Natural Gas STAR Methane Challenge Program BMP Commitment: Distribution Segment Supplementary Technical Information

Updated 6/17/16

Contents

Introduction

This document provides additional details to augment the Natural Gas STAR Methane Challenge Program ("Methane Challenge") Best Management Practices (BMP) Commitment Framework and Partnership Agreement documents released January 21, 2016.[1] This document provides additional information for each of the emission sources for the distribution segment, including source descriptions, detail on mitigation options, and Greenhouse Gas Reporting Program (GHGRP) and voluntary reporting data elements that would be reported annually to the EPA to track partner progress. Where multiple mitigation options are listed, Partners can choose to implement any combination of these throughout their operations to meet their commitments.

Methane Challenge Program Reporting

The EPA will collect the following information from partner companies as part of annual reporting to provide context for participation in the Program and facilitate annual tracking of progress:

- List of included facilities that report to Subpart W (facility ID)
- List of included facilities not reporting to Subpart W (a process will be developed for generating a facility ID for facilities that do not report to Subpart W)
- List of facilities acquired/divested during the reporting year

In the following sections of this document, for each emission source, the "Reporting" table summarizes the Data Elements the Methane Challenge Program will utilize to track partner company progress towards their commitments, including the following information:

- **Emission Source**: For each Emission Source that a company has committed to address[2], the company will provide information on all occurrences of that source across company/unit operations. Data collection will include both unmitigated sources and sources that have implemented mitigation options (including supplementary information for those sources that have eliminated emissions completely).
- **Quantification Method**: For most Emission Sources, there is a corresponding method or methods to quantify methane emissions.
- **Data Elements Collected via Facility-Level Reporting:** The table lists data elements to be reported by Partners, and indicates those already collected through GHGRP Subpart W reporting. Facilities not already reporting to Subpart W would report Data Elements through a supplemental reporting mechanism. Facilities already reporting to Subpart W would provide only supplemental data elements through the supplemental reporting mechanism.

In addition, annual reports will provide an opportunity for reporting optional, qualitative information to provide context for their progress each year.

For reporting purposes, the Methane Challenge Program will utilize the same segment and facility

[1] The Methane Challenge Program: Best Management Practices (BMP) Framework document can be found on the Natural Gas STAR website at http://www3.epa.gov/gasstar/documents/MethaneChallenge_BMP_Framework.pdf.
[2] Partners will only provide supplemental data for sources for which they have made commitments.

definitions as Subpart W. Data will be reported at the facility level. Annually, the EPA will compile the data collected and publicly release (on the Program website) all non-confidential data submitted either to the Methane Challenge Program[3] or through the GHGRP to track the progress of individual Partner companies in meeting their Program commitments.

Natural Gas Distribution Segment and Facility Definition

For purposes of the Methane Challenge Program, natural gas distribution means the distribution pipelines and metering and regulating equipment at metering-regulating stations that are operated by a Local Distribution Company (LDC) within a single state that is regulated as a separate operating company by a public utility commission or that is operated as an independent municipally-owned distribution system. This segment also excludes customer meters and regulators, infrastructure, and pipelines (both interstate and intrastate) delivering natural gas directly to major industrial users and farm taps upstream of the local distribution company inlet.

A natural gas distribution facility for the purposes of reporting under the Methane Challenge is the collection of all distribution pipelines and metering-regulating stations that are operated by an LDC within a single state that is regulated as a separate operating company by a public utility commission or that are operated as an independent municipally-owned distribution system.

Description of Emission Sources

Metering and Regulating (M&R) Stations/City Gates

At this time, EPA is not finalizing BMP commitment details for this source. Details for this source will be released as soon as they are available.

Distribution Pipeline Blowdowns

Source Description: Blowdown means the release of gas from a pipeline or section of pipeline that causes a reduction in system pressure or a complete depressurization.

Mitigation Options:

- Route gas to a compressor or capture system for beneficial use, or
- Route gas to a flare, or
- Route gas to a low-pressure system by taking advantage of existing piping connections between high- and low-pressure systems, temporarily resetting or bypassing pressure regulators to reduce system pressure prior to maintenance, or installing temporary connections between high and low pressure systems, or
- Utilize hot tapping, a procedure that makes a new pipeline connection while the pipeline remains in service, flowing natural gas under pressure, to avoid the need to blow down gas, or
- Use stopoff/stopple equipment and fittings to reduce the length of pipe and the associated volume of gas being blown down.

[3] All Methane Challenge supplemental data must be non-confidential.

Partners commit to maximize blowdown gas recovery and/or emission reductions through utilization of one or more of these options to reduce methane emissions from non-emergency blowdowns of pipelines operating greater than 60 psi by at least 50%[4] from total potential emissions each year. Total potential emissions equals calculated emissions from all planned maintenance activities in a calendar year[5], assuming the pipeline is mechanically evacuated or mechanically displaced using non-hazardous means down to atmospheric pressure and no mitigation is used.[6]

Commitment Timeframe: Partners commit to achieve the specified annual reduction rate by their designated commitment achievement date, not to exceed five (5) years from the commitment start date, and maintain at least that rate moving forward.

Reporting:

Emission Source	Quantification Method	Data Elements to be Collected at Facility-Level	Collected through GHGRP
Distribution Pipeline Blowdowns[7]	Subpart W calculation method 1 or 2 [8] [9]	Number of blowdowns	
		Total CH_4 emissions (mt CH_4)	
Voluntary action to reduce methane emissions during the reporting year	Difference in potential and actual emissions[10]	Number of blowdowns that routed gas to a:	
		Compressor or capture system for beneficial use	
		Flare[11]	
		Low-pressure system	
		Number of hot taps utilized that avoided the need to blowdown gas to the atmosphere	
		Total potential emissions (mt CH_4)	
		Emission reductions from voluntary action (mt CH_4)	

Mains – Cast Iron and Unprotected Steel

Source Description: Distribution mains are natural gas distribution pipelines that serve as a common source of supply for more than one service line.[12] This source covers cast iron and unprotected steel mains (steel mains without cathodic protection).

Mitigation Options:

- Replace cast iron mains with plastic or cathodically protected steel and replace or cathodically protect unprotected steel mains, or

[4] Partners are encouraged to designate a higher reduction rate.
[5] Total potential emissions amounts will likely be different each year.
[6] The reference to atmospheric pressure is intended to assist in defining total potential emissions, not an indication that companies must reduce pressure to atmospheric pressure for every blowdown.
[7] Emergency blowdown events and blowdowns of pipelines operating at 60 psi or less are not included in this source for the BMP Option.
[8] 40 CFR 98.233(i)(2), based on the volume of pipeline segment between isolation valves and the pressure and temperature of the gas within the pipeline
[9] 40 CFR 98.233(i)(3), based on the measurement of emissions using a flow meter
[10] As calculated per the specified emission quantification methodologies for each source.
[11] 40 CFR 98.233 (n) provides flaring quantification guidance.
[12] http://primis.phmsa.dot.gov/comm/glossary/index.htm?nocache=1606#Main

- Rehabilitate cast iron and unprotected steel pipes with plastic pipe inserts, also referred to as slip-lining or u-liners, or cured-in-place liners:
  - Slip-lining is a technique that involves the insertion of a plastic pipe into an existing pipe. The new pipe is pushed or pulled into the host pipe.[13] U-liners are high-density polyethylene (HDPE) plastic piping and are manufactured in a "U" shape with diameter sizing specific to the host pipe in need of repair. The liner is pulled through the host pipe and then reformed to a circular shape after insertion using steam. This process is carried out without the need to trench and results in a structurally sound HDPE plastic pipe fitted tightly within the pipe needing repair.[14] PHMSA provides guidance related to inserting plastic pipe into a metal pipe.
  - Cured-in place liners are pipe liners comprised of flexible tubing, jackets, elastomer skin, and adhesive systems. These liners are installed into an existing metallic natural gas pipe in need of rehabilitation. Cured-in place liners provide resistance to gas permeation and provide resistance against damage caused by ground movement, internal corrosion, leaking joints, pinholes, and chemical attacks.[15]

Partners commit to replace or rehabilitate cast iron and unprotected steel mains at the following minimum annual rates (based on a partner's total inventory of cast iron and unprotected steel mains) per the mitigation options listed above. Partners may choose to commit to higher rates than those designated.

Tier	Inventory of Cast Iron[16] and Unprotected Steel Mains[17]	% Minimum Annual Replacement/Repair
Tier 1	<500 miles	6.50%
Tier 2	500-1,000 miles	5%
Tier 3	1,001 – 1,500 miles	3%
Tier 4	1,501 miles – 3000 miles	2%
Tier 5	>3000 miles	1.5%

Commitment Timeframe: Partners commit to achieve the specified annual replacement/rehabilitation rate by their designated commitment achievement date, not to exceed five years from the commitment start date, and maintain at least that rate moving forward. Commitments will be based on the Partner's inventory of cast iron and unprotected steel mains as of January 1 of the year of their commitment[18]. After achieving their specified rate, Partners can maintain that rate for a period of five years (e.g. if replacement/rehabilitation actions results in a Partner's moving to a different mileage tier, they will not automatically have to adopt that new rate). After five years, Partners will be requested to evaluate their ability to commit to a higher rate. Partners can raise their committed rate at any time.

Reporting:

[13] http://www.istt.com/guidelines/slip-lining
[14] http://www.astm.org/Standards/F1504.htm
[15] http://www.astm.org/Standards/F2207.htm
[16] Includes wrought iron.
[17] Excluding cast iron and unprotected steel mains that have been rehabilitated using specified mitigation methods.
[18] Excluding cast iron and unprotected steel mains that have been rehabilitated using specified mitigation methods.

Emission Source	Quantification Method[19]	Data Elements to be Collected at Facility-Level	Collected through GHGRP
Distribution mains - cast iron - gas service	Subpart W cast iron mains EF	Total miles of cast iron distribution mains	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution mains - plastic - gas service	Subpart W plastic mains EF	Total miles of plastic distribution mains	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution mains - protected steel - gas service	Subpart W protected steel mains EF	Total miles of protected steel distribution mains	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution mains - unprotected steel - gas service	Subpart W unprotected steel mains EF	Total miles of unprotected steel distribution mains	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution mains - cast iron or unprotected steel with plastic liners or inserts - gas service	Subpart W plastic mains EF	Total miles of cast iron or unprotected steel distribution mains with Plastic Liners or Inserts*	
		Annual CH_4 emissions* (mt CH_4)	
Voluntary action to reduce methane emissions during the reporting year	Difference in emissions before and after mitigation[20]	Miles of cast iron mains:	
		Replaced with plastic	
		Replaced with protected steel	
		Rehabilitated with plastic pipe inserts or cured-in-place liners	
		Miles of unprotected steel mains:	
		Cathodically protected or replaced with protected steel	
		Rehabilitated with pipe inserts or cured-in-place liners	
		Replaced with plastic	
		Emission reductions from voluntary action (mt CH_4)	

*The reporting of this supplemental data may result in duplicate data for some facilities reporting into Subpart W. The Methane Challenge Program will develop a process to reconcile any potential duplications that occur.

Services – Cast Iron and Unprotected Steel

Source Description: A service line is a distribution line that transports gas from a common source of supply to (1) a customer meter or the connection to a customer's piping, whichever is farther downstream, or (2) the connection to a customer's piping if there is no customer meter. (A customer meter is the meter that measures the transfer of gas from an operator to a consumer.)[21] This source covers cast iron and unprotected steel services.[22]

Mitigation Options:

- Replace unprotected steel and cast iron services with copper, plastic, or protected steel that meet the manufacturing requirements and qualifications provided in 49 CFR Part 192, Subpart B[23], or

[19] 40 CFR 98.233(r) and Table W-7 to Subpart W of Part 98.
[20] As calculated per the specified emission quantification methodologies for each source.
[21] http://primis.phmsa.dot.gov/comm/glossary/index.htm?nocache=1606#ServiceLine
[22] "Service Ts" are included in this source category.
[23] http://www.ecfr.gov/cgi-bin/text-idx?SID=06dfe10fe465d0ee1b352dad32b2c248&mc=true&node=sp49.3.192.b&rgn=div6

- Rehabilitate cast iron and unprotected steel services with plastic pipe inserts or liners.

At a minimum, partners commit to replace or rehabilitate cast iron and unprotected steel services when the main is replaced or rehabilitated. Partners would be encouraged to specify any additional targeted replacement efforts beyond this practice. Due to the linkage with mains, this source is not eligible for a stand-alone commitment, but can be selected as an optional addition for Partners that select the "Mains – Cast Iron and Unprotected Steel" source category.

Commitment Timeframe: Partners commit to adopt the specified replacement or rehabilitation practice by their designated commitment achievement date, not to exceed five (5) years from the commitment start date, and maintain that practice moving forward.

Reporting:

Emission Source	Quantification Method [24]	Data Elements to be Collected at Facility-Level	Collected through GHGRP
Distribution services - cast iron - gas service	Subpart W unprotected steel services EF[25]	Total number of cast iron services	
		Annual CH_4 emissions (mt CH_4)	
Distribution services - copper - gas service	Subpart W copper services EF	Total number of copper services	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution services - plastic - gas service	Subpart W plastic services EF	Total number of plastic services	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution services - protected steel - gas service	Subpart W protected steel services EF	Total number of protected steel services	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution services - unprotected steel - gas service	Subpart W unprotected steel services EF	Total number of unprotected steel services	X
		Annual CH_4 emissions (mt CH_4)	X
Distribution services - cast Iron or unprotected steel with plastic liners or inserts - gas service	Subpart W plastic services EF	Total number of cast iron or unprotected steel services with plastic liners or inserts*	
		Annual CH_4 emissions* (mt CH_4)	
Voluntary action to reduce methane emissions during the reporting year	Difference in emissions before and after mitigation[26]	Number of cast iron services:	
		Replaced with plastic	
		Replaced with protected steel	
		Replaced with copper	
		Rehabilitated with plastic pipe inserts	
		Number of unprotected steel services:	
		Cathodically protected or replaced with protected steel	
		Replaced with plastic	
		Replaced with copper	

[24] 40 CFR 98.233(r) and Table W-7 to Subpart W of Part 98.

[25] EPA is using the unprotected steel EF as a proxy quantification method for this source.

[26] As calculated per the specified emission quantification methodologies for each source.

Emission Source	Quantification Method [24]	Data Elements to be Collected at Facility-Level	Collected through GHGRP
		Rehabilitated with plastic pipe inserts	
		Emission reductions from voluntary action (mt CH_4)	

*The reporting of this supplemental data may result in duplicate reporting for some facilities reporting into GHGRP Subpart W. The Methane Challenge Program would develop a process to reconcile any potential duplications that occur.

Excavation Damages

Source Description: Excavation damage may include damage to the external coating of the pipe, or dents, scrapes, cuts, or punctures directly into the pipeline itself. Excavation damage often occurs when required One-Call notifications are not made prior to beginning excavation, digging, or plowing activities, or when calls are made but pipe is still damaged. When the location of underground facilities is not properly determined, the excavator may inadvertently – and sometimes unknowingly – damage the pipeline and its protective coating.[27] This source covers both distribution mains and service.

Mitigation Options:

- Conduct incident analyses (e.g. by identifying whether excavation, locating, or One-Call practices were not sufficient) to inform process improvements and reduce excavation damages, or
- Undertake targeted programs to reduce excavation damages and/or shorten time to shut-in when damages do occur, including patrolling systems when construction activity is higher, excavator education programs (811, call before you dig), identifying and implementing steps to minimize repeat offenders, and stand-by efforts.

Partner companies' collection and reporting of data on all excavation damages is a significant part of this commitment.[28] Partners will use the collected data to set a company-specific goal for reducing excavation damages and/or methane emissions from excavation damages.

Commitment Timeframe: Partners commit to reporting all data elements by their designated commitment achievement date, not to exceed five (5) years from the commitment start date.

Reporting:

Emission Source	Quantification Method	Data Elements to be Collected at Facility-Level	Collected through GHGRP
Excavation damages – natural gas distribution network	NA	Total number of excavation damages	
		Total number of excavation damages per thousand locate calls	
		Total number of excavation damages per class location (optional)	
		Total number of excavation damages by pipe material (steel, cast iron, copper, plastic etc.) and part of system involved (main, service, inside meter/regulator set, etc.)	

[27] http://primis.phmsa.dot.gov/comm/FactSheets/FSExcavationDamage.htm

[28] The program is not requesting quantification of emissions/reductions due to lack of a quantification methodology that would result in consistent, comparable emissions calculations. EPA will evaluate adding quantification to this source in the future should an acceptable methodology become available.

Emission Source	Quantification Method	Data Elements to be Collected at Facility-Level	Collected through GHGRP
		Total number of excavation damages which resulted in a release of natural gas	
		Total number of excavation damages which resulted in the pipeline being shut down	
		Total number of excavation damages on pipelines or facilities with supervisory control and data acquisition-based systems in place	
		Total number of excavation damages where the operator was given prior notification of excavation activity	
		Total number of excavation damages by type that caused excavation damage incidents[29]	
		Total number of excavation damages by apparent root cause[30]	
Voluntary action to reduce methane emissions during the reporting year	NA	Actions taken to minimize excavation damages/reduce methane emissions from excavation damages	
		Company-specific goal for reducing excavation damages and/or methane emissions from excavation damages (when available)	
		Progress in meeting company-specific goal (when available)	

Cost Recovery

Distribution companies charge rates that are typically approved by the utility's governing body (state public utility commission (PUC), city council, utility board, etc.). EPA recognizes that Methane Challenge Program partner commitments may be dependent on obtaining additional approval from regulators, including cost recovery for steps taken to reduce methane emissions and meeting their Program commitments. EPA encourages company efforts, including efforts to seek cost recovery if appropriate, to make and fulfill Methane Challenge commitments that will help achieve the Administration's ambitious methane reduction goal.

[29] Contractor, Railroad, County, State, Developer, Utility, Farmer, Municipality, Occupant, Unknown/Other, Data not collected

[30] One-Call Notification Practices, Locating Practices, or Excavation Practices not Sufficient; One-Call Notification Center Error, Abandoned Facility, Deteriorated Facility, Previous Damage, Data not Collected, Other Outside Force Damage, Pipe, Weld or Joint Failure, Equipment Failure, Incorrect Operation, Other/Miscellaneous