Southern California Gas Company

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Elizabeth Scheehle
Chief, Oil and Gas Mitigation Branch
California Air Resources Board
Submitted electronically to:
http.//www.arb ca gov/msprog/tech/comments.htm

Subject: Southern California Gas Company Comments on California Air Resources Board's (CARB) Sustainable Freight Strategy Technology Assessment — Methane Leakage Assessment as presented at the September 3, 2014 workshop

Dear Ms. Scheehle,

The Southern California Gas Company (SoCalGas) appreciates the opportunity to comment on the Methane Leakage Assessment as presented at the September 3rd workshop. While we understand that there are many questions outstanding regarding methane leakage in general and the information presented in the workshop, we are very concerned regarding many of the apparent avenues that CARB appears to be taking without having done a complete data analysis and without giving industry time to present and discuss upcoming research results regarding methane leakage. Many methane leakage studies are currently underway, and these studies are likely to provide significant new information in the next year that must be considered as part of use of methane leakage rates in both policy and potential regulatory decision making.

Methane Leakage from Natural Gas Systems

In the U.S. Emissions section of staff's Transportation Fuels presentation (slide 49), the United States Environmental Protection Agency (EPA) greenhouse gas (GHG) emission inventory levels for methane are presented as declining each year due to improvements in methodology and assumptions. Furthermore, methane emissions from natural gas systems have also declined due to advancements in natural gas sector technologies and best practices. Consequently, EPA found overall emissions from all natural gas sectors declined 17% from 1990 levels and 15% below 2005. (http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html)

What is different now compared to 20 years ago when EPA conducted its first set of measurements is that technology is much better at detecting methane. And that means that gas companies are doing a much better job of detecting leakage and remediating it. For instance, SoCalGas continues to have a robust research, development and demonstration program leading the industry in implementing detection technologies starting with early adoption of optical methane detectors over a decade ago and now employing new highly sensitive mobile mapping tools. With the numerous new data points collected in recent studies, the uncertainty in the emission factors has been greatly reduced.

Beyond earlier detection of leaks, declining methane emissions will continue to occur as a result of local distribution companies (LDCs) modernizing their infrastructure. For example, SoCalGas eliminated cast iron pipe over two decades ago and replaced much of its pre-World War II pipe with plastic pipelines that have lower associated leak rates. Most LDCs have upgraded their meter and regulator stations from high to low or no bleed pneumatics, thus reducing total methane leakage.

These improvements in addressing leaks will be reflected in updated data from new study results, further described in the next section. We also provide details on factors that can affect leakage rate calculations in the Appendix.

Methane Emissions Studies

On slide 57 of the Transportation Fuels presentation, CARB staff highlights the limitations in the Brandt study. This study reports that excess leakage above EPA GHG levels are not entirely attributed to natural gas sources and infrastructure, and could be from landfills, seepage, abandoned wells, etc. Therefore, high leakage rates in recent studies are unlikely to be representative of the natural gas sector. SoCalGas agrees that these are major limitations to the Brandt study and other studies that use ambient measurements, especially in California. SoCalGas believes that ambient measurements and mobile leak detection methods may result in false positives. Such methods often do not differentiate between distribution natural gas and other thermogenic sources, such as oil production. In fact, over the last five years SoCalGas has found that of the methane emissions investigated by our lab more than half were found to be field or foreign gas, not pipeline gas. The sources of field or foreign gas could be from landfills, wastewater systems, sewers, dairies or pipelines and abandoned wells owned by the petroleum or other industries.

SoCalGas recommends that CARB take full advantage of data from new studies that have taken direct measurements from the natural gas system. There are several efforts currently underway to provide greater transparency on the factors that contribute to the overall methane leakage rate. The Environmental Defense Fund (EDF) is overseeing a series of studies on each area of the natural gas supply chain, in order to develop a fact-based estimate of the methane leakage rates for various parts of the natural gas system. In these EDF studies, direct measurements of methane emissions are taken at the actual sources on the ground, rather than estimated by applying an emission factor to a component count. Consequently, the results from these EDF studies are apt to be more precise as well as better representative of the industry. As part of this series of studies, the University of Texas (UT) conducted a study on emissions from natural gas production, the first set of results of which were released in 2013. UT's Dr. David Allen presented a summary of the natural gas production study to Executive Director Richard Corey and other CARB staff on September 12th. A second phase of the project will focus on pneumatic equipment. A link to the UT study can be accessed at www.edf.org/climate/methane-studies/UT-study-faq). The results of additional studies on gathering and processing, transmission and storage, local distribution, and transportation are expected to be published in early 2015.

The Gas Technology Institute (GTI) and Operations Technology Development (OTD) also have a number of studies underway with the goal of improving emissions factors of natural gas distribution infrastructure. These studies include field measurement programs to improve uncertainties for GHG emissions factors for distribution sources to ultimately facilitate the incorporation of these methodologies and strategies into the local distribution company's practices. The final phase of these studies is scheduled for completion by mid-2015.

Based on this upcoming data, the EPA has indicated that outdated emissions factors would be updated. On July 25, 2014, the EPA Office of Inspector General (OIG) released its report, Improvements Needed in EPA Efforts to address Methane Emissions From Natural Gas Distribution Pipelines. The report indicates that information improvements are needed in EPA's efforts to address methane emissions from natural gas distribution, further stating that EPA's existing methane emissions data for distribution pipelines may not be valid. OIG wrote, "**The EPA needs to examine the design of the GTI and EDF studies** (emphasis added) and evaluate the data to determine their usefulness for validating and/or updating its distribution pipeline EFs." (http://www.epa.gov/oig/reports/2014/20140725-14-P-0324.pdf) EPA has agreed to review these studies and re-evaluate its emission factors.

SoCalGas believes the findings from all of these comprehensive and recent studies will not only better ground CARB in its efforts to develop sound policies for addressing methane emissions from the natural gas supply chain, but also foster a more accurate public understanding of methane leakage rates. SoCalGas, therefore, urges CARB to consult these studies and programs as well as review their findings and results before initiating rulemaking or other regulatory activity.

Attribution of Methane Leakage from Oil and Gas Production and Processing

At the CARB Technology Assessment meeting on September 3, 2014, on slide 44, staff stated that there is no standardization of methodology with regard to calculating methane leakage. As discussed above, there is very robust data soon to be available to better understand how leakage should be measured and what the most appropriate emission factors are for methane leakage from all stages of oil and gas production to natural gas distribution. Once there is concurrence regarding methane leakage rates for oil and gas production and processing, it may then be attributed to the various resulting fuels.

On slide 45 of the September 3rd Transportation Fuels presentation, staff posed the following question as to methane leakage: how to attribute production and processing "leakage" from natural gas produced along with oil? To answer this question one must consider what happens with associated natural gas production (that is produced along with oil production) in the field before it enters natural gas transmission and distribution systems at the point of custody transfer, also known as a "sales pipeline". Note that CARB staff pointed out on slide 61 of the Transportation Fuels presentation that approximately 75% of California's natural gas is produced along with oil, and thus is associated gas. There are two main uses of associated gas in the oil production field, 1) combustion for energy or for disposal, and 2) injection for enhanced oil recovery (EOR) also known as gas lift. Field gas may be combusted in pumping units, heater-treaters for water separation, dehydration units, steam generators for EOR, compressors, and in flares (mainly for disposal so the gas is not vented to atmosphere). Therefore an appropriate attribution of methane leakage for associated natural gas production would be based on the volume that reaches the sales gas line. Methane leakage from the systems that feed into oil-related combustion devices, flares and gas lift EOR should be attributed with other oil production and processing methane leakage to oil, of which the majority end use is fuels such as gasoline and diesel. This is appropriate as the monetary driver for oil production is its refining into finished liquid products like gasoline and diesel.

In addition, there are additional phases of the UT Production study that address allocating methane emissions from combined natural gas and oil production in depth. The studies, due early 2015, will use direct measurements to better quantify methane from oil and gas co-production.

Wells to Wheel Analysis—Methane Leakage

At the September 3rd workshop, CARB staff also discussed the addition of methane leakage to the well to wheels (WTW) analysis used in CARB's Low Carbon Fuel Standard program. To determine the total leakage associated with all end uses of a LDC's natural gas, it makes sense to add the following together: 1) leakage from associated gas production and processing (as discussed above), 2) leakage from non-associated natural gas production (produced from gas wells) and processing and 3) leakage from the natural gas transmission and distribution system. Then the total leakage may be attributed to the various ends uses of the natural gas system.

In terms of the WTW analysis, only a very small percentage of total natural gas volume is ever delivered for compressed natural gas (CNG) and liquid natural gas (LNG) fuels. An example for SoCalGas illustrates this fact. Between 2008 and 2012, SoCalGas deliveries for natural gas vehicles (NGVs) as a percentage of total throughputs ranged between 0.90 percent and 1.07 percent (page 29, 2013 California Gas Report Supplement)[1]. SoCalGas had no deliveries for LNG production.

SoCalGas recommends that natural gas system methane leakage be apportioned in all WTW analysis in line with the percentage of total natural gas throughput used to deliver or make the specific fuel in question, and that methane leakage from oil and gas production and processing not attributed to sales natural gas be attributed to the appropriate liquid fuels as discussed above.

Potential Mitigation Measures and Cost

SoCalGas believes accurate identification of mitigating costs is imperative to assure cost effective emission reductions. The cost analysis provided on slide 78 of the Transportation Fuels presentation is a step in the right direction; however, as CARB staff also point out, there are still uncertainties in leakage rates. SoCalGas encourages refinement of the mitigation cost analysis by updating the analysis as more accurate leakage rate data becomes available over the next few months. As mentioned above, the EDF studies will provide much better data and science based estimates of methane leakage rates for the natural gas system. Efforts should also be made to improve cost estimates. Estimates should include all aspects of the mitigation including costs for components, construction equipment, labor, and ancillary equipment and operational and other equipment improvements needed to implement the mitigation measure.

SoCalGas thanks CARB again for the opportunity to provide these comments. We look forward to working closely with CARB during the early stages of the rulemaking process in 2015 to assist with

[1] http //www socalgas com/regulatory/documents/cgr/2013-cgr pdf

crafting regulations that will enable companies to better and more cost-effectively address methane emissions from their respective operations.

If you have any questions, please contact me directly at (213) 244-5554 or tpeacock@semprautilities.com.

Yours sincerely,

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Appendix

Calculating Methane Leakage

Emissions from gas distribution system leaks are estimated annually based on the number of leaks in each category, the frequency of inspection for the type of facility involved, and the average time to make repairs after detection. The rate of leakage used in the calculation for each type of leak is derived from the average emission rates that were obtained from studies of representative leak samples. This approach provides an approximation using available data; however, it does not take into account the actual emission rates of individual system leaks over the period the leak exists on the system. Until a leak is detected it is obvious nothing can be known about its history. For this reason assumptions must be made to calculate a total emission value for the life of the leak. To do so, repaired leaks are assumed to have started immediately after the last leak survey of the facility, and it is assumed that the leaks increased in a simple linear fashion from zero to the average leak rate assigned to that type of leak. It is also assumed that the leaks continue to increase in a linear fashion until the leak is repaired.

While this approach provides a means of calculating a volume of gas lost, it does not take into account many variables that can and do influence the emission rates of individual leaks. From operational knowledge and anecdotal information, leaks are often influenced by the operating environment from factors, such as types of soil, area paving, soil moisture levels, types of pipeline components involved, operating pressures and temperatures, and the cause of the leak. Emission rates from a single leak can vary over its life cycle due to changes in the operating environment. For example, under some circumstances the surrounding soil can react to the presence of the methane and harden creating a cement-like ball around the pipe at the leak location that then reduces or eliminates growth of the leak. In some cases, the emitted methane is driven underground and then mitigated by the operator after leak repair through soil remediation methods that reduce the carbon equivalency of the methane emission. In other cases, leaks related to certain types of fittings have leakage rates that remain relatively constant over their life and may only fluctuate due to variation in pressure and temperature. A certain portion of leaks are also identified through odor complaints by the public, which may be mitigated more quickly thus having a shorter life spans. As detection technologies have improved, methane leaks are detected earlier in their life cycle thus have lower overall emissions. These advancements along with new technologies that allow for mass-flow rate estimations at the time of detection provide for continuous improvement in both the emission rate estimates and the reduction in overall emissions from system leakage.