:ConsumptionFuelFeedStock>
            <ghg:CarbonContentFuelFeedStock>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:CarbonContentFuelFeedStock>
            <ghg:MolecularWeightOfGaseousFuel>
                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
            </ghg:MolecularWeightOfGaseousFuel>
        </ghg:MonthlyHydrogen>
    </ghg:FuelFeedStockDetails>
    <ghg:AnnualQuantityofHydrogenProduced massUOM="Metric Tons">
        <ghg:MeasureValue>1111</ghg:MeasureValue>
    </ghg:AnnualQuantityofHydrogenProduced>
    <ghg:AnnualQuantityofAmmoniaProduced massUOM="Metric Tons">
        <ghg:MeasureValue>2222</ghg:MeasureValue>
    </ghg:AnnualQuantityofAmmoniaProduced>
    <ghg:AnnuualCO2Emission massUOM="Metric Tons">
        <ghg:CalculatedValue>2500</ghg:CalculatedValue>
    </ghg:AnnuualCO2Emission>
</ghg:NoCEMSHydrogenUnitDetails>
```

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

6.0 Total CEMS Unit Production

If a CEMS is used to measure CO_2 emissions, then you must report the following information:

- Annual quantity of hydrogen produced (metric tons) for all CEMS process units combined [98.166(a)(2)].
- Annual quantity of ammonia produced (metric tons), if applicable, for all CEMS process units combined [98.166(a)(3)].

Figure 18
Total CEMS Unit Production Schema Diagram
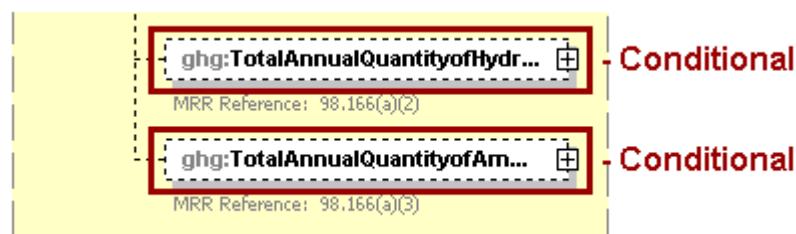
Table 7
Total CEMS Unit Production XML Data Elements

Data Element Name	Description
TotalAnnualQuantityofHydrogenProduced	A collection of data elements containing the annual quantity of hydrogen produced by all units monitored by CEMS combined. Report the measured value only.
TotalAnnualQuantityofHydrogenProduced.massUOM	Metric Tons
TotalAnnualQuantityofAmmoniaProduced	A collection of data elements containing the annual quantity of ammonia produced, if applicable, by all units monitored by CEMS combined. Report the measured value only.
TotalAnnualQuantityofAmmoniaProduced.massUOM	Metric Tons

Figure 19
Sample XML Excerpt for Total CEMS Unit Production

```
<ghg:TotalAnnualQuantityofHydrogenProduced massUOM="Metric Tons">
        <ghg:MeasureValue>3333</ghg:MeasureValue>
</ghg:TotalAnnualQuantityofHydrogenProduced>
<ghg:TotalAnnualQuantityofAmmoniaProduced massUOM="Metric Tons">
        <ghg:MeasureValue>4444</ghg:MeasureValue>
</ghg:TotalAnnualQuantityofAmmoniaProduced>
</ghg:SubPartP>
```

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

7.0 Facility-Level Roll-up Emissions

Each reporting entity (facility or supplier) must report the following:
- Total CO_2 equivalent (CO_2e) emissions (excluding biogenic CO_2) aggregated across all source category subparts associated with the facility or supplier.
- Total biogenic CO_2 emissions aggregated across all source category subparts associated with the facility or supplier.
- Total CO_2e emissions aggregated across all supplier categories associated with the facility or supplier.

Figure 20
Facility-Level Roll-up Emissions Schema Diagram
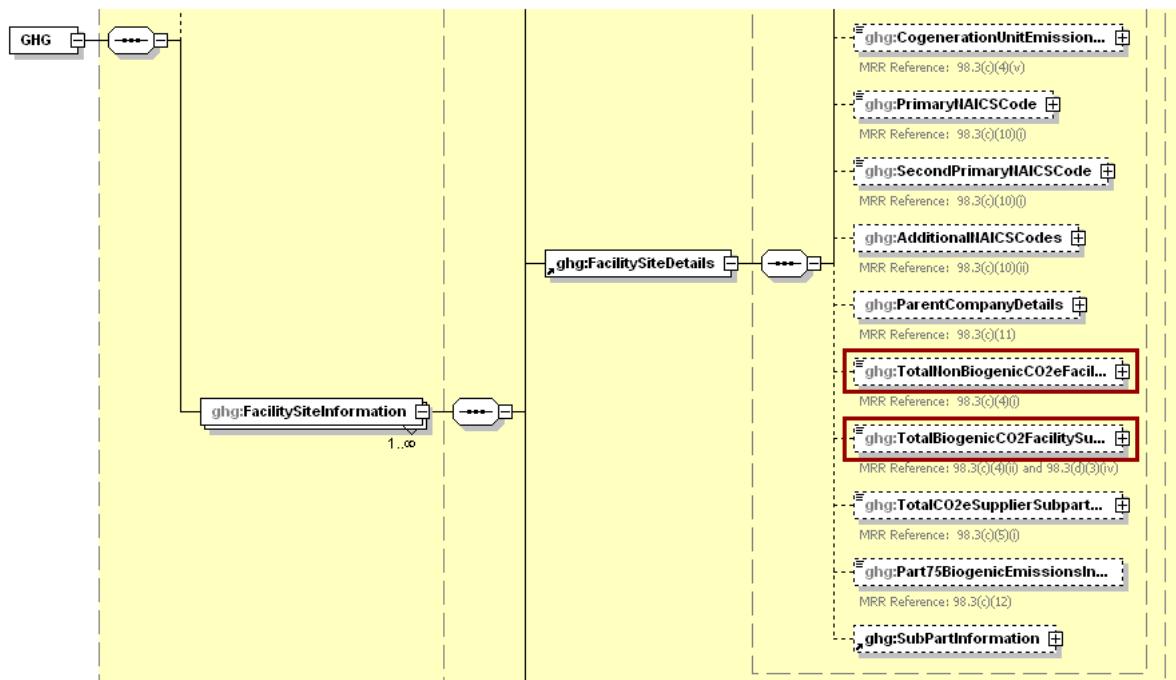
For Subpart P, report total emissions for CO_2e (excluding biogenic CO_2) and biogenic CO_2 using the following guidelines.

1) Add the total CO_2e value for subpart P 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 emissions from each hydrogen processing unit in metric tons rounded to one decimal place.
   - Add the total annual CO_2 mass emissions measured by the CEMS in metric tons rounded to one decimal place for each CEMS monitoring location (CML) minus the total annual biogenic CO_2 mass emissions in metric tons rounded to one decimal place (the difference of the total CO_2 monitored by the CEMS and the total biogenic CO_2) for each CML.

2) Add the total annual biogenic CO_2 mass emissions in metric tons rounded to one decimal place for each CML to the total biogenic CO_2 aggregated across all source category subparts associated with the facility.

Table 8
Facility Level Roll-up Emissions XML Data Elements

Data Element Name	Description
TotalNonBiogenicCO2eFacilitySubpartsCtoJJ	Add the total CO_2e value for subpart P 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.
TotalNonBiogenicCO2eFacilitySubpartsCtoJJ.massUOM	Metric Tons
TotalBiogenicCO2FacilitySubpartsCtoJJ	Add the total annual biogenic CO_2 value for subpart P in metric tons to the total biogenic CO_2 emissions aggregated across all source category subparts associated with the facility according to the guideline above.
TotalBiogenicCO2FacilitySubpartsCtoJJ.massUOM	Metric Tons

Figure 21
Sample XML Excerpt for Facility Level Roll-up Emissions

```
<ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric
Tons">108091</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
<ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">150</ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ>
<ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">0</ghg:TotalCO2eSupplierSubpartsKKtoPP>
```

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

Appendix A

Legend for Tables

Blue = parent element

Legend for XML Schema Diagrams

Red box = relevant for reporting

The following XML symbol "0..∞" means that multiple occurrences for the parent element can be reported:
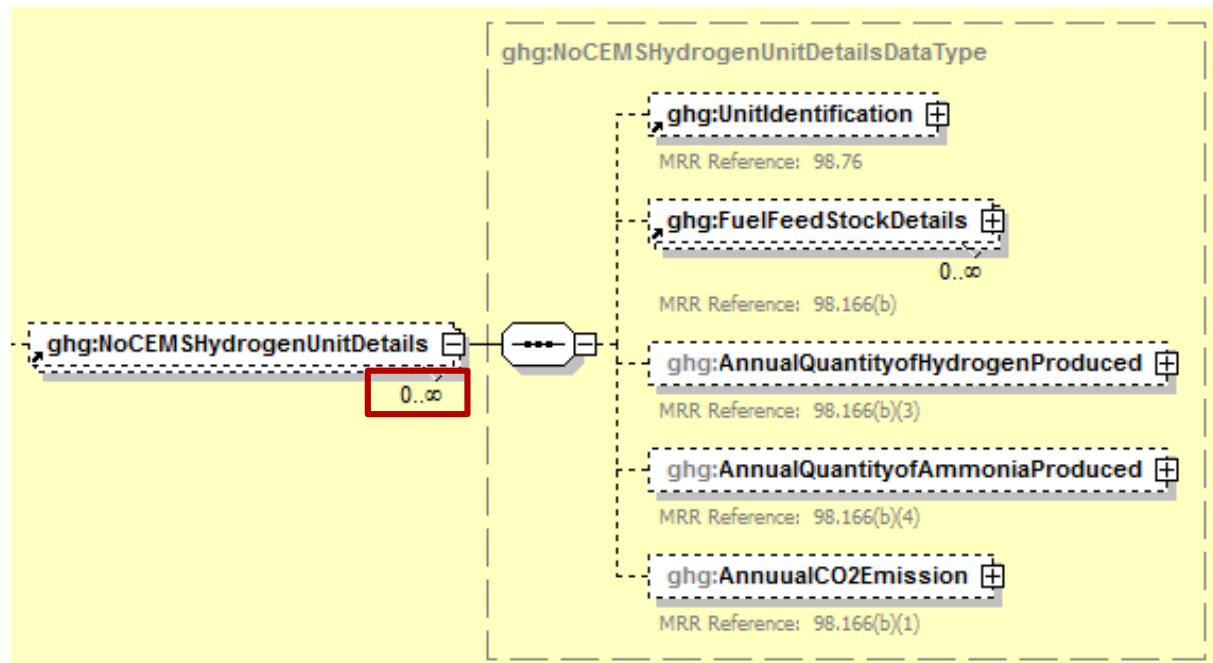
The following XML symbol for "or" means that only one of the data elements following the sign can be reported for the current instance of the parent element:
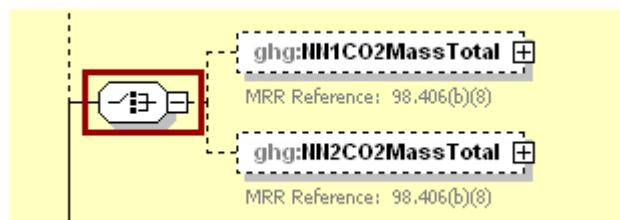
Appendix B

Sample XML Document for Subpart P

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

```
<ghg:GHG xmlns="http://www.ccdsupport.com/schema/ghg">
  <ghg:FacilitySiteInformation>
    <ghg:CertificationStatement>The designated representative or alternate designated representative must sign (i.e., agree
to) this certification statement. If you are an agent and you click on  "SUBMIT", you are not agreeing to the certification
statement, but are submitting the certification statement on behalf of the designated  representative or alternate designated
representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on
behalf of the designated representative, not to sign (i.e., agree to) the certification statement.</ghg:CertificationStatement>
    <ghg:ReportingYear>2010</ghg:ReportingYear>
    <ghg:FacilitySiteDetails>
      <ghg:FacilitySite>
            <ghg:FacilitySiteIdentifier>524097</ghg:FacilitySiteIdentifier>
            <ghg:FacilitySiteName>Test Facility P</ghg:FacilitySiteName>
      </ghg:FacilitySite>
      <ghg:LocationAddress>
            <ghg:LocationAddressText>1 Main St.</ghg:LocationAddressText>
            <ghg:LocalityName>Charlottesville</ghg:LocalityName>
            <ghg:StateIdentity>
                    >VA</ghg:StateCode>
            </ghg:StateIdentity>
            <ghg:AddressPostalCode>22911</ghg:AddressPostalCode>
      </ghg:LocationAddress>
      <ghg:CogenerationUnitEmissionsIndicator>N</ghg:CogenerationUnitEmissionsIndicator>
      <ghg:PrimaryNAICSCode>325120</ghg:PrimaryNAICSCode>
      <ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric
Tons">108091</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
      <ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric
Tons">150</ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ>
      <ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">0</ghg:TotalCO2eSupplierSubpartsKKtoPP>
      <ghg:SubPartInformation>
            <ghg:SubPartP>
              <ghg:GHGasInfoDetails>
                    <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
                    <ghg:GHGasQuantity massUOM="Metric Tons">
                            <ghg:CalculatedValue>150</ghg:CalculatedValue>
                    </ghg:GHGasQuantity>
              </ghg:GHGasInfoDetails>
              <ghg:GHGasInfoDetails>
                    <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
                    <ghg:GHGasQuantity massUOM="Metric Tons">
                            <ghg:CalculatedValue>102350</ghg:CalculatedValue>
                    </ghg:GHGasQuantity>
              </ghg:GHGasInfoDetails>
              <ghg:QuantityOfNonCarbonCO2CollectedTransferred massUOM="Kilograms">
                    <ghg:MeasureValue>10000</ghg:MeasureValue>
              </ghg:QuantityOfNonCarbonCO2CollectedTransferred>
              <ghg:CEMSHydrogenUnitDetails>
                    <ghg:UnitIdentification>
                            <ghg:UnitName>002- CEMS</ghg:UnitName>
                            <ghg:UnitDescription>CEMS unit</ghg:UnitDescription>
                            <ghg:UnitType>Hydrogen production process unit</ghg:UnitType>
                    </ghg:UnitIdentification>
                    <ghg:CEMSAnnualQuantityofHydrogenProduced massUOM="Metric Tons">
                            <ghg:MeasureValue>3300</ghg:MeasureValue>
                    </ghg:CEMSAnnualQuantityofHydrogenProduced>
                    <ghg:CEMSAnnualQuantityofAmmoniaProduced massUOM="Metric Tons">
                            <ghg:MeasureValue>4400</ghg:MeasureValue>
                    </ghg:CEMSAnnualQuantityofAmmoniaProduced>
              </ghg:CEMSHydrogenUnitDetails>
              <ghg:Tier4CEMSDetails>
                    <ghg:CEMSMonitoringLocation>
                            <ghg:Name>003- CML</ghg:Name>
                            <ghg:Description>CML</ghg:Description>
                            <ghg:Type>Single process/process unit exhausts to dedicated
                            stack</ghg:Type>
                    </ghg:CEMSMonitoringLocation>
                    <ghg:CO2EmissionsAllBiomassFuelsCombined massUOM="Metric Tons">
                            <ghg:CalculatedValue>150</ghg:CalculatedValue>
                    </ghg:CO2EmissionsAllBiomassFuelsCombined>
                    <ghg:CO2EmissionsNonBiogenic massUOM="Metric Tons">
                            <ghg:CalculatedValue>140</ghg:CalculatedValue>
                    </ghg:CO2EmissionsNonBiogenic>
```

```xml
<ghg:AnnualCO2EmissionsMeasuredByCEMS massUOM="Metric Tons">
        <ghg:CalculatedValue>100000</ghg:CalculatedValue>
</ghg:AnnualCO2EmissionsMeasuredByCEMS>

<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>First Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>10000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>Second Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>20000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>Third Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>30000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:Tier4QuarterDetails>
        <ghg:QuarterName>Fourth Quarter</ghg:QuarterName>
        <ghg:CumulativeCO2MassEmissions massUOM="Metric Tons">
                <ghg:CalculatedValue>40000</ghg:CalculatedValue>
        </ghg:CumulativeCO2MassEmissions>
</ghg:Tier4QuarterDetails>
<ghg:TotalSourceOperatingHours>8400</ghg:TotalSourceOperatingHours>
<ghg:OperatingHoursDetails>
        <ghg:OperatingHoursCO2ConcentrationSubstituted>20</ghg:OperatingHoursCO2ConcentrationSubstituted>
        <ghg:OperatingHoursStackGasFlowRateSubstituted>30</ghg:OperatingHoursStackGasFlowRateSubstituted>
        <ghg:OperatingHoursStackGasMoistureContentSubstituted>40</ghg:OperatingHoursStackGasMoistureContentSubstituted>
</ghg:OperatingHoursDetails>
<ghg:TierMethodologyStartDate>2010-01-01</ghg:TierMethodologyStartDate>
<ghg:TierMethodologyEndDate>2010-12-31</ghg:TierMethodologyEndDate>
<ghg:SlipStreamIndicator>Y</ghg:SlipStreamIndicator>
<ghg:CEMSFuel>coal, coke, natural gas</ghg:CEMSFuel>
<ghg:ProcessUnitNames>
        <ghg:UnitName>002- CEMS</ghg:UnitName>
</ghg:ProcessUnitNames>
</ghg:Tier4CEMSDetails>
<ghg:NoCEMSHydrogenUnitDetails>
        <ghg:UnitIdentification>
                <ghg:UnitName>001- Non-CEMS</ghg:UnitName>
                <ghg:UnitDescription>Non-CEMS unit</ghg:UnitDescription>
                <ghg:UnitType>Hydrogen production process unit</ghg:UnitType>
        </ghg:UnitIdentification>
        <ghg:FuelFeedStockDetails>
                <ghg:FuelFeedStockName>Fuel A</ghg:FuelFeedStockName>
                <ghg:FuelFeedStockType>gaseous feedstock</ghg:FuelFeedStockType>
                <ghg:MonthlyHydrogen>
                        <ghg:MonthName>January</ghg:MonthName>
                        <ghg:ConsumptionFuelFeedStock>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        </ghg:ConsumptionFuelFeedStock>
                        <ghg:CarbonContentFuelFeedStock>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        </ghg:CarbonContentFuelFeedStock>
                        <ghg:MolecularWeightOfGaseousFuel>
                                <ghg:IsSubstitutedIndicator>Y</ghg:IsSubstitutedIndicator>
                        </ghg:MolecularWeightOfGaseousFuel>
                </ghg:MonthlyHydrogen>
                <ghg:MonthlyHydrogen>
                        <ghg:MonthName>February</ghg:MonthName>
                        <ghg:ConsumptionFuelFeedStock>
                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
                        </ghg:ConsumptionFuelFeedStock>
                        <ghg:CarbonContentFuelFeedStock>
                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
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                        <ghg:MolecularWeightOfGaseousFuel>
                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndicator>
                        </ghg:MolecularWeightOfGaseousFuel>
```

```
                                        </ghg:MolecularWeightOfGaseousFuel>
                                </ghg:MonthlyHydrogen>
                                <ghg:MonthlyHydrogen>
                                        <ghg:MonthName>March</ghg:MonthName>
                                        <ghg:ConsumptionFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:ConsumptionFuelFeedStock>
                                        <ghg:CarbonContentFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:CarbonContentFuelFeedStock>
                                        <ghg:MolecularWeightOfGaseousFuel>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:MolecularWeightOfGaseousFuel>
                                </ghg:MonthlyHydrogen>
                                <ghg:MonthlyHydrogen>
                                        <ghg:MonthName>April</ghg:MonthName>
                                        <ghg:ConsumptionFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:ConsumptionFuelFeedStock>
                                        <ghg:CarbonContentFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:CarbonContentFuelFeedStock>
                                        <ghg:MolecularWeightOfGaseousFuel>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:MolecularWeightOfGaseousFuel>
                                </ghg:MonthlyHydrogen>
                                <ghg:MonthlyHydrogen>
                                        <ghg:MonthName>May</ghg:MonthName>
                                        <ghg:ConsumptionFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:ConsumptionFuelFeedStock>
                                        <ghg:CarbonContentFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:CarbonContentFuelFeedStock>
                                        <ghg:MolecularWeightOfGaseousFuel>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:MolecularWeightOfGaseousFuel>
                                </ghg:MonthlyHydrogen>
                                <ghg:MonthlyHydrogen>
                                        <ghg:MonthName>June</ghg:MonthName>
                                        <ghg:ConsumptionFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:ConsumptionFuelFeedStock>
                                        <ghg:CarbonContentFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:CarbonContentFuelFeedStock>
                                        <ghg:MolecularWeightOfGaseousFuel>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:MolecularWeightOfGaseousFuel>
                                </ghg:MonthlyHydrogen>
                                <ghg:MonthlyHydrogen>
                                        <ghg:MonthName>July</ghg:MonthName>
                                        <ghg:ConsumptionFuelFeedStock>
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                                        ator>
                                        </ghg:ConsumptionFuelFeedStock>
                                        <ghg:CarbonContentFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:CarbonContentFuelFeedStock>
                                        <ghg:MolecularWeightOfGaseousFuel>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
                                        </ghg:MolecularWeightOfGaseousFuel>
                                </ghg:MonthlyHydrogen>
                                <ghg:MonthlyHydrogen>
                                        <ghg:MonthName>August</ghg:MonthName>
                                        <ghg:ConsumptionFuelFeedStock>
                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                        ator>
```

```
                                                        </ghg:ConsumptionFuelFeedStock>
                                                        <ghg:CarbonContentFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:CarbonContentFuelFeedStock>
                                                        <ghg:MolecularWeightOfGaseousFuel>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:MolecularWeightOfGaseousFuel>
                                        </ghg:MonthlyHydrogen>
                                        <ghg:MonthlyHydrogen>
                                                <ghg:MonthName>September</ghg:MonthName>
                                                        <ghg:ConsumptionFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:ConsumptionFuelFeedStock>
                                                        <ghg:CarbonContentFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:CarbonContentFuelFeedStock>
                                                        <ghg:MolecularWeightOfGaseousFuel>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:MolecularWeightOfGaseousFuel>
                                        </ghg:MonthlyHydrogen>
                                        <ghg:MonthlyHydrogen>
                                                <ghg:MonthName>October</ghg:MonthName>
                                                        <ghg:ConsumptionFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:ConsumptionFuelFeedStock>
                                                        <ghg:CarbonContentFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:CarbonContentFuelFeedStock>
                                                        <ghg:MolecularWeightOfGaseousFuel>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:MolecularWeightOfGaseousFuel>
                                        </ghg:MonthlyHydrogen>
                                        <ghg:MonthlyHydrogen>
                                                <ghg:MonthName>November</ghg:MonthName>
                                                        <ghg:ConsumptionFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:ConsumptionFuelFeedStock>
                                                        <ghg:CarbonContentFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:CarbonContentFuelFeedStock>
                                                        <ghg:MolecularWeightOfGaseousFuel>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:MolecularWeightOfGaseousFuel>
                                        </ghg:MonthlyHydrogen>
                                        <ghg:MonthlyHydrogen>
                                                <ghg:MonthName>December</ghg:MonthName>
                                                        <ghg:ConsumptionFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:ConsumptionFuelFeedStock>
                                                        <ghg:CarbonContentFuelFeedStock>
                                                                <ghg:IsSubstitutedIndicator>N</ghg:IsSubstitutedIndic
                                                ator>
                                                        </ghg:CarbonContentFuelFeedStock>
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