SAFETY POLICY DIVISION EVALUATION OF SAN DIEGO GAS AND ELECTRIC COMPANY'S 2024 NATURAL GAS LEAK ABATEMENT COMPLIANCE PLAN

June 30 2025

Safety Policy Division Staff review and approval of emission reduction measures proposed by the San Diego Gas and Electric Company

California Public Utilities Commission

Contents

EXECUTIVE SUMMARY

The California Public Utilities Commission's (CPUC or Commission) Safety Policy Division (SPD) approves,[1] with some exceptions, the emissions reduction measures proposed in the San Diego Gas & Electric Company (SDG&E) Amended 2024 Natural Gas Leak Abatement (NGLA) Compliance Plan ("2024 Plan"), filed on April 4, 2024. The 2024 Plan was filed in accordance with the NGLA program requirements established in Decision (D.)17-16-015 and expanded in D.19-08-020.

The 2024 Plan forecasts an annual emission reduction of 14,462 thousand standard cubic feet (MCF) of natural gas in 2025 continuing into 2030. This expected reduction is 8 percent of the 2015 baseline of 178,996 MCF. The Commission has not set an emission reduction target for SDG&E because the baseline emissions were already at a low level in 2015, only directing that it must adopt the Best Practices for leak abatement of D.17-16-015. While the 2024 Plan does not indicate how the company expects to meet the statewide greenhouse gas reduction goal of 40 percent by 2030[2] based solely on company emissions, the Aerial Methane Mapping proposal, including customer-side benefits, would improve total reductions to 64,792 MCF, a 36 percent reduction.

Many emission reduction measures approved in the 2022 Plan are proposed to continue at increased costs, while some measures have experienced reduced expenditures in the 2024 Plan. Expenditure is split between Operations and Maintenance (O&M) and Capital expenditure (Capex). The O&M costs directly affect the plan years, whereas the Capex will impact the future years over the asset's life. Cost effectiveness is based on the annual revenue requirement which combines annual Capex recovery and O&M.

The chapters where O&M expenditures increased significantly are Increased Leak Survey (Chapter 1), Electronic Leak Survey (Chapter 6), Damage Prevention Public Awareness (Chapter 7), and Gas Speciation (Chapter 10). The only significant Capex request is the one-time purchase of new leak surveying equipment in Chapter 1 at $1.6 million. A notable cost reduction in the 2024 Plan is the re-proposal for Aerial Monitoring (Chapter 14) with a funding request of $1.9 million compared to the initial forecast of $7.1 million in 2022.

APPROVED PROPOSALS

SPD approves the adoption of the SDG&E's 2024 Plan, except for Chapter 1 (Increased Leak Survey). All Research and Development (R&D) proposals in Table 2 are approved. While the approved measures have a high cost relative to the value of emissions reduction, they are approved based on compliance with Best Practices and emission reductions.

[1] Approval authority delegated to SED Staff, now SPD Staff, in D.19-08-020 at p. 19
[2] D.17-06-015, Ordering Paragraph 6(c).

BACKGROUND

In accordance with Decision (D.)19-08-020, which established Phase II in the CPUC's proceeding to address Senate Bill (SB) 1371,[3] SDG&E filed a Compliance Plan as required on March 15, 2024. Concurrently, SDG&E submitted the associated Advice Letter (AL) G-3285. After initial feedback from SPD Staff, SDG&E submitted an amended Compliance Plan on April 4, 2024. The purpose of the NGLA Compliance Plan is to propose how the utility will achieve emissions reductions, primarily through the implementation of the 26 Best Practices[4] for leak abatement adopted by the Commission in Phase I of the NGLA Program D.17-06-0155 (hereafter the "Best Practices"). The list of Best Practices is also attached to this report as Appendix B.

D.19-08-020 added requirements for the Compliance Plans, including specifications for determining the cost-effectiveness of each proposed compliance measure when emissions reduction can be attributed to the measure. D.19-08-020 requires the use of a specified cost-effectiveness methodology and two cost-benefit tests to provide information when evaluating proposed methane reduction measures and for evaluating the Biennial Methane Leaks Compliance Plans (Compliance Plans) while maintaining full discretion for the Commission also to consider qualitative factors and policy goals. The two cost-benefit tests are: Cap-and-Trade savings and avoided Social Cost of Methane (SCM). D.19-08-020 did not specify a cost-effectiveness threshold but required the proposals to be evaluated on qualitative and quantitative bases.[6] Resolution G-3595 directed SPD and Energy Division Staff, in consultation with California Air Resources Board (CARB) Staff, to convene a Technical Working Group (TWG) in 2023. As a result of the TWG, SPD provided guidance on updating cost savings estimates using current dollars.

Some of the Best Practices, such as record-keeping or training, do not have directly associated emissions reductions; rather, these practices serve as foundational support for the overall goal. D.19-08-020 also provides for grouping multiple Best Practices into integrated measures, with each measure described in its own chapter.

APPROVAL AUTHORITY

D.19-08-020 authorizes the CPUC's Safety Enforcement Division (SED) to approve or reject NGLA Compliance Plans.[7] Since this decision was issued, the Safety Policy Division was established and has taken on that role. When funding for emissions reduction measures described in the Compliance Plan is required outside of a General Rate Case (GRC), the utility will file a Tier 3 Advice Letter with the Energy Division. Pursuant to CPUC General Order 96-B, a Tier 3 Advice Letter is subject to disposition by Resolution, which requires a Commission vote.

COMPLIANCE PLAN SUMMARY

SDG&E's 2024 Plan presents 14 chapters detailing measures that address the Best Practices to begin or continue in 2025. Four of the chapters provide an emissions reduction estimate, with three also

[3] SB 1371, Leno, Chapter 525 statutes of 2014
[4] D.17-06-015, Appendix B.
[5] D.17-06-015 Ordering Paragraph 4 and Appendix B
[6] D.19-08-020, at p. 36
[7] D.19-08-020, at p. 19

providing corresponding cost-effectiveness estimates. Following the 14 chapters, the 2024 Plan also includes an attachment detailing six Research and Development (R&D) programs proposed by Southern California Gas Company (SoCalGas) for 2025-2026 in partnership with SDG&E.

Overall, the 2024 Plan forecasts an emissions reduction of 8 percent by 2025 (relative to the 2015 proposed baseline). This forecast does not meet the statewide greenhouse gas (GHG) reduction goal of 40 percent by 2030. However, unlike SoCalGas, SDG&E is not mandated to reduce emissions by the target of 20 percent by 2025, established in D.19-08-020 for SoCalGas and Pacific Gas and Electric Company.

Until the 2022 Plan, approximately 80 percent of the proposed baseline emissions and subsequent reported emissions were estimated from population-based emission factors, which rigidly linked emission volumes to the number of devices or miles of pipeline in the operator's system rather than measurement of actual leaks. Thus, unless SDG&E reduced the population of devices or miles of pipeline, it was largely unable to demonstrate a reduction in emissions until the development of better quantification methods based around detected leaks. From 2018 to 2023, SDG&E, with Sempra partner SoCalGas, conducted and presented research and pilot studies to develop such quantification methods for approval by SPD Staff in consultation with CARB Staff. These improved methods have allowed for better measurement of the performance of SDG&E's emission reduction measures and will better inform decisions about Compliance Plan proposals to facilitate emissions reductions.

A summary table of the chapters offering emissions reduction forecasts and cost-effectiveness values follows in Appendix A, Table 3.

COST-EFFECTIVENESS DEFINITION AND USE

D.19-08-020 defines a cost-effectiveness calculation method and requires presenting the SCM and Cap-and-Trade cost-benefit tests. D.19-08-020 does not establish a threshold cost-effectiveness value or limit. However, SPD finds that it is useful to compare proposed measure cost-effectiveness with a "break-even" value. Given the Cap-and-Trade cost-benefit of $2.46/thousand cubic feet (MCF) and SCM benefit of $24.42/MCF, a measure is considered to achieve a break-even net cost-effectiveness of $0/MCF when it has a standard cost-effectiveness of $26.88/MCF (i.e., $2.46 + $24.42).

STANDARD COST-EFFECTIVENESS

SDG&E describes standard cost-effectiveness value as the measure's average annual revenue requirement (AARR) less directly associated cost savings (such as value of natural gas saved) divided by the total emissions reduction (in MCF) for the same period.[8] For the 2024 Plan, SDG&E used the forecasted average annual Weighted Average Cost of Gas (WACOG) published in the 2018 California Gas Report,[9] resulting in a cost-benefit of $2.42/MCF, for calculating standard cost-

[8] SDG&E 2024 Plan, at p. 8
[9] 2018 California Gas Report

effectiveness. Program costs are defined as the AARR times the number of years of the benefit period. Cost-effectiveness is expressed in dollars per MCF of natural gas emissions ($/MCF).

CAP-AND-TRADE BENEFITS

An avoided Cap-and-Trade cost-benefit test is required by D.19-08-020 to be used for information and comparison purposes.[10] For SDG&E, an annual Advice Letter (AL) forecasts the rate impact of the Cap-and-Trade expense. This expense is added to rates through CPUC approval in the AL resolution process. Emissions reductions are accounted for in this Advice Letter as part of the total gas throughput. In the Compliance Plan, the utility must show the value of the avoided Cap-and-Trade cost as a benefit in $/MCF. D.19-08-020 specifies that the Cap-and-Trade cost-benefit test shall use the same Emission Conversion Factor and Proxy Greenhouse Gas Allowance Price as is used for the gas utilities' forecast revenue requirements pursuant to D.15-10-032.[11] That decision values Cap-and-Trade costs assuming that all gas throughput is combusted and emitted to the atmosphere as CO2.

The Proxy Greenhouse Gas Allowance Price is variable based on market valuation. To determine the Cap-and-Trade benefit for the Compliance Plan, SDG&E used a December 2025 futures value based on the five-day average of trading days January 2-8, 2024, from the International Exchange: $45.12 per metric ton CO2 equivalent (MT CO2(e)). Compliance with the Commission instructions produces a Cap-and-Trade benefit value of $2.46/MCF.

SOCIAL COST OF METHANE BENEFITS

The second cost-benefit test required by D.19-08-020 is the value for avoided SCM. While not immediately tangible savings to the ratepayer, the future cost to society from the environmental impact of Greenhouse Gases (GHGs) is an important component of any GHG program. The D.19-08-020 provides a table of estimates (in 2007 dollars) of the SCM, forecasted every five years, to be used in Compliance Plans.[12] Following the 2023 Technical Working Group meeting, CPUC Staff provided written guidance to update those values using the California Consumer Price Index. In the 2024 Plan, SDG&E calculated a SCM of $24.42/MCF by using the D.19-08-020 estimate for 2020 of $21/MCF and applying the California Consumer Price Index.

SAFETY COST-BENEFITS

During the 2023 Technical Working Group, CPUC Staff suggested including an optional cost-benefit test that included the safety cost-benefits of an activity, where relevant. In the 2024 Plan, SDG&E noted that "(a)lthough several of the projects within this Compliance Plan have associated safety benefits, safety benefits are not included because SDG&E did not have sufficient data to complete the calculations. SDG&E plans to reassess the available data and revisit the possibility of quantifying safety benefits in the future."[13]

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[10] D.19-08-020, at p. 36
[11] D.15-01-008, Ordering Paragraph 3, at p. 82
[12] D.19-08-020, at p. 16
[13] SDG&E 2024 Plan, p. 6, Common Assumptions for Cost Estimates, at 7.d

TABLE 1. COMPLIANCE PLAN SUMMARY

Chpt.	Description	Best Practices	AARR Total Costs, (000)	Forecast Annual Emission Reductions 2025-2030, MCF	Standard Cost Effectiveness ($/MCF), (2025-2030)	Net Cost Effectiveness ($/MCF), (2025-2030)
1	Increased Leak Survey	15, 16	$ 2,600	5,464	$ 463	$ 436
2	Blowdown Reduction Activities	23, 3-7	400	3,338	116	89
3	Damage Prevention Algorithm & Proactive Intervention	24, 25, 26	-	-	-	-
4	Record Keeping IT Project	9	200	-	-	-
5	Geographic Tracking	9, 20b	-	-	-	-
6	Electronic Leak Survey	20b	200	-	-	-
7	Damage Prevention Public Awareness	24, 25, 26	900	-	-	-
8	Pipe Fitting Specifications	22	700	-	-	-
9	Repeat Offenders IT Systems	26	-	-	-	-
10	Gas Speciation	17	300	-	-	-
11	Public Leak Maps	20b	1	-	-	-
12	Accelerated Leak Repairs - Transmission	21	-	-	-	-
13	Distribution Above Ground Leak Survey	19	-	108	-	-
14	Aerial Monitoring	16, 17, 20a	1,900	5,660	339	313
Total (System Only)			**$ 7,201**	**14,570**		
14	Aerial Monitoring - System + Non-System Customer Emissons	16, 17, 20a	-	50,222	32*	5*
Total (System+Non-System)				**64,792**		

*Calculated using System plus Non-System Customer Emissions.

TABLE 2. RESEARCH AND DEVELOPMENT SUMMARY

Project Number	Project Topic	Best Practice Addressed	Advice Letter Loaded Cost ($)
16	Leak Detection and Prevention Algorithm	16	115,662
17	Eval. Of Instruments and Methods for Leak Detection, Quantification, Localization, and Speciation	17, 20a	404,676
18	Eval. Of Stationary Methane Detectors	18	23,603
20a	Develop and Maintain Company Specific Emission Factors	20a, 20b	309,671
22	Leak Prev. for Threaded Connections	22	149,983
23	Eval of Tech. to Mitigate Blowdown and Vented Emissions	23	131,037

EVALUATION OF CHAPTERS WITH SIGNIFICANT COSTS

APPROVAL CRITERION

To determine approval of proposed emission reduction measures, SPD considers the following:

- Is it required for compliance with D.17-06-015-mandated Best Practices?
- Is it technically feasible?
- Is it cost effective?
- Does it contribute substantially to meeting reduction goals?
- Is it foundational to the NGLA Program?
- Is it essential for continuance of reductions achieved?

SPD reviewed four chapters constituting a significant portion (85%) of the proposed revenue requirement.

CHAPTER 1. INCREASED LEAK SURVEY

This chapter incorporates Best Practices 15 (Leak Survey Interval) and 16 (Special Leak Surveys). Best Practice 15 requires a three-year leak survey period or a more frequent survey period if more effective in certain cases. These intervals are beyond the minimum required by the PHMSA regulations in place at the time the Best Practices were adopted. SDG&E proposes to continue with the alternative annual leak surveys as approved in the 2018 Plan for two types of pipe material known to be leak-prone: unprotected steel and pre-1986 vintage Aldyl-A plastic pipe. SDGE also plans to continue the three-year leak survey on SOTA plastic and protected steel pipe.

Performing annual surveys on pre-1986 Aldyl-A began under SDG&E's regulatory Distribution Integrity Management Program (DIMP). SPD Staff notes that the pre-1986 Aldyl-A leak survey is funded under the General Rate Case as a DIMP-related program.

SDG&E states they will be able to continue the increased survey intervals with its current staff. However, there are cost increases due to higher labor costs, and tooling replacement. The $400,000 cost increase in Chapter 1 from the 2022 Plan AARR of $2.2 million[14] to the 2024 Plan AARR of $2.6 million is from:

- Annual direct labor increases from $884,680 to $1,118,960.
- Recovery of a one-time capital expense for tooling replacement and related vehicle modifications of $1,590,000.

Although SDG&E will not be shifting its leak survey cycles further, it will expand its efforts to replace population-based emission factors with Company-Specific Leaker-Based emission factors by using PHMSA safety reporting criteria for above-ground leaks similar to SoCalGas. There is no implementation cost associated with this effort.[15]

[14] Advice Letter G-3071. Approved by Resolution G-3599

[15] SDG&E 2024 Plan, at p. 14

The net cost-effectiveness is presented as $436/MCF based on an AARR of $2.6 million and a forecasted annual emissions reduction of 5,464 MCF.

While the cost effectiveness figure is not close to break-even, this practice produces one of the highest emission reductions of all the SDG&E measures and complies with Best Practice 15 to perform surveys more frequently than three years when that is more effective. However, the development of the Aerial Methane Mapping (AMM) program in recent years has provided a more cost effective alternative. AMM is forecasted to reduce 5,660 MCF on utility pipelines at a net effectiveness of $313/MCF, better than Chapter 1. When customer-side reductions are included, the effectiveness of AMM is almost break-even at $5/MCF and the expected reduction of 50,222 MCF would bring the total program achievement close to the 40 percent emissions reduction goal before 2030.

SPD does not approve continuation of Chapter 1 assuming adoption of Chapter 14, Aerial Methane Mapping. If AMM is not adopted, Chapter 1 should continue.

CHAPTER 6. ELECTRONIC LEAK SURVEY

Best Practice 20b for Geographic Tracking involves developing geographic tracking and evaluating leaks in the gas system. To satisfy this best practice SDG&E is developing a mobile application (app) that will allow the uploading of geographic locational gas leak data and provide a means to improve survey walking paths for its Electronic Leak Survey (ELS) process. The phased project began in 2018 and was extended due to the complex and technical nature of the undertaking. The project phase, which involves developing the mobile apps and portal apps, is planned for completion in 2024. The deployment activities will begin in 2024 for all distribution districts.

SDG&E proposes refining and evolving the system and mobile apps as ELS's initial distribution routine survey implementation continues. The new enhancements will become apparent as the digitization of paper maps, and employees utilize the apps in the field. Additionally, upgrades to software packages and the underlying product by the vendor are expected to provide enhanced functionality and stability.

Regarding cost-effectiveness, SDG&E states: "While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific technology enhancement was designed to improve processes to support the overall Program's goals and objectives".[16] Standard cost-effectiveness for this chapter cannot be forecasted at this time, and SDG&E plans to demonstrate the benefits associated with Best Practice 20b once it is fully deployed.

The estimated AARR for the 2024 Plan period is $200K.

SPD approves the adoption of Chapter 6.

[16] SDG&E 2024 Plan, at p. 33

CHAPTER 7. DAMAGE PREVENTION PUBLIC AWARENESS

This chapter incorporates the Best Practices 24 - Dig-Ins and Public Education Program, 25 - Dig-Ins and Company Standby Monitors, and 26 - Dig-Ins and Repeat Offenders.

These Best Practices align with other statutory requirements, as SDG&E implements a federally mandated Public Awareness program, as prescribed in 49 CFR §192.616, thereby contributing to enhanced public safety. In addition, the State of California mandates a preconstruction meeting with excavators requesting Locate and Mark support and requires continuous monitoring of all excavations within ten feet of high-pressure pipelines pursuant to Cal. Gov't Code § 4216.2. The Public Awareness program is also driven by the requirements of 49 C.F.R. § 192.616 and the recommended public awareness practices outlined in the American Petroleum Institute's API RP 1162.

Beyond the other statutory requirements, SDG&E proposes to continue its incremental outreach and education efforts, its dissemination of safe digging procedures, and maintain the existing number of staff to support its Public Awareness Program. These measures improve processes supporting the Senate Bill (SB)1371 emission reduction goals and objectives.

SB1371 generally requires cost-effectiveness analysis for projects. Because the specific benefits of the incremental damage prevention measures cannot be separated from the effects of the other regulatory efforts, the associated Cost-Effectiveness metrics are not straightforward. In general, SDG&E has demonstrated that increasing 811 calls results in fewer damage incidents and a lower rate of damage incidents per 1,000 tickets. Since 2019, the number of incidents resulting in emissions has reduced from 431 to 293.

The estimated AARR for Chapter 7 is $900K.

SPD approves the adoption of Chapter 7.

CHAPTER 14. AERIAL MONITORING

This chapter addresses Best Practices 16 (Special Leak Surveys), 17 (Enhanced Methane Detection), and 20a (Quantification). AMM's advantage over traditional ground-based foot and vehicle measurement is that since natural gas leaks upwards, it is not always visible from the ground, especially when the wind is blowing away from the surveyor or when a structure stands between the leak and the measurement device. Aerial surveys provide an assessment tool for leaks that may not have been otherwise detected.

SDG&E states that Gas Mapping LiDAR (GML) technology used for AMM was successfully demonstrated in pilot programs in 2019 and 2020. Because AMM activities cover large areas of the utility territory, the measure presents a unique opportunity to identify and repair leaks on both the utility (system) and customer (non-system) sides of natural gas pipelines. However, the NGLA program only tracks emissions from utility assets. It does not currently have a specified method to track customer emissions or the reductions achieved by repairing such leaks.

In the 2022 Plan, SDG&E proposed a significant expansion of aerial-based methane sensing technology (also known as Aerial Methane Mapping, or AMM) to identify methane leaks on system facilities and beyond-the-meter customer appliances. Due to SPD's concerns about cost-effectiveness, SPD only approved Aerial Monitoring activities at the level first implemented by SDG&E in the 2020 Compliance Plan. Funding for AMM was not approved in the 2022 plan due to insufficient cost-effectiveness data.

As a follow-up, in the 2024 Plan, SDG&E proposed to "… perform a Research, Development, and Demonstration (RD&D) evaluation of aerial methane detecting and quantification technology. If the findings from the evaluation demonstrate cost-effective emission reductions, SDG&E proposes to enhance its leak survey program by implementing an aerial leak monitoring and leak quantification program starting 2025. Aerial monitoring will be performed using LIDAR technology mounted to a helicopter and will be performed on vintage pipelines that have higher leak rates per mile and are more prone to leakage."[17] In the 2024 Plan, SDG&E used data from SoCalGas's AMM to make assumptions on the rate of leaks found with respective emissions reductions included in the 2024 Plan.

The following assumptions were made:[18]

- Based on SoCalGas' AMM implementation, SDG&E anticipates finding approximately 263 post-meter leaks on customer facilities each year.
- Based on SoCalGas' AMM implementation, SDG&E anticipates identifying approximately 126 emissions sources resulting from incomplete combustion in customer equipment each year. Based on SoCalGas's AMM implementation, SDG&E anticipates that 36% of these customers will require a service shut off for safety reasons. Of those, 98% of the customers will repair their leak, or will keep the leak abated. Of the 64% that do not have their service shut off, SDG&E anticipates being able to call back and reach 50% of those customers, confirming that 70% have fixed their leak. These numbers are based on SoCalGas's AMM implementation and will be revised for SDG&E once implementation starts at SDG&E.

In January 2025, SDG&E reported on their study of AMM for their territory which confirms the forecast presented in the 2024 Plan. SDG&E estimates annual emissions reductions starting in 2025 of 5,660 MCF on company system assets, and 50,222 MCF on non-system assets. The utility forecasts a net cost-effectiveness of $313/MCF for 2025-2030 emissions reductions of system emissions alone and $5/MCF when combining system and confirmed non-system emissions.

While the NGLA Program does not account for emission reductions achieved outside of the utility's system, SPD observes that the greenhouse gas reduction benefits that AMM will produce are in the spirit of SB 1371. Furthermore, detection of leaks that would otherwise not be included in the standard utility survey practice offers additional safety and cost-saving advantages for customers.

Based on experience with the costs of implementing AMM at SoCalGas, the cost forecast for the SDG&E AMM program has significantly reduced from an AARR of $7.1 million in the 2022

[17] SDG&E 2024 Plan, at p. 54
[18] SDG&E 2024 Plan, at p. 55

Compliance Plan, to the current $1.9 AARR in the 2024 Plan. The cost is based on the concurrent use of AMM at SoCalGas.

SPD approves adoption of Chapter 14.

CONCLUSION

SPD approves all chapters, except for Chapter 1 assuming that Chapter 14 is implemented. If Chapter 14 is not operational, SPD approves continuation of Chapter 1.

APPENDIX A: FORECASTED EMISSIONS REDUCTIONS

TABLE 3. Major Efforts to Reduce Emissions (2015 Proposed Baseline) - SDG&E

Chapter	2025 Emission Reduction, MCF	Percent Reduction from Baseline	AARR, $Million	Standard Cost-effectiveness $/MCF	Net Cost-effectiveness $/MCF
Chapter 1 - Increased Leak Survey	5,464	8%	$ 2.6	463	436
Chapter 2 - Blowdown Reduction Activities	3,338	8%	$ 0.4	116	86
Chapter 14 - Aerial Monitoring (System Only)	5,660	8%	$ 1.9	339	313
Summary	**14,462**				
Percentage Reduction from Baseline	**8%**				

APPENDIX B: BEST PRACTICES FOR THE NATURAL GAS LEAK ABATEMENT PROGRAM

No.	Best Practices	Rationale
	Policies and Procedures (P&P)	
BP 1	Compliance Plan Written Compliance Plan identifying the policies, programs, procedures, instructions, documents, etc. used to comply with the Final Decision in this Proceeding (R.15-01-008). Exact wording TBD by the company and approved by the CPUC, in consultation with CARB. Compliance Plans shall be signed by company officers certifying their company's compliance. Compliance Plans shall include copies of all policies and procedures related to their Compliance Plans. Compliance Plans shall be filed biennially (i.e. every other year) to evaluate best practices based on progress and effectiveness of Companies' natural gas leakage abatement and minimization of methane emissions.	Each company is of a different size and has a different business model. Compliance Plans will require Companies to include those Best Practices (BPs) mandated by the Commission, noting applicable exemptions and alternatives, and any additional measures proposed by each Company to abate natural gas leakage and minimize methane emissions. However, companies must submit a Compliance Plan for approval by the CPUC, in consultation with CARB, to ensure that they are complying with the decisions of this proceeding and SB 1371. The Compliance Plan filing also incorporates many requirements for other BPs including policies and procedures, recordkeeping, training, experienced/trained personnel. In addition, other specific requirements in many leak detection, leak repair and leak prevention BPs are incorporated into the Compliance Plan filing.
BP 2	Methane GHG Policy Written company policy stating that methane is a potent Green House Gas (GHG) whose emissions to the atmosphere must be minimized. Include reference to SB 1371 and SB 1383. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of Compliance Plan filing.	Written company policies, referencing both SB 1371 (2014, Leno) and SB 1383 (2016, Lara), are needed to guide company activities and ensure effective implementation to abate natural gas leakage and minimize methane emissions.
BP 3	Pressure Reduction Policy Written company policy stating that pressure reduction to the lowest operationally feasible level to minimize methane emissions is	Written company policies are needed to require minimization of methane emissions from company activities (e.g. blowdowns, other operational emissions, etc.), and

No.	Best Practices	Rationale
	required before non-emergency venting of high-pressure distribution (above 60 psig), transmission and underground storage infrastructure consistent with safe operations and considering alternative potential sources of supply to reliably serve customers. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of Compliance Plan filing.	ensure effective implementation consistent with Operations & Maintenance (O&M) safety, system integrity and reliability requirements.
BP 4	Project Scheduling Policy Written company policy stating that any high-pressure distribution (above 60 psig), transmission or underground storage infrastructure project that requires evacuating methane will build time into the project schedule to minimize methane emissions to the atmosphere consistent with safe operations and considering alternative potential sources of supply to reliably serve customers. Projected schedules of high-pressure distribution (above 60 psig), transmission or underground storage infrastructure work, requiring methane evacuation, shall also be submitted to facilitate audits, with line venting schedule updates TBD. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing.	Written company policies to schedule projects for high pressure distribution, transmission or underground storage infrastructure projects to minimize methane emissions are needed to guide company activities and ensure effective implementation consistent with O&M safety, system integrity and reliability requirements. This scheduling projects BP applies to non-emergency venting of high-pressure distribution (above 60 psig), transmission or underground storage infrastructure requiring methane evacuation.
BP 5	Methane Evacuation Procedures Written company procedures implementing the BPs approved for use to evacuate methane for non-emergency venting of high-pressure distribution (above 60 psig), transmission or underground storage infrastructure and how to use them consistent with safe operations and considering alternative potential sources of supply to reliably serve customers. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing.	Written company procedures are needed to guide company activities for methane evacuation implementation and ensure effective implementation consistent with O&M safety, system integrity and reliability requirements. This methane evacuation implementation BP applies to non-emergency venting of high-pressure distribution (above 60 psig), transmission or underground storage infrastructure requiring methane evacuation.
BP 6	Methane Evacuation Work Orders Policy Written company policy that requires that for any high-pressure distribution (above 60 psig), transmission or underground storage	Written company policies are needed for methane evacuation work orders to guide company activities and ensure effective implementation consistent with O&M

No.	Best Practices	Rationale
	infrastructure projects requiring evacuating methane, Work Planners shall clearly delineate, in procedural documents, such as work orders used in the field, the steps required to safely and efficiently reduce the pressure in the lines, prior to lines being vented, considering alternative potential sources of supply to reliably serve customers. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing.	safety, system integrity and reliability requirements. This methane evacuation work orders BP applies to non-emergency venting of high-pressure distribution (above 60 psig), transmission or underground storage infrastructure requiring methane evacuation.
BP 7	Bundling Work Policy Written company policy requiring bundling of work, whenever practicable, to prevent multiple venting of the same piping consistent with safe operations and considering alternative potential sources of supply to reliably serve customers. Company policy shall define situations where work bundling is not practicable. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing.	Written company policy is needed for bundling work to guide company construction and O&M activities for coordination of multiple venting of lines to minimize excess methane emissions consistent with O&M safety, system integrity and reliability requirements. This bundling work BP requires companies to define situations where work bundling is not practicable.
BP 8	Company Emergency Procedures Written company emergency procedures which describe the actions company staff will take to prevent, minimize and/or stop the uncontrolled release of methane from the gas system or storage facility consistent with safe operations and considering alternative potential sources of supply to reliably serve customers. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing.	Most natural gas companies have gas systems containing large volumes of methane. An uncontrolled release can negate the methane reductions of other utilities and increase GHG emissions. Written emergency company procedures are needed to guide company staff to prevent, minimize, and/or stop the uncontrolled release of methane and ensure effective implementation consistent with O&M safety, system integrity and reliability requirements.
	Recordkeeping	
BP 9	Recordkeeping Written Company Policy directing the gas business unit to maintain records of all SB 1371 Annual Emissions Inventory Report methane emissions and leaks, including the calculations, data and assumptions used to derive the volume of methane released. Records are to be maintained in accordance with G.O. 112 F and succeeding revisions, and 49 CFR 192. Currently, the record	Accurate reporting of methane emissions and leaks, including estimation methodologies and assumptions, is critical for regulatory audits to ensure compliance. Written company policy is needed to ensure these records are maintained for all SB 1371 relevant actual measured emissions and leaks and estimated emissions and leaks including calculations,

No.	Best Practices	Rationale
	retention time in G.O. 112 F is at least 75 years for the transmission system. 49 CFR 192.1011 requires a record retention time of at least 10 years for the distribution system. Exact wording TBD by the company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing.	data and assumptions to derive the volume of methane released.
	Training	
BP 10	Minimize Uncontrolled Natural Gas Emissions Training Training to ensure that personnel know how to use company emergency procedures which describe the actions staff shall take to prevent, minimize and/or stop the uncontrolled release of natural gas from the gas system or storage facility. Training programs to be designed by the Company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing. If integration of training and program development is required with the company's General Rate Case (GRC) and/or Collective Bargaining Unit (CBC) processes, then the company shall file a draft training program and plan with a process to update the program once finalized into its Compliance Plan.	Most natural gas companies have gas systems containing large volumes of methane. An uncontrolled release can negate the methane reductions of other utilities and increase GHG emissions. This training BP is needed to ensure personnel know how to use emergency procedures to prevent, minimize and/or stop the uncontrolled releases of methane. This training BP allows for companies to submit draft training programs along with a process to update the program once finalized to allow companies opportunities to integrate changes to their existing training and program development through their existing GRC and/or CBC processes.
BP 11	Methane Emissions Minimization Policies Training Ensure that training programs educate workers as to why it is necessary to minimize methane emissions and abate natural gas leaks. Training programs to be designed by the Company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing. If integration of training and program development is required with the company's GRC and/or CBC processes, then the company shall file a draft training program and plan with a process to update the program once finalized into its Compliance Plan.	Training programs are necessary to help employees understand why it is important to abate natural gas leaks and minimize methane emissions. If they understand the reasoning behind the goals, they are more likely to comply with the company's policies and procedures. This training BP is needed to ensure workers knows methane emissions reductions policies. This training BP allows for companies to submit draft training programs along with a process to update the program once finalized.
BP 12	Knowledge Continuity Training Programs Knowledge Continuity (Transfer) Training Programs to ensure knowledge continuity for new methane emissions reductions best	New workers need to be trained in how to abate natural gas leakages and minimize methane emissions. Knowledge continuity (transfer) training programs are also needed

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	practices as workers, including contractors, leave and new workers are hired. Knowledge continuity training programs to be designed by the Company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing. If integration of training and program development is required with the company's GRC and/or CBC processes, then the company shall file a draft training program and plan with a process to update the program once finalized into its Compliance Plan.	to alleviate knowledge gaps and improve safety for new methane emissions minimization best practices. This training BP allows for companies to submit draft training programs along with a process to update the program once finalized to allow companies opportunities to integrate changes to their existing training and program development through their existing GRC and/or CBC processes.
BP 13	<u>Performance Focused Training Programs</u> Create and implement training programs to instruct workers, including contractors, on how to perform the BPs chosen, efficiently and safely. Training programs to be designed by the Company and approved by the CPUC, in consultation with CARB, as part of the Compliance Plan filing. If integration of training and program development is required with the company's GRC and/or CBC processes, then the company shall file a draft training program and plan with a process to update the program once finalized into its Compliance Plan.	Training programs are necessary to instruct workers, including contractors, on how to perform BPs, efficiently and safely. This training BP is needed to ensure companies instructs workers, including contractors, on how to perform BPs, efficiently and safely. This training BP allows for companies to submit draft training programs along with a process to update the program once finalized to allow companies opportunities to integrate changes to their existing training and program development through their existing GRC and/or CBC processes.
	<u>Experienced, Trained Personnel</u>	

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BP 14	Formal Job Classifications Create new formal job classifications for apprentices, journeyman, specialists, etc., where needed to address new methane emissions minimization and leak abatement best practices, and filed as part of the Compliance Plan filing, to be approved by the CPUC, in consultation with CARB.	According to the Unions, there is a significant need for experienced, qualified people working in the field, and for participation in the evaluation of existing practices and development of better (best) practices. Experienced gas system workers have first-hand knowledge of how system equipment operates, what the O&M problems are and how to fix them resulting in less methane leaks. If this is accurate, then methane leaks and emissions are not entirely infrastructure issues. Experienced workers are critical to help train, improve procedures, maintain and operate equipment and to address new methane emissions reduction and leak abatement best practices.
	Leak Detection	
BP 15	Gas Distribution Leak Surveys Utilities should conduct leak surveys of the gas distribution system every 3 years, not to exceed 39 months, in areas where G.O. 112-F, or its successors, requires surveying every 5 years. In lieu of a system-wide three-year leak survey cycle, utilities may propose and justify in their Compliance Plan filings, subject to Commission approval, a risk-assessment based, more cost-effective methodology for conducting gas distribution pipeline leak surveys at a less frequent interval. However, utilities shall always meet the minimum requirements of G.O. 112-F, and its successors.	This leak detection BP recommends leak survey intervals of 3 years for all distribution pipelines formerly under the five-year leak survey requirement, unless the utility proposes and gets approved more effective leak survey cycles at a less frequent interval using a risk assessment approach. Different leak survey cycles may be appropriate for various districts or areas of a utilities' distribution system based on risk considerations of leak history, pipe material and age, soil conditions, etc.
BP 16	Special Leak Surveys Utilities shall conduct special leak surveys, possibly at a more frequent interval than required by G.O. 112-F (or its successors) or	This leak detection BP requires utilities to conduct special leak surveys, possibly more frequently than G.O. 112-F or BP # 15, in coordination with their integrity

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	BP 15, for specific areas of their transmission and distribution pipeline systems with known risks for natural gas leakage. Special leak surveys may focus on specific pipeline materials known to be susceptible to leaks or other known pipeline integrity risks, such as geological conditions. Special leak surveys shall be coordinated with transmission and distribution integrity management programs (TIMP/DIMP) and other utility safety programs. Utilities shall file in their Compliance Plan proposed special leak surveys for known risks and proposed methodologies for identifying additional special leak surveys based on risk assessments (including predictive and/or historical trends analysis). As surveys are conducted over time, utilities shall report as part of their Compliance Plans, details about leakage trends. Predictive analysis may be defined differently for differing companies based on company size and trends.	management and other utility safety programs. Also, this BP states that the use of special leak surveys (for the purpose of SB 1371 compliance) shall be predicated on risk assessments, including predictive and historical trends analysis, if possible. This BP also allows for predictive analysis to be defined differently for differing companies based on company size and trends.
BP 17	<u>Enhanced Methane Detection</u> Utilities shall utilize enhanced methane detection practices (e.g. mobile methane detection and/or aerial leak detection) including gas speciation technologies.	This leak detection BP requires utilities to use enhanced methane detection practices including enhanced gas speciation technologies. This BP allows utilities to propose specific technologies that are most suitable for their gas systems and geographical areas.

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BP 18	Stationary Methane Detectors Utilities shall utilize Stationary Methane Detectors for early detection of leaks. Locations include: Compressor Stations, Terminals, Gas Storage Facilities, City Gates, and Metering & Regulating (M&R) Stations (M&R above ground and pressures above 300 psig only). Methane detector technology should be capable of transferring leak data to a central database, if appropriate for location.	This leak detection BP requires utilities to utilize Stationary Methane Detectors for early detection of leaks. This BP applies to locations including compressor stations, terminals, gas storage facilities, City Gates and Metering & Regulating (M&R) Stations (M&R above ground and pressures above 300 psig only). This BP recommends that methane detector technology is capable of transferring leak data to a central database, if appropriate for location.
BP 19	Above Ground Leak Surveys Utilities shall conduct frequent leak surveys and data collection at above ground transmission and high-pressure distribution (above 60 psig) facilities including Compressor Stations, Gas Storage Facilities, City Gates, and Metering & Regulating (M&R) Stations (M&R above ground and pressures above 300 psig only). At a minimum, above ground leak surveys and data collection must be conducted on an annual basis for compressor stations and gas storage facilities.	This leak detection BP requires utilities to conduct frequent leak surveys and data collection at above ground transmission and high-pressure distribution (above 60 psig) facilities including Compressor Stations, Gas Storage Facilities, City Gates, and Metering & Regulating (M&R) Stations (M&R above ground and pressures above 300 psig only). This BP also requires a minimum of annual surveys to be conducted for compressor stations and gas storage facilities.
BP 20a	Quantification & Geographic Tracking Utilities shall develop methodologies for improved quantification and geographic evaluation and tracking of leaks from the gas systems. Utilities shall file in their Compliance Plan how they propose to address quantification. Utilities shall work together, with CPUC and ARB staff, to come to agreement on a similar methodology to improve emissions quantification of leaks to assist demonstration of actual emissions reductions.	This leak detection BP requires utilities to develop methodologies for improved quantification of leaks. This BP also requires utilities to work together, with CPUC and ARB staff, to come to agreement on a similar methodology to improve emissions quantification of leaks to assist demonstration of actual emissions reductions. Improved quantification technologies are very much needed in the industry. Quantifying the amount of natural gas emitted from a leak is dependent on equipment sensitivities and the ability to utilize equipment successfully to measure leakage. Therefore, it is critical to improve accurate emissions inventory data as lessons learned from reviewing Annual Emissions Inventory Report data is that

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		much of the inventory is based on estimations.
BP 20b	Geographic Tracking Utilities shall develop methodologies for improved geographic tracking and evaluation of leaks from the gas systems. Utilities shall work together, with CPUC and ARB staff, to come to agreement on a similar methodology to improve geographic evaluation and tracking of leaks to assist demonstrations of actual emissions reductions. Leak detection technology should be capable of transferring leak data to a central database to provide data for leak maps. Geographic leak maps shall be publicly available with leaks displayed by zip code or census tract.	This BP also requires utilities to work together, with CPUC and ARB staff, to come to agreement on a similar methodology to improve geographic tracking and evaluation of leaks to assist demonstrations of actual emissions reductions. This BP also recommends that leak detector technologies are capable of transferring leak data to a central database to provide data for leak maps.
	Leak Repairs	
BP 21	"Find It/Fix It" Utilities shall repair leaks as soon as reasonably possible after discovery, but in no event, more than three (3) years after discovery. Utilities may make reasonable exceptions for leaks that are costly to repair relative to the estimated size of the leak.	As the only leak repair BP, this "find-it/fix-it" BP applies to all leaks. This BP requires utilities to repair all leaks within a maximum of three years of discovery, allowing for reasonable exceptions. In the short-term, utilities are also required separately to eliminate their backlog of leaks unless leak repairs are cost prohibitive.
	Leak Prevention	
BP 22	Pipe Fitting Specifications Companies shall review and revise pipe fitting specifications, as necessary, to ensure tighter tolerance/better quality pipe threads. Utilities are required to review any available data on its threaded fittings, and if necessary, propose a fitting replacement program for threaded connections with significant leaks or comprehensive procedures for leak repairs and meter set assembly installations and repairs as part of their Compliance Plans. A fitting replacement program should consider components such as pressure control fittings, service tees, and valves metrics, among other things.	This leak prevention BP addresses the very large number of threaded fittings and their known propensity to develop leaks. This BP requires companies to review and revise pipe fitting specifications and any available data on utilities' threaded fittings, as necessary. This BP requires utilities to review their own pipe fittings specifications along with available data and if necessary, propose a fitting replacement program as part of their Compliance Plan. For example, Aeronautical National Pipe Taper (ANPT) threads (ANSI SAE AS71051) may be less leak-prone than National Pipe Taper (NPT) pipe threads (ANSI/ASME B1.20.1) since the former has 2 threads and the latter has 3 threads. However, other types of threads or connections may prove better.

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BP 23	Minimize Emissions from Operations, Maintenance and Other Activities Utilities shall minimize emissions from operations, maintenance and other activities, such as new construction or replacement, in the gas distribution and transmission systems and storage facilities. Utilities shall replace high-bleed pneumatic devices with technology that does not vent gas (i.e. no-bleed) or vents significantly less natural gas (i.e. low-bleed) devices. Utilities shall also reduce emissions from blowdowns, as much as operationally feasible.	Most natural gas companies have gas systems containing large volumes of methane. Large amounts of fugitive and vented emissions from operations, maintenance and other activities, along with unforeseen catastrophic releases, can negate the methane reductions by other measures and significantly increase GHG emissions. This leak prevention BP focuses on minimizing fugitive and vented methane emissions including those from catastrophic releases, high-bleed pneumatics and blowdowns. This BP requires replacement of high-bleed pneumatic devices and requires reduction of blowdown emissions, as much as operationally feasible.
BP 24	Dig-Ins / Public Education Program Dig-Ins – Expand existing public education program to alert the public and third-party excavation contractors to the Call Before You Dig – 811 program. In addition, utilities must provide procedures for excavation contractors to follow when excavating to prevent damaging or rupturing a gas line.	Dig-Ins are a major cause of gas line ruptures. The utilities are already required to implement Dig-In public awareness programs. This leak prevention BP requires utilities to expand their existing public education programs and to provide procedures for excavation contractors to follow when excavating.
BP 25	Dig-Ins / Company Standby Monitors Dig-Ins – Utilities must provide company monitors to witness all excavations near gas transmission lines to ensure that contractors are following utility procedures to properly excavate and backfill around transmission lines.	Dig-Ins are a major cause of gas line ruptures. This leak prevention BP is necessary to ensure contractors follow utility excavation and backfill procedures around transmission lines to try to prevent damage to a transmission line. (It is possible to nick or damage a transmission line which can be a root cause for a rupture years later.)
BP 26	Dig-Ins / Repeat Offenders Utilities shall document procedures to address Repeat Offenders such as providing post-damage safe excavation training and on-site spot visits. Utilities shall keep track and report multiple incidents, within a 5-year period of dig-ins from the same party in their Annual Emissions Inventory Reports. These incidents and leaks shall be recorded as	This leak prevention BP requires utilities to document procedures to address Repeat Offenders and to track and report multiple incidents in their Annual Emissions Inventory Reports. This BP recommends utilities report egregious offenders to appropriate enforcement agencies. This BP requires these incidents and leaks to be recorded under the Recordkeeping BP.

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	required in the recordkeeping best practice. In addition, the utility should report egregious offenders to appropriate enforcement agencies including the California Contractor's State License Board. The Board has the authority to investigate and punish dishonest or negligent contractors. Punishment can include suspension of their contractor's license.	

(End of Appendix B)