CHAPTER 9 LIQUIDS UNLOADING

This chapter addresses the EPA's responses to public comments on liquids unloading in the EPA's Proposed *Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources.*

Commenters also raised issues on topics that are not covered by this chapter. Please refer to the following chapters for responses specific to those issues:

- **Chapter 1**: Source Category
- **Chapter 2**: Regulation of Methane
- **Chapter 3**: Well Completions
- **Chapter 4**: Fugitives Monitoring
- **Chapter 5**: Pumps
- **Chapter 6**: Controllers
- **Chapter 7**: Compressors
- **Chapter 8**: Equipment Leaks at Natural Gas Processing Plants
- **Chapter 10**: Storage Vessels
- **Chapter 11**: Compliance
- **Chapter 12**: Regulatory Impact Analysis
- **Chapter 13**: Existing State, Local, and Federal Rules
- **Chapter 14**: Subpart OOOO
- **Chapter 15**: Miscellaneous
- **Chapter 16**: Comment Period Extension

This section presents the comments received by the EPA on the topic of liquids unloading.

Response: In the proposal, the EPA did not propose a standard for liquids unloading because we did not have sufficient information. However, the EPA did request comments with regard to nationally applicable technologies and techniques that reduce methane and VOC emissions from liquids unloading events. 80 Fed. Reg. 56614-56615. Specifically, we requested data and information on the level of GHG and VOC emissions per unloading event, the number of unloading events per year, and the number of wells that perform liquids unloading. In addition, we requested comment on (1) characteristics of the well that play a role in the frequency of liquids unloading events and the level of emissions; (2) demonstrated techniques to reduce the emissions from liquids unloading events, including the use of smart automation, and the effectiveness and cost of these techniques; (3) whether there are demonstrated techniques that can be employed on new wells that will reduce the emissions from liquids unloading events in

the future; and (4) whether emissions from liquids unloading can be captured and routed to a control device and whether this has been demonstrated in practice.

We appreciate the information that commenters provided in response to our request. While these comments have helped the EPA to gain a better understanding of the practice of liquids unloading, we have not been able to identify an emission reduction technology that is an adequately demonstrated best system of emission reduction. According to the information we received, the differences in liquids unloading events (with respect to both frequency and emission level) are due to the specific conditions of a given well at the time the operator determines that well production is impaired such that unloading must be done. Operators select the technique to perform liquids unloading operations based on the conditions of the well each time production is impaired. Because well conditions change over time, each iteration of unloading may require repeating a single technique or utilizing a different technique that may not have been appropriate under prior conditions. While we do not have enough information to set a standard for liquids unloading at this time, we are continuing to evaluate potential solutions. The EPA continues to consider ways to address emissions associated with liquids unloading and is including this emissions source in the upcoming information gathering effort.

See section V.I of the preamble to the final rule for additional information on liquids unloading and section III.E of the preamble to the final rule for more detail regarding the EPA's information collection request.

The following are excerpts of the specific public comments regarding liquids unloading:

Commenter Name: Howard J Feldman
Commenter Affiliation: American Petroleum Institute
Document Control Number: EPA-HQ-OAR-2010-0505-6884
Comment Excerpt Number: 46

Comment: API Supports EPA's Conclusion Regarding Liquids Unloading Requirements.

Well-bore fluid dynamics and the portfolio of techniques, practices, and technologies that the industry uses to manage well-bore liquids are extremely complex. EPA has solicited significant comment on many aspects of liquids unloading operations within the preamble. Specifically EPA has sought comment (FR 56645) on:

- the level of methane and VOC emissions per unloading event, the number of unloading events per year, and the number of wells that perform liquids unloading.
- characteristics of the well that play a role in the frequency of liquids unloading events and the level of emissions,
- demonstrated techniques to reduce the emissions from liquids unloading events, including the use of smart automation, and the effectiveness and cost of these techniques,
- whether there are demonstrated techniques that can be employed on new wells that will reduce the emissions from liquids unloading events in the future, and
- whether emissions from liquids unloading can be captured and routed to a control device and whether this has been demonstrated in practice.

API prepared information in Comments in response to EPA's White Paper on Liquid Unloading, which has been included as an attachment to this document as Attachment D. Due to inadequate time in the comment period, API refers EPA to this set of comments previously submitted.

API also reiterates its previous position that to adequately evaluate options to reduce venting of wells and the emissions that result, it is necessary to understand the reasons that wells are vented, alternatives to venting that will still provide for well-bore liquid loading management, and the envelope of conditions where these alternatives are feasible. As EPA mentioned, emissions from liquids unloading are highly skewed and well-specific. This process is better left managed by companies under voluntary programs to manage, mitigate and implement. As such, API supports EPA's decision to not include requirements on liquids unloading.

Commenter Name: Darin Schroeder, David McCabe, Lesley Fleishman and Conrad Schneider
Commenter Affiliation: Clean Air Task Force et al.
Document Control Number: EPA-HQ-OAR-2010-0505-7062
Comment Excerpt Number: 9

Comment: EPA has not proposed standards to address liquids unloading emissions, despite the fact that this is a significant source of emissions and technologies are available to reduce (or eliminate) this pollution. Accordingly, we urge EPA to adopt liquids unloading standards, and, in particular,

- Define the regulatory term "modification" to encompass actions operators take to restore production at a well when reservoir pressure drops and liquids unloading becomes necessary.
- Adopt a performance-based threshold, based on the suite of available technologies that can minimize emissions while only addressing a relatively discrete number of high-emitting wells.

Commenter Name: K. Roberts
Commenter Affiliation: Citizen
Document Control Number: EPA-HQ-OAR-2010-0505-6222
Comment Excerpt Number: 2

Comment: I am concerned about the proposed rule's reluctance to include liquids unloading under its purview. Liquids unloading involves the removal of liquids in order to facilitate increased oil and natural gas production. This process often causes methane and VOC emissions to come from the wells.

Commenter Name: K. Roberts
Commenter Affiliation: Citizen
Document Control Number: EPA-HQ-OAR-2010-0505-6222
Comment Excerpt Number: 3

Comment: According to a FAQ document from the University of Texas at Austin, some types of unloading result in emissions and other do not: Liquids can be removed from well bores in a

variety of ways. For example, the well tubing can be modified to increase gas velocity or a pump may be installed to remove downhole liquids. Neither of these methods result in venting of emissions. Other unloading methods, such as temporarily diverting the flow from the well to an atmospheric vent, do lead to emissions.

Commenter Name: Erik Schlenker-Goodrich
Commenter Affiliation: Western Environmental Law Center (WELC)
Document Control Number: EPA-HQ-OAR-2010-0505-6871
Comment Excerpt Number: 5

Comment: The rules as proposed exempt liquids unloading. Instead, EPA is "… requesting comment on nationally applicable technologies and techniques that reduce methane and VOC emissions from these events. Specifically, we request comment on technologies and techniques that can be applied to new gas wells that can reduce emissions from liquids unloading in the future."

The exemption for liquids unloading ignores the need for this practice at wells undergoing modifications such as recompletions, workovers and major maintenance operations. In Western states alone there are almost 200,000 oil and gas wells: 50,000 wells in Colorado, 10,000 in Montana, 56,000 in New Mexico, 11,000 in North Dakota, 12,000 in Utah and 34,000 in Wyoming. A percentage of these wells, especially in older or wet gas fields, can reasonably be expected to require such modifications and constitute a significant source of methane emissions.

Technologies and practices for well deliquification are well established and low cost. Therefore, the rules should be expanded to cover liquids unloading.

Commenter Name: J. Jared Snyder, Assistant Commissioner for Air Resources, Climate Change Energy
Commenter Affiliation: New York State Department of Environmental Conservation (DEC)
Document Control Number: EPA-HQ-OAR-2010-0505-7006
Comment Excerpt Number: 3

Comment: The DEC further recommends that EPA consider different approaches for controlling emissions from liquids unloading based on availability of power. For example, the World Resources Institute working paper recommends the use of an artificial lift when external power sources are available and the use of plunger lifts when external power sources are not available.

Commenter Name: Public Hearing Comments On Proposed Climate, Air Quality, and Permitting Rules for the Oil and Natural Gas Industry; Wednesday, September 23, 2015; 9:00 AM - 7:55 PM; Public Hearing #1 - Denver, Colorado
Commenter Affiliation: None
Document Control Number: EPA-HQ-OAR-2010-0505-7337
Comment Excerpt Number: 230

Comment: [I]ndustry should be using best practices in unloading liquids, to prevent blowdown or venting of VOCs and HAP emissions, and EPA should include those facilities in their regulations.

Commenter Name: Public Hearing Comments On Proposed Climate, Air Quality, and Permitting Rules for the Oil and Natural Gas Industry; Wednesday, September 23, 2015; 9:00 AM - 7:55 PM; Public Hearing #1 - Denver, Colorado
Commenter Affiliation: None
Document Control Number: EPA-HQ-OAR-2010-0505-7337
Comment Excerpt Number: 236

Comment: For liquids unloading facilities, we recommend that EPA include those facilities in the regulation and require that emissions during liquids unloading be minimized with current best practices. Wyoming requires this statewide, addressing liquids unloading through minor source permit conditions.

These conditions include: VOC and HAP emissions resulting from episodes of blowdown or venting must be minimized to the extent practicable; manual blowdown and venting must be attended, to minimize the duration of such events; and records must be kept detailing the duration, process conditions, control measures taken, and estimated emissions from each event.

Commenter Name: William C. Allison
Commenter Affiliation: Colorado Department of Public Health and Environment
Document Control Number: EPA-HQ-OAR-2010-0505-6876
Comment Excerpt Number: 22

Comment: EPA did not propose a standard for liquids unloading and is requesting comment on applicable technologies and techniques to reduce methane and VOC emissions from liquids unloading events.

Colorado's regulations require that owners and operators use best management practices to minimize hydrocarbon emissions and the need for well venting associated with downhole well maintenance and liquids unloading. The Division developed a frequently asked questions document to further assist owners and operators subject to the best management practice requirement. The Division has also seen Colorado operators use technologies undertaken through EPA's Methane Challenge. The Division would support further efforts by EPA to reduce emissions from liquids unloading events.

Commenter Name: K. Roberts
Commenter Affiliation: Citizen
Document Control Number: EPA-HQ-OAR-2010-0505-6222
Comment Excerpt Number: 5

Comment: Secondly, although the Agency has solicited technical advice on “technologies and techniques that can be applied to new gas wells that can reduce emissions from liquids unloading

in the future," I urge the Agency to also do this research independently and ensure that this important issue is not overlooked.

Commenter Name: Darin Schroeder, David McCabe, Lesley Fleishman and Conrad Schneider
Commenter Affiliation: Clean Air Task Force et al.
Document Control Number: EPA-HQ-OAR-2010-0505-7062
Comment Excerpt Number: 99

Comment: EPA specifically requests comment on the level of methane and VOC emissions per unloading event, the number of unloading events per year, and the number of wells that perform liquids unloading. EPA's recently released Reporting Program data and the 2014 Allen, et al. study provide key insights in each of these areas, presented in Table X below:

Commenter Name: Jill Morrison
Commenter Affiliation: Powder River Basin Resource Council
Document Control Number: EPA-HQ-OAR-2010-0505-7240
Comment Excerpt Number: 6

Comment: For liquids unloading facilities we recommend that EPA include those facilities in the regulation and require that emissions during liquids unloading be minimized with current Best Practices. Wyoming requires this statewide, addressing liquids unloading through minor source permit conditions. These conditions include: a) VOC and HAP emissions resulting from episodes of blowdown or venting must be minimized to the extent practicable; b) manual blowdown and venting must be attended to minimize the duration of such events; and c) records must be kept detailing the duration, process conditions, control measures taken, and estimated emissions from each event.

Commenter Name: Michael J. Meyers, et al., Assistant Attorneys General
Commenter Affiliation: Attorneys Generals of New York, Massachusetts, Oregon, Rhode Island, and Vermont (States)
Document Control Number: EPA-HQ-OAR-2010-0505-6940
Comment Excerpt Number: 12

Comment: EPA Should Promptly Propose Standards to Address Methane Emissions from Liquids Unloading.

Liquids unloading is an operation, typically referred to as a "well blowdown," in which companies periodically open mature natural gas wells to the atmosphere to unload well bore liquids, such as water and condensate, which accumulate in the bottom of the well. The well blowdown process can result in the release of large quantities of methane and VOCs. Although emission figures vary, EPA estimates that methane emissions from liquids unloading comprised about fourteen percent of emissions from the natural gas production segment in 2012. Inventory of U.S. Greenhouse Gas Emissions and Sinks.

Rather than using well blowdown methods to unload liquids and allow the flow of gas from the well to resume, there are available technologies that perform this same function while

significantly reducing emissions. As the white paper notes, plunger lifts are the most common of the technologies. Of these, the use of optimized plunger lift systems (e.g., those that use smart well automation) offer the dual benefits of decreasing the amount of emissions by more than ninety percent while reducing the need for venting due to overloading. U.S. EPA Office of Air Quality Planning and Standards (OAQPS), Oil and Natural Gas Sector Liquids Unloading Processes 16 (2014) [hereinafter Oil and Natural Gas Sector Liquids Unloading Processes White Paper]; see also NRDC Leaking Profits Report at 24-25 (summarizing emission reductions attributable to use of plunger lift systems). Previous studies have also demonstrated that plunger lift systems are cost-effective. See Oil and Natural Gas Sector Liquids Unloading Processes White Paper at 11-12; WRI Clearing the Air Report at 6 (identifying use of plunger lift systems at new and existing wells during liquids unloading as one of three technologies that could cut methane emissions in the oil and gas sector by thirty percent). Other available technologies—such as artificial lifts, velocity tubing, and foaming agents—can achieve even greater emission reductions, eliminating emissions entirely from liquids uploading. Oil and Natural Gas Sector Liquids Unloading Processes White Paper at 17-18.

Given the significant emissions of methane from liquids unloading and the existence of available, cost-effective technologies to reduce such emissions, EPA should promptly propose standards to address methane emissions from liquids unloading.

Commenter Name: J. Jared Snyder
Commenter Affiliation: New York State Department of Environmental Conservation.
Document Control Number: EPA-HQ-OAR-2010-0505-6894
Comment Excerpt Number: 2

Comment: The DEC recommends that EPA include liquids unloading in this final rule because of the large amount of data that identifies it as a significant contributor of methane emissions in the oil and natural gas sector. Liquids unloading, a topic of one of EPA's 2014 technical white papers is estimated to account for as much as 12.4% of the methane emissions from the oil and natural gas sector. The DEC further recommends that EPA consider different approaches for controlling emissions from liquids unloading based on availability of power. For example, the World Resources Institute working paper recommends the use of an artificial lift when external power sources are available and the use of plunger lifts when external power sources are not available.

Commenter Name: Robert LeResche, Chair
Commenter Affiliation: Western Organization of Resource Councils (WORC) et al.
Document Control Number: EPA-HQ-OAR-2010-0505-6962
Comment Excerpt Number: 6

Comment: Liquids unloading operations should also be included in the final rules. According to Conoco Phillips, liquids unloading and pneumatic devices are the two largest contributors of methane emissions from oil and gas operations. It is therefore important that EPA include these operations in its rule. Practically speaking, there are no barriers to regulating emissions from this source as there are simple solutions that can reduce the amount of venting during liquids unloading. One is to require the use of plunger lifts. Although many industry experts agree that

plunger lifts are an easy and necessary solution, the American Petroleum Institute, an industry trade group, found that as recently as 2012 only 36 percent of gas wells were equipped with plunger lifts. It is clear that rules are required to achieve modernization of industry operations and reduce harmful methane emissions by facilitating the use of practical and cost-effective best practices. We urge EPA to require oil and gas operators to install best available control technologies, which include plunger lifts, on all new and modified oil and gas wells for liquids unloading operations.

Commenter Name: Peter Zalzal, Hillary Hull, Elizabeth Paranhos and Alice Henderson
Commenter Affiliation: Environmental Defense Fund
Document Control Number: EPA-HQ-OAR-2010-0505-7033
Comment Excerpt Number: 4

Comment: EPA Should Adopt Performance-Based Standards to Reduce Liquids Unloading Emissions.

EPA has not proposed standards applicable to liquids unloading activities, but requests comment on possible approaches the agency could take to address these sources, including "technologies and techniques that can be applied to new gas wells that can reduce emissions from liquids unloading in the future." As EPA recognizes in the proposal, liquids unloading emissions are significant and are dominated by a relatively discrete number of high emitting wells. Moreover, several technologies are capable of reducing (or eliminating) these emissions, including at wells both with and without plunger lift systems. Below, we discuss emissions associated with liquids unloading activity and present data to support development of liquids unloading standards. In light of this information, EPA should establish a numeric, performance-based annual venting limit of no more than 100 Mcf/year in order to reduce liquids unloading emissions.

Emissions from Liquids Unloading Activities are Significant, and Available Technologies Can Reduce These Emissions.

Liquids Unloading Emissions are Significant.

Wells accumulate liquids when the reservoir gas pressure is insufficient for lifting liquids up the wellbore. The liquids settle at the bottom of the well tubing, obstructing gas flow and inhibiting production. Since reservoir pressure declines as wells age, liquids accumulation eventually becomes an issue in most wells, although when and how often wells require liquids unloading varies. Sometimes, operators remove these liquids by venting a well, which reduces the downward pressure on the liquids from pipeline to atmospheric pressure. If the reservoir pressure is higher than the liquid pressure, then some of the liquids will be lifted out of the wellbore, temporarily restoring gas flow. During this process, however, gas will also be vented, which depletes reservoir pressure and therefore exacerbates the problem in the long-term.

As EPA recognizes in the preamble, liquids unloading emissions are significant, and a small minority of wells contribute the majority of the sector's emissions. Based on measurements of over 100 wells, Allen et al. (2014) estimates that 2012 unloading emissions in the United States were 270 Gg methane—the third largest emission source in the natural gas production segment.

Several other recent studies suggest nationwide liquids unloading emissions of approximately 300 Gg methane. These emissions are dominated by a small number of high-emitting sites: Allen et al. found that less than 20 percent of wells (both with and without plunger lifts) accounted for the majority of emissions, and the most recent subpart W data suggests that 19 percent of wells are responsible for about 75 percent of the unloading venting emissions.

EPA specifically requests comment on the level of methane and VOC emissions per unloading event, the number of unloading events per year, and the number of wells that perform liquids unloading. EPA's recently released Subpart W data and the 2014 Allen study provide key insights in each of these areas, presented in Table 2 below:

Table 2: Liquids Unloading Data Requested by EPA

	2014 Subpart W [1]	2014 Subpart W [1]	Allen et al. (2014)	Allen et al. (2014)	Allen et al. (2014)
Liquids Unloading Parameter	With Plunger Lifts	Without Plunger Lifts	Manual Plunger Lifts	Automatic Plunger Lifts	Without Plunger Lifts
Methane Emissions Per Unloading Event	0.0002 – 16.0 Mg/event	0.002 - 118.7 Mg/event	0.004 – 0.94 Mg/event	0.001 – 0.15 Mg/event	0.011 – 2.6 Mg/event
Average Methane Emissions per Unloading Event	0.33 Mg/event (0.06 Mg/event[2])	1.16 Mg/event (0.29 Mg/event[2])	0.186 Mg/event	0.024 Mg/event	0.414 – 0.674 Mg/event [3]
Average Number of Unloading Events Per Year	67 events/well (range from 1 – 3,316 events)	14 events/well (range from 1-2,008 events)	<100 events/well	1,870 events/well	<50 events/well [4]

[1] Figures only reflect reported data for wells with non-zero well count, events, and emissions values.

[2] Value represents the geometric mean of the reported data.

[3] The low end of the range corresponds to wells with fewer than 10 events per year and the higher end to those with fewer than 50 events per year.

[4] 1.1% of wells without plunger lifts undergo more than 50 events per year.

Available Technologies Can Reduce These Emissions.

In response to EPA's Liquids Unloading White Paper, several commenters provided extensive information on technologies available to restore production to wells with liquid unloading issues while eliminating or minimizing emissions. We incorporate those analyses by reference and briefly highlight a few salient aspects of each of these technologies.

Plunger lifts are one technology that can minimize or eliminate venting during liquids unloading by using a well's own reservoir pressure to overcome pressure differentials. However, plunger lifts do not always lead to low emissions. Some wells equipped with these devices have high emissions because plunger lifts are installed to increase gas production and not specifically to reduce emissions. For example, if a plunger lift fails to reach the surface by its own mechanics, then the well may be manually or automatically vented to lift the plunger up. However, an efficiently functioning plunger lift can unload liquids with zero emissions.

Allen et al. reports a higher average emission factor per event for non-plunger lift equipped wells than plunger lift wells, though annual emissions can be higher for plunger lift wells due to higher frequency of venting. A separate study conducted by API/ANGA included an industry survey of over 40,000 wells and concluded that only 21.1 percent of wells equipped with plunger lifts vent to the atmosphere. If the Allen et al. plunger lift emission factor is adjusted to account for the 78.9 percent of wells that do not vent, then automatic plunger lift and manual plunger lift wells have average annual methane emissions of 518 and 25 Mcf, respectively, compared to 1,011 Mcf from non-plunger lift wells.

Furthermore, total automatic plunger lift well emissions are highly influenced by the fact that many wells with automatic plunger lifts vent over 1,000 times per year. In fact, automatic plunger lift wells with high venting frequencies (i.e., those that vent over 100 times per year) are estimated to contribute the majority of all emissions from wells with venting for liquids unloading. BP has demonstrated that optimization of plunger lifts with smarter automation can drastically cut emissions—reducing them from over 4 Bcf/year to less than 0.01 Bcf/year using these practices. Accordingly, strategically operated plunger lifts are an effective means of reducing (or eliminating) the need for venting from most wells with liquids accumulation issues.

Beyond plunger lifts, other solutions are also available, such as installing velocity tubing or using compressor engines to lower the pressure differential between the reservoir and the wellhead. When the aforementioned technologies are insufficient to lift liquids, creating artificial lift can successfully remove liquids from wells with little or zero emissions. As we describe more fully below, flaring technology is also a feasible control option that could be applied where more desirable technologies designed to capture or otherwise minimize these emissions are infeasible. We do, however, emphasize that operators should prioritize capture technology over flaring whenever possible.

B. EPA Should Establish an Annual, Performance-Based Venting Limit to Minimize Liquids Unloading Emissions.

Individual wells with liquids accumulation issues may respond differently to the various options for unloading those liquids in order to increase production. For instance, some wells may require a single blowdown to restore production, while others may require artificial lift because reservoir pressure is insufficient to effectively utilize a plunger lift. This makes it challenging to apply a single capture technology at all wells to minimize venting due to liquids unloading.

Accordingly, to address liquids unloading emissions consistent with its section 111 obligations, EPA should establish a quantitative emission limit that operators can satisfy with whichever

technology is most appropriate. Moreover, due to the skewed distribution of well emission rates, a large fraction of total emissions can be reduced by setting an emission limit that only affects a relatively small fraction of wells.

Below, we describe the available data that supports establishing such a limit and evaluate the cost-effectiveness of deploying flares to reduce methane emissions at wells above this limit. We likewise recommend several ways the agency should optimize these standards under section 111(b).

Existing Data Supports Establishing a Performance-Based Annual Venting Limit.

We have evaluated potential annual venting limits based both on data from the Allen et al. paper and recently released Reporting Rule data. Based on Allen et al., we have estimated the percent of wells affected and percent of total emissions reduced at different emission limits, as shown in Figure 1 below. For example, an annual emission limit of 1,000 Mcf/well/year would affect 9 percent of wells and reduce total emissions from liquids unloading by 67 percent if those wells exceeding the threshold reduced venting to the threshold. Alternately, this 1,000 Mcf limit would reduce emissions by 85 percent if those wells exceeding the threshold flared all emissions rather than reducing emissions to the threshold itself. Similarly, a threshold of 250 Mcf/well/year would affect about 16 percent of wells and reduce emissions by 86 percent (or by 93 percent if emissions are flared), while a 100 Mcf/well/year limit would affect 24 percent of wells and reduce emissions by about 93 percent (or by over 96 percent if emissions above the threshold are flared).

Fig. 1: The Percentage of Wells Affected and Emissions Reduced by Different Emission Limits (Mcf/well/year)

We have likewise analyzed recently-released Reporting Rule data, and the percentage of wells and related emissions that fall above and below certain venting thresholds are similar to the findings in the Allen study. Figure 2 below depicts the percentage of wells and emissions at various thresholds based on Reporting rule data, and Table 3 compares results from Allen et al. and the Reporting Rule, demonstrating that the two data sources substantially agree.

Fig. 2: Percentage of Liquids Unloading Wells and Percentage of Emissions Based on 2014 Reporting Rule Data

Table 3: Comparison of Liquids Unloading Thresholds from Allen et al. and Subpart W

	Allen et al. [1]	Allen et al. [1]	Allen et al. [1]	Subpart W (2014) [2]	Subpart W (2014) [2]	Subpart W (2014) [2]
Venting Threshold (Mcf CH4)	% of Wells	% of Emissions reduced if flared [3]	% of Emissions reduced if reduced to threshold	% of Wells	% of Emissions reduced if flared [3]	% of Emissions reduced if reduced to threshold

1,000	9.1%	84.6%	67.2%	3.1%	30.9%	12.3%
250	16.3%	93.0%	85.9%	17.3%	70.2%	44.4%
100	24.4%	96.5%	92.6%	33.0%	88.1%	69.3%
50	30.6%	97.4%	95.9%	43.4%	92.7%	80.8%

[1] Allen et al. focused on wells with unloading events. Also, the values in this table include a correction for an assumed 78.9% of wells with plunger lifts that do not vent during unloading.

[2] The Reporting Rule data only incorporate reporting operators, excluding facilities with emissions below reporting thresholds.

[3] Assuming 98% DRE for flares applied to all emissions from wells above threshold.

Available Technology Can Reduce Emissions at Wells Above Annual Venting Limits.

In addition, we examined the 107 liquids unloading wells measured by Allen, et al. and evaluated the cost-effectiveness of deploying flares to reduce methane emissions at only those wells emitting above various thresholds. The range of control options for wells with and without plunger lifts is significant. Because flares can reduce emissions at all wells, our cost analysis focuses on this technology, though we emphasize that operators should use capture technology rather than flaring to meet these performance standards wherever feasible.

In this analysis, we evaluated the use of either mobile or stationary flares depending on well type, using assumptions from existing literature concerning the cost and effectiveness of flaring technology. Although not universally applicable, other technologies may be available to some operators to meet performance standards. Because many of these technologies result in capture of natural gas that would otherwise be wasted, they can be expected to enhance cost-effectiveness beyond the numbers presented here.

In the Allen study, wells that vented at least 100 Mcf per year of methane represented approximately 24 percent of the well population, but accounted for 98 percent of the total measured emissions in the study. If flares with a combustion efficiency of 98 percent were deployed at this subset of wells, total measured emissions from all wells in the dataset would be reduced by over 96 percent, as outlined in Table 3 above. The average cost-effectiveness of these reductions would be $197–$429 per ton of methane abated. The distribution of emissions for the different well types is shown in Figure 3, below, for wells with liquids unloading emission rates greater than 100 Mcf per year.

Fig. 3: Distribution of Emissions by Well Type for Emission Rates Greater Than 100 Mcf

Table 4 below summarizes the cost-effectiveness of deploying flares to reduce emissions from each well type (automatic plunger lift, manual plunger lift, and manual non-plunger lift wells) at the 107 analyzed wells. For each well type (as described more fully below), the analysis assumes the deployment of flaring technologies (mobile vs. stationary; rented vs. purchased) according to

certain well characteristics and provides a range of estimates for the cost-effectiveness of methane reduction.

Table 4: Cost Effectiveness of Flares for Liquids Unloading Emissions for all Well Types

Automatic Plunger Lift Wells.

Due to the greater frequency of unloading events at wells with automatic plunger lifts, we assumed stationary flares would be the most cost-effective flaring technology available to reduce emissions from such wells.

In estimating the cost-effectiveness of stationary flares, this analysis assumes: (1) the "low cost" estimates are based on EPA data for annualized capital costs for completion combustion devices, based on a 15-year equipment life and 7 percent interest rate, plus annual operating costs estimated for Colorado's oil and gas rules, which include cost estimates for pilot fuel and maintenance; and (2) the "high cost" estimates are based on ICF International data for capital costs for completion and venting flares, annualized for consistency based on EPA's assumptions of a 15 year equipment life and 7 percent interest rate, plus annual operating cost estimates from ICF International.

As shown in Table 4, based on the wells in the Allen et al. dataset, the average cost-effectiveness of employing a stationary flare at wells with automatic plunger lifts across all emission thresholds assessed ranges from $67 to $236 per ton of methane abated ($2.68 to $9.44 per ton CO2-e, using a methane GWP of 25). The cost-effectiveness of employing a stationary flare to reduce emissions at wells with automatic plunger lifts with emissions above 100 Mcf methane ranges from $129 to $227 per ton of methane abated ($5.14 to $9.06 per ton CO2-e, using a methane GWP of 25).

Manual Plunger Lift and Non-Plunger Lift Wells.

For wells in the data set with manual plunger lifts and manually vented wells without plunger lifts, we assumed the use of either a mobile flare or stationary flare based on the frequency of unloading events reported at the wells. For manually vented wells, vented methane emissions in the dataset are generally lower than for the other measured wells, averaging around 100 Mcf per year for wells with manual plunger lifts and 1,000 Mcf per year for wells without plunger lifts, compared with an average of 2,500 Mcf per year for wells using automatic plunger lifts. (Note, however, that the emissions per event for non-plunger lift wells are much higher than at wells with either automatic or manual plunger lifts). Well venting also occurs relatively infrequently at these wells, with some averages as few as 10 reported venting events per year for wells with manual plunger lifts and 30 per year for wells without plunger lifts. By comparison, some automated plunger lift wells reported over 2,000 events per year. This analysis assumes that mobile flares would be deployed at manual plunger wells when the number of annual venting events is low—less than 20—and that stationary flares would be deployed at wells when annual venting events exceed 20.

In estimating the cost-effectiveness of flares at wells with manual plunger lifts, we relied on the stationary flaring assumptions set forth above. For mobile flares deployed at wells with fewer than 20 venting events per year, we assume: (1) cumulative annual costs for all reported venting events are calculated based on mobile flare rental costs ranging from $250/day to $850/day and labor costs of $100/hour; (2) the number of rental days is assumed to equal the reported number of venting events (i.e., a mobile flare only serves one well at a time and one event per day); and (3) estimated labor time is based on the minimum and maximum reported average sampled event duration rounded up to the next hour (labor costs are then calculated at a rate of $100/hour).

As shown in Table 4, the average cost effectiveness of employing a combination of stationary and mobile flares at wells with and without manual plunger lifts across all emission limits assessed ranges from $77 to $752 per ton of methane abated. The cost effectiveness at this same subset of wells with emissions above 100 Mcf ranges from $266-$632 per ton of methane abated. Taken together, these analyses demonstrate that flaring technology can secure low-cost reductions at both wells with and without plunger lifts.

Recommendations for Design of the Standards.

By adopting certain definitions of "modification" and "affected facility" and establishing an annual venting limit, EPA can promulgate standards for liquids unloading at gas wells that secure substantial reductions at a reasonable cost to industry.

- Modification. As we describe above, many gas wells reach a point in their productive lives at which reservoir pressure is no longer sufficient to flow produced liquids to the surface, causing accumulation of liquids and inhibiting gas production. At this point, operators can take various actions to restore production, all of which constitute changes in the method of operating a well and some of which likewise constitute physical changes (i.e., installing a plunger lift system). To the extent that these changes are accompanied by venting during liquids unloading, EPA should define the regulatory term "modification" to encompass these activities.
- Affected facility. EPA should also define an "affected facility" for the purpose of its section 111 regulations to cover any liquids unloading facility as a well that vents in excess of 100 Mcf/year. This would ensure the majority of emissions are addressed by the standards, but would focus standards on only the highest emitting wells.
- Emission limit. EPA could establish an emission limit based on the conclusion that a combination of capture and flaring technologies constitutes BSER for both plunger and non-plunger wells. The standard could require affected liquids unloading facilities to meet an annual venting limit of at most 100 Mcf/year, or alternatively, to achieve a 95% reduction. Operators should be encouraged to meet this performance-based limit by deploying other technologies, like smart automation, to enhance environmental performance and further reduce costs.

Standards designed in this way would focus requirements on liquids unloading wells that vent in excess of 100 Mcf/year, securing substantial emission reductions while leaving the majority of

liquids unloading wells unaffected. We urge EPA to move forward with standards along these lines.

Commenter Name: Darin Schroeder, David McCabe, Lesley Fleishman and Conrad Schneider
Commenter Affiliation: Clean Air Task Force et al.
Document Control Number: EPA-HQ-OAR-2010-0505-7062
Comment Excerpt Number: 100

Comment: Available Technologies Can Reduce These Emissions.

In response to EPA's Liquids Unloading White Paper, several commenters provided extensive information on technologies available to restore production to wells with liquid unloading issues while eliminating or minimizing emissions. We incorporate those analyses by reference and briefly highlight a few salient aspects of each of these technologies.

Plunger lifts are one technology that can minimize or eliminate venting during liquids unloading by using a well's own reservoir pressure to overcome pressure differentials. However, plunger lifts do not always lead to low emissions. Some wells equipped with these devices have high emissions because plunger lifts are installed to increase gas production and not specifically to reduce emissions. For example, if a plunger lift fails to reach the surface by its own mechanics, then the well may be manually or automatically vented to lift the plunger up. However, an efficiently functioning plunger lift can unload liquids with zero emissions.

Allen, et al. reports a higher average emission factor per event for non-plunger lift- equipped wells than plunger lift wells, though annual emissions can be higher for plunger lift wells due to higher frequency of venting. A separate study conducted by API/ANGA included an industry survey of over 40,000 wells and concluded that only 21.1 percent of wells equipped with plunger lifts vent to the atmosphere. If the Allen, et al. plunger lift emission factor is adjusted to account for the 78.9 percent of wells that do not vent, then automatic plunger lift and manual plunger lift wells have average annual methane emissions of 518 and 25 Mscf, respectively, compared to 1,011 Mscf from non-plunger lift wells. Therefore, although some wells equipped with plunger lifts are associated with significant emissions, those wells would surely have much higher emissions *without* the lifts.

Furthermore, total automatic plunger lift well emissions are highly influenced by the fact that many wells with automatic plunger lifts vent over 1,000 times per year. In fact, automatic plunger lift wells with high venting frequencies (i.e., those that vent over 100 times per year) are estimated to contribute the majority of all emissions from wells with venting for liquids unloading. BP has demonstrated that optimization of plunger lifts with smarter automation can drastically cut emissions—reducing them from over 4 Bcf/year to less than 0.01 Bcf/year using these practices. Accordingly, well operated plunger lifts are an effective means of reducing (or eliminating) the need for venting from most wells with liquids accumulation issues. EPA should propose liquids unloading standards based on the emission reduction benefits from this technology.

Beyond plunger lifts, other solutions are also available, such as installing velocity tubing or using compressor engines to lower the pressure differential between the reservoir and the wellhead. When the aforementioned technologies are insufficient to lift liquids, creating artificial lift can successfully remove liquids from wells with little or zero emissions. Furthermore, although capture technology must always take priority over wasteful completion combustion, flaring may be an option to reduce emissions from liquids unloading where an operator cannot make use of other technologies and would otherwise have no choice but to vent gas released during the event.

In light of this information, EPA should establish a numeric, performance-based annual venting limit that incorporates the emission reduction potentials of the different technologies that can reduce emissions from liquids unloading events. Individual wells with liquids accumulation issues may respond differently to the various options for unloading those liquids in order to increase production. For instance, some wells may require a single blowdown to restore production, while others may require artificial lift because reservoir pressure is insufficient to effectively utilize a plunger lift. This makes it challenging to apply a single capture technology at all wells to minimize venting due to liquids unloading.

Accordingly, to address liquids unloading emissions consistent with its section 111 obligations, EPA should establish a quantitative emission limit that operators can satisfy with whichever technology works best for them. Moreover, due to the skewed distribution of well emission rates, a large fraction of total emissions can be reduced by setting an emission limit that only affects a relatively small fraction of "super-emitting" wells. The agency should take this fact into account as it develops standards for liquids unloading.

Commenter Name: Darin Schroeder, David McCabe, Lesley Fleishman and Conrad Schneider
Commenter Affiliation: Clean Air Task Force et al.
Document Control Number: EPA-HQ-OAR-2010-0505-7062
Comment Excerpt Number: 101

Comment: Recommendations for Design of the Standards.

By adopting certain definitions of "modification" and "affected facility" and establishing an annual venting limit, EPA can promulgate standards for liquids unloading at gas wells that secure substantial reductions at a reasonable cost to industry.

- Modification. As we describe above, many gas wells reach a point in their productive lives at which reservoir pressure is no longer sufficient to flow produced liquids to the surface, causing accumulation of liquids and inhibiting gas production. At this point, operators can take various actions to restore production, all of which constitute changes in the method of operating a well and some of which likewise constitute physical changes (i.e., installing a plunger lift system). To the extent that these changes are accompanied by venting during liquids unloading, EPA should define the regulatory term "modification" to encompass these activities.
- Affected facility. EPA should also define an "affected facility" for the purpose of its section 111 regulations to cover any liquids unloading facility as a well that vents in

excess of a certain minimum threshold (for instance, 100 mcf/year). This would ensure the majority of emissions are addressed by the standards, but would focus standards on only the highest emitting wells.

- Emission limit. EPA should establish a numerical emission limit based on a BSER that reflects the emission reduction potentials of the technologies discussed above. The standard could require affected liquids unloading facilities to meet an annual venting limit based on an optimal mcf/year value, or alternatively, to achieve a certain percentage emission reduction. This standard should prioritize captured-based technologies, like smart automation, to enhance environmental performance and further reduce costs, and flaring should only be considered an option of last resort.

Commenter Name: K. Roberts
Commenter Affiliation: Citizen
Document Control Number: EPA-HQ-OAR-2010-0505-6222
Comment Excerpt Number: 4

Comment: The Agency has stated it "does not have sufficient information to propose a standard for liquids unloading" (VII Summary of Proposed Standards, I. Liquids Unloading Operations). While there may be uncertainty regarding *how* to set standards regulating liquids unloading, it is very certain that liquids unloading often *does* result in methane emissions. I am concerned that if liquids unloading is not regulated due to this "uncertainty," then the new standards will not regulate a big contributor to methane emissions caused by oil and natural gas industry operations.

Commenter Name: J. Young
Commenter Affiliation: Citizen
Document Control Number: EPA-HQ-OAR-2010-0505-6469
Comment Excerpt Number: 5

Comment: We urge the -- you to improve the proposed rules to include:

- Several key pieces of equipment that were omitted from the proposal that emit methane and harmful VOCs: Liquids unloading operations;

Commenter Name: Patricia Karr Seabrook
Commenter Affiliation: Miller/Howard Investments, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6818
Comment Excerpt Number: 10

Comment: We would like to see a performance standard developed for several pieces of equipment that are associated with significant methane emissions, but that have not been included in the proposed rule. These include:

- Liquids unloading operations;

Commenter Name: Robert M. Gould
Commenter Affiliation: San Francisco Bay Area Physicians for Social Responsibility (SF Bay PSR)
Document Control Number: EPA-HQ-OAR-2010-0505-6819
Comment Excerpt Number: 18

Comment: Expand the scope of the standards to incorporate key pieces of equipment and practices including: liquids unloading operations;

Commenter Name: Henry Robertson, Energy Chair, Staff Attorney
Commenter Affiliation: Missouri Sierra Club, Great Rivers Environmental Law Center
Document Control Number: EPA-HQ-OAR-2010-0505-6913
Comment Excerpt Number: 4

Comment: EPA has not acted on liquids unloading, a maintenance practice of purging liquids used during production. This is a substantial source of methane emissions that should be addressed, as it has been by Colorado and Wyoming, which have among the most advanced emission control standards in the nation.

Commenter Name: Stuart A. Clark and Ursula Nelson, Co-President
Commenter Affiliation: National Association of Clean Air Agencies (NACAA)
Document Control Number: EPA-HQ-OAR-2010-0505-6932
Comment Excerpt Number: 3

Comment: Though the proposal covers a number of sources across the oil and natural gas sector, NACAA recommends that EPA expand the NSPS to include methane and VOC emissions from additional equipment and activities, particularly liquids unloading activities. Liquids unloading, which is addressed in EPA's 2014 technical white papers but left out of the proposal, has been recognized as a significant emissions source in many states and is already covered by some state regulatory programs.

Including performance standards for these additional equipment and activities would enhance the environmental benefits of the proposed rule.

Commenter Name: Stuart A. Clark, (Washington), Co-President and Ursula Nelson, (Pima County, AZ), Co-President
Commenter Affiliation: National Association of Clean Air Agencies (NACAA)
Document Control Number: EPA-HQ-OAR-2010-0505-6961
Comment Excerpt Number: 5

Comment: Though the proposal covers a number of sources across the oil and natural gas sector, NACAA recommends that EPA expand the NSPS to include methane and VOC emissions from additional equipment and activities, particularly liquids unloading activities. Liquids unloading, which is addressed in EPA's 2014 technical white papers but left out of the proposal, has been recognized as a significant emissions source in many states and is already covered by some state regulatory programs.

Commenter Name: Julie Archer, Project Manager; and David McMahon, J.D., Co-Founder
Commenter Affiliation: West Virginia Surface Owners' Rights Organization (WVSORO)
Document Control Number: EPA-HQ-OAR-2010-0505-7066
Comment Excerpt Number: 5

Comment: In addition, we urge you to improve the proposed rules to: Include several key pieces of equipment that were omitted from the proposal that emit methane and harmful VOCs: Liquids unloading operations.

Commenter Name: Public Hearing Comments On Proposed Climate, Air Quality, and Permitting Rules for the Oil and Natural Gas Industry; Wednesday, September 23, 2015; 9:10 AM - 8:00 PM; Public Hearing #1 - Dallas, Texas
Commenter Affiliation: None
Document Control Number: EPA-HQ-OAR-2010-0505-7336
Comment Excerpt Number: 74

Comment: Please include emissions from liquids unloading in these rules. Voluntarily compliance does not work. When the Flower Mound mayor asked Williams Petroleum why they weren't using the vapor recovery units they use in Wyoming, the Williams representative replied, we don't use them unless they are mandated, and Texas does not mandate them.

Commenter Name: Public Hearing Comments On Proposed Climate, Air Quality, and Permitting Rules for the Oil and Natural Gas Industry; Wednesday, September 23, 2015; 9:00 AM - 2:40 PM; Public Hearing #2 - Dallas, Texas
Commenter Affiliation: None
Document Control Number: EPA-HQ-OAR-2010-0505-7336
Comment Excerpt Number: 108

Comment: Liquids, unloading operations, you know, when they're unloading and loading liquids, make sure that you can check methane emissions and VOCs from them, pneumatic controllers that operate on intermittent or a snap-acting basis and compressors at well sites.

Commenter Name: J. Jared Snyder, Assistant Commissioner for Air Resources, Climate Change Energy
Commenter Affiliation: New York State Department of Environmental Conservation (DEC)
Document Control Number: EPA-HQ-OAR-2010-0505-7006
Comment Excerpt Number: 2

Comment: The DEC recommends that EPA include liquids unloading in this final rule because of the large amount of data that identifies it as a significant contributor of methane emissions in the oil and natural gas sector. Liquids unloading, a topic of one of EPA's 2014 technical white papers, is estimated to account for as much as 12.4% of the methane emissions from the oil and natural gas sector.

Commenter Name: James Martin
Commenter Affiliation: Noble Energy

Document Control Number: EPA-HQ-OAR-2010-0505-6852
Comment Excerpt Number: 18

Comment: Noble concurs with EPA's proposed conclusion that the agency does not have sufficient information to propose a standard for liquids unloadings. Mr. Gordon Reid Smith, who was a peer reviewer for EPA's White Paper on Oil and Natural Gas Sector Liquids Unloading Processes, aptly captured the challenges of developing one or even several technologies capable of reducing or eliminating venting to the atmosphere during unloading events:

Dealing with liquids unloading issues is a very complex mix of engineering and economics applied to an individual well. The appropriate approach to managing well-bore liquids in an individual well is likely to change as the well progresses through its life-cycle. Attempting to describe the applicability of individual techniques to the wide range of U.S. gas wells is not appropriate and runs the risk of severely constraining innovation.

Liquids Unloading, Gordon Reid Smith, available at http://www3.epa.gov/airquality/oilandgas/2014papers/attachmentj.pdf (last visited Nov. 22, 2015).

Noble recognizes the importance of this issue, and suggests that the proposed Voluntary Methane Challenge be structured in a way that would encourage companies to invest in research on techniques that could be broadly used to manage liquid unloading events.

Commenter Name: Wesley D. Lloyd, Freeman Mills PC
Commenter Affiliation: Texas Independent Producers and Royalty Owners Association (TIPRO)
Document Control Number: EPA-HQ-OAR-2010-0505-6893
Comment Excerpt Number: 16

Comment: Liquids Unloading – TIPRO Supports the EPA's Current Standard for Liquids Unloading Emissions.

TIPRO supports the EPA's continued refrain from proposing federal standards regulating liquids unloading emissions. Liquids loading emissions vary amongst well types and regions. It is the inability to generalize that makes each well unique and requires a case-by-case analysis to address a liquid loading problem. For example, a well's initial release of gas ceases when liquids travel up the well bore. This cessation occurs varyingly from a few minutes to several hours. Formulas intended to estimate emissions during well activity are inaccurate because of its failure to take into account the cessation of venting during production. Additionally, regional factors in VOC and methane emissions further detract from a national, one-size-fits-all regulation on liquids unloading emissions. These factors include temperature, pressure, hydrocarbon composition of the oil and gas within the production formation, gas to liquid ratio, well configuration, well depth and surface conditions at the time of the unloading event. The factors affecting the frequency and duration of liquids unloading include the well solution and design. Predicting the ability to minimize venting is largely difficult because of the variation between wells.

Motivated by strong economic incentives, operators currently capture as much of the gas as possible. Unfortunately, it is not always possible to unload without venting for safety, technological and well-specific reasons.

TIPRO continues to support the EPA's stance on avoiding blanket, federal standards for liquids unloading emissions.

Commenter Name: J. Roger Kelley, Director, Regulatory Affairs
Commenter Affiliation: Continental Resources, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6963
Comment Excerpt Number: 17

Comment: Liquids Unloading Regulation Is Impractical at the Federal Level.

We agree with EPA's conclusion that the agency has accumulated insufficient information to propose standards for liquids unloading. The numerous comments filed by industry trade groups and others in response to EPA's June 2014 liquids unloading white paper have not been addressed. In short, Continental believes that there is too much variation in liquids unloading processes to properly address the issue with federal regulation. The variations occur not only from one producing formation to another but also from one county to another within a given formation. VOC/methane emissions from liquids unloading events are being sufficiently managed by the states.

Commenter Name: Lee Fuller, Executive Vice President, and V. Bruce Thompson, President
Commenter Affiliation: Independent Petroleum Association of America (IPAA) and the American Exploration and Production Council (AXPC)
Document Control Number: EPA-HQ-OAR-2010-0505-6983
Comment Excerpt Number: 21

Comment: IPAA/AXPC supports EPA's conclusion that it does not have sufficient information to propose standards for liquids unloading. IPAA and WEA filed extensive comments on EPA's liquids unloading White Paper on June 16, 2014. The numerous issues raised by IPAA/WEA have not been adequately addressed and continue to be the basis for IPAA/AXPC's position that controls aimed at reducing emissions from liquids unloading vary greatly based on numerous factors that make it difficult if not impossible to promulgate a cost-effective NSPS. IPAA/AXPC incorporates by reference these comments in their entirety regardless of topic. Nonetheless, certain portions of IPAA/WEA's comments on liquids unloading warrant repeating:

EPA's proposed Subpart OOOOa seems to leave the door open for potential regulation of emissions associated with liquids unloading and requested comment on the issue. IPAA/AXPC supports EPA's decision to not propose federal standards. The issues outlined above have not been adequately addressed by EPA and remain largely unaddressed.

Commenter Name: W. Michael Scott, General Counsel
Commenter Affiliation: Trilogy Operating, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6603
Comment Excerpt Number: 36

Comment: Finally, Trilogy agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: W. Michael Scott, Vice President and General Counsel
Commenter Affiliation: CrownQuest Operating, LLC
Document Control Number: EPA-HQ-OAR-2010-0505-6703
Comment Excerpt Number: 33

Comment: Finally, CrownQuest agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Bradley C. Cross, President/Partner
Commenter Affiliation: Big Star Oil & Gas, LLC
Document Control Number: EPA-HQ-OAR-2010-0505-6757
Comment Excerpt Number: 32

Comment: Finally, Big Star agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Glenn Prescott
Commenter Affiliation: RK Petroleum Corporation
Document Control Number: EPA-HQ-OAR-2010-0505-6788
Comment Excerpt Number: 33

Comment: Finally, RK agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: W. Jeffrey Sparks
Commenter Affiliation: Discovery Operating, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6790
Comment Excerpt Number: 33

Comment: Finally, Discovery agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Josh W. Luig
Commenter Affiliation: Veritas Energy, LLC
Document Control Number: EPA-HQ-OAR-2010-0505-6797
Comment Excerpt Number: 34

Comment: Finally, Veritas agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Rick D. Davis, Jr.
Commenter Affiliation: Midland Energy, Inc. and Petroplex Energy, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6801
Comment Excerpt Number: 33

Comment: Finally, MEI agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Ben Shepperd
Commenter Affiliation: Permian Basin Petroleum Association
Document Control Number: EPA-HQ-OAR-2010-0505-6849
Comment Excerpt Number: 71

Comment: Finally, the PBPA agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Michael Hollis
Commenter Affiliation: Diamondback E&P LLC
Document Control Number: EPA-HQ-OAR-2010-0505-6869
Comment Excerpt Number: 28

Comment: Finally, Diamondback agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Dan G. LeRoy
Commenter Affiliation: Legacy Reserves Operating LP
Document Control Number: EPA-HQ-OAR-2010-0505-6882
Comment Excerpt Number: 11

Comment: Finally, Legacy agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Denzil R. West, Vice President
Commenter Affiliation: Reliance Energy, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6915
Comment Excerpt Number: 27

Comment: Finally, Reliance agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Brandon M. Black, Vice President
Commenter Affiliation: BC Operating, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6968
Comment Excerpt Number: 24

Comment: Finally, BC agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: Joe Strickling, Operations Manager
Commenter Affiliation: Patriot Resources, Inc.
Document Control Number: EPA-HQ-OAR-2010-0505-6978
Comment Excerpt Number: 10

Comment: Finally, Patriot Resources agrees with EPA that additional rules should not be imposed on liquid loading and unloading operations as there is currently no feasible method to limit VOC and methane emissions during these activities, and there is no evidence indicating that current practices pose a risk to the environment.

Commenter Name: T. Bacci
Commenter Affiliation: Citizen
Document Control Number: EPA-HQ-OAR-2010-0505-6471
Comment Excerpt Number: 10

Comment: We urge the -- you to improve the proposed rules to include:

- Several key pieces of equipment that were omitted from the proposal that emit methane and harmful VOCs:
    - Liquids unloading operations;

Commenter Name: S. Hathaway
Commenter Affiliation: Citizen
Document Control Number: EPA-HQ-OAR-2010-0505-6473
Comment Excerpt Number: 11

Comment: We urge you, even knowing that it's futile, to improve the proposed weak rules to include:

- Several key pieces of equipment that were omitted from the proposal that emit methane and harmful VOCs:
    - Liquids unloading operations;

Commenter Name: Jonas Kron
Commenter Affiliation: Trillium Asset Management, LLC
Document Control Number: EPA-HQ-OAR-2010-0505-6794
Comment Excerpt Number: 9

Comment: In particular, we urge the EPA to strengthen the proposal by covering the following equipment and practices: Liquids unloading operations;

Based on our research, we believe that these four areas are linked to meaningful amounts of methane emissions. Furthermore, studies strongly suggest that there are low cost controls that exist for all areas.

Commenter Name: Jennifer Cassel, Staff Attorney
Commenter Affiliation: Environmental Law & Policy Center
Document Control Number: EPA-HQ-OAR-2010-0505-6994
Comment Excerpt Number: 11

Comment: Specifically, as delineated by our colleague Earthworks in their separate comments on this proposed rule, the draft rule should be revised to include:

- Provisions regulating methane from several key pieces of methane-emitting equipment that were omitted from the proposal, including:
    - Liquids unloading operations;