

TESTIMONY TO THE TEXAS RAILROAD COMMISSION SUNSET COMMITTEE

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Good afternoon,

I am the Director of Air Quality Science at the Houston Advanced Research Center, a nonprofit organization located in The Woodlands, Texas that provides unbiased and independent scientific analysis on air, energy, and water issues. HARC was founded in 1982 by George P. Mitchell, the visionary Houston oilman who pioneered horizontal drilling and hydraulic fracturing in the Barnett Shale, but was also an ardent sustainability advocate and philanthropist. HARC, in partnership with other institutions, has developed and tested the technology to monitor, detect, and measure pipeline leaks, flare emissions, and other large releases from the oil and gas industry, all in real time. This technology decreases the dependence on highly uncertain and often heuristic emission factors commonly used to construct emission inventories. I urge members of this committee to consider empowering the Railroad Commission to make use of new monitoring technology to inform policy decisions related to air emissions from the oil and gas industry in Texas, with the goal of protecting the environment and human health.

I will give two examples of applications of the new technology in recent field studies related to oil and gas industry impacts. In 2014, HARC operated a mobile laboratory in the Eagle Ford Shale to monitor a large flare at a natural gas production facility. The lab deployed a very fast chemical ionization technique to measure toxic air pollutants such as benzene about every second. Every six seconds, the measurements were broadcast over the Internet, so that project personnel other than the mobile lab operators could see what was being measured at any point on the mobile lab trajectory. This enabled the mobile lab to be directed in real time and to efficiently detect and measure large emission events. The figure I am showing depicts the mobile lab trajectory and corresponding benzene measurements on the day a major flare was observed to be in operation at the facility for a few hours. You can see that the mobile lab was measuring well over 200 ppb of benzene about 330 feet from the flare stack. This is a very dangerous amount of benzene for workers to be breathing. Acute exposure to benzene can cause drowsiness, headaches, and eye, skin and respiratory tract infections, while chronic exposure to even a few ppb of benzene can cause reproductive effects and blood disorders, including anemia and leukemia. For comparison, the TCEQ's short-term Effects Screening Level for benzene is only 54 ppb. HARC used a sophisticated micro-scale air quality model to deduce that the flare was emitting benzene at a rate of 28 kg in just a single hour, roughly a third of the total amount that the flare was permitted to emit in an entire year.

The second example is from the BEE-TEX field study HARC conducted in 2015 in the Houston Ship Channel. In this study, the same mobile laboratory detected unsuspected leaks of benzene from underground pipelines in the residential neighborhood of Galena Park. The area had been placed by the TCEQ on a watch list for benzene, which sparked vigorous efforts by industry to detect fugitive leaks and reduce benzene emissions, including the use of helicopter-mounted infrared cameras to detect pollution plumes. Nevertheless, mobile measurements during BEE-TEX revealed short-term spikes in ambient benzene up to about 40 ppb. The pipeline emissions

deduced from these measurements were estimated to be about twice the amount of benzene from industrial point sources within the same area, despite being below the detection limit of infrared cameras. These results were so alarming that the Houston Chronicle did an op-ed about the problem, after initial attention in other local media outlets.

Other technology tested by HARC and various partners includes CAT scans to monitor entire neighborhoods "24-7" near industrial facilities based on ultraviolet remote sensing with Light Emitting Diodes. This technology is developed, ready to deploy in Texas, and can be applied to air emissions generated by the oil and gas industry. The Railroad Commission and other stakeholders can make use of the data and information that the technology provides to inform policy decisions that protect human health and the environment in Texas. Thank you.

