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SoCalGas Comments 15-IEPR-04 Comments to June 1, 2015 Workshop

Comments to June 1, 2015 Workshop. 2 attachments included.

Additional submitted attachment is included below.

Tamara Rasberry
Manager
State Regulatory Affairs

925 L Street, Suite 650
Sacramento, CA 95814

(916) 492-4252
trasberry@semprautilities.com

California Energy Commission
Docket Office, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

June 15, 2015

RE: Comments of Southern California Gas Company on the June 1, 2015 IEPR Workshop, in Support of the AB 1257 Report, on Fugitive Methane Emissions in California's Natural Gas System Docket No. 15-IEPR-04

Dear Commissioners:

The Southern California Gas Company (SoCalGas) appreciates the opportunity to comment on the 2015 Integrated Energy Policy Report (IEPR) Workshop, in Support of the AB 1257 Report, on Fugitive Methane Emissions in California's Natural Gas System. We offer the following responses to your specific questions regarding: 1) the most problematic sources of methane leakages, 2) SoCalGas' costs associated with leakage issues, 3) reducing uncertainty and variability, 4) opportunities for research and development, 5) how to balance the economy, reduce greenhouse gas emissions (GHGs), and improve air quality, 6) incentives that could quickly drive change, 7) SoCalGas' use of seismic cut-off and excess flow valves, as well as 8) active and inactive oil/gas wells in California. Additionally, we provide comments in response to presentations made by the California Air Resources Board (ARB), Environmental Defense Fund (EDF), and Lawrence Berkeley National Laboratory/UC Davis (LBNL).

1. What are the most problematic sources of methane leakages?

A. How SoCalGas and San Diego Gas and Electric's (SDG&E) assess and categorize leaks.

Currently SoCalGas and SDG&E (Sempra utilities) use the Pipeline and Hazardous Material Safety Administration (PHMSA) definition, which is tied to the PHMSA Cause categories for the gas release. PHMSA states that if the methane release can be repaired by tightening, lubrication, or adjustment of the pipeline component then it is defined as a "Minor" release, not a "leak", and is not to be reported. All other unintentional releases of gas (unintentional on the part of the operator) are defined as "leaks." A summary of how we assess and categorize system "leaks" is as follows:

i. Leaks on buried pipe are assessed based on above ground methane readings over the buried pipeline. These "Leak Indications" are classified as:

- **CODE 1 LEAK INDICATION** - a leak that represents an existing or probable hazard to persons or property, and requires immediate repair or continuous action until the conditions are no longer hazardous and the leak has been repaired.
    - Requires immediate response to mitigate any hazard and that the leak indication is repaired or cleared.
- **CODE 2 LEAK INDICATION** - a leak that is recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard.

- Requires the leak indication be repaired or cleared no later than 6 months for High Pressure facilities, and 15 months for Medium or Low pressure facilities, from the date the leak was reported.

- **CODE 3 LEAK INDICATION** - a leak that is non-hazardous at the time of detection and can be reasonably be expected to remain non-hazardous.
  - Requires monitoring every 15 months; except for leak indications suspected to involve plastic pipe the leak shall be repaired within 15 months.

ii. For leaks on facilities that are not buried the leak location is easily pinpointed, and the severity of the leakage is easily determined by soap testing (for medium and low pressure), or by measuring of the methane concentration (for high pressure). These "Leaks" are classified as:

- **HAZARDOUS LEAK** - an above ground leak that represents an existing or probable hazard to persons or property, and requires immediate repair or continuous action until the leak is repaired and the conditions are no longer hazardous..
  - Requires immediate repair or continuous action until the leak is repaired and the conditions are no longer hazardous.
- **NON-HAZARDOUS LEAK** - an above ground leak that is recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard..
  - In determining the repair schedule, the proximity of gas to buildings and structures is considered along with certain types of facilities that require sufficient time for one-call notification. The required time to repair ranges from 2 days to 15 months.

B. Sempra utilities "sources" of emissions in 2014.

SoCalGas' and SDG&E "sources" of emissions in 2014 are outlined below in Figures 1 and 2, respectively. This data was is summarized from the data submitted on May 15 to the California Public Utilities Commission (CPUC) and the California Air Resources Board (CARB) in response to SB 1371. It should be noted that only some of the sources listed below are considered to be "leaks" by definition. We expect the definition of "leaks" to be more clearly defined for California through the SB 1371 proceedings. These proceeding will also determine the agreed upon technical approach for determining or calculating emissions volumes from the various sources, along with identifying the best management practices for mitigating these emissions. Currently, SoCalGas and SDGE participate in the EPA Natural Gas Star program and have implemented the identified best practices, and will continue to participate and implement new best practices and technologies as appropriate.

Figure 1: Consolidated list of SoCalGas emission sources derived from analysis of all system operations. Stated volumes are for Natural Gas in MCF.

Emission Source	Type	Category	2014 Estimate (MCF)	% of Total	Rank	Cumulative % of Total
System "Minor" Releases (Emissions from equipment, fittings or joints that are repaired by tightening, lubrication, or adjustment)	Unintentional	PHMSA-defined "Minor" Release	439,300.08	36.2%	1	36.2%
System Leaks (Caused by Corrosion, Equipment Failure, Material & Welds, Incorrect Operations, Other)	Unintentional	System Leakage	300,639.03	24.8%	2	61.0%
Compressor Seal Losses	Intentional	System Operation (Facility & Component Design)	161,002.00	13.3%	3	74.3%
Pipeline, Facility & Equipment Blow Down & Purge	Intentional	Pipeline & Equip Installation (New, Repair, Replace)	155,580.03	12.8%	4	87.1%
System Damages (Caused by Excavation, Natural Forces, and Other Outside Forces)	Unintentional	System Damages	91,577.00	7.6%	5	94.7%
Inspection, & Test of Pipelines, Facilities, Equipment and System Components	Intentional	Inspection, Test & Maintenance	38,594.51	3.2%	6	97.8%
Instruments & Equipment for Actuation, Gas Sampling, Analysis and Odorization	Intentional	System Operation (Facility & Component Design)	13,239.05	1.1%	7	98.9%
Compressor & Equipment Blowdowns	Intentional	Inspection, Test & Maintenance	8,139.60	0.7%	8	99.6%
PE Pipe Permeation	Intentional	System Operation (Facility & Component Design)	3,060.80	0.3%	9	99.9%
Compressor Engine Starts	Intentional	System Operation (Facility & Component Design)	1,157.00	0.1%	10	99.96%
Emergency Shut Down	Unintentional	System Upset	493.00	0.04%	11	99.999%
Training	Intentional	Operations Support	7.80	0.001%	12	100%

Figure 2: Consolidated list of SDG&E emission sources derived from analysis of all system operations. Stated volumes are for Natural Gas in MCF.

Emission Source	Type	Release Type	2014 Estimate (MCF)	% of Total	Rank	Cumulative % Of Total
System "Minor" Releases (Emissions from equipment, Fitting, or joints that are repaired by tightening, lubrication, or adjustment)	Unintentional	PHMSA-defined "Minor" Releases	69153.39	68.62%	1	68.6%
System Damages (Caused by Excavation, Natural Forces, and Other Outside Forces)	Unintentional	System Damage	8305.00	8.24%	2	76.9%
System Leaks (Caused by Corrosion, Equipment Failure, Material & Welds, Incorrect Operations, Other)	Unintentional	System Leakage	5506.03	5.46%	3	82.3%
Pipeline, Facility, & Equipment Blow Down & Purge	Intentional	Pipeline & Equip Installation (New, Repair, Replace)	5199.53	5.16%	4	87.5%
Compressor Seal Losses	Intentional	System Operation (Facility & Component Design)	3958.00	3.93%	5	91.4%
Compressor & Equipment Blowdowns	Intentional	Inspection, Test & Maintenance	3399.63	3.37%	6	94.8%
Compressor Engine Starts	Intentional	System Operation (Facility & Component Design)	1611.00	1.60%	7	96.4%
Inspection, & Test of Pipelines, Facilities, Equipment and System Components	Intentional	Inspection, Test & Maintenance	1526.27	1.51%	8	97.9%
Instruments & Equipment for Actuation, Gas Sampling and Analysis and Odorization	Intentional	System Operation (Facility & Component Design)	803.25	0.80%	9	98.7%
Emergency Shut Down	Unintentional	System Upset	713.63	0.71%	10	99.4%
PE Pipe Permeation	Intentional	System Operation (Facility & Component Design)	588.65	0.58%	11	99.99%
Borrego Springs LNG Facility System Operations	Intentional	System Operation (Facility & Component Design)	6.42	0.01%	12	100%

2. How much money has SoCalGas spent, plans to spend, and requested to address leakage issues?

In response to you interest in identifying costs associated with leak abatement, SoCalGas offers the following information. As demonstrated in Figure 3 below, SoCalGas Distribution spent $24,898,000 (2013$) on methane leakage surveys between 2009 and 2013. In 2014, we projected to spend $6,684,000, but actual spending was $7,454,000. The forecasted cost for 2015 and 2016 is $7,252,000 and $7,820,000, respectively.

Area: GAS DISTRIBUTION
Witness: Frank B. Ayala
Category: B. Field Operations & Maintenance
Category-Sub 2. Leak Survey
Workpaper: 2GD000.001 - Field O&M - Leak Survey

Summary of Results:

	In 2013$ (000) Incurred Costs							
	Adjusted-Recorded					Adjusted-Forecast		
Years	2009	2010	2011	2012	2013	2014	2015	2016
Labor	4,104	4,162	4,789	5,551	6,237	6,665	7,231	7,796
Non-Labor	3	13	10	13	16	19	21	24
NSE	0	0	0	0	0	0	0	0
Total	4,107	4,175	4,799	5,564	6,253	6,684	7,252	7,820
FTE	60.2	60.0	68.3	79.2	88.3	93.8	101.4	108.9

Figure 3: Historical and forecasted costs associated with Leak Survey

By the end of 2013, SoCalGas had a backlog of approximately 9,400 non-hazardous methane leaks. In the 2016 General Rate Case (GRC), we provided the following incremental costs associated with repairing and/or eliminating leaks (Figure 4) and projected to reduce the backlog to approximately 4,400 by the end of 2016.

SoCalGas Gas Distribution Work Category	Historical Recorded Costs (2009 - 2013 historical data was provided in ORA Data Request ORA-SCG-DR-004-DAO, Questions 3a and 3b.)					Incremental Cost for Leakage Reduction Forecast (2016 GRC Forecast Associated with Leakage Backlog Reduction. Note that this leakage reduction forecast is incremental to the typical base level of leak repair / elimination.)		
	2009	2010	2011	2012	2013	2014	2015	2016
Main Leak Repairs	4,081	4,349	6,279	7,176	7,085	-	1,007	2,015
Service Leak Repairs	2,486	2,412	2,259	2,654	2,726	-	114	229
Total O&M	**6,567**	**6,760**	**8,538**	**9,830**	**9,810**	**-**	**1,121**	**2,244**
Main Replacement to Eliminate Leaks	17,404	11,424	13,829	23,215	3,289	-	-	-
Service Replacement to Eliminate Leaks	6,021	3,842	4,904	6,369	5,673	7,108	790	-
Total Capital	**23,424**	**15,266**	**18,733**	**29,583**	**8,962**	**7,108**	**790**	**-**
Total O&M and Capital	**29,991**	**22,026**	**27,270**	**39,413**	**18,773**	**7,108**	**1,911**	**2,244**

3. What are the largest sources of variability and uncertainty? How can we minimize them?

SoCalGas will consider this issue further, but offers the following feedback now. Funding more research on methane emission sources is one way to reduce uncertainty and variability. Specifically, research in Southern California is needed since LBNL, EDF, and other studies have been focused in Northern California or in other states. Southern California has a distinct natural gas distribution system and geography, including earthquake risks. Additionally, increasing research sample sizes also reduces uncertainty and offers significant results.

4. What should new research be focused on?

SoCalGas and SDGE commends the CEC for their actions in placing focus on the issues of methane emissions. We strongly support the vision of developing "Power to Gas" technologies, ways to reduce the cost of conditioning and utility interconnection to bio-methane supplies, and the development of heavy duty natural gas engines as strategic ways to reduce the state's overall emissions profile. In addition to these efforts we also suggest the following as possible areas where the CEC could focus some Research and Development resources:

A. Develop technologies for the early detection of gross methane emissions and for the identification of the source.

Screening tools aimed at early detection and identification of gross emissions sources could be effective at

significantly and quickly reducing methane emissions. Current identification tools using isotopic or methane/ethane ratios to differentiate biogenic compared to petro-genic sources is not adequate in the Los Angeles area because of the many natural seepages that are both biogenic and petrogenic. As discussed in the Division of Oil, Gas and Geothermal Resources (DOGGR) presentation there are thousands of abandon wells in Los Angeles area. Also, SoCalGas has local suppliers that may be producing biogenic gas and inserting it into the system both from traditional production as well as new sources such as wastewater treatment facilities. Furthermore, SoCalGas will continue to replace traditional fossil based sources of natural gas with bio-methane and other carbon neutral or renewable sources in its supply mix making fingerprinting these sources even more difficult. As a result, the recommendation is to develop detection for the distinct "odorant" used in natural gas (Tetrahydrothiophene or Tertiary butyl mercaptan) as a means to quickly identify if the source of methane is coming from the natural gas system. In the interim, most of Sempra utilities' current supplies can be differentiated by Helium compared to local seepages and is used successfully as a fingerprinting tool. Ultimately, any analytical tool to distinguish natural gas from the local utilities system would have to be able to test a grab sample from the system for comparison with the field gas in question to make definitive calls on whether the methane detected is from the local distribution company.

B. Develop cost effective methane mitigation/recovery technologies to address known emission sources during pipeline operation and maintenance activities.

System Operators perform routine activities that result in methane emissions. Most of these activities are driven by pipeline safety requirements and are mandated by laws and regulations. There are currently very few options for the mitigation of the methane released during normal pipeline operations and maintenance.

C. Develop system and regional specific emission factors for pipeline facilities from actual system performance data.

The recent Washington State University study provides the best new data and emission factors for underground pipeline leaks and meter and regulator stations based on nation-wide sampling. However, based on this study, there were significant regional differences in system performance mainly due to differences in pipeline materials pervasive in the systems. The western region systems were found to emit much less than their east coast counterparts because they have more plastic and no cast-iron. Also, SoCalGas participated early in the EPA Natural Gas STAR program and implemented many best management practices such as, replacing high bleed pneumatic devices with low or no bleed. Indeed, we eliminated our cast-iron pipe over two decades ago. Consequently, System Operators perform a great deal of system inspections and maintenance and have a vast amount of system performance data that may provide a better snap shot of emissions based on their current integrity management programs.

D. Develop a continuous integrity monitoring system (in-situ) (analogy would be iRobot vacuum system for home) that can continuously monitor the integrity of pipelines.

Continuous monitoring would enable utilities to act before there is a leak or identify a leak and upload the coordinates to the local advance meter initiative (AMI) network or system integrity network system.

5. Considering that 20% of California's economy is based on goods movement, how do we maintain the economy, reduce GHGs, and improve air quality? What are our choices?

SoCalGas appreciates the CEC's efforts to consider and develop energy policies that balance the economy with reducing GHG's and improving air quality. To help staff consider all solutions, we offer the following information about the potential for natural gas vehicles (NGV) and renewable natural gas/biogas.

A. Natural Gas Vehicles

The transportation sector offers a significant opportunity for GHG reductions and regional air quality improvements because it is responsible for more than 37% of the region's total greenhouse gas emissions and more than 80% of the region's nitrogen oxide emissions[1]—the majority of which come from diesel-fueled vehicles. Considering this, policymakers are raising costs for California diesel fleet operators, through regulations like the Federal Clean Air Act, Statewide Truck and Bus Rule, South Coast Air Quality Management District (SCAQMD) Fleet Rules, Cap and Trade, Low Carbon Fuel Standard, etc. Recently, Governor Brown called for a 50% reduction in petroleum in the next 15 years, so we can expect to see more regulation and associated costs to meet California's new stretch goal.

These anticipated regulatory developments mean that diesel is not well-positioned for the future. Even with 2010-compliant diesel technologies and after treatments, we need to take the long-view in addressing the stricter standards that will be introduced over the next 15 years, especially in light of compliance costs that will continue to grow. Just as importantly, pricing volatility in global oil markets makes it difficult for fleet operators to accurately forecast business expenditures.

Converting heavy-duty vehicle fleets from diesel to natural gas can provide a way to meet tomorrow's regulations without crippling the economy. Since diesel particulate matter is an air toxic, it can be treated, but diesel will never be truly "clean." Natural gas emits no diesel particulate matter and has 20% fewer GHG emissions than 2010-compliant diesel vehicles.[2] By 2018, technological advancements will facilitate "near-zero" natural gas engines that will reduce nitrogen oxide emissions by 90%.[3] Natural gas is also less expensive than diesel: it delivers 30-50% cost savings over diesel.[4] According to the EIA, the cost of diesel is rising, whereas, natural gas is more insulated against pricing volatility because the U.S. is the world's largest natural gas producer—93% of the natural gas we use is produced domestically, and under current estimates, our nation has more than 100 years of reserves.[5]

An even more exciting prospect is the opportunity to use renewable natural gas, or biogas, as a transportation fuel. Renewable natural gas can be sourced from organic waste from landfills, wastewater treatment facilities, dairies and farms, making natural gas even cleaner. Instead of landfilling or burning waste, California could use it to replace 75% of diesel used by vehicles.[6] In fact, biogas produced from green waste has a negative carbon intensity value—removing carbon from the air. Because of this negative carbon intensity value, it is possible for businesses to generate LCFS carbon credits and sell them as an additional source of revenue. This process runs on methane that would normally be released into the atmosphere, creating a double environmental win: reducing emissions from the agriculture and waste sectors as well as generating renewable energy for other applications. This is an opportunity with huge growth potential.

Natural gas technology is available today in the form of Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) vehicles. CNG is produced locally and supplied by a utility gas line, making it an attractive option for owner-operators who have return-to-base fleets. It has the potential lowest fuel cost, and while LNG has a "boil-off" meaning the fuel can evaporate if not used, CNG does not—what goes into the tank always gets used. If operators

[1] 37% figure: California Air Resources Board (CARB). "2000-2012 California Greenhouse Gas Emission Inventory." CARB, May 2014. <http://www.arb.ca.gov/cc/inventory/inventory_current.htm >; 80% figure: South Coast Air Quality Management District (SCAQMD). "Final 2012 Air Quality Management Plan." SCAQMD, February 2013, p. ES-9. <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/main-document-final-2012.pdf>

[2] University of California Project Managers: Alexander E. Farrell, UC Berkeley; Daniel Sperling, UC Davis. "A Low-Carbon Fuel Standard for California, Part 1: Technical Analysis – FINAL REPORT. California Energy Commission (CEC), May 30, 2007, p. 47. <http://www.energy.ca.gov/low_carbon_fuel_standard/UC_LCFS_study_Part_1-FINAL.pdf >

[3] Gladstein, Neandross & Associates (GNA). "Pathways to Near-Zero-Emission Natural Gas Heavy-Duty Vehicles." GNA, May 19, 2014, p. 1. < http://www.gladstein.org/pdfs/On-Road_Pathways.pdf>

[4] U.S. Department of Energy (US DOE). "Clean Cities Alternative Fuel Price Report." US DOE, January 2015, p. 3. < http://www.afdc.energy.gov/uploads/publication/alternative_fuel_price_report_jan_2015.pdf> and U.S. Energy Information Administration (US EIA). "Gasoline and Diesel Fuel Update." US EIA, June 8, 2015. < http://www.eia.gov/petroleum/>

[5] Potential Gas Committee (PGC). "Potential Supply of Natural Gas in the United States." PGC, April 8, 2015. < http://potentialgas.org/biennial-report>

[6] Bioenergy Association of California. "Decarbonizing the Gas Sector: Why California Needs a Renewable Gas Standard," November 2014. < http://americanbiogascouncil.org/pdf/BAC%20Report%20on%20Renewable%20Gas%20Standard.pdf>

do not set up fueling operations on site, they have access to 100+ fueling stations in Southern California. CNG also offers the most truck options and tank configurations: side-mounted, back-of-cab, front-of-body, and roof-mounted. There are two ways to fuel CNG vehicles: time-fill, in which fleet owners set up fueling infrastructure onsite and vehicles connect directly into the gas pipeline to fuel up (usually takes 4-8 hours); and fast-fill, in which vehicles fuel up at a natural gas station. It's similar to public diesel fueling stations and takes about the same time.

LNG is natural gas cooled to a liquid state so it can be stored in a vehicle. It has to be processed at a plant and then shipped to the site. The advantages include a slightly faster fill rate, a lower incremental weight per diesel gas equivalent (DGE), and a higher energy density, which means that more fuel can fit in a smaller frame rail space. The lower weight of LNG is especially beneficial to long-haul fleets, highly weight-sensitive fleets, and large, off-road applications, such as mining, marine, and rail. LNG has a similar fill time to diesel fueling.

The technology is available today, and SoCalGas anticipates that this market will grow in the coming years. Fueling infrastructure is also growing in tandem. There are 330+ CNG refueling stations in Southern California alone, and 100 of them are open to the public. There are 1,500+ CNG refueling stations across the U.S., representing a 94% growth in the number of CNG stations since 2009.[7]

Although natural gas vehicles have higher upfront costs, fleet owners save money over the lifecycle of the vehicle through decreased fuel, operating and compliance costs. SoCalGas offers a tool that provides fleet owners with a customized view of how much they can save over the lifecycle of converting their fleets to natural gas. There are multiple financing options to make conversion easy, such as the Compression Services Tariff (CST), which allows fleet owners to pay for time fill service over time with a small fee that's included in their monthly gas utility bill. Fleet owners can also use bank loans and third party financing options to offset the upfront costs.

As you know, SoCalGas does not make money based on how much gas is used—our rates are decoupled from volumes, and therefore do not? have a vested interest in this fight. SoCalGas is advocating converting heavy-duty fleets to natural gas because we genuinely believe it's the right thing to do for California. We are happy to discuss these opportunities further.

B. Renewable Natural Gas/Biogas

California has the opportunity to use organic waste from landfills, wastewater treatment, dairies and farms to create "renewable natural gas" and make natural gas even cleaner. Studies say organic waste alone could supply 15% to 20% of our current natural gas demand if converted to methane. And with purpose-grown crops, studies say we can produce an additional 20% of our gas from this renewable source. That means up to 40% of our natural gas supply could come from renewable resources.

6. Are there incentives that could drive change faster than regulation?

SoCalGas will consider this issue further, but offers the following feedback now. A comprehensive approach that reviews the entire inventory of methane emissions, identifies the most efficient (from a cost and total reduction perspective) measures, and allows utilities to invest in the most efficient reductions, even if they are in other sectors, e.g. agriculture or organic waste diversion, would drive change and reduce emissions quickly. This approach would apply only to non-hazardous leaks.

7. What is SoCalGas' status of using seismic cut-off valves and excess flow valves?

Sempra Utilities have historically operated Automatic Shut Off (ASVs) and Remote Control Valves (RCVs) on natural gas pipeline systems to provide for closure and rapid pipeline isolation in the event of a rupture caused by earthquake, landslide, or other geologic or anthropologic event. As part of our Pipeline Safety Enhancement Plan

[7] 2015 American Gas Association

(PSEP), Sempra Utilities will expand the number of valves and flow management devices associated with this effort from approximately 200, to over 500. This enhancement will limit the length of pipeline isolation sections vented to the atmosphere, in the event of an emergency, to 5-8 miles and ensure pipeline depressurization (and the end of major gas venting to the atmosphere) occurs within 30 minutes of a major rupture, instead of within 1-2 hours which is the current response in some pipeline sections. Approximately 100 of these isolation sections traverse earthquake faults.

In addition, where larger pipelines cross active major earthquake faults (12,000 years or less since last major event), SoCalGas will shorten the automatic-shut-off valve spacing interval to 2-5 miles, from the current intervals of up to 20 miles. There are 20 such areas targeted within the PSEP for interval reduction in the next 5 years. These valves will sense pressure drop for 2-3 minutes following a major pipeline rupture and close approximately 30 seconds after this monitoring period, to limit the volume and duration of gas venting. While the principal pursuits of this program are emergency response and system management, our PSEP valve installations directly support enhanced GHG management. The Sempra Utilities expect to have over 100 PSEP ASV/RCV sites operational by the end of 2015 as we aggressively move forward with our Implementation Plan.

SoCalGas installs excess flow valves in all new and renewed Services where the design load on the Service meets design criteria. These devices are sensitive to gas flow velocity and as such are designed to stop the gas flow whenever it exceeds the designed limit. Typical scenarios that trip these types of devices are when a Service is severed during excavation (third party) activities or during a seismic or other earth movement event that results in the severing of the service.

8. How many active and inactive oil/gas wells in California? How much of the emission are from active vs. from unknown wells?

While these questions were asked of Division of Oil, Gas, and Geothermal Resources (DOGGR) staff, their answer that there are 70,000 active wells, 20,000 idle wells, and 10,000-100,000 abandoned wells demonstrates a significant data gap. Staff noted that abandoned wells in the Los Angeles area are an especially large issue. SoCalGas urges the CEC to collect this information and accurately attribute methane emissions from active, idle, and abandoned wells. Without this information, these petrogenic sources are attributed to the natural gas distribution system.

9. California Air Resources Board Perspective on Methane Emission from Oil and Gas

SoCalGas is currently drafting written comments to the California Air Resources Board (ARB) on their Short-Lived Climate Pollutant (SLCP) Strategy Concept Paper (Concept Paper), part of which was presented at the IEPR Commissioner Workshop on Fugitive Emissions. To ensure both agencies receive consistent feedback, SoCalGas offers the following general comments that will be submitted to ARB.

A. Concern Regarding New California Methane Source Calculations

The Concept Paper, for the first time in public, uses the following chart to account for the methane sources in California:

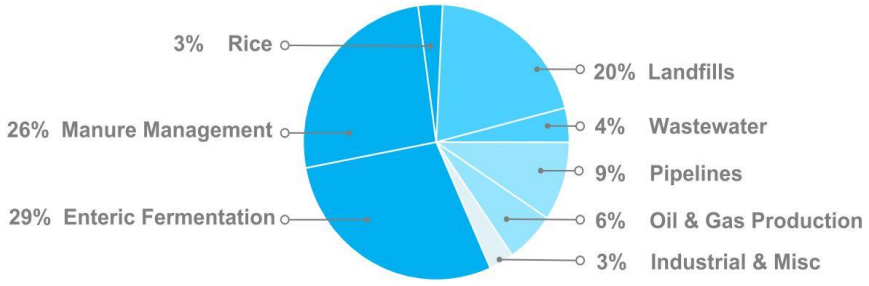

Figure 5 (Concept Paper page 17): California's 2013 Methane Emission Sources

According to this new methane emissions chart, emissions from pipelines are 9%, while oil and gas production adds up to 6%. These emissions are significant increases from previous percentages, which were about 6% from pipelines. This calculation causes SoCalGas to ask several questions because as of last year, "Pipelines" and "Oil and Gas Production" categories were not specifically delineated and instead were lumped together with "Industrial."

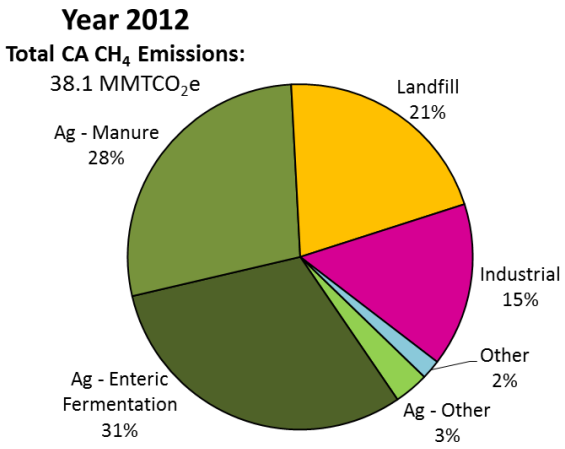

Figure 6: Year 2012 Total California Methane Emissions: 38.1 $MMTCO_2e$[8]

The attribution of almost 60% of methane sources in California to dairy operations, via manure and enteric fermentation, remain almost identical from 2012 to 2013. Yet the attribution of California methane to "Pipelines" and "Oil and Gas" categories are new to us. As a result, SoCalGas is specifically requesting that ARB share with the public the documents and calculations that ARB relied upon to lead to the new attribution graph that now show a 2013 attribution of 9% of California methane coming from "Pipelines" and how that differentiates from the calculation of the 2012 methane sources.

B. Differentiation Between Methane Emissions From Oil Production and Natural Gas

It is essential for ARB staff to clearly differentiate between methane that is released through the production of crude oil in California, and methane that is released through natural gas production and distribution. As confirmed by the of Division of Oil, Gas, and Geothermal Resources (DOGGR) presentation at the Fugitive Emissions Workshop, there is virtually no current nor historical gas production in California. Historically, all gas produced by oil production was considered a waste product of the oil business because it was not of useable quality. However, gas utilities must take the associated gas from these local producers into their system if they meet quality specifications. If the producer does not meet quality specifications, we can literally shut-in their production because they are no longer allowed to just flare or release the gas to atmosphere due to air quality regulations;

[8] Source: http://www.arb.ca.gov/cc/inventory/background/ch4.htm, "Sources of CH4 in California for 2012."

otherwise we are obligated to take the gas. The ratepayers of the utilities should not be burdened with the responsibility of methane leakage that is waste mitigation for oil production. As a result of this regulatory history, SoCalGas proposes the following: If methane emissions associated with any California oil production is counted as part of the natural gas utility value chain, then California gas utilities should also receive a credit for the full volume of gas produced by the oil producers and taken by the gas utility. In the alternative, emissions along the natural gas value chain should be counted as part of the oil/diesel/gasoline value chain, and NOT the natural gas value chain. As a fundamental matter, the natural gas industry cannot be held responsible for methane emissions released during production and processing of oil, as we do not have any direct control over oil company operations and safety protocol. Thus, it is important for ARB staff to (1) recognize the historic treatment of methane emissions related to oil operations and (2) appropriately allocate those emissions to the correct source of emissions. Without this clarity, industry cannot be held accountable for those emissions over which we have no control.

C. New Methane Emission Studies Should Be Considered By ARB in the SLCP Process

The other reason for our questioning of ARB's new 2013 methane sources graphic and its underlying data is the exploding numbers of new studies specifically examining the amount of methane released to the atmosphere from natural gas production, transmission, and distribution. For example, we believe at least two of Environmental Defense Fund's (EDF) anticipated 16 studies on methane emissions have direct applicability to the analysis of the Concept Paper. Specifically, Dr. David Allen of the University of Texas conducted an in-depth study of methane emissions directly attributable to natural gas production. Although his research was based out of state, because virtually no actual natural gas production occurs in California, we believe his findings are useful for ARB staff to review and evaluate in light of concerns with SLCP. For example, his study found that emissions from well completions were lower than anticipated from federal Environmental Protection Agency ("EPA") estimates and methane emissions from pneumatic equipment were higher than EPA estimates. This is important in California, as the state doesn't have any pneumatic equipment currently operating to produce natural gas, so it is an issue ARB can lay to rest.

Further, and perhaps more directly relevant, is the study by Dr. Brian Lamb of Washington State University regarding emissions from Local Distribution Companies ("LDC") operations. As a California LDC, SoCalGas paid dedicated attention to Dr. Lamb's findings. His study, released in late March of this year, specifically revisited 13 locations evaluated for methane emissions by the federal EPA in the early 1990s, including 230 underground pipeline leaks and 229 metering and regulating facilities.

> "[T]he report found, the amount of methane being released is 36 percent to 70 percent less than estimates published in 2011 by the federal Environmental Protection Agency. Those earlier estimates were based on data from the 1990s. The researchers suggested that **the reduction was largely a result of equipment upgrades, including replacement of leaky old cast-iron or unprotected steel pipe**. Three leaks produced half of the total measured emissions from pipelines.
>
> **The stemming of methane emissions could also be attributed to improved leak detection and maintenance**. Metering and regulating stations checked for the earlier Environmental Protection Agency estimates and checked again for the current study experienced as much as **a 90 percent reduction in leaks** — "very dramatic changes," said Brian Lamb, lead author of the report. (New York Times, "Gas Utilities Reduce Leaks of Methane, Study Finds," John Schwartz, March 31, 2015, emphasis added.)

We have attached both studies to our comments and include them by reference. The larger point is, ARB and the CEC need to be looking to new data sets and new studies to inform the scientific basis of their findings on SLCPs and all climate change decision making. Using old data, simply because it is well-sourced (i.e., from the federal EPA), does not necessary make it the most reliable and the best to utilize for purposes of 21st Century policy

making. We urge ARB and the CEC to test, and trust, new sources of data that may lead to more accurate measurements of pollutants and GHGs, which, in turn, will result in the most effective forms of mitigating and reducing such emissions.

D. ARB Analysis Needs to Include Ground-Level Detection Data

We recognize that scientific information on air pollution and GHG emissions and how they are measured is a constant discussion in the atmospheric science and regulatory communities worldwide. At the same time, it is essential that the best and most accurate data is utilized by ARB, CEC, and others to measure GHGs, including methane. Ambient measurement and differentiation is one method of emission measurement but is not the only one that ARB and CEC should rely upon. Ground level detection is also important to confirm leakage from the natural gas system.

Our experience is there is about a 50% correlation between the ambient measurement of methane and "boots on the ground" detection of methane leakage from the SoCalGas natural gas system. Our participation with the Colorado State University ("CSU")/EDF methane emission mapping effort has delivered similar and confirming results. Specifically, the CSU/EDF ambient measurement with an algorithm in which they have high confidence only returned a 50-60% correlation to actual leaks in the SoCalGas system. Additionally, in the CSU/EDF mapping exercise, ambient measurement did not find numerous known leaks. Clearly, more work needs to be done to double check current ambient measurement techniques with ground-level detection. Further, ambient measurement must distinguish better between (1) petrogenic sources and biogenic sources and (2) among different petrogenic sources. While methane is used, SoCalGas recommends helium as a tracer for their system gas as a more effective method to differentiate among petrogenic sources.

E. SoCalGas Comments Regarding Waste Stream and Dairy Sources of Methane

SoCalGas is providing detailed comments to ARB, but want to note here that SoCalGas respectfully disagrees with a number of ARB's underlying assumptions regarding Waste Streams and Dairy Sources of methane. Most specifically, the assumption that methane emissions from the natural gas system vary directly with the amount of gas flowing on the system is technically incorrect and should be corrected in the Concept Paper.

F. General Comments Regarding Natural Gas as a Source of Methane

SoCalGas appreciates the hard work ARB staff has put into the SLCP Concept Paper, to satisfy the requirements of SB 605. The request from the public and the legislature to address SLCP is one that ARB has taken seriously, and SoCalGas looks forward to the dialogue that will move forward this year on addressing SLCPs. At the same time, there are some statements in the Concept Paper that are a little strong in their anti-natural gas bent, which we want to highlight for ARB and the CEC. We hope, by emphasizing these statements, we can come to alternative language that is more reflective of ARB's public statement of being fuel neutral in its policy making.

For example, on page 19, the Concept Paper states: "Ultimately, a key driver of fugitive emissions is our demand for oil and natural gas which will likely have to decline significantly to meet our climate and air quality targets." SoCalGas believes this statement completely ignores the role of natural gas in improving air quality and mitigating climate change. SoCalGas respectfully requests that this statement be deleted, and the discussion on pages 18-19 appropriately revised.

In the same paragraph on page 19, the Concept Paper indicates that ARB will consider "whether fugitive methane emissions should be accounted for in cost/benefit calculations for various state energy and efficiency programs…". SoCalGas believes the end result of this statement would, for example, require a school district to conduct a fugitive emissions cost/benefit analysis before switching its school buses from diesel to natural gas. In this way, we believe such cost/benefit analysis could be seen as administratively onerous and would serve as a disincentive for agencies and vehicle owners to move to natural gas vehicles in any sector category.

When the Concept Paper discusses the largest sources of methane – agricultural sources – it admits difficulty in measuring methane from such large sources. At the same time, there is a clear recognition and acknowledgment that approximately 60% of California's methane comes from agriculture sources. If we accept the 2013 estimate that 9% of methane comes from natural gas pipeline, that means **agriculture causes more than five times the methane of natural gas.** Consequently, SoCalGas believes the Concept Paper over-focuses on reducing methane from sources it can measure, without more clearly defining a path forward with respect to, admittedly, the absolutely largest source of methane – agriculture.

In the Concept Paper's discussion of black carbon (pp. 22-23), which includes diesel combustion emissions, it talks about cleaner diesel equipment and cleaner vehicles, but stops short of mentioning natural gas vehicles such as buses and trucks. At the same time, the federal EPA in March of this year just awarded over $750,000 to purchase compressed natural gas vehicles to replace diesel trucks and buses in Los Angeles County. Jared Blumenfeld, EPA's Regional Administrator for the Pacific Southwest, stated "School children and residents of Los Angeles will be able to breathe cleaner, healthier air." (EPA News Release, "EPA Awards $753,476 for Twenty-one Cleaner School Buses and Trucks in Los Angeles County," 03/20/2015.) SoCalGas hopes that ARB can include such examples where natural gas vehicles are part of the clean air and climate solutions utilized throughout the state.

10. Environmental Defense Fund's Methane Emissions Studies.

At the workshop, EDF presented a number of their studies on methane emissions. However, renewable natural gas and biogas—which could supply 40% of future natural gas supply—were not included in their assumptions.

11. Lawrence Berkeley National Laboratory/UC Davis Residential Leakage Study Results.

SoCalGas urges the Commission to support residential leakage research in Southern California. As noted above, studies and results in PG&E territory may not reflect leakage rates in Southern California. Additionally, the Lawrence Berkeley National Laboratory (LBNL) study sample size was only 10 San Francisco Bay homes (Figure 7 below). Their combustion appliance leakage results seem quite high (Figure 8 below) and we plan to review their methodology, especially calibration data and flue back-pressure tests. We caution the CEC not to rely on limited regional data (Northern California) and apply it to the entire state. We request the Commission wait until reviewing additional data, for example from the new CEC project, that might be more representative of state wide emissions.

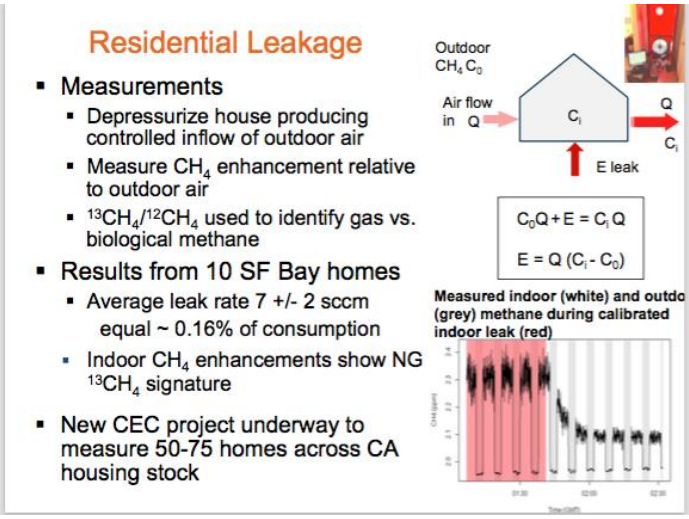

Figure 7: LBNL residential leakage study, slide 15 presented at IEPR Commissioner Workshop on Fugitive Methane Emissions

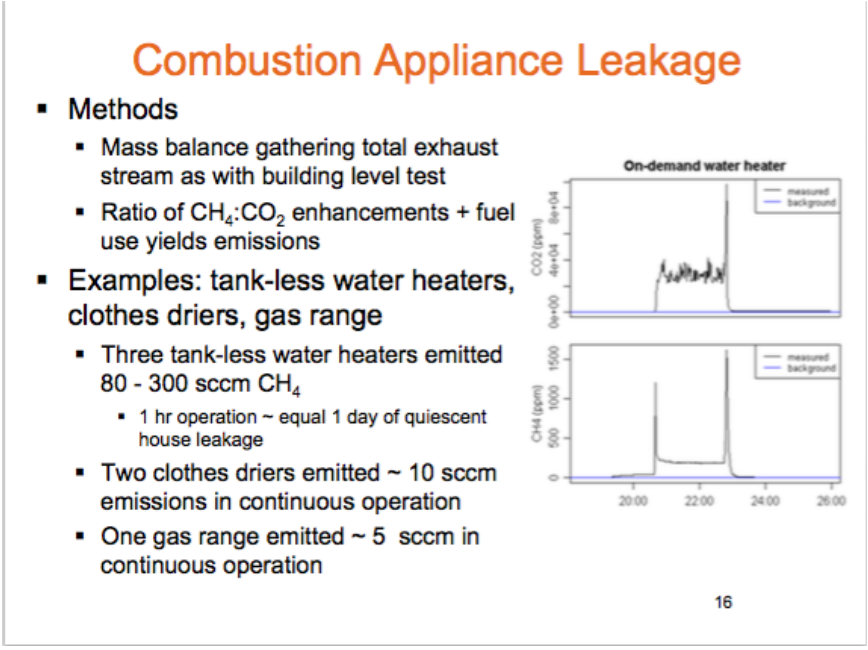

Figure 8: LBNL residential leakage study, slide 16 presented at IEPR Commissioner Workshop on Fugitive Methane Emissions

In closing, SoCalGas appreciates the opportunity to provide comments on the IEPR Workshop, in Support of the AB 1257 Report, on Fugitive Methane Emissions in California's Natural Gas System. Please do not hesitate to reach out for more information.

Respectfully submitted,

Tamara Rasberry