EPA's Proposed Air Pollution Standards for the Oil and Natural Gas Sector
Preliminary Analysis
September 2011

This paper summarizes EDF's initial review of the U.S. Environmental Protection Agency's ("EPA") proposal to limit air pollution from natural gas and oil operations. We examine the proposal's principal elements, noting strengths and recommendations for improvement. We would welcome feedback and insights from other reviewers (please respond to Ramon Alvarez at ralvarez@edf.org). We also encourage concerned citizens to submit written comments to the EPA and testify at public hearings to share your views about the proposal. For more information about EPA's proposal and how to provide your input to the Agency, please see http://www.epa.gov/airquality/oilandgas/actions.html.

I. Introduction

Air pollution standards for the natural gas and oil industry are a trifecta: they protect human health and the environment, reduce waste of an important domestic energy source, and increase industry profits through increased sales of recovered natural gas product. EPA's proposal goes a long way towards maximizing the multiple benefits achievable through the implementation of readily available technologies and practices. In general, EDF commends EPA on a strong proposal. There is, nevertheless, important room for improvement. We identify, below, some specific areas where proposed standards should be strengthened. In addition, we are concerned that the proposal fails to reduce emissions from many existing sources. As a result, these sources will continue to contribute to unhealthy levels of smog, haze, toxic air pollution, and climate-disrupting pollution for years to come. Similarly, EPA has declined to reduce methane emissions directly. While reductions in this potent greenhouse will occur as a co-benefit of compliance with many of the proposed requirements, additional opportunities to prevent waste of natural gas, which is primarily comprised of methane, exist and should have been included in the proposal.

The Shale Gas Subcommittee of the Secretary of Energy Advisory Board recently released a report recommending "the adoption of rigorous standards for new and existing sources of methane, air toxics, ozone precursors and other air pollutants from shale gas operations." The report is available at http://www.shalegas.energy.gov/resources/081111_90_day_report.pdf.

II. Analysis of New Source Performance Standards (NSPS)

EPA's proposal significantly improves the New Source Performance Standards established pursuant to Section 111 of the Clean Air Act ("CAA") that apply to oil and gas operations in the Crude Oil and Natural Gas Production source category by strengthening existing standards and expanding the scope of standards to apply to a greater number of sources.

1. Emissions from Natural Gas Wells

EPA proposes to require the use of reduced emission completions ("REC") during the completion, re-completion or "workover" of all hydraulically fractured gas wells to reduce the emissions of volatile organic compounds ("VOCs"). It is unclear what is meant by "workovers" as the rule does not define this term. Given the uncertainty surrounding the meaning of a "workover" it is possible that liquids unloading activities could be subject to the REC requirement, although the proposal does not explicitly mention liquids unloading. The REC requirement does not apply to exploratory gas wells or those used to delineate the boundaries of existing gas reservoirs. For these types of wells, emissions may be flared. Venting is allowed in lieu of flaring where flaring is infeasible (e.g. prohibited by local or state law, presents a safety hazard or gas is not combustible). Conventional wells (i.e. non-

hydraulically fractured wells) are also not covered. Oil wells, including those that produce associated gas, do not appear to be included in the proposed rule's definition of "gas well." *See* 40 C.F.R. § 60.5430. However, the definition is somewhat vague and therefore leaves room for improvement, and as written, could be construed to include oil wells that produce associated gas.

a. Strengths

EDF supports the use of reduced emission completions as a demonstrated, cost-effective best management practice to reduce emissions of VOCs, hazardous air pollutants ("HAPs") and methane. EPA's rule builds on existing requirements in place in Wyoming and Colorado, thus providing for uniformity, certainty and a level playing field among gas-producing states while also securing vital protections for human health and the environment.

EPA has proposed a definition of modification that includes recompletions of a fractured or refractured gas well. As a result, existing gas wells that undergo completions, re-completions or workovers are also subject to the requirement to utilize RECs. EPA's proposal to require RECs from existing wells is an essential component of a comprehensive national strategy to reduce air pollution from oil and gas operations. This is particularly true if the REC requirement applies to liquids unloading activities as these are a significant source of air pollution.

b. Areas for improvement

Existing and new oil wells that co-produce gas can be significant sources of pollution and lost product that can be cost-effectively captured by reduced emission completions. EDF recommends the scope of the reduced emission completion requirement be explicitly expanded to cover emissions from this type of well.

On its face, the proposal does not include a standard that reduces emissions from liquids unloading activities. EPA's most recent greenhouse gas inventory identified liquids unloading as one of the most significant sources of methane emissions from existing production activities in the natural gas sector. The reduced emission completion requirement applies to workovers of gas wells that have been hydraulically fractured. However, the term "workover" is not defined. Assuming that "liquids unloading" is a distinct practice from a well workover, liquids unloading is not covered under the proposal. As cost-effective technologies exist to reduce emissions during well unloading activities, EDF believes this is an important area for rule improvement in order to secure additional protections for human health and the environment from existing wells. The final rule should add a protective definition of well workover that clearly describes which types of activities at existing wells are subject to the REC requirement.

EDF is concerned that the standard could be carried out to exclude hydraulically fractured gas wells with very low VOC content. These wells can produce significant methane emissions during completion, re-completion and workovers. As written, the requirement to utilize RECs during completions, re-completions and workovers is an operational standard which applies to all hydraulically fractured wells during these activities irrespective of VOC emissions. However, EPA is soliciting comments on the appropriate applicability thresholds for the REC requirement. REC's are highly cost-effective for reducing both VOC and methane emissions. Accordingly, EDF recommends the REC standard apply to all hydraulically fractured well completions, re-completions and workovers without exclusions.

2. Pneumatic Devices

EPA's proposal requires all new or replaced pneumatic controllers located at natural gas processing plants to be "no bleed" (have zero emissions). Pneumatic controllers located in the production, storage and transmission sectors, must be "low bleed" (emit no more than 6 cubic feet of gas per hour). Reducing natural gas losses from high-bleed pneumatic controllers prevents pollution and increases available gas for sale. The installation or replacement of a pneumatic controller triggers the requirement to comply with the NSPS. EPA has not proposed any controls for pneumatic pumps.

a. Strengths

EPA's rule builds upon existing state standards in place in Wyoming and Colorado, again ensuring uniformity and regulatory certainty for industry as well as critical benefits for health and the environment. Pneumatic controllers are a significant source of emissions and we are encouraged that EPA's proposal covers them.

b. Areas for improvement

Existing pneumatic controllers account for a significant share of emissions. While replaced controllers must comply with the NSPS, additional pollution reductions are available by requiring all existing controllers to be low or no-bleed. Colorado requires existing, as well as new, pneumatic controllers located in areas out of compliance with the national health-based standard for ozone to be low bleed. EPA should follow Colorado's example by requiring additional pollution reductions from existing pneumatic devices.

In addition, Wyoming requires the control of VOCs and HAPs from gas-operated pneumatic pumps by 98%. We recommend EPA adopt a similar national standard for pneumatic pumps.

3. Storage Vessels

a. Strengths

EPA's proposal requires storage vessels in the *Crude Oil and Natural Gas Production* source category with a throughput of 1 barrel of condensate per day or 20 barrels of crude oil (equivalent to emissions of approximately 6 tons of VOCs per year) to reduce VOC emissions by 95%. Produced water tanks and vessels in the *Natural Gas Storage and Transmission* source category are not covered. The proposed standard requires the same level of control as standards in place for oil, condensate and produced water tanks in Colorado and a similar level of control to standards in place to reduce flash emissions from storage vessels in Wyoming.

b. Areas for Improvement

Wyoming requires 98% control of VOC and HAP emissions from storage vessels with the potential for flash emissions. EDF recommends EPA adopt an equivalent level of control for storage vessels pursuant to the NSPS. Such protections would carry out the law and would secure additional health and environmental benefits. In addition, EDF believes additional air quality benefits can and should be obtained from produced water tanks vessels in both the *Crude Oil and Natural Gas Production* and *Natural Gas Storage and Transmission* source categories and storage vessels used in the *Natural Gas Storage and Transmission* source category as these are also significant pollution sources. Lastly, EPA should require reductions from existing storage vessels in order to fully carry out its obligations under the law.

4. Centrifugal Compressors

High-pressure oil is often used as a barrier to prevent natural gas losses from seals used in centrifugal compressors to move gas along a pipeline. EPA's proposal requires the use of dry seals on centrifugal compressors in the production, storage and transmission sectors.

a. Strengths

Fugitive emissions from compressors are a significant source of air pollution. EPA's proposal will dramatically reduce emissions of HAPs, VOCs and methane from this important source. The methane savings resulting from this measure would render this proposed requirement highly cost-effective.

b. Areas for Improvement

Under the proposal, seals on *existing* compressors are not subject to the requirement to use the best demonstrated technology. Fugitive emissions from existing sources will continue to represent a significant amount of pollution going forward. EDF recommends EPA require existing compressors to replace wet seals with dry consistent with the law and as an important component in protecting human health and the environment.

5. Reciprocating Compressors

Reciprocating compressors are another type of compressor used to move gas through pipelines. Leaks in older rod packing used in compressor piston systems contribute to methane, VOC and HAP fugitive emissions. EPA's proposal requires replacement of rod-packing every 26,000 hours, approximately every three years, for reciprocating compressors located at gathering, boosting, processing, and transmission stations.

a. Strengths

EDF supports EPA's proposal to reduce emissions from reciprocating compressors through the use of a demonstrated, cost-effective technology that has a very short payback period.

b. Areas for Improvement

EDF is concerned that reciprocating compressors in the production sector do not need to comply with the proposed standard. We recommend EPA strengthen the rule by broadening the scope of coverage to include compressors in this sector. Reciprocating compressors in the production sector are significant sources of methane, according to EPA's Mandatory Greenhouse Gas Reporting Rule. In addition, EPA has missed an important opportunity for additional cost-effective reductions by failing to reduce emissions from *existing* reciprocating compressors.

6. Gas Processing Plants

EPA has proposed to strengthen the leak detection and repair ("LDAR") standard for reducing VOC emissions from components and equipment at natural gas processing plants. Specifically, the proposal reduces the leak detection threshold from 10,000 parts per million (ppm) to 500 ppm based on the application of more recent standards that apply to the synthetic organic chemicals manufacturing industry. EPA is soliciting comments on the appropriate methodology to use to monitor for gas leaks, including the use of advanced leak detection tools such as optical gas imaging and ultrasound equipment. EPA has also proposed a 99.9% reduction in sulfur dioxide ("SO2") emissions from onshore plants with the highest sulfur feed rates and hydrogen sulfide concentrations.

a. *Strengths*

EDF supports EPA's efforts to expand vital protections to address leaks at gas processing plants by lowering the leak detection threshold. We appreciate the opportunity to provide input on the best available monitoring tools to help identify fugitive emissions so that harmful leaks can be repaired and encourage members of the public to offer solutions addressing the pressing concern with leaks. EDF also supports the additional SO2 reductions from gas processing plants as an important measure under the NSPS to protect human health and the environment from these deleterious emissions.

b. *Areas for Improvement*

Existing natural gas processing plants are not subject to the NSPS. Improved leak detection methods are equally available to detect VOC leaks at existing plants and should be required for older, existing plants as demonstrated by Colorado's rules to reduce VOCs at existing gas plants in ozone nonattainment areas. We recommend EPA include these protections in the final rule. EDF also recommends EPA include additional SO2 reductions from existing plants in the final standards.

7. Produced Water Ponds

EPA is requesting comments on promulgating a performance standard that applies to produced water ponds as well as ways to reduce and measure emissions from this significant source of air pollution.

a. Strengths

Produced water ponds can be a significant source of VOC emissions, especially in arid parts of the country such as the Intermountain West. The state of Colorado has a permitting system in place to help reduce emissions from

produced water ponds and has also developed ways to calculate emissions. EDF supports the promulgation of a performance standard that reduces emissions from produced water ponds as well as implementation of the best available techniques to quantify emissions.

8. Compliance

EPA has proposed monitoring, recordkeeping and reporting requirements to ensure compliance with the NSPS. These requirements include the submission of initial notices that a source is subject to an NSPS, annual reports documenting compliance, and self-certification. EPA has proposed these compliance mechanisms in lieu of requiring compliance with Title V mechanisms. EPA is accepting comments on these alternative compliance requirements as well as the viability of requiring third-party verification of compliance. Compliance with the proposed standards is critical to ensuring the intended public health and environmental benefits are realized. EDF will submit detailed comments designed to ensure that the critical protections provided by the standards are adhered to fully.

III. National Emission Standards for Hazardous Air Pollutants (NESHAPs).

EPA has strengthened and expanded the scope of the standards to reduce hazardous air pollutants promulgated under Section 112 of the CAA. NESHAPs apply to new and existing storage vessels, vents on glycol dehydrators and valves located at natural gas plants.

1. New Standards for Glycol Dehydrators Located at Major Sources

EPA proposes new standards to limit BTEX (benzene, ethylbenzene, toluene, and Xylene) emissions from vents located on glycol dehydrators co-located at major sources of toxic air pollution. The glycol dehydrators covered under these protections are those with an annual average natural gas throughput of less than three million cubic feet per day, or actual annual average benzene emissions of less than one ton per year. The proposed standards require the use of Maximum Achievable Control Technology and are commonly referred to as "MACT" standards. The current MACT standards for glycol dehydrators in the *Crude Oil and Natural Gas Production* and *Natural Gas Storage and Transmission* source categories apply only to large dehydrators with emissions above the thresholds identified in the proposal.

a. Strengths

We strongly support EPA's proposal to reduce toxic air pollution from a broader range of dehydrators -- existing and new -- than those currently covered. Emissions from glycol dehydrators are associated with a host of serious health impacts, and additional pollution reductions from this source are needed to protect adequately human health.

2. Revised Standard for Large Glycol Dehydrators

For large glycol dehydrators in the *Crude Oil and Natural Gas Production* and *Natural Gas Storage and Transmission* source categories that are currently subject to existing MACT standards, EPA proposes to remove a compliance option that it determined does not adequately protect public health with an ample margin of safety. Specifically, EPA proposes to remove the one ton per year benzene compliance option and require all large dehydrators to reduce HAPs by 95%.

a. Strengths

EDF supports EPA's decision to ensure that the MACT standards protect human health and the environment with an ample margin of safety, as required by the Clean Air Act.

3. New Standards for Storage Vessels with Breathing, Working and Standing Losses

Storage vessels contribute to air pollution through a number of ways, including flash emissions and breathing and working losses. The current MACT standards only apply to storage vessels in the *Crude Oil and Natural Gas Production* source category with the potential for flash emissions. EPA's proposal expands the scope of the MACT standards to apply to production vessels that contribute to air pollution through breathing, working and

standing losses. Specifically, the MACT standard requires 95% control of HAPs from all existing and new storage vessels— located in the *Crude Oil and Natural Gas Production* source category. EDF believes additional air benefits can and should be realized by broadening the scope of types of storage vessels covered under the NESHAP to include produced water tanks and also applying the standard to storage vessels in the *Natural Gas Storage and Transmission* source category. EDF also recommends EPA consider a more stringent control requirement of 98%.

4. Lowering the Threshold for Detecting Leaks at Gas Processing Stations

EPA proposes to reduce the leak detection and repair threshold for fugitive hazardous air pollutant (HAP) emissions from valves located at natural gas plants from 10,000 to 500 ppm. But EPA is not proposing to extend this lowered leak detection threshold to other equipment located at gas processing plants, as it is proposing to do in the NSPS, based on a determination that doing so is not cost-effective for HAP reductions.

a. Strengths

As discussed above in the NSPS section, EDF supports a lower leak detection threshold as an important measure to ensure that all significant fugitive emissions are reduced to the greatest extent practicable.

b. Areas of Improvement

EDF believes the proposal misses the mark in failing to reduce HAP emissions from equipment other than valves. Leak detection and corrective action saves valuable product and can be highly cost-effective. We recommend EPA expand and strengthen these important protections to address the pressing problem of leak detection and repair from all components and equipment located at natural gas processing plants.