

# Greenhouse Gas Reporting Program

## XML Reporting Instructions for Subpart V – Nitric Acid Production

United States Environmental Protection Agency  
Climate Change Division  
Washington, DC

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

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

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## Table of Contents

	<u>Page</u>
<b>Introduction.....</b>	<b>1</b>
<b>1.0 Subpart V Total Emissions .....</b>	<b>6</b>
<b>2.0 Facility Level Details.....</b>	<b>7</b>
<b>3.0 Nitric Acid Train Unit Details.....</b>	<b>8</b>
<b>4.0 Facility Level Roll-up Emissions .....</b>	<b>15</b>
Appendix A.....	17
Appendix B: Sample XML Document for Subpart V.....	18

## List of Tables

	<b><u>Page</u></b>
Table 1 Greenhouse Gas Information Details XML Data Elements.....	6
Table 2 Facility Level Details XML Data Elements.....	7
Table 3 Nitric Acid Train Unit Details XML Data Elements .....	9
Table 4 Administrator-Approved Alternative Method Details XML Data Elements .....	11
Table 5 Site-specific Emissions Factor Details XML Data Elements .....	13
Table 6 Facility Level Roll-up Emissions XML Data Elements .....	16

## List of Figures

	<u>Page</u>
Figure 1 Sample Calculated Value Schema Diagram .....	2
Figure 2 Sample Measured Value Schema Diagram .....	2
Figure 3 Subpart V Reporting Diagram .....	3
Figure 4 Subpart V Schema Diagram .....	5
Figure 5 Greenhouse Gas Information Details Schema Diagram .....	6
Figure 6 Sample XML Excerpt for Greenhouse Gas Information Details .....	6
Figure 7 Facility Level Details Schema Diagram .....	7
Figure 8 Sample XML Excerpt for Facility Level Details .....	7
Figure 9 Nitric Acid Train Unit Details Schema Diagram .....	8
Figure 10 Abatement Technology Details Schema Diagram .....	8
Figure 11 Sample XML Excerpt for Nitric Acid Train Unit Details .....	10
Figure 12 Administrator-Approved Alternative Method Details Schema Diagram .....	11
Figure 13 Sample XML Excerpt for Administrator-Approved Alternative Method Details .....	12
Figure 14 Site-specific Emissions Factor Details Schema Diagram .....	13
Figure 15 Sample XML Excerpt for Site-specific Emissions Factor Details .....	14
Figure 16 Facility Level Roll-up Emissions Schema Diagram .....	15
Figure 17 Sample XML Excerpt for Facility Level Roll-up Emissions .....	16

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## Introduction

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

The e-GGRT XML schema 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-ggrrt\\_xml.html](http://www.epa.gov/climatechange/emissions/e-ggrrt_xml.html). The zip file contains:

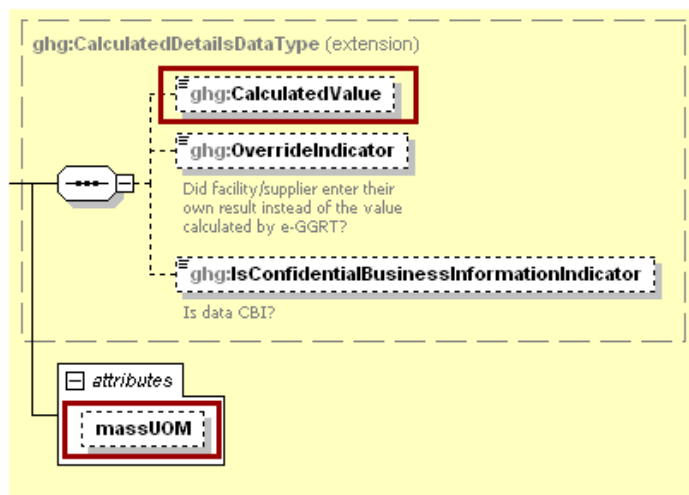
- **GHG\_Final.xsd and Included Files**
- **SchemaChanges.xlsx**

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

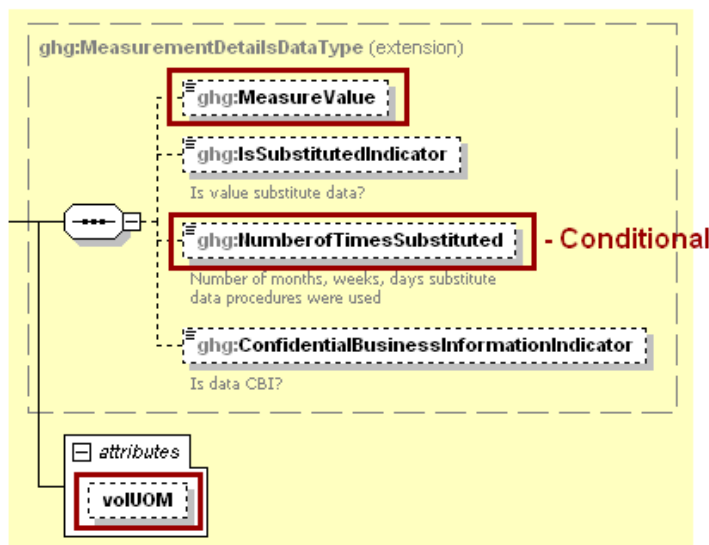
- **Not all data elements included in the schema must be reported.** Required or relevant data components and data elements are boxed in red in the schema diagrams and listed in the tables. If a data element is not listed, it does not need to be reported (e.g., deferred data elements, the data element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

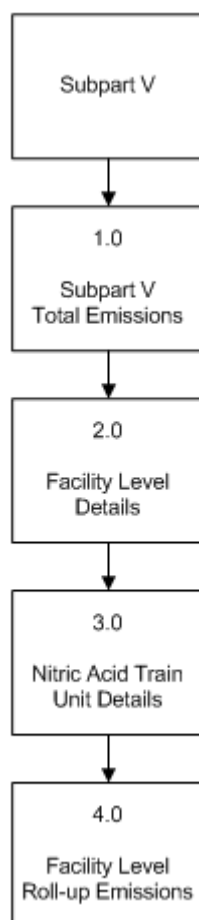


**Figure 2  
Sample Measured Value Schema Diagram**





**Figure 3**  
**Subpart V Reporting Diagram**



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

- 1.0 Subpart V Total Emissions: includes the total emissions of greenhouse gases required to be reported.
- 2.0 Facility Level Details: includes information on the annual nitric acid production and the number of nitric acid trains.
- 3.0 Nitric Acid Train Unit Details: includes information on the annual N<sub>2</sub>O emissions, nitric acid process type, abatement technology details, and N<sub>2</sub>O calculation method details for each nitric acid train unit.
- 4.0 Facility Level Roll-up Emissions: includes information on how to report total emissions for CO<sub>2</sub>e (excluding biogenic CO<sub>2</sub>).

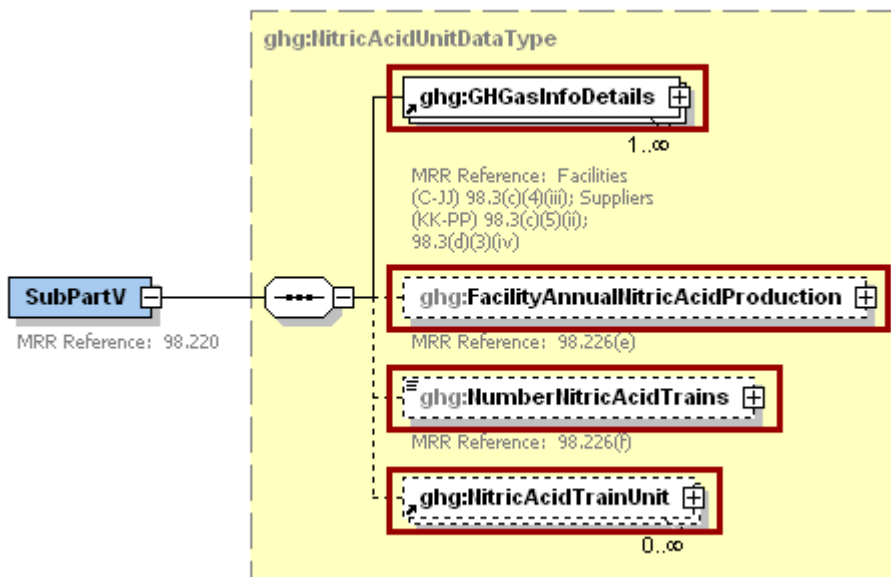
The following terminology is used throughout this document:

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

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

- 1) CO<sub>2</sub>e and CO<sub>2</sub> emissions data expressed in metric tons should be rounded to one decimal place. This should be done regardless of the level of data collection (e.g., unit-level, facility-level). Quantities less than 0.05 metric tons would round to 0.0 and be reported as such. Quantities greater than or equal to 0.05 metric tons would round up to 0.1 and be reported as such.
- 2) CH<sub>4</sub> emissions data expressed in metric tons should be rounded to two decimal places.
- 3) N<sub>2</sub>O emissions data expressed in metric tons should be rounded to three decimal places.
- 4) Emissions data for all GHGs other than CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> expressed in metric tons should be rounded to the fourth digit to the right of the decimal (one tenth of a kilogram, or 1 ten thousandth of a metric ton). This rounding should be applied regardless of the level of data collection (unit, facility, etc.).
- 5) Other (non-emissions) quantitative data reported by the user (e.g., a monthly HHV sample result, an annual production quantity) will not need to be rounded.
- 6) In the case of aggregation/roll-ups, those calculations should be performed on the rounded values.

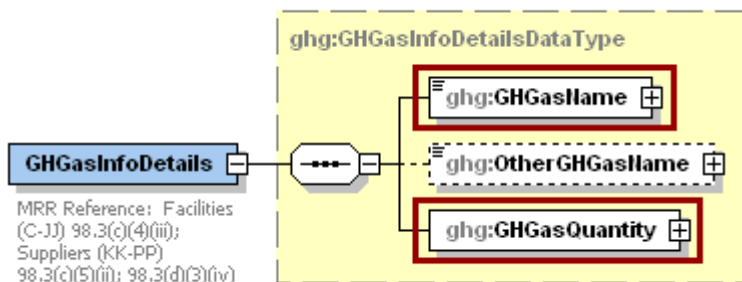
**Figure 4**  
**Subpart V Schema Diagram**



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

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



For Subpart V, report the total annual nitrous oxide (N<sub>2</sub>O) mass emissions from all nitric acid trains in metric tons rounded to three decimal places.

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

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

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

```

<ghg:SubPartV>
  <ghg:GHGasInfoDetails>
    <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
    <ghg:GHGasQuantity massUOM="Metric Tons">
      <ghg:CalculatedValue>1333.332</ghg:CalculatedValue>
    </ghg:GHGasQuantity>
  </ghg:GHGasInfoDetails>
  
```

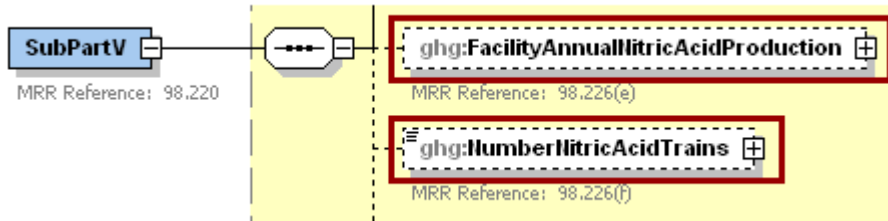
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

## 2.0 Facility Level Details

Subpart V requires that the facility report the following:

- The facility’s total annual nitric acid production in short tons [98.226(e)].
- The total number of nitric acid trains [98.226(f)].

**Figure 7  
Facility Level Details Schema Diagram**



**Table 2  
Facility Level Details XML Data Elements**

Data Element Name	Description
FacilityAnnualNitricAcidProduction	A collection of data elements with information on the annual nitric acid production from the nitric acid facility (short tons, 100 percent acid basis). Report the measured value and mass unit of measure only.
FacilityAnnualNitricAcidProduction.massUOM	Short Tons
NumberNitricAcidTrains	The total number of nitric acid trains.

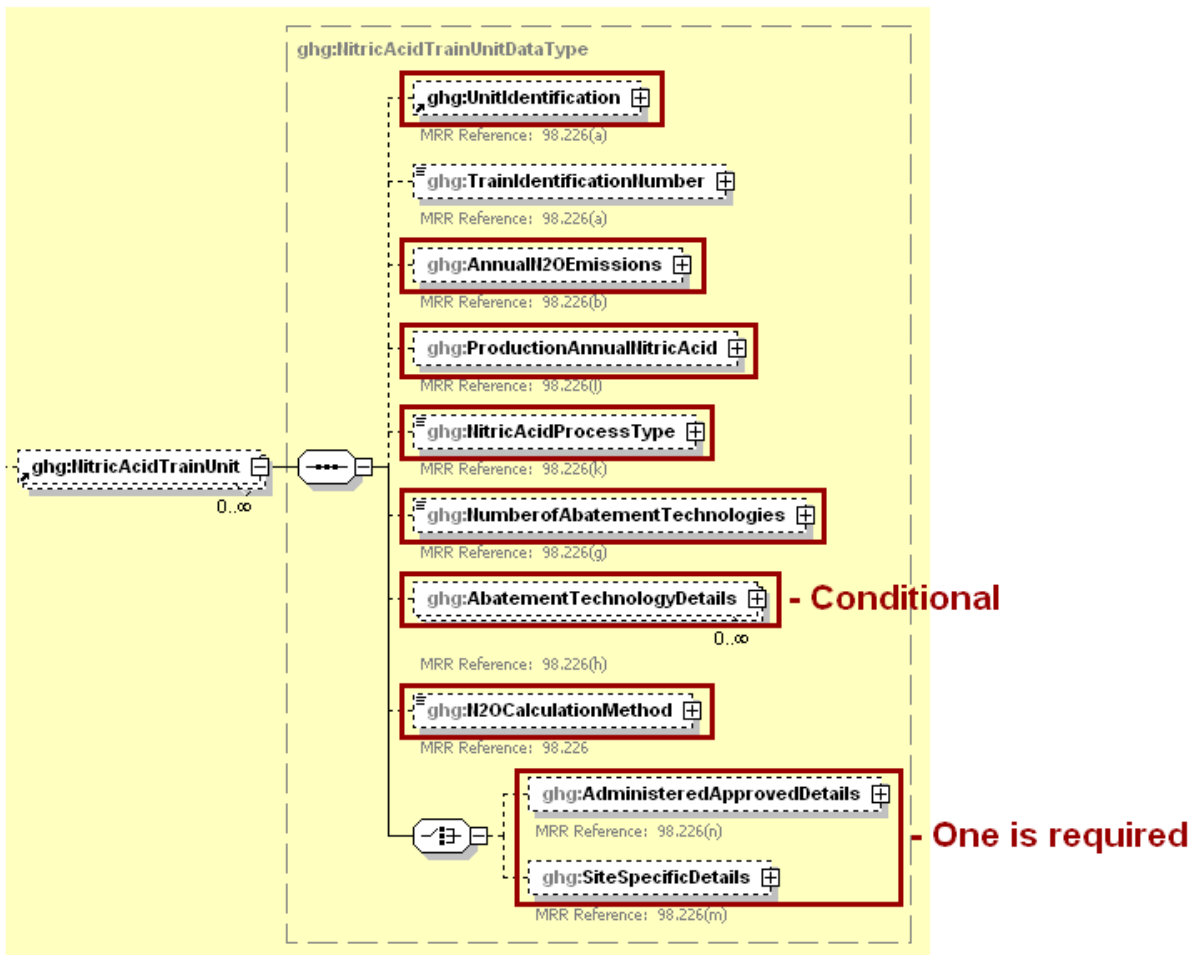
**Figure 8  
Sample XML Excerpt for Facility Level Details**

```
<ghg:FacilityAnnualNitricAcidProduction massUOM="Short Tons">
  <ghg:MeasureValue>55555</ghg:MeasureValue>
</ghg:FacilityAnnualNitricAcidProduction>
<ghg:NumberNitricAcidTrains>2</ghg:NumberNitricAcidTrains>
```

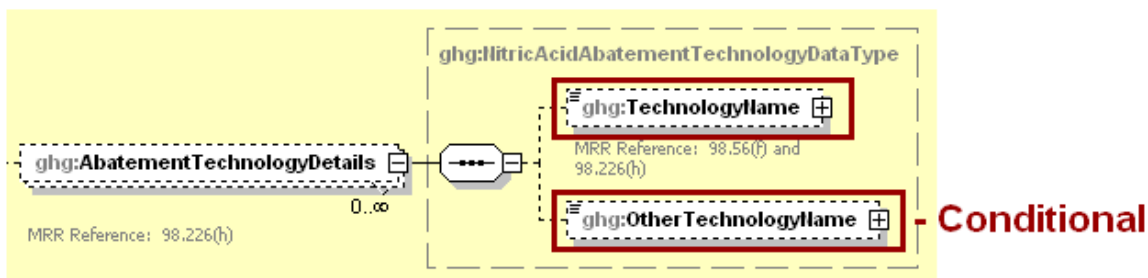
Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas emissions data.

### 3.0 Nitric Acid Train Unit Details

**Figure 9**  
Nitric Acid Train Unit Details Schema Diagram



**Figure 10**  
Abatement Technology Details Schema Diagram



For each nitric acid train, the facility must provide the following:

- A unique identifier for each nitric acid train, an optional description and the unit type: “Nitric acid train” [98.226(a)].
- The total annual N<sub>2</sub>O emissions [98.226(b)].

- The number of months a missing data procedure was used to determine a monthly quantity of nitric acid production used in the determination of the annual nitric acid production quantity [98.226(l)].
- The type of nitric acid process used by the train from the following list [98.226(k)]:
  - low pressure (<100 kilopascal)
  - medium pressure (400-800 kilopascal)
  - high pressure (800-1400 kilopascal)
  - dual pressure
- The total number of different abatement technologies used [98.226(g)].
- For each nitric acid train which exhausts to an N<sub>2</sub>O abatement technology after the test point, each abatement technology type used from the following list [98.226(h)]:
  - nonselective catalytic reduction (NSCR)
  - other
- An indication if N<sub>2</sub>O emissions were estimated using an Administrator-approved alternative method or site-specific emission factor method.

**Table 3**  
**Nitric Acid Train Unit Details XML Data Elements**

Data Element Name	Description
NitricAcidTrainUnit	A collection of data elements containing details about each nitric acid train unit.
UnitIdentification	A collection of data elements containing the identity of the each nitric acid train unit. It includes a unique unit name, an optional description of the unit, and the unit type: "Nitric acid train"
AnnualN2OEmissions	A collection of data elements containing information on the annual process N <sub>2</sub> O emissions from the specified nitric acid train. Report the measured value only.
AnnualN2OEmissions.massUOM	Metric Tons
ProductionAnnualNitricAcid	A collection of data elements containing information on annual nitric acid production. Report the number of months in the reporting year that missing data procedures were followed to measure nitric acid production for the specified nitric acid train and mass unit of measure only.  Note: The measured value for annual nitric acid production is not required to be reported until March 31, 2015, however the UOM attribute is required by the schema design. If you do not report a UOM value, then your XML submission file will be ill-formed and will not validate.
ProductionAnnualNitricAcid.massUOM	Short Tons

Data Element Name	Description
NitricAcidProcessType	The type of nitric acid process used by the specified nitric acid train. See list of allowable values:  low pressure (&lt;100 kilopascal) medium pressure (400-800 kilopascal) high pressure (800-1400 kilopascal) dual pressure
NumberofAbatementTechnologies	The number of different N <sub>2</sub> O abatement technologies used for the specified nitric acid train.
AbatementTechnologyDetails	A collection of data elements containing details about each abatement technology used for the specified nitric acid train, if applicable.
TechnologyName	The name of an abatement technology type used for the specified nitric acid train. See list of allowable values:  nonselective catalytic reduction (NSCR) other
OtherTechnologyName	The name of the abatement technology type used for the specified nitric acid train if not found in the list of allowable abatement technology types.
N2OCalculationMethod	The type of method used by the facility to calculate N <sub>2</sub> O emissions for the specified nitric acid train. See list of allowable values:  Administrator approved alternative method Site-specific emission factor method

**Figure 11**  
**Sample XML Excerpt for Nitric Acid Train Unit Details**

```

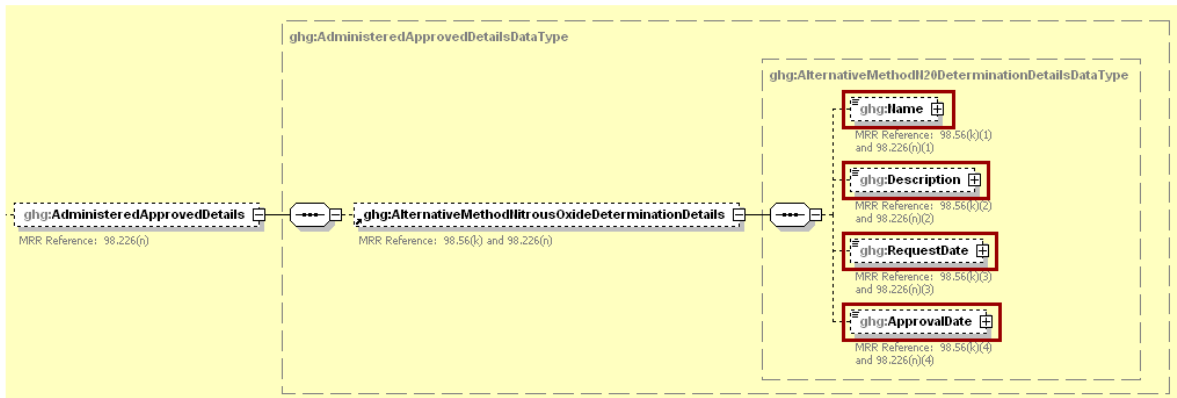
<ghg:NitricAcidTrainUnit>
  <ghg:UnitIdentification>
    <ghg:UnitName>001</ghg:UnitName>
    <ghg:UnitDescription>Admin-Approved-001</ghg:UnitDescription>
    <ghg:UnitType>Nitric acid train</ghg:UnitType>
  </ghg:UnitIdentification>
  <ghg:AnnualN2OEmissions massUOM="Metric Tons">
    <ghg:MeasureValue>444.444</ghg:MeasureValue>
  </ghg:AnnualN2OEmissions>
  <ghg:ProductionAnnualNitricAcid massUOM="Short Tons">
    <ghg:NumberofTimesSubstituted>3</ghg:NumberofTimesSubstituted>
  </ghg:ProductionAnnualNitricAcid>
  <ghg:NitricAcidProcessType>low pressure (&lt;100 kilopascal)</ghg:NitricAcidProcessType>
  <ghg:NumberofAbatementTechnologies>2</ghg:NumberofAbatementTechnologies>
  <ghg:AbatementTechnologyDetails>
    <ghg:TechnologyName>nonselective catalytic reduction (NSCR)</ghg:TechnologyName>
  </ghg:AbatementTechnologyDetails>
  <ghg:AbatementTechnologyDetails>
    <ghg:TechnologyName>selective catalytic reduction (SCR)</ghg:TechnologyName>
  </ghg:AbatementTechnologyDetails>
  <ghg:N2OCalculationMethod>Administrator approved alternative method</ghg:N2OCalculationMethod>

```

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



**Figure 12**  
**Administrator-Approved Alternative Method Details Schema Diagram**



For each nitric acid train for which N<sub>2</sub>O emissions were estimated using an Administrator-approved alternative method, provide the following:

- The name of the alternate method [98.226(n)(1)].
- A description of the alternate method [98.226(n)(2)].
- The request date [98.226(n)(3)].
- The approval date [98.226(n)(4)].

**Table 4**  
**Administrator-Approved Alternative Method Details XML Data Elements**

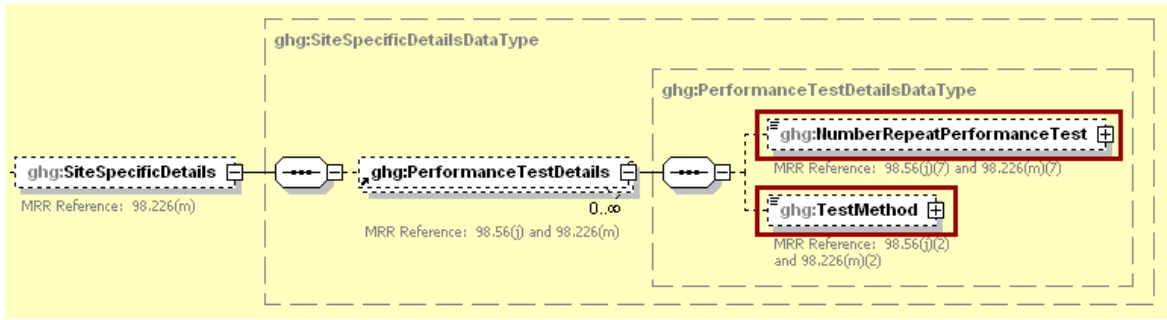
Data Element Name	Description
AdministeredApprovedDetails	A collection of data elements containing details about the administrator-approved alternative method. Report if you requested Administrator approval for an alternative method of determining N <sub>2</sub> O emissions under §98.223(a)(2) and reported "Administrator approved alternative method" for N <sub>2</sub> O Calculation Method.
AlternativeMethodNitrousOxideDeterminationDetails	A collection of data elements containing details about the administrator-approved alternative method used by the facility to estimate N <sub>2</sub> O emissions for the specified nitric acid train.
Name	The name of the alternate method.
Description	A description of the alternate method.
RequestDate	The date the facility requested administrator approval for the alternative method of determining N <sub>2</sub> O concentration (YYYY-MM-DD).
ApprovalDate	The date that the approval to use the alternate method was granted (YYYY-MM-DD).

**Figure 13**  
**Sample XML Excerpt for Administrator-Approved Alternative Method Details**

```
<ghg:AdministeredApprovedDetails>
  <ghg:AlternativeMethodNitrousOxideDeterminationDetails>
    <ghg:Name>Alternate Method A</ghg:Name>
    <ghg:Description>descriptionof Alternate Method A</ghg:Description>
    <ghg:RequestDate>2011-02-02</ghg:RequestDate>
    <ghg:ApprovalDate>2011-02-03</ghg:ApprovalDate>
  </ghg:AlternativeMethodNitrousOxideDeterminationDetails>
</ghg:AdministeredApprovedDetails>
```

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

**Figure 14**  
**Site-specific Emissions Factor Details Schema Diagram**



For each nitric acid train for which a performance test was conducted and a site-specific emissions factor was calculated according to §98.223(a)(1), provide the following information:

- The number of times in the reporting year that a performance test had to be repeated [98.226(m)(7)].
- For each performance test, provide the test method used for the performance test from the following list [98.226(m)(2)]:
  - ASTM D6348-03
  - EPA Method 320

**Table 5**  
**Site-specific Emissions Factor Details XML Data Elements**

Data Element Name	Description
SiteSpecificDetails	A collection of data elements containing details about the calculation of a site-specific emissions factor. Report if you conducted a performance test and calculated a site-specific emissions factor according to §98.223(a)(1) and reported "Site-specific emission factor method" for N2OCalculationMethod.
PerformanceTestDetails	A collection of data elements containing details about each performance test conducted.
NumberRepeatPerformanceTest	The number of times in the reporting year that a specific performance test had to be repeated.
TestMethod	The specific test method used. See list of allowable values:  ASTM D6348-03 EPA Method 320

**Figure 15**  
**Sample XML Excerpt for Site-specific Emissions Factor Details**

```
<ghg:SiteSpecificDetails>
  <ghg:PerformanceTestDetails>
    <ghg:NumberRepeatPerformanceTest>16</ghg:NumberRepeatPerformanceTest>
    <ghg:TestMethod>ASTM D6348-03</ghg:TestMethod>
  </ghg:PerformanceTestDetails>
  <ghg:PerformanceTestDetails>
    <ghg:NumberRepeatPerformanceTest>6</ghg:NumberRepeatPerformanceTest>
    <ghg:TestMethod>EPA Method 320</ghg:TestMethod>
  </ghg:PerformanceTestDetails>
</ghg:SiteSpecificDetails>
</ghg:NitricAcidTrainUnit>
```

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

### 4.0 Facility Level Roll-up Emissions

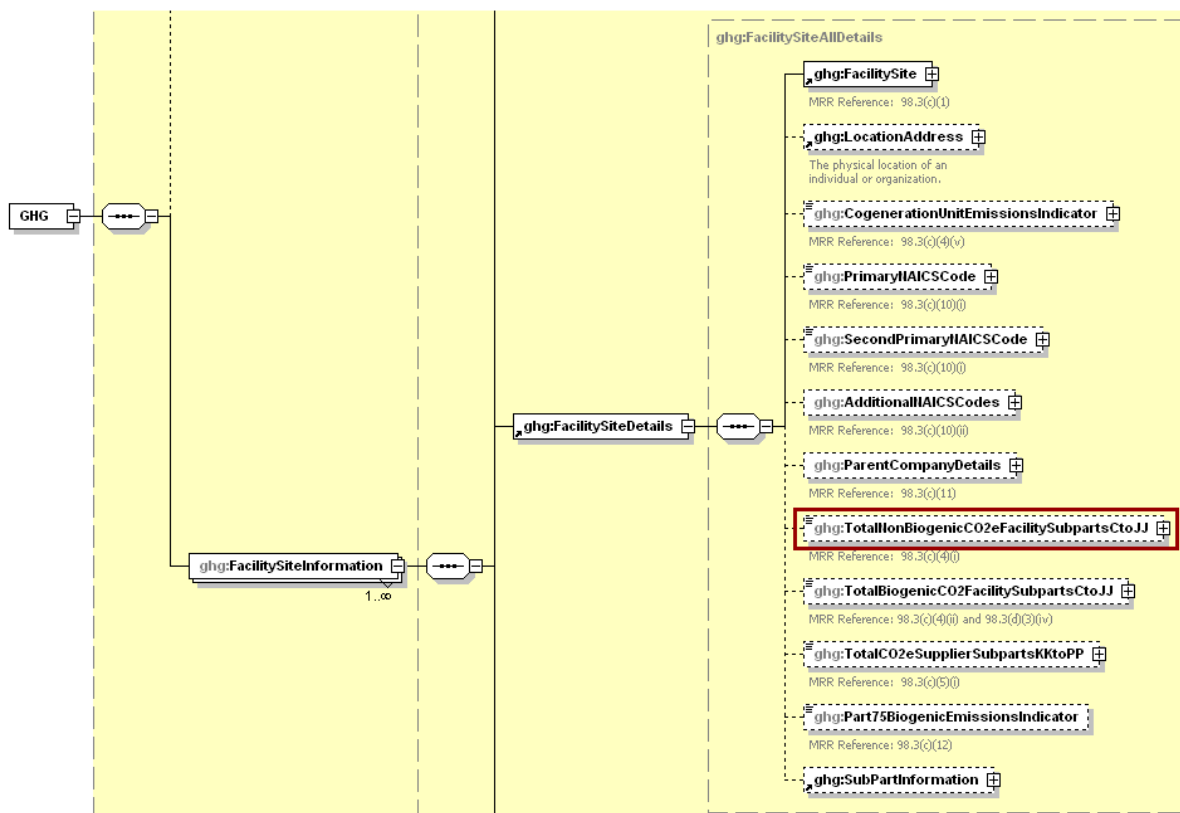
Each facility must report the following facility-level emission totals:

- Total CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions (excluding biogenic CO<sub>2</sub>) aggregated across all direct emitter source categories (subparts C-HH) associated with the facility.
- Total biogenic CO<sub>2</sub> emissions aggregated across all direct emitter source categories (subparts C-HH) associated with the facility.

Each supplier must report the following supplier totals:

- Total CO<sub>2</sub>e associated with products supplied aggregated across subparts NN, OO and PP (as applicable). Do not include subpart LL and MM totals in this data element as these values are not being collected in e-GGRT.

**Figure 16**  
**Facility Level Roll-up Emissions Schema Diagram**



For Subpart V, multiply the total annual N<sub>2</sub>O mass emissions (in metric tons rounded to three decimal places) by the Global Warming Potential for N<sub>2</sub>O (310) and add the resulting value rounded to one decimal place to the total CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions (excluding biogenic CO<sub>2</sub>) aggregated across all source categories subparts associated with the facility

**Table 6**  
**Facility Level Roll-up Emissions XML Data Elements**

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

**Figure 17**  
**Sample XML Excerpt for Facility Level Roll-up Emissions**

```

    <ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ massUOM="Metric
Tons">413332.9</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
    <ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">0</ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ>
    <ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">0</ghg:TotalCO2eSupplierSubpartsKKtoPP>
  
```

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

**Appendix A**

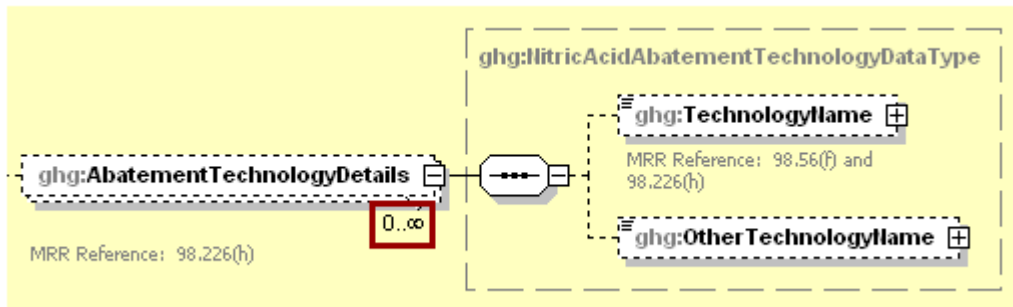
**Legend for Tables**

Blue = parent element

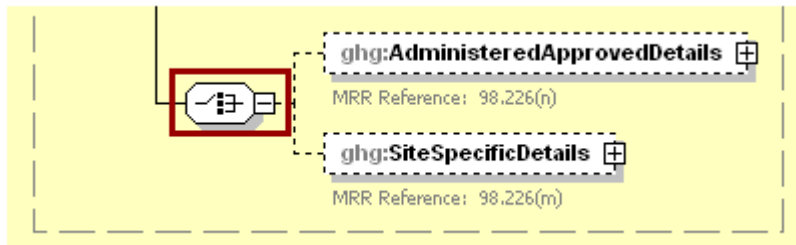
**Legend for XML Schema**

Red box = relevant for reporting

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



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



## Appendix B: Sample XML Document for Subpart V

(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>523937</ghg:FacilitySiteIdentifier>
        <ghg:FacilitySiteName>Test Facility 8</ghg:FacilitySiteName>
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