San Diego Gas and Electric Company
2022 Natural Gas Leak Abatement Compliance Plan
Safety Policy Division Evaluation Report Revision11.30.22

EXECUTIVE SUMMARY

The California Public Utilities Commission (CPUC) Safety Policy Division (SPD) approves[1], with some exceptions, the emissions reduction measures proposed in the San Diego Gas and Electric Company (SDG&E) Amended 2022 Natural Gas Leak Abatement (NGLA) Compliance Plan, filed on August 12, 2022. The Plan was filed according to the NGLA program requirements established in Decision (D.)17-16-015 and expanded in (D.)19.08-020.

The SDG&E 2022 Compliance Plan forecasts an annual emissions reduction of approximately 13,405 thousand cubic feet (MCF) by 2030, a 7.6 percent reduction from the adjusted 2015 Baseline[2]. This estimate does not meet the statewide goal of 40 percent. However, SDG&E has already implemented many of the mandatory best practices and has a low emissions level[3] so there are limited opportunities to further reduce methane emissions. The Commission has not established a reduction target for SDG&E.

While SPD approves most of proposed measures for compliance with the NGLA best practices, SPD does not take a position on whether ratepayers should fund additional reduction efforts considering SDG&E's already low emissions. SPD anticipates that question will be addressed as part of the disposition of Advice Letter 3071-G seeking approval of forecasted costs for implementing its NGLA program.

In the 2022 Plan, most emission reduction measures approved in the 2020 Plan are proposed to continue, along with some expansions and new activities. However, some of these proposals request funding for measures based on cost-effectiveness studies not yet completed. SPD recommends that the Commission, rather than the utility, should decide if a measure's cost-effectiveness is acceptable and only then approve funding for a measure.

A notable measure introduced in the Compliance Plan is Aerial Monitoring, which identifies both company and customer leaks with an airborne survey. In preliminary testing performed by SDG&E's sister company, SoCalGas, the emissions from customer leaks have been estimated at double the amount from SoCalGas's infrastructure. Also, the identification of customer leaks may provide incremental safety benefits to disadvantaged communities due to expectation of older and poorly maintained appliances. However, SDG&E could not provide a cost-effectiveness estimate for this measure.

[1] Approval authority delegated to SED Staff, now SPD Staff, in D.19.08-020 at 19.
[2] Forecast based on CPUC/CARB 2022 preliminary adjustments to emission measurement methods. The final adjustment may alter the forecast somewhat.
[3] The 2021 Emissions of 254,900 MCF are 6 percent of the 2015 baseline.

SPD approves adoption of the SDG&E Compliance Plan, with exceptions described below.

MEASURES NOT APPROVED

SPD does not approve the following measures because of insufficient cost-effectiveness information:

1. The expansion of Blowdown Reduction Activities beyond the 2020 approval level described in Chapter 2.
2. Chapter 12, Accelerated Leak Repair - Transmission
3. Chapter 14, Aerial Monitoring

RECOMMENDED APPROVAL PROCEDURES

To secure approval and funding for the non-approved measures above, SPD advises the following conditions and procedures:

1. The Commission will require a separate Tier 3 Advice Letter filing for funding these measures, concurrent or after submission of engineering studies that demonstrate reasonable cost effectiveness. The studies will be reviewed for approval by SPD staff.
2. Because SDG&E is not required to meet the Commission target of 20 percent and the Statewide goal of 40 percent, SPD recommends that no ratepayer funding should be expended for new or expanded measures that exceed the break-even[4] standard cost effectiveness of approximately $22/MCF.
3. SDG&E will provide a presentation and a written report for each measure to document the expected cost-effectiveness at the 2023 NGLA Program Winter Workshop, normally scheduled in February each year. If more time is needed, SDG&E will provide the presentation and written report by no later than June 15, 2023.
4. Within 30 days of receipt, SPD Staff will review the reports for sufficiency of data and analysis that support the estimated cost-effectiveness and the utility's rationale for adoption of the measure. Staff may request CARB assistance with these reviews.
5. SPD Staff recommends that, where possible, safety benefits from reduction of leaks should be quantified and included in the calculation of cost-effectiveness in a similar manner to that used in the Risk Assessment Mitigation Phase (RAMP) process.
6. The engineering studies should include an analysis of the safety benefits to disadvantaged communities (DACs), including the volume of emissions found in DACs vs. Non-DACs.
7. SPD Staff will evaluate the proposed measures based on a comparison of the expected cost-effectiveness to previously adopted measures, the break-even cost, the contribution to the 2030 Statewide reduction goal, and the benefits to disadvantaged communities. Staff will also consider the impact on the Commission's duty to ensure safety, reliability, and just and reasonable rates.
8. Following staff evaluation of the engineering studies, the Director of Safety Policy Division will communicate approval of the measures by letter to Sempra and the Energy Division.

[4] "Break-even" occurs when the standard cost effectiveness is offset to a zero balance from avoided cap-and-trade costs (currently $1.14/MCF), and social cost of methane savings (currently $21/MCF).

BACKGROUND

In accordance with Decision (D.) 19.08-020, which established Phase II in the CPUC's proceeding to address Senate Bill (SB) 1371[5], SDG&E filed a Compliance Plan as required on March 15, 2022. After initial feedback by SPD Staff, SDG&E submitted an amended plan on August 12, 2022. The purpose of the NGLA Compliance Plan is to propose how the utility will achieve emissions reductions, primarily though implementation of the Best Practices for leak abatement described in the Phase I NGLA Program Decision (D.) 17-06-015.

The Phase II Decision added requirements for the Compliance Plans, including specifications for determining the cost-effectiveness for each proposed compliance measure, when emissions reduction can be attributed to the measure. D.19.08-020 requires use of a specified cost-effectiveness methodology and two cost-benefit tests to provide benefit 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 to also consider qualitative factors and policy goals. The two cost-benefit tests are: Cap-and-Trade savings and avoided social cost of methane. D.19.08-020 did not specify a cost-effectiveness threshold but required the proposals to be evaluated on qualitative and quantitative bases.

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. The Phase II Decision also provides for grouping multiple Best Practices into integrated measures, with each measure described in its own chapter.

APPROVAL AUTHORITY

Decision (D.)19.08-020 authorizes the CPUC's Safety Enforcement Division (SED) to approve or reject NGLA Compliance Plans.[6] Since the Decision was issued, the SED Staff who had that responsibility are now part of the Safety Policy Division (SPD) and have continued that role. When funding is required outside of a General Rate Case (GRC), the utility will file a Tier 3 Advice Letter with 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

The SDG&E Amended 2022 Compliance Plan presents a total of 14 Chapters detailing measures to address the 26 Best Practices to begin or continue in 2023. Four of the chapters provide an emissions reduction estimate, with three of those chapters also providing corresponding cost-effectiveness estimates. Overall, the Plan forecasts emissions reduction of 7.6 percent by 2025, with no additional reduction expected by 2030. This forecast does not meet the statewide greenhouse gas (GHG) reduction goal of 40 percent by 2030 or the interim reduction target of 20 percent by 2025 established in the Phase II Decision. However, due to SDG&E's prior implementation of best practices and already low leak inventory, opportunities to achieve such reductions are limited and SDG&E is under no requirement to achieve a particular reduction.

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[5] Leno, chapter 525 statutes of 2014

[6] D.19.08-020, at p. 19.

Until this most recent 2022 Compliance Plan, approximately 60 percent of the baseline emissions level 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, no reduction from those sources could be measured until better quantification methods were established. Research and pilot studies aimed at developing such quantification methods have since been conducted and presented by SDG&E for approval by SPD Staff in consultation with California Air Resources Board (CARB) Staff.

These improved methods have allowed for better measurement of the performance of SDG&E's measures and will better inform decisions about Compliance Plan proposals as may be needed to reach the 2030 goal.

A summary table of the chapters offering emissions reduction estimates and cost-effectiveness values follows in Appendix A, Table 2.

COST-EFFECTIVENESS DEFINITION AND USE

D.19.08-020 defines a cost-effectiveness calculation method and requires presentation of the social cost of methane and Cap-and-Trade cost-benefit tests. The Decision does not establish a threshold cost-effectiveness value or limit.

STANDARD COST-EFFECTIVENESS

The standard cost-effectiveness is the total program costs less direct savings over the expected benefit period divided by the total emissions reduction for the same period. Program costs are defined as the average annual revenue requirement (AARR) times the number of years of the benefit period. Cost-effectiveness is expressed in dollars per thousand standard cubic feet of natural gas emissions or $/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.[7] For SDG&E, an annual Advice Letter forecasts the rate impact of the Cap-and-Trade expense. This expense is added to rates per CPUC approval. Emissions reductions are accounted for in this Advice Letter as reduced gas throughput. In the Compliance Plan, the utility is required to show the value of the avoided Cap-and-Trade cost as a benefit in $/MCF. The Decision 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 Decision 15-10-032.[8] That decision values Cap-and-Trade costs on the assumption that all gas throughput is combusted and emitted to the atmosphere as CO2.

[7] D. 19-08-020 at 36
[8] D.15-01-008, Ordering Paragraph 3, p. 82.

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 2022 futures value based on the five-day average of trading days January 10-16, 2020, from the International Exchange: $20.82 per metric ton CO2 equivalent (MT CO2(e)). Compliance with the Commission instructions produces a Cap-and-Trade benefit value of $1.14/MCF. In the "Common Assumptions for Cost Estimates" section of the 2022 Compliance Plan, SoCalGas gives an erroneous Cap and Trade benefit value of $13.61/MCF. However, examination of the cost-effectiveness values presented in the Plan shows that SDG&E used the correct $1.14/MCF value in the calculations and simply miswrote the incorrect value in the introductory section.

SOCIAL COST OF METHANE BENEFITS

The second cost-benefit test required by Phase II is the value for avoided social cost of methane (SCM). While not an immediately tangible savings to the ratepayer, the future cost to society from the environmental impact of GHGs is an important component of any GHG program. The Phase II Decision provides an SCM value of $21/MCF to use in Compliance Plans.[9] SDG&E used that value in the Plan.

REVIEW OF PLAN CHAPTERS

A complete list of all chapters with their Average Annual Revenue Requirement, Standard Cost-effectiveness, and Best Practices (BPs) addressed, is provided in Table 1 below. Given that many of the programs presented have been approved in previous with similar levels of funding, this report will primarily examine the five programs identified by staff that are either new or are proposed to have a significant expansion in cost. For all proposals not reviewed in depth in this evaluation, staff approves their adoption as proposed by SDG&E in their Compliance Plan.

A description of all 26 Best Practices is provided in Appendix B for reference.

[9] D. 19-08-020 at Page 16.

TABLE 1. COMPLIANCE PLAN SUMMARY

CH.	DESCRIPTION	Avg. Ann. Revenue Reqt., Millions	Std. Cost Eff, $/MCF[10]	Best Practices Addressed	New Program or Sig. Expansion
1	Increased Leak Survey	$2.00	$432	15, 16	Yes
2	Blowdown Reduction Activities	$1.40	$489[11]	23, 3-7	Yes
8	Pipe Fitting Specifications	$1.20	NE	22	Yes
12	Accelerated Leak Repair - Transmission	$2.10	NE	21	Yes
14	Aerial Monitoring	$7.10	NE	16, 17, 20a	Yes
3	Damage Prevention Algorithm and Proactive Intervention	$0.20	$73	24, 25, 26	No
4	Recordkeeping IT Project	$0.40	NA	9	No
5	Geographic Tracking	None	NA	9, 20b	No
6	Electronic Leak Survey	$0.20	NA	20b	No
7	Damage Prevention Public Awareness	$0.70	NE	24, 25, 26	No
9	Repeat Offenders IT Systems	$0.03	NE	26	No
10	Gas Speciation	$0.20	NE	17	No
11	Public Leak Maps	$0.03	NE	20b	No
13	Distribution Above Ground Leak Surveys	None	NA	19	No
	TOTAL	**$15.36**			

NA = Cost-effectiveness not applicable. **NE =** Emission reduction could not be estimated.

SECTION A. EVALUATION OF CHAPTERS WITH SIGNIFICANT EXPANSIONS

SPD staff identifies 5 chapters that propose significant increases in revenue requirement.

CHAPTER 1. INCREASED LEAK SURVEY

This chapter incorporates Best Practice 15 (Leak Survey Interval) and 16 (Special Leak Surveys). BP 15 requires a three-year leak survey period or an alternative survey period if more effective in special cases. SDG&E plans 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.

[10] Standard Cost-effectiveness is the average annual revenue requirement less direct savings divided by the annual emission reduction.

[11] The Standard Cost-effectiveness for Chapter 2 reflects amended data provided by SDG&E to SPD Staff.

Unprotected steel pipe means that no anti-corrosion system, such as cathodic protection, is installed on that pipe. Aldyl-A, one of the earliest forms of plastic pipe used instead of steel, has been found to develop leaks more often than other materials. The older, "vintage," supplies of Aldyl-A are particularly subject to developing leaks.

The practice of performing annual surveys on pre-1986 Aldyl-A was begun under SDG&E's regulatory Distribution Integrity Management Program (DIMP) and is a good example of what can be achieved with increased leak survey intervals. SPD staff note that the pre-1986 Aldyl-A survey is funded under the General Rate Case as a DIMP-related program.

Although SDG&E does not propose increasing its pipeline survey cycles, it requests additional funding to support the initiative, including automation of the process to improve its precision and speed as well as expanded efforts to replace Population-Based emission factors with more accurate Leaker-Based emission factors.

For the leak survey frequency measures in Chapter 1, the expected reduction by 2025 is 7,301 MCF, accounting for over half of all estimated reductions.

The standard cost-effectiveness is presented as $432/MCF based with an AARR of $2.0 million. Staff observes that this cost ratio is many times higher than the break-even standard cost-effectiveness of about $22/MCF. For comparison, the historical achieved standard cost-effectiveness reported for 2018-2020 was $352/MCF. The net cost effectiveness with cap-and-trade and social cost of methane savings is $420/MCF.

While the cost-effectiveness value is high, the program has consistently demonstrated emissions reduction and the revenue requirement is moderate. The added costs in the 2022 Plan are said to be needed to maintain the ability to effectively perform tasks that have been approved in previous Compliance Plans.

SPD Staff approves adoption of Chapter 1.

CHAPTER 2. BLOWDOWN REDUCTION ACTIVITIES

Another set of BPs involve reduction of intentional gas releases, usually for maintenance purposes, known as blowdowns. This chapter implements BPs 3, 4, 5, 6, 7, and 23. These practices include such activities as bundling of several projects, reducing pressure before the blowdown, and containing the emissions with portable compressors.

SDG&E proposes continuing its high-pressure pipeline blowdown reduction efforts, as well as a significant expansion of the program (from an AARR of $0.07 million proposed in 2020 to an AARR of $1.40[12] million in the 2022 Compliance Plan) to increase the use of technologies such as gas capture or cross compression on more projects, as well as exploring efforts on Distribution

[12] The Average Annual Revenue Requirement reflects amended data provided by SDG&E to SPD Staff.

operations. A large portion of this cost is driven by a proposal within the chapter to improve structural and piping components at the Borrego Springs Liquified Natural Gas (LNG) facility.

Estimated emissions reduction by 2025 is 2,944 MCF. However, the number of blowdowns can vary up or down from year to year as different maintenance activities may dictate. Additionally, these emissions reductions do not include forecasts for work performed on the Borrego Springs LNG facility due to lack of available data. As such, it is anticipated that reduction forecasts will increase once SDG&E has sufficient data to accurately estimate the reductions from work on the LNG facility.

Standard cost-effectiveness for this chapter is forecasted as $489/MCF[13], which contrasts with the historical 2018-2020 actual standard cost-effectiveness of $41/MCF. This difference is largely due to the $5 million in capital costs for modernization of the Borrego Springs LNG facility without including any expected emissions reductions from the work. SPD expects that the cost-effectiveness forecasted for the chapter will improve once SDG&E includes reductions from work on the LNG facility.

SPD Staff does not approve expansion of Chapter 2 beyond the 2020 level at this time. Staff recommends that SDG&E prepare and present a research paper to document the expected performance of the program at the 2023 Winter Workshop or no later than June 15, 2023, with a subsequent Advice Letter filing if SDG&E wishes to fully implement the proposed program. Staff also recommends SDG&E presents any information or filing related to the Borrego Springs LNG facility modernization as a separate item from other proposed activities in Chapter 2.

CHAPTER 8. PIPE FITTING SPECIFICATIONS

BP 22 requires utilities to review and revise pipe fitting specifications to ensure that pipe connections will not leak. In the 2020 Compliance Plan, SDG&E proposed a quality control inspection process to ensure incoming threaded components meet the company specifications and to modify requirements as experience suggests. Since then, SDG&E developed a plan focused on updating standards during the inspection process, shipping and handling, and construction/installation.

Due to these updated standards, SDG&E has increased the AARR to $1.2 million (from $0.24 million in 2020). SDG&E is unable to provide a cost-effectiveness forecast.

SPD Staff approves adoption of Chapter 8.

SECTION B. REVIEW OF CHAPTERS PROPOSING NEW PROGRAMS

SPD staff identifies one chapter describing a program that was not proposed (and subsequently approved) in the 2020 Compliance Plan.

[13] The Standard Cost-effectiveness reflects amended data provided by SDG&E to SPD Staff.

CHAPTER 12. ACCELERATED LEAK REPAIR – TRANSMISSION

This chapter addresses Best Practice 21: "Find It, Fix It". Historically, SDG&E prioritized transmission leaks based on safety risk instead of emission volumes. SDG&E proposes to accelerate leak repairs beyond the normal timeframe.

The proposed initiative has a total revenue requirement of $4.1 million, with an AARR of $2.1 million. SDG&E was unable to provide an emissions reduction estimate at the time the Compliance Plan was filed.

SPD does not approve Chapter 12 based on insufficient cost effectiveness data. Staff recommends that SDG&E prepare and present research to document the expected reductions and cost-effectiveness for the projects at the 2023 Winter Workshop or no later than June 15, 2023, with a subsequent Advice Letter filing if SDG&E wishes to fully implement the proposed program.

CHAPTER 14. AERIAL MONITORING

SDG&E proposes an aerial leak monitoring program using Gas Mapping LiDAR (GML) technology (also called Aerial Methane Mapping, or AMM) to identify methane leaks. This measure had already been approved for use with SoCalGas in the 2020 Compliance Plan. However, limited data on cost effectiveness at SoCalGas has been developed to date and no estimates were provided for cost effectiveness for San Diego.

This chapter addresses Best Practice 17 "Enhanced Methane Detection" and BPs 16, and 20a. An advantage of aerial sensing over traditional ground measurement is that natural gas leaks upwards, so it is not always visible from the ground, or when wind is blowing away from the surveyor, or when a structure interferes with the measurement. The aerial surveys will provide an independent look at leaks that may not have otherwise been found. SoCalGas reports that behind-the-meter leaks on customer facilities make up a significant portion of emissions detectable by the program.

SDG&E proposes this measure at an AARR cost of $7.1 million, with a total revenue requirement of $20.0 million. No emission reduction estimate was provided in the Compliance Plan.

While the NGLA Program currently does not account for emission reductions that are achieved outside of the utility's system, SPD staff acknowledges the significant societal greenhouse gas reduction benefit that aerial monitoring may produce are in the spirit of SB 1371. Furthermore, detection of leaks that would otherwise not be included in standard utility survey practice offers additional safety advantages.

However, SPD does not approve Chapter 14 for SDG&E based on insufficient cost effectiveness data. Staff recommends that SDG&E prepare and present research to document the expected reductions and cost-effectiveness for the program at the 2023 Winter Workshop or no later than June 15, 2023, with a subsequent Advice Letter filing if SDG&E wishes to fully implement the proposed program.

CONCLUSION

SPD Staff have reviewed all the chapters of the 2022 SDG&E Compliance Plan for consistency with the 26 Best Practices, cost-effectiveness, and qualitative safety benefits.

SPD approves all chapters, except for Chapters 12 and 14 and the Chapter 2 expansion as described in the respective sections.

APPENDIX A: ESTIMATED EMISSIONS REDUCTIONS

TABLE 2. Major Efforts to Reduce Emissions (2015 Official Baseline) – SDG&E

Chapter	2025 Emissions Reduction, MCF	Avg Annual Revenue Rqt, $Million	% Reduction from Baseline	Standard Cost-effectiveness ($/MCF)
Chapter 1 - Increased Leak Survey	7,301	2.0	4.1%	432
Chapter 2 - Blowdown Reduction Activities	2,944	1.4	1.7%	489
Chapter 3 - Damage Prevention Algorithm & Proactive Intervention	2,519	0.20	1.4%	73
Chapter 14 - Aerial Monitoring	641[14]	7.10	0.4%	TBD
Summary	**13,405**			
Percentage Reduction	**7.6%**			

[14] Emissions estimate only accounts for before-the-meter leaks

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 in order to minimize methane emissions	Written company policies are needed to require minimization of methane emissions from company activities (e.g. blowdowns, other operational emissions, etc.), and ensure effective

No.	Best Practices	Rationale
	is 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.	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 safety,

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.	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, data and assumptions to derive the volume of methane released.

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.	
	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 to alleviate

No.	Best Practices	Rationale
	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.	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>	

No.	Best Practices	Rationale
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 also 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 management

No.	Best Practices	Rationale
	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.	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.

No.	Best Practices	Rationale
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 much of the inventory is based on estimations.

No.	Best Practices	Rationale
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 in order 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 in order 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.
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	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

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	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.	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 also requires reduction of blowdown emissions, as much as operationally feasible.
BP 24	<u>Dig-Ins / Public Education Program</u> 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	<u>Dig-Ins / Company Standby Monitors</u> 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 in order 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	<u>Dig-Ins / Repeat Offenders</u> 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 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.	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.

(End of Appendix B)