



# NETL Life Cycle Inventory Data

## Process Documentation File

**Process Name:** Natural Gas Processing, Other Venting Fugitives  
**Reference Flow:** 1 kg of Natural Gas Processed  
**Brief Description:** This unit process quantifies the mass of gas emitted as a result of fugitive venting from natural gas processing activities not accounted for elsewhere in the NG model.

---

### Section I: Meta Data

---

**Geographical Coverage:** United States      **Region:** N/A  
**Year Data Best Represents:** 2006  
**Process Type:** Extraction Process (EP)  
**Process Scope:** Gate-to-Gate Process (GG)  
**Allocation Applied:** No  
**Completeness:** All Relevant Flows Captured

**Flows Aggregated in Data Set:**

Process       Energy Use       Energy P&D       Material P&D

**Relevant Output Flows Included in Data Set:**

Releases to Air:     Greenhouse Gases     Criteria Air     Other

Releases to Water:  Inorganic     Organic Emissions     Other

Water Usage:     Water Consumption     Water Demand (throughput)

Releases to Soil:  Inorganic Releases     Organic Releases     Other

**Adjustable Process Parameters:**

Vent\_rate      *[kg/kg] Adjustable parameter; kg of natural gas vented per kg of natural gas processed*

share\_CO2      *[dimensionless] fraction of CO<sub>2</sub> in vented gas*

share\_CH4      *[dimensionless] fraction of CH<sub>4</sub> in vented gas*

share_NMVOC	<i>[dimensionless] fraction of NMVOC in vented gas</i>
share_N2	<i>[dimensionless] fraction of nitrogen in vented gas</i>

**Tracked Input Flows:**

Natural gas [intermediate product]	<i>Natural gas (from dehydrator)</i>
------------------------------------	--------------------------------------

**Tracked Output Flows:**

Natural Gas Extracted	<i>Reference flow</i>
Carbon dioxide [Inorganic emissions to air]	<i>Emission to air</i>
Methane [Organic emissions to air (group VOC)]	<i>Emission to air</i>
NMVOC (unspecified) [Group NMVOC to air]	<i>Emission to air</i>
Nitrogen	<i>Emission to air</i>

---

## Section II: Process Description

---

**Associated Documentation**

This unit process is composed of this document and the data sheet (DS) *DS\_Stage1\_O\_NG\_Processing\_OtherVenting\_Fugitives\_2011.01.xls*, which provides additional details regarding relevant calculations, data quality, and references.

**Goal and Scope**

This unit process accounts for natural gas that is vented as fugitive emissions by unidentified processes at a natural gas processing plant. The reference flow of this unit process is 1 kg of processed natural gas.

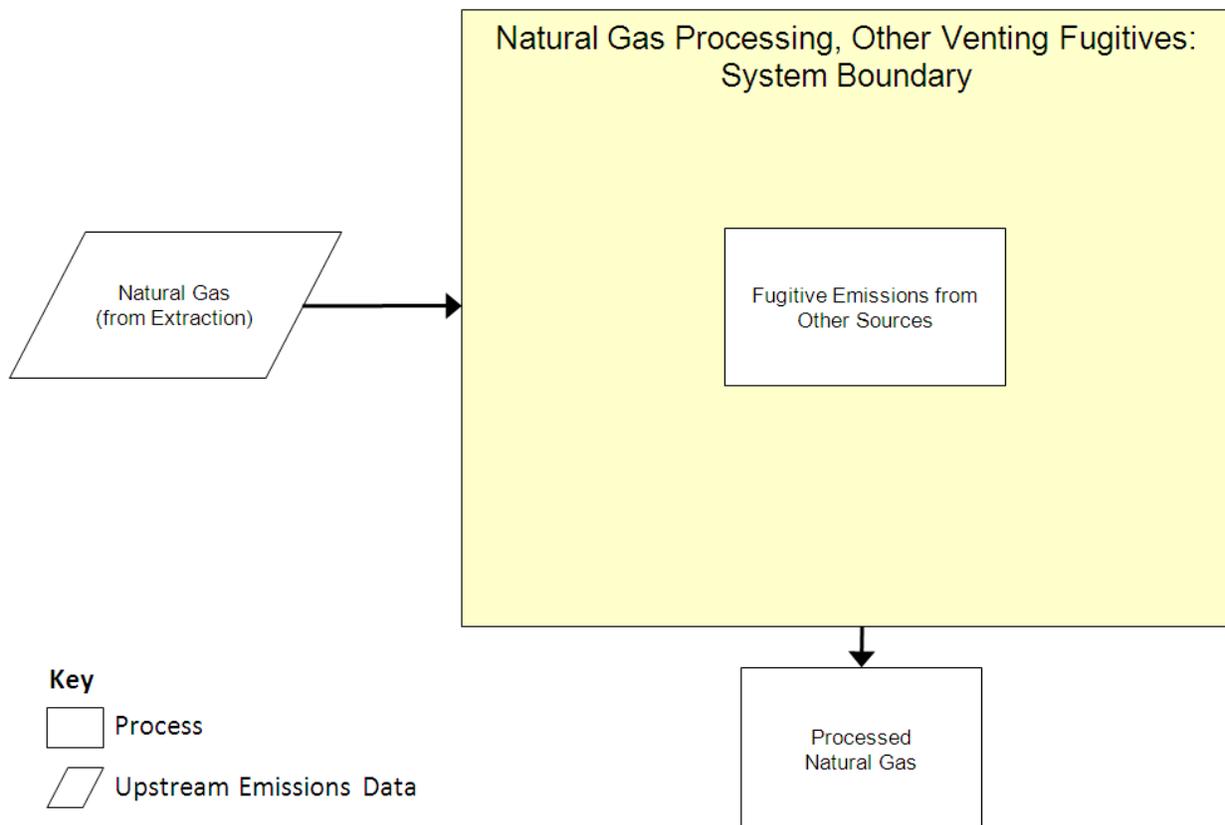
**Boundary and Description**

Routine emissions from natural gas extraction include fugitive emissions from equipment not accounted for elsewhere in the model. These emissions are referred to as "other fugitive emissions" and cannot be captured for flaring.

Data for other fugitive emissions from natural gas extraction are based on EPA data for onshore and offshore natural gas wells (EPA, 2011). EPA's data is based on 2006

production (EPA, 2011) and shows the annual methane emissions for specific extraction activities. EPA's data were converted from an annual basis to a unit-of-production basis by dividing the methane emission rate by the natural gas production rate in 2006. In 2006 the U.S. processed 14,682,188 MMCF of natural gas (EIA, 2011). **Table 1** shows other fugitive emissions from natural gas processing and the corresponding emission factor.

**Figure 1: Unit Process Scope and Boundary**



**Table 1: Other Point Source Emissions from Natural Gas Processing**

Processing Activity	Value	Units
Kimray Pumps	11,572	MMCF/yr
Blowdowns, Compressors	113	MMCF/yr
Blowdowns, Compressor Starts	253	MMCF/yr
Kimray Pumps (Glycol Pump for Dehydrator)	177	MMCF/yr
Total Emissions	12,115	MMCF/yr
Gas Processing Rate	14,682,188	MMCF/yr
Emission Factor	8.25E-04	kg CH <sub>4</sub> /kg NG

Table 2: Unit Process Input and Output Flows

Flow Name	Value	Units (Per Reference Flow)
<b>Inputs</b>		
Natural gas [intermediate product]	<b>1.000825</b>	kg
<b>Outputs</b>		
Natural Gas Extracted	<b>1.00</b>	kg
Carbon dioxide [Inorganic emissions to air]	3.88E-06	kg
Methane [Organic emissions to air (group VOC)]	7.71E-04	kg
NMVOC (unspecified) [Group NMVOC to air]	4.60E-05	kg
Nitrogen	4.54E-06	kg

\* **Bold face** clarifies that the value shown *does not* include upstream environmental flows.

### Embedded Unit Processes

None.

### References

EIA. (2011). Natural Gas Gross Withdrawals and Production. U.S. Energy Information Administration. Retrieved April 5, 2011, from [http://www.eia.doe.gov/dnav/ng/ng\\_prod\\_sum\\_a\\_EPGO\\_VRN\\_mmcfc\\_a.htm](http://www.eia.doe.gov/dnav/ng/ng_prod_sum_a_EPGO_VRN_mmcfc_a.htm)

EPA. (2011). Background Technical Support Document - Petroleum and Natural Gas Industry. Washington, D.C.



**Section III: Document Control Information**

---

**Date Created:** January 3, 2013

**Point of Contact:** Timothy Skone (NETL), Timothy.Skone@NETL.DOE.GOV

**Revision History:**

Original/no revisions

**How to Cite This Document:** This document should be cited as:

NETL (2011). NETL Life Cycle Inventory Data – Natural Gas Processing, Other Venting Fugitives. U.S. Department of Energy, National Energy Technology Laboratory. Last Updated: May 2011 (version 01). [www.netl.doe.gov/energy-analyses](http://www.netl.doe.gov/energy-analyses) (<http://www.netl.doe.gov/energy-analyses>)

---

**Section IV: Disclaimer**

---

Neither the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) nor any person acting on behalf of these organizations:

- A. Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this document, or that the use of any information, apparatus, method, or process disclosed in this document may not infringe on privately owned rights; or
- B. Assumes any liability with this report as to its use, or damages resulting from the use of any information, apparatus, method, or process disclosed in this document.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by NETL. The views and opinions of the authors expressed herein do not necessarily state or reflect those of NETL.