



Memorandum Regarding Cost Effectiveness of Conducting Quarterly LDAR

To: Steve Dietrich; Wyoming Air Division
From: Environmental Defense Fund and Wyoming Outdoor Council
Date: August 24, 2015
Re: Cost effectiveness of performing quarterly inspections and repairs at well sites.

The following memorandum provides an additional analysis of the cost effectiveness of conducting quarterly versus semi-annual and annual instrument-based inspections at well sites. As illustrated by the attached analysis, performing quarterly *instrument-based* inspections, whether done in-house or through a third-party contractor, is highly cost effective. Indeed, under either scenario the gas savings exceed the cost of the entire program. Even if gas savings are not monetized, quarterly leak detection and repair (LDAR) programs are among the most cost effective clean air measures available to dramatically reduce pollution from oil and gas facilities.

Accordingly, we urge DEQ in your upcoming permit guidance update for the statewide area to:

1. Require all LDAR inspections to be instrument based.
2. Require these instrument-based inspections on a quarterly basis at oil and gas facilities with the potential to emit at least two (2) tons of volatile organic compounds (VOCs) per year.¹

The attached spreadsheet is based on cost and emissions information in the ICF International report and an updated LDAR memorandum,² and on the final cost benefit analysis prepared by the Colorado Air Pollution Control Division (APCD) in support of the APCD's LDAR program

¹ We use 2 tons as the threshold for quarterly inspections because this is the lowest emissions potential that we understand the Air Division is considering for application of LDAR. We do not, however, believe it represents the lowest emission threshold at which quarterly inspections can be cost effectively required.

² ICF International, "Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries," March 2014. LDAR analysis updated in May 29, 2015. Memorandum from Joel Bluestein to Peter Zalzal.

in 2014.³ Specifically, our analysis utilizes ICF's estimate of the costs to conduct quarterly LDAR in-house for a model 5-well site as the starting point. We increased the inspection time assumed by ICF by three hours per inspection to conservatively account for additional travel time that may be needed to travel to rural wells in Wyoming. This is based on Colorado's estimate that it would take operators an additional three hours to travel to wells outside of its Denver Metropolitan ozone nonattainment area.⁴

We also estimated the costs of conducting inspections using a third-party contractor. Colorado assumed a 30% profit margin for contractors which they added to the hourly rate for in-house inspectors.⁵ We used this assumption in the attached analysis and increased the hourly in-house inspection rate by 30% to portray the costs of hiring a contractor to perform LDAR inspections.

Per the attached spreadsheet, quarterly *instrument-based* inspections are highly cost effective if operators perform them in-house or hire third-party contractors. Specifically, such inspections result in the following costs and benefits:

- \$4,265 per year (in-house), resulting in 10 tons of VOCs and 35 tons of CH₄ reduced. Overall cost effectiveness is \$440 per ton of VOC reduced (not accounting for gas savings) and **negative** \$281 per ton of VOC reduced (accounting for gas savings).
- \$5,544 per year (contractors) with an overall cost effectiveness of \$395 per ton of VOC reduced (not accounting for gas savings) and **negative** \$327 per ton of VOC reduced (accounting for gas savings).

Many operators can monetize the savings resulting from fixing leaks. In those cases where gas pipelines are available, operators can route the avoided gas losses to sales. In those instances where pipelines are not available currently, operators can often utilize the gas for onsite fuel. And, in many instances, gas infrastructure is in the process of being built and therefore, even if operators cannot route the saved product to sales today, they will be able to do so in the near future.

ICF and Colorado estimate that quarterly instrument-based inspections can achieve a 60% reduction in leaks.⁶ Notably, this estimate is based on the assumption that IR cameras and other modern leak detection equipment can effectively detect leaks. It is not based on an estimate of the effectiveness of sensory-based inspection methods such as audio, visual, olfactory.

³ Colorado Air Pollution Control Division, Cost-Benefit Analysis for Proposed Revisions to AQCC Regulations No. 3 and 7 (February 7, 2014).

⁴ *Id.*, at p.20-21

⁵ See *Colorado Cost Benefit*, p. 20.

⁶ *Id.* at 27 (citing EPA reported data); ICF March 2014 report at 3-10.

We urge the Air Division to require all inspections be performed with modern leak detection instruments consistent with the current requirements in the UGRB, and in other jurisdictions. Other leading states such as Colorado, Pennsylvania, and California, require operators use leak detection instruments when performing inspections. EPA also recently proposed an LDAR requirement for well sites nationwide which will require the use of optical gas imaging.⁷

Respectfully submitted,

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And on behalf of:

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⁷ EPA Notice, Oil and Gas Sector New Source Performance Standards, August 18, 2015. Available at: http://www.epa.gov/airquality/oilandgas/pdfs/og_nsps_pr_081815.pdf.