Greenhouse Gas Reporting Program Petroleum and Natural Gas Systems 2012 Data Summary

Alexis McKittrick, Ph.D.
Climate Change Division
Office of Air & Radiation
U.S. Environmental Protection Agency

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Overview of GHG Reporting Program

- Launched in response to FY 2008 Consolidated Appropriations Act
- Annual reporting of GHGs by 41 source categories
  - 33 types of direct emitters
  - 6 types of suppliers of fuel and industrial GHGs
  - Facilities that inject CO_2 underground for geologic sequestration, enhanced oil recovery, or any other purpose
- Most source categories began collecting data in 2010, with first annual reports submitted to EPA in September 2011
  - An additional 12 source categories began collecting data in 2011, with first annual reports submitted to EPA in September 2012
  - We have published 3 years of data for 29 source categories and 2 years of data for 12 source categories
- Facilities use uniform methods prescribed by the EPA to calculate GHG emissions, such as direct measurement, engineering calculations, or emission factors derived from direct measurement
  - In some cases, facilities have a choice of calculation methods for an emission source
- Direct reporting to EPA electronically
- EPA verification of GHG data

Source Categories Covered by GHG Reporting Program

Power	Refining & Petrochem	Other Chemicals	Combustion	Waste	Metals	Minerals	Pulp & Paper	High GWP Gases
- Electricity Generation - Electrical Equipment Mfg. - Electrical Equipment Use	- Petroleum Refineries - Petrochem. Production	- Adipic Acid - Ammonia - Hydrogen Production - Nitric Acid - Phosphoric Acid - Titanium Dioxide	- Stationary Combustion	- Industrial Waste Landfills - Industrial Wastewater Treatment - MSW Landfills	- Aluminum - Ferroalloy - Iron & Steel - Lead - Magnesium - Silicon Carbide - Zinc	- Cement - Glass - Lime - Misc. Carbonate Use - Soda Ash	- Pulp & Paper	- Electronics Mfg. - Fluorinated GHG Production - HCFC-22 Prod./HFC-23 Destruction - Pre-Charged Equipment Import/Export - Industrial Gas Suppliers

Petroleum & Natural Gas Systems	Fuel Suppliers	Carbon Capture & Sequestration	Mining
- Onshore Production - Offshore Production - Natural Gas Processing - Natural Gas Transmission/Compression - Natural Gas Distribution - Underground Natural Gas Storage - Liquefied Natural Gas Storage - Liquefied Natural Gas Import/Export	- Coal-Based Liquid Fuels Suppliers - Natural Gas and Natural Gas Liquids Suppliers - Petroleum Product Suppliers	- Geologic Sequestration of CO_2 - Injection of CO_2 - CO_2 Suppliers	- Underground Coal Mines

Direct Emitters
Suppliers
CO_2 Injection

Background on Petroleum and Natural Gas Systems in the Greenhouse Gas Reporting Program

Introduction

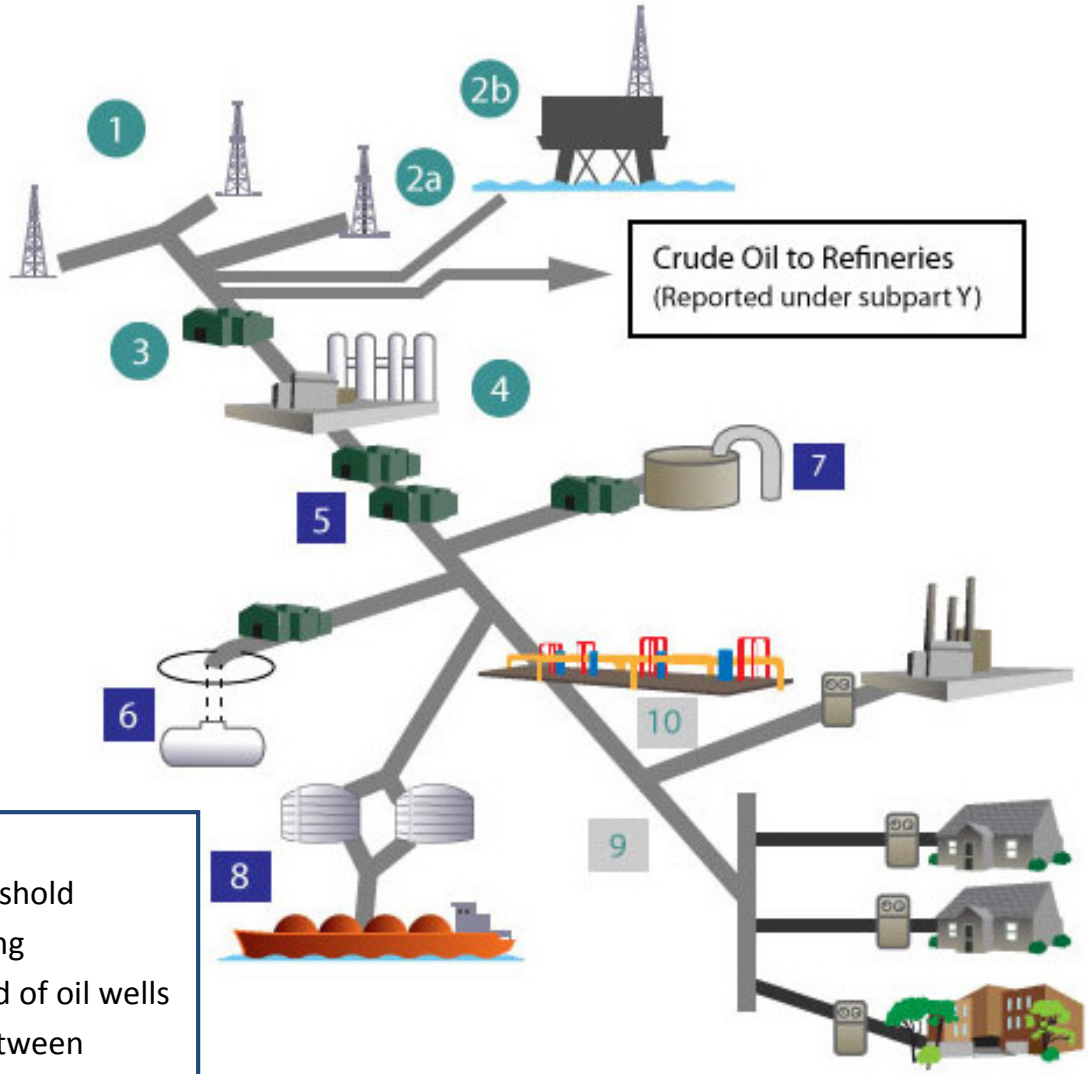
- On October 23, 2013, EPA released greenhouse gas (GHG) data for Petroleum and Natural Gas Systems collected under the Greenhouse Gas Reporting Program (GHGRP) from the 2012 reporting year, as well as refreshed data from the 2011 reporting year
- These data represent a significant step forward in better understanding greenhouse gas emissions from petroleum and natural gas systems
- EPA is working to improve the quality of data from this sector and expects that the GHGRP will be an important tool for the Agency and the public to analyze emissions, identify opportunities for improving the data, and understand emissions trends
- In this presentation, we will provide a summary of the reported data

Petroleum and Natural Gas Systems in GHGRP (Subpart W)

Production and Processing
1. Onshore Production
2a, 2b. Offshore Production
3. Gathering and Boosting (not covered by Subpart W)
4. Natural Gas Processing

Transmission and Storage
5. Natural Gas Transmission
6. Underground Natural Gas Storage
7. LNG Storage
8. LNG Import-Export

Distribution
9, 10. Natural Gas Distribution



Not Covered

- Emissions below 25,000 metric ton CO_2e threshold
- Process emissions from gathering and boosting
- Vented emissions from hydraulically fractured of oil wells
- Process emissions from transmission lines between compressor stations

Figure adapted from AGA and Natural Gas STAR

What is a Facility?

- In general, a “facility” for purposes of the GHGRP means all co-located emission sources that are commonly owned or operated
- However, certain industry segments within the Petroleum and Natural Gas Systems source category have unique “facility” definitions
  - Onshore production: the “facility” includes all emissions associated with wells owned or operated by a single company (the permit holder) in a specific hydrocarbon producing basin (as defined by the geologic provinces published by the American Association of Petroleum Geologists)
  - Natural gas distribution: the “facility” is a local distribution company as regulated by a single state public utility commission
- The other industry segments in the Petroleum and Natural Gas Systems source category follow the general GHGRP definition of “facility”

How to Access GHGRP Data on Petroleum and Natural Gas Systems

- EPA has several data portals to access data collected by the GHGRP on Petroleum and Natural Gas Systems
- EPA's easy-to-use Facility Level Information on GreenHouse gas Tool (FLIGHT) allows users to view GHG data from Petroleum and Natural Gas Systems in a variety of ways
  - View GHG data reported by individual facilities
  - Aggregate reported emissions based on industry segment or geographic level
  - Search for facilities by name, location, corporate parent, or NAICS code
  - Visit FLIGHT: http://ghgdata.epa.gov
- Detailed non-confidential business information data is available on the Envirofacts
  - Access GHG data on Envirofacts: http://www.epa.gov/enviro/facts/ghg/search.html

Reported GHG Emissions from Petroleum and Natural Gas Systems

Reported GHG Emissions by Industry Segment

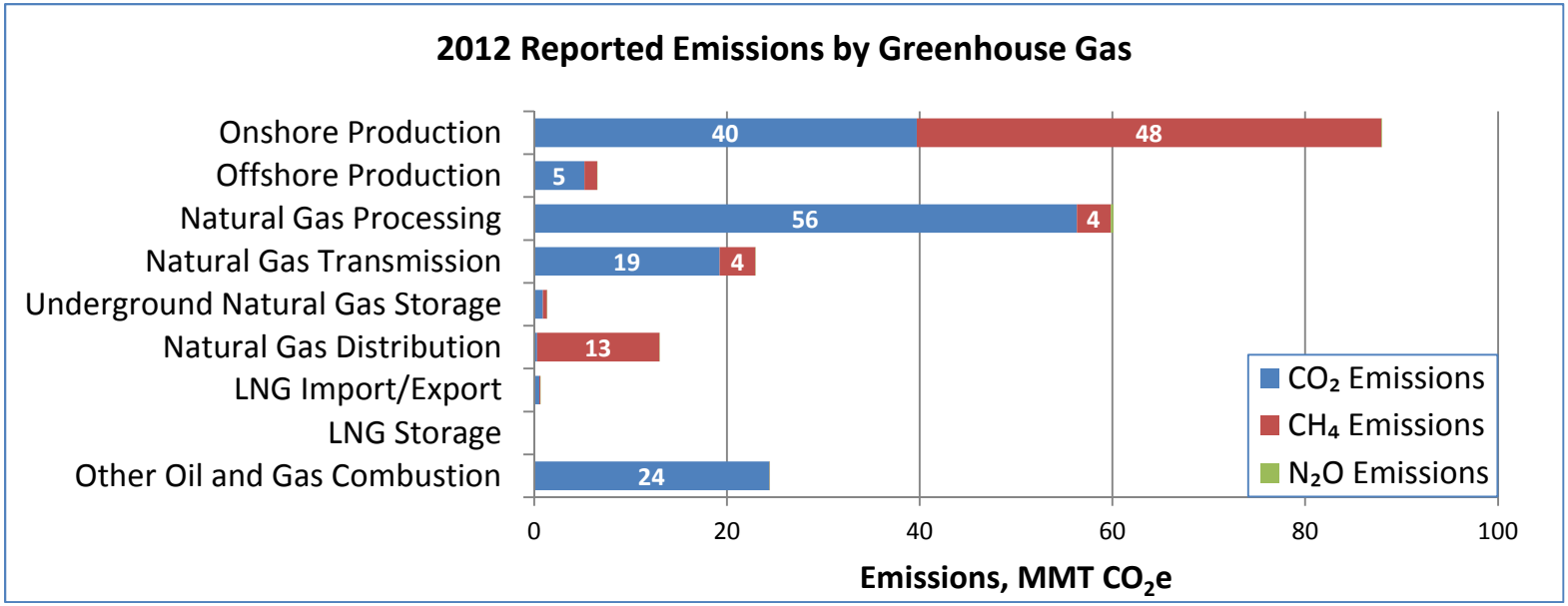
- EPA received annual reports from over 2,000 facilities
- Reported emissions totaled 217 Million Metric Tons (MMT) CO_2e
- Largest segments in terms of reported GHG emissions were onshore production, natural gas processing, and natural gas transmission

Segment	Number of Facilities	2012 Reported Emissions (Million Metric Tons CO_2e)
Onshore Production	497	88
Offshore Production	106	7
Natural Gas Processing	394	60
Natural Gas Transmission	462	23
Underground Natural Gas Storage	49	1
Natural Gas Distribution	174	13
LNG Import/Export	8	1
LNG Storage	4	<1
Other Oil and Gas Combustion	381	24
Total	**2,058**	**217**

GHGRP data as of 9/1/13

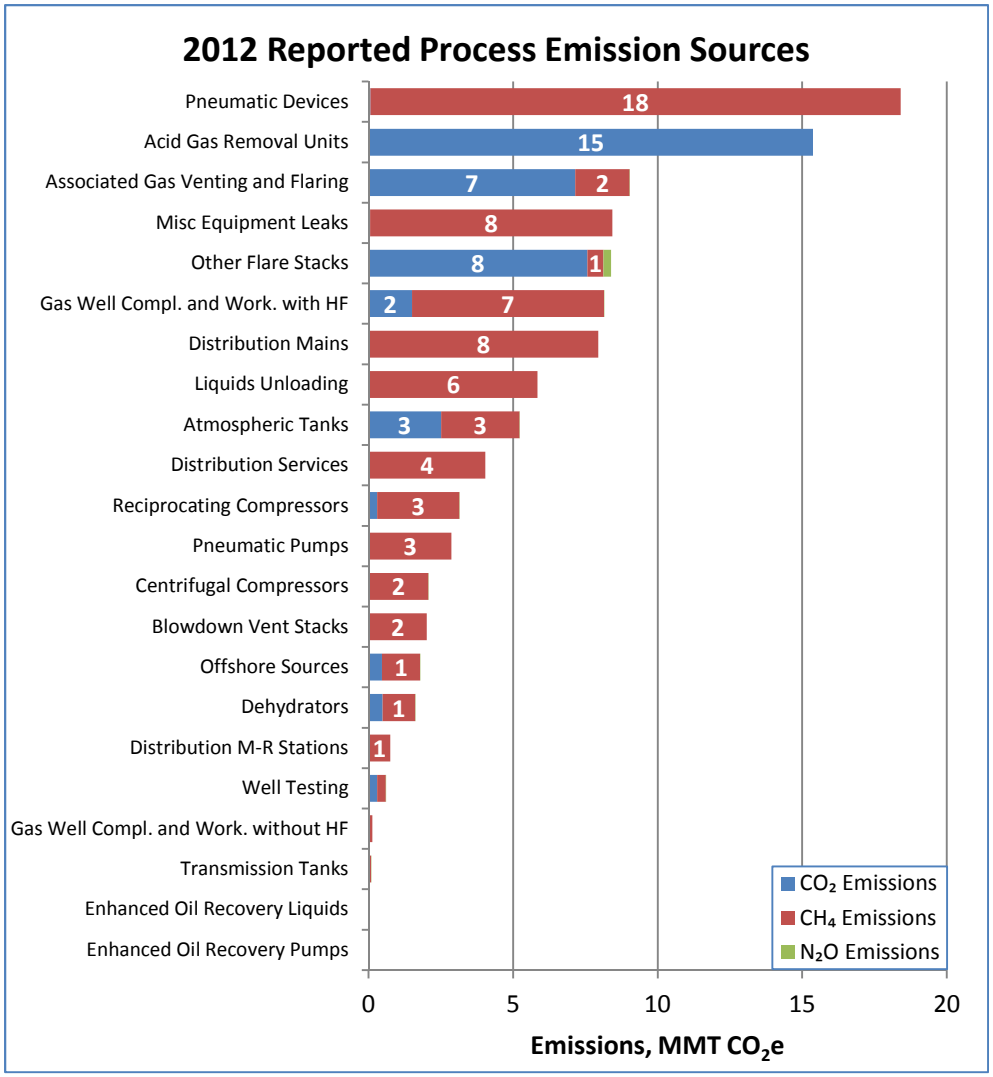
Reported Emissions by Greenhouse Gas

- Carbon dioxide (CO_2) emissions accounted for 147 MMT CO_2e and methane (CH_4) emissions accounted for 70 MMT CO_2e
- Emissions from onshore production were primarily methane while emissions from natural gas transmission, natural gas processing, and other oil and gas combustion were primarily carbon dioxide



GHGRP data as of 9/1/13

Reported Process Emission Sources



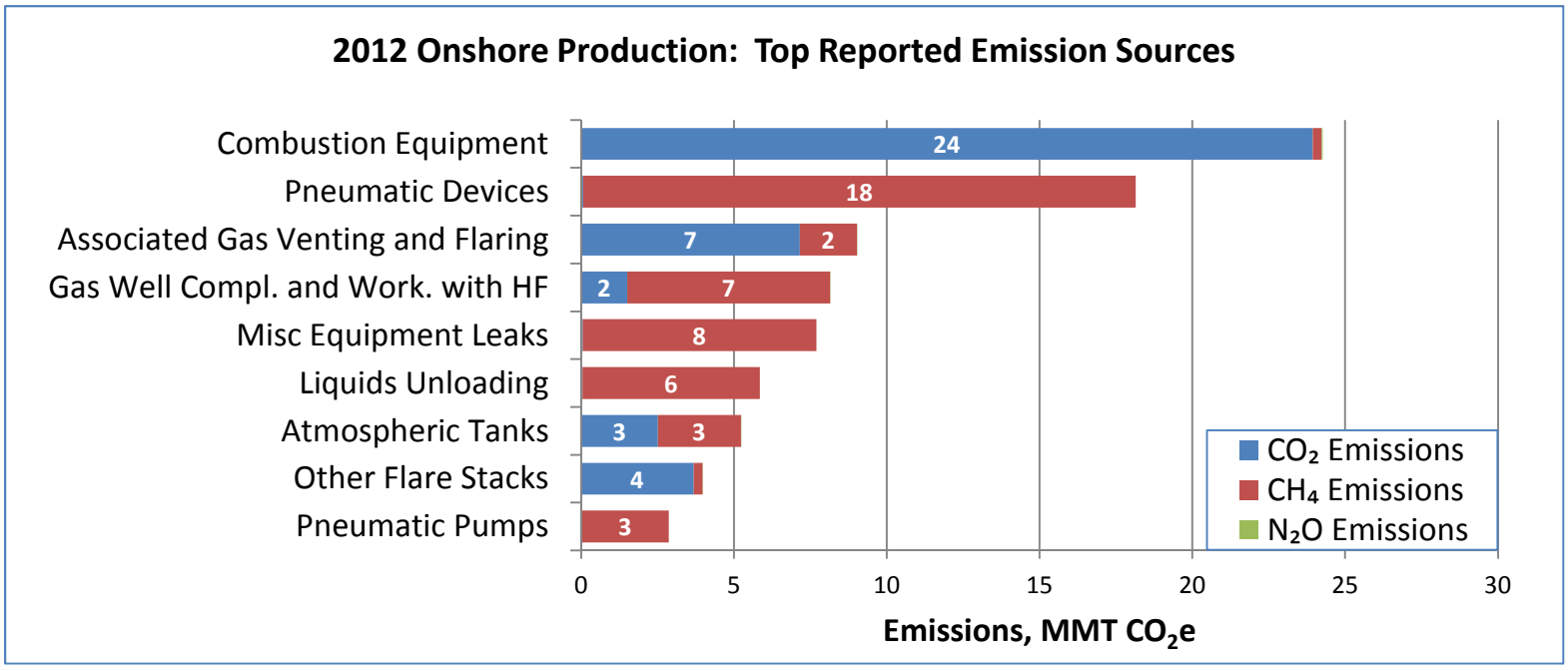
- The figure to the left shows total reported process emissions across all Petroleum and Natural Gas Systems facilities
- The largest reported process emission sources were pneumatic devices, acid gas removal units, associated gas venting and flaring, and miscellaneous equipment leaks
- Overall, vented emissions totaled 57 MMT CO_2e, equipment leaks totaled 27 MMT CO_2e, and flaring totaled 22 MMT CO_2e

GHGRP data as of 9/1/13

Reported GHG Emissions by Industry Segment and Source

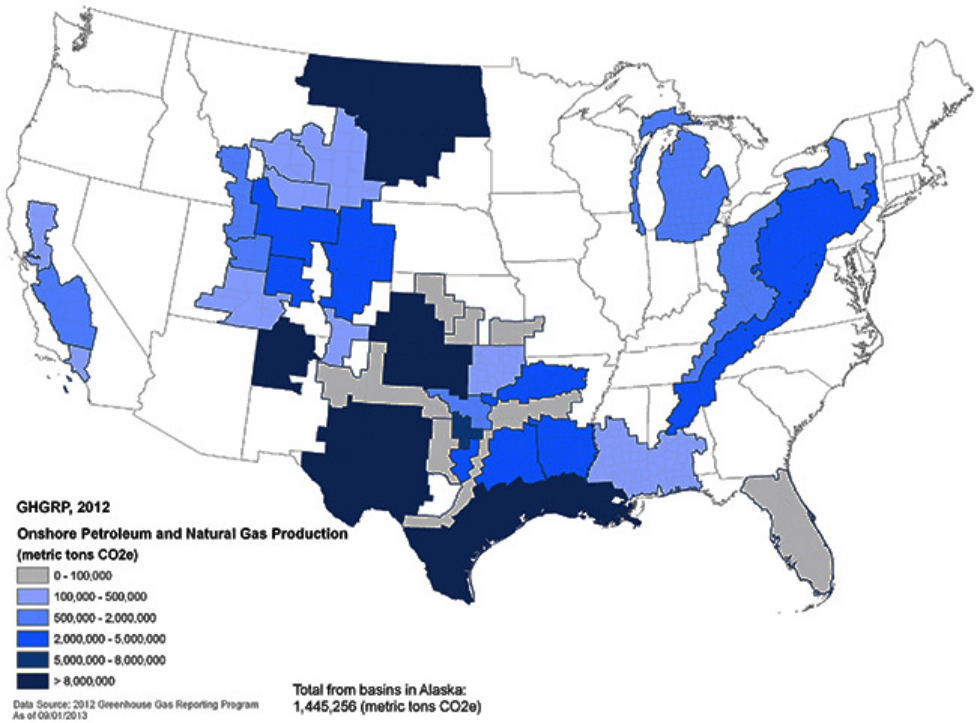
Onshore Production

- Reported emissions in onshore production totaled 88 MMT CO_2e
- Methane emissions totaled 48.2 MMT CO_2e and carbon dioxide emissions totaled 39.7 MMT CO_2e
- Combustion equipment (24.3 MMT CO_2e) and pneumatic devices (18.1 MMT CO_2e) were the top reported emission sources in onshore production



GHGRP data as of 9/1/13

Onshore Production Basins



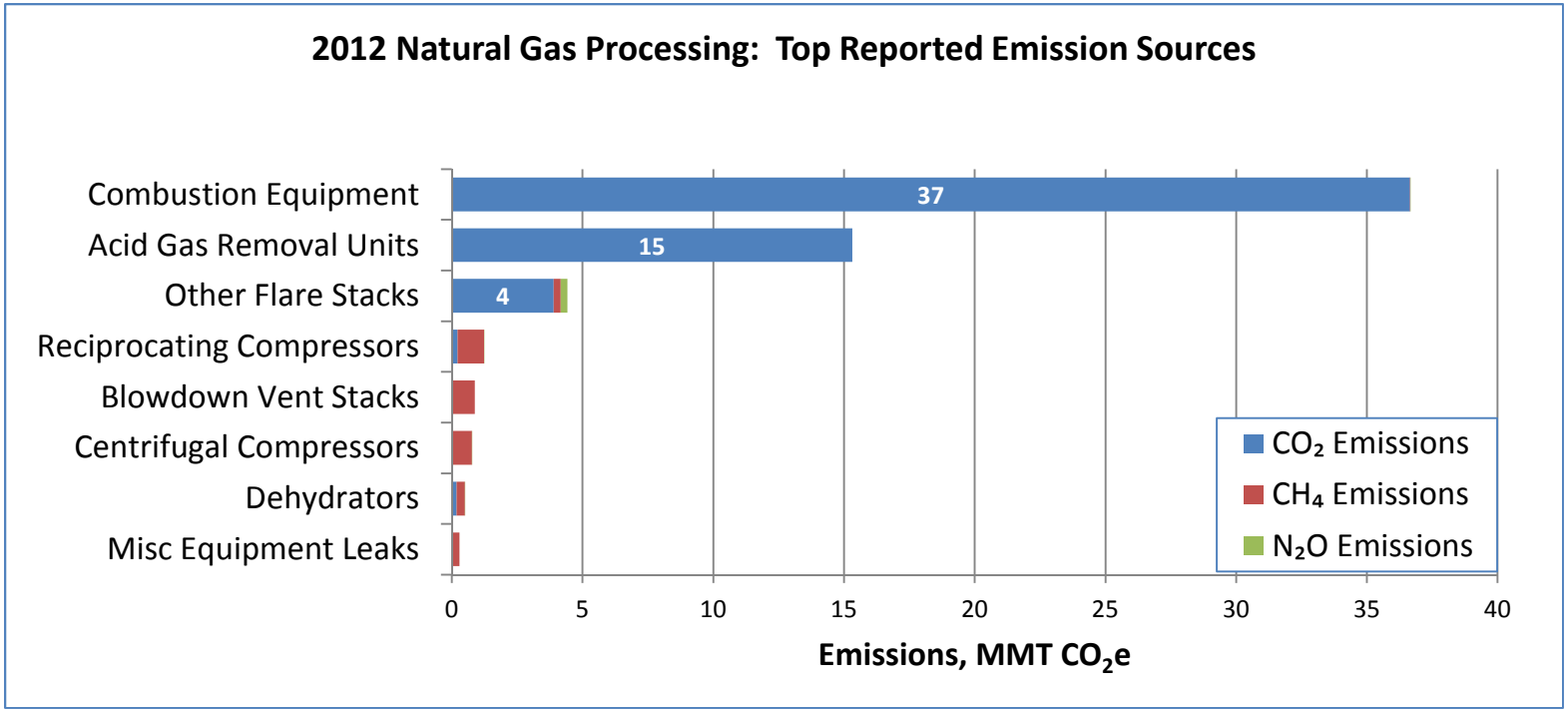
- Emissions in onshore production are reported by basin
- The map to the left shows reported emissions aggregated for all onshore production facilities by basin
- The basins with highest reported emissions were:
  - Gulf Coast Basin (12.2 MMT CO_2e)
  - Permian Basin (9.3 MMT CO_2e)
  - Williston Basin (9.3 MMT CO_2e)
  - San Juan Basin (9.1 MMT CO_2e)
  - Anadarko Basin (9.1 MMT CO_2e)

Note: For the onshore production segment, the "facility" includes all emissions associated with wells owned or operated by a single company in a specific hydrocarbon producing basin. A basin refers to a geologic region where sediment infilling has occurred. The GHG Reporting Program definition of basin refers to the geologic provinces as published by the American Association of Petroleum Geologists (AAPG).

GHGRP data as of 9/1/13

Natural Gas Processing

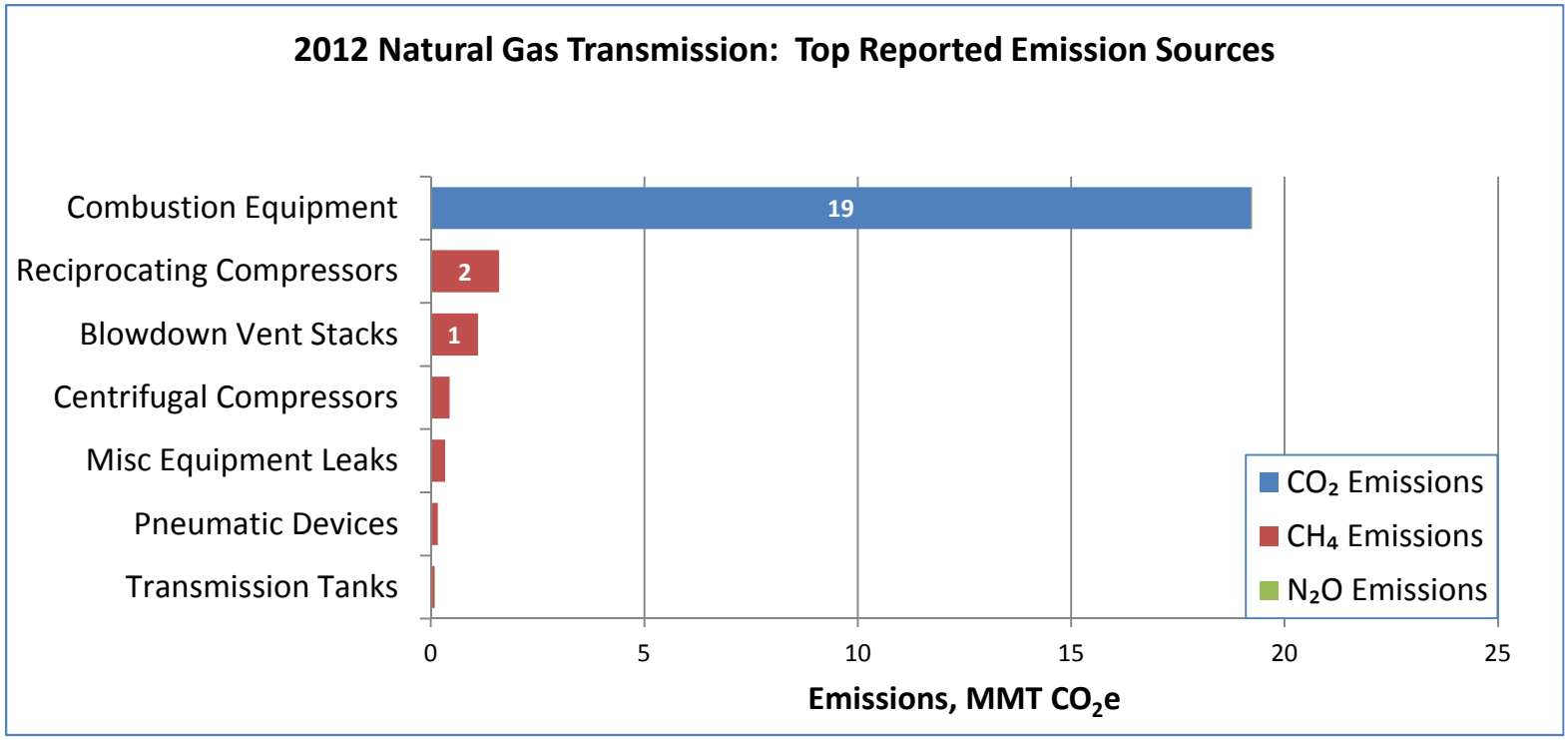
- Reported emissions from natural gas processing totaled 60.1 MMT CO_2e
- Methane emissions totaled 3.5 MMT CO_2e and carbon dioxide emissions totaled 56.3 MMT CO_2e
- The top reported emission sources were combustion equipment (36.7 MMT CO_2e), acid gas removal units (15.3 MMT CO_2e), and miscellaneous flare stacks (4.4 MMT CO_2e)



GHGRP data as of 9/1/13

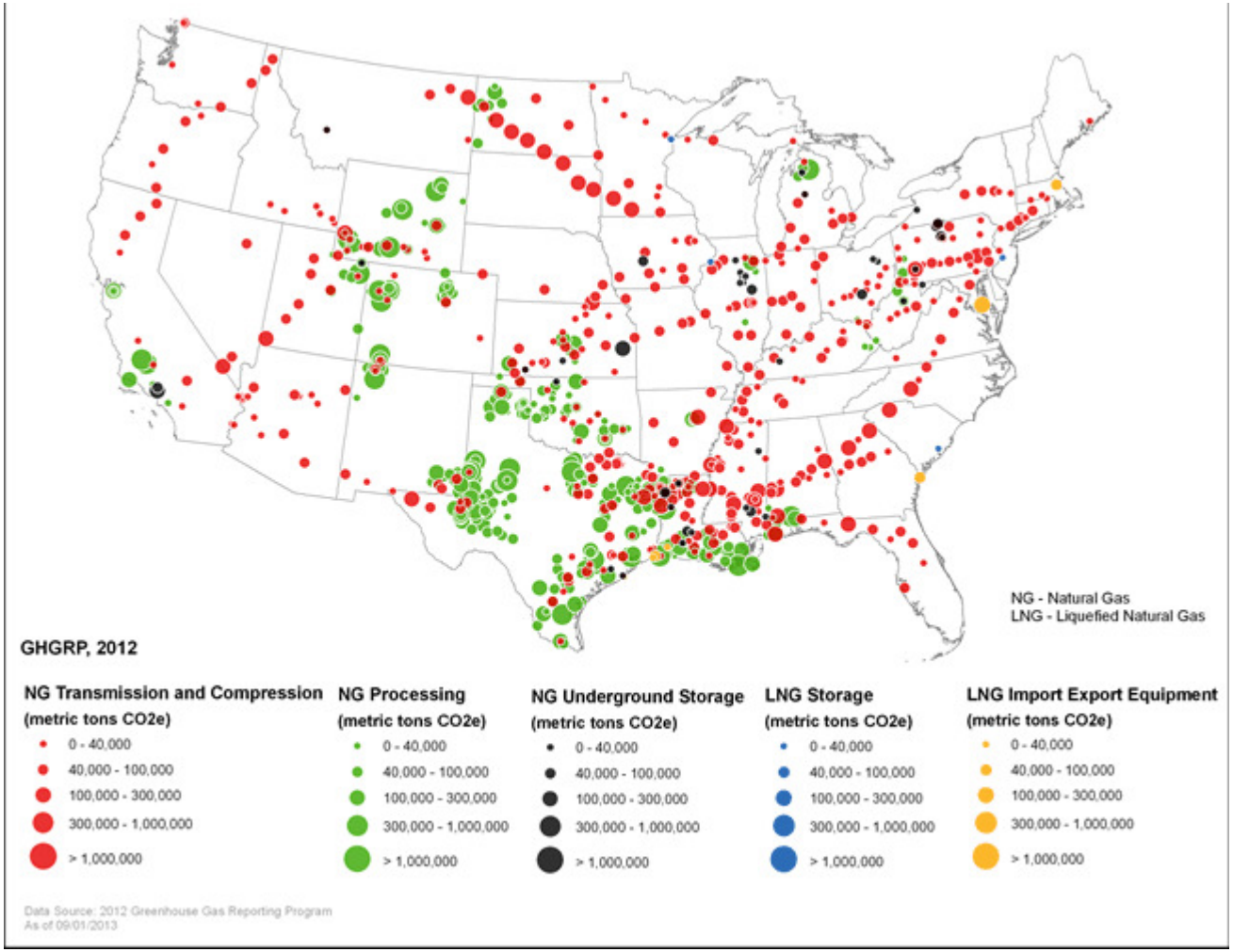
Natural Gas Transmission

- Reported emissions from natural gas transmission totaled 33.0 MMT CO_2e
- Methane emissions totaled 3.7 MMT CO_2e and carbon dioxide emissions totaled 19.2 MMT CO_2e
- Top reported emission source was combustion equipment (19.2 MMT CO_2e)



GHGRP data as of 9/1/13

NG Processing, Storage, Transmission, LNG



GHGRP data as of 9/1/13

Questions?

EPA
United States
Environmental Protection
Agency

Proposed Gas STAR Gold Program

Roger Fernandez

Team Leader, Natural Gas STAR Program

Climate Change Division, Office of Air & Radiation

U.S. Environmental Protection Agency

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NaturalGas
EPA POLLUTION PREVENTER

Overview

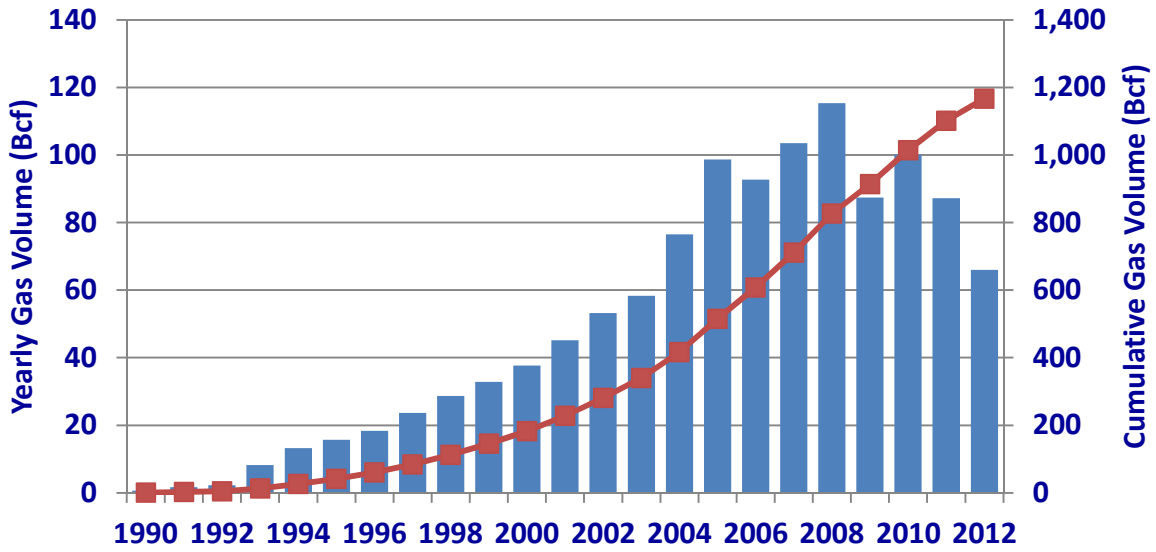
- Background
- Gas STAR Gold Program Objectives
- Gas STAR Gold Program Overview
- Stakeholder Feedback
- Timeline
- Contact us

Natural Gas STAR Program

- Currently, Gas STAR includes 109 domestic oil and gas partner companies from all sectors, representing about 50% of the U.S. natural gas industry and 18 international Partners.

- Partners have reported over 1 trillion cubic feet of methane emissions reductions since the Program began in 1993.

Natural Gas STAR Program Emission Reductions, Annual and Cumulative



Drivers for Evaluating Gas STAR

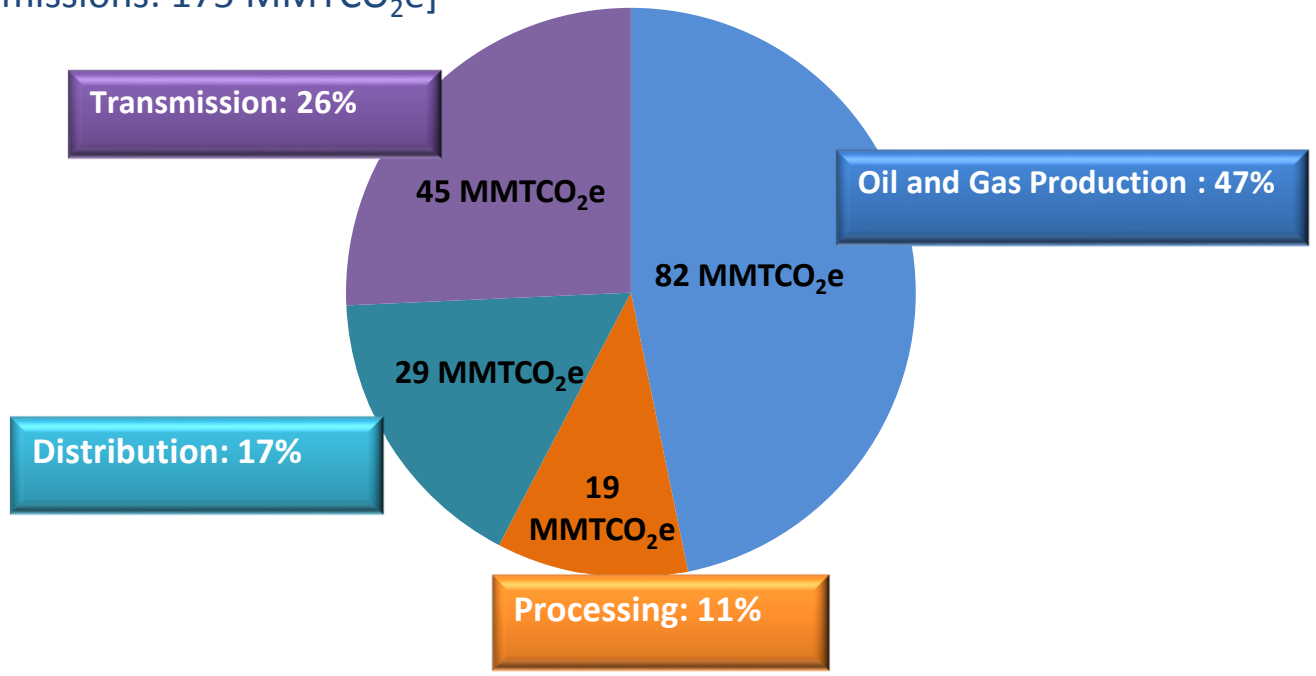
- **Methane is a potent greenhouse gas and clean energy source**
  - Reducing methane emissions has important cross-cutting benefits including reducing climate impacts, VOCs and hazardous air pollutants (HAPs) and thereby improving local air quality, improving industrial efficiency/safety, increasing domestic energy supply, and generating revenue.
- **Oil and gas is a key focus of the President's 2013 Climate Action Plan and the Strategy to Reduce Methane Emissions (March 2014)**
  - Interagency methane strategy recognizes oil and gas as a key sector and highlights the opportunity to bolster the Natural Gas STAR Program
- **Significant and diverse stakeholder interest in oil and gas-sector methane emissions**
- **Opportunity to leverage existing frameworks**
  - EPA NSPS and State regulations have established control technologies and practices that could be used in a voluntary context to address sources at existing facilities.
  - GHGRP facility-level data is available for verification/tracking purposes.
- **Mature program**
  - Gas STAR began in 1993 and has never been significantly updated. Program enhancement can provide new opportunities for partners and EPA.

Opportunities for Future Action

- While progress has been made, opportunity remains to further reduce methane.
- Viable low-cost technologies and practices exist today. Remaining low-cost abatement potential estimated at over 60 million metric tons of CO_2e.
- Opportunity for greater participation beyond current Program flexible framework.

Projected US Methane Emissions from Oil and Gas Industries in 2015*

[Total Emissions: 175 $MMTCO_2e$]



* Post 2012 New Source Performance Standards
Source: Global Non-CO2 Mitigation Report and Global Non-CO2 emissions and projections report

Key Opportunities for Methane Reductions

Oil Production

- Storage tanks
- Well Completions
- Well site leaks

Natural Gas Production & Processing

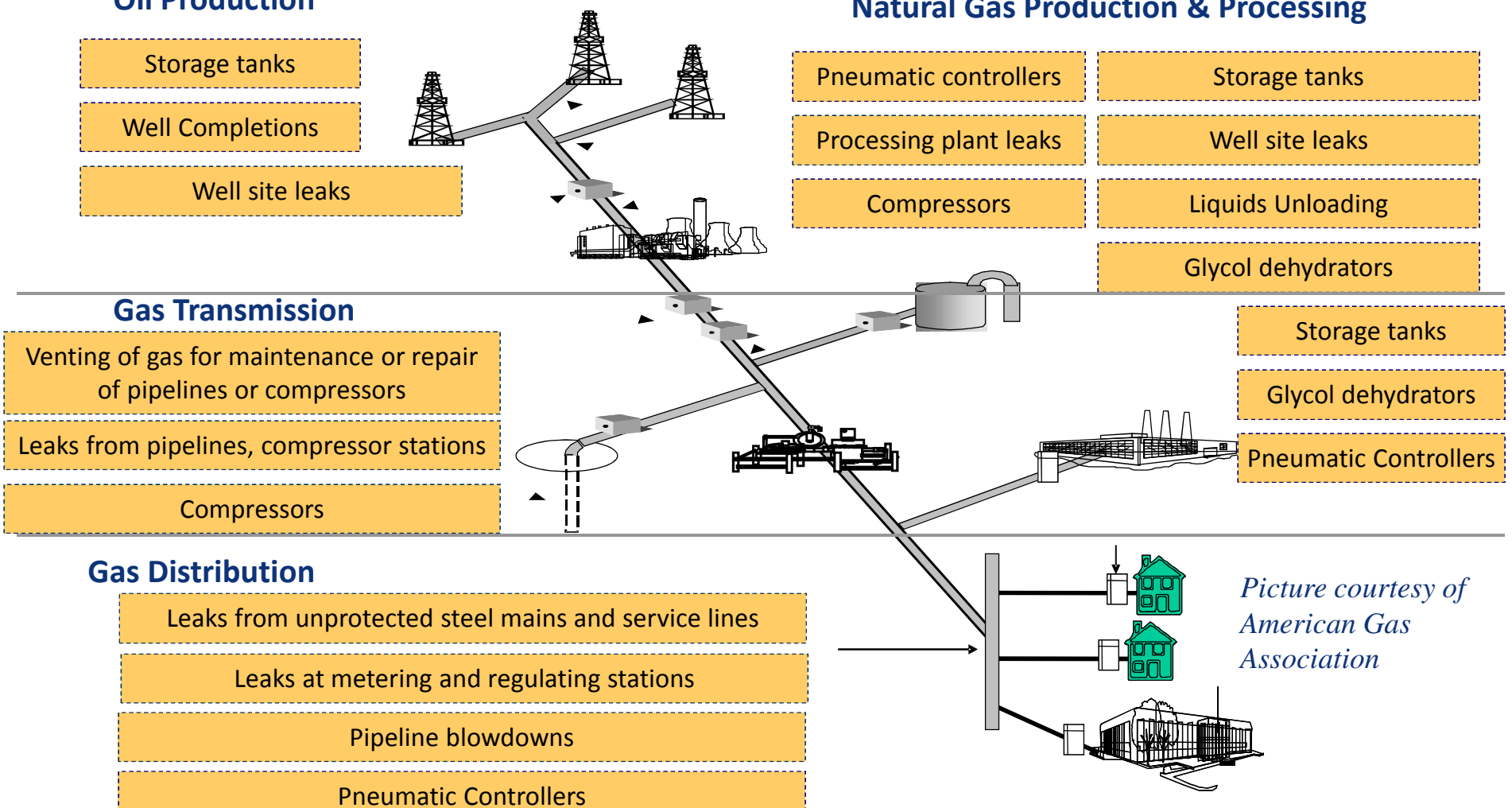
- Pneumatic controllers
- Processing plant leaks
- Compressors
- Storage tanks
- Well site leaks
- Liquids Unloading
- Glycol dehydrators

Gas Transmission

- Venting of gas for maintenance or repair of pipelines or compressors
- Leaks from pipelines, compressor stations
- Compressors
- Storage tanks
- Glycol dehydrators
- Pneumatic Controllers

Gas Distribution

- Leaks from unprotected steel mains and service lines
- Leaks at metering and regulating stations
- Pipeline blowdowns
- Pneumatic Controllers



Picture courtesy of American Gas Association

Gas STAR Gold Program Objectives

- The existing Gas STAR Program will remain in place with a primary focus of technology transfer.

- The proposed Gas STAR Gold Program creates a framework under which facilities will be recognized by EPA for implementing, at the facility level, methane reduction activities for all major methane emission sources. Major goals include:

  - Showcase the achievements of U.S. oil and gas operations at the facility-level by offering a standard set of best protocols to be implemented at the facility-level.

  - Achieve greater methane emissions reductions across the entire value chain (production through distribution) by encouraging additional facilities to achieve Gold- level performance.

  - Create a verifiable and transparent mechanism to demonstrate achievements and acknowledge high performers.

  - Complement existing regulatory requirements - such as applying control techniques required for new sources under NSPS Subpart OOOO to existing facilities.

  - Publically recognize participating companies' emission reduction.

Gold Program Overview

- Under the proposed Gas STAR Gold Program, companies can achieve Gold status at a facility by implementing all specified reduction protocols for all applicable methane sources at the facility level.

- **To achieve Gold status, companies would:**
  - **Submit a Letter of Intent** outlining list of proposed facilities working toward Gold status.
  - Develop an **Implementation Plan** for each facility seeking Gold status.
  - **Implement all applicable Gold protocols** at a minimum of one facility.
  - **Submit an Annual Report** for each Gold status facility demonstrating achievement of all protocols and plans for maintaining facility-level Gold status.
  - Continue the process of implementing the Gold status protocols at **a minimum of one new facility** each year.

- **To achieve Platinum status, companies would:**
  - Achieve Gas STAR Gold status for a high percentage (to be specified) of their facilities. For example, when a company attains Gold status for 90% of its facilities, they would achieve Platinum recognition at the corporate level.

Gas STAR Gold Program - EPA Implementation

- **EPA will:**
  - **Provide focused technical assistance** to companies as needed.
  - **Develop a reporting and verification system** to transparently certify and track Gold status progress and achievements at participating facilities.
  - **Publically recognize companies** by allowing Gold facilities to use an official EPA Gas STAR Gold logo and showcasing a facility's success on the Gas STAR website and at other applicable events and outlets.
  - **Calculate and document progress** in reducing methane emissions consistent with existing EPA data and estimation methodologies.
    - Create a "scorecard" so that the public can compare corporate progress.

Proposed Gold STAR Protocols

Protocol	Emission Source	Off P	On P	GB	Pc	T	S	LNG S	LNG I&E	D
1	Associated Gas	Y	Y	Y						
2	Casinghead Gas		Y							
3	Centrifugal Compressors - Wet and Dry Seals	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	Compressor Blowdowns	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	Compressor Starts	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	Equipment Fugitives above Ground	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	Flares	Y	Y	Y	Y	Y	Y	Y	Y	
8	Gas-driven Pneumatic Devices	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	Glycol Dehydrators	Y	Y	Y	Y	Y	Y	Y	Y	
10	Hydrocarbon Storage Tanks	Y	Y	Y	Y	Y				
11	Liquids Unloading		Y							
12	Pipeline Venting and Blowdowns		Y	Y	Y	Y	Y	Y	Y	Y
13	Pipeline Inspection and Repair (including low pressure distribution and gathering lines and high pressure pipelines)		Y	Y	Y	Y	Y			Y
14	Pressure Relief Valves - System Upsets	Y	Y	Y	Y	Y	Y	Y	Y	Y
15	Reciprocating Compressors Rod Packing	Y	Y	Y	Y	Y	Y	Y	Y	Y
16	Vessel Blowdowns	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	Cast Iron Distribution Pipeline and Unprotected Steel Pipeline									Y

Legend: Off P = Offshore Production; On P = Onshore Production; GB = gathering & boosting; Pc = Processing; T = Transmission; S = Storage; LNG S = LNG Storage; LNG import & export; D = Distribution

Benefits to the Oil and Gas Industry

- **EPA recognition of clear, comparable, verifiable and transparent** data on a facility's methane emissions performance.
  - **Facility emission data transparency** through public disclosure of all relevant data to verify Gold status.
- **EPA recognition** of facility performance.
  - EPA will publicize facility progress on our website and through workshops.
  - EPA will give facilities permission to use the EPA Gas STAR Gold logo.
  - EPA will publicly track company progress by listing Gold facilities and indicate percentage of operations that these facilities represent.
- Facility **revenue generation** through the sale of reduced methane emissions.
- Reduced **VOC and HAPs** emissions in upstream oil and gas sector.
- Increased **safety** at the facility level.
- Better **local and state** relationships.

Gas STAR Gold Program – Request for Feedback

EPA seeks feedback from stakeholders regarding all aspects of this proposed program, including:

- **Program Recognition and Incentives**
  - What other benefits would be appropriate for facilities that implement all "Gold" protocol standards?
  - How can EPA best promote facility "Gold" achievements?
  - **How should the program incorporate recognition for actors or partners that are not facilities or oil & natural gas companies – e.g., public utility commissions or states?**
- **Program Implementation**
  - What are the major facility barriers to achieving "Gold" recognition that EPA can assist in overcoming?
  - EPA is seeking feedback on specific aspects of implementing the Program at the facility level including handling acquisitions and divestitures for the production segment.
- **Existing Regulatory Frameworks**
  - It is the intent of Gas STAR "Gold" Program to compliment existing voluntary and mandatory methane-related regulatory frameworks. Do any of the proposed protocols conflict with existing regulations or frameworks?
- **Proposed Protocols**
  - Are appropriate emissions sources targeted in these protocols? Should EPA consider any additional emissions sources and/or associated protocols?
  - Are appropriate best management practices, technologies and/or emission mitigation targets used in the protocols?
  - **For the local distribution sector (LDC), please provide feedback on performance goals for specific sources, such as cast iron pipe replacement. We welcome suggestions for ways to reduce methane emissions from LDCs with limited or no cast iron or exposed steel pipe.**
  - How, and how frequently, should protocols or other program elements be updated to reflect evolving state of the art?

Timeline for Launch of Gas STAR Gold

- **On-going - Outreach to key industry, trades, State and NGO stakeholders**

- **May 12 – Natural Gas STAR Annual Implementation Workshop: Gas STAR Gold Program Discussion**
  - Describe proposed details of Gold STAR Program and seek initial feedback.
  - Framework document describing program implementation and overview of proposed protocols.

- **Through July 31 - Feedback Process**
  - EPA will request feedback on proposed program implementation
  - EPA will host an in-person meeting and webinars.
    - June 18, 2014: Webinar
    - June 25, 2014: In person meeting in Washington, DC

- **Autumn 2014 – Finalize Program Protocols**
  - Review of stakeholder feedback and finalization of Program details.

- **On-going through December 31, 2014 – Welcome Charter Partners and Launch Partnership**
  - Receive signed Letters of Intent from Charter Partners.
  - Kick-off event

- **January 1, 2015 – Begin first year of Gas STAR Gold Program**

Contact us!

For more information about Gas STAR Gold:

www.epa.gov/gasstar/gold/index.html

We welcome your feedback:

www.epa.gov/gasstar/contactus.html

Roger Fernandez

Fernandez.roger@epa.gov

(202) 343-9386

EPA
United States
Environmental Protection
Agency

Oil and Natural Gas Sector Regulatory Program Update

Bruce Moore
US Environmental Protection Agency
Office of Air and Radiation

Overview

- EPA's air regulations for the oil and natural gas sector
- 2012 rulemaking
- Status of reconsideration
- Technical white papers

New Source Performance Standards (NSPS)

- Authority: section 111(b) of Clean Air Act (CAA)
- Primarily regulate criteria pollutants and precursors from new, modified and reconstructed sources
  - Ozone (via precursors VOC* and NOx*)
  - Sulfur dioxide
  - Nitrogen dioxide
  - Particulate matter
  - Carbon monoxide
  - Lead
- Concept -- NSPS must reflect “best system of emission reductions”
- Must be reviewed every 8 years to determine whether technology advances warrant updating the requirements

*Volatile organic compounds (VOC) and oxides of nitrogen (NOx)

National Emission Standards for Hazardous Air Pollutants (NESHAP)

- Section 112 of the CAA requires EPA to control a specific list of air toxics from new and existing sources
- Pollutants of primary concern to oil and natural gas sector:
  - benzene, toluene, ethylbenzene, mixed xylenes (BTEX)
  - n-hexane
- Concept -- technology-based standards that require what the best facilities are doing (maximum achievable control technology -- MACT)
- Requires risk and technology review (RTR)
  - One-time residual risk assessment 8 years after promulgation of MACT to determine if existing rule provides an ample margin of safety
  - Technology review every 8 years to determine if technology advances warrant updating the requirements

Some Regulatory History

- 1985 - NSPS KKK (VOC) and LLL (SO_2) for gas processing plants
- 1999 - NESHAP HH for oil & natural gas production facilities
- 1999 - NESHAP HHH for natural gas transmission & storage facilities
- 2007 - Area source NESHAP HH for oil & natural gas production

- 08/23/11 - Proposed new NSPS OOOO and updated NESHAP HH & HHH
- 08/16/12 - Published final rules for OOOO, HH and HHH
- 10/15/12 - Received petitions for reconsideration of OOOO, HH and HHH
- 04/12/13 - Proposed storage vessel implementation amendments (NSPS-1)
- 09/23/13 - Published NSPS-1 final rule
- 11/22/13 - Received petitions for reconsideration of NSPS-1

2012 NSPS - Well Completions

- Applies to all hydraulically fractured gas wells, both new wells and existing wells that are fractured or refractured
- Beginning 1/1/15, the rule requires "green completions" for most wells
- Requires flaring in situations not meeting criteria for green completions (and where flaring is not a hazard)
  - Wildcat and delineation wells
  - Low pressure wells
  - Wells completed from 10/15/12 to 12/31/14
  - Green completions are encouraged during this time.

Green Completion Equipment
(Source: Weatherford)

A natural gas well site. EPA photo.

2012 NSPS - Compressors and Storage Vessels

A combustion device and storage tanks
EPA photo

- Centrifugal Compressors
  - Dry seal compressors not affected
  - 95% control for wet seal compressors
- Reciprocating Compressors
  - Requires replacement of rod packing
  - 26,000 hours of operation **or** every 3 years, regardless of hours of operation
- Storage vessels
  - 95% control for tanks ≥ 6 tpy VOC PTE
  - First compliance date 10/15/13
  - Reconsidered in 2013 (details later)

2012 NSPS - Pneumatic Controllers and Equipment Leaks

- Pneumatic controllers at oil & gas production facilities
  - Requires “low-bleed” controllers (gas bleed rate $\leq$ 6 scfh)
  - Exempts critical applications requiring high-bleed, gas-actuated controllers due to functional requirements
- Pneumatic controllers at gas processing plants
  - Requires continuous bleed, natural gas-actuated controllers to have zero bleed rate
- Equipment leaks at gas processing plants
  - Upgrades leak detection and repair (LDAR) for gas processing plants to lower leak threshold (500 ppm vs. 10,000 ppm)

2012 NESHAP Amendments

- Oil and Natural Gas Production (HH)
  - Glycol dehydrators
    - Sets new standards for small dehydrators at major sources
  - Equipment leaks at gas plants
    - Strengthens requirements for leak detection and repair
  - Storage Vessels
    - Amends definition of "associated equipment" to allow storage vessel emissions to be counted toward major source determination at well sites
- Natural Gas Transmission & Storage (HHH)
  - Glycol dehydrators
    - Sets new standards for small dehydrators

Glycol dehydrators at a well production pad
EPA photo

Petitions for Reconsideration

- Received 12 petitions for reconsideration and 9 petitions for judicial review

- EPA is currently addressing the NSPS and NESHAP issues separately
  - NSPS-1 Storage vessel implementation revisions
  - NSPS-1.5 Time-critical clarification of well completion requirements

The Agency is continuing to evaluate the other issues raised in the reconsideration petitions for the NSPS and the NESHAP.

Storage Vessels Reconsideration (NSPS-1)

- Clarified which tanks are subject to the rule
  - Revised definition of "storage vessel" – based on tank contents
    - Crude oil
    - Condensate
    - Intermediate hydrocarbon liquids
    - Produced water
  - Revised "affected facility" description – based on tank emissions
    - Storage vessels with potential to emit VOC $\geq$ 6 tpy
    - PTE takes into account any legally and practically enforceable permit or other limitation
    - PTE does not include any vapor recovered and routed to a process

Storage Vessels (NSPS-1), continued

- Phases in control dates for storage vessels constructed since NSPS proposal
  - Group 1 (constructed between August 23, 2011 and April 12, 2013)
    - Estimate emissions by October 15, 2013 to determine "affected facility" (≥ 6 tpy)
    - Submit one-time notification with first annual report (were due by January 16, 2014)
    - Control by April 15, 2015
  - Group 2 (constructed after April 12, 2013)
    - Estimate emissions by April 15, 2014 or within 30 days of startup, whichever is later
    - Control by 60 days after startup

- Alternative emission limits
  - 95% control, **or**
  - Limit uncontrolled emissions to <4 tpy
    - Emissions must be <4 tpy for at least 12 consecutive months
    - Must estimate emissions monthly
    - Allows controls to be removed and potentially reused at another location
    - If emissions reach 4 tpy, must apply 95% control

Storage Vessels (NSPS-1), continued

- Streamlined monitoring requirements (while we continue to evaluate)
  - Removed field performance testing and replaced with requirement to use controls "designed for" 95% control
  - Streamlined site inspection requirements by requiring only 15-minute Method 22 combustor check and auditory, visual, and olfactory check of storage vessel cover and closed vent system to be performed monthly
- Revised protocol for manufacturer-conducted tests of combustors
  - Reconciled NSPS language with that in the NESHAP, which was already correct
  - Manufacturers submit test results to EPA, who reviews and posts results on website
- Extended time for operators to submit annual report and compliance certification for all affected facilities under NSPS from 30 to 90 days

Time-Critical Clarifications (NSPS-1.5)

- 1/1/15 compliance date for reduced emissions completion (REC) requirement for most hydraulically fractured gas wells
- EPA previously provided clarification letter to American Petroleum Institute addressing several issues following the 2012 final NSPS
- Work under way to amend rule to clarify requirements and to add definitions of key terms
- NSPS-1.5 final rule scheduled prior to 1/1/15 REC compliance date

Obama Administration Strategy to Reduce Methane Emissions

- Strategy released March 2014
- Sets forth plan to reduce domestic and international methane emissions
- Focuses on four key sources
  - Landfills
  - Coal Mines
  - Agriculture
  - Oil and Gas
- Strategy for oil and gas includes the release of five white papers on potentially significant sources of methane

White Paper Overview

- Purpose
  - Obtain a common understanding of emerging data on emissions and control for certain potentially significant sources of VOCs and methane
  - Focus on technical issues
- Topics
  - Compressors
  - Completions and ongoing production of hydraulically fractured oil wells
  - Leaks
  - Liquids unloading
  - Pneumatic devices
- Status
  - Released on April 15, 2014, for external peer review
  - Peer review to be completed by June 16, 2014
  - Accepting technical information and data from the public until June 16, 2014

White Paper Structure

- Problem Statement
  - Define the source(s)
  - Define the context
- Available Emissions Data and Estimates
  - Summarize and compare the various data sources and estimates
  - Characterize quantity, geographic dispersion, distribution across sources
- Available Control Technologies
  - Cost, efficacy, and prevalence of technologies
- Charge Questions for Reviewers
  - Technical questions of particular interest to EPA

White Paper Next Steps

- June 16, 2014
  - Peer review deadline
  - Deadline for accepting technical information and data from the public
- Summer 2014
  - Submitted info and reviews will be made available
  - Review submitted info
- Fall 2014
  - Determine how best to pursue further methane reductions
- End of 2016
  - If EPA decides to develop additional regulations, complete those regulations

For Additional Information

- Visit: www.epa.gov/airquality/oilandgas

- Contact:

  Bruce Moore
  Senior Technical Advisor, Oil & Natural Gas Sector
  Office of Air and Radiation
  (919) 541-5460
  moore.bruce@epa.gov

- For information on the white papers, contact:

  Chris Frantz
  Fuels and Incineration Group
  Office of Air Quality Planning and Standards
  (919) 541-4312
  frantz.chris@epa.gov

Appendix

White Paper Charge Questions: Compressors

- Appropriate characterization of the different studies and data sources
- Ongoing or planned studies on this source of emissions
- Full range of technologies available to reduce vented compressor emissions
- Technical limitations to replacement of wet seals with dry seals
- Technical reasons for using a wet seal compressor without a gas recovery system
- Technical limitations to installation of gas capture systems at reciprocating compressors
- Specific applications that require wet seal compressors

White Paper Charge Questions: Completions and Ongoing Production of Hydraulically Fractured Oil Wells

- Appropriate characterization of the different studies and data sources
- Ongoing or planned studies on this source of emissions
- Full range of technologies available to reduce emissions
- Hydraulically fractured oil well completions
  - Methodologies for estimating completion emissions and rate of recompletions
  - Feasibility/cost of “green completions” at oil wells
  - Feasibility/cost of completion combustion devices at oil wells
- Ongoing production from hydraulically fractured oil wells
  - Methodologies for estimating associated gas emissions
  - Availability of pipeline infrastructure in tight oil formations

White Paper Charge Questions: Leaks

- Appropriate characterization of the different studies and data sources
- Ongoing or planned studies on this source of emissions
- Types of facilities more prone to leaks
- Full range of technologies available to detect leak emissions
- Applicability of detection and repair techniques to both oil and gas wells
- Comparison of the cost of detecting vs. cost of repairing a leak
- Necessity of leak detection technologies to quantify emissions
- State of innovation in leak detection technologies

White Paper Charge Questions: Liquids Unloading

- Appropriate characterization of the different studies and data sources
- Ongoing or planned studies on this source of emissions
- Full range of technologies available to reduce emissions
- Types of wells most likely to require liquids unloading
- Ability of plunger lift systems to perform liquids unloading without any air emissions
- Pros and cons of installing a “smart” automation system as part of a plunger lift system
- Feasibility of the use of flares during liquids unloading operations
- Rationale of performing blowdowns instead of using more effective liquid removal technologies

White Paper Charge Questions: Pneumatic Devices

- Appropriate characterization of the different studies and data sources
- Ongoing or planned studies on this source of emissions
- Full range of technologies available to reduce emissions
- Explanation for wide range of emission rates from pneumatic controllers
- Barriers to installing instrument air systems
- Barriers to using instrument air-driven controllers and pumps
- Limitations of electric-powered pneumatic controllers and pneumatic pumps