UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Proposed Information Collection Request; Comment Request; Information Collection Effort for Oil and Gas Facilities	)	**Docket No. EPA-HQ-OAR-2016-0204**
		Via Regulations.gov
		August 2, 2016

Clean Air Task Force, Earthjustice, Environmental Defense Fund, Environmental Integrity Project, Natural Resources Defense Council, and Sierra Club ("Environmental Commenters") appreciate the opportunity to submit comments on EPA's Proposed Information Collection Request for Oil and Gas Facilities ("ICR Proposal").

On March 10, 2016, in a joint announcement with Prime Minister Trudeau of Canada, the President committed to "begin developing regulations for methane emissions from existing oil and gas sources immediately and [moving] as expeditiously as possible to complete this process."[1] To assist in developing these standards, the administration directed EPA to begin an information collection process, which EPA Administrator McCarthy noted would allow the agency "to gather information on existing sources of methane emissions, technologies to reduce those emissions and the costs of those technologies in the production, gathering, processing, and transmission and storage segments of the oil and gas sector."[2]

We strongly support EPA's efforts to move forward expeditiously with comprehensive standards to reduce methane (CH_4) emissions from existing sources in the oil and natural gas sector. In 2018, sources in existence as of 2011 will account for nearly 90% of sector-wide methane emissions.[3] States—from Colorado and Wyoming to California—have demonstrated that the same low-cost technologies and approaches can effectively reduce emissions at both new and existing sources.[4]

There is an extensive and rigorous record on emissions, control technologies, and costs that supports these state actions, as well as proposals from both the Bureau of Land Management and EPA to address wasted natural gas and emissions of methane and volatile organic compounds

[1] The White House, U.S.-Canada Joint Statement on Climate, Energy, and Arctic Leadership, https://www.whitehouse.gov/the-press-office/2016/03/10/us-canada-joint-statement-climate-energy-and-arctic-leadership.
[2] EPA, EPA Taking Steps to Cut Methane Emissions from Existing Oil and Gas Sources, https://blog.epa.gov/blog/2016/03/epa-taking-steps-to-cut-methane-emissions-from-existing-oil-and-gas-sources/.
[3] ICF International, Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries at 1-1 (2014), https://www.edf.org/sites/default/files/methane_cost_curve_report.pdf.
[4] *See, e.g.*, Comments of Clean Air Task Force *et al* on EPA's Control Techniques Guidelines, EPA Doc. Id. No. EPA-HQ-OAR-2010-0505-7070 (2015).

(VOC) from existing sources in certain areas of the country.[5] Accordingly, we urge the agency to move forward expeditiously to establish comprehensive existing source emission guidelines under section 111(d) of the Clean Air Act, and to use the agency's expansive authority under section 114 of the statute to issue a highly-leveraged ICR that ensures EPA's final guidelines are comprehensive, stringent, and durable.

Broadly speaking, we urge EPA to ensure the ICR reflects the following key principles:

- Leverages existing data. The ICR should recognize the extensive record that already exists on emissions, control technologies, and costs, including numerous recent scientific studies; agency analysis and administrative records underlying the section 111(b) standards for methane from the oil and gas sector, and control technique guidelines for VOC emissions from existing oil and gas facilities; information collected in response to EPA's April 2014 technical white papers on oil and gas emissions; and information gathered through the Greenhouse Gas Reporting Program and Natural Gas STAR program. EPA should ensure the request is tailored to produce additional data on sources and industry segments not fully characterized by this available information.

- Produces rigorous and representative data. EPA should ensure its sampling plan is well designed and that reporters transparently disclose the manner in which data was collected. Where companies collect new data, EPA should require rigorous reporting methodologies, including direct measurement, where appropriate.

- Swiftly collects additional information. EPA should provide a swift timeframe for collecting additional information and commit to a date certain by which the agency will move forward with existing source standards.

- Transparently discloses collected data. EPA should ensure that collected data is transparently disclosed to the public, consistent with Section 114 of the Clean Air Act. As EPA has recognized in other contexts, data collection can not only help inform the design of rigorous standards, it also enables the provision of vital health-related information for communities living in close proximity to oil and gas development and accountability for reporters. Public disclosure is critical to secure these benefits.

Our detailed comments identify available information and recommend additional or different data requests that EPA should pursue in each of the areas the agency has set forth. In addition, we have provided a redline version of the ICR in Appendix 1 which illustrates our recommended changes.

[5] 81 Fed. Reg. 6616 (Feb. 8, 2016) (BLM proposal); 80 Fed. Reg. 56,593 (Sept. 18, 2015) (EPA proposed control technique guidelines).

In Section I, below, we briefly discuss EPA's legal authority for issuing the ICR under section 114 of the Clean Air Act. In Section II, we provide comments on EPA's proposed sampling approach. Section III includes our comments on the detailed facility surveys. Finally, in Section IV, we urge EPA to make the data collected as part of this request transparent and broadly publicly available, consistent with the agency's legal duties under section 114 of the Act.

All prior written and oral testimony and submissions to the Agency in this matter, including all citations and attachments, as well as all of the documents cited to in these comments are hereby incorporated by reference as part of the administrative record in this EPA action, Docket ID No. EPA-HQ-OAR-2016-0204.

I. EPA HAS AMPLE AUTHORITY UNDER SECTION 114 OF THE CLEAN AIR ACT TO ISSUE A BROAD AND DETAILED ICR.

EPA proposes to issue the methane ICR pursuant to section 114 of the Clean Air Act. As the agency makes clear in its supporting statement for public comment, section 114(a) fully authorizes it to solicit the complete range of data requested in the ICR. That section of the statute provides that, "[f]or the purpose . . . of developing or assisting in the development of any implementation plan under . . . section 7411(d) of this title, any standard of performance under section 7411 of this title, [or] any emission standard under section 7412 of this title," EPA may

> require *any* person who owns or operates *any* emission source . . . or who is subject to *any* requirement of this chapter . . . to (A) establish and maintain such records; (B) make such reports; (C) install, use, and maintain such monitoring equipment, and use such audit procedures, or methods; (D) sample such emissions . . . (E) keep records on control equipment parameters, production variables or other indirect data when direct monitoring of emissions is impractical; . . . and (G) provide such other information as the Administrator may reasonably require.

42 U.S.C. § 7414(a)(1) (emphasis added). EPA's authority under this provision is extremely broad: so long as information from an emissions source may reasonably assist in the development of performance standards or emission guidelines under section 111, the agency may require the source to collect and provide that information to the agency.[6] All of the information EPA has proposed to request through this ICR—as well as the additional information that Environmental Commenters urge EPA to request—would assist the agency in developing section 111 emission guidelines for methane and VOC emissions from the oil and gas industry, as well as section 112 National Emission Standards for Hazardous Air Pollutants (NESHAPs) and

[6] As discussed more fully in Section IV of these comments, any information collected under section 114(a) must be made publicly available, except where the data in question qualifies as confidential business information. 42 U.S.C. § 7414(c).

residual risk standards for hazardous air pollutants (HAPs)[7] from this sector. This information would help apprise EPA of the extent of emissions from various sources, the availability and efficacy of various control technologies, techniques, and practices for reducing emissions, and the appropriate level of emission control to require under section 111 and 112 regulations. Accordingly, EPA is fully within its authority to require this information under section 114(a).

EPA has, in the past, exercised its section 114(a) authority to collect emissions information from sources in the oil and natural gas sector. Under 40 C.F.R. Pt. 98, Subpart W, the agency has established a greenhouse gas reporting program for both onshore and offshore petroleum and natural gas systems. This program requires operators of different sources within the sector—including onshore and offshore oil and gas production facilities, natural gas processing plants, underground natural gas storage facilities, natural gas transmission systems, liquefied natural gas storage facilities and import or export terminals, oil and gas gathering and boosting facilities, and natural gas distribution systems—to report to EPA their annual carbon dioxide (CO_2), CH_4, and nitrous oxide (N_2O) emissions, exempting sources that do not meet an annual GHG emission threshold of 25,000 metric tons of carbon dioxide equivalent (CO_2-e). The Subpart W program offers precedent both for EPA using its section 114(a) authority to collect emissions data from the oil and gas industry to advance its rulemaking obligations, and for the industry's ability to monitor its emissions, collect data, and report it to EPA.

The Subpart W program has already yielded a robust set of data on methane pollution from the oil and gas sector, with over 2,000 facilities in eight oil and gas industry sectors reporting direct emissions in 2014.[8] These data assisted EPA in updating its new source performance standards (NSPS) for this industry to include direct methane safeguards for the first time. *See* 81 Fed. Reg. 35,824, 35,830, 35,840-41, 35,855 (June 3, 2016) (referencing Subpart W data).

As Environmental Commenters have emphasized, Subpart W data from reporting year 2014—along with other information currently available to the agency—are sufficiently detailed, reliable, and broad in scope to support existing source methane standards for oil and gas sources at this time.[9] At the same time, we acknowledge that the ICR process will allow EPA to supplement its robust set of existing data by providing information on non-reporters from Subpart W, covering more emission points within the sector, assessing emissions from a broader range of sources and equipment types, and evaluating the most cutting-edge methods, techniques, and technologies for reducing emissions. Therefore, we encourage EPA to initiate work on existing source standards now, using data and information currently available, while at

[7] Many of the undersigned organizations are also submitting separate comments on the ICR focusing on the hazardous air pollution component of the request; we wish to emphasize here the importance of that aspect of the ICR and urge EPA to adopt the recommendations made in our separate set of comments.

[8] EPA, *GHGRP 2014: Reported Data*, https://www.epa.gov/ghgreporting/ghgrp-2014-reported-data (last visited July 29, 2016).

[9] This information includes data generated through EPA's annual Greenhouse Gas Inventory, comments submitted to EPA through the Methane White Papers and 2012 NSPS rulemaking processes, and independent studies conducted in recent years.

the same time moving ahead expeditiously with the ICR to ensure that its eventual rule proposal comprehensively covers key sources of methane and is based on the best emission reduction strategies available.

II. EPA SHOULD ENSURE THAT ITS SAMPLING PROTOCOL PRODUCES RIGOROUS AND REPRESENTATIVE DATA.

EPA has proposed requiring all oil and gas producers to complete the operator survey, which generally seeks information on equipment types and facility characteristics for sources across the country. In addition, EPA has proposed detailed facility surveys that seek information on specific emission sources.[10] For the latter set of surveys, the agency has proposed to request information from only a subset of sources.[11] It is critical that the sampling methodology for identifying this subset recognizes available information in Subpart W and is designed to produce rigorous, representative data. Below, we briefly describe key features of EPA's sampling approach and identify opportunities for strengthening that approach, including recommending potential alternative approaches for the upstream and other industry segments.

A. *Key Features of EPA's Approach to Collecting Facility Data*

EPA's proposed approach to gathering detailed facility data includes several key features. The agency has first proposed to stratify the total population of facilities by eight industry segments. For the onshore petroleum and natural gas production segment, the agency has proposed two options for further stratification. Option 1 groups the onshore petroleum and natural gas industry sector into five strata, with four of these strata based on the gas/oil ratio (GOR) for each well and the remaining stratum reserved for coal-bed methane wells. Option 2 likewise includes five strata, but is instead based on simple geographic regions. These and the remaining industry segment strata are set forth in Table 1, below.

EPA then proposes to determine the number of facilities sampled in each stratum using statistical methodologies and statistical power and accuracy requirements, assuming a 75 percent response rate. After determining these strata and the number of facilities[12] to be sampled in each, EPA proposes simple random sampling to identify respondents.[13]

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[10] 81 Fed. Reg. 35763, 35764 (June 3, 2016)

[11] EPA, Supporting Statement for Public Comment; Information Collection Effort for Oil and Gas Facilites at 4 (June 3, 2016), *available at* https://www3.epa.gov/airquality/oilandgas/may2016/icr-supporting-statement.pdf (hereinafter "Supporting Statement")

[12] The ICR supporting document includes some inconsistencies as to whether random sampling would focus on wells or facilities. Table B-3 and page 23 implies that facilities are sampled, though Page 24 suggests a focus on wells. Accordingly, we urge EPA to clarify its intended approach to focus on wells for the production segment. The alternative analyses presented here assumes that wells are sampled for the onshore petroleum and natural gas production strata, but facilities are sampled for the other seven strata.

[13] *E.g.*, Supporting Statement at 23.

Table 1: Numbers of Facilities and Wells (Based on Tables B-2 and B-3 of the ICR Supporting Document); Assumes 2 wells per facility for the onshore petroleum and natural gas production facilities

Industry Stratum Number	Production Facility Type	Estimated Count of Facilities	Count of Wells	Emissions Data Distinguishable for GHGRP Facilities	Production Data Available for All Wells or Facilities
Onshore petroleum and natural gas production facility. Option 1 Groupings by GOR					
1A	Heavy Oil, GOR ≤ 300 scf/bbl	248,010	496,020	N	Y
2A	Light Oil, 300 < GOR ≤ 100,000 scf/bbl	219,395	438,790	N	Y
3A	Wet Gas, 100,000 < GOR ≤ 1,000,000 scf/bbl	31,200	62,400	N	Y
4A	Dry Gas, GOR > 1,000,000 scf/bbl	177,385	354,770	N	Y
5A	Coal Bed Methane	22,810	45,620	N	Y
Onshore petroleum and natural gas production facility. Option 2 Groupings by Basin Regions					
1B	-Production basins 100 to 190	106,275	212,550	Y	Y
2B	-Production basins 200 to 290 and 400	107,530	215,060	Y	Y
3B	-Production basins 300 to 395	174,605	349,210	Y	Y
4B	-Production basins 405 to 440	217,080	434,160	Y	Y
5B	-Production basins 445 to 895	93,310	186,620	Y	Y
Subtotal for Onshore petroleum and natural gas production facility		698,800	1,397,600		
6	Onshore petroleum and natural gas gathering and boosting facility	5,000	N/A	N	N
7	Onshore natural gas processing plant (or facility)	668	N/A	Y	Y
8	Onshore natural gas transmission compressor Station	1,400	N/A	Y	Y
9	Natural gas transmission pipeline facility	939	N/A	N	N
10	Underground natural gas storage facility	418	N/A	Y	Y
11	Liquefied natural gas (LNG) storage facility	100	N/A	Y	Y
12	LNG import and export facility	11	N/A	Y	Y

EPA's proposed approaches—including the strata, sample size determinations, and sampling approach—do not utilize certain information concerning emissions and facility types across the production segment. For instance, basins reflect important geological characteristics, though EPA's proposal to group basins by their numerical identification without regard to similarities in basin-level characteristics and emissions from those basins could result in oversampling from low-emitting basins and undersampling from higher-emitting basins.[14] EPA has alternatively proposed to collect data in five different GOR strata; but while GOR is an important factor, it is not clear that the specific thresholds the agency has defined would maximize available emissions information.[15] The same is true for both EPA's statistical approach to determining sample sizes, which does not determine the optimal sampling size based on the standard deviation of emissions data from available sources, as well as the sampling approach itself, which utilizes a simple random sample.

An approach tailored using existing information can potentially collect data with greater efficiency, helping to ensure more rigorous sampling of high-emitting sources and better characterization of emissions from all sources. Accordingly, in the following sections, we have suggested a potential alternative approach that utilizes data from EPA's Greenhouse Gas Reporting Program (GHGRP) to optimize stratification, sampling method, and statistical sample size.

B. *Alternative Petroleum and Natural Gas Production Sampling Approach*

We recommend an alternative approach to onshore production sampling that ensures the collection of data from a large set of high-producing basins and characterizes equipment configurations from both low-producing "marginal" wells as well as higher-producing wells. Our suggested approach results in 18 total strata that capture these distinctions.

In addition to capturing distinctions between higher-producing wells in different production basins, it is essential that EPA characterize equipment configurations and other data from marginal wells. This is because recent studies indicate that emissions from low production wells

[14] In Option 1, EPA has proposed to combine basins 200–290 and 400 into a single stratum, which results in equal probabilities of sampling sources in the Gulf Coast and Arkla basins, although Subpart W emissions from those basins vary considerably. *See id.* at 23.

[15] While GOR provides helpful information, there are several reasons GOR alone may not correlate well with emissions. First, marginal oil wells may not report gas that is produced but not captured for sale, so many of these facilities have a zero or near-zero GOR, which will not accurately reflect the well's production profile or emissions characteristics. In addition, GOR probably does not correlate simply with emissions, meaning wells with higher GORs are not necessarily associated with higher emissions. For example, we analyzed data from a recent aerial survey of super-emitters across seven geological basins and compared the prevalence of super-emitters to well GOR. We found significant percentages of super-emitters at sites with lower GORs and consistency across a number of the GOR thresholds EPA has proposed to assess in Option 1. This study data underscores that sites with low gas-to-oil ratios (oil producing sites) can have substantial emissions, as can sites with higher GOR values. *See* David R. Lyon et al., *Aerial Surveys of Elevated Hydrocarbon Emissions from Oil and Gas Production Sites*, 50 Envtl. Sci. & Tech. 4877 (Apr. 5, 2016).

are disproportionately high relative to production,[16] which makes production-based sampling ill-suited for these sources. Through separate sampling of these sources, we encourage EPA to seek data that can help illuminate the causes of these well-documented high-emitting events and additional solutions to minimize or eliminate these emissions.

In addition, we propose to divide higher-producing wells into those that report equipment counts, other activity data, and emissions under Subpart W ("reporters") and wells which do not ("non-reporters"). This approach is warranted because substantial emissions and activity data has already been collected for reporters, whereas the EPA has no such reported data for current non-reporters, enabling emissions-based sampling for the former but not the latter. If non-reporters have disproportionately higher emissions profiles, then separately sampling these sources can provide helpful additional data to further document this phenomenon and better understand its causes. Below, we provide greater detail on these stratification and sampling recommendations.

Identification of Strata.

We propose that EPA categorize wells according to three broad factors—well production level, whether a well reports to Subpart W, and the geological basin in which a well is located — and tailor its sampling approach to each category. This approach ensures comprehensive sampling of low-producing or "marginal" wells across all basins, given that these sources can be associated with significant emissions, and will help characterize key features driving those emissions. In addition, the Subpart W reporter classifications will provide more information on known large emitters and contrast their operations and emissions with non-reporters.

Our approach begins with stratification of wells according to geological basins and production levels. Using Subpart W data, we identified the top 15 emitting basins and recommend creating a separate stratum to represent each of these basins. These individual basins range from 12 percent to three percent of emissions and, in the aggregate, account for 92 percent of emissions reported under Subpart W. In addition, we recommend that EPA create an "other" stratum combining the remaining basins, which account for the remaining eight percent of Subpart W emissions. Finally, we identify two additional strata—for marginal oil wells and marginal natural gas wells, respectively[17]— that EPA could use to ensure rigorous characterization of emissions from these sources. Table 2, below, sets forth these 18 proposed strata.

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[16] M. Omara et al 2016, *Methane Emissions from Conventional and Unconventional Natural Gas Production Sites in the Marcellus Shale Basin*, 50 Envtl. Sci. & Tech. 2099 (Feb. 16, 2016) (DOI: 10.1021/acs.est.5b05503). Site-level measurements of 35 well pads in the Marcellus found 85X higher median production-normalized CH_4 emission rates from low production, conventional wells compared to high production, unconventional wells.

[17] All wells are determined to either be non-marginal wells or marginal wells based on total production. We used the Energy Information Association's definition of a marginal well, which is one that produces less than 10 barrels of oil per day and less than 60,000 cubic feet of gas per day (https://www.eia.gov/tools/glossary/index.cfm?id=S). A gas well is defined as a well with a GOR greater than 12,500 standard cubic feet of gas per barrel of oil. Thus, a marginal gas well is a marginal well with a GOR above 12,500 and a non-marginal gas well is a non-marginal well

This suggested approach is essentially a hybrid of EPA's proposed Options 1 and 2, though our recommended strata represent a more granular sampling of high-emitting basins while retaining a distinction between oil and natural gas production for marginal wells. The approach implicitly captures the GOR distinction for other wells based on the more specific basin-level sampling plan, and we urge EPA to ensure GOR data is transparently reported for each of these categories.

with a GOR at or below 12,500. The last two strata contain the marginal gas wells (for all basins) and the marginal oil wells (for all basins).

Table 2: Proposed Stratification for Onshore Production Facilities

Stratum	% of Emissions	Basin	Total Non-Marginal Wells	Marginal Gas Wells	Marginal Oil Wells	Total Gas Wells (marginal + non-marginal)	Total Oil Wells (marginal + non-marginal)
BASIN STRATA FOR NON-MARGINAL WELLS							
360 - ANADARKO BASIN	12%	360	21,907	39,400	20,500	55,054	26,753
220 - GULF COAST BASIN (LA TX)	12%	220	29,871	12,127	25,059	24,024	43,033
580 - SAN JUAN BASIN	11%	580	13,196	16,455	1,326	29,404	1,573
430 - PERMIAN BASIN	10%	430	44,830	27,302	110,247	33,581	148,798
160A - APPALACHIAN BASIN (EASTERN OVERTHRUST AREA)	6%	160A	11,847	141,122	45,214	152,494	45,689
260 - EAST TEXAS BASIN	6%	260	15,120	9,353	11,015	22,836	12,652
345 - ARKOMA BASIN	5%	345	9,490	8,239	1,542	17,693	1,578
535 - GREEN RIVER BASIN	5%	535	10,005	2,746	673	12,412	1,012
575 - UINTA BASIN	5%	575	7,064	2,445	2,085	7,030	4,564
540 - DENVER BASIN	4%	540	4,781	14,410	13,504	15,408	17,287
595 - PICEANCE BASIN	4%	595	10,604	6,430	200	16,615	619
395 - WILLISTON BASIN	4%	395	13,063	2,794	2,323	3,015	15,165
415 - STRAWN BASIN	3%	415	7,450	1,092	8	8,542	8
420 - FORT WORTH SYNCLINE	3%	420	6,991	5,691	5,644	12,196	6,130
230 - ARKLA BASIN	3%	230	7,543	10,695	16,849	17,231	17,856
Other	8%	Other	58,542	185,386	165,131	212,898	196,161
MARGINAL WELL STRATA							
Marginal Gas Wells				485,687			
Marginal Oil Wells					421,320		

Primary Sampling Approach.

Along with these 18 strata, we recommend EPA consider using available emissions and production information, set forth in Table 2 above, to tailor the sampling approach for particular well types within each stratum.

- Non-marginal reporters – For this stratum, Subpart W provides information for each operator on average emissions per well. Therefore, we propose that EPA sample proportionally to average well emissions, which means higher emitters are more likely to be selected for the survey.[18]
- Non-marginal non-reporters – For higher producing wells that do not report to Subpart W, EPA should sample proportionally to production.
- Marginal wells (both reporters and non-reporters) – The characteristics of marginal oil and gas wells may be different. For instance, marginal oil wells may not be connected to gas gathering infrastructure and so can have emissions from casinghead gas, tank vapors, and equipment leaks. Also, neither GOR nor production is a good metric to tailor sampling from these sources.[19] For these reasons, we suggest simple random sampling from these strata.

As discussed above, we encourage EPA to move forward with a hybrid stratification approach that recognizes the importance of both basin-level and GOR distinctions, even if different from the distinctions we have recommended.[20] If EPA retains either the original Option 1 or Option 2, we nonetheless encourage the agency to optimize its sampling approach to account for emissions and production data, as summarized in Table 3, below. Moreover, under either of EPA's proposed options, we urge EPA to collect robust data on GOR (based on the amount of gas extracted from the formation, not the amount of gas sold) and basin-level characteristics.

[18] Average emissions per well for Subpart W reporters includes emissions from both marginal and non-marginal wells. However, we assume that the contribution of marginal wells to emissions is proportionately lower than non-marginal wells, and hence does not significantly impact the average emissions per well estimate for the purposes of this survey. Furthermore, samples from this group are drawn at a basin level to reflect the level of emissions from each basin.

[19] GOR is calculated using gas sales, and as there are no gas sales from marginal oil wells, GOR does not provide additional information related to sampling marginal wells. Moreover, using production to tailor sampling for marginal wells is problematic because wells with lower production are not indicative of lower emissions.

[20] For instance, the agency could consider stratifying by the top 10 emitting basins or could consider basin groupings more granular than those reflected in the proposal.

Table 3: Summary of Sampling Approach

	Reporter	**Non-reporter**
Non-Marginal	Sample by basin and by emissions per well	Sample by basin and by production per well
Marginal	Sample randomly by oil wells and gas wells	

Sample sizes based on EPA's accuracy criteria adjusted for the finite populations, but assuming simple random sampling, are shown in Table 4, below. The EPA method assumes coefficients of variation (standard deviation divided by the mean) of either 1 or 3 and is designed to estimate each stratum mean within a margin of error of either 10 percent or 30 percent, using a simple random sample. Instead of assuming default values for the coefficients of variation, we have used the actual coefficients of variation from the Subpart W emissions data for each non-marginal stratum. The column "Sample Size Based on Emissions Data (@30% Accuracy)" shows sample sizes calculated using the EPA method applied to actual coefficients of variation to estimate each stratum mean within 30 percent. For the marginal well strata, we used EPA's sample sizes because our alternative approach for these strata is still based on simple random sampling. The sample sizes in Table 4, below, show that using standard deviations based on available emissions data can increase the sample accuracy to 20% while lowering sample sizes when compared to those EPA has proposed in Table B-3 of the ICR.[21]

[21] Our values represent wells. The conclusion that these represent lower values than reflected in Table B-3 assumes, as EPA has in the recently finalized NSPS, that 2 wells are located on an individual pad. EPA, Regulatory Impact Analysis of the Final Oil and Natural Gas Sector: Emissions Standards for New, Reconstructed, and Modified Sources at 6-5 (May 2016), *available at* https://www3.epa.gov/airquality/oilandgas/may2016/nsps-ria.pdf.

Table 4: Sample Size For Alterntaive Proposed Method Using EPA's Criteria Assuming Simple Random Sampling

Stratum	Marginal Gas Wells	Marginal Oil Wells	Total Non-Marginal Wells	Sample Size Based on Emissions Data (@30% Accuracy)	Sample Size Using Emissions Data (@20% Accuracy)	Sample Size Using Emissions Data (@10% Accuracy)
360 - ANADARKO BASIN			21,907	66	148	580
220 - GULF COAST BASIN (LA TX)			29,871	63	141	556
580 - SAN JUAN BASIN			13,196	6	13	50
430 - PERMIAN BASIN			44,830	206	460	1785
160A - APPALACHIAN BASIN (EASTERN OVERTHRUST AREA)			11,847	171	377	1377
260 - EAST TEXAS BASIN			15,120	18	40	160
345 - ARKOMA BASIN			9,490	7	15	61
535 - GREEN RIVER BASIN			10,005	19	44	172
575 - UINTA BASIN			7,064	33	73	284
540 - DENVER BASIN			4,781	25	55	212
595 - PICEANCE BASIN			10,604	9	21	83
395 - WILLISTON BASIN			13,063	50	112	438
415 - STRAWN BASIN			7,450	12	27	108
420 - FORT WORTH SYNCLINE			6,991	33	74	286
230 - ARKLA BASIN			7,543	13	30	118
Other			58,542	278	623	2413
Marginal Gas Wells	485,687			384	384	384
Marginal Oil Wells		421,320		384	384	384
TOTAL				1,776	3,020	9,451

C. *Comments on EPA's Proposed Sampling Approaches for Remaining Segments*

For the remaining industry segments, we do not propose additional stratification, although for certain segments, we recommend that EPA pursue an emissions-based sampling approach in which Subpart W provides additional data and distinct approaches where the universe of facilities is small or the agency is still in the process of collecting Subpart W information. Our proposals are as follows:

- Emissions-Based Sampling Approach. For the Natural Gas Processing, Transmission, and Underground Storage strata, we recommend EPA pursue an emissions-based sampling methodology, leveraging facility-level data from Subpart W.

- Simple Random Sample. For the Gathering and Boosting and Natural Gas Transmission Pipeline Facility strata, we support EPA retaining its proposed approach, focusing on simple random sampling.

- Census. For LNG storage and LNG import/export facilities, due to the small population of facilities, we support EPA's proposal to perform a census—that is, to include all facilities in the sample.

Table 5, below, details the sample sizes for non-production strata according to the methods outlined above. For strata based on simple random sampling, there is no change in sample size. However, using standard deviations based on available emissions data can increase the sample accuracy to 20 percent while retaining (and in some cases lowering) sample sizes in comparison to those EPA has proposed in Table B-3 of the ICR.

Table 5: Sample Sizes for Non-production Strata

Industry Stratum Number	Production Facility Type	Estimated Total Sample Size (@30% Accuracy)	Estimated Total Sample Size (@20% Accuracy)	Estimated Total Sample Size (@10% Accuracy)
6	Onshore petroleum and natural gas gathering and boosting facility	357	357	357
7	Onshore natural gas processing plant (or facility)	102	193	413
8	Onshore natural gas transmission compressor Station	108	222	601
9	Natural gas transmission pipeline facility	273	273	273
10	Underground natural gas storage facility	70	131	270
11	Liquefied natural gas (LNG) storage facility	Census	Census	Census
12	LNG import and export facility	Census	Census	Census

Importantly, the sample size estimates in the above table are based on EPA's estimate the total number of facilities in various segments, located in Table B-3 of the proposed ICR. However, we believe EPA's estimates in the gathering and boosting segment[22] and the agency's estimate of

[22] The gathering and boosting segment consists of pads with equipment such as tanks and dehydrators, as well as stations with compressors and other equipment. The 5,000 facility count reflected in EPA's proposal is similar to the estimate included in a recent study by the researchers at Carnegie Mellon and Colorado State University, which

transmission compressor counts[23] are significantly understated, and we encourage EPA to revise these estimates upward. An upward revision would yield higher sample sizes, either in EPA's proposed methodology or in our recommended, emissions-based approach described in Table 5, above.

III. SPECIFIC RECOMMENDATIONS FOR ADDITIONAL DATA COLLECTION IN OPERATOR AND FACILITY SURVEYS.

In addition to the sampling protocol, EPA has proposed detailed facility questionnaires that seek to gather information about emissions, controls, and costs from various sources. Appendix 1 includes a redline of these questionnaires, where we recommend definitional changes and additional, specific data requests that EPA should include in the ICR, as well as questions EPA could potentially streamline or remove based on available information. Here, we identify key aspects of these more detailed recommendations that could help supplement the existing body of information, though as explained above, we believe that EPA has the requisite information now to move forward with rigorous standards for existing sources.

A. *Comments on Definitions*

"Hydraulic fracturing"

The current definition of hydraulic fracturing may exclude some fracturing activities and we request that it be revised. Specifically, the current proposed definition:

- Includes the phrase "pressurized fluids containing any combination of **water**, proppant, and any added chemical" (emphasis added), but water is not the only base fluid used in hydraulic fracturing; some operations use gas or a mixture of gas and water as the base fluid.

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estimated approximately 4,549 (+921/−703) facilities nationwide. Anthony J. Marchese et al., *Methane Emissions from United States Natural Gas Gathering and Processing* 49 Envtl. Sci. & Tech. 10718 (Aug. 18, 2015) *available at* http://pubs.acs.org/doi/full/10.1021/acs.est.5b02275. The Marchese et al. gathering station definition includes facilities with compression, dehydration, or treatment, but excludes tank batteries. Not included in this estimate, however, are the numerous gathering and boosting facilities that lack compression and are on pads without wells. This information is now being collected under Subpart W, and we encourage EPA to ensure its sampling approach reflects the presence of these facilities. Moreover, we urge EPA to ensure such facilities receive and submit questionnaires further elucidating onsite equipment and emissions profiles.

[23] EPA has estimated that there are 1,400 compressor stations in the transmission segment, though we note that this is an estimated of stations on the interstate network. The Energy Information Administration provides an estimate of both interstate mileage (217,306) and compressor stations (~1,400). U.S. Energy Information Admin., About U.S. Natural Gas Pipelines, https://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/index.html (last visited Aug. 2, 2016). Using the ratio of compressor station per mile for interstate pipelines and applying it to the intrastate mileage (88,648) gives an estimated ~570 stations on intrastate pipelines, and a total estimate of closer to 1,970 stations. This also closely aligns with the 1,834 stations estimated in the EPA National GHG Inventory, Annex 3, Table A-137, *available at* https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Annex-3-Additional-Source-or-Sink-Categories-Part-A.pdf. We urge EPA to account for this missing number of intrastate compressor stations in its sampling plan.

- Specifies that hydraulic fracturing is used to penetrate "tight formations," but does not define this term.[24] Hydraulic fracturing is also used in conventional formations with higher permeability (for example, to bypass formation damage near the wellbore).
- Includes the phrase "subsequently require high rate, extended flowback to expel fracture fluids and solids during completions." The terms "high rate" and "extended" are vague and undefined. Additionally, not all fracturing jobs may require "high rate" or "extended" flowback, particularly lower-volume hydraulic fracturing.

EPA should collect data on all types of fracturing, not only high-volume, high-pressure fracturing which occurs in unconventional reservoirs, and should revise the definition according to our recommendations in Appendix 1.

"Flowback"

The proposed definition of flowback only refers to natural gas wells, but oil wells also undergo flowback and produce flowback fluids. The proposed definition should be expanded to also include oil wells.

In Appendix 1, we likewise recommend technical adjustments to EPA's proposed definitions of **"Vertical Well,"** and suggest renaming **"Well Bore Length,"** and **"Well Depth"** to conform to our understanding of standard industry usage of these terms.

B. *Comments on Well-Site Survey (2E)*

Attachment 2E contains detailed well-site questions, including questions on individual wells, well completions and workovers, and well testing, venting and liquids unloading. We encourage EPA to include additional questions that address the availability and emissions characteristics of onsite flares and combustion devices, which will allow the agency and stakeholders to compare the impacts of these devices relative to venting emissions, as well as to emissions reduction alternatives such as routing to a process. In addition, we recommend that EPA collect data on whether well sites are connected to the electricity grid or have power generated on site, which could lower the cost of replacement of certain gas driven equipment (such as pneumatic devices or pumps) with zero-emitting, electrical alternatives. Finally, we recommend that EPA collect additional information on the number of completions and workovers, as well as information to ensure all liquids unloading technologies are characterized and the duration and other key features of liquids unloading events are reported.

We also encourage EPA clarify and streamline certain of its proposed requests related to gas composition. For instance, gas composition changes only marginally throughout the production year and so providing both 2015 gas composition and current gas composition will not likely yield significant additional information. EPA could streamline these reporting requirements

[24] EPA subsequently proposes a definition of "tight gas reservoir" to mean "A natural gas reservoir (other than coal seam or shale formation) with a permeability of 0.1 millidarcy or less." There is no similar proposed definition of tight oil reservoir, and it is unclear if there is any relationship between the term "tight formation" used in this definition and the term "tight gas reservoir."

accordingly. However, EPA should also collect information on the pressure and temperature of the gas at the point where composition is determined, as these variables affect the partitioning of VOC between the gas phase and liquid phases.

C. *Comments on Tanks/Separators (2F)*

It is important that EPA characterize three types of emissions from tanks and separators via its data collection effort. The first group of emissions is the flashing, working, and standing losses from hydrocarbon liquids in the tank. The second type of emissions are those from dump valves being routed through the tank to the atmosphere. The third type of emissions are those from tanks with controls that leak through thief hatches and corrosion holes in tank roofs and other failures to maintain a sealed system. Recent studies have suggested each of these emissions can be significant and that each may be a substantial contributor to the "super-emitter" phenomenon,[25] which is largely uncharacterized in current inventories. Accordingly, we propose to add several data elements to ensure that the questionnaires obtain the data needed to rigorously characterize these three types of tank emissions.

With respect to flashing, working, and standing losses from uncontrolled tanks, the agency has proposed to request important information on throughput and other variables that can help determine how VRUs need to be sized to appropriately meet peak liquids volumes. Not all tanks, however, are operational throughout the entire year and so EPA's proposed focus on average annual volumes may miss key information on these peak volumes, associated emissions and needed vapor recovery equipment capacity and associated cost. To better understand these operational parameters and implications, we propose that EPA include the number of days a tank is in operation in the data request. This and other information will allow EPA to more accurately characterize the magnitude of emissions from uncontrolled tanks. Environmental Integrity Project has submitted separate comments identifying several important features related to effective VRU control.

Dump valves are likewise a significant source of emissions according to information available from Subpart W reported data. Therefore, we also recommend that EPA add a request to help characterize the frequency of stuck dump valves in calendar year 2015.

Finally, we propose adding several data requests to better characterize tank control measures and other operational parameters, such as maximum and minimum liquid throughputs. These data will allow for better assessment of the control measures needed across the population, control effectiveness, and the cost to implement such measures widely.

D. *Comments on Pneumatics Survey (2G)*

Draft Questionnaire 2G seeks more detailed information on pneumatics, including counts of pneumatic controllers, devices, and pumps at a wellsite; general pneumatic controller information;

[25] David R. Lyon et al., *supra* n. 15; Consent Decree, *United States v. Noble Energy*, No. 1:15 cv 00841 (D. Colo. Apr. 22, 2015), *available at* https://www.epa.gov/sites/production/files/2015-04/documents/noble-cd.pdf.

information on isolation valve actuations; and direct measurements.

An opportunity exists for EPA to clarify and supplement section 2 of the pneumatics request, focused on inventory counts, given the confusion that sometimes persists regarding pneumatic device classification. In particular, Subpart W reporting may reflect some inconsistencies with respect to how operators are classifying intermittent devices, and the ICR provides an opportunity to better characterize these sources by collecting information on pneumatic devices based on their functional characteristics rather than manufacturer bleed rates. A pneumatic device consists of two main components in a closed loop that are important from an emissions perspective: the controller and the actuator. The controller can be continuous-bleed or intermittent-bleed (using a three-way valve). The actuator can be on-off (snap-acting) or throttling (intermittent). We recommend that EPA seek counts based on these characteristics, which can help ensure these classifications are consistent and do not depend on operator judgment.[26]

We also recommend that EPA require additional direct measurement of emissions from pneumatic devices to help supplement information available from a number of recent measurement studies of pneumatic device emissions, including the University of Texas at Austin (UT) Phase I and II studies[27] and other recently completed work.[28] Additional measurement is valuable because the existing emission factors are based on older studies of small numbers of pneumatic controllers, relative to the recent studies, and they are likely underestimate emissions from malfunctioning pneumatic devices.[29] A discussion of the pneumatic device emissions factors currently used by EPA is provided in Appendix 2. Improving the accuracy of these emission factors is critical and can help ensure EPA's standards are effective and rigorous.

Where direct monitoring data is not available, some respondents should be required to measure the pneumatic device emissions rate, either by metering the supply line or using a measurement device such as a high-flow sampler or by bagging the controller. These methods can be used for both continuous-bleed and intermittent-bleed controllers.[30] Direct measurement is particularly important to help supplement data EPA has proposed to request on improperly operating devices, which recent studies suggest are an important emissions source.

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[26] EPA is not proposing to collect information on high and low bleed devices and a data request structured in this fashion could help collect information on these sources.

[27] *See* D.T. Allen et al, *Measurements of methane emissions at natural gas production sites in the United States*, 110 Proc. Natl. Acad. Sci. 17768 (2013), *available at* http://www.pnas.org/content/110/44/17768.full. *See also* D.T. Allen et al., *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Pneumatic Controllers*, 49 Envntl. Sci. & Tech. 633 (2015), *available at* http://pubs.acs.org/doi/abs/10.1021/es5040156 ("Allen (2015)").

[28] The Prasino Group, *Determining bleed rates for pneumatic devices in British Columbia; Final Report* at 19(Dec. 18,2013), *available at* http://www2.gov.bc.ca/assets/gov/environment/climate-change/stakeholdersupport/reporting-regulation/pneumatic-devices/prasino_pneumatic_ghg_ef_final_report.pdf.

[29] Emissions factors for pneumatic devices currently used by EPA are based on data from the 1990's. GRI/EPA, *Research and Development, Methane Emissions from the Natural Gas Industry* (1996). Further, recent studies indicate that those emissions factors do not adequately capture emissions from improperly functioning devices, *see* Allen(2015), *supra* n. 27.

[30] Allen et al. (2014)

Indeed, the California Air Resources Board just voted unanimously to move forward with a proposed regulation that requires operators of existing continuous-bleed pneumatic controllers to regularly measure actual emissions from those controllers.[31] The cost of such measurements is low: some leak-detection service providers measure emissions from leaks with high volume samplers as a routine part of their standard leak-detection service, indicating that the cost of these measurements is quite reasonable.[32]

Finally, three additional classes of pneumatic devices with no emissions should also be included in the data request: self-contained devices that discharge to a downstream gas line, pneumatic devices using instrument air, and electric controllers/ actuators. Additionally, emissions from pneumatic devices and pumps can be routed to a process or control. These and other technologies can, in many cases, function as zero-emitting alternatives to vented gas-driven units and additional data can help supplement recent studies documenting their widespread availability, technical feasibility and low cost.[33]

E. *Comments on Dehydrators Survey (2I)*

EPA proposes to collect information on both dehydrators generally and glycol dehydrators in particular, and to require that operators provide direct measurement information where available. We recommend several additional data requests for dehydrators, including the saturation level of the gas, to help better characterize the volume and composition of emissions from dehydrators. The saturation level influences the circulation rate of glycol, which is a primary driver of emissions from dehydrators. Similarly, the use of stripper gas can significantly add to the total emissions from dehydrators without controls and should be incorporated into the questionnaire.

Moreover, the use of a flash tank separator does not automatically indicate control on dehydrators. Therefore, we recommend adding data elements on specific flash tank characteristics, including whether control measures are in place. Finally, EPA should require specific information on the method of direct measurement, where such data is available, to assess the rigor and reliability of the reported data.

[31] CARB Resolution 16-9 (July 21, 2016) (directing the Executive Officer to move forward with the development of Proposed Regulation Order 17 C.C.R. § 95665 et seq.); *see also* Proposed Regulation Order 17 C.C.R. § 95668(f)(2)(A)(1),(3),(4) (requirements to directly measure emissions from continuous-bleed controllers on an annual basis).

[32] Carbon Limits, *Quantifying Cost-effectiveness of Systematic Leak Detection and Repair Programs Using Infrared Cameras*, CL-13-27 at 10(Mar. 2014), *available at* http://www.catf.us/resources/publications/files/Carbon_Limits_LDAR.pdf.

[33] Carbon Limits, Zero Emission Technologies for Pneumatic Controllers in the USA: Applicability and Cost Effectiveness (Aug. 1, 2016).

F. *Comments on Equipment Leaks Survey (2J)*

EPA is proposing to require reporting of facility information and equipment leak survey information, as well as other data. We recommend clarifying and consolidating the data request with respect to equipment leaks, focusing on the following key pieces of information:

- Type of component leaking;
- Association of leaking component with specific equipment;
- Count of components associated with specific equipment and components not associated with specific equipment;
- Percent methane and VOC in natural gas for various streams within a facility (this primarily applies to production, gathering and boosting, and processing plants); and
- Any historic data on leak surveys.

We encourage EPA to consider an approach along the lines reflected in our detailed suggestions in Appendix 1, which captures the individual data elements as well as the relationships between the pieces of data. While EPA's proposed method lists most of the required data elements, it does not address the relationships between those elements. For example, as currently written, the component counts and leaks request fields are not associated with any particular equipment. Including this information would provide important additional detail on the characteristics of leaks across facilities.

Apart from production facilities, gathering and boosting stations, and processing plants, facilities in other segments have pipeline quality gas throughout the facility with consistent gas composition. We propose that facilities identify the various streams with consistent gas composition as well as the components and equipment associated with these streams. This will allow EPA to estimate leak levels of methane, VOC, and HAPs individually. We also recommend that EPA require operators to report all streams with methane, VOC, and CO_2 collectively greater than five percent.

Finally, we propose that EPA collect information that can help better characterize "super-emitters," including information on components (total component count and leaking components) for individual units for each equipment type. For example, EPA could require operators to report component information for each compressor. We also recommend additional granularity on equipment and component types to further supplement EPA's understanding of the cost of leak repair.

G. *Comments on Compressor Survey (2K)*

EPA likewise proposes to collect general information on compressors, specific information on centrifugal and reciprocating compressors, and direct measurement data, where available.

Compressor emissions from wet seals occur primarily from two different locations: the seal oil separator and the seal oil tank. In addition, blowdown and isolation valves leak through the blowdown vent stack. In some cases there could be multiple vents associated with the separator or tank. We propose adding several data requests that will provide more detail on the location of compressor emissions. For example, EPA should collect direct emissions measurement data separately from blowdown stack and wet seals in the table in Section 3 of Attachment 2k.

We also propose adding several data requests in order to accurately link emissions with the specific characteristics of the seal oil system and associated controls. For example, data on seal oil pressure and circulation rate can help inform the viability of capture options. In its current form, EPA's ICR proposal does not address the fact that some wet seals include internal capture systems; we thus propose data requests regarding specific types and locations of wet seal control measures.

For reciprocating compressor rod packings, it is important to understand how operators are making decisions regarding replacements—namely, whether such replacements are based on a fixed run time or based on emissions thresholds. If the replacement scheme is based on an emissions threshold, then knowing the threshold is valuable. It is also important to know how many stages there are on a reciprocating compressor to understand how many seals contribute to the total emissions. We propose adding all these data components to the compressor section of the ICR. Finally, similar to centrifugal compressor reporting, operators should report reciprocating compressor direct measurements separately for blowdown vent stacks and seals.

H. *Comments on Blowdowns (2L)*

For blowdowns, it is valuable to know the operating pressure of the vessel that is being blown down, as this information helps determine whether the blowdown gas can be captured for beneficial use, such as use in a fuel gas system. We thus recommend that EPA request information on this parameter. In addition, we recommend that EPA request information on what control measures in the "other" category are being used by operators. This information could potentially identify effective control options available for broad deployment across the population of facilities.

I. *Comments on Control Devices (2M)*

Please see other sections of our comments regarding control devices, as well as the redline markup edits regarding control devices (Appendix 1).

IV. EPA SHOULD ENSURE COLLECTED DATA IS TRANSPARENT AND PUBLICLY AVAILABLE.

We strongly urge to EPA to make data collected through the ICR publicly available to the greatest extent feasible and required by law. Such transparency will serve not only robust rulemakings pursuant to sections 111 and 112 of the Act (among others) but will also serve a

range of other public purposes, such as citizen, state and federal enforcement, state regulatory efforts, scientific research, and decision-making by private investors. The Clean Air Act strongly favors disclosure of data collected pursuant to section 114: "[a]ny records, reports or information obtained" under that section "shall be available to the public." 42 U.S.C. § 7414(c). Information may be withheld only upon "a showing satisfactory to the Administrator" that a specific data element would "if made public ... divulge methods or processes entitled to protection as trade secrets." *Id*.

Moreover, section 114(c) of the Act precludes ''emission data'' from being considered confidential and requires that such data be available to the public. *See id*. This term is defined by regulation to include, "with reference to any source of emission of any substance into the air,"

> [i]nformation necessary to determine the identity, amount, frequency, concentration, or other characteristics (to the extent related to air quality) of any emissions which has been emitted by the source (or of any pollutant resulting from any emission by the source), or any combination of the foregoing

40 C.F.R. § 2.301(a)(2)(i)(A); *see also id*. § 2.301(a)(2)(i)(B) (including information needed to determine compliance with applicable standards and limitations); *id.* § 3.301(a)(2)(i)(C) (including descriptions of the location and nature of the source). Since 1991, EPA has provided a lengthy, non-exclusive list of specific data types that fall into this category. Under that guidance, emissions data includes information on the type and origin of emissions, emission rates, release frequency and duration, emission concentration and density, and emission estimation methods.

We encourage EPA to approach disclosure of ICR data as it did disclosure of information submitted pursuant to Subpart W. In that context, EPA made categorical determinations as to the emission data or confidential status of a particular information item, and broadly required disclosure. To the extent that EPA determines that the business confidentiality of non-emission data information submitted in response to the ICR has been demonstrated, we ask EPA to consider disclosure approaches such as aggregation, anonymization, averaging, and others that may enable provision of important information to the public while adequately protecting any legitimate business confidentiality concerns.

Conclusion

We appreciate EPA's commitment to move forward expeditiously with standards for existing sources and encourage the agency to immediately begin to put these measures in place. We respectfully urge EPA to ensure the ICR is designed in a way that best achieves this important outcome, including by leveraging existing data and focusing on additional pieces of information that will help ensure final standards for the oil and gas sector are rigorous, comprehensive, and protective of all communities across the country.

Respectfully submitted,

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