

SED EVALUATION REPORT
FOR PACIFIC GAS AND ELECTRIC COMPANY
2018 LEAK ABATEMENT COMPLIANCE PLAN

I) EXECUTIVE SUMMARY

On March 15, 2018, Pacific Gas and Electric Company (PG&E) submitted a Methane Leak Compliance Plan, as directed by Commission decision (D.) 17-06-015 in R. 15-01-008, the Rulemaking to Adopt Rules and Procedures Governing Commission-Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leakage Consistent with Senate Bill 1371.¹ Pursuant to D. 17-06-015, the Commission's Safety and Enforcement Division, in cooperation with the CA Air Resources Board, has evaluated the Compliance Plan and provides this written response. PG&E shall make the modifications to its Plan that are identified herein by the Safety and Enforcement Division (SED) and submit a revised Plan to SED within 30 days. (D.17-06-015, ¶ 6(a)2. at p. 159; ¶¶10 – 13 at pp. 161-162).

PG&E and other gas utilities participated in an April 19, 2018 workshop to review major elements of their Compliance Plans, especially proposals for Pilot/Research & Development (R&D) programs and plans for addressing the 26 Best Practices for methane emissions detection, quantification and reduction, as well as for operations and training, as detailed in D. 17-06-015.

SED has evaluated and approves the PG&E 2018 Methane Leak Abatement Compliance Plan, with the following key observations or modifications:

Pilot and R&D Projects: SED approves the proposed Pilot and R&D projects as clarified in the set of Pilot/R&D Summaries which have been provided in a Data Request response, according to a Project Summary template mutually developed with SEMPRA and PG&E. All such projects will be subject to regular progress review by SED and CARB Staff with PG&E R&D representatives not less than every six months, the first review to occur before December 30, 2018.

Emission Reduction by 2030

PG&E has discussed the goal of a 40% reduction by 2030 in the Compliance Plan by identifying the largest sources where reductions can be achieved and discussing the challenges in realizing those reductions. To reach the goal, PG&E plans to conduct R&D

¹ The Plan is available online at <http://www.cpuc.ca.gov/riskassessment/>

studies to develop new technologies, refine the emission-factor approach for more accurate emissions reporting, and evaluate whether reduction activities are meaningful and cost-effective. SED expects the 2020 Plan will incorporate the lessons learned during the first Compliance Plan period to provide a more comprehensive reduction plan.

BP-3 Pressure Reduction Before Venting: The procedures for non-emergency venting must include post-event evaluation and analysis, after every event, to determine if further procedural changes should be adopted. A summary of these evaluations must be included in the following Compliance Plan. This change to BP-3 must be implemented in 2018.

BP-20b Geographic Tracking of Leaks: SED staff plans to host a workshop later in 2018 to facilitate the collaboration of the utilities in developing a similar methodology to improve geographic evaluation and tracking of leaks, as required In the Decision. PG&E shall use this common methodology in its implementation of BP-20b.

BP-21 “Find-it/Fix-It”: SED is concerned that the Grade 3 below-ground leak backlog repair program is excessively costly relative to the expected emission reduction, especially compared to the Super Emitter program. As explained further below, SED recommends that PG&E should modify BP-21 so that the Grade 3 below-ground program will spend no more than half the requested ratepayer funding while collecting data on repair costs and emissions reduction for evaluation of cost effectiveness for remaining backlog repairs in the next compliance plan period.

II) INTRODUCTION

BACKGROUND: D. 17-06-015 ordered jurisdictional gas pipeline operators to file a Biennial Compliance Plan, detailing how they would adopt the Decision’s 26 Best Practices for methane emissions detection, quantification and reduction, as well as for operations and training. The Compliance Plans were required to be part of the operator’s annual Gas Safety Plan under CPUC General Order (GO) 112-F. Some of the Best Practices included allowance for Pilot or R&D programs to evaluate the cost-effectiveness of potential methods and technologies and application to the utility’s specific operating conditions before adoption.

EVALUATION APPROACH: SED reviewed the PG&E Compliance Plan in collaboration with California Air Resources Board (CARB) and considered comments received from members of the Best Practices Working Group². Elements of the Compliance Plan which raised concerns and require modification will be discussed in detail in below.

² Working Group members who gave informal comments are the Environmental Defense Fund (EDF) and the Coalition for Utility Employees (CUE).

III) EMISSION REDUCTION ESTIMATES

The Decision ordered that the “Compliance Plans shall include information on how each Respondent plans to achieve a 40% reduction of emissions below 2013 levels by 2030, what level of reduction would be achieved by 2020, and how they plan to achieve the 2020 reduction level.” (D.17-06-015, ¶6(c) at p. 160). D.17-06-015 established that the 2013 baseline will be represented by the 2015 emissions inventory as reported in the annual Leak Inventory, since 2015 is the first year that the emissions inventory was compiled.

In the Compliance Plan Summary, PG&E projects a 17% reduction of the 2015 baseline by 2020. That will be a significant step towards the 40% reduction by 2030 target. The largest components of the reduction are expected from fewer blowdown emissions, the Super Emitter program, and adoption of a three-year leak survey cycle.

However, PG&E does not specify how the 40% by 2030 reduction will be achieved as required in the Decision. SED expects the 2020 Compliance plan will provide a more comprehensive analysis for how PG&E plans to meet the 2030 goal, possibly including new ideas beyond the 26 Best Practices.

Included in the analysis, PG&E may propose alternative means of determining emission volumes that currently rely on emissions factors, such as the application of results from the pilot and R&D projects. These proposals to change the emission measurement methods would be reviewed by interested parties in Workshops and if uniformly applicable would be approved for use by CARB.

IV) BEST PRACTICES COMPLIANCE

BP-1 to BP-9 Policies and Procedures

SED finds these BP statements are consistent with D. 17-06-015. BP-3 should be amended to include a requirement to conduct a post-blowdown evaluation and analysis, to determine if further revisions to procedures are warranted. The amendment should be made before the end of 2018, and a summary of the evaluations performed shall be included in the 2020 Compliance Plan.

BP-7 Blowdown Reduction. PG&E estimates reduction of 0.24 BCF (billion cubic feet of natural gas) for the years 2018-2019, which initially seemed too large since it is greater than the total blowdown emissions reported in 2015 and 2016. In response to a data request, however, PG&E said it expects a greater level of pipeline maintenance activity in 2018-2019 so this reduction is consistent with that greater level of activity. However, this estimated reduction is

not necessarily an accurate estimate of reductions achieved by implementing this BP in future years due to changing levels of maintenance activities.

BP-16 Special Leak Surveys: PG&E's initial choice of vintage pipe materials for special leak surveys based on integrity-management analysis is a good place to start. For future special leak surveys, PG&E has proposed an R&D project to develop advanced risk-based targeting method incorporating Picarro mobile leak measurements with other data analysis. PG&E must conduct the R&D project according to the details supplied in response to SED's data request.

BP-18 Stationary Methane Detection

PG&E proposes to leverage the work required to comply with the CARB Oil and Gas Rule³ for leak monitoring at compressor and storage facilities, to serve as a pilot study to evaluate performance and cost factors of current commercial devices before deployment at other locations such as M&R stations. PG&E also expects to use the sensor measurements to refine emission factors for Regulation Stations, providing a more accurate leak inventory.

In addition, PG&E will participate in an OTD (Operations Technology Development) collaborative project to study the capabilities of newly-developed stationary methane detectors, to determine which would be most cost-effective for fixed-point monitoring of gas facilities. OTD is a non-profit research organization that serves the natural gas utility community.

SED approves this two-pronged approach to stationary methane detection which should determine the most cost-effective solution for PG&E's facilities.

BP-20a Leak Quantification.

PG&E has proposed a major program based on leak quantification technology newly developed: the Super Emitter program. While not exact, the current method is capable of quantifying leaks as super-sized. For further development of quantification, PG&E plans to participate in collaborative research projects with OTD and NYSEARCH (a research branch of the Northeast Gas association).

BP-20b Geographic Tracking of Leaks

PG&E states it is collaborating with the Environmental Defense Fund (EDF) to develop a publicly available leak map to display leak information by zip code or similar location with a "tentative launch in 2018 or as soon as practicable". However, Staff notes that the BP requires utilities to "work together, with CPUC and CARB, to agree on a similar methodology to improve geographic

³ Regulation for Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities.

evaluation and tracking of leaks”. SED staff will convene a public workshop so that agreement on methodology can be reached. PG&E shall use the common methodology to implement this BP.

BP-21 “Find-it/Fix-it”

This BP requires repair of any gas leak within 3 years after discovery, with reasonable exceptions for leaks that are costly to repair relative to the estimated size of the leak. The targeted leaks are those that don’t already require prompt repair under existing safety regulations. These leaks are usually referred to as “Grade 3” leaks.

PG&E proposes three programs under this BP: 1) a “Super-Emitter” leak reduction program, 2) a program to reduce the backlog of Grade 3 below-ground leaks, and 3) prompt repair of above-ground Grade 3 leaks. The Super-Emitter program has a very attractive cost effectiveness estimate of \$22/MCF of emissions abated while the Grade 3 Underground program is significantly more expensive at \$591/MCF.

The Super-Emitter program is a novel application of recently-developed methods that can determine the approximate flow rate of a leak, accurate enough to categorize the leak as larger than a threshold value. Studies have shown that a small percentage of gas pipeline leaks have very large emissions compared to the others. PG&E proposes to find those largest, “super-emitter”, leaks with a dedicated survey program and repair them promptly no matter what the leak Grade is. The emissions reduction estimate for the first two years of this program is 248,000 MCF for an estimated 400 underground repairs. The projected cost effectiveness is \$22/MCF.

The Grade 3 below-ground program proposes to reduce the backlog of other below-ground Grade 3 leaks, which have remained open for extended periods (as permitted under GO-112 regulations) at an advanced pace of about 2000 leaks per year, which would reduce the backlog by about 70% by 2020. The average cost to locate and repair an underground leak is about the same for any size of leak. But the potential emissions reduction from this category is small compared to the Super Emitter program. PG&E estimates the cost effectiveness of this program is \$591/MCF, or 27 times more expensive than the Super-Emitter program.

SED is concerned that the Grade 3 below-ground leak repair program is too costly relative to the size of the leaks. PG&E has stated its corporate goal of eliminating the backlog of Grade 3 leaks, unless SED provides an exemption due to high cost. It is not clear that funding for these repairs should be borne by gas utility ratepayers due to the relatively high cost and low emission reduction forecasted. There are other sources of methane emissions in California which may be more economical to abate. In addition, before authorizing the proposal in full, it is prudent to first evaluate why PG&E's estimate of costs to repair Grade 3 leaks is so much

higher than Southern California Gas estimate (\$591/MCF vs. \$138/MCF) and why the estimate of methane reductions for PG&E's Grade 3 leak program is so much lower than SoCalGas' estimate.

Further evaluation will also allow comparison with other ways to reduce methane emissions that may be identified through the R&D/pilots, and that may be more cost-effective. Therefore, pursuant to D.17-06-015, SED grants an exemption to the goal of eliminating the backlog of Grade 3 leaks within 3 years due to costly repairs (Order, ¶ 5 at p.159) and recommends that the Commission should authorize one-half the requested funds for this program. With those funds, PG&E should prioritize repairs of Grade 3 leaks based on highest emission reduction for lowest cost, where possible. The remaining backlog of Grade 3 leaks should be addressed in the 2020 Compliance Plan based on actual cost-effectiveness experience learned from this initial effort, combined with information gained from the various research projects.

PG&E also expects to fix many above-ground Grade 3 leaks, which are Meter Set Assembly (MSA) leaks. The expected number of these repairs is about 19,500 per year, which should significantly reduce the backlog of these leaks. According to the 2017 Leak Inventory report, PG&E repaired 15,684 MSA leaks in 2017, some of which had been open for more than 3 years, with only 518 MSA leaks remaining open for 3 years or longer. No cost estimate is provided in the Compliance Plan for this work, so it is assumed to be included within GRC-funded Operations and Maintenance budgets. The reported emissions for MSA leaks in 2016-2017 of 640,000 MCF average per year is not tied to the actual number of MSA leaks but is based on the population of 4.5 million MSAs times a fixed emission factor. SED is aware that CARB has recently conducted a special study of MSA emission factors in Northern and Southern California, so it is hoped that future Leak Inventory reports will provide a more accurate estimate of emissions for the category.

PG&E has not estimated an emission reduction from the above-ground repairs. It will be difficult to quantify the emission reduction results since the individual MSA leak volumes are currently based on population count rather than actual measurements. SED notes that PG&E has proposed an R&D project to study threaded Pipe Fitting Specifications under BP-22, which should apply to MSA emissions since meter set assemblies contain many threaded pipe fittings. If the study shows that different pipe fitting specifications will reduce leaking, PG&E may propose a change to MSA emission factors based on a program to replace MSA fittings. Other research into leak quantification may also help to obtain accurate emission figures.

BP-23 Minimize Emissions from Operations and Maintenance

This BP is focused primarily on the replacement of "high-bleed" pneumatic devices that routinely release gas to the atmosphere by design. PG&E proposes to replace most of these

devices by 2020, with the remainder to be replaced in the following two years. Given that these devices are working components of complex gas facilities that can be difficult to replace without affecting gas operations, the proposed pace is satisfactory.

V) PILOT AND R&D PROGRAMS

Ordering Paragraph 10, part b, of Decision 17-06-015 requires that justifications for proposed R&D and Pilot projects are consistent with criteria in Pub. Util. Code Section 740.1.

SED reviewed the proposed Pilot and R&D projects according to PU Code 740.1 and considered suggestions and comments made by interested parties. SED asked PG&E to present detailed Project Summaries to provide project information in a standardized format developed jointly by SED, PG&E, and SCG. PG&E has summarized 19 projects in their data request response and this information is available online at: <http://www.cpuc.ca.gov/riskassessment/> The proposed R&D cost of \$4.6 Million is 7 % of the total Compliance Plan incremental cost.

SED finds that all the proposed projects meet the required criteria.

SED and CARB will be conducting review meetings with the PG&E R&D team to assess progress and results of these projects. These project reviews will examine progress towards meeting milestones and discuss whether to continue or cease projects based on trigger points. SED may direct PG&E to discontinue a project that SED determines is no longer in the ratepayers' interest.

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