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The Honorable Gina McCarthy
Administrator, U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Attn: Docket ID No. EPA-HQ-OAR-2010-0505

Re: Supplemental Comments of Environmental Defense Fund on EPA's Proposed Rule, Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, 80 Fed. Reg. 56593 (Sept. 18, 2015)

We respectfully submit these supplemental comments, which respond to public comments submitted by the American Petroleum Institute (API) regarding the costs of performing leak detection and repair (LDAR) at well sites.¹ In particular, API claims that well-site costs are nearly three times higher than EPA estimated in its regulatory impact analysis due to certain costs that the comments claim EPA failed to consider.²

As we describe more fully below, API's LDAR cost analysis is fundamentally flawed. First, API improperly conflates its analysis of "in-house" LDAR costs—where a company chooses to purchase equipment, hire and train staff and develop its own compliance program—with EPA's analysis of third-party survey costs—where a company hires a contractor to perform these tasks. API's comparison suggests that all costs must necessarily be in-house, when, in fact, the costs API identifies do not apply to companies contracting with third-party providers. Second, API's analysis of in-house compliance costs dramatically overstates well-site costs by applying large, fixed capital and labor costs to just a small number of wells. In reality, operators choosing to develop in-house compliance programs would share these costs across a far larger number of facilities. These serious errors fail to recognize the availability of low-cost, third party

¹ API, Comments on EPA Proposed Rulemaking, Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, 80 FR 56593 (September 18, 2015), Docket ID No. EPA-HQ-OAR-2010-0505-6884 (December 4, 2015) at 117 - 125.

² *Id.* at 120.

contractors for small operators and assign inaccurately high costs for producers that comply with the rule by developing their own programs in-house.

Below, we describe these errors in more detail and identify additional information that suggests EPA's cost estimates are reasonable, and likely materially conservative in *over-estimating* costs.

I. API IMPROPERLY CONFLATES ITS ANALYSIS OF IN-HOUSE SURVEY COSTS WITH EPA'S ANALYSIS OF THIRD-PARTY LDAR SERVICE PROVIDERS

API claims that EPA failed to consider certain costs in its LDAR analysis, but the costs API cites are particular to companies choosing an in-house survey program, where the company purchases equipment and hires personnel to comply with LDAR requirements. These costs would not apply to companies hiring third-party contractors, which is the approach EPA analyzed in its proposal and technical support document. Indeed, EPA reasonably concluded third-party contractors are available to perform these surveys and information in state rulemakings and submitted by certain third-party providers suggests EPA's costs are reasonable, and likely substantially conservative in *over-estimating* costs.

API's analysis includes costs specific to in-house LDAR programs, which EPA reasonably excluded.

API's NSPS OOOOa comments present costs that would only apply if companies choose to comply with the NSPS OOOOa LDAR requirement through an in-house program. These encompass labor costs associated with hiring and training personnel to perform LDAR surveys, including API line items for "OGI certification training;" "Annual Training;" "Data Analyst;" along with large, fixed capital costs for equipment and technology like: "OGI Camera;" "OGI Data Management System;" and "OGI Device Calibration."³

EPA's LDAR cost analysis reasonably excludes these items because the agency analyzes the costs of hiring a third-party contractor to comply with LDAR requirements.⁴ When companies hire third-party contractors, the price those providers charge incorporate capital and labor costs associated with performing inspections, including costs for things like equipment, personnel,

³ *Id.* at 119-120.

⁴ *See* 80 Fed. Reg. at 56,641 ("Further practical aspects we considered for the methodology of each monitoring survey include the likeliness that many owners and operators will hire a contractor to conduct the monitoring survey due to the cost of the specialized equipment needed to perform the monitoring survey and the training necessary to properly operate the OGI equipment."); *see also* TSD at 72 ("The cost for OGI monitoring using an outside contractor was assumed to be \$600 for a well production site and \$2,300 for a gathering and boosting station, a transmission station and a storage facility.") (citing Carbon Limits Report); *see also* EPA, Regulatory Impact Analysis of the Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector at 7-41, *available at* https://www3.epa.gov/airquality/oilandgas/pdfs/og_prop_ria_081815.pdf. (noting some uncertainty about the relative contribution of labor and rental rates to total costs).

training, and travel. EPA reasonably noted that many operators, including smaller operators, would chose third party providers for this very reason—to avoid “the cost of the specialized equipment needed to perform the monitoring survey and the training necessary to properly operate the OGI equipment.”⁵ Indeed, Rebellion Photonics—a technology and third party contractor—described the scope of its services in its Dallas public hearing testimony on EPA’s proposed OOOOa, noting that, in addition to performing surveys “Rebellion creates a turnkey approach to [LDAR] for our customers by providing a web portal included in our \$250 per site that can store well site inspection videos, both of leaks and then post leak repair, and the required maintenance logs.”⁶

API, therefore, seriously errs in suggesting that EPA failed to consider various LDAR costs. In fact, those costs are incorporated in the fees charged by third-party contractors and are expressly and rigorously incorporated into EPA’s cost analyses. Appendix 1 includes more detailed information on the costs API presents that are specific to in-house programs, and therefore reasonably excluded from EPA’s analysis of costs associated with third-party contractors.

EPA reasonably concluded that third-party contractors are an available, low-cost approach to LDAR compliance.

EPA’s analysis reasonably relied on the availability of third-party contractors to perform required surveys and on the estimated cost of those surveys. In its statement of basis and purpose, the state of Colorado noted that “[o]wners and operators have flexibility in how to meet the leak detection and repair requirements, including utilizing their own equipment and personnel or hiring a third party contractor.”⁷ Moreover, the state assumed that all compressor surveys would be performed by third-party contractors, and, for well production facilities, companies with fewer than 500 inspections per year would hire contractors—amounting to 3,545 contractor inspections conducted annually.⁸

Moreover, several third-party contractors commented or submitted public hearing testimony on EPA’s proposal. For example, Heath Consultants Incorporated, a technology manufacturer and leak service provider, submitted comments noting “Heath has inspected millions of miles of natural gas piping, components, connections and fittings throughout the United States and World.”⁹ Rebellion likewise described its experience in providing LDAR services to assist

⁵ *Id.*

⁶ Rebellion Photonics comments at the EPA hearing in Dallas, TX on September 23, 2015 (Attachment 1).

⁷ CDPHE, Regulation 7 Statement of Basis Page 7, *available at* https://www.colorado.gov/pacific/sites/default/files/064_R7-SBAP-request-11-21-13-1-11-pgs-064_1.pdf.

⁸ Colorado Air Pollution Control Division, Final Economic Impact Analysis for Regulation Number 7, at 18.

companies in complying with Colorado regulations.¹⁰ While noting that most API members *voluntarily* implementing LDAR programs have done so using in-house personnel, API's comments themselves recognize the availability of third-party contractors.¹¹ Appendix 2 sets forth an illustrative list of additional LDAR service providers.

In addition, the costs EPA projects for these third-party surveys are reasonable, if not materially conservative. The agency based its estimate on a report by Carbon Limits that concluded that third-party contractors' average fee to inspect a well site was \$600.¹² Additional information supports this conclusion and, indeed, suggests that EPA has over-estimated costs:

- Rebellion. In its comments at the EPA public hearing on the proposed NSPS OOOOa rule in Dallas, TX, Rebellion Photonics noted that its services are available for \$250 per site.¹³ Rebellion noted that this cost is “turn-key,” including data management services, which were the source of substantial additional costs in the API assessment.
- Colorado. Colorado likewise assumed an hourly contractor rate of \$134 (reflecting a 30% premium),¹⁴ which at API's assumed 4 hour survey, yields a survey cost of \$536.¹⁵
- ICF. ICF developed a complex model to investigate the distribution of LDAR cost profiles at well sites. The results of the model indicate that the cost for LDAR using third-party contractors ranges between \$491–793 per facility, depending on facility size.¹⁶
- EDF also contacted a number of third-party service providers and equipment rental firms, which provided costs that support the reasonableness of EPA's determination. In

⁹ Heath Consultants, Inc., comments on EPA Proposed Rulemaking, Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, 80 FR 56593 (September 18, 2015), Docket ID No. EPA-HQ-OAR-2010-0505-6868 (December 4, 2015).

¹⁰ Rebellion Photonics comments at the EPA hearing in Dallas, TX on September 23, 2015 (Attachment 1).

¹¹ API Comments at 123 (“In some locations a company may choose to use contract services and other areas the same company may choose to conduct the surveys with internal staff.”).

¹² Background Technical Support Document, Proposed 40 CFR Part 60 subpart OOOOa, August 2015, page 72, available at <https://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2010-0505-5021>.

¹³ Rebellion Photonics comments at the EPA hearing in Dallas, TX on September 23, 2015.

¹⁴ Colorado Air Pollution Control Division, Final Economic Impact Analysis for Regulation Number 7, at 18. Colorado assumed slight longer surveys, approximately 6.1 hours, yielding third party survey costs of approximately \$817.

¹⁵ CDPHE Cost Benefit Analysis for Proposed Revisions to AQCC Regulations No. 3 and 7. Table 14: Instrument Based Tank Inspections Based on Proposed Tiering.

¹⁶ ICF Leak Detection and Repair Cost-Effectiveness Analysis, December 4, 2015. Figures reflect survey and equipment costs per facility.

particular, a FLIR presentation includes information from survey providers suggesting well-pad rates ranging from \$300-\$800.¹⁷

While there are other costs associated with a third-party survey approach, as reflected in Appendix 1, the agency reasonably considered those costs and properly excluded the additional costs identified by API.

II. API OVERSTATES IN-HOUSE COSTS BY IMPROPERLY APPLYING CERTAIN FIXED / OPERATING COSTS TO A SMALL NUMBER OF WELLS WHEN THESE COSTS SHOULD BE SPREAD OVER A FAR LARGER NUMBER OF SOURCES

In addition to improperly attributing the costs of in-house surveys to third-party contractors, API overstates the costs of an in-house program by applying large, fixed capital and labor costs to a very small number of wells.

EPA's LDAR cost analysis assumes an operator owns 22 well sites and hires a third-party service provider to perform required surveys. API's analysis likewise assumes an operator owns 22 well sites, but instead suggests the operator will perform LDAR surveys in-house. This assumption inflates the cost per site because the total cost of an in-house program—which includes the capital cost for an OGI camera and associated training and calibration—is only divided among a small number of well sites. API's assumption that such small companies would nonetheless purchase equipment and train in-house personnel is unreasonable and inconsistent with available evidence:

- Colorado assumes that only well sites that are required to undertake 500 or more inspections annually will purchase equipment and hire personnel to perform these inspections in-house.¹⁸ Colorado assumes no compressor stations will comply using in-house surveys.
- As part of the 2015 Colorado rulemaking, Encana notes that in Wyoming alone, its in-house program services 170 sites.¹⁹
- API's analysis, to the contrary, assumes a company required to perform only 44 inspections annually would do so by purchasing its own equipment and training and hiring personnel. Using API's own assumptions, API's analysis suggests that a camera

¹⁷ FLIR, OGI Service Provider Survey, March 2016, at 2-3 (Attachment 2). The presentation notes additional charges for travel but also notes potential discounts for multiple well surveys.

¹⁸ Colorado Air Pollution Control Division, Final Economic Impact Analysis for Regulation Number 7, at 18.

¹⁹ CDPHE 2014 Rulemaking. Encana Rebuttal presentation. February 2014, *available at* [ftp://ft.dphe.state.co.us/apc/aqcc/Oil%20&%20Gas%20021914-022314/PRESENTATIONS/Encana%20Oil%20&%20Gas%20USA%20\(Encana\)/Encana%20REB%20Presentation.pdf](ftp://ft.dphe.state.co.us/apc/aqcc/Oil%20&%20Gas%20021914-022314/PRESENTATIONS/Encana%20Oil%20&%20Gas%20USA%20(Encana)/Encana%20REB%20Presentation.pdf).

would be deployed less than 10 percent of the available time each year, otherwise remaining idle.²⁰

Beyond these equipment costs, API's analysis overstates in-house costs by translating average basin-level costs to comply with Colorado's Regulation 7 and applying those costs to 22 wells. In particular, API assumes costs associated with 15,000 miles of travel per basin, based on company experiences with Colorado Regulation 7. Regulation 7 applies to new and existing wells and requires tiered inspections with survey frequencies as great as monthly.²¹ Though API does not derive average well-site travel times from these numbers, these features suggest that the assumption of 15,000 miles greatly overstates travel required to comply with semi-annual monitoring at 22 wells. Indeed, that assumption would mean that, for each survey, an operator would travel approximately 340 miles roundtrip.²² In addition, API sets forth basin-level recordkeeping costs that, although unclear how they factor into its analysis, are likely similarly overstated.²³

As Colorado's requirements and EPA's proposal suggest, larger companies may choose to perform in-house surveys if they own a sufficient number of wells to take advantage of economies of scale associated with purchasing equipment and training personnel. Data submitted in both Colorado and Wyoming underscore that in-house compliance with LDAR requirements can be associated with very low costs:

- Noble and Anadarko submitted comments in response to the Colorado LDAR rule, stating that "the leak detection and repair requirements using instrument-based monitoring is a reasonable and cost effective way to reduce fugitive emissions at well production sites."²⁴ Additionally, the companies compiled a cost analysis for LDAR under the Colorado rule and found that, "Based on company-specific historic data and

²⁰ 22 sites x 4 hrs/site x 2 inspections/year = 176 hours/year.

²¹ CDPHE Regulation Number 7, Control of Ozone via Ozone Precursors and Control of Hydrocarbons via Oil and Gas Emissions, Table 1, available at https://www.colorado.gov/pacific/sites/default/files/5-CCR-1001-9_0.pdf.

²² 15,000 miles/22 sites/2 inspections per year = 340.9 miles per inspection.

²³ API, Comments on EPA Proposed Rulemaking, Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, 80 FR 56593 (September 18, 2015), Docket ID No. EPA-HQ-OAR-2010-0505-6884 (December 4, 2015), Table 27-6, at 120.

²⁴ Prehearing statement of Noble Energy, Inc. and Anadarko Petroleum Corporation in the matter of proposed revisions to Regulation Number 3, 6, and 7, available at [ftp://ft.dphe.state.co.us/apc/aqcc/Oil%20&%20Gas%2020021914-022314/PREHEARING%20STATEMENTS,%20EXHIBITS%20&%20ALTERNATIVE%20PROPOSALS/Noble%20Energy%20Inc%20&%20Anadarko%20Petroleum%20Corporation%20\(Noble%20&%20Anadarko\)/Noble%20and%20Anadarko%20OPHS.pdf](ftp://ft.dphe.state.co.us/apc/aqcc/Oil%20&%20Gas%2020021914-022314/PREHEARING%20STATEMENTS,%20EXHIBITS%20&%20ALTERNATIVE%20PROPOSALS/Noble%20Energy%20Inc%20&%20Anadarko%20Petroleum%20Corporation%20(Noble%20&%20Anadarko)/Noble%20and%20Anadarko%20OPHS.pdf).

certain estimated values, Noble anticipates that LDAR monitoring at well production facilities would cost between approximately \$260 and \$430 per inspection...²⁵

- According to a presentation delivered by Jonah Energy at the WCCA 2015 Spring Meeting, total LDAR program costs were about \$99 per inspection in the first year, decreasing to about \$29 per inspection in the 5th year.²⁶

Taken together, these analyses confirm that costs associated with both third-party contractors and in-house LDAR requirements are reasonable, and indeed often lower than costs EPA projected. Accordingly, we urge the agency to reject API's seriously flawed analysis, which conflates these two different compliance pathways and is based on otherwise unreasonable assumptions.

Respectfully submitted,

Peter Zalzal
Alice Henderson
Hillary Hull
Environmental Defense Fund
pzalzal@edf.org
303-447-7214

²⁵ Rebuttal Statement of Noble Energy, Inc. and Anadarko Petroleum Corporation in the matter of proposed revisions to Regulation Number 3, 6 and 7; Page 7, *available at* ftp://ft.dphe.state.co.us/apc/aqcc/Oil%20&%20Gas%20021914-022314/REBUTTAL%20STATEMENTS,%20EXHIBITS%20&%20ALT%20PROPOSAL%20REVISIONS/Noble%20Energy%20Inc%20&%20Anadarko%20Petroleum%20Corporation/NOBLE_APC%20-%20REB.pdf

²⁶ WCCA Spring Meeting, Jonah Energy Presentation, May 8, 2015 delivered by Paul Ulrich.

Appendix 1: Detailed Critique of API Cost Estimates

One-time Costs per Company		EPA	API	Comments
LABOR	Read Rules	\$231	\$231	
	Develop Corporate Monitoring Plan	\$3,468	\$7,200	
	Activities Planning	\$1,850	\$1,850	
	Notify of Initial Compliance Status	\$1,272	\$1,272	
	OGI certification training	\$0	\$2,000	EPA implicitly includes in third party contractor cost for OGI surveys.
CAPITAL PURCHASE	OGI Camera		\$95,000	EPA implicitly includes camera cost in "OGI Survey Cost" per site (third party contractor). API assumes 176 hours per year per company for OGI surveys (22 sites x 4 hr/site x 2)- this is less than 10% utilization of a camera if every company buys their own.
	OGI data Mangement System		\$225,000	EPA implicitly includes this cost in third party contractor costs for OGI surveys. Rebellion confirms its site-level inspection fee includes data management services. ^[1]
	M21 Data Collection System	\$10,800	\$10,800	
TOTAL		\$17,620	\$343,352	

Annual Recurring Costs per Company		EPA	API	Comments
LABOR	Annual Training		\$2,000	Implicitly included by EPA in third party contractor costs.
	Data Analyst		\$24,000	API seems to assume ~\$60/hr for administrative tasks. At this labor rate this implies 18 hr/site/year for data analysis. The Rebellion \$250 cost per site includes maintenance logs and filing paperwork with the regulating agency. ^[2]
PURCHASE	OGI device calibration		\$4,000	Implicitly included by EPA in third party contractor costs.
	Transportation Costs		\$20,000	EPA implicitly includes in third party survey costs. API says that this is based on 15,000 mi/yr, which is 681 mi/site/yr, or 170 mi/one-way trip. It is not clear what exactly this represents; API indicates that their separate line items for "FLIR Survey" and "M21 Resurvey" include travel time labor costs. If this is only vehicle costs it implies \$1.33/mi. By comparison IRS is willing to reimburse \$0.575/mi for company use of a personal car. ^[3]
TOTAL		\$0	\$50,000	

Annual Recurring Costs per Site		EPA	API	Comments
LABOR	Annual activities planning	\$63	\$63	
	Site-specific monitoring plan		\$120	
	OGI survey cost	\$1,200	\$462	EPA cost is higher because it includes third party costs for camera and data collection system. Using API costs for OGI camera and data collection system (amortized over 5 years) a third party contractor would need to charge ~\$50/hr to account for capital equipment costs (this assumes one camera would be used for 1,500 chargeable hours/yr - 250 day x 6 hr/day). API assumes 4 hr/site to survey, including travel time, so this implies that equipment costs would be \$200/survey if the equipment has reasonable utilization. ^[4]
	Repair cost	\$597	\$597	
	M21 resurvey costs	\$4	\$116	
	Annual Report	\$231	\$231	
TOTAL		\$2,096	\$1,590	

Sites and Amortization		EPA	API	Comments
Number of Sites per Company		22	22	
One-time Cost Amortization Factor		0.244	0.167	EPA amortization assumes 5 years at 7%; API assumes 8 years at 7%

AMORTIZED ANNUAL COST PER SITE	EPA	API	Comments
One-time Company Labor	\$76	\$95	API includes OGI certification training cost implicitly included in EPA contractor survey cost.
One-time Company Capital Purchase	\$120	\$2,511	API includes OGI camera and management system cost implicitly included in EPA contractor survey cost.
Annual Company Labor	\$0	\$1,182	API includes annual OGI training cost implicitly included in EPA contractor survey cost.
Annual Company Purchase	\$0	\$1,091	API includes annual OGI calibration and survey transportation cost implicitly included in EPA contractor survey cost.
Annual Site Costs	\$2,096	\$1,590	EPA costs implicitly include third party contractor capital equipment purchase, annual training, annual certification, and travel expenses included by API in above line items
TOTAL	\$2,291	\$6,469	

Notes:

[1] Rebellion cost quote is \$250/site, including filing necessary paperwork with regulating agencies. In its comments at the EPA hearing in Dallas, TX on September 23, 2015, Rebellion noted that it "creates a turnkey approach to this for our customers by providing a web portal included in our \$250 per site that can store well site inspection videos, both of leaks and then post leak repair, and the required maintenance logs."

[2] See note [1], above.

[3] IRS Standard Mileage Rate for 2015, https://www.irs.gov/publications/p463/ch04.html#en_US_2015_publink100033935

[4] Note the Rebellion cost of \$250 per contractor survey and the Noble/Anadarko estimate of \$260-430 per in-house inspection (from the Noble/Anadarko Rebuttal for the Colorado rule).

Appendix 2: LDAR Service Providers

There are currently a significant number of available LDAR service providers and equipment rental services available to operators. Examples of IR camera LDAR survey and equipment providers include, but are not limited to, the following:

EcoTest Energy Services, LLC - www.ecotest.us/ldar-testing

FLIR - <http://www.flir.com/ogi/content/?id=66693>

Heath Consultants Incorporated - <http://heathus.com/services/leak-detection/>

Hy-Bon/EDI - www.hy-bon.com/services/iqr-survey

Infrared Services & Thermal Imaging of North Texas, LLC - www.infraredtex.com

Leak Finder, Inc. - <http://www.leakfinderinc.com/greenhouse-gas-services/>

Leak Imaging, LLC - www.leakimaging.com

Leak Surveys, Inc. - <http://www.leaksurveysinc.com/>

LeSair Environmental - <http://lesair.com/services/>

LT Environmental, Inc. - <http://www.ltenv.com/lte-expertise/methane-assessment-and-mitigation>

Olsson Associates - <http://www.olssonassociates.com/our-services/oil-and-gas/>

Rebellion Photonics - <http://rebellionphotonics.com/ldar-and-maintenance/>

Sage Environmental - http://www.sageenvironmental.com/air_quality/ldar

SCS Engineers - <http://www.scsengineers.com/services/oil-and-gas-exploration-and-production/leak-detection-and-repair-ldar>

Trinity Consultants -

<http://www.trinityconsultants.com/Templates/TrinityConsultants/News/Article.aspx?id=5650>