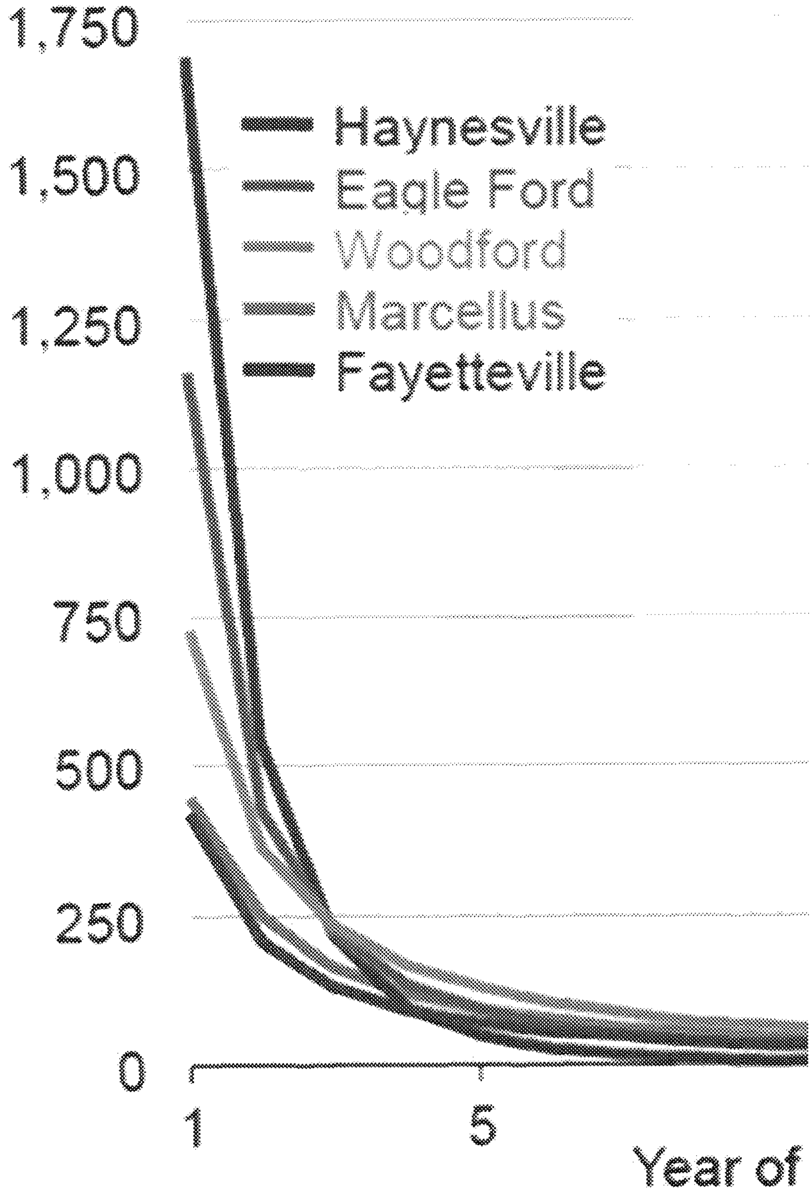
Information for IPAA-EPA Meeting
Subpart OOOOa
March 13, 2018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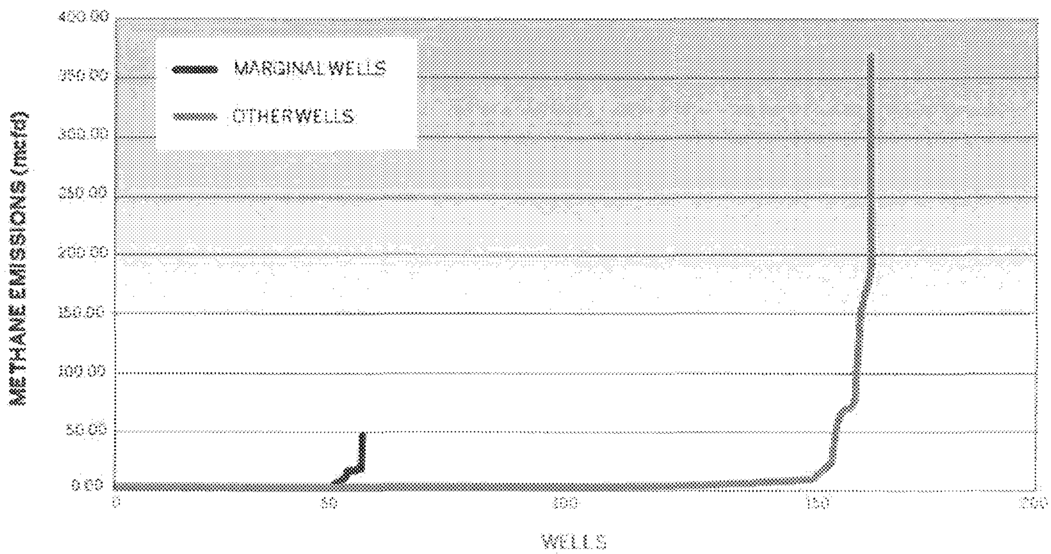
Manipulating Data to Create the Illusion That Low Producing Wells Are "Super-Emitters"

This document addresses data manipulation issues in the environmentalist study submitted to the rulemaking proposal for Subpart OOOOa to distort the role of low producing wells regarding methane emissions. This study was then characterized as the basis for removing the low producing well exclusion for the Subpart OOOOa fugitive emissions program initially proposed by the Environmental Protection Agency (EPA).

Background

Initially, it is important to understand that this study used data from a number of different studies to create its arguments. All of the underlying studies generated their data by driving vehicles with samplers downwind of production sites, hunting for methane plumes. None of them used samples taken on the production site. This creates two issues. First, it measures everything emitted at the site – fugitive emissions and permitted vents. Second, the data are collected over minutes – maybe over an hour – but not over a day. The data in the study are presented as if they were daily emissions but the studies merely scale up hourly estimates. Consequently, an emission that might occur for several hours, but not the full day, would be overstated.

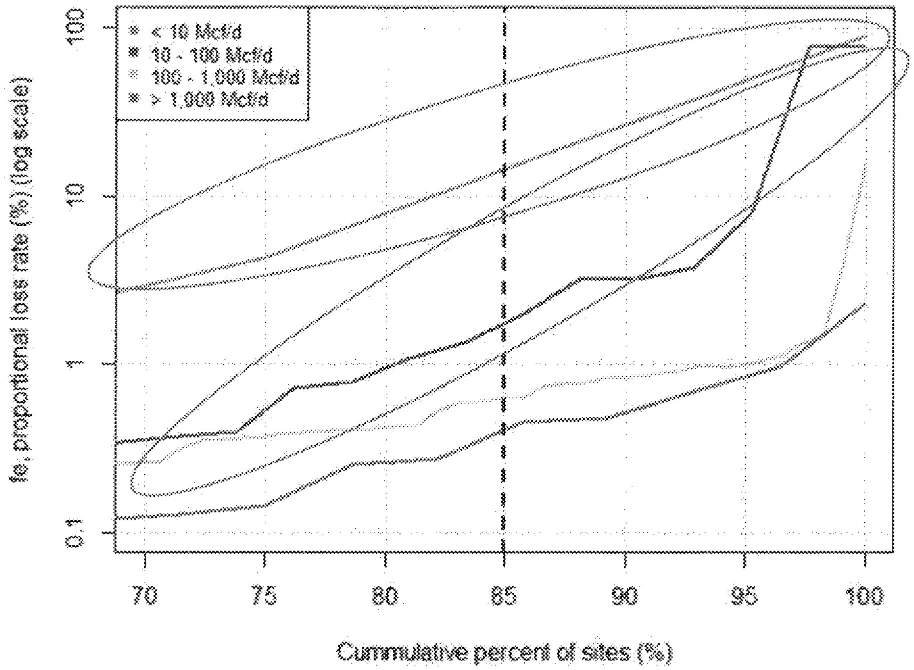
Before turning further to describe the submitted study, it is useful to look at the same data using a direct graph of emissions. In this graph, marginal wells are those with production volumes of 90 mcfd or less.



This graph is consistent with information from other studies showing that a small portion of wells have an emission profile for some reason with high emissions and most wells have really low emissions. Importantly, it also clearly shows that marginal wells – low producing wells in the context of the regulation – have far smaller emissions. But, since this graph is using the same data as the study, it could also be overstating emissions because of scaling short term emissions to a daily amount.

With this background, turning to the presentation of the same material in the study demonstrates how it was manipulated.

Below is the graphic used to present the data. It would suggest that the worst emitting operations – the "super-emitters" – are the smallest wells (the orange line and the blue line, circled in green). Having directly plotted this data, the obvious issue is how such a result can occur.



It is a busy and confusing graph – it's intended to be. The study uses data analysis tricks to create the appearance that marginal wells are "super-emitters".

First, it shows emissions as a percentage of production rather than actual emissions. Thus, one mcf emitted out of ten mcf produced is 10 percent, but 50 mcf emitted out of 1000 mcf produced is 5 percent. As a result, it skews the perception of the data to imply that low producing wells are large emitters when they are not.

Second, its production volumes are really sales volumes, not the amount extracted from the wellhead. Consequently, a "proportional loss rate" of 50 percent would be the calculated loss divided by the volume sold. If the percentage of loss were calculated based on extracted volumes, the 50 percent "proportional loss rate" would drop to 33 percent because the loss would be added to the sales volume to obtain the extracted volume.

Third, it only shows data from the 70th percentile of information. This excludes all of the virtually zero emissions that dominate the data.

Fourth, it uses a logarithmic scale to present the data. One of the reasons to use logarithmic scales is to flatten curves to make them look more like straight lines.

EPA -- Gas Production Sites

Production Equipment	Model Plant Production Equipment Counts	Component Count per Unit of Production Equipment for a "Low Volume" Well				Average Component Count Per Model Plant			
		Valves	Connectors	OELs	PRVs	Valves	Connectors	OELs	PRVs
Gas Well Heads	2	9	37	1	0	19	74	1	0
Separators	2	22	68	4	1	43	137	7	2
Meters/Piping	1	13	48	0	0	13	48	0	0
In-Line Heaters	1	14	65	2	1	14	65	2	1
Dehydrators	1	24	90	2	2	24	90	2	2
	Total:	82	308	9	4	113	414	12	5

Gas Production Site A

Production Equipment	Model Plant Production Equipment Counts	Component Count per Unit of Production Equipment for a "Low Volume" Well				Comments
		Valves	Connectors	OELs	PRVs	
Gas Well Heads	1	6	30	0	0	
Separators	1	1	18	1	1	
Meters/Piping	1	5	5	0	0	
In-Line Heaters	1	3	23	0	0	
Dehydrators	1	7	10	1	0	*Dehydrators are typically not utilized at the well site, but at the downstream sales point.
	Total:	22	86	2	1	

Gas Production Site B

Production Equipment	Model Plant Production Equipment Counts	Component Count per Unit of Production Equipment for a "Low Volume" Well				
		Valves	Connectors	OELs	PRVs	
Gas Well Heads	1	8	12	0	0	
	Total:	8	12	0	0	

Gas Production Site C

Production Equipment	Model Plant Production	Component Count per Unit of Production				
		Valves	Connectors	OELs	PRVs	
Gas Well Heads	1	7	20	0	1	
	Total:	7	20	0	1	

Gas Production Site D

Production Equipment	Model Plant Production Equipment Counts	Component Count per Unit of Production Equipment for a "Low Volume" Well				Average Component Count Per Model Plant			
		Valves	Connectors	OELs	PRVs	Valves	Connectors	OELs	PRVs
Gas Well Heads	2					9	65	0	1
	Total:	0	0	0	0	9	65	0	1

EPA -- Oil Production Sites

Production Equipment	Model Plant Production Equipment Counts	Component Count per Unit of Production Equipment for a "Low Volume" Well				Average Component Count Per Model Plant			
		Valves	Connectors	OELs	PRVs	Valves	Connectors	OELs	PRVs
Oil Well Heads	2	5	18	0	0	10	36	0	0
Separators	1	6	22	0	0	6	22	0	0
Meters/Piping	1	5	14	0	0	5	14	0	0
In-Line Heaters	1	8	32	0	0	8	32	0	0
	Total:	**24**	**86**	**0**	**0**	**29**	**104**	**0**	**0**

Oil Production Site A

Production Equipment	Model Plant Production Equipment Counts	Component Count per Unit of Production Equipment for a "Low Volume" Well				Average Component Count Per Model Plant			
		Valves	Connectors	OELs	PRVs	Valves	Connectors	OELs	PRVs
Oil Well Heads	1	9	10	0	1	9	10	0	1
Separators	0	0	0	0	0	0	0	0	0
Header	1	3	3	0	0	3	3	0	0
In-Line Heaters	0	0	0	0	0	0	0	0	0
	Total:	**12**	**13**	**0**	**1**	**12**	**13**	**0**	**1**

Oil Production Site B

Production Equipment	Model Plant Production Equipment Counts	Component Count per Unit of Production Equipment for a "Low Volume" Well				Average Component Count Per Model Plant			
		Valves	Connectors	OELs	PRVs	Valves	Connectors	OELs	PRVs
Oil Well Heads	1	11	14	0	NA	11	14	0	NA
	Total:	**11**	**14**	**0**	**0**	**11**	**14**	**0**	**0**

Cost of Fugitive Emissions Program on Low Producing Wells

Much of the controversy surrounding the fugitive emissions monitoring program is its enduring application throughout the life of the well. This issue surfaces most significantly as wells decline and become low producing wells. EPA did not assess the cost effectiveness of the fugitive emissions program as it applies to these facilities. Not surprisingly, the impact is significantly different between small and large wells. For the past several years, the Environmental Defense Fund (EDF) has scammed the country and many regulators with an analysis that it developed showing that a variety of methane controls are cost effective. The EDF likes to state that these controls only cost a few cents.

The problem is that the EDF's analysis is flawed and, when the average low producing well produces 22 mcf per day, even a few cents per mcf means a lot. The EDF initially contracted with the ICF International ("ICF") to develop its economic analysis of methane emissions controls. In 2016, ONE Future Inc., contracted with the ICF to revisit its prior work using more realistic assumptions.[1] One key assumption – an assumption that is also problematic with the EPA's economic analysis for Subparts OOOO and OOOOa – is the value of methane used in the analyses. The EDF and the EPA use a value of $4.00/mcf. This is not a realistic value. The ONE Future analysis used $3.00/mcf, which is close to the current national wellhead price for natural gas but still conservative. Equally important, it reflected that a producer does not receive this amount due to royalties and fees that are about 25% of the wellhead price and therefore reduces the net to the producer to about $2.25/mcf. However, even the ONE Future/ICF report does not attempt to distinguish the cost effectiveness of controls based on size of operation.

However, it can be done. The ONE Future/ICF study developed information on the cost of a fugitive emissions leak detection and repair (LDAR) that approximates the Subpart OOOOa biannual testing program. It concluded that the annual cost for the program is $3,436.[2]

There are little data on the emissions from low producing wells. However, in the EPA's April 2012 Technical Support Document for its NSPS,[3] it created a model plant well pad for one well that estimates methane emissions at 0.330 tons/year.[4] This translates to 16 mcf/year.

The ICF analysis uses an estimate that 50% of these emissions would be reduced by the LDAR program. Using the more realistic product prices, this recovery adds about $17.50 to the income of the well and reduces the net cost to about $3,418/year. It is noteworthy to point out that even this small recovery may overstate the amount. Field experience with state fugitive emissions programs indicates that after the first examination of a facility and the initiation of operation and maintenance programs on equipment, subsequent LDAR reviews find far fewer leaks to repair.

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[1] *Economic Analysis of Methane Emission Reduction Potential from Natural Gas Systems*, ICF International, May 2016.

[2] As noted and set forth in their own cost analyses below, the Independent Producers submit that this agency estimate is low.

[3] *Oil and Natural Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution. Background Supplemental Technical Support Document for the Final New Source Performance Standards*, EPA, April 2012.

[4] Ibid, Appendix C.

Additionally, recent American Petroleum Institute (API) efforts have shown that the EPA's assumptions on initial equipment leaks are higher than actual experience.

The larger question is what impact does this have on a low producing well. Using the ICF assumptions, the average low producing well (22 mcf per day) would receive daily income of $49.50 ($18,000 per year).

It is difficult to determine operating costs but the Energy Information Administration ("EIA") released a report in March 2016, *Trends in U.S. Oil and Natural Gas Upstream Costs*, which assessed a wide range of costs and looked at several production areas. One of its evaluations addressed operating costs in the Marcellus play – the world-scale natural gas play in the northeastern states. The report estimated that Marcellus operating costs range from $12.36/BOE to $29.60/BOE. Using the standard 1 BOE = 6 mcf conversion, it produces operating costs ranging from $2.06/mcf to $4.93/mcf. Applying these costs to the average low producing well results in a daily cost range of $45.32 to $108.46.

Consequently, the average low producing well would have to manage its finances in a range from a daily income of $4.18 to a loss of $58.95. In this difficult financial situation, the application of the EPA LDAR program is a more significant factor than EPA has presumed in its analysis. The daily cost of its program would be $9.36 – after taking into account methane recovery. For a low producing well, this small change would drive the well into a net loss ranging from about $5.00/day to $68.00/day.

Clearly, there are many factors that come into play in this analysis – price of natural gas, cost of the LDAR program, operating costs. The fundamental point is that an LDAR program that *may* be justified for large producing wells will have a very different impact on small ones. The EPA should develop a methodology that reflects these differences and it has not.