Greenhouse Gas Reporting Program

XML Reporting Instructions for Subpart NN – Suppliers of Natural Gas and Natural Gas Liquids

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

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Table of Contents

List of Tables

List of Figures

List of XML Excerpts

I.   Introduction

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

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

The schema's structure can be thought of as a family tree. The elements are related to each other in parent-child relationships. The root element is the parent element of the entire schema. Complex elements are children of the root element, and complex elements can also be children of other complex elements.

The XML upload method may be used for reporting a facility or supplier's annual greenhouse gas (GHG) data; however, the following actions can only be performed using the e-GGRT web forms:
- User, facility and supplier registration
- Certificate of Representation and Notice of Delegation signing
- Facility representative and agent changes
- Facility and supplier address changes
- Notice of intent to not submit an annual GHG report

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

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

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

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

- **Schema zip file with the master GHG_Final_v*N.n*.xsd and supporting subpart and component xsd files for the current reporting year.**
- **Schema change log files and year to year comparison reports.**

Table 1
Reporting Numbers for Subpart NN

Number Format	Description
Rounding	• CO_2e and CO_2 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. • 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, <TotalCH4CombustionEmissions massUOM="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 are hierarchy. The top of the XML tree is considered the root – it is the parent to all data elements within the schema. In the example below, "GHG_Unit_Details" is the root, and just like in many other family trees, there is more than one item with the same name (e.g., "Unit_ID"). The easiest way to distinguish these items is by referencing them in terms of their parent-child relationships, e.g., NoCEMS /Unit_ID vs. CEMS/Unit_ID.

Figure 1
Example of an XML Tree
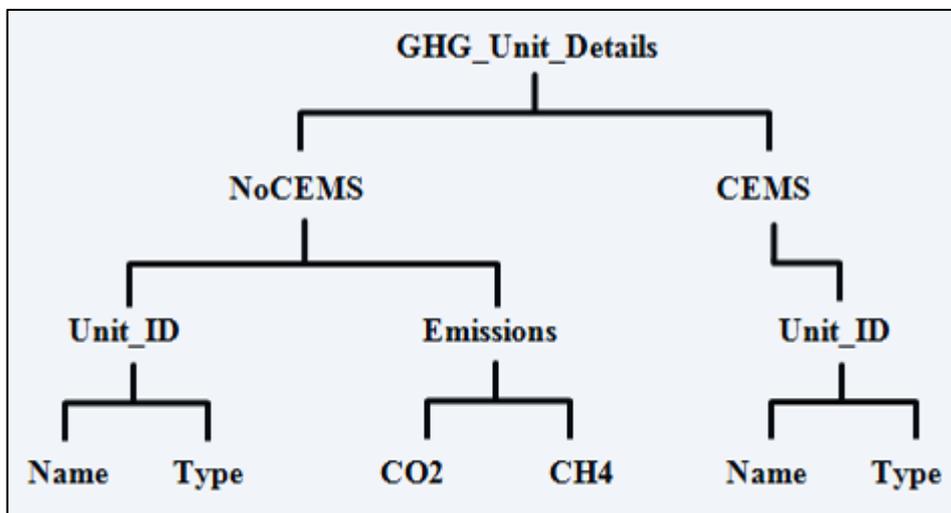
This document provides a step-by-step description of how to report emissions data using the XML schema. Please note the following:

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

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

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

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

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

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

  - Calculated Details
  - Measurement Details
  - Unit Identification Details

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

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

Figure 2
Calculated Details Data Type Schema Diagram
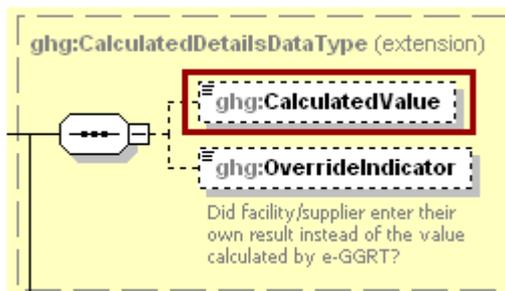
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

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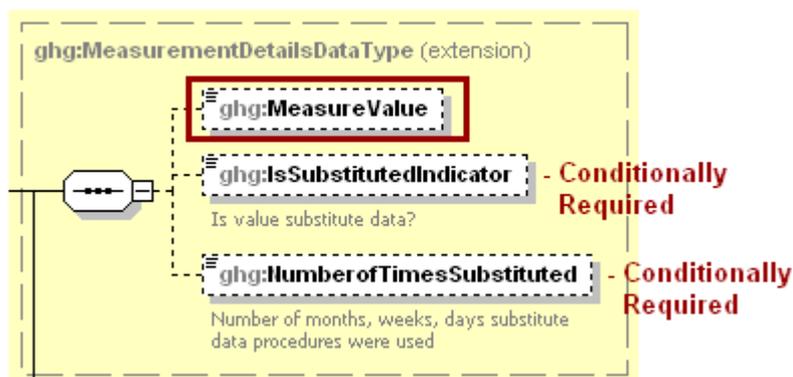
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

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
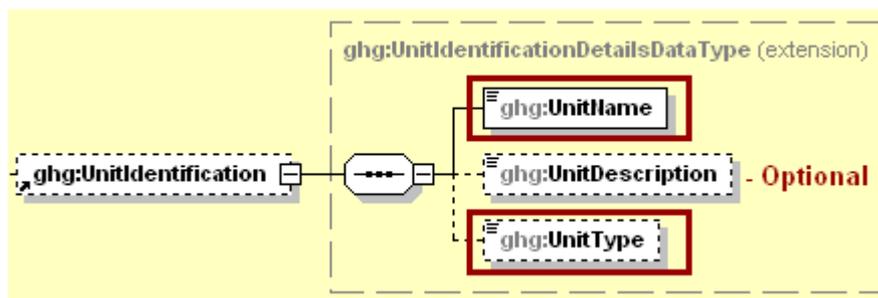
Note: Data elements boxed in red are required.

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
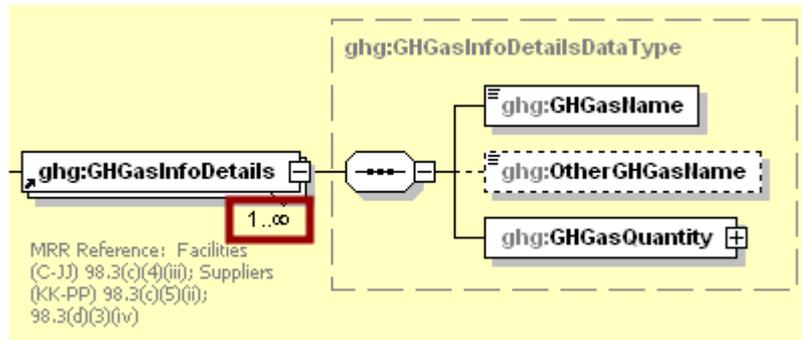
XML Excerpt 1
Example for "Unbounded" Parent Element

```xml
<ghg:GHGasInfoDetails>
        <ghg:GHGasName>Biogenic Carbon dioxide</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
                <ghg:CalculatedValue>600.1</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
        <ghg:GHGasName>Methane</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
                <ghg:CalculatedValue>280.23</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
        <ghg:GHGasName>Nitrous Oxide</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
                <ghg:CalculatedValue>19.456</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>
<ghg:GHGasInfoDetails>
        <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
        <ghg:GHGasQuantity massUOM="Metric Tons">
                <ghg:CalculatedValue>10800.7</ghg:CalculatedValue>
        </ghg:GHGasQuantity>
</ghg:GHGasInfoDetails>
```

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

Figure 6
Logical "Or" Symbol in Schema Diagram
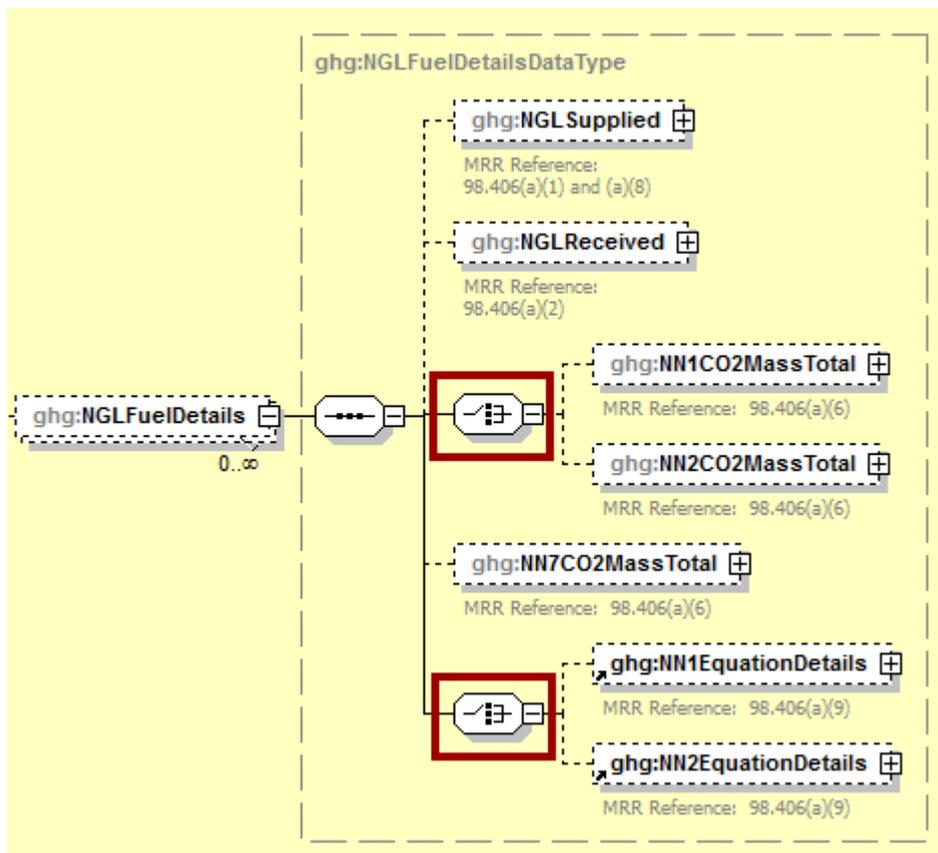
II.   Summary of Changes

Substantive changes to the Subpart NN XML schema and reporting guidelines for Reporting Year 2017 include:

- New data elements in the GHGasInfoDetails node (GHGasCASRegistryNumber, GHGasLinearChemicalFormula, OtherGHGasCASRegistryNumber, and OtherGHGaslinearChemicalFormula) now appear in the schema but are only applicable to gases other than Carbon Dioxide, Methane, Nitrous Oxide, and Biogenic Carbon Dioxide so they **should NOT be used in the reporting of Subpart NN** (see Section 1, Subpart NN Total Emissions).
- New data element addressing the state or territory covered by the LDC has been added to the LDCDetails node

Please note that example screen images and XML examples sourced from or labeled with a prior reporting year are accurate for Reporting Year 2017.

III.   Subpart NN Overview

This document provides a step-by-step description of how to report data for Subpart NN Suppliers of Natural Gas and Natural Gas Liquids and overall total Subpart NN GHG data for a facility using the XML schema.

Figure 7
Subpart NN Reporting Diagram
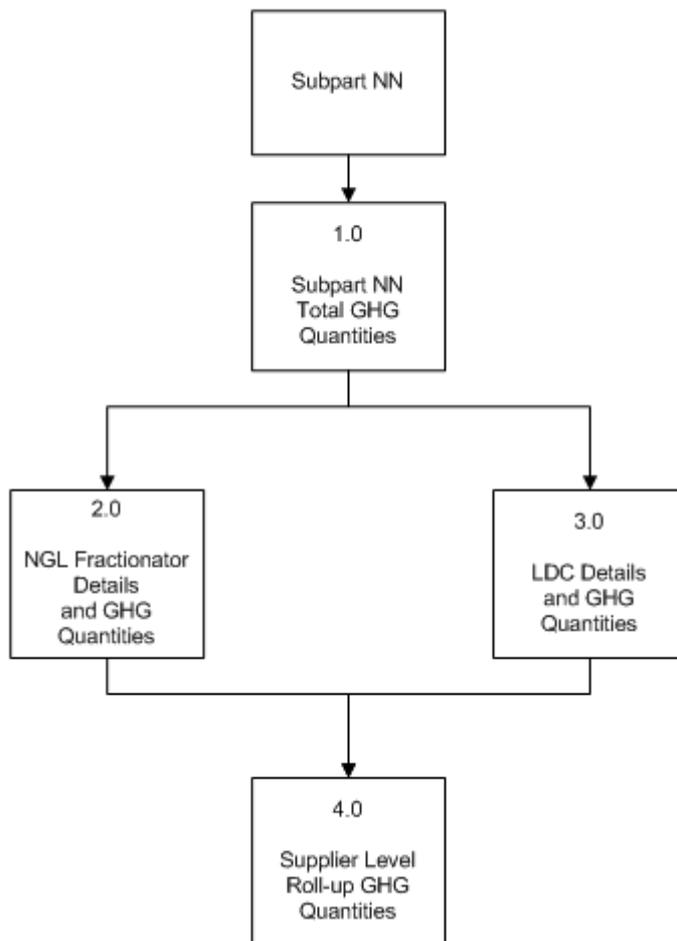
The XML schema includes the following areas for reporting for Subpart NN, as displayed in the reporting diagram:

1.0   Subpart NN Total GHG Quantities: includes the total quantity of carbon dioxide.

2.0   NGL Fractionator Details and GHG Quantities: includes information to report if the supplier is a fractionator of natural gas liquids.

3.0   LDC Details and GHG Quantities: includes information to report if the supplier is a natural gas local distribution company that delivers 460,000 Mscf or more of natural gas annually.

4.0   Supplier Level Roll-up GHG Quantities: includes information on how to add GHG quantity data to supplier level totals.

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

Figure 8
Subpart NN Schema Diagram
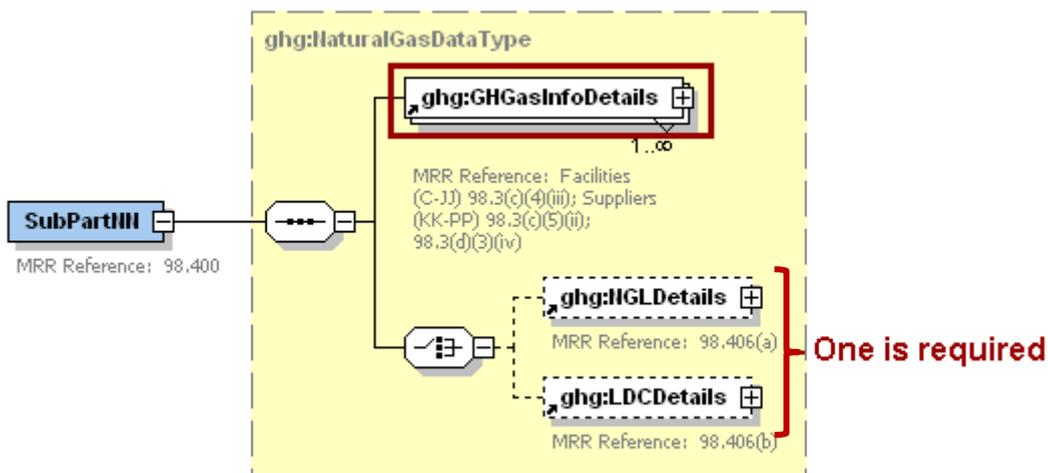
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

1.0   Subpart NN Total GHG Quantity

Greenhouse gas information details comprise a collection of data elements to report the total annual GHG quantity of each greenhouse gas (GHG) listed in Table A-1 of 40 CFR 98 Mandatory Reporting of Greenhouse Gases reported under Subpart NN, expressed in metric tons.

Figure 9
Greenhouse Gas Information Details Schema Diagram
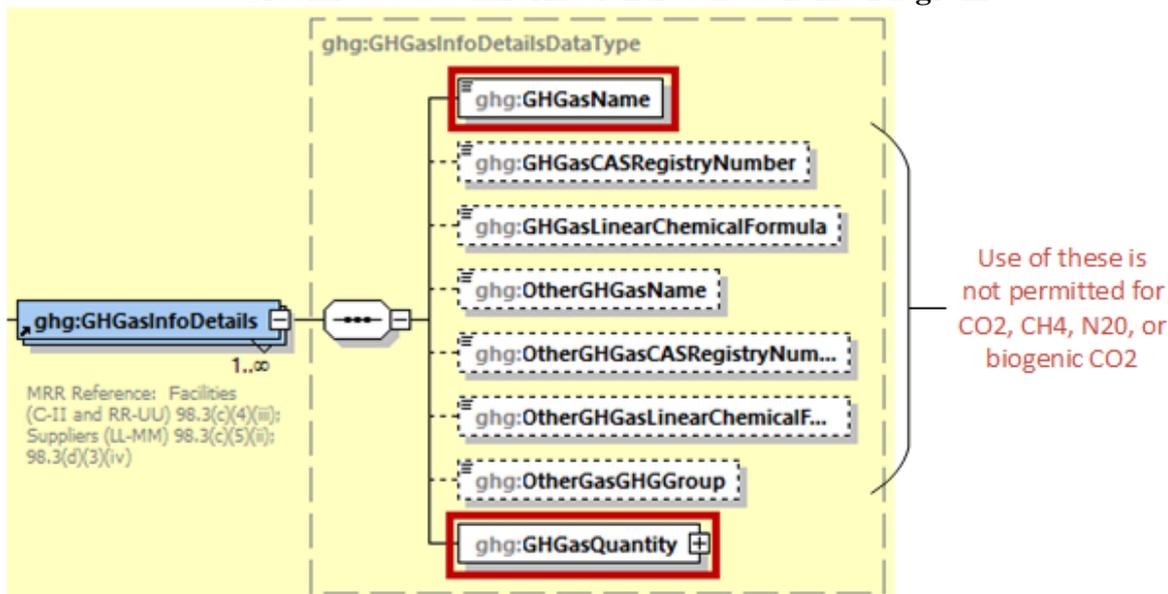
Note: Data elements boxed in red are required.

For Subpart NN, report the gas name and quantity for carbon dioxide (CO2); do not report the CAS Registry Number, Linear Chemical Formula, or the other gas data elements for CO2. For greenhouse gas quantity, report the total GHG quantity for carbon dioxide (CO_2) using the following guidelines:

1. If the supplier is a fractionator of natural gas liquids (NGL), use the potential CO_2 quantity associated with all products delivered to customers (sum of Equation NN-8 across each fractionated NGL product) in metric tons.

    This value is calculated by summing the rounded results of Equations NN-1 and NN-2 across each fractionated NGL product – ethane, propane, butane, isobutane and pentanes plus – (the potential CO_2 quantity associated with product supplied in metric tons) and subtracting the rounded result of Equation NN-7 across each fractionated NGL product (the potential CO_2 quantity associated with product received from other fractionators in metric tons).

2. If the supplier is a natural gas local distribution company (LDC), use the potential CO_2 quantity associated with the combustion or oxidation of natural gas supplied to end-users that receive less than 460,000 Mscf per year (Equation NN-6) in metric tons.

    For RY2013 onwards, this value is calculated by subtracting the rounded results of Equation NN-3 (potential CO_2 quantity associated with natural gas delivered to downstream transmission pipelines or other LDCs in metric tons), Equation NN-4 (potential CO_2 quantity associated with natural gas delivered to end users that receive a supply greater than or equal to 460,000 Mscf per year in metric tons) and Equation NN-5a (potential CO_2 quantity associated with the net quantity of natural gas that is liquefied and/or stored/removed from storage by the LDC within the reporting year in metric tons) from the rounded result of the sum of Equation

NN-1 or NN-2 (potential CO_2 quantity associated with natural gas received at the city gate(s) in metric tons) and Equation NN-5b (potential CO_2 quantity associated with natural gas received that bypassed the city gate(s) such as natural gas received from local production.

For RY2010-2012, this value is calculated by subtracting the rounded results of Equation NN-3 (potential CO_2 quantity associated with natural gas delivered to downstream transmission pipelines or other LDCs in metric tons), Equation NN-4 (potential CO_2 quantity associated with natural gas delivered to end users that receive a supply greater than or equal to 460,000 Mscf per year in metric tons) and Equation NN-5 (potential CO_2 quantities associated with product received that bypassed the city gate(s) such as natural gas received from local production and the net quantity of natural gas that is liquefied and/or stored/removed from storage by the LDC within the reporting year in metric tons) from the rounded result of Equation NN-1 or NN-2 (potential CO_2 quantity associated with natural gas received at the city gate(s) in metric tons).

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

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

Table 5
Greenhouse Gas Information Details Data Element Definitions

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

XML Excerpt 2
Example for Greenhouse Gas Information Details

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

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

? *Is the supplier a natural gas liquids (NGL) fractionator or a local distribution company (LDC)?*

If the supplier is a NGL fractionator, see Section 2.0 for instructions on how to report.

If the supplier is an LDC, see Section 3.0 for instructions on how to report.

2.0　NGL Fractionator Details and GHG Quantities

This section contains the information that must be reported under Subpart NN for a supplier which is a natural gas liquids (NGL) fractionator.

Figure 10
NGL Fractionator Details Schema Diagram
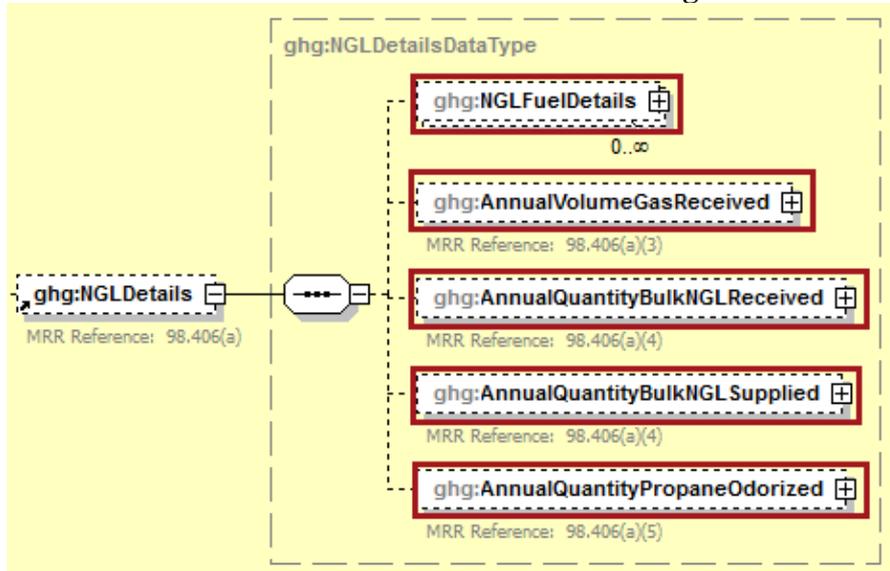
Note: Data elements boxed in red are required.

Figure 11
NGL Fuel Details Schema Diagram
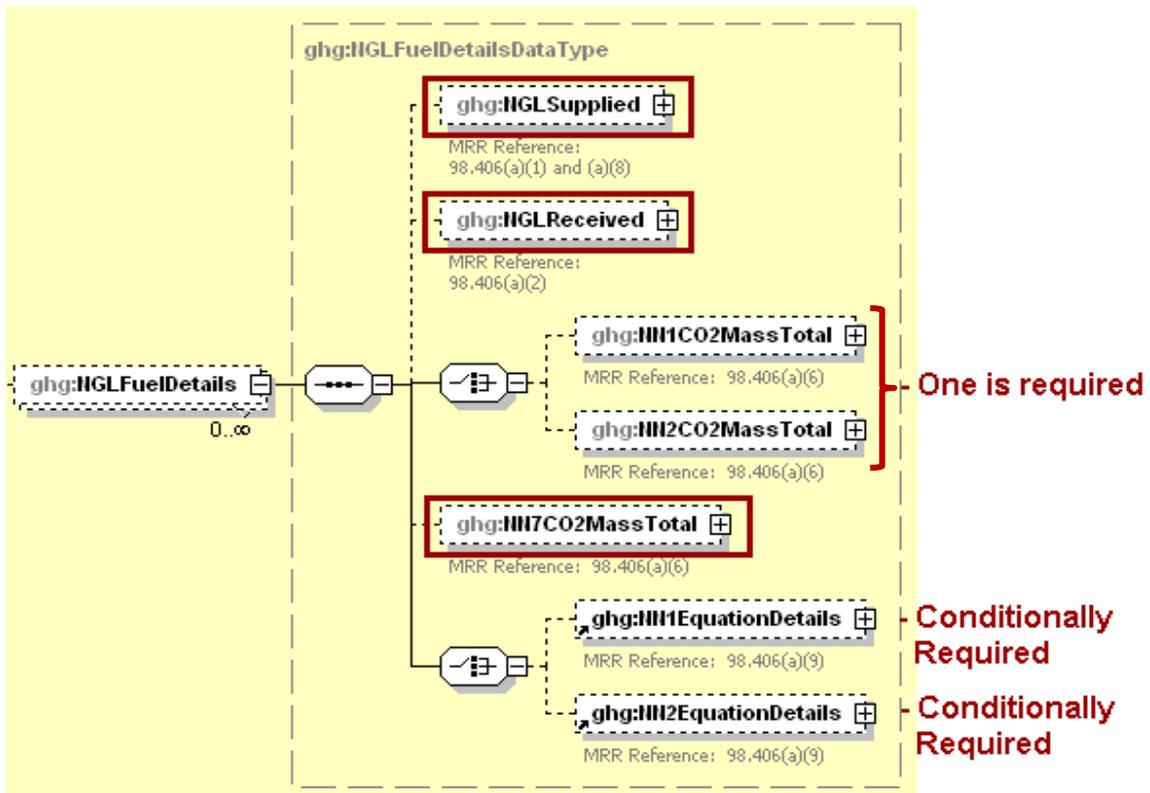
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

Note: Report data for each NGL product using separate instances of the parent element "NGLFuelDetails".

Each supplier that is a NGL fractionator must report the annual quantity (barrels) of each of the following NGL products, **if supplied** to downstream facilities during the reporting year [98.406(a)(1)]:

- ethane
- propane
- normal butane
- isobutane
- pentanes plus

Click this link to view definitions of these products.

For each quantity of NGL required for reporting under this Subpart, the supplier must report the number of days in the reporting year for which substitute data procedures were used to measure those quantities [98.406(c)(1)].

Also, the industry standard(s) used to measure each applicable NGL product supplied must be reported [98.406(a)(8)].

Figure 12
NGL Supplied Schema Diagram
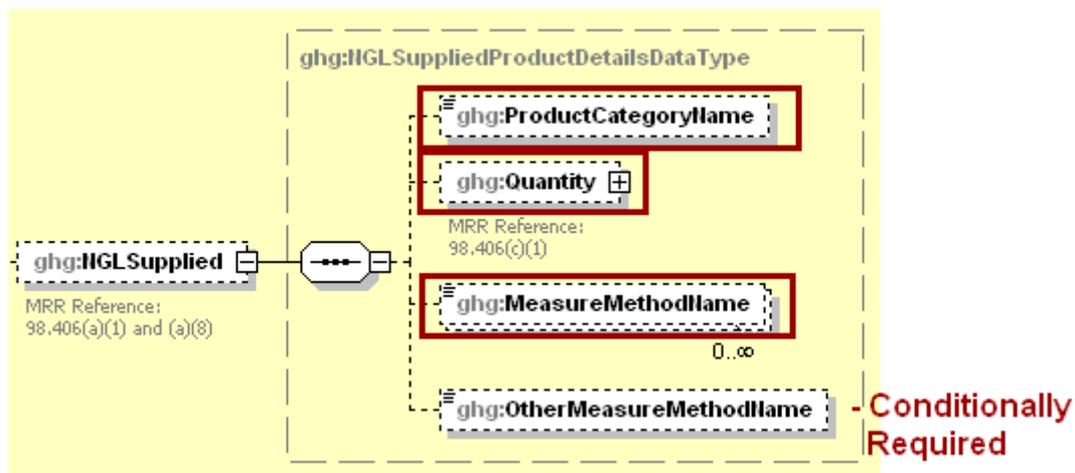
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

Table 6
NGL Supplied Data Element Definitions

Data Element Name	Description
NGLDetails	**Parent Element (Conditionally Required):** A collection of data elements to report only if the supplier is a fractionator of natural gas liquids. Otherwise do not report these elements.
NGLFuelDetails	**Parent Element:** A collection of data elements containing information on fuels supplied and received and the GHG quantities associated with them. Report each fuel separately.
NGLSupplied	**Parent Element:** A collection of data elements containing information on fuels supplied.

ProductCategoryName	Specify each applicable NGL product supplied to downstream facilities. See list of allowable values:
	
	  Ethane
	  Propane
	  Butane
	  Isobutane
	  Pentanes Plus

Quantity	A collection of data elements containing information on the quantity of the specified NGL product supplied to downstream facilities. Report the value in the child data element **MeasureValue**. Set the units of measure to "bbl" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the annual quantity of the specified NGL product supplied to downstream facilities in the child data element **NumberofTimesSubstituted**.

MeasureMethodName	The industry standard(s) used to measure the quantity of the specified NGL product supplied to downstream facilities. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherMeasureMethodName" data element.
	
	  ASTM standard
	  ANSI standard
	  AGA standard
	  ASME standard
	  API standard
	  NAESB standard
	  Industry standard practices
	  Other

OtherMeasureMethodName	**Conditionally Required:** The industry standard(s) used to measure the quantity of the specified NGL product supplied to downstream facilities if not on the list above. A value for this data element is required if "Other" was reported for "MeasureMethodName". Otherwise do not report this data element.

XML Excerpt 3
Example for NGL Supplied

```
<ghg:NGLDetails>
        <ghg:NGLFuelDetails>
                <ghg:NGLSupplied>
                        <ghg:ProductCategoryName>Propane</ghg:ProductCategoryName>
                        <ghg:Quantity volUOM="bbl">
                                <ghg:MeasureValue>7777.345342</ghg:MeasureValue>
                                <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSbstituted>
                        </ghg:Quantity>
                        <ghg:MeasureMethodName>AGA standard</ghg:MeasureMethodName>
                        <ghg:MeasureMethodName>ASTM standard</ghg:MeasureMethodName>
                        <ghg:MeasureMethodName>NAESB standard</ghg:MeasureMethodName>
                        <ghg:MeasureMethodName>Other</ghg:MeasureMethodName>
                        <ghg:OtherMeasureMethodName>Standard ABC, Standard
                        XYZ</ghg:OtherMeasureMethodName>
                </ghg:NGLSupplied>
```

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

Each supplier that is a NGL fractionator must report the annual quantity of each of the following NGL products, **if received** from other NGL fractionators [98.406(a)(2)]:

- ethane
- propane
- normal butane
- isobutane
- pentanes plus

Note: Report data for the same product for "NGLReceived" as was used for "NGLSupplied" in the same instance of the parent element "NGLFuelDetails".

For each quantity of NGL required for reporting under this Subpart, the supplier must report the number of days in the reporting year for which substitute data procedures were used to develop those quantities [98.406(c)(1)].

Conditionally Required: If you developed a supplier-specific emission factor (EF) for use in Equation NN-7, Subpart NN requires you to report the following data:

- The developed EF [98.406(a)(9)(iii)].
- The number of days in the reporting year for which substitute data procedures were used to develop the EF [98.406(c)(3)].
- The industry standard(s) used to develop the EF [98.406(a)(9)(i)].

Note: Reporting is not required for "DevelopedEF7" if the default emission factor was used.

New for 2013 and subsequent years: The default emission factors for several natural gas liquids were updated for 2013. NGL fractionators should review the new default emission factors provided in table NN-2.

Figure 13
NGL Received Schema Diagram
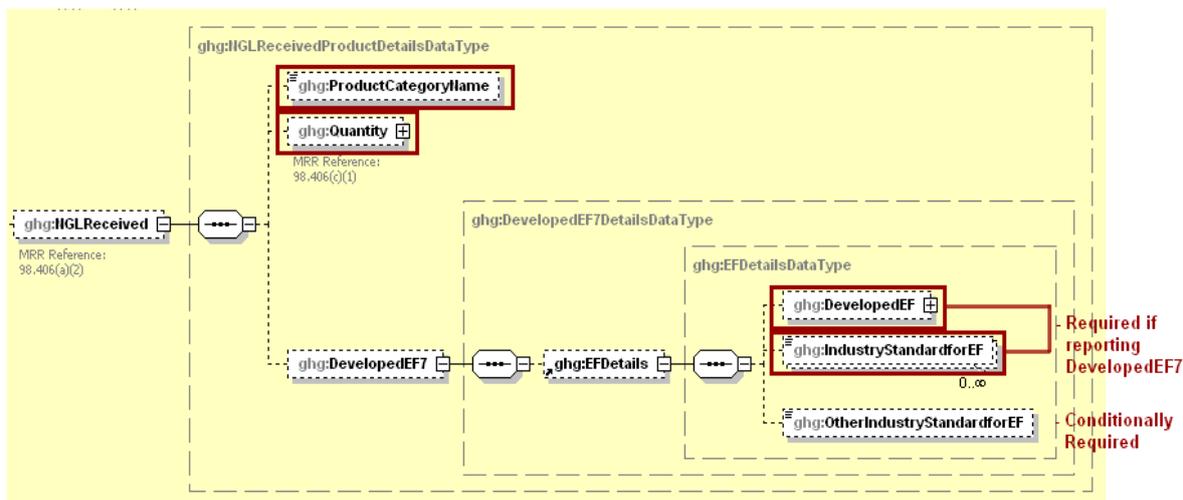
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

Table 7
NGL Received Data Element Definitions

Data Element Name	Description
NGLReceived	**Parent Element:** A collection of data elements containing information on fuels received. Report data for the same product for "NGLReceived" as was used for "NGLSupplied" in the same instance of the parent element "NGLFuelDetails".

ProductCategoryName	Specify each NGL product received from other NGL fractionators. See list of allowable values:
	
	  Ethane
	  Propane
	  Butane
	  Isobutane
	  Pentanes Plus

Quantity	A collection of data elements containing information on the annual quantity of the specified NGL product received from other NGL fractionators. Report the value in the child data element **MeasureValue**. Set the units of measure to "bbl" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the annual quantity of the specified NGL product received from other NGL fractionators in the child data element **NumberofTimesSubstituted**.

Data Element Name	Description
DevelopedEF7	**Parent Element (Conditionally Required):** A collection of data elements containing information to report if the facility is using a supplier-specific emission factor in Equation NN-7 instead of the default emission factor for the specified NGL product. If the default emissions factor is used, do not report these elements.
EFDetails	**Parent Element:** A collection of data elements containing information to report if the facility is using a supplier-specific emission factor in Equation NN-7 instead of the default emission factor for the specified NGL product.
DevelopedEF	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-7 for the specified product. Report the value in the child data element **MeasureValue**. Set the units of measure to "MT CO2/bbl" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.
IndustryStandardforEF	The industry standard(s) used to develop the supplier-specific emission factor. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element. AGA standard GPA standard Industry standard practices Other
OtherIndustryStandardforEF	**Conditionally Required:** The industry standard(s) used to develop the supplier-specific emission factor if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.

XML Excerpt 4
Example for NGL Received

```xml
<ghg:NGLReceived>
        <ghg:ProductCategoryName>Propane</ghg:ProductCategoryName>
        <ghg:Quantity volUOM="bbl">
                <ghg:MeasureValue>7777.654</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>7</ghg:NumberofTimesSubstituted>
        </ghg:Quantity>
        <ghg:DevelopedEF7>
                <ghg:EFDetails>
                        <ghg:DevelopedEF efUOM="MT CO2/bbl">
                                <ghg:MeasureValue>0.237</ghg:MeasureValue>
                                <ghg:NumberofTimesSubstituted>9</ghg:NumberofTimesSubstituted>
                        </ghg:DevelopedEF>
                        <ghg:IndustryStandardforEF>GPA standard</ghg:IndustryStandardforEF>
                        <ghg:IndustryStandardforEF>AGA standard</ghg:IndustryStandardforEF>
                </ghg:EFDetails>
        </ghg:DevelopedEF7>
</ghg:NGLReceived>
```

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

NGL fractionators must report the annual CO_2 quantity that would result from the complete combustion or oxidation of each NGL product supplied to downstream facilities and of each NGL product received from other NGL fractionators during the reporting year [98.406(a)(6)].

1. NGL fractionators must report the annual CO_2 quantity that would result from the complete combustion or oxidation of each NGL product supplied to downstream facilities during the reporting year using either Calculation Methodology 1 [98.403(a)(1)] or Calculation Methodology 2 [98.403(a)(2)]. Calculation Methodology 1 uses a higher heating value and CO_2 emission factor based on heat content to calculate CO_2 emissions from supplied product. Calculation Methodology 2 uses a CO_2 emission factor based on product volume to calculate CO_2 emissions from supplied product.

Did you use Calculation Methodology 1 [98.403(a)(1)] or Calculation Methodology 2 [98.403(a)(2)] to calculate CO_2 emissions from the supplied product?

Report "NN1CO2MassTotal" if Calculation Methodology 1 (Equation NN-1) was used.

Report "NN2CO2MassTotal" if Calculation Methodology 2 (Equation NN-2) was used.

2. NGL fractionators must report the annual CO_2 quantity that would result from the complete combustion or oxidation of each NGL product received from other NGL fractionators during the reporting year using Equation NN-7 [98.403(c)(1)].

Note: Report data for the same product for the following data elements as was used for "NGLSupplied" and "NGLReceived" in the same instance of the parent element "NGLFuelDetails".

Figure 14
Fractionator Equation NN-1, NN-2 and NN-7 GHG Schema Diagram
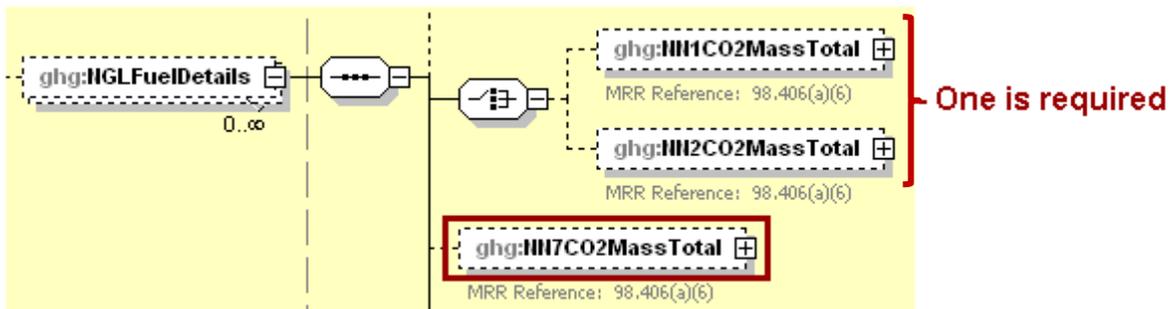
Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Table 8
Fractionator Equation NN-1, NN-2 and NN-7 GHG Quantities Data Element Definitions

Data Element Name	Description
NN1CO2MassTotal	**Conditionally Required:** A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of each fractionated NGL product for redelivery to all recipients if Equation NN-1 was used. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**. **Note:** Report for only NN1CO2MassTotal or NN2CO2MassTotal, but not for both.
NN2CO2MassTotal	**Conditionally Required:** A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of each fractionated NGL product for redelivery to all recipients if Equation NN-2 was used. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**. **Note:** Report for only NN1CO2MassTotal or NN2CO2MassTotal, but not for both.
NN7CO2MassTotal	A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of each fractionated NGL product received from other fractionators using Equation NN-7. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 5
Example for Fractionator Equation NN-1 and NN-7 GHG Quantities

```
<ghg:NN1CO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>3854.2</ghg:CalculatedValue>
</ghg:NN1CO2MassTotal>
<ghg:NN7CO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>1972.3</ghg:CalculatedValue>
</ghg:NN7CO2MassTotal>
```

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

XML Excerpt 6
Example for Fractionator Equation NN-2 and NN-7 GHG Quantities

```
<ghg:NN2CO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>1905.4</ghg:CalculatedValue>
</ghg:NN2CO2MassTotal>
<ghg:NN7CO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>1843.1</ghg:CalculatedValue>
</ghg:NN7CO2MassTotal>
```

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

Each NGL fractionator that elects to use Calculation Methodology 1 may, for each NGL product, use a supplier-specific higher heating value (HHV) in units of MMBtu/bbl in place of the default value provided in Table NN-1 and/or a supplier-specific CO_2 emission factor (EF) in units of kg CO_2/MMBtu in place of the default value provided in Table NN-1 [98.403(a)(1)].

New for 2013 and subsequent years: The default HHV's and EF's for several natural gas liquids were updated for 2013. NGL fractionators should review the new default emission factors provided in table NN-1.

Conditionally Required: If you developed a supplier-specific EF and/or HHV for use in Equation NN-1, Subpart NN requires you to report the following data for each applicable product type:

- The developed HHV and/or EF [98.406(a)(9)(ii) and 98.406(a)(9)(iii)].
- The number of days in the reporting year for which substitute data procedures were used to develop the HHV [98.406(c)(2)] and/or EF [98.406(c)(3)].
- The industry standard(s) used to develop the HHV and/or EF [98.406(a)(9)(i)].

Reporting is not required for "NN1EquationDetails" if the default higher heating value and default emission factor were used.

Note: Report data for the same product for the following data elements as was used for "NGLSupplied" and "NGLReceived" in the same instance of the parent element "NGLFuelDetails".

Figure 15
Fractionator Equation NN-1 Details Schema Diagram
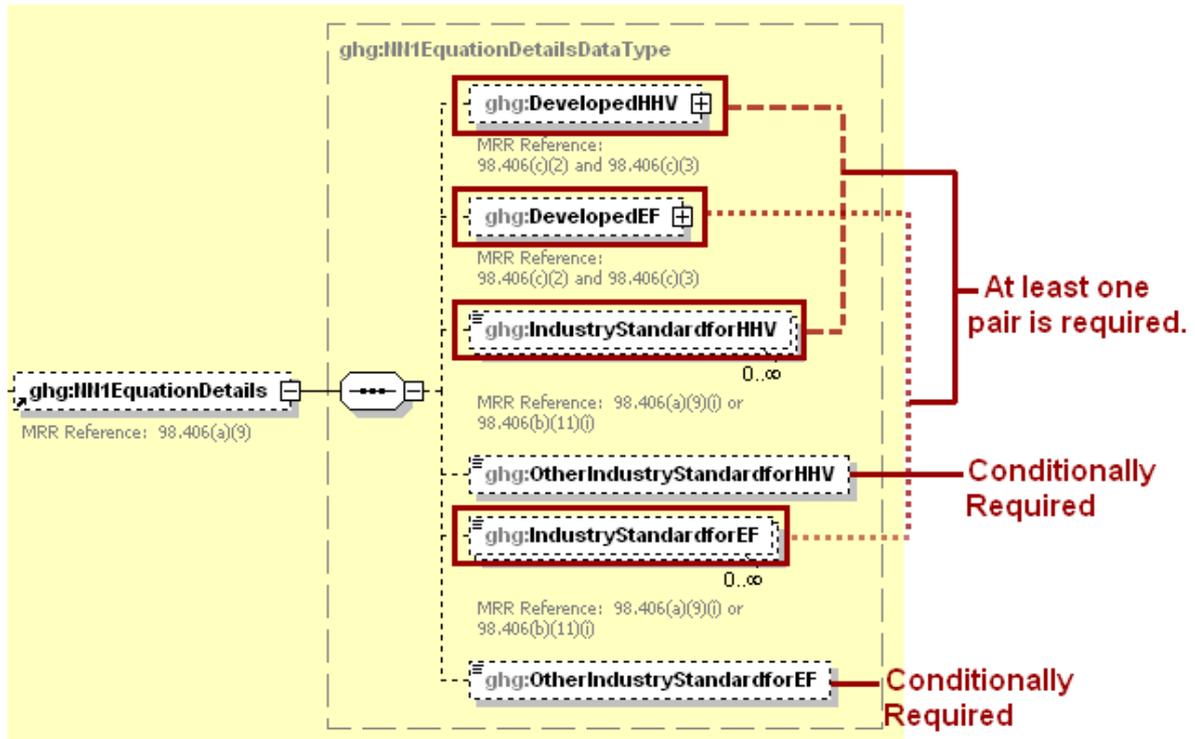
Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Table 9
Fractionator Equation NN-1 Details Data Element Definitions

Data Element Name	Description
NN1EquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if either a supplier-specific higher heating value or supplier-specific emission factor was used for Equation NN-1 instead of the default value or factor.
DevelopedHHV	**Conditionally Required:** A collection of data elements containing information on a supplier-specific higher heating value developed using methods outlined in §98.404. Report only if a supplier-specific higher heating value was used in Equation NN-1. Report the value in the child data element **MeasureValue**. Set the units of measure to "MMBtu/bbl" in the attribute **heatUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific higher heating value in the child data element **NumberofTimesSubstituted**.
DevelopedEF	**Conditionally Required:** A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-1. Report the value in the child data element **MeasureValue**. Set the units of measure to "kg CO2/MMBtu" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.
IndustryStandardforHHV	**Conditionally Required:** Report the industry standard(s) used to develop the value for the supplier-specific higher heating value (HHV) reported for Calculation Methodology 1. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforHHV" data element. AGA standard GPA standard Industry standard practices Other
OtherIndustryStandardforHHV	**Conditionally Required:** The industry standard(s) used to develop the value for each supplier-specific higher heating value (HHV) reported for Calculation Methodology 1 if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforHHV". Otherwise do not report this data element.
IndustryStandardforEF	**Conditionally Required:** Report the industry standard(s) used to develop the value for the supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 1. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element. AGA standard GPA standard Industry standard practices Other

Data Element Name	Description
OtherIndustryStandardforEF	**Conditionally Required:** The industry standard(s) used to develop the value for the supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 1 if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.

XML Excerpt 7
Example for Fractionator Equation NN-1 Details

```
<ghg:NN1EquationDetails>
        <ghg:DevelopedHHV heatUOM="MMBtu/bbl">
                <ghg:MeasureValue>4.08</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>4</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedHHV>
        <ghg:DevelopedEF efUOM="kg CO2/MMBtu">
                <ghg:MeasureValue>61.09</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>4</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforHHV>AGA standard</ghg:IndustryStandardforHHV>
        <ghg:IndustryStandardforEF>GPA standard</ghg:IndustryStandardforEF>
</ghg:NN1EquationDetails>
```

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

Each NGL fractionator that elects to use Calculation Methodology 2 may, for each NGL product, use a supplier-specific CO_2 emission factor (EF) in units of metric ton CO_2/bbl in place of the default value provided in Table NN-2 [98.403(a)(2)].

New for 2013 and subsequent years: The default EF's for several natural gas liquids were updated for 2013. NGL fractionators should review the new default emission factors provided in table NN-2.

Conditionally Required: If you developed a supplier-specific EF for use in Equation NN-2, Subpart NN requires you to report the following data:

- The developed EF [98.406(a)(9)(iii)].
- The number of days in the reporting year for which substitute data procedures were used to develop the EF [98.406(c)(3)].
- The industry standard(s) used to develop the EF [98.406(a)(9)(i)].

Reporting is not required for "NN2EquationDetails" if the default emission factor was used.

Note: Report data for the same product for the following data elements as was used for "NGLSupplied" and "NGLReceived" in the same instance of the parent element "NGLFuelDetails".

Figure 16
Fractionator Equation NN-2 Details Schema Diagram
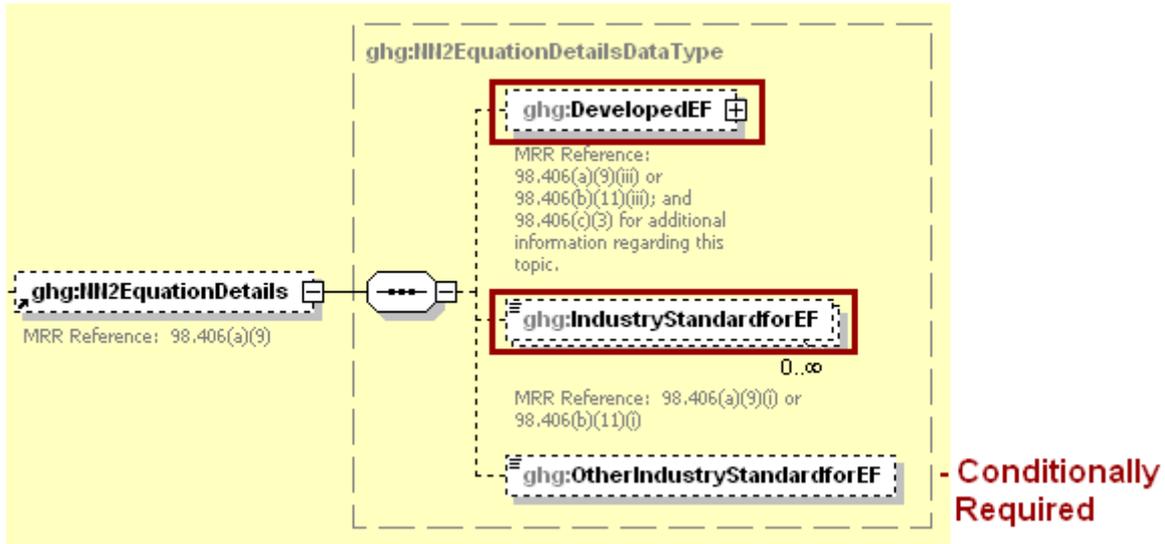
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

Table 10
Fractionator Equation NN-2 Details Data Element Definitions

Data Element Name	Description
NN2EquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if a supplier-specific emission factor was used for Equation NN-2 instead of the default emission factor.
DevelopedEF	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emissions factor was used in Equation NN-2. Report the value in the child data element **MeasureValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.

IndustryStandardforEF	Report the industry standard(s) used to develop the value for the supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 2. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard in the "OtherIndustryStandardforEF" data element.
	
	  AGA standard
	  GPA standard
	  Industry standard practices
	  Other

Data Element Name	Description
OtherIndustryStandardforEF	**Conditionally Required:** The industry standard(s) used to develop the value for the supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 2 if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.

XML Excerpt 8
Example for Fractionator Equation NN-2 Details

```
<ghg:NN2EquationDetails>
        <ghg:DevelopedEF efUOM="MT CO2/bbl">
                <ghg:MeasureValue>0.245</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>6</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforEF>AGA standard</ghg:IndustryStandardforEF>
        <ghg:IndustryStandardforEF>Industry standard practices</ghg:IndustryStandardforEF>
</ghg:NN2EquationDetails>
</ghg:NGLFuelDetails>
```

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

Each supplier that is a NGL Fractionator must report the following data:

- The annual volume (in thousand standard cubic feet) of natural gas received for processing [98.406(a)(3)].
- The annual quantity (in barrels) of y-grade, o-grade, and other bulk NGLs received from others for fractionation [98.406(a)(4)(i)].
- **RY2013 onward only:** The annual quantity (in barrels) of y-grade, o-grade, and other bulk NGLs supplied to downstream users that have not been fractionated. [98.406(a)(4)(ii)].
- The annual quantity (in barrels) of propane that the supplier odorized at the facility and delivered to others [98.406(a)(5)].

Figure 17
Fractionator Annual Quantity Details Schema Diagram
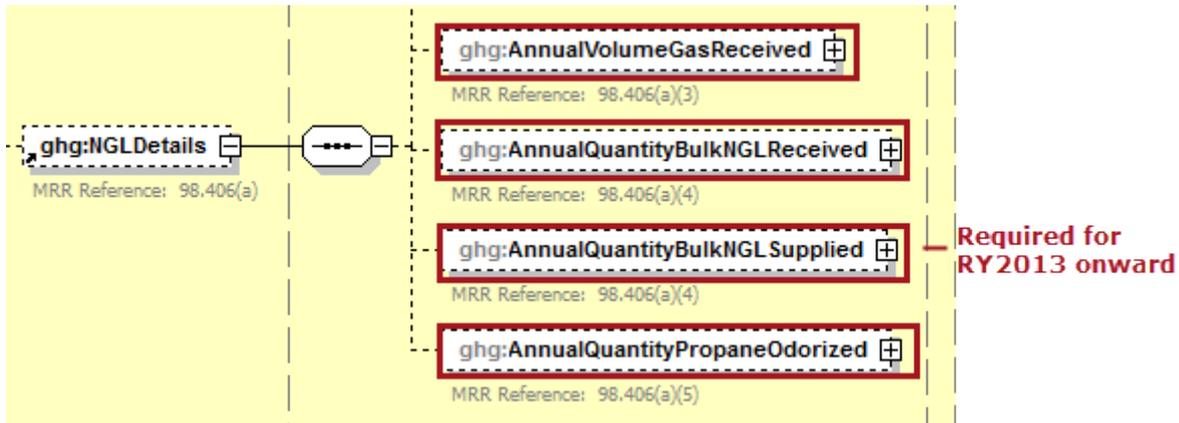
Note: Data elements boxed in red are required.

Table 11
Fractionator Annual Miscellaneous Quantity Details Data Element Definitions

Data Element Name	Description
AnnualVolumeGasReceived	A collection of data elements containing information on the annual volume of natural gas received for processing. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**.
AnnualQuantityBulkNGLReceived	A collection of data elements containing information on the annual quantity (in barrels) of y-grade, o-grade, and other bulk NGLs received from others for fractionation. Report the value in the child data element **MeasureValue**. Set the units of measure to "bbl" in the attribute **volUOM**.
AnnualQuantityBulkNGLSupplied (RY2013 onward.)	A collection of data elements containing information on the annual quantity (in barrels) of y-grade, o-grade, and other bulk NGLs supplied to downstream users that have not been fractionated. Report the value in the child data element **MeasureValue**. Set the units of measure to "bbl" in the attribute **volUOM**.
AnnualQuantityPropaneOdorized	A collection of data elements containing information on the annual quantity of propane odorized at the facility and delivered to others. Report the value in the child data element **MeasureValue**. Set the units of measure to "bbl" in the attribute **volUOM**.

XML Excerpt 9
Example for Fractionator Annual Quantity Details

```
        <ghg:AnnualVolumeGasReceived volUOM="Mscf">
                <ghg:MeasureValue>100.43530</ghg:MeasureValue>
        </ghg:AnnualVolumeGasReceived>
        <ghg:AnnualQuantityBulkNGLReceived volUOM="bbl">
                <ghg:MeasureValue>2000.1988</ghg:MeasureValue>
        </ghg:AnnualQuantityBulkNGLReceived>
        <ghg:AnnualQuantityBulkNGLSupplied volUOM="bbl">
                <ghg:MeasureValue>1600.2278</ghg:MeasureValue>
        </ghg:AnnualQuantityBulkNGLSupplied>
        <ghg:AnnualQuantityPropaneOdorized volUOM="bbl">
                <ghg:MeasureValue>3000.56467</ghg:MeasureValue>
        </ghg:AnnualQuantityPropaneOdorized>
    </ghg:NGLDetails>
```

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

Note: The code excerpt above reflects revised reporting required for Reporting Year 2013 and subsequent years.

See Section 4.0 for instructions on how to report facility level roll-up GHG quantity.

3.0   LDC Details and GHG Quantities

This section contains the information that must be reported under Subpart NN for a supplier which is a local distribution company (LDC).

Figure 18
LDC Details and GHG Quantities Schema Diagram
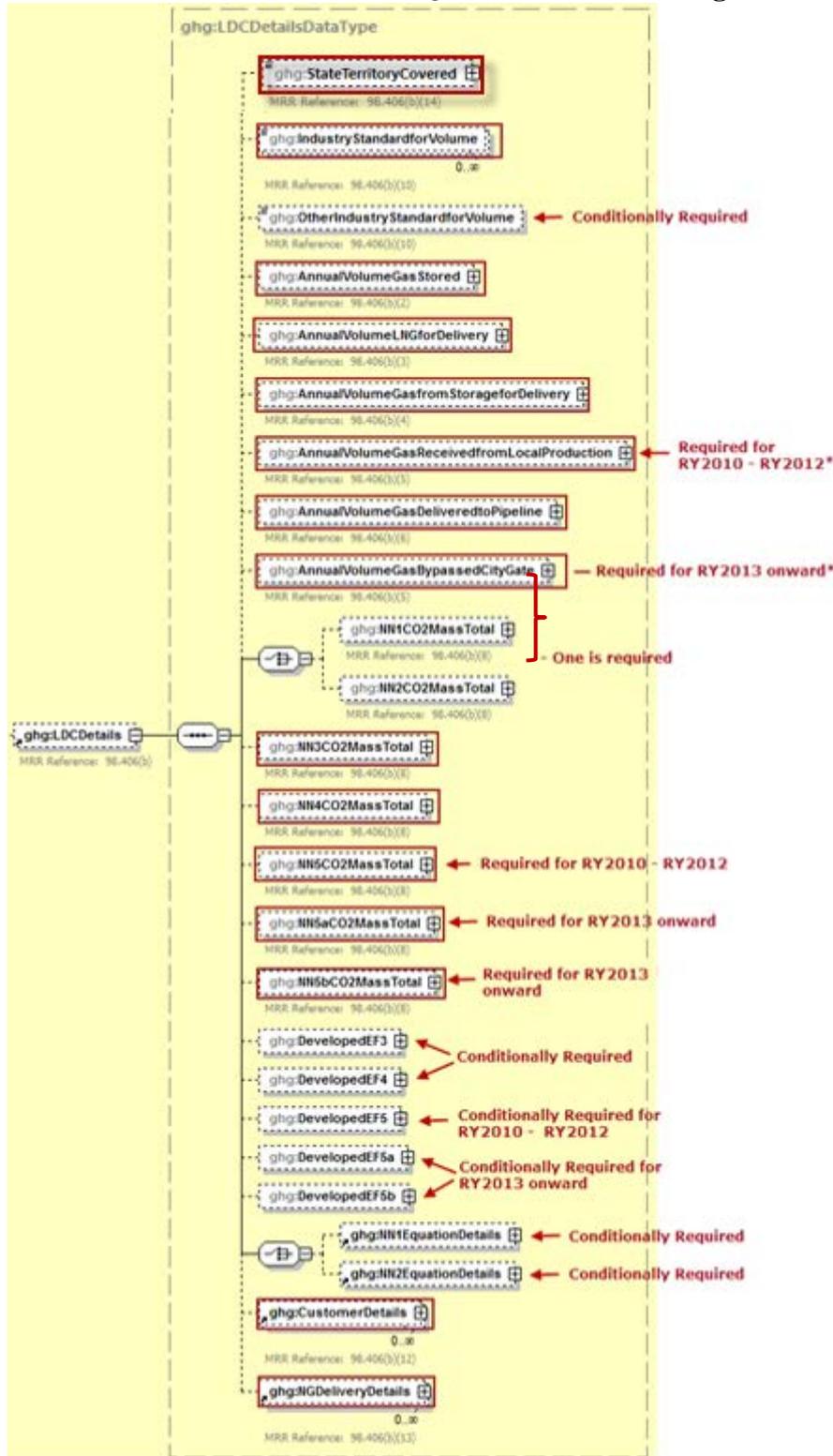
Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

*Data element AnnualVolumeGasReceivedfromLocalProduction (RY2010 – RY2012) was replaced by the new equivalent data element AnnualVolumeGasBypassedCityGate (RY2013 onward).

For each supplier that is a LDC, Subpart NN requires you to report the following volumes:

- The US State or Territory covered in this report. Report the state or territory abbreviation for Reporting Year 2017 and onward. [98.406(b)(14)]
- The annual volume (in thousand standard cubic feet) of natural gas received by the LDC at its city gate stations for redelivery on its distribution system, including for use by the LDC [98.406(b)(1)], and the specific industry standard(s) used to measure this volume [98.406(b)(10)].
- The annual volume (in thousand standard cubic feet) of natural gas placed into storage, including gas liquefied and placed into storage [98.406(b)(2)].
- The annual volume (in thousand standard cubic feet) of vaporized liquefied natural gas (LNG) produced at on-system vaporization facilities for delivery on the distribution system [98.406(b)(3)].
- The annual volume (in thousand standard cubic feet) of natural gas withdrawn from on-system storage (that is not delivered to the city gate) for delivery on the distribution system [98.406(b)(3)] for Reporting Year 2013 onwards, [98.406(b)(4)] for Reporting Year 2010-2012.
- The annual volume (in thousand standard cubic feet) of natural gas delivered directly to LDC systems that bypassed the city gate(s) such as natural gas received from producers or natural gas processing plants from local production [98.406(b)(5)].
- The annual volume (in thousand standard cubic feet) of natural gas delivered to downstream gas transmission pipelines and other local distribution companies [98.406(b)(6)].

Figure 19
LDC Annual Volume Details Schema Diagram
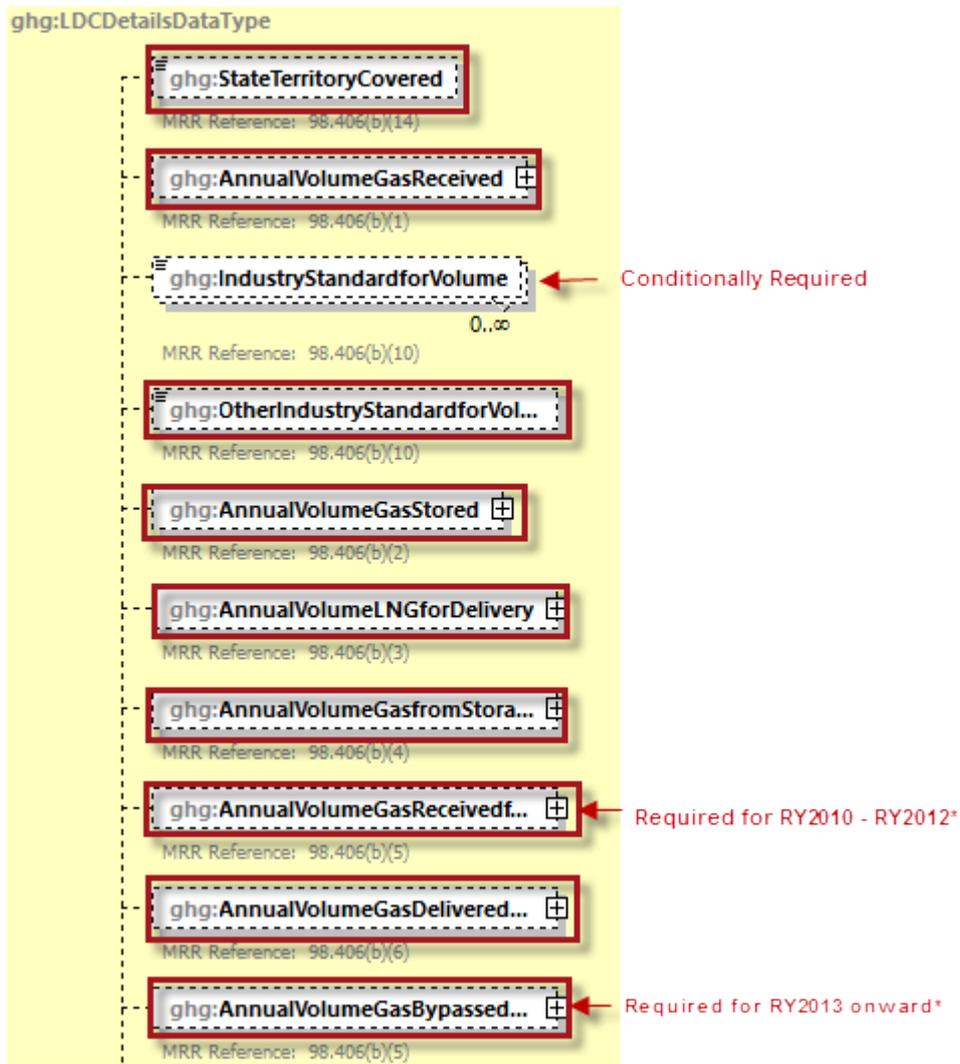
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.
*_Data element AnnualVolumeGasReceivedfromLocalProduction (RY2010 – RY2012) was replaced by the new
equivalent data element AnnualVolumeGasBypassedCityGate (RY2013 onward)._

Table 12
LDC Annual Volume Details Data Element Definitions

Data Element Name	Description
LDCDetails	**Parent Element (Conditionally Required):** Report if the facility is a natural gas local distribution company.
StateTerritoryCovered	The US State or Territory covered in this report. Report the state or territory abbreviation. Required for RY2017 onwards.

Data Element Name	Description
AnnualVolumeGasReceived	A collection of data elements containing information on the annual volume of natural gas received at the city gate(s). It includes the annual volume of natural gas received by the LDC at its city gate station(s) for redelivery on the LDC's distribution system, including for use by the LDC. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the annual volume of natural gas received at the city gate(s) in the child data element **NumberofTimesSubstituted**.
IndustryStandardforVolume	Specify the industry standard(s) used to measure the volume. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforVolume" data element. ASTM standard ANSI standard AGA standard ASME standard API standard NAESB standard Industry standard practices Other
OtherIndustryStandardforVolume	**Conditionally Required:** The industry standard used to measure the volume if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforVolume". Otherwise do not report this data element.
AnnualVolumeGasStored	A collection of data elements containing information on the annual volume of natural gas placed into storage. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the annual volume of natural gas placed into storage in the child data element **NumberofTimesSubstituted**.
AnnualVolumeLNGforDelivery	A collection of data elements containing information on the annual volume of vaporized liquefied natural gas (LNG) produced at on-system vaporization facilities for delivery on the distribution system that is not accounted for in the volume collected under the "AnnualVolumeGasReceivedatCityGate" data element. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the value in the child data element **NumberofTimesSubstituted**.

Data Element Name	Description
AnnualVolumeGasfromStorageforDelivery	A collection of data elements containing information on the annual volume of natural gas withdrawn from storage (that is not delivered to the city gate) for delivery on the distribution system. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the value in the child data element **NumberofTimesSubstituted**.
AnnualVolumeGasReceivedfromLocalProduction	**Required for RY2010 – RY2012 only:** A collection of data elements containing information on the annual volume of natural gas received from local production (delivered directly to the LDC systems from producers or natural gas processing plants from local production). Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the value in the child data element **NumberofTimesSubstituted**. *Note: Data element AnnualVolumeGasReceivedfromLocalProduction (RY2010 – RY2012) was replaced by the new corresponding data element AnnualVolumeGasBypassedCityGate (RY2013 onward).*
AnnualVolumeGasDeliveredtoPipeline	A collection of data elements containing information on the annual volume of natural gas delivered to downstream transmission pipelines and other LDCs. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the value in the child data element **NumberofTimesSubstituted**.
AnnualVolumeGasBypassedCityGate	**Required for 2013 onwards:** A collection of data elements containing information on the annual volume of natural gas that bypassed the city gate(s) and was supplied through the LDC distribution system. This includes natural gas from producers and natural gas processing plants from local production, or natural gas that was vaporized upon receipt and delivered, and any other source that bypassed the city gate ($Fuel_z$ in Equation NN-5b). Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**. Also report the number of days that missing data procedures were used in measuring the value in the child data element **NumberofTimesSubstituted.** *Note: Data element AnnualVolumeGasReceivedfromLocalProduction (RY2010 – RY2012) was replaced by the new corresponding data element AnnualVolumeGasBypassedCityGate (RY2013 onward).*

XML Excerpt 10
Example for LDC Annual Volume Details

```xml
<ghg:LDCDetails>
        <ghg:StateTerritoryCovered>VA</ghg: StateTerritoryCovered>
        <ghg:AnnualVolumeGasReceived volUOM="Mscf">
                <ghg:MeasureValue>10000000.34545</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>10</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeGasReceived>
        <ghg:IndustryStandardforVolume>ANSI standard</ghg:IndustryStandardforVolume>
        <ghg:IndustryStandardforVolume>Industry standard practices</ghg:IndustryStandardforVolume>
        <ghg:AnnualVolumeGasStored volUOM="Mscf">
                <ghg:MeasureValue>10000.222</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>10</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeGasStored>
        <ghg:AnnualVolumeLNGforDelivery volUOM="Mscf">
                <ghg:MeasureValue>1000.46468</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>15</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeLNGforDelivery>
        <ghg:AnnualVolumeGasfromStorageforDelivery volUOM="Mscf">
                <ghg:MeasureValue>2000.33345</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>20</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeGasfromStorageforDelivery>
        <ghg:AnnualVolumeGasDeliveredtoPipeline volUOM="Mscf">
                <ghg:MeasureValue>10000.555566</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>15</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeGasDeliveredtoPipeline>
        <ghg:AnnualVolumeGasBypassedCityGate volUOM="Mscf">
                <ghg:MeasureValue>6100.22266</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>10</ghg:NumberofTimesSubstituted>
        </ghg:AnnualVolumeGasBypassedCityGate>
```

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

LDCs must report the total annual CO_2 quantities associated with the volumes reported above [98.406(b)(8)]. Additionally, LDCs must report the volume delivered to each large end-user receiving a supply equal to or greater than 460,000 Mscf during the reporting year [98.406(b)(7)] and the total annual CO_2 quantity associated with these volumes [98.406(b)(8)].

1. LDCs must estimate the CO_2 quantity that would result from the complete combustion or total oxidation of the natural gas received at the city gate(s). Either Calculation Methodology 1 [98.403(a)(1)] or Calculation Methodology 2 [98.403(a)(2)] may be used. Calculation Methodology 1 uses a higher heating value and CO_2 emission factor based on heat content to calculate CO_2 quantities associated with natural gas received at the city gate(s). Calculation Methodology 2 uses a CO_2 emission factor based on product volume to calculate CO_2 quantities associated with natural gas received at the city gate(s).

   Did you use Calculation Methodology 1 [98.403(a)(1)] or Calculation Methodology 2 [98.403(a)(2)] to calculate CO_2 emissions which would result from the complete combustion or total oxidation of the natural gas received at the city gates(s)?

   ↳ Report "NN1CO2MassTotal" if Calculation Methodology 1 (Equation NN-1) was used.

   ↳ Report "NN2CO2MassTotal" if Calculation Methodology 2 (Equation NN-2) was used.

2. For natural gas that is received for redelivery to downstream gas transmission pipelines and other local distribution companies, use Equation NN-3 [98.403(b)(1)].

3. For natural gas delivered to each large end-user receiving a supply equal to or greater than 460,000 Mscf per year, use Equation NN-4 [98.403(b)(2)].

4. **RY 2010 through RY 2012 only:** For natural gas received by the LDC at the city gate(s) that is injected into on-system storage and/or liquefied and stored, removed from storage and received from local production, use Equation NN-5. Note that the value for CO_2l, calculated

in Equation NN-5, may either be positive or negative depending on whether more natural gas was withdrawn from storage/received from local production or placed into storage during the reporting

5. **RY 2013 onward:** For natural gas received by the LDC at the city gate(s) that is injected into on-system storage and/or liquefied and stored, and for gas removed from storage and used for deliveries, use Equation NN-5a [98.403(b)(3)(i)]

6. **RY 2013 onward:** For natural gas received by the LDC that bypassed the city gate(s), use Equation NN-5b. This includes natural gas received directly by LDC systems from producers or natural gas processing plants from local production, received as a liquid and vaporized for delivery, or received from any other source that bypassed the city gate. [98.403(b)(3)(ii)]

Figure 20
LDC Equations NN-1 through NN-5 GHG Quantities Schema Diagram
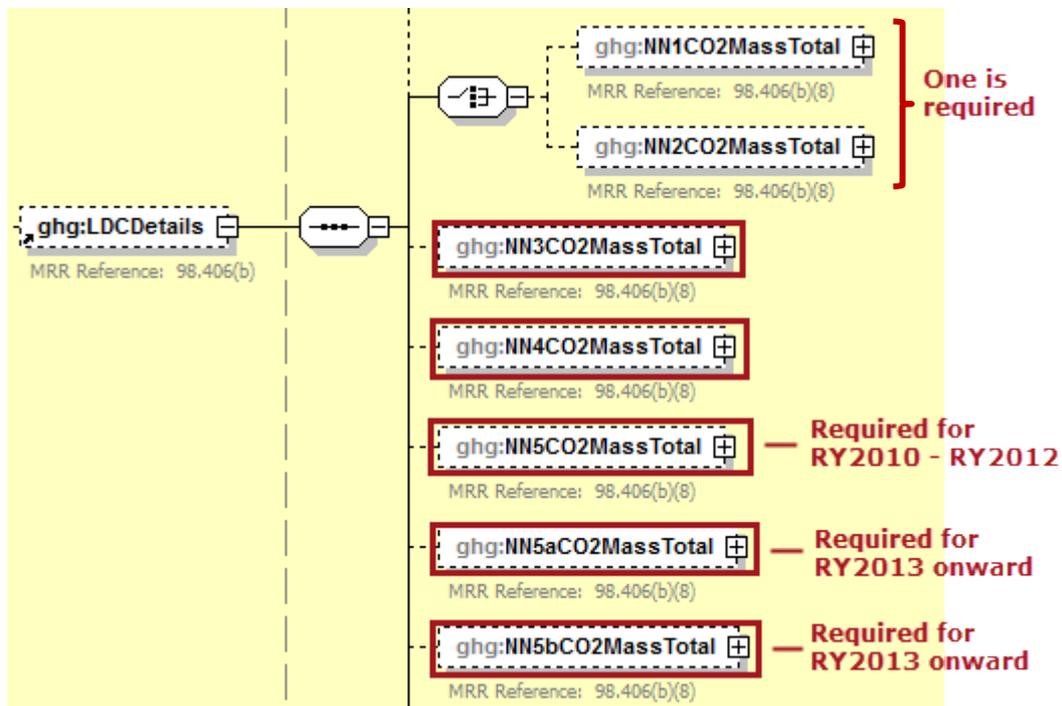
Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Table 13
LDC Equations NN-1 through NN-5b GHG Quantities Data Element Definitions

Data Element Name	Description
NN1CO2MassTotal	**Conditionally Required:** A collection of data elements containing information on annual CO_2 quantities associated with the complete combustion or oxidation of natural gas received at the city gate(s) calculated using Equation NN-1. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**. **Note:** Report only NN1CO2MassTotal or NN2CO2MassTotal, but not both.
NN2CO2MassTotal	**Conditionally Required:** A collection of data elements containing information on annual CO_2 quantities associated with the complete combustion or oxidation of natural gas received at the city gate(s) calculated using Equation NN-2. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**. **Note:** Report only NN1CO2MassTotal or NN2CO2MassTotal, but not both.
NN3CO2MassTotal	A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of natural gas delivered to downstream transmission pipelines or other LDCs, calculated using Equation NN-3. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
NN4CO2MassTotal	A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of natural gas received by end-users that receive a supply equal to or greater than 460,000 Mscf per year, calculated using Equation NN-4. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
NN5CO2MassTotal (RY 2010 through RY 2012 only)	A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of natural gas received by the LDC that bypassed the city gate(s) and the net natural gas that is stored/removed from storage (including gas that was liquefied and stored/removed from storage) by the LDC, calculated using Equation NN-5. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.
NN5aCO2MassTotal (RY 2013 onward)	A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of natural gas received by the LDC at the city gate(s) that is injected into on-system storage and/or liquefied and stored, and for gas removed from storage and used for deliveries, calculated using Equation NN-5a Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

Data Element Name	Description
NN5bCO2MassTotal (RY 2013 onward)	A collection of data elements containing information on annual CO_2 quantities associated with the combustion or oxidation of natural gas received by the LDC that bypassed the city gate(s) calculated using Equation NN-5b. This includes natural gas received directly by LDC systems from producers or natural gas processing plants from local production, received as a liquid and vaporized for delivery, or received from any other source that bypassed the city gate. Report the value in the child data element **CalculatedValue**. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 11
Example for LDC Equations NN-2, NN-3, NN-4, NN-5a and NN-5b

```
<ghg:NN2CO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>567890.1</ghg:CalculatedValue>
</ghg:NN2CO2MassTotal>
<ghg:NN3CO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>650.6</ghg:CalculatedValue>
</ghg:NN3CO2MassTotal>
<ghg:NN4CO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>188000.2</ghg:CalculatedValue>
</ghg:NN4CO2MassTotal>
<ghg:NN5aCO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>224.6</ghg:CalculatedValue>
</ghg:NN5aCO2MassTotal>
<ghg:NN5bCO2MassTotal massUOM="Metric Tons">
        <ghg:CalculatedValue>277.7</ghg:CalculatedValue>
</ghg:NN5bCO2MassTotal>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas and the code excerpt above reflects revised reporting required for Reporting Year 2013 and subsequent years.

Conditionally Required: If you developed a supplier-specific emission factor (EF) for use in Equation NN-3, Equation NN-4, Equation NN-5 (RY2010-2012 only), Equation NN-5a (2013 onwards) and/or Equation NN-5b (2013 onwards),Subpart NN requires you to report the following data:

- The developed EF for each applicable equation [98.406(b)(11)(iii)]
- The number of days in the reporting year for which substitute data procedures were used to develop each EF [98.406(c)(3)]
- The industry standard(s) used to develop each EF [98.406(b)(11)(i)]

Note: Reporting is not required for the applicable parent element if the default emission factor was used.

For 2013 and subsequent years: The default emission factor for natural gas was updated for 2013. LDCs should review the new default emission factor for natural gas provided in table NN-2.

Figure 21
Equations NN-3, NN-4, NN-5, NN-5a and NN-5b
Developed Emission Factors Schema Diagram
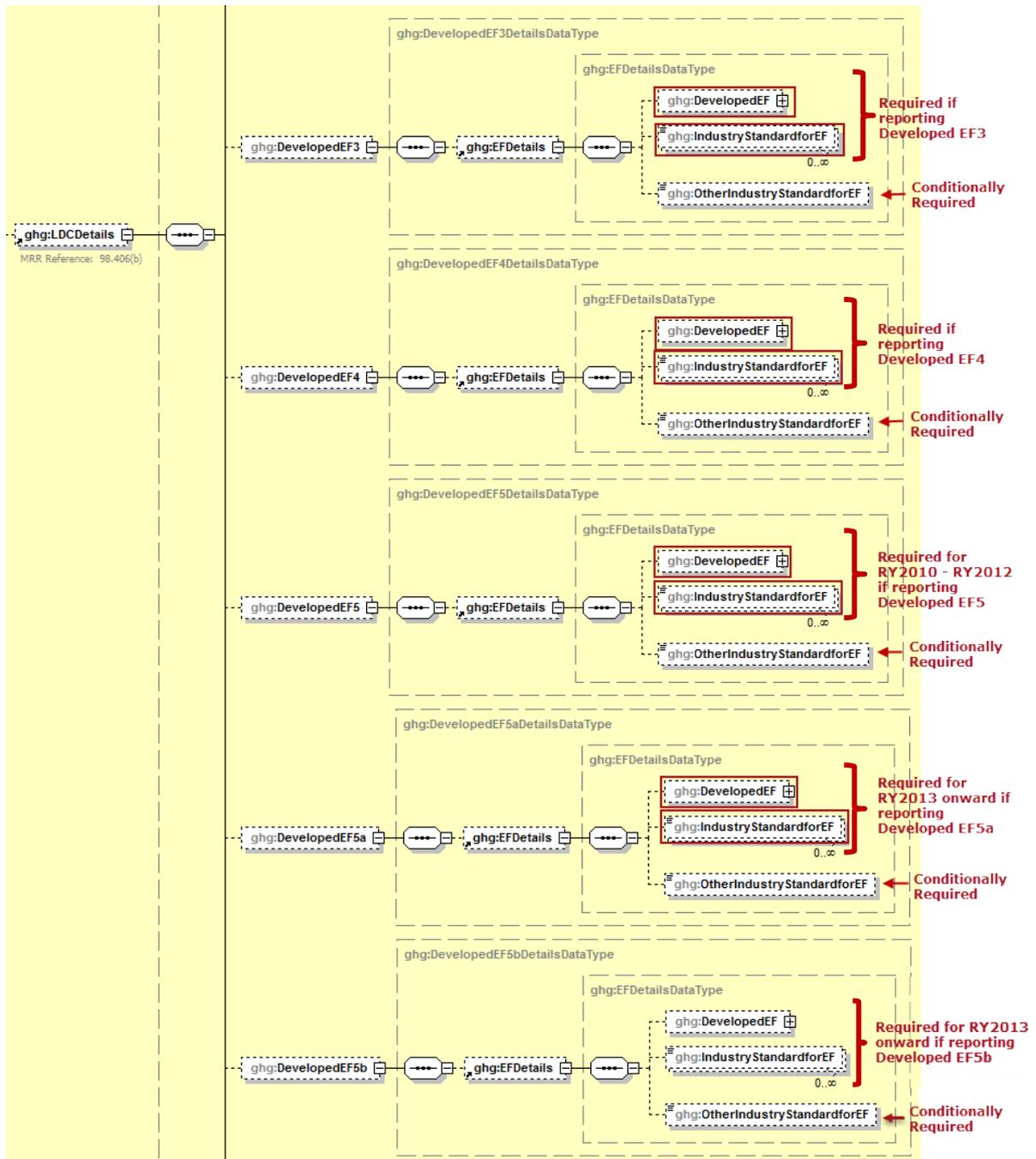
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

Table 14
Equations NN-3, NN-4, NN-5, NN-5a and NN-5b
Developed Emission Factors XML Data Elements

Data Element Name	Description
DevelopedEF3	**Parent Element (Conditionally Required):** A collection of data elements containing information to report if the facility is using a supplier-specific emission factor in Equation NN-3 instead of the default emission factor.
EFDetails	**Parent Element:** A collection of data elements containing information to report if the facility is using a supplier-specific emission factor in Equation NN-3 instead of the default emission factor
DevelopedEF	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-3. Report the value in the child data element **MeasureValue**. Set the units of measure to "MT CO2/Mscf" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.
IndustryStandardforEF	The industry standard(s) used to develop the supplier-specific emission factor. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element. AGA standard GPA standard Industry standard practices Other
OtherIndustryStandardforEF	**Conditionally Required:** The industry standard(s) used to develop the supplier-specific emission factor if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.
DevelopedEF4	**Parent Element (Conditionally Required):** A collection of data elements containing information to report if the facility is using a supplier-specific emission factor in Equation NN-4 instead of the default emission factor.
EFDetails	**Parent Element:** A collection of data elements containing information to report if the facility is using a supplier-specific emission factor in Equation NN-4 instead of the default emission factor.
DevelopedEF	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-4. Report the value in the child data element **MeasureValue**. Set the units of measure to "MT CO2/Mscf" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.

Data Element Name	Description

IndustryStandardforEF	The industry standard(s) used to develop the supplier-specific emission factor. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element.
	
	  AGA standard
	  GPA standard
	  Industry standard practices
	  Other

OtherIndustryStandardforEF	**Conditionally Required:** The industry standard(s) used to develop the supplier-specific emission factor if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.
DevelopedEF5 (RY 2010 through RY 2012 only)	**Parent Element (Conditionally Required):** A collection of data elements containing information to report if the facility is using a supplier-specific emissions factor in Equation NN-5 instead of the default emissions factor.
EFDetails (RY 2010 through RY 2012 only)	**Parent Element:** A collection of data elements containing information to report if the facility is using a supplier-specific emissions factor in Equation NN-5 instead of the default emissions factor.
DevelopedEF (RY 2010 through RY 2012 only)	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-5. Report the value in the child data element **MeasureValue**. Set the units of measure to "MT CO2/Mscf" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.

IndustryStandardforEF
(RY 2010 through RY 2012 only)
	The industry standard(s) used to develop the supplier-specific emission factor. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element.
	
	  AGA standard
	  GPA standard
	  Industry standard practices
	  Other

OtherIndustryStandardforEF (RY 2010 through RY 2012 only)	**Conditionally Required:** The industry standard(s) used to develop the supplier-specific emission factor if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.
DevelopedEF5a (RY 2013 onward)	**Parent Element (Conditionally Required):** A collection of data elements containing information to report if the facility is using a supplier-specific emissions factor in Equation NN-5a instead of the default emissions factor.
EFDetails (RY 2013 onward)	**Parent Element:** A collection of data elements containing information to report if the facility is using a supplier-specific emissions factor in Equation NN-5a instead of the default emissions factor.

Data Element Name	Description
DevelopedEF (RY 2013 onward)	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-5a. Report the value in the child data element **MeasureValue**. Set the units of measure to "MT CO2/Mscf" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.

IndustryStandardforEF
(RY 2013 onward)
	The industry standard(s) used to develop the supplier-specific emission factor. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element.
	
	   AGA standard
	   GPA standard
	   Industry standard practices
	   Other

OtherIndustryStandardforEF (RY 2013 onward)	**Conditionally Required:** The industry standard(s) used to develop the supplier-specific emission factor if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.
DevelopedEF5b (RY 2013 onward)	**Parent Element (Conditionally Required):** A collection of data elements containing information to report if the facility is using a supplier-specific emissions factor in Equation NN-5b instead of the default emissions factor.
EFDetails (RY 2013 onward)	**Parent Element:** A collection of data elements containing information to report if the facility is using a supplier-specific emissions factor in Equation NN-5b instead of the default emissions factor.
DevelopedEF (RY 2013 onward)	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-5b. Report the value in the child data element **MeasureValue**. Set the units of measure to "MT CO2/Mscf" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.

IndustryStandardforEF
(RY 2013 onward)
	The industry standard(s) used to develop the supplier-specific emission factor. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element.
	
	   AGA standard
	   GPA standard
	   Industry standard practices
	   Other

Data Element Name	Description
OtherIndustryStandardforEF (RY 2013 onward)	**Conditionally Required:** The industry standard(s) used to develop the supplier-specific emission factor if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.

XML Excerpt 12
Example for Equations NN-3, NN-4, NN-5a and NN-5b Developed Emission Factors

```
<ghg:DevelopedEF3>
        <ghg:EFDetails>
        <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                <ghg:MeasureValue>0.051</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforEF>AGA standard</ghg:IndustryStandardforEF>
        </ghg:EFDetails>
</ghg:DevelopedEF3>
<ghg:DevelopedEF4>
        <ghg:EFDetails>
        <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                <ghg:MeasureValue>0.052</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforEF>GPA standard</ghg:IndustryStandardforEF>
        <ghg:IndustryStandardforEF>Industry standard practices</ghg:IndustryStandardforEF>
        </ghg:EFDetails>
</ghg:DevelopedEF4>
<ghg:DevelopedEF5a>
        <ghg:EFDetails>
        <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                <ghg:MeasureValue>0.056</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforEF>Industry standard practices</ghg:IndustryStandardforEF>
        <ghg:IndustryStandardforEF>AGA standard</ghg:IndustryStandardforEF>
        </ghg:EFDetails>
</ghg:DevelopedEF5a>
<ghg:DevelopedEF5b>
        <ghg:EFDetails>
        <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                <ghg:MeasureValue>0.055</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>7</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforEF>Industry standard practices</ghg:IndustryStandardforEF>
        <ghg:IndustryStandardforEF>AGA standard</ghg:IndustryStandardforEF>
        </ghg:EFDetails>
</ghg:DevelopedEF5b>
```

Note: The code excerpt above is presented here to demonstrate the concept of reporting greenhouse gas quantity data and reflects revised reporting required for Reporting Year 2013 and subsequent years.

Each supplier that is a LDC that elects to use Calculation Methodology 1 may use a supplier-specific higher heating value (HHV) in units of MMBtu/Mscf in place of the default value provided in Table NN-1 and/or a supplier-specific CO_2 emission factor (EF) in units of kg CO_2/MMBtu in place of the default value provided in Table NN-1 [98.403(a)(1)].

Conditionally Required: If you developed a supplier-specific EF and/or HHV for use in Equation NN-1, Subpart NN requires you to report the following data:

- The developed HHV and/or EF [98.406(b)(11)(ii) and 98.406(b)(11)(iii)].
- The number of days in the reporting year for which substitute data procedures were used to develop the HHV [98.406(c)(2)] and/or EF [98.406(c)(3)].
- The industry standard(s) used to develop the HHV and/or EF [98.406(b)(11)(i)].

Note: Reporting is not required for "NN1EquationDetails" if the default emission factor and default higher heating value were used.

New for 2013 and subsequent years: The default emission factor and higher heating value for natural gas were updated for 2013. LDCs should review the new default emission factors provided in table NN-1.

Figure 22
LDC Equation NN-1 Details Schema Diagram
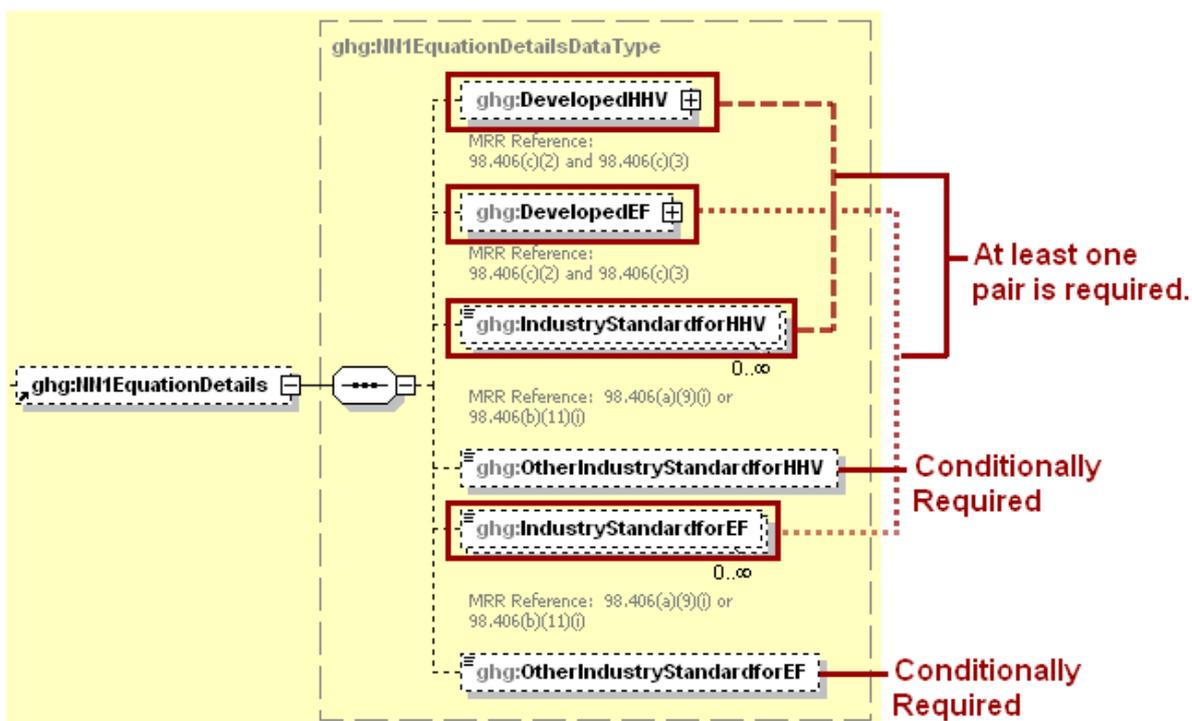
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

Table 15
LDC Equation NN-1 Details Data Element Definitions

Data Element Name	Description
NN1EquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if either a supplier-specific higher heating value or supplier-specific emission factor was used for Equation NN-1 instead of the default value or factor.

Data Element Name	Description
DevelopedHHV	**Conditionally Required**: A collection of data elements containing information on a supplier-specific higher heating value developed using methods outlined in §98.404. Report only if a supplier-specific higher heating value was used in Equation NN-1. Report the value in the child data element **MeasureValue**. Set the units of measure to "MMBtu/Mscf" in the attribute **heatUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific higher heating value in the child data element **NumberofTimesSubstituted**.
DevelopedEF	**Conditionally Required**: A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-1. Report the value in the child data element **MeasureValue**. Set the units of measure to "kg CO2/MMBtu" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.
IndustryStandardforHHV	**Conditionally Required**: The industry standard(s) used to develop the value for each supplier-specific higher heating value (HHV) reported for Calculation Methodology 1. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforHHV" data element. AGA standard GPA standard Industry standard practices Other
OtherIndustryStandardforHHV	**Conditionally Required**: The industry standard(s) used to develop the value for each supplier-specific higher heating value (HHV) reported for Calculation Methodology 1 if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforHHV". Otherwise do not report this data element.
IndustryStandardforEF	**Conditionally Required**: The industry standard(s) used to develop the value for each supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 1. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element. AGA standard GPA standard Industry standard practices Other
OtherIndustryStandardforEF	**Conditionally Required**: The industry standard(s) used to develop the value for each supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 1 if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.

XML Excerpt 13
Example for LDC Equation NN-1 Details

```
<ghg:NN1EquationDetails>
        <ghg:DevelopedHHV heatUOM="MMBtu/Mscf">
                <ghg:MeasureValue>1.038</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedHHV>
        <ghg:DevelopedEF efUOM="kg CO2/MMBtu">
                <ghg:MeasureValue>53.04</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>9</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforHHV>AGA standard</ghg:IndustryStandardforHHV>
        <ghg:IndustryStandardforHHV>Industry standard practices</ghg:IndustryStandardforHHV>
        <ghg:IndustryStandardforEF>GPA standard</ghg:IndustryStandardforEF>
        <ghg:IndustryStandardforEF>AGA standard</ghg:IndustryStandardforEF>
</ghg:NN1EquationDetails>
```

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

Each supplier that is a LDC that elects to use Calculation Methodology 2 may use a supplier-specific CO_2 emission factor (EF) in units of metric ton CO_2/Mscf in place of the default value provided in Table NN-2 [98.403(a)(2)].

Conditionally Required: If you developed a supplier-specific EF for use in Equation NN-2, Subpart NN requires you to report the following data:

- The developed EF [98.406(b)(11)(iii)].
- The number of days in the reporting year for which substitute data procedures were used to develop the EF [98.406(c)(3)].
- The industry standard(s) used to develop the EF [98.406(b)(11)(i)].

Note: Reporting is not required for "NN2EquationDetails" if the default emission factor was used.

For 2013 and subsequent years: The default emission factor for natural gas was updated for 2013. LDCs should review the new default emission factor for natural gas provided in table NN-2.

Figure 23
LDC Equation NN-2 Details Schema Diagram
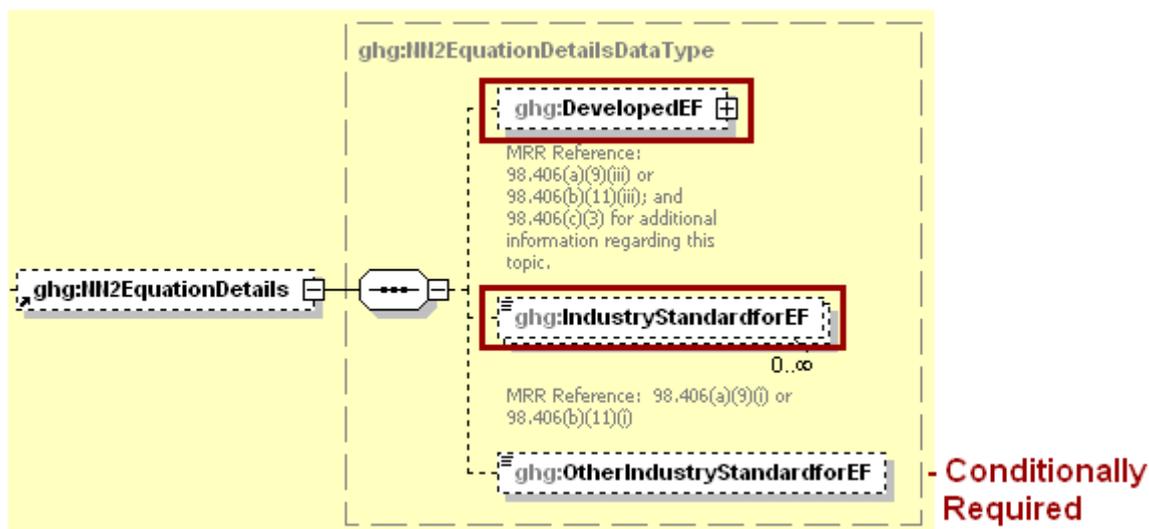
Note: Data elements boxed in red are required. Please see page 4 of this document for more information on conditionally required elements.

Table 16
LDC Equation NN-2 Details Data Element Definitions

Data Element Name	Description
NN2EquationDetails	**Parent Element (Conditionally Required):** A collection of data elements to report if a supplier-specific emission factor was used for Equation NN-2 instead of the default factor.
DevelopedEF	A collection of data elements containing information on a supplier-specific CO_2 emission factor developed using methods outlined in §98.404. Report only if a supplier-specific CO_2 emission factor was used in Equation NN-2. Report the value in the child data element **MeasureValue**. Set the units of measure to "MT CO2/Mscf" in the attribute **efUOM**. Also report the number of days that missing data procedures were used in measuring the supplier-specific CO_2 emission factor in the child data element **NumberofTimesSubstituted**.

IndustryStandardforEF	The industry standard(s) used to develop the value for each supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 2. See the list of allowable values below. If any standards used are not on the list, specify "Other" and report the industry standard(s) in the "OtherIndustryStandardforEF" data element.
	
	  AGA standard
	  GPA standard
	  Industry standard practices
	  Other

OtherIndustryStandardforEF	**Conditionally Required:** The industry standard(s) used to develop the value for each supplier-specific CO_2 emission factor (EF) reported for Calculation Methodology 2 if not on the list above. A value for this data element is required if "Other" was reported for "IndustryStandardforEF". Otherwise do not report this data element.

XML Excerpt 14
Example for LDC Equation NN-2 Details

```xml
<ghg:NN2EquationDetails>
        <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                <ghg:MeasureValue>53.04</ghg:MeasureValue>
                <ghg:NumberofTimesSubstituted>9</ghg:NumberofTimesSubstituted>
        </ghg:DevelopedEF>
        <ghg:IndustryStandardforEF>GPA standard</ghg:IndustryStandardforEF>
        <ghg:IndustryStandardforEF>Other</ghg:IndustryStandardforEF>
        <ghg:OtherIndustryStandardforEF>Standard 123, Standard 456</ghg:OtherIndustryStandardforEF>
</ghg:NN2EquationDetails>
```

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

Each supplier that is a LDC must report the following for each large end-user receiving a supply equal to or greater than 460,000 Mscf during the reporting year:

- The customer name [98.406(b)(12)].
- The customer address (street address, city, state, ZIP code) [98.406(b)(12)]. Note that you should report the customer's physical address, if the physical address is known. Should a facility you deliver gas to not have a physical address, the facility's mailing address may be used.
- The meter number [98.406(b)(12)].
- The EIA identification number of the LDC customer * (conditionally required - only if known). [98.406(b)(12)(i)].
- The annual volume of natural gas delivered to the large end-user by the LDC (in thousand standard cubic feet) [98.406(b)(7)].
- **For Reporting Year 2013 Onward:** Indicate whether the quantity of natural gas reported was delivered to a large end-user's facility or delivered to a specific meter located at the facility [98.406(b)(12)].

* Note: LDCs are only required to report this information if known. The EIA identification number referenced here is a number assigned to electric power plants who report on EIA Form EIA-923 (Power Plant Operations Report). Each facility who reports on this form is assigned a "Plant ID" number by EIA, which is a unique number for each power generating facility. This identification number is from 1 to 5 digits in length and can be found in the files under "Downloads" located at: http://www.eia.gov/cneaf/electricity/page/eia906_920.html. Reporting of this identification number is not required.

Each supplier that is a LDC must report the total annual volume (in thousand standard cubic feet) of natural gas delivered to each of the following end-use categories:

- Residential consumers [98.406(b)(13)(i)]
- Commercial consumers [98.406(b)(13)(ii)]
- Industrial consumers [98.406(b)(13)(iii)]
- Electricity generating facilities [98.406(b)(13)(iv)]

For definitions of these categories, refer to EIA Form 176 (Annual Report of Natural and Supplemental Gas Supply and Disposition) and Instructions: http://www.eia.gov/survey/form/eia_176/instructions.pdf

Note: When you report the quantity of gas delivered to each of the four end-use categories, make sure to include the following:

- Natural Gas delivered and owned by your LDC
- Natural Gas delivered to end-users by your LDC that IS NOT OWNED by your LDC
- Any deliveries to large end-users which receive greater than 460,000 mscf of natural gas per year as reported in Equation NN-4

Figure 24
Customer Details and Delivery Details Schema Diagram
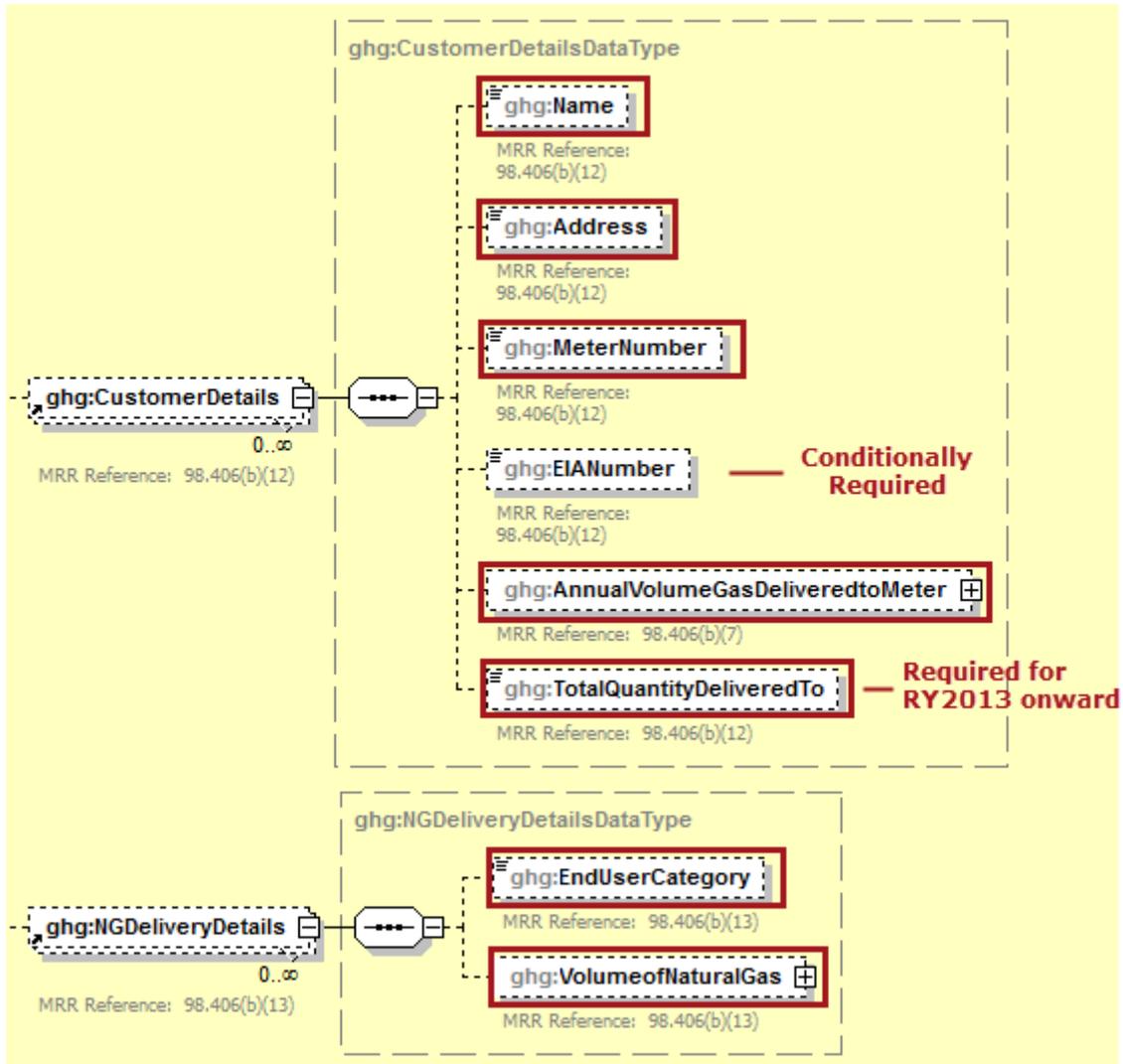
Note: Data elements boxed in red are required. Please see page 4 of this document
for more information on conditionally required elements.

Table 17
Customer Details and Delivery Details Data Element Definitions

Data Element Name	Description
CustomerDetails	**Parent Element:** A collection of data elements containing information for each customer who has a meter registering a supply equal to or greater than 460,000 Mscf during the reporting year.
Name	The customer name associated with the meter registering a supply equal to or greater than 460,000 Mscf during the reporting year.
Address	The specified customer's address (street address, city, state, ZIP code).
MeterNumber	The specified customer's meter number.
EIANumber	**Conditionally Required:** The EIA identification number of the specified customer (if known).
AnnualVolumeGasDeliveredtoMeter	A collection of data elements containing information on the annual volume of natural gas delivered by the LDC to the specified large end-user registering supply equal to or greater than 460,000 Mscf during the reporting year. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**.
TotalQuantityDeliveredTo	Indicate whether the total quantity of natural gas as reported in AnnualVolumeGasDeliveredtoMeter, is the total quantity delivered to a large end-user's facility or the quantity delivered to a specific meter located at the facility. See list of allowable values: Large end-user's facility Specific meter located at the facility
NGDeliveryDetails	**Parent Element:** A collection of data elements containing information on the volume of natural gas delivered to each end-use category.
EndUserCategory	Specify each end-use category that natural gas was delivered to in the reporting year. See list of allowable values: Residential consumers Commercial consumers Industrial consumers Electricity generating facilities
VolumeofNaturalGas	A collection of data elements containing information on the annual volume of natural gas delivered by the LDC to the specified end-use category. Report the value in the child data element **MeasureValue**. Set the units of measure to "Mscf" in the attribute **volUOM**.

XML Excerpt 15
Example for Customer Details and Delivery Details

```
            <ghg:CustomerDetails>
                <ghg:Name>Customer A</ghg:Name>
                <ghg:Address>1 Elm Street, Richmond, VA 23294</ghg:Address>
                <ghg:MeterNumber>123456</ghg:MeterNumber>
                <ghg:EIANumber>147258</ghg:EIANumber>
                <ghg:AnnualVolumeGasDeliveredtoMeter volUOM="Mscf">
                    <ghg:MeasureValue>500000.234</ghg:MeasureValue>
                </ghg:AnnualVolumeGasDeliveredtoMeter>
                <ghg:TotalQuantityDeliveredTo>Large end-user's facility</ghg:TotalQuantityDeliveredTo>
            </ghg:CustomerDetails>
            <ghg:CustomerDetails>
                <ghg:Name>Customer B</ghg:Name>
                <ghg:Address>1 Main Street, Richmond, VA 23294</ghg:Address>
                <ghg:MeterNumber>963852</ghg:MeterNumber>
                <ghg:EIANumber>987654</ghg:EIANumber>
                <ghg:AnnualVolumeGasDeliveredtoMeter volUOM="Mscf">
                    <ghg:MeasureValue>500000.66</ghg:MeasureValue>
                </ghg:AnnualVolumeGasDeliveredtoMeter>
                <ghg:TotalQuantityDeliveredTo>Specific meter located at the facility</ghg:TotalQuantityDeliveredTo>
            </ghg:CustomerDetails>
            <ghg:NGDeliveryDetails>
                <ghg:EndUserCategory>Residential consumers</ghg:EndUserCategory>
                <ghg:VolumeofNaturalGas volUOM="Mscf">
                    <ghg:MeasureValue>100000.25</ghg:MeasureValue>
                </ghg:VolumeofNaturalGas>
            </ghg:NGDeliveryDetails>
            <ghg:NGDeliveryDetails>
                <ghg:EndUserCategory>Commercial consumers</ghg:EndUserCategory>
                <ghg:VolumeofNaturalGas volUOM="Mscf">
                    <ghg:MeasureValue>200000.7505</ghg:MeasureValue>
                </ghg:VolumeofNaturalGas>
            </ghg:NGDeliveryDetails>
            <ghg:NGDeliveryDetails>
                <ghg:EndUserCategory>Industrial consumers</ghg:EndUserCategory>
                <ghg:VolumeofNaturalGas volUOM="Mscf">
                    <ghg:MeasureValue>800000.15</ghg:MeasureValue>
                </ghg:VolumeofNaturalGas>
            </ghg:NGDeliveryDetails>
            <ghg:NGDeliveryDetails>
                <ghg:EndUserCategory>Electricity generating facilities</ghg:EndUserCategory>
                <ghg:VolumeofNaturalGas volUOM="Mscf">
                    <ghg:MeasureValue>900000.95234</ghg:MeasureValue>
                </ghg:VolumeofNaturalGas>
            </ghg:NGDeliveryDetails>
        </ghg:LDCDetails>
</ghg:SubPartNN>
```

4.0   Supplier-Level Roll-up GHG Quantity Data

Each facility must report the following facility-level emission totals:
- Total CO_2 equivalent (CO_2e) emissions (excluding biogenic CO_2) aggregated across all direct emitter source categories (Subparts C-HH) associated with the facility.
- Total biogenic CO_2 emissions aggregated across all direct emitter source categories (Subparts C-HH) associated with the facility.

Each supplier must report the following supplier totals:
- Total CO_2e associated with products supplied aggregated across Subparts LL, MM, NN, OO, PP and QQ (as applicable).

Figure 25
Supplier-Level Roll-up GHG Quantity Data Schema Diagram
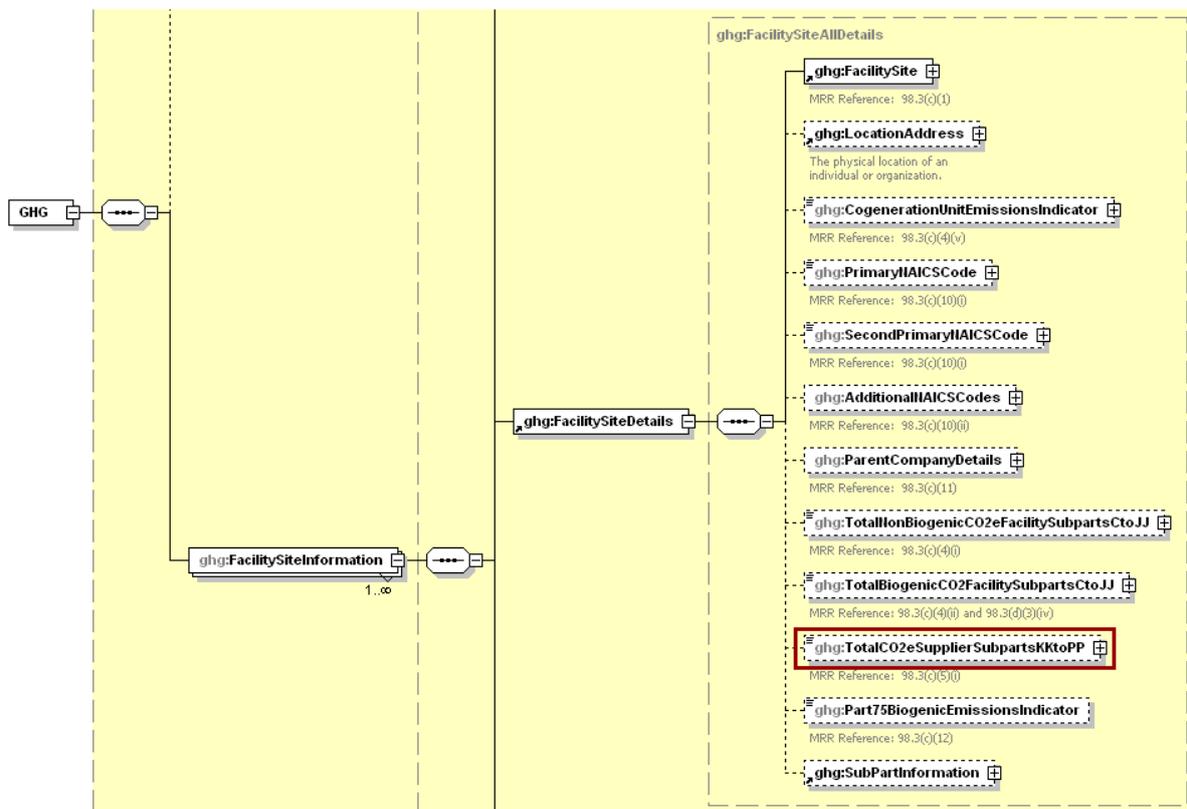
Note: Data elements boxed in red are required.

For Subpart NN, add the total quantity of carbon dioxide (CO_2) to the total CO_2 equivalent (CO_2e) quantity aggregated across all supplier categories Subparts associated with the supplier using the following guidelines:

1. If the supplier is a fractionator of natural gas liquids (NGL), use the potential CO_2 quantity associated with all products delivered to customers (sum of Equation NN-8 across each fractionated NGL product) in metric tons.

    This value is calculated by summing the rounded results of Equations NN-1 and NN-2 across each fractionated NGL product (the potential CO_2 quantity associated with product supplied in

metric tons) and subtracting the rounded result of Equation NN-7 across each fractionated NGL product (the potential CO_2 quantity associated with product received from other fractionators in metric tons).

2. If the supplier is a natural gas local distribution company (LDC), use the potential CO_2 quantity associated with the combustion or oxidation of natural gas supplied to end-users that receive less than 460,000 mscf per year (Equation NN-6) in metric tons.

    For RY 2010 through RY 2012, this value is calculated by subtracting the rounded results of Equation NN-3 (potential CO_2 quantity associated with natural gas delivered to downstream transmission pipelines or other LDCs in metric tons), Equation NN-4 (potential CO_2 quantity associated with natural gas delivered to end users that receive a supply equal to or greater than 460,000 mscf per year in metric tons) and Equation NN-5 (potential CO_2 quantities associated with product received that bypassed the city gate(s) such as natural gas received from local production and the net natural gas that is liquefied and/or stored/removed from storage by the LDC within the reported year in metric tons) from the rounded result of Equation NN-1 or NN-2 (potential CO_2 quantity associated with natural gas received at the city gate(s) in metric tons).

    For RY 2013 onward, this value is calculated by subtracting the rounded results of Equation NN-3 (potential CO_2 quantity associated with natural gas delivered to downstream transmission pipelines or other LDCs in metric tons), Equation NN-4 (potential CO_2 quantity associated with natural gas delivered to end users that receive a supply equal to or greater than 460,000 mscf per year in metric tons), Equation NN-5a (potential CO_2 quantities associated with the combustion or oxidation of natural gas received by the LDC at the city gate(s) that is injected into on-system storage and/or liquefied and stored, and for gas removed from storage and used for deliveries), from the rounded result of the sum of Equation NN-1 or NN-2 (potential CO_2 quantity associated with natural gas received at the city gate(s) in metric tons) and Equation NN-5b (potential CO_2 quantities associated with the combustion or oxidation of natural gas received by the LDC that bypassed the city gate(s), including natural gas received directly by LDC systems from producers or natural gas processing plants from local production, received as a liquid and vaporized for delivery, or received from any other source that bypassed the city gate).

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

Table 18
Supplier Level Roll-up GHG Quantity Data Element Definitions

Data Element Name	Description
TotalCO2eSupplierSubpartsKKtoPP	Add the total CO_2e value for Subpart NN in metric tons to the total CO_2e quantity aggregated across all other supplier categories Subparts associated with the supplier according to the guidelines above. Set the units of measure to "Metric Tons" in the attribute **massUOM**.

XML Excerpt 16
Example for Supplier Level Roll-up GHG Quantity Data

```
<ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">6753.4</ghg:TotalCO2eSupplierSubpartsKKtoPP>
```

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

IV.   Appendix A – Sample XML Document for Subpart NN – NGL Fractionator

(Note: The example below is for a NGL Fractionator for RY2013 and later. Data values do not reflect an actual facility's emissions.)

```xml
<ghg:GHG xmlns="http://www.ccdsupport.com/schema/ghg">
  <ghg:FacilitySiteInformation>
    <ghg:CertificationStatement>The designated representative or alternate designated representative must sign (i.e., agree to) this certification statement. If you are an agent and you click on "SUBMIT", you are not agreeing to the certification statement, but are submitting the certification statement on behalf of the designated representative or alternate designated representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on behalf of the designated representative, not to sign (i.e., agree to) the certification statement.</ghg:CertificationStatement>
    <ghg:ReportingYear>2011</ghg:ReportingYear>
    <ghg:FacilitySiteDetails>
      <ghg:FacilitySite>
        <ghg:FacilitySiteIdentifier>524117</ghg:FacilitySiteIdentifier>
        <ghg:FacilitySiteName>Test Facility NN</ghg:FacilitySiteName>
      </ghg:FacilitySite>
      <ghg:LocationAddress>
        <ghg:LocationAddressText>1 Main St.</ghg:LocationAddressText>
        <ghg:LocalityName>Charlottesville</ghg:LocalityName>
        <ghg:StateIdentity>
        <ghg:StateCode>VA</ghg:StateCode>
        </ghg:StateIdentity>
        <ghg:AddressPostalCode>22911</ghg:AddressPostalCode>
      </ghg:LocationAddress>
      <ghg:CogenerationUnitEmissionsIndicator>N</ghg:CogenerationUnitEmissionsIndicator>
      <ghg:PrimaryNAICSCode>211112</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">0</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
      <ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">0</ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ>
      <ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">323641.5</ghg:TotalCO2eSupplierSubpartsKKtoPP>
      <ghg:SubPartInformation>
        <ghg:SubPartNN>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>323641.5</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:NGLDetails>
            <ghg:NGLFuelDetails>
              <ghg:NGLSupplied>
                <ghg:ProductCategoryName>Propane</ghg:ProductCategoryName>
                <ghg:Quantity volUOM="bbl">
                  <ghg:MeasureValue>7777.95162</ghg:MeasureValue>
                  <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
                </ghg:Quantity>
                <ghg:MeasureMethodName>AGA standard</ghg:MeasureMethodName>
```

```
                    <ghg:MeasureMethodName>ASTM standard</ghg:MeasureMethodName>
                    <ghg:MeasureMethodName>NAESB standard</ghg:MeasureMethodName>
                    <ghg:MeasureMethodName>Other</ghg:MeasureMethodName>
                    <ghg:OtherMeasureMethodName>Standard ABC, Standard XYZ</ghg:OtherMeasureMethodName>
            </ghg:NGLSupplied>
            <ghg:NGLReceived>
                    <ghg:ProductCategoryName>Propane</ghg:ProductCategoryName>
                    <ghg:Quantity volUOM="bbl">
                            <ghg:MeasureValue>7777.34556</ghg:MeasureValue>
                            <ghg:NumberofTimesSubstituted>7</ghg:NumberofTimesSubstituted>
                    </ghg:Quantity>
                    <ghg:DevelopedEF7>
                            <ghg:EFDetails>
                                    <ghg:DevelopedEF efUOM="MT CO2/bbl">
                                            <ghg:MeasureValue>0.237</ghg:MeasureValue>
                                            <ghg:NumberofTimesSubstituted>9</ghg:NumberofTimesSubstituted>
                                    </ghg:DevelopedEF>
                                    <ghg:IndustryStandardforEF>GPA standard</ghg:IndustryStandardforEF>
                            </ghg:EFDetails>
                    </ghg:DevelopedEF7>
            </ghg:NGLReceived>
            <ghg:NN2CO2MassTotal massUOM="Metric Tons">
                    <ghg:CalculatedValue>1905.4</ghg:CalculatedValue>
            </ghg:NN2CO2MassTotal>
            <ghg:NN7CO2MassTotal massUOM="Metric Tons">
                    <ghg:CalculatedValue>1843.1</ghg:CalculatedValue>
            </ghg:NN7CO2MassTotal>
            <ghg:NN2EquationDetails>
                    <ghg:DevelopedEF efUOM="MT CO2/bbl">
                            <ghg:MeasureValue>0.245</ghg:MeasureValue>
                            <ghg:NumberofTimesSubstituted>6</ghg:NumberofTimesSubstituted>
                    </ghg:DevelopedEF>
                    <ghg:IndustryStandardforEF>Industry standard practices</ghg:IndustryStandardforEF>
            </ghg:NN2EquationDetails>
    </ghg:NGLFuelDetails>
    <ghg:NGLFuelDetails>
            <ghg:NGLSupplied>
                    <ghg:ProductCategoryName>Ethane</ghg:ProductCategoryName>
                    <ghg:Quantity volUOM="bbl">
                            <ghg:MeasureValue>4444.24234</ghg:MeasureValue>
                            <ghg:NumberofTimesSubstituted>2</ghg:NumberofTimesSubstituted>
                    </ghg:Quantity>
                    <ghg:MeasureMethodName>ASTM standard</ghg:MeasureMethodName>
            </ghg:NGLSupplied>
            <ghg:NGLReceived>
                    <ghg:ProductCategoryName>Ethane</ghg:ProductCategoryName>
                    <ghg:Quantity volUOM="bbl">
                            <ghg:MeasureValue>3333.04567</ghg:MeasureValue>
                            <ghg:NumberofTimesSubstituted>3</ghg:NumberofTimesSubstituted>
                    </ghg:Quantity>
                    <ghg:DevelopedEF7>
                            <ghg:EFDetails>
                                    <ghg:DevelopedEF efUOM="MT CO2/bbl">
                                            <ghg:MeasureValue>0.253</ghg:MeasureValue>
                                    </ghg:DevelopedEF>
                            </ghg:EFDetails>
                    </ghg:DevelopedEF7>
            </ghg:NGLReceived>
            <ghg:NN1CO2MassTotal massUOM="Metric Tons">
```

```xml
                                        <ghg:CalculatedValue>1122.4</ghg:CalculatedValue>
                                    </ghg:NN1CO2MassTotal>
                                    <ghg:NN7CO2MassTotal massUOM="Metric Tons">
                                        <ghg:CalculatedValue>843.2</ghg:CalculatedValue>
                                    </ghg:NN7CO2MassTotal>
                                    <ghg:NN1EquationDetails>
                                        <ghg:DevelopedHHV heatUOM="MMBtu/bbl">
                                            <ghg:MeasureValue>4.032</ghg:MeasureValue>
                                        </ghg:DevelopedHHV>
                                        <ghg:DevelopedEF efUOM="kg CO2/MMBtu">
                                            <ghg:MeasureValue>62.64</ghg:MeasureValue>
                                        </ghg:DevelopedEF>
                                    </ghg:NN1EquationDetails>
                                </ghg:NGLFuelDetails>
                                <ghg:AnnualVolumeGasReceived volUOM="Mscf">
                                    <ghg:MeasureValue>1000.24567</ghg:MeasureValue>
                                </ghg:AnnualVolumeGasReceived>
                                <ghg:AnnualQuantityBulkNGLReceived volUOM="bbl">
                                    <ghg:MeasureValue>2000.789875</ghg:MeasureValue>
                                </ghg:AnnualQuantityBulkNGLReceived>
                                <ghg:AnnualQuantityBulkNGLSupplied volUOM="bbl">
                                    <ghg:MeasureValue>2000.789875</ghg:MeasureValue>
                                </ghg:AnnualQuantityBulkNGLSupplied>
                                <ghg:AnnualQuantityPropaneOdorized volUOM="bbl">
                                    <ghg:MeasureValue>3000.876432</ghg:MeasureValue>
                                </ghg:AnnualQuantityPropaneOdorized>
                            </ghg:NGLDetails>
                        </ghg:SubPartNN>
                    </ghg:SubPartInformation>
                </ghg:FacilitySiteDetails>
                <ghg:CalculationMethodologyChangesDescription>None</ghg:CalculationMethodologyChangesDescription>
                <ghg:BestAvailableMonitoringMethodsUsed>N/A</ghg:BestAvailableMonitoringMethodsUsed>
                <ghg:StartDate>2011-01-01</ghg:StartDate>
                <ghg:EndDate>2011-12-31</ghg:EndDate>
                <ghg:DateTimeReportGenerated>2012-02-08T13:24:34</ghg:DateTimeReportGenerated>
            </ghg:FacilitySiteInformation>
        </ghg:GHG>
```

V.   Appendix B – Sample XML Document for Subpart NN - LDC

(Note: The example below is for RY2013 and later. Data values do not reflect an actual facility's emissions.)

```
<ghg:GHG xmlns="http://www.ccdsupport.com/schema/ghg">
  <ghg:FacilitySiteInformation>
    <ghg:CertificationStatement>The designated representative or alternate designated representative must sign (i.e., agree to) this certification statement. If you are an agent and you click on  "SUBMIT", you are not agreeing to the certification statement, but are submitting the certification statement on behalf of the designated  representative or alternate designated representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on behalf of the designated representative, not to sign (i.e., agree to) the certification statement.</ghg:CertificationStatement>
    <ghg:ReportingYear>2011</ghg:ReportingYear>
    <ghg:FacilitySiteDetails>
      <ghg:FacilitySite>
        <ghg:FacilitySiteIdentifier>524117</ghg:FacilitySiteIdentifier>
        <ghg:FacilitySiteName>Test Facility NN-1</ghg:FacilitySiteName>
      </ghg:FacilitySite>
      <ghg:LocationAddress>
        <ghg:LocationAddressText>1 Main St.</ghg:LocationAddressText>
        <ghg:LocalityName>Charlottesville</ghg:LocalityName>
        <ghg:StateIdentity>
        <ghg:StateCode>VA</ghg:StateCode>
        </ghg:StateIdentity>
        <ghg:AddressPostalCode>22911</ghg:AddressPostalCode>
      </ghg:LocationAddress>
      <ghg:CogenerationUnitEmissionsIndicator>N</ghg:CogenerationUnitEmissionsIndicator>
      <ghg:PrimaryNAICSCode>211112</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">0</ghg:TotalNonBiogenicCO2eFacilitySubpartsCtoJJ>
      <ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ massUOM="Metric Tons">0</ghg:TotalBiogenicCO2FacilitySubpartsCtoJJ>
      <ghg:TotalCO2eSupplierSubpartsKKtoPP massUOM="Metric Tons">384781.2</ghg:TotalCO2eSupplierSubpartsKKtoPP>
      <ghg:SubPartInformation>
        <ghg:SubPartNN>
          <ghg:GHGasInfoDetails>
            <ghg:GHGasName>Carbon Dioxide</ghg:GHGasName>
            <ghg:GHGasQuantity massUOM="Metric Tons">
              <ghg:CalculatedValue>384781.2</ghg:CalculatedValue>
            </ghg:GHGasQuantity>
          </ghg:GHGasInfoDetails>
          <ghg:LDCDetails>
            <ghg:StateTerritoryCovered>VA</ghg: StateTerritoryCovered>
            <ghg:AnnualVolumeGasReceived volUOM="Mscf">
              <ghg:MeasureValue>10000000.369</ghg:MeasureValue>
              <ghg:NumberofTimesSubstituted>10</ghg:NumberofTimesSubstituted>
            </ghg:AnnualVolumeGasReceived>
            <ghg:IndustryStandardforVolume>Industry standard practices</ghg:IndustryStandardforVolume>
            <ghg:AnnualVolumeGasStored volUOM="Mscf">
              <ghg:MeasureValue>10000.147</ghg:MeasureValue>
```

```xml
                    <ghg:NumberofTimesSubstituted>10</ghg:NumberofTimesSubstituted>
            </ghg:AnnualVolumeGasStored>
            <ghg:AnnualVolumeLNGforDelivery volUOM="Mscf">
                    <ghg:MeasureValue>1000.845</ghg:MeasureValue>
                    <ghg:NumberofTimesSubstituted>15</ghg:NumberofTimesSubstituted>
            </ghg:AnnualVolumeLNGforDelivery>
            <ghg:AnnualVolumeGasfromStorageforDelivery volUOM="Mscf">
                    <ghg:MeasureValue>2000.625</ghg:MeasureValue>
                    <ghg:NumberofTimesSubstituted>20</ghg:NumberofTimesSubstituted>
            </ghg:AnnualVolumeGasfromStorageforDelivery>
            <ghg:AnnualVolumeGasDeliveredtoPipeline volUOM="Mscf">
                    <ghg:MeasureValue>10000.485</ghg:MeasureValue>
                    <ghg:NumberofTimesSubstituted>15</ghg:NumberofTimesSubstituted>
            </ghg:AnnualVolumeGasDeliveredtoPipeline>
            <ghg:AnnualVolumeGasBypassedCityGate volUOM="Mscf">
                    <ghg:MeasureValue>1500.454</ghg:MeasureValue>
                    <ghg:NumberofTimesSubstituted>16</ghg:NumberofTimesSubstituted>
            </ghg:AnnualVolumeGasBypassedCityGate>
            <ghg:NN1CO2MassTotal massUOM="Metric Tons">
                    <ghg:CalculatedValue>550555.2</ghg:CalculatedValue>
            </ghg:NN1CO2MassTotal>
            <ghg:NN3CO2MassTotal massUOM="Metric Tons">
                    <ghg:CalculatedValue>550.6</ghg:CalculatedValue>
            </ghg:NN3CO2MassTotal>
            <ghg:NN4CO2MassTotal massUOM="Metric Tons">
                    <ghg:CalculatedValue>165000.8</ghg:CalculatedValue>
            </ghg:NN4CO2MassTotal>
            <ghg:NN5aCO2MassTotal massUOM="Metric Tons">
                    <ghg:CalculatedValue>224.5</ghg:CalculatedValue>
            </ghg:NN5aCO2MassTotal>
            <ghg:NN5bCO2MassTotal massUOM="Metric Tons">
                    <ghg:CalculatedValue>331.9</ghg:CalculatedValue>
            </ghg:NN5bCO2MassTotal>
            <ghg:DevelopedEF3>
                    <ghg:EFDetails>
                    <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                            <ghg:MeasureValue>0.055</ghg:MeasureValue>
                    </ghg:DevelopedEF>
                    </ghg:EFDetails>
            </ghg:DevelopedEF3>
            <ghg:DevelopedEF4>
                    <ghg:EFDetails>
                    <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                            <ghg:MeasureValue>0.055</ghg:MeasureValue>
                    </ghg:DevelopedEF>
                    </ghg:EFDetails>
            </ghg:DevelopedEF4>
            <ghg:DevelopedEF5a>
                    <ghg:EFDetails>
                    <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                            <ghg:MeasureValue>0.056</ghg:MeasureValue>
                            <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
                    </ghg:DevelopedEF>
                    </ghg:EFDetails>
            </ghg:DevelopedEF5a>
            <ghg:DevelopedEF5b>
                    <ghg:EFDetails>
                    <ghg:DevelopedEF efUOM="MT CO2/Mscf">
                            <ghg:MeasureValue>0.056</ghg:MeasureValue>
```

```
                                        <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
                                </ghg:DevelopedEF>
                        </ghg:EFDetails>
                </ghg:DevelopedEF5b>
                <ghg:NN1EquationDetails>
                        <ghg:DevelopedHHV heatUOM="MMBtu/Mscf">
                                <ghg:MeasureValue>1.038</ghg:MeasureValue>
                                <ghg:NumberofTimesSubstituted>5</ghg:NumberofTimesSubstituted>
                        </ghg:DevelopedHHV>
                        <ghg:DevelopedEF efUOM="kg CO2/MMBtu">
                                <ghg:MeasureValue>53.04</ghg:MeasureValue>
                                <ghg:NumberofTimesSubstituted>9</ghg:NumberofTimesSubstituted>
                        </ghg:DevelopedEF>
                        <ghg:IndustryStandardforHHV>AGA standard</ghg:IndustryStandardforHHV>
                        <ghg:IndustryStandardforEF>GPA standard</ghg:IndustryStandardforEF>
                </ghg:NN1EquationDetails>
                <ghg:CustomerDetails>
                        <ghg:Name>Customer A</ghg:Name>
                        <ghg:Address>1 Elm Street, Richmond, VA 23294</ghg:Address>
                        <ghg:MeterNumber>123456</ghg:MeterNumber>
                        <ghg:EIANumber>147258</ghg:EIANumber>
                        <ghg:AnnualVolumeGasDeliveredtoMeter volUOM="Mscf">
                                <ghg:MeasureValue>500000.159</ghg:MeasureValue>
                        </ghg:AnnualVolumeGasDeliveredtoMeter>
                        <ghg:TotalQuantityDeliveredTo> Specific meter located at the facility </ghg:TotalQuantityDeliveredTo>
                </ghg:CustomerDetails>
                <ghg:CustomerDetails>
                        <ghg:Name>Customer B</ghg:Name>
                        <ghg:Address>1 Elm Street, Richmond, VA 23294</ghg:Address>
                        <ghg:MeterNumber>963852</ghg:MeterNumber>
                        <ghg:EIANumber>987654</ghg:EIANumber>
                        <ghg:AnnualVolumeGasDeliveredtoMeter volUOM="Mscf">
                                <ghg:MeasureValue>500000.485</ghg:MeasureValue>
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