

**GHG Emission Factor Development Project for Selected
Sources in the Natural Gas Industry**

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Quarterly Progress Report

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Submitted to

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Project Overview

Methane (CH₄) is the primary component of natural gas and is also a potent greenhouse gas (GHG). Emissions of CH₄ from natural gas production, processing, and distribution are among the top ten source categories of greenhouse gas emissions in the United States, expressed on a CO₂ equivalent basis. The overall goal of the project is to update default CH₄ emission factors for selected processes and equipment used in the natural gas industry. The default emission factors will be updated by compiling and synthesizing existing data for a variety of source categories and by acquiring new emission rate measurement data for selected sources where existing data have unacceptably large uncertainties or are insufficiently representative of current practices or equipment.

The project is organized into four tasks:

- *Task 1, Data Synthesis and Gap Analysis:* The purposes of this task are to: (1) identify, compile, and synthesize existing CH₄ emission factor and activity factor data; (2) critically review the quality and representativeness of the existing data; (3) recommend and prioritize emission source characteristics for new data collection efforts under Task 3.
- *Task 2, Technical Plan Development:* The purpose of this task is to develop technical work plans and detailed cost estimates for conducting data collection and measurement studies aimed at filling the emission data gaps identified in Task 1. In doing so, we will consider the range of potential activity data metrics that could be used for updating default emission factors and gather preliminary data on relevant metrics to ensure that all the major subgroups of equipment or processes are taken into account.
- *Task 3, Measurements and Analysis:* The purposes of this task are to: (1) execute the technical plans developed in Task 2, contingent on authorization by EPA; and (2) analyze the resulting data to develop new default emission factors and uncertainty estimates for the measured sources.
- *Task 4, Reporting and Dissemination:* The purpose of this task is to report on the default emission factors developed in Tasks 1 and 3 of this study, including the methods used in the process. Reporting and communication with stakeholders will be integrated into all of the tasks and a final reporting will disseminate project results.

Progress on Tasks

Task 1

Review of sources of emission factor and/or activity factor data that may have relevance to the natural gas sources of interest was begun. The following page shows an overview of the types of information available in the references that have been reviewed in the second quarter.

Document	Description/Purpose of Data Program	Data Year	Data Location	Geographical Representativeness	Data Quality	Production	Processing	Transmission and Storage	Distribution
Greenhouse Gas Emission Estimation Methodologies, Procedures and Guidelines for the Natural Gas Distribution Sector	Detailed compilation of select methods for estimating CO ₂ , CH ₄ , and N ₂ O emissions from combustion and non-combustion sources for the natural gas industry distribution sector. Designed as a detailed reference for developing GHG inventories.	1995-2008	United States						X
Fugitive Hydrocarbon Emissions for Oil and Gas Production Operations	This report contains new emission factors for light crude production sites, heavy crude production sites, gas production sites, and Gulf of Mexico (Gulf) offshore petroleum operations that supersede those published by API in "Fugitive Hydrocarbon Emissions from Petroleum Production Operations, Volumes I and II," (1980). This report also contains emission correlation equations that can be used to calculate fugitive emissions from individual instrument screening values (ISV) obtained with portable hydrocarbon monitoring instruments at all types of petroleum production facilities. Data were collected from 184, 035 components at 20 different sites.	1990-1993	CA, TX, NM, LA, WY			X			
Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2006. Energy: Fugitive Fuel Emissions	Presents the Australian methodology to estimate greenhouse gas emissions and sinks for emissions from industrial processes. This document contains the methods and emission factors used by Australia to estimate annual fugitive emissions of greenhouse gases from activities associated with fuel production, transmission, storage and distribution.	2006	Australia energy sector.			X		X	X
Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2006. Energy: Stationary Sources	Presents the Australian methodology to estimate greenhouse gas emissions and sinks for emissions from industrial processes. This document contains the methods and emission factors used by Australia to estimate annual greenhouse gas emissions from stationary sources within the energy sector. The focus of the workbook is on the emissions of CO ₂ , CH ₄ , N ₂ O, NO _x , CO, and NMVOCs from purposeful combustion of fuels to provide energy.	2006	Australia energy sector.						
Australia National Greenhouse Accounts (NGA) Factors	Default emission factors estimated by the Department of Climate Change using the Australian Greenhouse Emissions Information System (AGEIS). The emission factors reported in this publication replace those listed in the AGO Factors and Methods Workbook, released in December 2006.		Australia						
National Inventory Report: Greenhouse Gas Sources and Sinks in Canada	Greenhouse gas inventory reports from 1990-2005.	1990-2005	Canada						
Annual European Community Greenhouse Gas Inventory 1990-2005 and Inventory Report 2007	Greenhouse gas inventory reports from 1990-2005.	1990-2006	Europe						
IPCC Emission Factor Database http://www.ipcc-nggip.iges.or.jp/EPDF/ind_of_main.php									
Environmental Performance in the E&P Industry 2006 Data	This report summarizes information on exploration and production activities carried out by International Association of Oil and Gas Producers (IOGP) member companies in 2006.	2006	Worldwide			X			
Flaring and Venting in the Oil & Gas Exploration and Production Industry	Provides non-technical information about the reasons gas is flared or vented. Explains what flaring and venting are, why they occur, their links with the safety of workforces and local populations and relevant environmental impacts. Also describes varied steps being taken within the industry to reduce flaring and venting emissions.	2000	Worldwide			X			
Methane Emission Mitigation Options in the Global Oil and Natural Gas Industries	Examines the most economic means of reducing emissions of methane associated with natural gas in several countries with large or rapidly growing natural gas or oil industries. The report discusses the sources of methane emissions from natural gas and oil industry sectors, methane emissions reported for selected countries, division of those emission between industry sectors, applicable emissions reduction practices and technologies, and abatement opportunities for each country based on a breakeven natural gas values and cost per tonne of carbon dioxide equivalent.		Worldwide						
Emissions of Greenhouse Gases in the United States 2006	Presents the Energy Information Administration's latest estimate (from 2006) of emissions for carbon dioxide, methane, nitrous oxide, and other greenhouse gases	2006	United States						
Year 2005 Gulfwide Emission Inventory Study	2005 emissions inventory of greenhouse gases from gulfwide offshore sources.	2005	Gulf of Mexico						
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005	Emissions inventory of greenhouse gases and sinks in 2005. Report also shows trends from 1990-2005	1990-2005	United States						
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006	Emissions inventory of greenhouse gases and sinks in 2006. Report also shows trends from 1990-2006	1990-2006	United States						
Natural Gas STAR Resources http://www.epa.gov/asseta									

Task 2

During this quarter we have begun to draft work plan specifying methods and procedures for gathering additional data needed for updating factors used for estimating methane emissions from centrifugal and reciprocating compressors used in natural gas processing.

Plans for Next Quarter

Task 1

During the next quarter we plan to continue to review data sources for information that might augment emission factors that are currently in widespread use for the source types of interest. We will identify limitations of the conventional emission factors and determine whether any of the more recent data addresses those limitations. A draft report of our findings in Task 1, conclusions, and recommendations for additional data gathering will be produced.

Task 2

After obtaining EPA and industry review of the draft natural gas processing work plan, and addressing comments, the work plan will be completed and used as a model for a similar document which will address compressors, pneumatic devices, and meter/regulating stations used in natural gas transmission and storage.

Equipment Purchased

None