

EPA's New Standards for Oil & Gas: What They Do, and Don't Do

ABOUT THE AUTHOR

David McCabe is an Atmospheric Scientist at CATF, with a focus on methane and black carbon emissions, and abatement policies.

You can reach David at dmccabe@catf.us or 626-710-6542.

The U.S. oil and gas industry is the nation's largest source of methane emissions. Methane is a global warming pollutant that is far more potent, pound for pound, than carbon dioxide in warming the planet. On April 17, 2012, the US Environmental Protection Agency issued new rules governing air pollution from new oil and gas drilling operations.

A. Emissions Reductions Measures in EPA's New Standards

Reduced Emissions Completions

The most important part of the new standards is the requirement that gas producers capture natural gas when a hydraulically fractured ("fracked") well is completed. Fracking involves pushing a lot of high pressure fracking fluid into a well and the surrounding rock; during well completion, the gas producer lets this water flow back to the surface. Gas mixes with this water, and in some areas it has been commonplace to vent this gas into the air, or burn it off with a simple flare.

The new NSPS requires gas producers, after January 1, 2015, to use “Reduced Emissions Completion” (REC), also known as “Green Completion” technology. This means that instead of flaring or dumping this gas into the air, producers will need to use simple equipment to separate out the gas from the water and send the gas into pipelines for sales. This equipment pays for itself and is used by many operators in many gas basins; the rules require it to be used on all wells except for exploration wells (i.e. wildcat wells) and low-pressure wells such as coal-bed methane wells. Flaring will be required from now until 2015, and for exploration and low-pressure wells, so dumping natural gas into the air – which has been common – will now be prohibited.

The rules also require REC to be used when a well is refracked (except for low-pressure wells). Refracking is done to wells that have existed for some time, and are tailing off in production, to increase production.

The rules will reduce emissions by 0.9 – 1.6 million tons of methane per year. The range reflects two scenarios regarding current *voluntary* use of REC by industry – after all, REC equipment is cheap and pays for itself rapidly, even with low gas prices. EPA estimates that operators voluntarily use REC for roughly half of fracked gas wells in states that don’t require REC. Using this appraisal of the current prevalence of REC, EPA’s best estimate is that the new rules will reduce emissions by the lower amount, 0.9 million tons per year.

Other Important Emissions Reductions Measures

Beyond the rules for using REC for fracking and refracking, the most important aspects of the new rules require the use of modern equipment, instead of older, dirtier technologies:

Pneumatic Controllers. The natural gas infrastructure has many automatic valves and controllers that use the pressure of gas in pipes and equipment to open, shut, and control the valves in locations where electricity isn’t available for power. Many of these “pneumatic controllers” leak natural gas, continuously, by design. The rules require equipment which minimizes or eliminates these leaks, after a one-year delay, for controllers in the gas production and processing segments of the industry. Emissions savings when implemented: 91,000 tons per year of methane; 25,000 tons/year of VOC; almost a thousand tons/year of toxic organic compounds. (These savings are underestimates, due to simplistic accounting used to produce EPA’s estimates.) Again, this equipment is common, and widely used, and the extra cost of the modern devices over older equipment is easily paid for by the value of the natural gas not wasted by the cleaner equipment.

Compressors. The rules also require modern technology and reasonable maintenance for two common types of compressors used in natural gas systems. Again, these measures are already used by some gas companies, and they will pay for themselves or come close due to the sales of the natural gas they conserve. Emissions savings: 8,100 tons/year of methane, 1,700 tons/year of VOC, 65 tons/year of toxics.

Other Equipment. The rules also require emissions controls on storage tanks, and tighter leak detection standards for natural gas processing plants. Emissions savings: 7,000 tons/year of methane, 30,000 tons/year of VOC, and 880 tons/year of toxics.

B. Gaps in the New Rules

Failure to Regulate Methane

Methane is a very potent greenhouse gas (pound for pound, it warms the climate dozens of times more than CO₂). Oil and Gas systems are the largest source of methane emissions from the US. Methane from this sector warms the climate about 16% as much as carbon dioxide from coal-fired power plants, for example. Despite this, and EPA's legal obligation to regulate emissions of greenhouse gases which harm public health and welfare, EPA's new rules fail to directly regulate methane. They do reduce methane emissions, which is quite beneficial, but the rules would do a better job of reducing methane emissions if they were designed for that purpose.

Delays

The most important requirements of the rule, for emissions reductions of methane and VOC, are delayed. As mentioned above, the REC requirement is delayed for 2½ years, and the pneumatic controllers requirement (and some less important rules) are delayed by one year. It is important to note that during the delay on REC equipment, operators must flare off gas; they may not simply dump it into the air. This will reduce methane emissions from well completion dramatically (EPA claims by 95%, although there are no direct measurements to confirm that figure). However, flares will be a substantial source of CO₂, NO_x, particulates, and other pollutants.



Unaddressed Sources of VOC

Beyond the failure to regulate methane, there are many sources of VOC and toxic compounds – the pollutants the regulation is designed to reduce – that the proposal leaves unaddressed:

Well Clean-up. The rule does not address an activity which produces the second largest emissions of methane from the oil and gas sector, and is certainly a very large source of VOC: when old wells are cleaned up to remove water and other material which clogs them up. Although there are cost-effective devices and techniques to clean up wells without polluting the air, none of these are required by the new rules.

Oil Wells. Many fracked oil wells, and some conventional oil wells, produce a lot of natural gas. We are concerned about natural gas releases when fracked oil wells are completed, but what is far worse is the practice of producing oil while flaring off gas, because the pipelines to accept the gas have not been built. In North Dakota, in the Bakken Shale Oil formation, it is permissible to flare a well for an entire year after it begins producing oil. The pollution produced by this flaring is not quantified, but it is clearly very substantial.

Below and left: Reduced emissions completion (REC) equipment is available today, and is in common use (below). Delays in the requiring REC use means highly polluting flares (left).



Missed Opportunities for Compressors and Pneumatic Controllers. While EPA's rules include common-sense measures for these sources, in some cases they clearly aren't enough. For example, EPA exempts gas compressors at well pads from the maintenance requirements. Likewise, while EPA requires zero-emissions pneumatic controllers at gas processing plants, these could be required at other locations where electrical power is available (such as compressor stations). While controls for compressors and pneumatic controllers in the transmission and storage segments of the industry were included in the proposed rules, EPA removed those in the final rule, so interstate pipelines can still use leaky, outdated technologies.

EPA should require modern technologies such as cleaner compressors and pneumatic controllers wherever they are feasible.

Leaks. With the exception of gas processing plants, there is no federal requirement for gas companies to take the basic action of testing their equipment for leaks, and repairing leaky equipment. Some states and regions require leak testing and repair, with various stringency, but EPA's failure to provide a federal standard will mean that sloppy practice in less regulated states will continue. Mitigating leaks is important all the way through the distribution system of natural gas to consumers.

Based on information from researchers currently studying the oil and gas industry, CATF believes that leaks may be a much more important source of methane than EPA's inventories would suggest, although the situation may vary quite a bit from one field to another (or even one well to another).



Above: Advanced imaging shows methane leaks from existing gas infrastructure, which was largely unaddressed in EPA's rule.

Existing Sources. Finally, we are very concerned about existing sources. As mentioned earlier, methane emissions from the gas industry are a tremendous problem. EPA's rules are commonsense and a good start, but much of this equipment will stay in service, with no requirement to retrofit or replace it, potentially for decades. This dirty equipment needs to be cleaned up in years, not decades.