



February 21, 2017

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California Air Resources Board
1001 "I" St. Sacramento, CA, 95814

Joseph Fischer
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California Air Resources Board
1001 "I" St. Sacramento, CA, 95814

VIA Electronic Mail

Re: Proposed Regulation for Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities Modified Text and Availability of Additional Documents and/or Information

Dear Ms. Scheehle and Mr. Fischer:

Thank you for accepting these comments submitted by Environmental Defense Fund ("EDF") on the February 3, 2017 proposal to regulate greenhouse gas emissions from oil and gas facilities. This proposal responds to the Air Resources Board ("ARB") direction to the Executive Officer to consider whether any additional conforming modifications were necessary to the June 1, 2016 proposal. EDF is a national membership organization with over two million members residing throughout the United States, nearly 70,000 of which live and work in California and who are deeply concerned about the pollution emitted from oil and natural gas sources.

EDF supports the modifications to the June 1, 2016 proposal reflected in the current version of the proposed rule.¹ In particular, we strongly support the quarterly inspection requirement in Section 95669(g). As our prior comments demonstrated, frequent, if not continuous, inspections of oil and gas facilities for leaks is essential to ensuring maximum reductions of harmful natural gas emissions.²

I. Quarterly Inspections Are Highly Cost Effective, As a Recent ICF Analysis Demonstrates

¹ Attachment 1: Proposed 15-Day Modifications, available at <https://www.arb.ca.gov/regact/2016/oilandgas2016/oilgasatt1.pdf>.

² See Feb. 19, 2016 group comments submitted by CATF and May 15, 2015 EDF comments.

CARB's revised cost estimates demonstrate that quarterly Method 21 inspections are highly cost effective. CARB estimates the cost of its proposal to be \$23 per Metric Ton of Carbon Dioxide Equivalent reduced (assuming a 20 year global warming potential and savings from recovered gas).³ CARB's analysis includes costs associated with inspecting idle wells, well casing vents, and compressors as well as traditional "components" such as valves and flanges, per the scope of the proposed requirement.

EDF commissioned ICF International to conduct an analysis of the cost effectiveness of conducting leak surveys. Appendix 1 contains a detailed description of the model methodology, inputs, and results. This analysis supports the proposed requirement in Section 95669. The ICF analysis evaluates the costs and benefits of leak surveys at various frequencies and multiple types of facilities, specifically onshore production, gathering and boosting stations, gas processing plants, gas transmission compressor stations, and gas storage facilities. ICF developed a Monte Carlo-based simulation model to analyze the dynamics of various leak survey programs and evaluate the effectiveness of such programs using multiple variables including the frequency of surveys, the value of recovered gas, and the number of third-party contractors conducting the surveys. The ICF analysis did not include costs associated with inspecting components at idle wells or well casing vents. However, like the CARB analysis, ICF also included information on stochastic leaks (or "super-emitters" in its model).

Per the ICF model the average cost effectiveness of conducting quarterly inspections is:

- Production facilities: \$8.58 MT CO₂e avoided
- Processing facilities: \$11.13 MT CO₂e avoided
- Gathering and Boosting facilities: \$4.51 MT CO₂e avoided
- Transmission: \$3.59 MT CO₂e avoided.

These numbers reflect the use of two third-party contractors, assume a price of \$3 for natural gas, and a global warming potential of 72 over a 20-year time-frame. ICF calculated emissions avoided as the difference between the emissions at the beginning of the first survey and the emissions at the end of each subsequent survey over a three-year period. ICF's analysis demonstrates the reasonableness of ARB's cost effectiveness determination for the LDAR provision.

II. Quarterly Inspections Are Necessary to Reduce Methane and Air Toxics, as Demonstrated by Recent Field Studies

Frequent inspections of oil and gas facilities have important benefits: (1) they reduce the waste of a valuable product; (2) enhance safety; (3) protect the climate from potent greenhouse gas emissions; and (4) protect human health from harmful air toxics and smog-altering pollution.

A recent field study conducted by Sage Consulting LP (Sage) demonstrate that in addition

³ Attachment 2, Revised Cost Estimates for the <https://www.arb.ca.gov/regact/2016/oilandgas2016/oilgasatt2.pdf>

to being significant sources of methane, oil and gas facilities release harmful air toxics such as benzene and toluene.⁴ Sage collected data from 160 components at 39 natural gas production sites between January 20 and August 14, 2015.⁵ In addition to methane, benzene, toluene, xylenes and ethylbenzene (BTEX) repeatedly were detected in at least 10% of the samples.⁶ Indeed, benzene was detected in 46% of the samples and toluene in 63% of the samples.⁷ This data further underscores the importance of frequent leak inspections coupled with expeditious repairs.

III. Recent Data Supports the Declining Leak Thresholds in Section 95669

Data collected during the Sage field study and prior experience across California's Air Pollution Control Districts supports the declining leak thresholds contained in Section 95669(i). The proposed rule requires operators repair leaks of 10,000 ppmv in the first year of rule implementation (2018). This minimum leak threshold declines to 1,000 ppmv as of January 1, 2020. As documented in the Sage field study- there are ample leaks throughout the system above 1,000 ppmv and below 10,000 ppmv. In the study, leaks were found across the system - and the sampling report documents that many more were found which were not recorded in the results. Furthermore, some Air Districts have already been incorporating leak thresholds of 1,000 ppm and below at oil and gas facilities, and Method 21 equipment sensitivity yields highly accurate results below 1,000 ppmv.

We commend CARB on a well-supported proposal to reduce methane, volatile organic compounds and air toxics from onshore and offshore oil and gas facilities.

Thank you for your consideration of these comments.

Sincerely,

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⁴ Sage ATC Consulting LLC, Air Resources Board RFP No. 13-414: Enhanced Inspection & Maintenance for GHG & VOCs at Upstream Facilities – Final (Revised).

⁵ Sage ATC Consulting LLC, Air Resources Board RFP No. 13-414: Enhanced Inspection & Maintenance for GHG & VOCs at Upstream Facilities – Final (Revised), at 1-2.

⁶ *Id.* at 2-9

⁷ *Id.* at Section 2 Appendix D: Descriptive Statistics for Measured Concentrations and Calculated Emissions Rates for Components in Gas Service.

