

Appendix A: List of Materials EPA shared with Small Entity Representatives

Appendix A2. Materials EPA shared with SERs before the Panel Meeting July 29, 2021

- Agenda for Panel Outreach Meeting, July 29, 2021 (page 2)
- Power Point Presentation: Oil and Gas SBAR Panel Presentation (pages 3 - 20)
- Power Point Presentation: Oil and Gas SBAR Panel Presentation - Supplemental Materials (pages 21 - 41)
- Pre-Panel Comments from Potential SERs (See Appendix B1)

EPA's Panel Outreach Meeting with Small Entity Representatives for
EPA's Rulemaking, "Oil and Natural Gas Sector New Source Performance
Standards"

Thursday, July 29, 2021 – 2:00 pm to 4:00 pm (Eastern)

- 2:00 **Welcome and Introductions** (EPA Office of Policy)
- 2:15 **Presentation of Outreach Materials** (EPA Office of Air Quality Planning and Standards)
- 4:00 **Discussion** (All)
- 4:50 **Summary and Closing** (EPA Office of Policy)

Oil and Natural Gas Sector New Source Performance Standards

Small Entity Representative Panel Outreach

July 2021

Overview

- ▶ Background
 - ▶ Consultation with Small Entity Representatives
 - ▶ Clean Air Act Section 111 – Emissions Standards
 - ▶ Regulatory History
 - ▶ Congressional Review Act (CRA)
 - ▶ Executive Order on Protecting Public Health and the Environment
 - ▶ Estimated Number of Small Businesses
- ▶ Post-CRA Discrepancies
- ▶ Schedule
- ▶ Input Requested
- ▶ Contact Information

Consultation with Small Entity Representatives

- ▶ EPA is interested not only in information, but also in advice and recommendations from the small entity representations (SERs)
- ▶ EPA will use this information to develop a regulatory flexibility analysis, which becomes part of the record for the potential regulation
- ▶ Key elements in this analysis:
 - ▶ Number of small entities to which the potential rule would apply
 - ▶ Projected compliance requirements of the potential rule
 - ▶ Identification of all relevant federal rules that may duplicate, overlap or conflict with the potential rule
 - ▶ Any significant alternatives to the potential rule that accomplish the stated objectives and that minimize significant economic impact of the potential rule on small entities

SERs and the Regulatory Process

- ▶ Pre-Panel Outreach Meeting was held on June 29, 2021
- ▶ Concerns noted by SERs following the Pre-Panel Outreach Meeting included:
 - ▶ Definition of the source category
 - ▶ Applicability and requirements for low-production wells and tank batteries
 - ▶ Expansion of technologies for monitoring leaks and fugitive emissions
 - ▶ Definition of hydraulic fracturing
 - ▶ Reporting and recordkeeping requirements
- ▶ EPA has worked to address these concerns in considering various control strategies and assessing their potential impacts

Clean Air Act Section 111 – Emissions Standards

- ▶ For source categories that cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare, Section 111 of the Clean Air Act requires that EPA establish standards of performance for new sources and, for certain pollutants, issue regulations under which states establish standards of performance for existing sources.
- ▶ Standards must be set based on what is achievable through the application of the best system of emission reduction (BSER)
- ▶ To determine BSER, EPA must consider:
 - ▶ Technology that has been adequately demonstrated
 - ▶ Cost (must not be “exorbitant,” “greater than the industry can bear,” or “unreasonable”)
 - ▶ Non-air quality health and environmental impacts
 - ▶ Energy requirements
- ▶ When issuing regulations for existing sources, EPA allows states to take into account the remaining useful life of those sources, and other factors, in applying standards of performance in their state plans

Regulatory History

- ▶ 2012 – NSPS OOOO regulated VOC emissions from several sources in the production and processing segments
- ▶ 2016 – NSPS OOOOa added methane as a regulated pollutant and expanded regulations through the transmission and storage segment. NSPS OOOOa also added requirements to cover additional sources; included fugitive emissions monitoring
- ▶ 2020 Policy Rule – removed the transmission and storage segment from OOOO and OOOOa and rescinded methane standards in the production and processing segments. President Biden signed a joint Congressional resolution disapproving this rule.
- ▶ 2020 Technical Rule – exempted low production well sites from fugitive emissions monitoring, decreased monitoring frequency at compressor stations to semi-annually, allowed compliance with state requirements as an alternative to fugitive emissions requirements

Congressional Review Act

- ▶ On June 30, 2021, President Biden signed into law a joint resolution of Congress disapproving the 2020 Policy Rule, meaning the Policy Amendments are no longer in effect
 - ▶ Reinstates the 2012 VOC and 2016 VOC and methane standards for the transmission and storage segments, as well as the methane standards for the production and processing segments
 - ▶ Any facility that would have been subject to the 2012 or 2016 NSPS but for the 2020 Policy Rule immediately became subject to those NSPS
- ▶ The CRA resolution that disapproved the 2020 Policy Rule did not address the 2020 Technical Rule; therefore, those amendments remain in effect
- ▶ EPA provided [information](#) to the industry about compliance with the newly reinstated requirements for new, reconstructed, and modified sources
- ▶ As part of the 2021 Proposal, EPA will explain the impact of the CRA resolution of disapproval of the 2020 Policy Rule, as well as identify and propose appropriate changes to resolve any discrepancies in the regulatory text between the 2016 NSPS and 2020 Technical Rule

Executive Order on Public Health and the Environment

- ▶ On January 20, 2021, President Biden issued Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis
- ▶ Among other direction to EPA, the order instructs EPA to consider taking two actions by September 2021 focused on reducing methane emissions from the oil and gas sector:
 - ▶ Propose strengthening previously issued standards for new sources
 - ▶ Propose emission guidelines for existing operations in the oil and gas sector
- ▶ These actions both fall under section 111 of the Clean Air Act

2021 Proposal

- ▶ As directed by Executive Order 13990, this proposal will include comprehensive new source performance standards for methane and volatile organic compound (VOC) emissions and emission guidelines for methane emissions
- ▶ The proposal will cover exploration and production, processing, transmission, and storage segments
- ▶ New studies and data are available that may indicate the need for EPA to reevaluate the emissions sources considered since the 2015 OOOOa proposal
- ▶ While the Executive Order directs EPA to issue proposals for both new and existing sources, this Panel is focused only on the NSPS because it directly regulates small entities, while the proposed emission guidelines will only provide requirements to states
 - ▶ EPA may convene a separate SBAR Panel on the emission guidelines during development of a Federal Implementation Plan

Source Category Definition

- ▶ Post-CRA, the definition of the source category reverted back to the original language promulgated in 2016
- ▶ *Crude oil and natural gas source category* means: (1) Crude oil production, which includes the well and extends to the point of custody transfer to the crude oil transmission pipeline or any other forms of transportation; and (2) Natural gas production, processing, transmission, and storage, which include the well and extend to, but do not include, the local distribution company custody transfer station.
 - ▶ *Local distribution company (LDC) custody transfer station* means a metering station where the LDC receives a natural gas supply from an upstream supplier, which may be an interstate transmission pipeline or a local natural gas producer, for delivery to customers through the LDC's intrastate transmission or distribution lines.

Estimated Small Business Concentrations

- ▶ Work is ongoing to determine small business concentrations for affected facilities in the NSPS
- ▶ The following table illustrates small business concentrations in a recent year based on operators of well sites and natural gas processing plants

Category	Total firms	Small	Not small	Unknown	Small business percentage (of identified firms)
Well Sites	1,751	1,004	104	643	91%
Natural Gas Processing Plants	180	86	47	47	65%

Notes: Well site operator data obtained from Enverus; limited to operators that completed a well in 2019. Natural gas processing plant data obtained from EIA ([Form-757 for 2017 reporting year](#))

Preliminary Regulatory Structure

- ▶ NSPS OOOO - New, modified, or reconstructed after August 23, 2011, and on or before September 18, 2015
- ▶ NSPS OOOOa - New, modified, or reconstructed after September 18, 2015, and on or before September 2021
- ▶ 2021 NSPS - New, modified, or reconstructed after September 2021
- ▶ Emission guidelines for existing sources (pre-September 2021)

Post-CRA Discrepancies: Fugitive Emissions Monitoring

- ▶ Monitoring Frequency at Compressor Stations
 - ▶ Gathering and Boosting
 - Quarterly (methane); semiannual (VOC)
 - ▶ Transmission and Storage
 - Quarterly (methane); quarterly (VOC)
 - ▶ Alaska North Slope
 - Quarterly (methane); annual (VOC)
- ▶ Monitoring Frequency at Well Sites
 - ▶ Low production wells
 - Semiannual (methane); exempt (VOC)
 - ▶ Alaska North Slope
 - Annual (methane); annual (VOC)
 - ▶ All other wells
 - Semiannual (methane); semiannual (VOC)
- ▶ Initial monitoring requirements
 - ▶ 60 days of startup (methane); 90 days of startup (VOC)

Post-CRA Discrepancies: Fugitive Emissions Requirements

- ▶ Fugitive emissions repair requirements differ for VOC and methane
 - ▶ Repair within 30 days of leak identification and resurvey within 30 days of repair (methane)
 - ▶ First attempt at repair within 30 days of leak identification and final repair within 30 days of first attempt, with resurvey required before repair is considered complete (VOC)
- ▶ Additional provisions apply to VOC and not methane
 - ▶ Fugitives monitoring is not required when all major production and processing equipment is removed from the site, and it becomes wellhead only
 - ▶ Excludes third party equipment (*e.g.*, custody meter), and solid waste and saltwater disposal wells from fugitives monitoring
- ▶ State equivalency provisions apply to VOC and not methane

Additional Post-CRA Discrepancies

- ▶ Pneumatic pump provisions
 - ▶ Technically infeasibility of routing emissions to controls or processes at greenfield sites (VOC can claim technical infeasibility, methane cannot)
 - ▶ Boilers and process heaters as control devices for purposes of controlling emissions from pneumatic pumps (VOC they are not considered controls, methane they are considered controls)
 - ▶ Certification of technical infeasibility (VOC in-house engineer, methane must be a professional engineer)
- ▶ Additional provisions from the 2020 Technical Rule apply to VOC and not methane
 - ▶ Technical corrections and clarifications that only apply to VOC emissions in production and processing
 - ▶ Streamlined recordkeeping and reporting requirements that only apply to VOC emissions in production and processing

Comments on the Pre-Panel Outreach Materials

- ▶ Following the pre-panel outreach meeting, we received comments from 9 SERs:
 - ▶ American Public Gas Association, City of Las Cruces Utilities/Gas, Middle Tennessee Natural Gas Utility District, Pensacola Energy, And Unutil Corporation
 - ▶ CountryMark, Indiana Oil and Gas Association (INOGA), and Kentucky Oil and Gas Association (KOGA)
 - ▶ Cumberland Valley Resources, LLC
 - ▶ Fore Energy Partners, Inc
 - ▶ Kansas Independent Oil & Gas Association
 - ▶ Michigan Oil and Gas Association
 - ▶ Pennsylvania Grade Crude Oil Coalition and Cameron Energy Company
 - ▶ The Petroleum Alliance of Oklahoma
 - ▶ Texas Alliance of Energy Producers
- ▶ We intend to summarize these comments and use them to provide a guide to our discussion at the Panel Outreach meeting

How to comment

- ▶ As a follow up to the discussion during the Panel Outreach Meeting, please provide written comments by August 12, 2021
- ▶ To the extent possible, please provide specific data, costs, and actionable information on your experience with OOOOa or these control technologies

- ❖ Send comments to Lanelle Wiggins, wiggins.lanelle@epa.gov
- ❖ Please reach out to Lisa Thompson, thompson.lisa@epa.gov before submitting Confidential Business Information (CBI)

Contact Information

- ▶ For Oil and Natural Gas Sector NSPS questions:
 - ▶ Lisa Thompson, EPA Office of Air and Radiation
919-541-9775, thompson.lisa@epa.gov
 - ▶ Rhonda Wright, EPA Office of Air and Radiation
919 541-1087, wright.rhonda@epa.gov
- ▶ For SBAR Panel questions:
 - ▶ Lanelle Wiggins, EPA Office of Policy
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 - ▶ Stephanie Brown, EPA Office of Policy
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Supplemental Materials

Small Entity Representative Panel Outreach
July 2021

Overview

- ▶ EPA is currently gathering and analyzing information that will form the basis of the proposed rule
- ▶ The following slides describe the scope of the rule that is under consideration and describe the potential control strategies that EPA is evaluating
- ▶ EPA is interested in your perspective on these potential control strategies and input on regulatory alternatives that still accomplish the objectives of the Clean Air Act
 - ▶ Other relevant control strategies, including data on their costs, effectiveness, and information on how to ensure compliance
 - ▶ Appropriate subcategorization
 - ▶ Flexibilities -- such as exemptions, different compliance timetables, and simplified reporting requirements

Rule coverage / scope

- ▶ SERs stated EPA's definition of hydraulic fracturing should explicitly exclude conventional wells

Hydraulic fracturing means the process of directing pressurized fluids containing any combination of water, proppant, and any added chemicals to penetrate tight formations, such as shale or coal formations, that subsequently require high rate, extended flowback to expel fracture fluids and solids during completions

- ▶ Questions for SERs
 - ▶ Can you describe your operations in terms of flowback and formation and how this definition may or may not apply to you?
 - ▶ How would you define a conventional well versus a hydraulically fractured well?
 - ▶ How do emissions differ between conventional wells and hydraulically fractured wells?

Reporting and Recordkeeping

- ▶ The 2020 Technical Rule successfully reduced recordkeeping and reporting burden by streamlining and removing several requirements:
 - ▶ Recordkeeping and reporting requirements for well completions
 - ▶ Digital photo for each monitoring survey performed
 - ▶ Number and type of fugitive emissions components or digital photo of fugitive emissions components that are not repaired during the monitoring survey
 - ▶ Name or ID of operator
 - ▶ Number and type of difficult-to-monitor and unsafe-to-monitor components
 - ▶ Ambient temperature, sky conditions, and maximum wind speed
 - ▶ Date of successful repair
 - ▶ Type of instrument used for resurvey
- ▶ This streamlining resulted in an annualized reduction of burden of approximately 30 percent for well sites and gathering and boosting stations
- ▶ EPA finalized the E-reporting template in April 2021
 - ▶ <https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/implementation-oil-and-natural-gas-air#report>

SER Comments on Recordkeeping and Reporting

▶ Requirements

- ▶ SERs stated some recordkeeping and reporting elements were burdensome and added no value. These included notification of hydraulic fracturing, FLIR operator training, starting and ending time of monitoring surveys, maximum wind speed, and survey deviations
- ▶ SERs recommended maintaining the streamlining from the 2020 Technical Rule

▶ Costs

- ▶ SERs estimated the cost to manage data for OOOOa ranged from \$50,000 - \$60,000 annually
- ▶ SERs estimated developing a site-specific monitoring plan costs \$30,000 - \$50,000
- ▶ SERs estimated storing photos and reports costs \$40,000 - \$50,000

▶ Electronic Reporting

- ▶ SERs stated the electronic reporting template is daunting, and shouldn't ask information that isn't required

For Discussion

- Do you have recommendations for how to further reduce reporting and recordkeeping burden?
- How have your costs compared to these estimates?
- Do you have recommendations for improving the electronic reporting template?
- Do you have recommendations on how EPA could align 2016 and 2020 subpart OOOOa recordkeeping and reporting for methane and VOC requirements?

Emissions Sources Under Consideration:

Liquids Unloading

- ▶ In mature gas wells, when the accumulation of liquids in the well slows gas production, the removal of fluids (*i.e.*, liquids unloading) is required in order to maintain production
- ▶ Most gas wells will have liquid loading occur at some point during the productive life of the well
- ▶ The choice of what liquids unloading technology or techniques to employ is based on well-by-well and reservoir-by-reservoir analysis
 - ▶ Plunger lifts, velocity tubing, intermitting, surfactant injection, reduce surface pressure all rely on reservoir energy
 - ▶ Down-hole pumps and gas-lift add energy to the reservoir fluids
- ▶ Emissions come from venting of the well through atmospheric tanks during unloading event
- ▶ Potential control strategies
 - ▶ Best management practices to minimize venting to maximum extent possible during event
 - ▶ Capturing emissions and routing to a control device or process
 - ▶ Allow flexibilities depending on reservoir conditions

Liquids Unloading: Questions for SERs

- ▶ How often do you conduct liquids unloading operations?
- ▶ What equipment is onsite during a liquids unloading event?
- ▶ Do you already implement practices as part of voluntary efforts or state requirements to minimize emissions during liquids unloading events as part of regular operations?
- ▶ What practices do you implement that reduce or eliminate venting of emissions during liquids unloading events?
- ▶ Can you describe instances where it is not technically feasible to not vent emissions during liquids unloading events?
- ▶ Under those scenarios, can you vent to an emissions control device or process? If not, why?
- ▶ Are there any reservoir or other characteristics that correlate with emissions during these events?

Fugitive Emissions

▶ Applicability

▶ New, modified or reconstructed well sites

- Well sites are modified when a new well is drilled or an existing well is hydraulically fractured or refractured
- Exempts wellhead only well sites

▶ New, modified or reconstructed compressor stations

- Compressor stations are modified when an additional compressor is installed or an existing compressor is replaced with by one with greater horsepower
- Excludes compressors at well sites or processing plants from the definition of a compressor station

▶ Current requirements

- ▶ Develop an emissions monitoring plan
- ▶ Monitoring can be done using optical gas imaging (OGI) or Method 21
- ▶ Monitoring surveys must be done semi-annually except for facilities on the Alaska North Slope, which have annual monitoring requirements*
- ▶ Exempts low production wells (less than 15 barrels per day)*
- ▶ Leaks must be repaired and resurveyed
- ▶ EPA has deemed that compliance with state programs in California, Colorado, Ohio, Pennsylvania, Texas, and Utah is equivalent to OOOOa, provided certain conditions are met

**Impacted by the CRA*

Fugitive Emissions

- ▶ Potential control strategies
 - ▶ Use site-level emissions to guide monitoring frequency instead of production-based frequency
 - ▶ Lower emitting sites could be determined based on:
 - Screening with new technologies that may identify large emission events
 - Owner/operator calculation of the site-wide methane emissions
 - The absence of higher emitting equipment
- ▶ Unit-level cost estimates from selected regulatory options in 0000a

	Capital Cost	Annual Cost*	VOC \$/ton	Methane \$/ton
Non-low Production Well sites	\$1,026	\$2,527	\$4,324	\$1,202
Gathering and Boosting Compressor Stations	\$3,087	\$12,629	\$2,632	\$732

* Includes monitoring surveys, cost of repair and resurvey, recordkeeping and reporting costs, and the amortized capital cost over 8 years at 7 percent interest

SER Comments on Fugitive Emissions

▶ Tank Batteries

- ▶ SERs stated that tank batteries with emissions less than 6 tpy may fall into the fugitives program, even though the tank battery emissions are uncontrolled

▶ Costs

- ▶ SERs stated that they need to hire third-party contractors or consultants
- ▶ SERs estimated their annual cost of OGI monitoring is \$75,000, or \$3,000 - \$6,000 per well site. Single well monitoring can range from \$2,500 - \$3,000
- ▶ SERs estimated first year costs can range from \$4,000 - \$10,000
- ▶ SERs estimated the cost to repair a small leak can range from \$500 - \$1,500

For Discussion

- Have others had uncontrolled tank batteries pulled into their fugitive emissions program?
- Have you hired third-party contractors or used in-house personnel for your fugitive emissions monitoring?
- How have your costs compared to these estimates?
- Do you have recommendations on how EPA could align 2016 and 2020 subpart OOOOa fugitive emissions requirements for methane and VOC?

SER Comments on Low Production Well Sites

▶ Applicability

- ▶ SERs asked for a separate subcategory
- ▶ SERs recommended low production wells should be exempted from requirements
- ▶ SERs recommended setting the low production threshold at 15 barrels per day, based on a rolling 12-month average

▶ Emissions profile

- ▶ SERs stated low production wells have little to no emissions
- ▶ SERs recommended a DOE study on these emissions, which should be complete by the end of 2021
- ▶ SERs stated that EPA's data on emission is outdated and incorrect (e.g., many studies include emissions from unregulated sources such as thief hatch emissions)

▶ Requirements

- ▶ SERs asked for an offramp for low production wells
- ▶ SERs asked for annual or every 2-year monitoring frequency
- ▶ SERs asked EPA to allow for AVO or soap bubble tests

For Discussion

- Are there any other characteristics of these wells (aside from production) that could serve as the basis of a subcategory or less stringent requirements?
- Aside from the DOE report, is there any other data on emissions from these wells you can provide?
- Do you have recommendations on how EPA could align 2016 and 2020 subpart OOOOa low production well site requirements for methane and VOC?

Storage Vessels

- ▶ Current requirements
 - ▶ Storage vessels with a potential to emit (PTE) greater than 6 tons per year of VOC must route emissions to a control device or process
 - ▶ Must determine PTE using the maximum average daily throughput - the earliest calculation of daily average throughput during the 30-day PTE evaluation period employing generally accepted methods
 - ▶ Exempt storage vessels with a capacity greater than 100,000 gallons used to recycle water
- ▶ Potential control strategies
 - ▶ Consider if methane-based applicability is appropriate
 - ▶ Consider applicability to tank batteries in lieu of single storage vessels
- ▶ Unit-level cost estimates from selected regulatory options in OOOO

Capital Cost	Annual Cost*	VOC \$/ton
\$77,639	\$23,638	\$242

* Assumes a 7 percent interest rate over equipment lifetime

SER Comments on Storage Vessels

- ▶ SERs stated they have had to purchase supplemental fuel for the pilot lights on storage vessel control devices because the associated low production wells don't produce enough gas to power the units
- ▶ SERs stated that compliance with storage vessel requirements has caused them to plug wells before the end of their useful life
- ▶ SERs stated that calculating the maximum daily throughput is unnecessarily burdensome

For Discussion

- Have others had to purchase supplemental fuel for control devices on storage vessels? Do you have a recommendation for controlling emissions that wouldn't require purchasing supplemental fuel?
- Do you have any recommendations to make determining your affected facility status easier? What other parameters do you have readily available that could be used to calculate emissions in place of throughput?

Well Completions

- ▶ Current requirements
 - ▶ Subcategory 1 (non-wildcat, non-delineation) wells must conduct a reduced emissions completion (REC) using a completion combustion device, and have a separator onsite during the flowback period of a well completion operation following hydraulic fracturing or refracturing
 - ▶ Subcategory 2 (wildcat, delineation, or low pressure) wells must use a completion combustion device during a well completion operation following hydraulic fracturing or refracturing
 - ▶ Heavy oil wells are exempt from well completion requirements
- ▶ Potential control strategies
 - ▶ Reevaluating the current requirements to determine if they continue to be the best system of emission reduction
 - ▶ Considering whether applicability is appropriately defined
- ▶ Unit-level cost estimates from selected regulatory options in OOOO and OOOOa

	Annual Cost*	VOC \$/ton	Methane \$/ton
Reduced Emissions Completion (REC)	\$15,074	\$2,057	\$1,724
REC and Completion Combustion Device	\$19,245	\$2,489	\$2,084

*One-time event. Annual costs are assumed to be the same as capital costs.

SER Comments on Well Completions

▶ Costs

- ▶ SERs estimated that combustion devices cost between \$20,000 - \$30,000 to purchase and install
- ▶ SERs estimated green completions cost \$10,000 - \$15,000

For Discussion

- How have your costs compared to these estimates?
- Do you have any recommendations to minimize the impact of well completion requirements on small businesses?

Centrifugal Compressors

- ▶ Current requirements
 - ▶ Centrifugal compressors using wet seals must reduce emissions from the wet seal fluid degassing system by routing to a control device or process
 - ▶ Control devices can include combustion control devices, flares, boilers, process heaters, thermal or catalytic vapor incinerators, and carbon adsorption systems
 - ▶ Exempt compressors located at well sites
- ▶ Potential control strategies
 - ▶ Consider expanding applicability to dry seal compressors
 - ▶ Reevaluate if wellsite exemption is appropriate for centralized production facilities
- ▶ Unit-level cost estimates from selected regulatory options in OOOO and OOOOa

	Capital Cost	Annual Cost*	VOC \$/ton	Methane \$/ton
Processing	\$80,822	\$123,011	\$6,306	\$569
Transmission	\$80,397	\$127,844	\$31,030	\$859
Storage	\$80,397	\$127,844	\$41,558	\$1,151

* Assumes a 7 percent interest rate over equipment lifetime

Reciprocating Compressors

- ▶ Current requirements
 - ▶ Replace rod packing every 26,000 hours or 36 months, or collect emissions under negative pressure and route to a process
 - ▶ Exempt compressors located at well sites
- ▶ Potential control strategies
 - ▶ Consider rod packing changeout based on monitoring of emissions (e.g., flow meter measurement), rather than a set period of time or hours of operation
 - ▶ Reevaluate if wellsite exemption is appropriate for centralized production facilities
- ▶ Unit-level cost estimates from selected regulatory options in OOOO and OOOOa

	Capital Cost	Annual Cost*	VOC \$/ton	Methane \$/ton
Gathering & Boosting	\$6,362	\$1,986	\$1,044	\$290
Processing	\$4,820	\$1,681	\$325	\$90
Transmission	\$6,328	\$1,958	\$3,259	\$91
Storage	\$8,630	\$2,326	\$3,846	\$106

* Assumes a 7 percent interest rate over equipment lifetime

Compressors: Questions for SERs

- ▶ Do you own or plan to build any centralized production facilities where new centrifugal and reciprocating compressor requirements may be appropriate?
- ▶ Do you have recommendations on how to define centralized production facilities? As an example, Colorado defines these types of facilities as
 - ▶ “all equipment at a single stationary source directly associated with one or more oil wells or natural gas wells upstream of the natural gas processing plant. This equipment includes, but is not limited to, equipment used for storage, separation, treating, dehydration, artificial lift, combustion, compression, pumping, metering, monitoring, and flowline.”
- ▶ Do you own any compressors that are subject to OOOOa requirements? If so, what has been your experience with OOOOa compliance?
- ▶ EPA has received previous comments that indicate higher emissions of dry seal compressors than EPA and states estimates. Have you experienced abnormal or higher emissions from dry seals caused by contaminated seals, mechanical failure, low pressure, for example?

Pneumatic Controllers

- ▶ Current requirements
 - ▶ Continuous bleed pneumatic controllers must be zero emissions at natural gas processing plants, and low bleed (<6 scf/hr) at all other locations
 - ▶ Exempt controllers required for functional needs (*e.g.*, response time, safety, positive actuation); however, these controllers have recordkeeping and reporting requirements
- ▶ Potential control strategies
 - ▶ Consider operational requirements for intermittent-bleed and low-bleed controllers (*e.g.*, leak detection, monitoring, proper operation)
 - ▶ Consider expanding zero emissions controller requirements
- ▶ Unit-level cost estimates from selected regulatory options in OOOO and OOOOa

	Capital Cost	Annual Cost*	VOC \$/ton	Methane \$/ton
Production (Incremental Cost)	\$196	\$28	\$15	\$5
Processing (Instrument Air System)	\$20,197	\$13,197	\$3,161	\$878
Transmission & Storage (Incremental Cost)	\$254	\$28	\$362	\$10

* Assumes a 7 percent interest rate over equipment lifetime

Pneumatic Pumps

- ▶ Current requirements
 - ▶ Natural gas-driven diaphragm pumps must be zero emissions at natural gas processing plants
 - ▶ Pumps at well sites must route emissions to a control device or process, if one is available on site, unless it is technically infeasible
 - ▶ Exempt limited use pumps at well sites
- ▶ Potential control strategies
 - ▶ Consider expanding applicability to piston pumps
 - ▶ Consider expanding zero emissions pump requirements
 - ▶ Consider requirements for pumps beyond well sites and natural gas processing plants (i.e., gathering and boosting, transmission, and storage)
- ▶ Unit-level cost estimates from selected regulatory options in OOOOa

	Capital Cost	Annual Cost*	VOC \$/ton	Methane \$/ton
Production	\$6,085	\$867	\$263	\$949
Processing	\$2,024 - \$5,994	\$2,240 - \$4,676	\$370 - \$1,113	\$103 - \$309

* Assumes a 7 percent interest rate over equipment lifetime

Equipment Leaks at Natural Gas Processing Plants

- ▶ Current requirements
 - ▶ NSPS VVa Method 21 monitoring on components in VOC service (<10% by weight VOC) at frequencies based on component type (e.g., quarterly for valves)
 - ▶ Repair leaks above 500 ppm
- ▶ Potential control strategies
 - ▶ Consider including additional components
 - ▶ NSPS VVa Method 21 or OGI program for all components
- ▶ Unit-level cost estimates from selected regulatory options in 0000

	Capital Cost	Annual Cost*	VOC \$/ton
Processing	\$9,596	\$14,591	\$3,202

*Includes initial monitoring and setup, ongoing monitoring surveys, administrative and training costs, and assumes a 7 percent interest rate over equipment lifetime