SoCalGas
Attachment Q1

No.	Mandatory Best Practice(s)	Title	Emission Source	Question 1: A summary of changes to utility leak and emission management practices from January 1st, 2017 to December 31st, 2017
1	N/A	Refinement of Emission Factors	Various Sources (e.g. Customer Meters and Meter and Regulator Stations etc.)	• This work is being done in collaboration with California Air Resources Board (CARB) and the California Public Utilities Commission. SoCalGas cooperated and participated in studies and supported CARB to revise emission factors. SoCalGas is hopeful CARB will provide a report with revised factors as discussed in the Workshop on January 19th, 2018, and SoCalGas will be supporting technical review with CARB going forward.
2	21	Reduction of Non-Hazardous Leak Inventory	Distribution Pipeline Leaks	• In the Test Year 2016 General Rate Case [A.14-11-004], SoCalGas requested funding to address its inventory of non-hazardous buried leaks, and in June 2016, the final decision approved this incremental activity. SoCalGas started ramping up leak repair efforts in 2016, including hiring incremental employees. • In 2017, SoCalGas repaired 4,663 non-hazardous code 3 leaks.
3	24 - 26	Excavation Damage Prevention	Distribution and Transmission Pipeline Damages	• SoCalGas continues to conduct 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). Reduction of damages to the system can support public safety, integrity of the system as well as methane emission reduction goals. • SoCalGas continues to promote other damage prevention measures such as protection of gas facilities from outside force damage, monitoring of third-party excavation activities near high pressure lines, and proactive monitoring of Company facilities. • In 2017, SoCalGas invested an additional $350,000 in safe digging media campaigns to promote safe excavation practices and contacting 811 before digging. SoCalGas achieved a decrease in the number of excavation damages in 2017 compared to 2016, as well as an increase in the number of USA tickets. Increased awareness of the 811 process

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				correlates with reduced excavation damages, resulting in decreased occurrences of uncontrolled gas release. • SoCalGas committed to participate in the EPA Methane Challenge Program and implement the options for the Excavation Damages Best Management Practice. A report of the company's 2017 Excavation Damages Best Management Practices activities will be submitted in 2018 pending Program Approval by the Office of Management & Budget. • As of 2017, SoCalGas is now a member of the Gold Shovel Standard and all Company Prime Contractors are enrolled in the Gold Shovel Standard as well. • SoCalGas implemented the Big Shovel Program in August 2017. The Big Shovel was first unveiled on National 8-1-1 Day (August 11) at a media event with SoCalGas and fire officials from the Woodland Hills Los Angeles Fire Department to help remind the public about the dangers of hitting utility lines when digging, and to increase awareness of the need to call 811. Since then, SoCalGas has brought the Big Shovel to events including the Camarillo Air Show, the Anaheim Home and Garden Show, CARCGA Mock Utility Line Strike, and the SoCalGas Contractor Safety Congress • In the TY 2019 GRC, SoCalGas is proposing using data analytics to automate the prioritization process of USA tickets using sophisticated algorithms based on ticket and GIS information. This automation will improve visibility for ticket management of high priority lines.
4	17	Mobile Methane Mapping Assessment of Pipelines Identified for	Distribution Pipelines	• SoCalGas evaluated the feasibility of using existing mobile methane mapping technologies to model atmospheric methane levels near pipeline Main segments or Services identified through the Distribution Integrity Management Program (DIMP) risk model for replacement. This practice supports methane reduction as well as DIMP.

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		Replacement by Distribution Integrity Management Program		• In 2017, the SoCalGas DIMP Segment emissions assessment project performed mobile methane mapping assessments on 130 Main replacement projects totaling approximately 36 miles. From this work, there were 0 leaks identified. In addition, 6 Service leak cluster areas were assessed using mobile methane mapping for a total of 4,929 Services and 137 miles of Main. From this work there were 3 leaks identified that were not previously known.
5	16	Distribution Integrity Management Program Replacement of Bare Steel and Vintage Plastic Pipe	Underground Distribution Pipe	• In 2017, SoCalGas replaced 131 miles of non-state-of-the-art pipe, including 77 miles of unprotected steel and 54 miles of early vintage plastic pipe. Using the leak rate per mile per year for these categories of materials, these replacements are estimated to provide a reduction of 693 MCF emissions annually. • SoCalGas has a GRC-funded Bare Steel Replacement Program (BSRP) that focuses on the replacement of poor performing bare steel. SoCalGas plans to target 29 miles of mains and associated services annually above and beyond routine replacements in accordance with DIMP regulations. • SoCalGas has a GRC-funded Vintage Integrity Plastic Plan (VIPP) that focuses on the replacement of poor performing early vintage plastic for all pre-1986 plastic pipe. SoCalGas plans to target 78 miles of mains and associated services annually above and beyond routine replacements in accordance with DIMP regulations.
6	21	Increased Compressor Rod Packing Replacements	Transmission and Storage Compressors	• In 2016, SoCalGas proactively began increasing compressor rod packing replacements by adding the incremental replacement parameter of replacing packings with greater 26,000 hours of engine operation. • In 2017, SoCalGas installed 19 packing replacements at Transmission Compressor Stations and 28 packing replacements at Storage facilities, providing an estimated reduction of 40,655 MCF of methane. Increasing the frequency of rod packing replacements reduces methane emissions that may occur due to worn or damaged rod packings that allow natural

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				gas to escape while compressors are in operation. SoCalGas has voluntarily replaced compressor rod packing units as part of its commitment to the EPA Natural Gas STAR program since 1994.
7	23	Replacement of High Bleed Pneumatic Devices	High Bleed Pneumatics	• 35 high-bleed pneumatic devices have been identified on the SoCalGas system. In 2017, eight of these devices were replaced. The remaining devices are scheduled for replacement over the next few years, with the goal of zero high-bleed devices by 2021. Nine of the high-bleed pneumatic devices are located at California Producer sites. The replacement of these devices is the financial responsibility of the California Producers as described in SoCalGas Tariff Rule 39. This may pose an additional challenge to meeting this deadline. SoCalGas plans to replace all high bleed pneumatic devices with zero bleed pneumatic devices that only vent during operation. SoCalGas has voluntarily replaced high bleed pneumatic devices as part of its commitment to the EPA Natural Gas STAR program since 1994.
8	23	Reduce Venting During Blowdowns and Improve Data Collection	Transmission Pipeline Blowdowns	• SoCalGas Transmission Pipelines routinely require maintenance to maintain system integrity and safety. The gas must be evacuated from the pipelines to a safe level prior to maintenance work. As a best practice in 2017, SoCalGas lowered the pipeline pressure where feasible to reduce the potential volume of methane emissions. In 2017, SoCalGas avoided 59,000 MCF of methane emissions by reducing line pressure prior to blowdowns. • In 2017, SoCalGas continued implementing a methane capture system which compressed pipeline gas into a compressed natural gas tube trailer and then re-introduced the gas into the pipeline. This further reduced methane emissions by an additional 2,200 MCF. Details on this new strategy was shared during the November 2016 EPA Natural Gas STAR Methane Challenge Blowdown workshop. Additional information is available in the following press release: http://sempra.mediaroom.com/index.php?s=19080&item=137192

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9	20	Electronically Track Verified Gas Leaks	Transmission and Distribution Pipelines - Leak Survey	• In 2017, SoCalGas' leak detection equipment used for walking leak survey was replaced with 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. This will allow the electronic tracking of verified gas leaks. Complete integration is expected to be completed by the end of 2019. Once fully integrated with enterprise GIS and work management systems, this enhancement should: • Improve recordkeeping of survey activities • Provide means of validating proper equipment operation during survey operation • Capture equipment readings that could be missed by operators • Reduce paperwork & data entry labor • Reduce data entry errors and missed records
10	23	Expanded Storage Integrity Management Program	Storage Wells	• In addition to SoCalGas' existing maintenance and prevention programs, SoCalGas has been implementing an expanded an accelerated Storage Integrity Management Program ("SIMP"). The SIMP program uses state-of-the-art inspection technologies to validate storage facility safety and integrity, and identify potential issues. SIMP includes a baseline assessment and regular, periodic reassessments of wells and associated surface facility integrity; safety enhancements; and proactive assessment, management, planning, repair, and replacement of storage facilities. SIMP involves the expanded use of contract workover rigs to evaluate downhole casing and tubing conditions and enhanced methods of evaluating surface equipment such as valves, wellheads, and well laterals. • SIMP is intended to enhance existing practices that will: • Perform a risk assessment for each well based on historical data, design, and location of well • Assess the well using enhanced, state-of-the-art technology • Remediate conditions identified during well assessment activities, if

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				any • Develop enhanced preventative and mitigation measures • Maintain associated records developed as a result of SIMP activities After these activities are completed leaks that existed on the wells and associated surface pipe will be remediated, therefore reducing emissions. • In 2017, SoCalGas performed baseline SIMP assessments at Playa Del Rey, Honor Rancho, Aliso Canyon, and La Goleta. This work is still in progress. Additionally, at Aliso Canyon, SoCalGas is only operating wells that have completed assessments as part of the DOGGR-ordered comprehensive safety review. • As of 2017, all operating wells at SoCalGas' storage fields have been reconfigured so that natural gas flows only through a newly-installed, steel inner tubing, leading to reduction of leak paths with double barrier protection to prevent emissions.
11	18	Synergies with Pipeline Safety Enhancement Plan (PSEP) Technology Plan	Distribution and Transmission Pipeline Leaks	• SoCalGas requested funding in the TY 2019 GRC application to install approximately 2100 methane sensors that link to the Advanced Meter network across both utilities. Theses sensors support early warning of a leak for schools, hospitals or hard to evacuate facilities (e.g. nursing homes). SoCalGas installed ten sensors as a pilot to integrate with the network, back office systems, and associated processes. If this program is funded, SoCalGas would like to expand the program beyond pilot. • SoCalGas requested in the TY 2019 GRC to begin installing fiber optic cables along the route of high pressure pipelines that can sense leaks and potential encroachments near the pipeline. In 2016, SoCalGas installed as a pilot and for training a fiber optic line in their Situation Training facility at Pico Rivera. To further this effort, SoCalGas changed its

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				procedures to require any Transmission pipeline projects 12" or greater in diameter for a mile or longer to install a fiber optic sensing line. In 2017, SoCalGas broke ground on a fiber optic cable installation that will enable it to monitor the condition of high-pressure transmission pipelines in real time. The fiber optic technology is being installed along a new, seven-mile section of natural gas pipeline in Bakersfield, California and will serve as an early-warning system to detect unauthorized construction work that could damage the pipeline as well as changes in pressure that could indicate a leak in the line.
12	17, 20	Research Projects to Advance the Science and Tools Available to Detect and Quantify Leaks	Various	• SoCalGas funded and actively participated in various research projects to advance the science related to estimating methane emissions from various portions of the natural gas system through refinement of emission factors and other emission quantification methods. SoCalGas is also involved in work to develop and advance technologies related to the detection and quantification of individual fugitive and vented methane emission sources. This work supports technological advancements in leak detection to find leaks earlier, quantify emissions, and target resources to optimally reduce natural gas emissions. Work is also conducted on a variety of new technologies related to pipeline safety and integrity that will synergistically reduce methane emissions. • SoCalGas began a study to evaluate advanced mobile methane quantification and detection technologies for transmission and storage facilities. The objective is to validate advanced leak detection and emissions quantification technologies for transmission and storage facilities. The study includes performing controlled release studies in geographically diverse testing sites and evaluating detection and quantification performance of three advanced technologies; Picarro EQ

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				Ground Mobile System (CRDS ppb), SEEKOPS Aerial (Drone) Mobile System (JPL open/fixed-path laser ppb) and SoCalGas Aerial (Drone) Mobile System (Pergam open-path laser ppm-m). Results of this study are expected to be made available by the fourth quarter 2018. • In 2017, SoCalGas worked on research projects in the following areas: ● Emission Factors - improving Methane Emissions Factors of buried pipelines and meter set assemblies with CARB, DOT, and third party research partners. ● Leak Detection - development of fixed-location sensors, evaluation of various systems designed to measure atmospheric methane concentrations and other related gas constituents (aka "mobile methane mapping"), optical gas imaging, residential leak detection, fence-line monitoring, aerial leak detection from both manned aircraft and drones, and fiber optic leak detection along buried pipelines. ● Leak Quantification - evaluation of Leak Quantification technologies, including surface expression, mobile measurement in gas plumes, optical imaging, and development of other potential approaches. ● Damage Prevention - including fiber optic and acoustic technologies, advancements in pipe locating, excavation equipment operator pipeline warning system, and radio frequency identification (RFID) technologies. ● Blowdowns – perform gap analysis of methods and technologies to mitigate pipeline blowdowns. For example, there are still areas where there may be opportunities on distribution mains where equipment can be used to capture blowdown before we purge a pipeline. ● Pipeline Safety & Integrity – development of intelligent service shut-off device, investigation of leak growth rates in plastic piping systems, and development of breakaway devices for Service risers.
13	16	Leverage eGIS to Prioritize	Distribution Pipelines	• SoCalGas leveraged eGIS to enhance prioritization and optimization of non-state-of-the-art pipeline replacement programs by identifying leak clusters. Leveraging eGIS to more efficiently address the leakiest

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		Non-State-of-the-Art Pipeline Replacement Programs		portions of the system increases the effectiveness of modernization programs and supports greater emissions reductions. • As part of the DIMP, SoCalGas replaced 669 incremental services in 2017 by prioritizing leak clusters.
14	16	Move Pre-1986 Aldyl-A Mains and Associated Services on 5-Year Leak Survey Cycle to Annual Leak Survey	Distribution Pipelines	• In 2017, SoCalGas began transitioning the leak survey cycle on pre-1986 Aldyl-A mains and associated services on 5-year leak survey cycles to annual leaks surveys. The emissions reductions expected for this activity are detailed in the 2018-2019 Leak Abatement Compliance Plan.
15	All	Mandatory Best Practices		• SoCalGas submitted its Leak Abatement Compliance Plan on March 15, 2018, detailing the proposed activities for each of the 26 Best Practices, milestones for implementation, and emissions reduction expectations for the years 2018 and 2019.