

**SoCalGas  
Attachment Q1**

<b>Mandatory Best Practice(s)</b>	<b>Title</b>	<b>Emission Source</b>	<b>Question 1: A summary of changes to utility leak and emission management practices from January 1st, 2018 to December 31st, 2018</b>
1	2018-2019 Compliance Plan Implementation	All	<ul style="list-style-type: none"> <li>• SoCalGas received approval on its 2018-2019 Leak Abatement Compliance Plan in October 2018 and developed a program management office to oversee the implementation of the approved best practice activities.</li> </ul>
2	Methane GHG Policy	All	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas updated its Environmental Excellence Policy to reflect that methane is a potent Greenhouse Gas (GHG) that must be prevented from escaping to atmosphere.</li> </ul>
3	Pressure Reduction Policy	Blowdown from high pressure Transmission, Distribution, and Storage Pipelines	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas prepared and circulated draft policies with internal stakeholders stating that pressure reduction to the lowest operationally feasible level in order to minimize methane emissions is required before non-emergency venting of high-pressure facilities.</li> </ul>
4	Project Scheduling Policy	Blowdown from high pressure Transmission, Distribution, and Storage Pipelines	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas prepared and circulated draft policies with internal stakeholders stating that projects must have time built in to minimize methane emissions, which is required before non-emergency venting of high-pressure facilities.</li> </ul>
5	Methane Evacuation Procedures	Blowdown from high pressure Transmission, Distribution, and Storage Pipelines	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas prepared and circulated draft policies with internal stakeholders outlining the procedures approved for evacuating methane before non-emergency venting of high-pressure facilities.</li> </ul>

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6	Methane Evacuation Work Orders Policy	Blowdown from high pressure Transmission, Distribution, and Storage Pipelines	<ul style="list-style-type: none"> <li>In 2018, SoCalGas prepared and circulated draft policies and procedures with internal stakeholders outlining requirements for documenting in procedures the steps to reduce pressure before non-emergency venting of high-pressure facilities.</li> </ul>
7	Bundling Work Policy	Blowdown from high pressure Transmission, Distribution, and Storage Pipelines	<ul style="list-style-type: none"> <li>In 2018, SoCalGas prepared and circulated draft policies and procedures with internal stakeholders outlining requirements for bundling projects to reduce venting methane to atmosphere.</li> </ul>
9	Recordkeeping	All	<ul style="list-style-type: none"> <li>In 2018, SoCalGas began work on developing a centralized database to incorporate SB 1371 records to enable automation of reporting. SoCalGas' project manager is working with the data owners to understand how to better gather the data in improved mobile forms, as well as system architects to outline how to house the data. This project is expected to extend through 2020.</li> </ul>
11	Methane Emissions Minimization Policies Training	All	<ul style="list-style-type: none"> <li>In 2018, SoCalGas began developing a training module that provides employees with an overview of what GHGs are, how they impact the environment, the impacts of methane, and how employees can help reduce methane emissions. This module is expected to be finalized in 2019 and will be a mandatory training requirement for all SoCalGas employees. SoCalGas also updated internal training materials for operational trainings so they reflect policy updates regarding implementations of the 26 mandatory best practices.</li> </ul>

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12	Knowledge Continuity Training Programs	All	<ul style="list-style-type: none"> <li>• SoCalGas will be implementing the training program developed to meet the requirements of Best Practice 11 into the new employee training bundle so all new employees are trained on the importance of minimizing methane emissions.</li> </ul>
13	Performance Focused Training Program	Distribution and Transmission facilities	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas began developing a competency based training program that will leverage mobile training formats to provide a comprehensive, multimedia training program. This new format will encompass methane mitigation policies and procedural changes to increase the agility and speed of policy change implementations. The first set of training development is expected to be completed in 2019.</li> </ul>
16	Gas Distribution Leak Survey	Unprotected Steel Distribution Pipe	<ul style="list-style-type: none"> <li>• SoCalGas will begin performing annual survey on unprotected steel distribution pipe beginning in January 2020. In 2018, SoCalGas began hiring and training 13 incremental Construction Technicians and 2 supervisors to perform this work. SoCalGas also began purchasing tools, vehicles, and instrumentation, and updating compliance systems with new survey requirements to prepare for the 2020 implementation.</li> </ul>
16	Distribution Integrity Management Program Replacement of Bare Steel and Vintage Plastic Pipe	Underground Distribution Pipe	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas replaced 104 miles of non-state-of-the-art pipe, including 29 miles of unprotected steel and 75 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 1,000 MCF emissions annually.</li> <li>• 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 Integrity Management Program (DIMP) regulations.</li> <li>• SoCalGas has a GRC-funded Vintage Integrity Plastic Plan (VIPP) that focuses on the replacement of poor performing early vintage</li> </ul>

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			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.
16	Leverage eGIS to Prioritize Non-State-of-the-Art Pipeline Replacement Programs	Distribution Pipelines	<ul style="list-style-type: none"> <li>• 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 portions of the system increases the effectiveness of modernization programs and supports greater emissions reductions.</li> <li>• As part of the DIMP, SoCalGas replaced 340 incremental services in 2018 by prioritizing leak clusters.</li> </ul>
16	Move Pre-1986 Aldyl-A Mains and Associated Services on 5-Year Leak Survey Cycle to Annual Leak Survey	Distribution Pipelines	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas began performing annual leak surveys on pre-1986 Aldyl-A mains and associated services, compared with the previous 5-year leak survey cycles. The emissions reductions expected for this activity are detailed in the 2018-2019 Leak Abatement Compliance Plan.</li> </ul>
17	Enhanced Methane Detection	Underground Pipelines	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas began the procurement of a new speciation van, including a vehicle and gas speciation equipment. These are long lead time items, which are expected to arrive in 2019.</li> </ul>
17, 20	Research Projects to Advance the Science and Tools Available to Detect and Quantify Leaks	Various	<ul style="list-style-type: none"> <li>• 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,</li> </ul>

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			<p>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.</p> <ul style="list-style-type: none"> <li>• In 2018, SoCalGas participated in industry research projects and conducted demonstrations and pilot studies in the following Research and Development areas: <ul style="list-style-type: none"> <li>○ Emission Factors - continued work with CARB, DOT, and third-party research partners to improve Methane Emissions Factors of buried pipelines and meter set assemblies.</li> <li>○ Leak Detection and Localization (pin-pointing) - development of fixed-location sensors, evaluation of various systems designed to measure atmospheric methane concentrations compared with “traditional” methodologies, optical gas imaging, residential leak detection, fence-line monitoring, and aerial leak detection from both manned aircraft and drones.</li> <li>○ Leak Quantification - evaluation of emissions quantification technologies, including surface expression, mobile measurement in gas plumes, optical imaging, development of other potential approaches, and investigation of leak growth rates in plastic piping systems</li> <li>○ Operations – identified areas for a potential reduction of emissions from operation activities: evaluated quick repair methods for Meter Set threaded connections, evaluated quality of pipe fittings, and performed gap analysis of methods and technologies to mitigate pipeline blowdowns.</li> <li>○ Geographic Tracking and Integrity Risk factors – projects to develop data models to facilitate mobile data collection and to enhance Integrity Management Practices through risk</li> </ul> </li> </ul>

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			analysis, prediction, and decision-based methodologies for Transmission and Storage facilities.
18	Stationary Methane Detector Pilot	Above Ground High Pressure Facilities	<ul style="list-style-type: none"> <li>• SoCalGas proposed piloting stationary methane sensors for high pressure regulator stations to determine emission reduction capabilities and cost effectiveness of these systems. In 2018, SoCalGas began developing the pilot scope, determining data needs, evaluating technologies to be piloted, and evaluating various locations to install pilot sensors to have a diverse and statistically significant data set. Equipment was ordered in early 2019 and preliminary results are expected by the end of 2019.</li> </ul>
18	Synergies with Pipeline Safety Enhancement Plan (PSEP) Technology Plan	Distribution and Transmission Pipeline Leaks	<ul style="list-style-type: none"> <li>• 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. These 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 a pilot. Efforts in 2018 include project plan development, finalizing site selection criteria, and providing remote methane sensor system design enhancements. Deployment is on hold pending a GRC decision.</li> <li>• 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</li> </ul>

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			<p>Situation Training facility at Pico Rivera. To further this effort, SoCalGas changed its 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 monitor the condition of high-pressure transmission pipelines in real time. The fiber optic technology was 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. Another section of fiber optic cable was installed on a Transmission pipeline in Montecito, California on pipeline creek crossings that were damaged or exposed during the Montecito storm of 2018.</p>
19	Above Ground Leak Survey	Above Ground Facilities	<ul style="list-style-type: none"> <li>In 2018, SoCalGas began evaluating instrumentation options to use for above ground survey on high pressure M&amp;R facilities. SoCalGas also began exploring resources to provide method 21 leak survey training and equipment to storage employees.</li> </ul>
20a	Quantification	Distribution Pipeline Leaks	<ul style="list-style-type: none"> <li>In 2018, SoCalGas began work to differentiate leak locations with potential larger leak rates and conducted leak quantification resulting in repairs prioritized by leak rate. The method developed by SoCalGas will identify and prioritize Code 2 and Code 3 leaks that have leak rates exceeding 10 cubic feet per hour (CFH). This is being implemented as a pilot at three distribution bases to further evaluate the data model and determine best processes for full scale implementation, expected to begin in 2020.</li> </ul>

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20b	Electronically Track Verified Gas Leaks	Transmission and Distribution Pipelines - Leak Survey	<ul style="list-style-type: none"> <li>• SoCalGas worked on development of an IT system to replace existing leak survey/patrol processes involving paper maps with a mobile application that provides electronic maps and captures breadcrumb data. Complete integration is expected to be completed by the end of 2020. Once fully integrated with eGIS and work management systems, this enhancement should:               <ul style="list-style-type: none"> <li>○ Provide electronic maps in the field and collect Breadcrumb data along survey path</li> <li>○ Improve geographic evaluation and tracking of leaks with auto-population of GIS coordinates for leak location</li> <li>○ Track when pipeline assets have been leak-surveyed/patrolled and capture all leak indications</li> <li>○ Improve recordkeeping of survey activities</li> <li>○ Reduce paperwork and data entry labor</li> <li>○ Reduce data entry errors and missed records</li> </ul> </li> </ul>
20b	AVEVA modeling and updating P&IDs	Storage and Compressor Facilities	<ul style="list-style-type: none"> <li>• SoCalGas identified and prioritized the facilities that will be modeled in AVEVA. In 2018, vendors were secured to begin development of updated process and instrumentation diagrams (P&amp;IDs) and staffing began for incremental employees to support this project.</li> </ul>
21	Reduction of Above Ground Minor Leak Inventory	Distribution Meter Sets	<ul style="list-style-type: none"> <li>• In 2018 SoCalGas had an inventory of over 5,000 above ground minor leaks. To mitigate this inventory, SoCalGas staffed and trained 13 Construction Technicians. SoCalGas' goal is to completely mitigate this inventory by the end of 2019. To support this goal, SoCalGas updated the leak repair policy to reflect that all distribution above ground minor leaks must now be repaired within 10 days of discovery.</li> </ul>
21	Reduction of Non-Hazardous Leak Inventory	Distribution Pipeline Leaks	<ul style="list-style-type: none"> <li>• SoCalGas updated the leak repair policy to reflect that all Code 3 steel leaks and above ground minor leaks now need to be repaired within three years of discovery. Above ground minor leaks on distribution facilities must be repaired within 10 days.</li> </ul>



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			<ul style="list-style-type: none"> <li>• SoCalGas continues to address the Code 3 steel leak inventory including hiring incremental employees to reduce the inventory.</li> <li>• In 2018, SoCalGas repaired 3,812 non-hazardous Code 3 leaks.</li> <li>• Based on information and belief, SoCalGas requests an exception for approximately 490 leaks that SoCalGas believes is too costly to repair at this time. In 2019, SoCalGas intends to quantify the emission flow rate of these leaks and will use that information to assist in prioritizing repairs. Additional information related to these exception requests can be found in Appendix 4, Explanatory Notes/Comments.</li> </ul>
21	Increased Compressor Rod Packing Replacements	Transmission and Storage Compressors	<ul style="list-style-type: none"> <li>• In 2016, SoCalGas proactively began increasing compressor rod packing replacements by adding the incremental replacement parameter of replacing packings with greater than 26,000 hours of engine operation.</li> <li>• In 2018, SoCalGas installed 13 packing replacements at Transmission Compressor Stations and 14 packing replacements at Storage facilities, providing an estimated reduction of 23,355 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 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.</li> </ul>
22	Pipe Fitting Specifications	Threaded Fittings	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas engaged in a research project on the quality of threaded fittings on its system. SoCalGas also began designing the scope of an internal study to determine if more stringent quality control processes need to be implemented to reduce emissions through threaded fittings.</li> </ul>
23	Replacement of High Bleed Pneumatic Devices	High Bleed Pneumatics	<ul style="list-style-type: none"> <li>• In SoCalGas' 2018 Compliance Plan, the nine high-bleed pneumatic devices remaining on SoCalGas' system were targeted for replacement. Three of these devices were replaced in 2018, and four more have</li> </ul>

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			subsequently been replaced in 2019. The remaining two devices are scheduled for replacement by the end of 2020.
23	Use Billing Calibration Factor In lieu of Meter Replacement	MSA Blowdown	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas staffed a Project Manager to oversee the Billing Calibration Factor in Lieu of Meter Replacement project. This project will allow SoCalGas to reduce blowdown from replacing meters. SoCalGas began development of system architecture to allow the billing adjustment to be incorporated into the billing system. An advice letter (AL 5403) was submitted in 2018 proposing a pilot program to apply a 2% meter calibration adjustment factor in lieu of meter replacement of certain class of meters by modifying Condition 1 in Res. G-2928, revising SoCalGas' Rule No. 02, Description of Service, and including a bill message on the periodic bill statement.</li> </ul>
23	Reduce Venting During Blowdowns and Improve Data Collection	Transmission Pipeline Blowdowns	<ul style="list-style-type: none"> <li>• 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, SoCalGas lowers the pipeline pressure where feasible to reduce the potential volume of methane emissions. In 2018, SoCalGas avoided 1,450 MCF of methane emissions by reducing line pressure prior to blowdowns. This number is much lower in 2018 due to fewer transmission pipeline projects necessitating a blowdown.</li> <li>• In 2018, 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 800 MCF.</li> </ul>
23	Vapor Collection Systems	Compressor Stations	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas was in construction for a vapor collection system at a transmission compressor station, which is expected to be completed in 2019. SoCalGas is also designing a study to be performed after completion to evaluate the system for emission reductions and cost</li> </ul>

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			effectiveness to determine if this strategy should be further implemented at other stations.
23	Expanded Storage Integrity Management Program	Storage Wells	<ul style="list-style-type: none"> <li>• 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.</li> <li>• SIMP is intended to enhance existing practices that will: <ul style="list-style-type: none"> <li>○ Perform a risk assessment for each well based on historical data, design, and location of well</li> <li>○ Assess the well using enhanced, state-of-the-art technology</li> <li>○ Remediate conditions identified during well assessment activities, if any</li> <li>○ Develop enhanced preventative and mitigation measures</li> <li>○ Maintain associated records developed as a result of SIMP activities</li> </ul> </li> <li>• In 2018, SoCalGas continued to perform 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.</li> <li>• As of 2018, all operating wells at SoCalGas’ storage fields that have completed the SIMP assessments have been reconfigured so that natural gas flows only through a newly-installed, steel inner tubing, leading to</li> </ul>

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			reduction of leak paths with double barrier protection to prevent emissions.
23	Reducing Emissions Through Storage Capital Projects	Storage	<ul style="list-style-type: none"> <li>• SoCalGas implemented several projects at Storage facilities in 2018 to reduce vented and fugitive emissions, including the following:               <ul style="list-style-type: none"> <li>○ Master Lease Fuel system that runs throughout the field and provides dehydrated, pressurized natural gas to equipment and instrumentation. It drives combustion-driven equipment, provides heat for certain processes, is the source of blanket gas for tanks, and is the motive gas for well safety systems and other valves and instruments. The Master Lease Fuel System cannot be removed, because the combustion-driven equipment, process heating equipment, and blanket gas for tanks all require dehydrated, pressurized natural gas to operate. However, all other functions (motive gas for well safety systems and other valves and instruments) are being converted over to compressed air as the motive gas. This project includes the installation of the compressors and piping, supports, air receivers, and utilities to make the system functional.</li> <li>○ Electric Driven Compressors are designed to vent gas to atmosphere through the station’s vent stack on start-up, shutdown, and for maintenance. This project provides a piping connection to an existing piping system that can be used to capture that gas and reduce the amount of gas vented to atmosphere.</li> <li>○ Many existing chemical injection pumps are powered by pressurized natural gas, and gas is vented to the atmosphere after it has powered the pumps. This project replaces those pumps with electric motor driven pumps in an effort to eliminate gas venting to atmosphere. The project includes the</li> </ul> </li> </ul>

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			<p>installation of the pumps and ancillary piping, supports, and utilities to make the system functional.</p> <ul style="list-style-type: none"> <li>○ Existing kill network piping are being installed as a drawdown system to reduce the amount of gas vented to atmosphere during maintenance, choke changes, and capital project work.</li> <li>○ SoCalGas is installing multiple, small compressors at strategic locations throughout the field to compress gas from one system to another in order to capture gas that would otherwise be vented to the atmosphere during maintenance and capital project work.</li> <li>○ Several flow meters once used to measure the flow of gas to various parts of the field and groups of wells are being removed and replaced with pipe spools.</li> </ul> <ul style="list-style-type: none"> <li>● A family of orifice meters has a history of repeated minor leaks. These meters are being rebuilt to prevent future leakage.</li> </ul>
24 - 26	Excavation Damage Prevention	Distribution and Transmission Pipeline Damages	<ul style="list-style-type: none"> <li>● 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.</li> <li>● 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.</li> <li>● In 2018, SoCalGas invested an additional \$350,000 in safe digging media campaigns to promote safe excavation practices and contacting 811 before digging. These funds were used to augment SoCalGas’s safety media campaign with additional radio, tv, and print message ads about contacting 811 before digging.</li> </ul>

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			<ul style="list-style-type: none"> <li>• SoCalGas is a member of the EPA Methane Challenge Program and implement the Excavation Damages Best Management Practice. A report of the company’s 2017 Excavation Damages Best Management Practices activities was submitted in late 2018, after Program Approval by the Office of Management &amp; Budget.</li> <li>• In the TY 2019 GRC, SoCalGas proposed 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 and allow for additional attention to be focused on tickets with higher risk ranking.</li> </ul>
25	Dig Ins and Company Standby Monitors	Underground Pipes	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas worked on the development of an algorithm that would prioritize USA tickets for expanded standby. This is expected to be completed in 2019 and go to a pilot phase to evaluate if the expanded standby reduces damages and emissions in a cost effective manner.</li> </ul>
26	Dig Ins and Repeat Offenders	Underground Pipes	<ul style="list-style-type: none"> <li>• In 2018, SoCalGas began developing the project scope and system requirements to develop system improvements so damage data can be better analyzed and aggregated for reporting. SoCalGas also began initial work in developing improved mobile forms for gathering data and submitting it into the system to reduce manual entry error.</li> </ul>
N/A	Refinement of Emission Factors	Various Sources (e.g. Customer Meters and Meter and Regulator Stations etc.)	<ul style="list-style-type: none"> <li>• 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 in January 2018, and SoCalGas will be supporting technical review with CARB going forward.</li> </ul>