Southern California Gas 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
Southern California Gas Company R15-01-008 2017 Annual Report

By: Southern California Gas Company

Date: 6/16/17

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 [Company Name] R15-01-008 2017 Annual Report.[2]

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, 2016 to December 31st, 2016. 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:

SoCalGas already has various methane emission reduction measures in place that support the objectives of SB 1371. During 2016, SoCalGas initiated several additional practices to address methane emissions. Please see Attachment Q1 & Q7 for a description of changes to the utility leak and emission management practices conducted from January 1st, 2016 to December 31st, 2016.

[1] As described in Data Request [Company Name] R.15-01-008 2016 Annual Report

[2] During SoCalGas' process of gathering and compiling data for its 2017 Annual Report, SoCalGas identified corrections in its underlying data that may affect its 2016 Annual Report. SoCalGas notified Energy Division Staff and will work with Energy Division Staff to determine the procedure for updating SoCalGas' 2016 Annual Report, if necessary.

(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, 2016 through December 31st, 2016.

Response:

See Appendices

(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, 2016 through December 31st, 2016. 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, 2016 through December 31st, 2016. 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:

See Appendices

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request [Company Name] R15-01-008 2017 Annual Report for the 12 months ending December 31st, 2016.

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:

SoCalGas hereby submits its proposed bundle of strategies to reduce gas leaks and emissions in the following year as Attachment Q1 & Q7 of this data request.

SoCalGas
Attachment Q1 & Q7

No.	Related Proposed Mandatory Best Practice(s)	Title	Emission Source	Question 1: A summary of changes to utility leak and emission management practices from January 1st, 2016 to December 31st, 2016.	Question 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.
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, and it was initiated in 20107, so. Current planned work will be initiated in 2017. There were no activities in 2016.	In 2017, SoCalGas will be working on the following projects: - Department of Transportation (DOT) / Operations Technology Development (OTD) project to investigate emissions from Commercial and Industrial meter sets. - DOT / OTD project to investigate emissions from leaks on vintage plastic pipelines and components - CARB / Gas Technology Institute (GTI) project to investigate emissions from leaks on Distribution buried Mains and Services - CARB / GTI project to investigate emissions from leaks on Distribution meter set assemblies Investing in studies for emissions factors (EFs) will improve quantification efforts and help identify the leakiest components to target for emissions reduction opportunities. Currently required Annual Facility-Based EFs do not provide a means for the System Operator to demonstrate emissions reduction. Developing component leak rates, or rates for different categories of leaks (such as Above Ground Hazardous, Non-

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					Hazardous, and Minor Distribution leaks) to replace annual facility-based factors will better support emissions reduction accounting because it will be estimating emissions based on actual leak data and component counts. Identifying the most leak-prone components will also improve system knowledge and may provide opportunity for component redesigns to improve emission performance. Improved estimates of methane emissions will help provide a more realistic assessment on magnitude of emission source for prioritizing resources. In addition, SoCalGas is willing to participate with CARB in state-wide studies to measure emissions to develop leak-based or component-based EFs. These factors will facilitate emission estimates from actual leak data that is currently available, and identify any additional data that will need to be collected to support this approach. Changes in data collection requirements will require changes to certain procedures, forms, and enterprise systems to manage the new information

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					and data collection effort. Once understood, cost estimates can be provided and funding will be needed to fund the necessary system changes and any incremental labor to collect, QC, monitor, and report the data.
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, and eliminated 799 of the non-hazardous code 3 steel leaks that had been identified in the General Rate Case.	SoCalGas' goal is to address its inventory of below-ground Distribution pipeline leaks older than three years by the end of 2018, so that no active below-ground leak will be more than three years old moving forward after 2018.
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	In 2017, SoCalGas required that all company excavation contractors be certified in the Gold Shovel program that is designed to reduce dig-ins. The Gold Shovel Standard aims to be a universally accepted, widely adopted, and ultimately legislatively mandated standard, which, within 3 years, anticipates reduction of

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				system can support public safety, integrity of the system as well as environmental methane reduction goals. SoCalGas also continues to promote other damage prevention measures such as protection of gas facilities from outside force damage, monitoring of certain third party excavation activities and proactive monitoring of Company facilities. Effective March 30, 2016, SoCalGas committed to participate in the EPA Methane Challenge Program and implement the options for the Excavation Damages Best Management Practice.	dig-ins from professional excavators by 50%.[1] In addition, SoCalGas is hiring six damage prevention advisors in 2017 as part of a pilot program to address areas with high dig-in rates. These advisors will check on excavation projects around our pipelines and be our ambassadors with the excavation contractors. Also, a company-wide enhancement of the use of Geographic Information System (GIS) with the integration of USA ticket management system (KorTerra) is being tested and will be rolled out in the next year. The GIS and KorTerra integration will provide additional tools to support responsive and accurate locate and mark as well as provide a means to develop algorithms for determining high risk areas that may need standby or periodic inspections. The locations of company personnel via their mobile data terminal (MDT) unit's GPS also will be overlaid onto the GIS to support efficient dispatch of personnel. The company is also taking the following

[1] http://www.goldshovelstandard.com/wp-content/uploads/2015/10/10-10-15-Gold-Shovel-Standard-QA.pdf

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					actions to improve locate and mark tools and processes: - Enhancing the data collection software for damages to allow better analysis and identification of any program deficiencies. - Evaluating options to allow taking pictures of markings to better identify changes in conditions and help identify issues. - Enhancing the quality assurance for locate and mark activities.
4	17	Mobile Methane Mapping Assessment of Pipelines Identified for Replacement by Distribution Integrity Management Program	Distribution Pipelines	SoCalGas began 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 Distribution Integrity Management Program (DIMP) risk model for replacement. This practice supports methane reduction as well as the DIMP. As beta-test models of leak quantification technologies become available, these areas may also provide viable locations for field trials.	For the 2017 project there are 63 Main replacement projects in the assessment plan prior to commencement of construction totaling 77,063 ft of Main, and 6 Service leak cluster areas with a total of 4,929 Service and 724,230 miles of Main for a total of 1,109,669 ft of Main and Service.

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				This information is 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 any 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 result in a re-prioritizing of some segments scheduled for replacement, thereby reducing emissions. In 2016 fifty (50) Main replacement projects were assessed prior to commencement of construction totaling 79,886 ft of Main and 3 Service leak cluster areas were assessed for a total of 882 Service and 384,668 miles of Main. The total system footage of Main and Service is 487,538ft.	

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				From this work there were 4 leaks identified that were not previously known.	
5	21	Increased Compressor Rod Packing Replacements	Transmission and Storage Compressors	In 2016, SoCalGas increased compressor rod packing replacements to be every 26,000 hours of engine operation, and replaced nine incremental compressor rod packings. Increasing the frequency of rod packing replacements reduces methane emissions that may occur due to worn or damaged rod packings that allow excessive amounts of 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.	SoCalGas is re-evaluating this best practice based on California Air Resources Board's Oil and Gas Rule related to compressor rod packing replacements. The new rule requires rod packing replacements based on leakage levels, rather than hours of engine operations. This is anticipated to result in more frequent compressor rod packing replacements, reducing emissions further.
6	23	Replacement of High Bleed Pneumatic Devices	High Bleed Pneumatics	In 2016, through research conducted for SB 1371 data gathering for system reporting of all types of Natural Gas facilities, a possible 32 locations were identified that indicate high-bleed pneumatic devices may exist.	In 2017, SoCalGas' expanded records research and field verifications led to additional high bleed pneumatic devices being identified that were not initially found in the 2016 research. There are a total of 88 verified high bleed pneumatic devices in SoCalGas' system. 32 of those

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				SoCalGas plans to replace these high bleed pneumatic devices with low-bleed or no-bleed devices after they are verified. SoCalGas has voluntarily replaced high bleed pneumatic devices as part of its commitment to the EPA Natural Gas STAR program since 1994.	devices are scheduled to be replaced or eliminated in 2017, and the remaining devices will be addressed in following years. This project will require a field site visit to each location to review the facility design and condition.
7	23	Reduce Venting During Blowdowns and Improve Data Collection	Transmission Pipeline Blowdowns	SoCalGas 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 2016, SoCalGas 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. In 2016, SoCalGas avoided blowing 42,000 Mscf of natural gas to atmosphere.	In order to identify key constraints and institute effective blowdown strategies, it is necessary to evaluate current practices and improve data collection practices, and employee training. SoCalGas continues to revise the blowdown data collection forms to improve data collection activities to support emission reduction, including electronically capturing the data to improve the ability to quickly calculate and record emission reductions, making sure all operating groups use consistent practices, and capturing the costs of emission reduction activities. New data collection practices and tools will require associated training to improve on collection and documentation practices. In addition, SoCalGas is looking for opportunities to use the methane capture

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				In addition, in 2016, SoCalGas started using 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 information was shared during the November 2016 EPA Natural Gas STAR / Methane Challenge Blowdown workshop, and with the media in the following press release: http://sempra.mediaroom.com/index.php?s=19080&item=137192 Also in 2016, SoCalGas revised the form used to capture gas blown to atmosphere to improve data collection practices.	system in the upcoming year. Below are links to some examples: http://sempra.mediaroom.com/index.php?s=19080&item=137297 http://sempra.mediaroom.com/index.php?s=19080&item=137300
8	20	Electronically Track Verified Gas Leaks	Transmission and Distribution Pipelines - Leak Survey	In 2016, 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. Once fully integrated with	In 2017, work is in progress to integrate the new technology with back-end systems, including GIS maps.

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				enterprise GIS and work management systems, this enhancement will: • Improve operator knowledge of alignment of survey activities to location of buried pipeline assets • 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	
9	23	Expanded Storage Integrity Management Program	Storage Wells	In addition to SoCalGas' existing maintenance and prevention programs, SoCalGas began implementing an expanded and accelerated Storage Integrity Management Program ("SIMP" and "Program") to validate facility safety and integrity identify and mitigate potential storage well safety and/or integrity issues. Storage Operations focus on safety, integrity and effective operations of the natural gas	In the upcoming year, the following work is scheduled: • Abandonment of approximately 40 wells at Aliso Canyon; all surface equipment related to these wells to be decommissioned. • Recompletion of approximately 36 wells at Aliso Canyon with all new equipment. New equipment as well as the application of updated technology to downhole and surface equipment should reduce / negate emissions from the wells that have received the updated equipment

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				storage system. Storage provides a reliable and economic supply of natural gas to customers throughout our service territory while achieving compliance with operating and environmental regulations. The SIMP program uses state-of-the-art inspection technologies to validate storage facility safety and integrity and identify potential issues. The SIMP inspects the wells within the Storage Fields with state of the art technology. Detailed baseline assessments on the wells and associated surface facilities will be complete, verifiable, and traceable. SIMP includes various safety enhancements and will further enhance the proactive assessment, management, planning, repair, and replacement of storage facilities. SIMP will include the expanded use of contract workover rigs to evaluate downhole casing and tubing conditions. Surface equipment such as valves,	and inspections. • Unloading of wells: all methane sent to the Aliso operations gas plant when unloading/testing the wells after recompletions. • Company-wide implementation of Aliso SIMP well assessments on any well workover in other storage fields, including running of all logging assessment tools, wells converted to tubing flow only, refurbishment / new equipment for all surface wellhead systems. The current status of the work at Aliso Canyon can be seen on DOGGR's website at http://www.conservation.ca.gov/dog/AlisoCanyon/Pages/Well-Detail.aspx.

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				wellheads, and well laterals will also be evaluated using enhanced methods. There are 229 wells within the four storage fields, some of which can operate at pressures up to 4,400 psi. 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 any • Develop enhanced preventative and mitigation measures • Maintain associated records developed as a result of SIMP activities After these activities are completed any leaks that existed on the wells and associated surface pipe will be remediated, therefore reducing emissions. In 2016, the following work was	

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				completed: • Inspected 38 wells that were approved by DOGGR. • Complete replacement of all downhole completion systems on all wells that were recompleted (inspected), which should reduce / negate emissions from the wells that have received the updated equipment and inspections. • Transition of 33 wells at Aliso Canyon to tubing flow only instead of dual flow (tubing and casing) leading to reduction of leak paths with double barrier protection to prevent emissions. • 71 wells at Aliso Canyon were fully isolated from the storage zone and therefore negated any possible emission from any of these wells. • Reduction of active wells as fields go to tubing flow only; SIMP abandoned one well in 2016 as it did not meet the storage zone requirements determined by the reservoir team. • Installation of real time read	

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				pressure transducers across all SoCal Gas fields; new alarm systems in place which will alert operators immediately of any possible gas leak. Monitoring of tubing, casing, and casing annulus for all well.	
10	15	Post-Construction Leakage Survey	Distribution Pipelines	In 2016, the supporting data for this proposed project was reevaluated to help develop the project scope and requirements for implementation.	SoCalGas conducted a pilot in 2017, and found that there was a low number of leaks compared to the effort, and has discontinued pursuing this practice.
11	18	Synergies with Pipeline Safety Enhancement Plan (PSEP) Technology Plan	Distribution and Transmission Pipeline Leaks	Methane Sensors: SoCalGas and SDG&E requested funding under the Utilities' PSEP Technology plan, to install approximately 2100 methane sensors that link to the Advanced Meter network. Theses sensors support early warning of a leak for schools, hospitals or hard to evacuate facilities (e.g. nursing homes). SoCalGas installed about a dozen sensors as a pilot to integrate with the network, back office systems, and associated processes. If this program is funded, the Utilities would like to expand the program beyond pilot.	SoCalGas and SDG&E are waiting for approval of the methane sensors project proposed in the PSEP filing before expanding installation to additional high consequence areas. Moving forward, new Transmission Line installation projects 12" or greater in diameter for a mile or longer will include a fiber optic sensing line. SoCalGas' first pipeline installation with fiber optics since the test facility installation is scheduled to start in late 2017.

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				In 2016, SoCalGas also installed 8 fence line methane sensors at their Aliso Canyon storage facility. Fiber Optics to Sense Encroachment: SoCalGas and SDG&E recommended under their PSEP Technology Plan to begin installing fiber optics above high pressure lines 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, the Utilities changed their procedures to require any Transmission pipeline projects 12" or greater in diameter for a mile or longer to install a fiber optic sensing line.	
12	17, 20	Research Projects to Advance the Science and Tools Available to Detect and Quantify	Various	SoCalGas funded and actively participated in various research projects to advance the science related to estimating methane emissions from various portion of the natural gas supply chain through refinement of emission factors and other emission	For 2017, Research Development and Demonstrations projects are planned or are in progress in the following areas: ● Emission Factors - improving Methane Emissions Factors of meter set assemblies and Direct Sale facilities, Emission factors for Vintage PE Piping Systems

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		Leaks		quantification methane. We are also involved in work to develop and advance technologies related to detect 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. In 2016, SoCalGas worked on research projects in the following areas: ● Emission Factors - improving Methane Emissions Factors of buried pipelines and meter set assemblies ● Leak Detection - development of fixed-location sensors, evaluation of various systems designed to measure atmospheric methane	● 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") in active and passive deployment strategies, technologies for early detection of large leaks, optical gas imaging, residential leak detectors, fence-line monitoring systems, 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 plume measurements, laser imaging, optical imaging, and development of other potential approaches. ● Damage Prevention – development of technologies using fiber optic and acoustics, advancements in pipe locating, proximity sensors on excavation equipment operator warning system, and RFID technologies ● Blowdowns – develop methods and technologies to mitigate pipeline blowdowns

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				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.	● Pipeline Safety & Integrity – development of intelligent service shut-off devices, investigation of leak growth rates in plastic piping systems, development of breakaway devices for Service risers, evaluation of threaded component quality, sealants on long-term integrity of joint.

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				● 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 Non-State-of-the-Art Pipeline Replacement Programs	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 portions of the system increases the effectiveness of modernization programs and supports greater natural gas reductions. As part of the Distribution Integrity Management Program, SoCalGas replaced 204 incremental services in 2016 by prioritizing leak clusters.	The goal for 2017 and 2018 is to continue to use the eGIS system to prioritize leak clusters and replace an incremental amount of services. As part of the Distribution Integrity Management Program, this project effectiveness will be evaluated on a continual basis.
14	16	Move Pre-1986 Aldyl-A Mains and Associated Services on 5-	Distribution Pipelines	N/A	Approximately 6,000 miles of pre-1986 Aldyl-A mains located in non-business districts are currently surveyed on a five-year leak survey cycle (Aldyl-A pipe in business districts is surveyed annually).

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		Year Leak Survey Cycle to Annual Leak Survey			Based on the advisory notices issues by PHMSA, NTSB, and SED in recent years discussing the susceptibility to brittle-like cracking of pre-1983 plastic pipelines, SoCalGas is placing this family of pipe on an accelerated leak survey. The accelerated leak survey will provide an opportunity to detect leaks that may be due to brittle-like cracking and may reduce the risk of an incident. Addressing those leaks will help reduce emissions. In 2017, as part of the Distribution Integrity Management Program, these mains and associated services will start to be converted to an annual leak survey cycle. This program will be funded under DIMP for 2017 and 2018, and is being included in the 2019 GRC application.
15	All	Proposed 26 Mandatory Best Practices		N/A	SoCalGas will comply with the SB 1371 Phase 1 Final Decision, including preparation of the Compliance Plan, participating in workshops, and forecasting incremental costs related to the best practices, pilot projects, and research and development.