San Diego Gas & Electric Company

Natural Gas Leakage Abatement Report

In partial fulfillment of

Rulemaking (R.) 15-01-008 to Adopt Rules and Procedures Governing Commission Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leaks Consistent with Senate Bill 1371, Leno.

And In Response to Data Request
San Diego Gas and Electric Company R.15-01-008
2016 Annual Report

By: San Diego Gas and Electric Company

Date: 6/17/16
Revision Submitted: 12/09/16

Introduction

The following data[1] have been prepared to comply with Senate Bill 1371 (Leno, 2014), Section 2, Article 3, Order Instituting Rulemaking (OIR) 15-01-008, and to provide our responses to Data Requests San Diego Gas & Electric Company (SDG&E) R.15-01-008 2016 Annual Report.

Pursuant to SB 1371, Leno - Natural gas: leakage abatement, the California Public Utilities Commission (CPUC) requests that the following information be transmitted to the CPUC and the State Air Resources Board (ARB):

(1) A summary of changes to utility leak and emission management practices from January 1st, 2015 to December 31st, 2015. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Response:

See Attachment Q1

(2) A list of new graded and ungraded gas leaks discovered, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, by grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered and annual volume of gas leaked for each, by month, from January 1st, 2015 through December 31st, 2015.

Response:

See Appendices

[1] As described in Data Request SDG&E R15-01-008 2016 Annual Report.

(3) A list of graded and ungraded gas leaks repaired, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, by month, from January 1st, 2015 through December 31st, 2015. Include the grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered, date of repair, annual volume of gas leaked for each and the number of days from the time the leak was discovered until the date of repair.

Response:

See Appendices

(4) A list of ALL open graded and ungraded leaks, regardless of when they were found, tracked by geographic location in a Geographic Information System (GIS) or best equivalent that are being monitored, or are scheduled to be repaired, by month, from January 1st, 2015 through December 31st, 2015. Include the grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered, scheduled date of repair, and annual volume of gas leaked for each.

Response:

See Appendices

(5) System-wide gas leak and emission rate data, along with any data and computer models used in making that calculation, for the 12 months ending December 31st, of the reporting year.

Response:

Per the Administrative Law Judge's (ALJ) Ruling Issuing a Staff Data Request Regarding 2016 Annual Reporting Requirements and Directing Responses by June

17, 2016 (Ruling), the system wide leak rate has been deleted.[2] However, the leak rate for purposes of this data request can be found in Appendix 8 on the "Total Leaks & Emissions" tab.

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request SDG&E R.15-01-008 2016 Annual Report for the 12 months ending December 31st, 2015.

Response:

See Appendices

(7) An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Response:

See Attachment Q7.a and Q7.b

[2] *See* Ruling, Attachment 1, at 2.

SDG&E
Attachment Q1

A summary of changes to utility leak and emission management practices from January 1st, 2015 to December 31st, 2015. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Emission Source	**Summary of Change in Practice and Reasoning**	**How Does this Change Reduce Methane Leaks and Emissions?**
1. Transmission Compressor Stations	Voluntary Simulated Emergency Shutdown (ESD) to avoid release of methane from preparedness for ESD systems. SDG&E documents gas savings from ESD activities on an annual basis	This prevention of gas being released to the atmosphere in 2015 accounted for a natural gas savings of 1,521 Mcf at SDG&E's Compressor Stations.

SDG&E
Attachment Q1

A summary of changes to utility leak and emission management practices from January 1st, 2015 to December 31st, 2015. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

2. Transmission Pipelines	Transmission Pipelines routinely require maintenance and/or repair to maintain system integrity and safety. Maintenance activities on high pressure pipelines are inherently dangerous due to the high pressure gas in the line. The gas must be evacuated from the pipelines to a safe level in advance of any repair work to be completed. As a best practice in 2015, SDG&E lowered the pipeline pressure where feasible to reduce to potential volume of gas that could be blown to atmosphere, and thus reduce methane emissions to the atmosphere.	Total natural gas reductions include 197 Mcf from the SDG&E Miramar District.
3. Transmission Compressor Stations & Facilities	Compressor Knowledge Community Since 2015, SDG&E personnel participate in the SoCalGas Compressor Station Community that helps share best maintenance practices and other knowledge transfer ideas. Through this community, SDG&E fosters open dialogue between Engineering and Transmission to share ideas and opportunities for areas of improvement.	This effort is difficult to quantify an emission reduction but will support the efficient and optimal operation of the equipment that ultimately results in emission reductions.
4. All Emission Sources	SDG&E has participated with SoCalGas' in-house research to develop or assess Mobile Methane Mapping and Leak Quantification technologies. SDG&E funds work through shared service agreements and best practices that are developed are deployed across both utilities.	As stated in previous comments, the ability to quickly quantify the size of a potential leak would be helpful to identify the "super-emitters" that statistically make up 50% of the methane emissions from leaks on the buried pipeline portion of the system. Unfortunately, the ability to quickly derive the flux rate of known system leaks through the use of algorithms, models, and various

A summary of changes to utility leak and emission management practices from January 1st, 2015 to December 31st, 2015. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

		novel techniques of measuring methane concentrations in air plus various other variables has yet to be validated in actual field conditions. In all of these studies the results have demonstrated that, while the technologies hold promise they are still being developed. Cost-effectiveness still needs to be determined for specific applications. These technologies will likely be useful initially for niche applications to assess emissions from certain types of facilities, such as Transmission Compressor Stations, Pressure Limiting Stations, and Measurement & Regulation facilities. Leakage flux rate estimates still have too much variation to be useful for estimating all leaks from the Distribution piping system. The target application should be to identify large leaks for prioritization of leak repair in order to reduce methane emissions.

SDG&E
Attachment Q7.a

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Emission Source	Description of Leak Management Practice	Synergistic with Safety or IM?	Incremental Funding Needed?	Anticipated Timeframe to Implement	Estimated Emissions Reduction Benefit (Mcf to be avoided) and Estimated Direct Costs To Implement (capital and O&M costs)	Reasoning Behind Strategy
SDG&E's Top Three Strategies to Pursue Starting in 2016						
1. Various sources (e.g. Customer Meters and Meter and Regulator (M&R) stations etc.)	Refinement of Emission Factors (EFs) through Research and Development (R&D) studies to improve quantification of leaks and emissions. Facility EFs are currently being used for Customer Meter Set Assemblies, Direct Sale Meter Sets, T-D Regulator Stations, and Farm Taps. There are currently no EFs for some other pipeline facilities such as Pressure Limiting Stations, Producer Receipt Points, In-Line Transmission Valves, and Launcher/Receiver facilities. Investing in	Yes	Yes. SDG&E/SoCalGas needs incremental funding to support any studies or any further research that CPUC/CARB wants to pursue in lieu of accepting updated factors recently adopted by the Environmental Protection Agency (EPA) for their mandatory greenhouse gas reporting program. Once the scope and	2016-2017	Estimated emissions reduction benefit and estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.	See SoCalGas' reasoning behind this strategy. Customer meters are the largest source of emissions for SDG&E. Recent studies have updated the EFs for certain meter set assemblies which were accepted by EPA in their latest inventory. SDG&E will support any further research on the EFs and/or identification of leakiest components to support reductions in this area.

SDG&E
Attachment Q7.a

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Emission Source	Description of Leak Management Practice	Synergistic with Safety or IM?	Incremental Funding Needed?	Anticipated Timeframe to Implement	Estimated Emissions Reduction Benefit (Mcf to be avoided) and Estimated Direct Costs To Implement (capital and O&M costs)	Reasoning Behind Strategy
	studies for EFs will improve quantification efforts and identify the leakiest components for targeting for reduction opportunities.		framework for these projects are determined by CPUC/CARB, appropriate funding can be determined.			
2. Transmission Pipeline Blowdowns	SDG&E will continue to employ practices that reduce pipeline venting where feasible to reduce emissions from maintenance activities on the backbone pipeline system. Feasibility includes consideration of the reliability of the backbone system and the net environmental	No	No, unless required to go beyond current feasibility concerns outlined in the description of leak management practice.	Ongoing	Estimated emissions reduction benefit and estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.	Transmission Pipeline blowdowns in SDG&E territory has been identified as another viable source for seeking emission reductions. Due to the relatively small footprint of the territory and associated Transmission Pipeline network (Miramar District), it will be ranked the least of the SDG&E Bundle in terms of possible emission reductions

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Emission Source	Description of Leak Management Practice	Synergistic with Safety or IM?	Incremental Funding Needed?	Anticipated Timeframe to Implement	Estimated Emissions Reduction Benefit (Mcf to be avoided) and Estimated Direct Costs To Implement (capital and O&M costs)	Reasoning Behind Strategy
	benefit. This may involve installing additional pipeline valves or piping to re-route gas or otherwise prevent gas from being blown to atmosphere. Due to the relatively low emissions from this region over the years, SDG&E believes this is category points to the need for case by case evaluation as the cost to install additional facilities will not always justify the effort to obtain minor methane reductions.					

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

3. Distribution and Transmission Pipeline damages	Excavation Damage Prevention Effective March 30, 2016, SDG&E voluntarily committed to participate in the EPA Methane Challenge Program SDG&E is also implementing the Gold Shovel program.	Yes	Yes. Incremental funding is needed that should be tracked and recorded in SDG&E's NERBA by authorizing in the SB 1371 OIR Phase 1 Decision.	2016-ongoing	Estimated emissions reduction benefit and estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.	Although SDG&E currently conducts damage prevention programs that address the nine damage prevention elements found within the PIPES Act listed in legislation, Title 49 U.S.C. (United States Code) §60134(b), more can be done to reduce this emission source. Reduction of damages to the system can support public safety, integrity of the system as well as environmental methane reduction goals. Annual damages per 1,000 Underground Service Alert (USA) tickets (also known as the damage rate) are tracked, which is the industry metric. During 2015, the SDG&E damage rate was 2.85. In addition to excavation damage prevention, SDG&E also promotes other damage prevention measures such as protection of gas facilities from outside force damage, and

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

						proactive monitoring of Company facilities.
4. Distribution Pipelines	Mobile Methane Mapping Assessment of Methane Emissions from Pipelines Identified by Distribution Integrity Management Program (DIMP) for Replacement Prioritization. SDG&E plans to evaluate the feasibility of using existing mobile methane mapping technologies to model atmospheric methane levels in the vicinity of pipeline Main segments or Services identified through the DIMP risk model for replacement	Yes	No, funded by DIMP.	2016-2017	Estimated emissions reduction benefit and estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.	This practice supports methane reduction as well as the DIMP. As beta-test models of mobile leak quantification technologies become available these areas may also provide good locations for field trials. This information will be evaluated against known system leaks in the area and then compared against atmospheric methane levels after replacement of the targeted pipelines to compare the emissions before and after replacement and observe the emissions reduction. In addition, the confirmation of any additional leakage prior to pipeline replacement through this work would result in a change of segment leak history and would affect the risk profiles of the segments. This additional information may also

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

						result in a re-prioritizing of some segments scheduled for replacement, thereby reducing emissions.
5. Transmission and Distribution Pipelines - Leak Survey	Adopt technologies that will allow the electronic tracking of verified gas leaks and show the routes surveyed by SDG&E's qualified technicians.	Yes	No, funding for replacing equipment and training is pending GRC decision and current pilot is under SoCalGas RD&D with SDG&E personnel involvement.	In 2016, finish pilot and in 2017, begin training and replacing equipment.	Estimated emissions reduction benefit and estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.	This will allow replacement of paper Leakage Survey Maps with electronic GPS "Bread-Crumb" records. Future system capability will also facilitate integrating methane readings from the leak detection instruments. The first step in the process is to purchase and deploy leak detection equipment that is Bluetooth enabled so that leak levels can be recorded via software placed on a smart device and matched with the GPS location. The Bluetooth enabled leak detection equipment is currently being evaluated with plans to deploy in SDG&E in 2017.
6. Distribution Pipelines	Post-Construction Leakage Survey	Yes	No. Funded through DIMP.	2016	Estimated emissions reduction benefit and	New pipeline construction projects in residential areas are scheduled for

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

					estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.	leakage survey every 5 years. Leaks can occur on newly constructed pipelines due to construction or material defects, and if the leak is small it may not be detected by odor until the first scheduled routine leak survey 5 years later. Detection of such leaks earlier in the life cycle of a pipeline is advantageous for many reasons, in addition to emissions reduction. The knowledge gained can lead to better inform decisions; for example it may lead to the identification of a defective material, pipeline component, or installer error that could exist elsewhere in the system. This initiative will support construction quality objectives by providing more timely feedback to construction personnel and potentially identify where additional training may be needed to help identify and prevent systemic construction problems. This practice may also improve cost

An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

						recovery of construction defects from contractors. 2015 miles of Main installed and scheduled for 5 year leak survey: 4.5 mi = $850 (Note: Leak Survey $35/1k ft)
7. Distribution Pipelines	Leverage eGIS to enhanced prioritization and optimization of non-state-of-the-art pipeline replacement programs by identifying leak clusters.	Yes	No, DIMP funded.	2016	Estimated emissions reduction benefit and estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.	Leveraging eGIS to more efficiently address the leakiest portions of the system increases the effectiveness of modernization programs and supports greater natural gas reductions.

SDG&E
Attachment Q7.b
Alternative Best Practices Considered

Accelerated Leak Survey from 5 to 3 Years

For SDG&E, distribution system leaks represent 6% of total system emissions based on the May 15, 2015 annual report. Staff's proposed mandatory requirement of increasing leak surveys to every 3 years for the portion of the gas distribution system that is currently surveyed every 5 years would not be cost effective or the most effective at reducing methane emissions for SDG&E when compared with other proposed measures for the same emission source category. SDG&E has a modern, state-of-the-art system with plastic and protected steel. An increased leak survey from 5 to 3 years on SDGE's system is not the most strategic method to address the most leak prone portions of the system. This is due to the fact that this proposed best practice targets the best performing portion of the system from a methane emissions perspective. For SDG&E, the current Distribution Integrity Management Program (DIMP) is addressing the non-state-of-the-art plastic pipelines and has targeted mileage for replacement in 2016. Because there is not a separate emission factor for non-state-of-the-art pipe compared to modern polyethylene pipe, no emission reduction estimates could be determined.

Distribution Mobile Leak Quantification)

SDG&E has evaluated the results of SoCalGas' research in this area and agrees with SoCalGas' conclusions:

Leakage flux rate estimates using mobile leak quantification techniques still have too much variation to be cost effective for estimating emissions from the Distribution piping system. The target application should be to measure only known large leaks or emission sources for prioritization of efforts to reduce methane emissions.

- Mobile Leak Quantification Systems are not yet commercially available.

- The ability to quickly derive the flux rate of known system leaks through the use algorithms, models, and various novel techniques of measuring methane concentrations in air (plus various other variables) has yet to be successfully validated in actual field conditions.
- Under controlled conditions, varying degrees of success in measure leakage flux rates have been achieved that show these techniques are feasible within a limited scope of application and provided enough data is gathered. However, these technologies are still being refined and need to be proven to be cost effective over currently available options using commercially available equipment.
- SoCalGas has funded research to develop or assess Mobile Leak Quantification technologies in projects with Picarro*, EDF**, Washington State University, Colorado State University, and PSI/Heath through NYSEARCH research and development (R&D) collaborative projects.
    - In all of these projects, the results have demonstrated that while the technologies hold promise, they are still being developed, and cost-effectiveness still needs to be determined for specific applications (such as measuring emissions from Pressure Limiting Stations and Measurement & Regulation facilities).

The following is the "Statement of Result of NYSEARCH/Picarro M2014-003 Project":

NYSEARCH Collaborative project with PICARRO (Funder Group 12/18/15): The project verified technical feasibility of quantifying near-ground methane emissions utilizing a prototype mobile flux-plane technology (developed by Picarro) in a variety of release simulations. Simulations included field measurements of known discharges of methane from point and distributed sources under controlled conditions. System performance was tested on leakage flow rates in the range of 4–42scfh. The study included tests in varying wind conditions from 2–11 mph and considered barriers and obstacles that are encountered in typical application environments (representing parked vehicles and low walls etc.).

Using a designed protocol, accuracy was achieved to within a nominal methane emissions ratio of 1.10 meaning that the average leak rate measured by the system was within 10% of the actual leak rate across the entire dataset. The precision of the nominal methane emissions ratios, when applying a 1 sigma standard deviation (67% confidence interval), ranged from 0.65 to 1.56, and when applying a 2 sigma standard deviation (95% confidence interval) ranged from 0.42 to 2.42.

In summary, this research & development project also provided an opportunity to demonstrate practical application of prototype emissions quantification technology. This technology has application in quantifying methane emissions within the range of confidence intervals established in similar applications. For future applications, the site specific conditions and associated critical variables would need to be evaluated to achieve accurate measurements consistent with this study.

SDG&E
Attachment Q7.b
Alternative Best Practices Considered

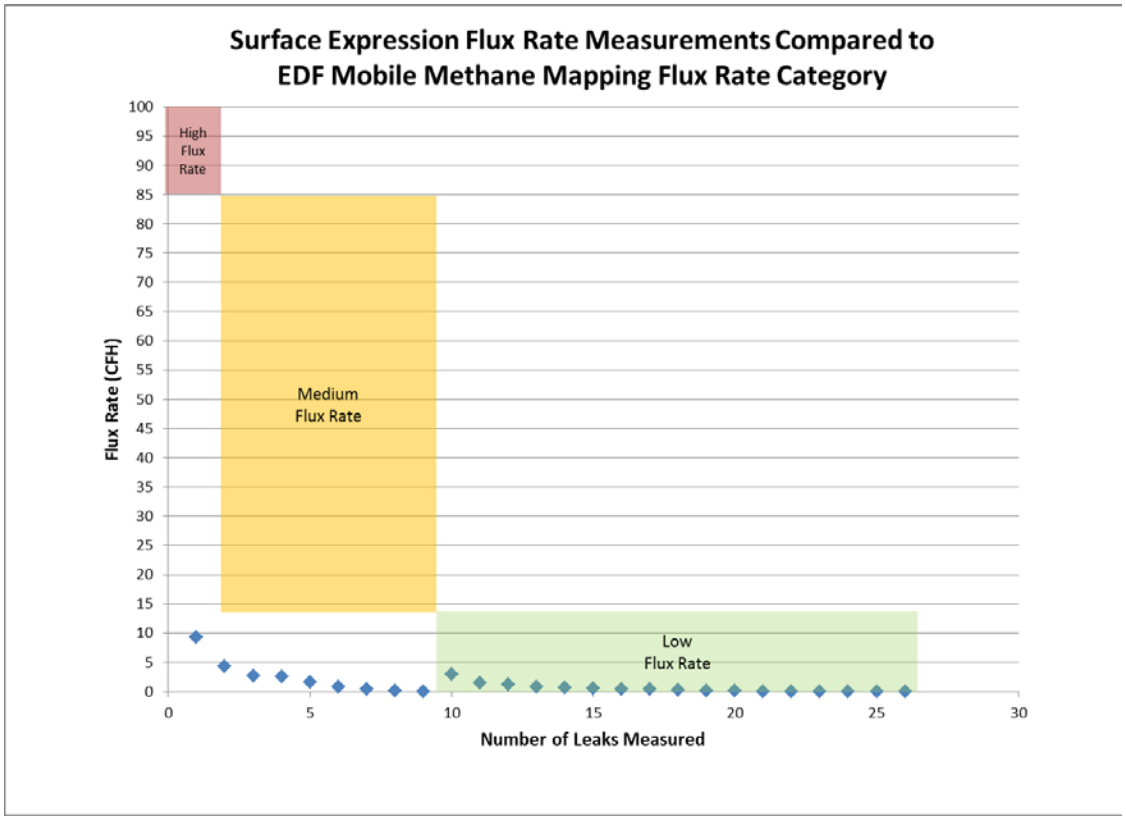
The following summarizes the findings of the collaboration with EDF and Colorado State University (CSU) to conduct mobile methane mapping of 4 cities within the SoCalGas service territory, which included leak quantification by CSU for each location:

SoCalGas has collaborated with EDF and Colorado State University (CSU) to conduct mobile methane mapping of 4 cities within the SoCalGas service territory, which included leak quantification by CSU for each location. In the collaboration with EDF and Colorado State University (CSU) to conduct mobile methane mapping, the effort included leak quantification for each location where CSU thought a leak existed, and slotted the emission into "Low," "Medium," and "High" flux rate categories, with defined ranges of 0+ to 13, 13 to 85, and over 85 CFH (Note: these estimates were derived by proprietary CSU algorithms). In one instance where CSU estimated the leak flux rate to be in the "High" category, EDF contacted SoCalGas and said it was the largest leak they had ever seen and estimate the flux rate to be on the order of 800 cubic feet per hour. SoCalGas located the leak and determined it was from a mechanical fitting. The fitting and section of piping was extracted without disturbing the leaking connection for laboratory testing to determine the root cause of the leak and measure the flow rate. Laboratory testing determined the leak to be from a displaced saddle o-ring on a mechanical tapping tee. The flow testing was by direct measurement and yielded a flow rate of 153 cubic feet per hour.

After this finding, SoCalGas contracted with Conestoga-Rovers & Associates (CRA-now GHD Services) to perform surface expression measurements on a sampling of EDF locations where SoCalGas confirmed the emissions were from a buried system leak.

When compared to the actual leak rates determined by using the same technique as in the study with EDF and Washington State University (WSU) for assessing methane emissions from the distribution sector, there was a very poor correlation to the emissions size buckets by EDF/CSU. If the CSU estimates were to be used to estimate the emissions from the system, the resulting emissions would be over 13 times greater than the results from the direct measurements (assuming EDF were to use the middle of the CSU category range to calculate the Low and Medium categories and 85 CFH for the High category) and applied to the original total number of leaks. When corrected for the actual number of confirmed system leaks found after investigation by SoCalGas, that overstatement of the methane emissions estimate increases significantly to more than 21 times the methane emissions than obtained by the direct surface expression measurement method.

The shaded area of the chart below shows the range of the High/Medium/Low categories and the diamonds are the results of surface expression measurement of confirmed leaks from buried pipelines within these categories.



The chart shows that all the leak rates were actually in the Low bucket, but the mapping study erroneously indicated one was in EDF/CSU's High bucket and eight in their Medium bucket. In the peer reviewed study by WSU on Distribution system leakage recently published by Dr. Lamb, the results suggest 98% of all system leaks should statistically land in the Low Flux Rate category as defined by CSU. For the SoCalGas system, based on this valuable work, this model seems to be holding true. Direct measurement of buried leaks on the distribution system is not a cost-effective activity since by doing nothing we can

assume 98% of the system leaks are in the Low category (as defined by CSU). Current efforts are being conducted by SoCalGas on developing a means of identifying the very few large leaks that occasionally develop. SoCalGas recommends the technologies being developed to quantify leaks be targeted in scope for the quantification of leaks or emission sources that fall into the large emission category. Hence, at this point the technology and practice should not be implemented.

Mobile Methane Mapping for Leak Survey

SDG&E has evaluated the results of SoCalGas' research in this area and agrees with SoCalGas' conclusions:

SoCalGas started evaluating a mobile methane mapping technology in January 2012 as a research, development, and demonstration project. After conducting two studies (in-house and NYSEARCH collaboration projects), it was concluded that the mobile methane mapping technology and approach studied could not be used to replace the current technologies and approaches used to conduct leak survey of Distribution Mains and Services. Subsequent experience gained with another system resulted in similar results. While mobile methane mapping technologies may be useful in other applications, they cannot replace the current leak survey technologies and approaches used in an urban environment for the following reasons:

- The systems provide a general estimate of where a methane emission source might be located in proximity to the vehicle location.
    - Many methane emissions from activities of the general population are transient or short-lived in nature. The systems cannot effectively differentiate piping system gas from other sources of methane emissions.* 40-50% of the methane indications obtained from this technology ends up being from sources other than utility-owned facilities.
      *Note: sources such as sewer gas, leaks on customer-owned facilities, and emissions from equipment starts, vehicles, abandoned wells, and naturally occurring methane.
    - The systems cannot pin-point leak locations, or provide an assessment of probable source of the methane indications
- The systems do not provide the information necessary for assessing public safety and to grade system leaks, such as:
    - Determining whether the leak is on an above ground facility, or a below ground leak indication, or from yard piping owned by the customer.
    - Whether methane readings exist inside enclosures that could provide a source of ignition, such as electrical boxes on structures or enclosures and vaults owned by other utilities.

- The systems cannot provide the information needed to assess the likelihood of leak migration into structures in order to grade below ground leak indications, such as:
    - The spread and ground level concentrations of the methane readings;
    - The proximity of the spread to buildings and structures; and
    - The type and extent of paving.
- The systems cannot assess for abnormal operating conditions, such as:
    - Construction that violates safe operation of the Meter Set Assembly and other company-owned facilities;
    - Proximity of system components designed to provide over-pressure protection to sources of ignition;
    - Unsafe alterations on visible customer piping;
    - Signs of tempering and theft;
    - Damage to above ground facilities and pipeline coatings; and
    - Exposed buried piping.
- The systems measure in parts per billion and hand-held technologies have not been commercially available (some are in development or just entering the market) to trace the methane readings from the vehicle to the source of the emissions.
    - For most system leaks that are very small, since it is impossible to validate this relationship, leaks can be missed.
    - The area of coverage (Field of View) from the vehicle is highly variable and often extends a long way from the vehicle location, sometimes blocks away. There is no practical way to validate the area coverage claimed by the system developers. Even if it is valid, such area coverage is a drawback for leak survey applications because of the variability of the system and impracticality of investigating the given area for leaks without performing a walking survey of all facilities.

For these reasons, walking surveys must be conducted in addition to the use of this technology; therefore, any benefit gained from this technology must be considered incremental to existing leak survey practices.

Estimated emissions reduction benefit and estimated direct costs should be re-calculated according to adopted CPUC cost-effectiveness methodology.