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2024 SB 1371

COMPLIANCE PLAN

SDGE™

Summary of Amendments to SDG&E's 2024 Natural Gas Leak Abatement Compliance Plan (April 2024)

The table below summarizes the changes made in SDG&E's 2024 Leak Abatement Amended Compliance Plan, submitted in April 2024:

Chapter	Page Number	Change Made
Intro	3	Updated cost effectiveness factor and calculations
1	16	Updated cost effectiveness factor and calculations
2	20	Updated cost effectiveness factor and calculations
14	57	Updated cost effectiveness factor and calculations

Introduction

SDG&E submits this Biennial Compliance Plan on March 15, 2024 (Compliance Plan) as part of the Natural Gas Leak Abatement Program (NGLAP or Program). Implementation of the activities for each measure will begin after Compliance Plan and associated forecasts for cost recovery as presented in Advice Letter (AL) 3285 are approved, with an expectation of implementation in years 2025 and 2026 (2024 Compliance Period).

Forecasts presented for cost recovery associated with the measures proposed in this Compliance Plan are for activities that are incremental to safety and specific to the emission reduction goals of Decision (D.)19-08-020. SDG&E currently has policies and procedures in place to meet environmental and safety regulations implemented by various agencies, including, but not limited to, the Pipeline and Hazardous Materials Safety Administration (PHMSA), Occupational Safety and Health Administration (OSHA), California Air Resources Board (CARB), Environmental Protection Agency (EPA), Local Air Pollution Control Districts, and California's Department of Conservation's Geological Energy Management Division (CalGEM). Some of these policies overlap with Senate Bill (SB) 1371 requirements, which is addressed in the relevant chapters herein.

Due to the ongoing collaboration between SDG&E and the relevant agencies to adjust/correct the 2015 baseline, SDG&E has completed the emission reduction estimates using the most recent proposed baseline value (submitted within the Reporting Year 2022 and 2023 Annual Emissions Reports). The most recent proposed value is used because this enables the most accurate emission reduction estimates.

Emission Reductions from Proposed 2015 Baseline

The current proposed 2015 baseline for SDG&E's system is 178,996 MCF. This value includes adjustments that were submitted within the Reporting Year 2022 and 2023 Annual Emissions Reports. Annual estimated emission reductions resulting from activities proposed in this Compliance Plan from 2025 – 2030 are currently estimated at 14,462 MCF. Therefore, the overall emissions in 2030 are estimated to be 164,534 MCF, an 8% reduction from baseline. This estimate was completed using the emission volumes from Table 1 below. Notably, the 2024 Compliance Plan is being submitted while SDG&E and the relevant regulatory agencies are still collaborating to adjust the 2015 baseline. As such, the estimated percentage reduction and emissions levels presented in this Compliance Plan may differ from the results observed after the baseline is finalized.

Table 1 below, Major Efforts to Reduce Emissions, summarizes SDG&E's proposed major activities and estimated emission reductions proposed in the 2024 Compliance Plan based on the 2015 proposed baseline.

Table 1: Major Efforts to Reduce Emissions (2015 Proposed Baseline) – SDG&E

Chapter	2025 Emission Reduction, MCF	2030 Emission Reduction, MCF	Standard Cost Effectiveness ($/MCF), (2025-2030)	Net Cost Effectiveness*($/MCF), (2025-2030)
Chapter 1- Increased Leak Survey	5,464	5,464	463	436
Chapter 2- Blowdown Reduction Activities	3,338	3,338	116	86
Chapter 14 - Aerial Monitoring (System Only)	5,660	5,660	339	313
Program Totals	**14,462**	**14,462**	**335**	**308**
Percentage Reduction Relative to 2015 Baseline	**8%**	**8%**		

** Net Cost Effectiveness reflects the Standard Cost Effectiveness with Avoided Cap & Trade and Social Cost of Methane Cost Benefits*

Emission Reduction Estimation Assumptions

- SDG&E is using the most recently proposed baseline values, as listed in the Reporting Year 2022 and 2023 Annual Emissions Reports, for all system categories when conducting reduction estimations from the 2015 baseline.
- SDG&E is using leaker-based emission factors to estimate 2025 and 2030 Distribution Main and Service Pipeline Leak emissions. SDG&E is utilizing the same emission factors that were submitted in the 2023 Annual Emissions Report to estimate emissions for Chapter 1. SDG&E is using the emission factors that were submitted in the "SoCalGas and SDG&E 2022 Aerial Methane Mapping Research & Cost-Effectiveness Summary Report" from February 2023 to estimate emissions for Chapter 14.
- The 2030 emissions reflect forecasted emission reductions as proposed in this Compliance Plan. The forecasted emission reductions are subtracted from the proposed 2015 baseline to estimate reductions relative to baseline.

Emission models used to forecast reductions will have some degree of variation and the final observed reduction may be higher or lower. Based on information and technologies currently available, SDG&E is proposing to implement measures that maximize cost-effective emission reductions as reasonably as possible and then maintain the reduced emission levels through 2030 and beyond. As proposed research projects and pilots are completed, more accurate modeling may become available. In addition, as pilots are concluded, new technologies may become commercially available to further reduce emissions beyond what is currently forecasted.

In addition to the emissions forecasted to be reduced from SDG&E's system, SDG&E is proposing to use emerging technologies and data analytics to reduce post-meter (customer) emissions, further discussed in Chapter 14 (Aerial Monitoring). Although these reductions are not currently reflected

in SDG&E's Annual Emissions Report, these activities support the state's climate goals and the spirit of Senate Bill 1371.

Calculating Cost Effectiveness

SDG&E implemented most cost-effective measures early on in the Emissions Strategy Program's (ESP) implementation to achieve the maximum emission reductions in the shortest period of time. Future initiatives may be less cost effective and hence demonstrate lower emissions reductions.

Historical Standard Cost Effectiveness:

$$\frac{(RRR - Cost\ Benefits)_{2018\text{-}2022}}{Emissions\ Reductions_{2018\text{-}2022}}$$

Pursuant to D.19-08-020, SDG&E also calculates cost effectiveness with avoided Cap & Trade costs, and social cost of methane as follows:

Historical Cost Effectiveness with avoided Cap & Trade Costs:

$$\frac{(RRR - Cost\ Benefits - Avoided\ Cap\ \&\ Trade\ Costs)_{2018\text{-}2022}}{Emissions\ Reductions_{2018\text{-}2022}}$$

Historical Cost Effectiveness with avoided Social Cost of Methane and Cap & Trade Costs:

$$\frac{(RRR - Cost\ Benefits - Avoided\ Cap\ \&\ Trade\ Costs - Social\ Cost\ of\ Methane)_{2018\text{-}2022}}{Emissions\ Reductions_{2018\text{-}2022}}$$

Historical Cost Effectiveness with avoided Social Cost of Methane, Cap & Trade Costs, and Safety Benefit:

$$\frac{(RRR - Cost\ Benefits - Avoided\ Cap\ \&\ Trade\ Costs - Social\ Cost\ of\ Methane - Safety\ Benefit)_{2018\text{-}2022}}{Emissions\ Reductions_{2018\text{-}2022}}$$

Future Standard Cost Effectiveness:

$$\frac{(AARR - Cost\ Benefits)_{2025\text{-}2030}}{Emissions\ Reductions_{2025\text{-}2030}}$$

Pursuant to D.19-08-020, SDG&E also calculates cost effectiveness with avoided Cap & Trade costs, and social cost of methane as follows:

Future Cost Effectiveness with avoided Cap & Trade Costs:

$$\frac{(AARR - Cost\ Benefits - Avoided\ Cap\ \&\ Trade\ Costs)_{2025\text{-}2030}}{Emissions\ Reductions_{2025\text{-}2030}}$$

Future Cost Effectiveness with avoided Social Cost of Methane and Cap & Trade Costs:

$$\frac{(AARR - Cost\ Benefits - Avoided\ Cap\ \&\ Trade\ Costs - Social\ Cost\ of\ Methane)_{2025\text{-}2030}}{Emissions\ Reductions_{2025\text{-}2030}}$$

Future Cost Effectiveness with avoided Social Cost of Methane, Cap & Trade Costs, and Safety Benefit:

$$\frac{(AARR - Cost\ Benefits - Avoided\ Cap\ \&\ Trade\ Costs - Social\ Cost\ of\ Methane - Safety\ Benefit)_{2025\text{-}2030}}{Emissions\ Reductions_{2025\text{-}2030}}$$

Common Assumptions for Cost Estimates

Below are the common assumptions SDG&E made when building cost estimates for the measures described in this Compliance Plan:

1. AARR = Average annual revenue requirement, calculated by dividing the cumulative revenue requirement for each measure by the useful life of the measure or asset
2. RRR = Realized revenue requirement. It should be noted that AARR and RRR will not match up by definition. Using an "average" does not account for the "realized" due to actual timing of when costs hit and the magnitude and mix of O&M and capital spending. As such, the corresponding AARR and RRR will result in variances
3. Full-Time Equivalents (FTEs) are internal company employees whose costs are known as "Labor." The salary of these FTEs is assumed to be $100,000 in direct annual costs, unless noted otherwise. Contractors are included in "Non-Labor" costs
4. Vehicle costs for employees are included in the loaders for employees and, therefore, are not shown as a specific line item, unless noted otherwise
5. Cost estimates were created in December 2021 dollars and loaded with December 2021 loading factors. Actual loaders vary month to month and may generate a variability in actual spending
6. When measures benefit both SDG&E and SoCalGas, unless otherwise noted, the costs are split 91% SoCalGas and 9% SDG&E. This percentage split is based on the ratio of emissions reported by each utility, as reported in the 2016 Emissions Inventory (reported in 2017)
7. The cost benefit values utilized in the 2024 Compliance Plan are as follows:
    a. The social cost of methane is $24.42/MCF. Per written guidance from the CPUC Safety Policy Division on November 11, 2023, the calendar year 2020 social cost of methane from the 2022 Compliance Plan was adjusted for inflation using the California Consumer Price Index to arrive at the updated value
    b. The cost benefit of the reduced cost of gas was evaluated at the forecasted average annual Weighted Average Cost of Gas (WACOG) published in the 2018 California Gas Report, converted to cost per MCF using a BTU conversion factor of 1.0343 MCF/MMBtu, resulting in a cost benefit of $2.42/MCF. This value was not updated from the 2022 Compliance Plan due to insufficient public data
    c. Cap & Trade costs are $45.12/MTCO2e, assuming December 2025 vintage prices, based on a 5-day average of trading days January 2 – 8, 2024. This futures data was acquired from the International Exchange. Converting from MTCO2e to MCF results in a cost benefit of $20.20/MCF
    d. Although 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
8. Loaded chapter costs include a 10% contingency, as noted in the SDG&E Advice Letter and each chapter cost summary section

SDG&E Table of Concordance

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SDG&E Acronym Library

Acronym	Definition
49 CFR 192	PHMSA Regulation - Transportation Of Natural And Other Gas By Pipeline: Minimum Federal Safety Standards
811	National call-before-you-dig phone number
AARR	Average annual revenue requirement
ACOR	Atmospheric Corrosion
AG	Above Ground
AL	Advice Letter
AMD	Advanced Meter Detection
AMI	Advanced Meter Initiative
AMM	Aerial Methane Mapping/ Aerial Monitoring
AOC	Abnormal Operating Conditions
API	American Petroleum Institute
BP	Best Practice
BTU	British thermal unit
CalGEM	California Geological Energy Management Division
CARB	California Air Resources Board
CCSLB	California Contractor State License Board
CF	Cubic feet
CFH	Cubic feet per hour
CIS	Customer Information System
CPDR	Company Property Damage Report
CPUC	California Public Utilities Commission
CT	Construction Technician
DIMP	Distribution Integrity Management Program
DM&S	Distribution Main and Services
DP	Differential Pressure
DPIR	Detecto Pak-Infrared
EDAPO	Engineering Data Analytics and Performance Optimization
EF	Emission Factor
EPA	Environmental Protection Agency
FTE	Full Time Equivalent; Employee

Acronym	Definition
G.O. 112F	State General Order Governing Design, Construction, Testing, Operation, and Maintenance of Gas Gathering, Transmission, and Distribution Piping Systems
GIS	Geographic Information System
GML	Gas Mapping LiDAR™
GRC	General Rate Case
GS	Gas Standard
HB	High Bleed
HESD	Historizing Emission Sensor Data
LDAR	Leak Detection and Repair
LiDAR	Light Detection and Ranging
LNG	Liquified Natural Gas
M&I	Maintenance and Inspection
M&R	Measurement and Regulation
MCF	Thousand cubic feet
MDMS	Meter Data Management system
MMBtu	Million British thermal units
MSCF/MCF	Thousand standard cubic feet
MSP	Material Specification Properties
MTCO2e	Metric tons of Carbon Dioxide equivalent
MTU	Meter transmission unit
N/A	Not Applicable
NGLAP	Natural Gas Leak Abatement Program
NSOTA	Non-State-of-the-Art
O&M	Operations & Maintenance
PAPA	Pipeline Associations for Public Awareness
PHMSA	Pipeline and Hazardous Materials Safety Administration
PMC	Planned Meter Change
psig	Pounds per square inch
QA	Quality assurance
QC	Quality Control
R/V	Read/Verify
RD&D	Research, Development, & Demonstration
RMLD	Remote Methane Leak Detector
RRR	Realized Revenue Requirement
SAP	System Analysis Program

Acronym	Definition
SCF	Standard cubic feet
SED	Safety and Enforcement Division
SIMP	Storage Integrity Management Program
SOTA	State-of-the-Art
WACOG	Weighted Average Cost of Gas
ZEVAC	Zero Emission Vacuum and Compressor

2024 SB 1371 Compliance Plan
Chapter 1: Increased Leak Survey

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practices:

Best Practice 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.
Best Practice 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 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.

Historic Project Achievements:

Leak surveys on distribution lines have historically been performed according to the requirements in 49 CFR § 192.723. SDG&E pipelines are typically leak surveyed at intervals of 1-, 3-, or 5-years. The frequency of this survey is determined by the pipe material involved, i.e., plastic or steel, the operating pressure, whether the pipe is under cathodic protection, and the proximity of the pipe to various population densities. In 2018, SDG&E increased the survey frequency for all Non-State-of-the-Art (NSOTA) pipe from 5-year and 3-year to annual. This activity was funded by the Distribution Integrity Management Program (DIMP).

In the 2018 Compliance Plan, SDG&E was approved to move Vintage Steel pipe from 5-year to annual leak survey cycles, State-of-the-Art (SOTA) pipe from 5-year to 3-year survey cycles, and protected steel (Post-1950) pipe from 5-year to 3-year leak survey cycles. All survey cycles were accelerated by early 2020.

As part of the 2022 Compliance Plan, SDG&E staffed the following dedicated employees:

- Six (6) Leak Patrollers.
- Two (2) Field Operations Supervisors.
- Two (2) Office Employees.

The incremental employees have completed required training, and some tools were purchased in 2023.

In addition to the surveying efforts mentioned above, additional labor was required for updating internal reporting and mapping systems (SAP & GIS) to update leak survey maps as a part of the increased survey cycle.

Emission Reductions Achieved

In 2020 SDG&E recorded a spike in emission reductions due to the survey cycle acceleration that began in 2019 and completed by early 2020. With the acceleration completed, the reduction number in 2022 indicates levelization.

Historical Emission Reductions (MCF)

2018	2019	2020	2021	2022
3,606	3,525	7,307	4,854	2,499

Cost Effectiveness Evaluation of Historic Work

Historical Standard Cost Effectiveness ($/MCF)

Projected in 2022 Compliance Plan	Actual Cost Effectiveness (2018-2022)
$432	$270

Part 2. Proposed New or Continuing Measure

SDG&E proposes to continue performing annual leak surveys on Pre-1950 Vintage Steel Pipe and NSOTA pipe, as well as 3-year leak survey cycles on SOTA plastic pipe and protected steel pipe.

SDG&E proposes continuing to fund the Full-Time Employees (FTEs) hired as part of the 2022 Compliance Plan, to maintain the accelerated leak survey work. Such continued effort will result in the same total workforce allocated in the 2022 Compliance Plan:

- Six (6) Patrollers.
- Two (2) Field Supervisors.
- Two (2) Office Employees.

To support the existing staff, SDG&E will purchase additional methane detection equipment which will replace existing equipment that are deemed outdated and/or no longer functional due to the age of the equipment for the field employees and field supervisors. The cost breakdown can be seen in the cost assumption section of this chapter including costs associated with installing the equipment on existing vehicles. The continued effort for leak survey are as follows:

- Pre-1950 Vintage Steel pipe from 5-year to annual leak survey cycles.
- SOTA Plastic pipe from 5-year to 3-year survey cycles.
- Protected steel (Post-1950) pipe from 5-year to 3-year leak survey cycles.
- Levelize distribution leak survey.

Although SDG&E will not be shifting its leak survey cycles further, it will expand the efforts on replacing Population-Based emission factors with Company-Specific Leaker-Based emission factors by using PHMSA safety reporting criteria for above ground leaks similar to SoCalGas. This leverages current company practices to estimate emissions using the following two (2) categories:

- AG Hazardous (AG-Haz)
- AG Nonhazardous (AG-Non Haz)

Each of these categories will have their own emission factor based on the system-wide random sampling conducted through RD&D. There is no implementation cost associated with this effort.

At the time of this submittal, the Large Leak Prioritization (LLP) program is anticipated to complete implementation by the end of the 2022 Compliance Period as a continued effort to reduce methane emissions and further support emissions data. No cost is associated with the implementation of the program at this time as the training modules and updates to IT software have already been created for SoCalGas and will be mirrored over to SDG&E. This will be used to improve emissions reporting and accelerate emissions detection and reduction. Collecting data for the five measurements fields for LLP will be part of a collection process that is already taking place when evaluating leaks for investigations and reevaluations.

Part 3. Abatement Estimates

SDG&E estimates that the emission reductions achieved by increasing leak survey cycles on Pre-1950 Vintage Steel Pipe and SOTA plastic pipe and protected steel to 1-year and 3-year leak survey cycles will result in a total emission reduction of 5,464 MCF year-over-year beginning 2023 and levelize moving forward for this Compliance Plan as below:

Forecast of Emission Reductions from Baseline (MCF)

2023	2024	2025	2026	2027	2028	2029	2030
5,464	5,464	5,464	5,464	5,464	5,464	5,464	5,464

The calculation methodology used to estimate the emission reductions is the same methodology used to calculate emissions from the distribution system in the Annual Emissions Report. The calculation methodology is found below:

1. Derive the annual system leak rates by materials and facilities.
2. Estimate the number of leaks and their associated emissions when shifting the survey cycle from 5-year to 3-year or annually.
3. Project emission reductions in future years after implementation.
4. Taking unknown leaks and shifting them to known leaks on accelerated survey cycles.

Part 4. Cost Estimates

Cost estimates below include costs associated with annual survey cycles on Pre-1950 Vintage Steel and 3-year survey cycles on protected steel and SOTA plastic pipe along with levelizing efforts for survey. SDG&E is not requesting funding for NSOTA survey in this program.

O&M Cost Estimates			
Activity	**2025**	**2026**	**2025 – 2026**
	Direct	**Direct**	**Total Loaded O&M Cost with Contingency**
Leak Survey Field Employees	$648,960	$648,960	$2,855,424
Leak Survey Office Employees	$170,000	$170,000	$748,000
Leak Survey Supervisors	$300,000	$300,000	$1,320,000
Total	**$1,118,960**	**$1,118,960**	**$4,923,424**

Capital Cost Estimates			
Activity	**2025**	**2026**	**2025 - 2026**
	Direct	**Direct**	**Total Loaded Capital Cost with Contingency**
Tools	$1,500,000	-	$1,815,000
Vehicle Modification	$90,000	-	$108,900
Total	**$1,590,000**	**-**	**$1,923,900**

Total Revenue Requirement over Expected Life of Investment
$11.1 million
Average Annual Revenue Requirement
$2.6 million

Cost Assumptions:

- 6,800 feet surveyed per day per patroller.
- Represented Employee Hourly Rate: $52.00.
- Annual cost of six (6) Leak Survey field FTEs.
- Annual cost of two (2) Survey Supervisors.
- Annual cost of two (2) Office Employees.
- $150K annual salary for Supervisor.
- $85K annual salary for Office Employees.
- 10% contingency is included in the total loaded O&M cost.
- Tools and Equipment for Field Employees.
- Vehicle modification cost to mount new methane detection tools.

Part 5. Cost Effectiveness/Benefits

Historical Achieved Cost Effectiveness Calculations (2018-2022) ($/MCF)

Standard Cost Effectiveness	With Cap and Trade Cost Benefits	With Cap and Trade, and Social Cost of Methane Cost Benefits
$270	$267	$243

Forecast of Cost Effectiveness Calculations (2023-2030) ($/MCF)

Standard Cost Effectiveness	With Cap and Trade Cost Benefits	With Cap and Trade, and Social Cost of Methane Cost Benefits
$463	$461	$436

Part 6. Supplemental Information/Documentation

Attachment 1A: Historical Project Schedule for Increased Leak Survey

2024 SB 1371 Compliance Plan
Chapter 2: Blowdown Reduction Activities

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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 ansd 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.
Best Practice 3: Pressure Reduction Policy
Written company policy stating that pressure reduction to the lowest operationally feasible level in order to minimize methane emissions is required before non-emergency venting of high-pressure distribution (above 60 psig), transmission and underground storage infrastructure consistent with safe operations and considering alternative potential sources of supply to reliably serve customers.
Best Practice 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.
Best Practice 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.
Best Practice 6: Methane Evacuation Work Orders Policy
Written company policy that requires that for any high-pressure distribution (above 60 psig), transmission or underground storage 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.
Best Practice 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.

Historic Project Achievements:

SDG&E has documented use of cost-effective methods to reduce vented emissions during high pressure construction projects, including performing pressure reduction using mobile compressors, transferring gas to lower pressure systems, and isolating sections of pipe using stopples.

Operators of natural gas pipeline systems routinely reduce line pressure and discharge gas from pipeline sections to provide safe working conditions during maintenance and repair activities. In the 2022 Compliance Plan, SDG&E was approved to continue blowdown reduction efforts and authorized to increase the resources to support blowdown gas capture activities. This included purchasing compressors and cross-compression equipment to reduce blowdown emissions, increasing field operations staff to support the incremental time required to reduce blowdown, and creating a recordkeeping and compliance process to document that the requirements of the Best Practices (BP) are being met. Seventeen incremental full-time equivalents (FTEs) were required at SDG&E for this implementation.

In the 2022 Compliance Plan, SDG&E was approved to continue blowdown reduction efforts on high pressure pipelines; however, it was not approved beyond the levels of the 2020 Compliance Plan.

No incremental staffing was required at SDG&E for this implementation. SDG&E is utilizing SoCalGas's centralized blowdown reduction organization.

Two (2) Gas Standards were identified to be updated to require blowdown reduction efforts as outlined in Best Practice (BP) Nos. 3 through 7. SoCalGas's Gas Standard G7909, *Purging Pipelines and Components* has been updated and is included as an attachment in the Appendix of this Compliance Plan. SoCalGas's Gas Standard G8148, *Gas Loss Estimation – Pipeline* was updated in 2020.

Emission Reductions Achieved:

The 2015 baseline for blowdown emissions reported for Blowdowns in Transmission Pipelines, Transmission Measurement and Regulation (M&R) Stations, Distribution Mains & Services Pipelines, and Distribution Measurement and Regulation (M&R) Stations totaled 3,518 MCF. Emissions from these categories in the calendar years 2018, 2019 and 2020 totaled 557 MCF, 1,588 MCF, 574 MCF, 119 MCF, and 241 MCF respectively. This equates to an estimated reduction of 2,961 MCF for 2018, 1,930 MCF for 2019, 2,944 MCF for 2020, 3,399 MCF for 2021, and 3,277 MCF for 2022.

Historical Emission Reductions (MCF)

2018	2019	2020	2021	2022
2,961	1,930	2,944	3,399	3,277

Cost Effectiveness Evaluation on Historic Work:

Historical Standard Cost Effectiveness ($/MCF)

Projected in 2022 Compliance Plan	Actual Cost Effectiveness (2018-2022)
$395	$70

Pipeline blowdown reduction activities have been about as cost-effective as originally anticipated. SDG&E has updated standards and practices in the company and has adopted blowdown reduction activities to the level expected when filing the 2020 Compliance Plan.

Part 2. Proposed New or Continuing Measure

SDG&E proposes to continue high pressure pipeline blowdown reduction efforts. SDG&E will continue to bundle work on high-pressure lines when and where it is practical to do so.

Continuing work includes maintaining the blowdown reduction program to include gas capture on more projects, the use of cross compression, and installing fittings on valves to expand cross compression capabilities.

Part 3. Abatement Estimates

SDG&E estimates that the emission reductions achieved by increasing blowdown reduction activities will result in a total emission reduction of 2,610 MCF from the 2015 baseline of 3,518 MCF. These emissions will be reduced from the Blowdown Emission Source Category within the Transmission Pipeline, Transmission M&R Stations, Transmission Compressor Stations and Distribution Mains & Services Categories.

Forecast of Emission Reductions from Baseline (MCF)

2025	2026	2027	2028	2029	2030
3,338	3,338	3,338	3,338	3,338	3,338

Blowdown emissions are a function of activity level. This is assuming the activity level remains constant and there are no unforeseen emergency blowdowns. The forecasted emission was derived from the average historical emission reductions from 2021 and 2022.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	2025	2026	2025 – 2026
	Direct	Direct	Total Loaded O&M Cost with Contingency
Blowdown Reduction Central Org	$109,225	$109,225	$318,391
Transmission Operation Staff	$58,952	$58,952	$171,844
Blowdown Reduction Projects	$93,189	$94,354	$273,343
Total	**$261,265**	**$262,530**	**$763,578**

Total Revenue Requirement over Expected Life of Investment
$0.8 million
Average Annual Revenue Requirement
$0.4 million

Cost Assumptions:

- Assume 10% of Blowdown reduction projects of SCG for SDGE.

Part 5. Cost Effectiveness/Benefits

Historical Achieved-Cost Effectiveness Calculations (2018-2022) ($/MCF)

Standard Cost Effectiveness	With Cap and Trade Cost Benefits	With Cap and Trade, and Social Cost of Methane Cost Benefits
$70	$67	$43

Forecast of Cost Effectiveness Calculations (2025-2030) ($/MCF)

Standard Cost Effectiveness	With Cap and Trade Cost Benefits	With Cap and Trade, and Social Cost of Methane Cost Benefits
$116	$113	$89

Part 6. Supplemental Information/Documentation

Attachment 2A: Historical Project Schedule for Blowdown Reduction Activities

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 24: Dig-Ins and Public Education Program
Expand existing public education program to alert the public and third-party excavation contractors to the Call Before You Dig – 811program. In addition, utilities must provide procedures for excavation contractors to follow when excavating to prevent damaging or rupturing a gas line.
Best Practice 25: Dig-Ins and Company Standby Monitors
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.
Best Practice 26: Dig-Ins and 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 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.

Historic Project Achievements:

The State of California mandates a pre-construction meeting with excavators requesting Locate and Mark support and requires continuous monitoring of excavations within ten feet of high-pressure pipelines pursuant to Cal. Gov. Code § 4216.2. Therefore, the requirements of Best Practice 25 are already met. SDG&E's Public Awareness Program is driven by the requirements of 49 C.F.R. § 192.616, Public Awareness Programs for Pipeline Operators, API RP 1162, and program expansion recommendations by regulators. SDG&E was approved to begin expanding the standby program to other areas where there could be challenges to controlling a damage, as proposed in the 2018 Compliance Plan. This implementation was pending the completion of a risk algorithm analyzing the location of 811 tickets and prioritizing them to trigger expanded standby. In 2019, this algorithm was completed and piloted. SDG&E has determined through the algorithm development that, rather than expanding standby, it would be more efficient to perform more field interventions for these higher-risk excavations. Rather than having an employee stand by and observe an excavation, which can often take multiple days, it would be more efficient to have that employee visit multiple excavators within the same timeframe to discuss damage prevention at their excavation sites.

Since implementation, using the prioritized results from the risk analysis algorithm, company personnel can initiate communication with excavators to discuss the project and remind them of the importance of locating and protecting the natural gas pipe within their projects delineated area. The form of communication can be a phone call, text message, email, or job site visit, prior to the date of excavation. These proactive interventions were implemented in the field and the company

personnel were able to effectively address a larger number of excavation projects than just performing standby.
In 2023, the Damage Prevention Algorithm & Proactive Intervention project for the 2022 Compliance Plan period was not approved because of its high standard cost effectiveness and the relatively small forecasted methane emissions reductions directly attributable to the practices. This project is deemed a crucial component in emissions prevention hence the organization has decided to fund it through the Distribution Integrity Management Program (DIMP) in 2022 Compliance Plan period and will continue to be funded by DIMP until further notice.

Emission Reductions Achieved:

No updates in emissions reductions achieved were made for this Compliance Period.

Cost Effectiveness Evaluation on Historic Work:

No updates in cost effectiveness evaluation on historic work were made for this Compliance Period.

Part 2. Proposed New or Continuing Measure

SDG&E will not propose new or continuing measures.

Part 3. Abatement Estimates

There are no abatement estimates because SDG&E will not pursue measures in this Chapter in this Compliance Period.

Part 4. Cost Estimates

SDG&E will not request funds for this initiative in this Compliance Period.

Part 5. Cost Effectiveness/Benefits

Cost effectiveness cannot be calculated because SDG&E will not request funding for this Chapter during this Compliance Period.

Part 6. Supplemental Information/Documentation

Attachment 3A: Historical Project Schedule for Damage Prevention Algorithm and Proactive Intervention

2024 SB 1371 Compliance Plan
Chapter 4: Recordkeeping IT Project

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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 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.

Historic Project Achievements:

Measure 1: Data Lake

In the past, developing the Annual Emissions Report required by the NGLAP involved querying various records, which were stored in varying formats, locations, databases, and with various record owners. This made report generation a time-consuming manual process. Additional challenges arose because the electronic systems were not designed for generating reports for emissions, but rather for billing, maintenance, or operational recordkeeping. As a result, the records included varying types of nomenclature relevant to specific departments. To help improve efficiency, SDG&E developed a Data Lake with automated interfaces from various source systems to help capture data elements required for emissions reporting. In addition, the Data Lake is designed to enable seamless modification of the emissions reporting templates as they evolve annually. The scope of the Data Lake expanded to capture the dynamic improvement of the Company's technical system upgrades and incorporate new emission estimation methodologies and reporting requirements. Given the granularity of the emissions reports, it was challenging to automate the data collection and processing that was previously performed manually by subject matter experts. However, the automated capture of source system data has reduced the effort needed by the critical experienced staff and made the data capture and reporting process more accurate and reliable.

Milestones Completed:

- Developed the Data Lake with automated interfaces from source systems to support the capture of data elements required for emissions reporting.
- Modified the automated interfaces when source system technical upgrades occurred.
- Enhanced the automated interfaces when new data elements became available.
- Modified and enhanced the automated reports to account for changes to emission estimation methodologies and reporting requirements.

Milestones Proposed:

- Emissions dashboard expected to be completed by Q4 of 2024.

- Complete automation based on current (i.e., 2023 Reporting Year) reporting requirements for all in-scope reporting categories by Q4 of 2024.

Measure 2: Engineering Data Analytics and Performance Optimization (EDAPO)

The EDAPO project was described in the 2022 Compliance Plan for SDG&E. However, this project was only initiated for SoCalGas and was inadvertently included in the SDG&E Compliance Plan. SDG&E did not spend nor request any funding for this project. As such, there are not any updates or further details to provide in the SDG&E 2024 Compliance Plan for this project.

Measure 3: Asset Field Verification

Prior to the 2018 Compliance Plan, SDG&E maintenance and inspection work management systems were designed for billing, maintenance, or operational recordkeeping purposes only. Moreover, because consistent naming conventions were not in place, records used varying types of nomenclature relevant to specific departments. Querying records from numerous departments in the Company and combining them to generate a single report was challenging and not readily available.

To improve asset data in the Company's source systems, SDG&E performed Asset Verification projects at its Transmission facilities. The Asset Verification projects enhanced existing systems to include additional data elements required for the methane emission calculations, which enabled field personnel to record required information into systems that were previously incapable of recording certain component data (e.g., manufacturer, date of install, and photos). Having such data readily available enhanced the emissions estimations for the mandated Annual Emissions Reports associated with these assets, and it has also allowed departments to refer to assets by a unified naming method and improve data governance.

Milestones Completed:

- Field verification of Transmission assets completed Q2 of 2022.

Measure 4: Real-time Data Management for Methane Abatement/Monitoring Support for Other Gas Operational Units

Real-time data management and monitoring is an essential tool to analyze methane emissions and implement efforts to reduce methane emissions effectively across all operational areas. SDG&E purchased a software license to modernize real-time data management to improve existing and new methane emission reduction projects. This tool's operational and maintenance cost will be distributed to the end of 2025 to comply with regulatory accounting requirements. The tool enabled SDG&E to improve maintenance/performance practices of its assets in Transmission and Distribution facilities. Moreover, the collected data is used to develop analytical capabilities to provide the ability to integrate with enterprise initiatives across the Company.

Milestones Completed:

- Obtained Enterprise license.
- Enabled additional analytics capabilities and gained the ability to integrate with other enterprise initiatives.
- Integrated existing infrastructure into the NGLAP solutions to enhance the Company's compliance with methane emission requirements.

Measure 5: Develop Mobile Field Forms

Prior to the 2022 Compliance Plan, the work management system used by Transmission did not include digitized forms or mobile capabilities. Enhancement efforts to address these deficiencies commenced in 2021 with software module updates to the work management system. The second part of the enhancement was to digitize forms and add mobile and spatial capabilities. Such improvements facilitated data recovery for maintaining assets, improved safety, and eliminated inconsistencies that the paper form may have caused. The project is anticipated to be completed in Q4 of 2024.

Milestones Completed:

- Modernized and enhanced mobile solutions to have offline capabilities by Q2 of 2022.
- Enabled spatial capabilities to the mobile solution by Q2 of 2022.
- Digitized paper forms and processes are anticipated to be completed by Q4 of 2024.

Measure 6: Historizing Emission Sensor Data (HESD)

The RD&D Pilot – Evaluation of Stationary Methane Detectors – did not identify current monitors that could be deployed to cost-effectively scan for emissions. Therefore, the sensor data intended to be historized by the HESD project does not exist at this time. However, the Emission Reduction Analytical Tools (ERAT) project has shown promise for identifying new areas to target for emission reductions. As such, the HESD funding was reallocated to ERAT initiatives.

*Measure 7: Emission Reduction Analytical Tools (ERAT***)**

During 2024, a tool for forecasting annual emissions from Distribution Mains and Services leaks was completed within the ERAT portfolio. The tool allows the user to forecast emissions based on targeted repair durations and projected leak counts. The forecasts are instrumental for NGLAP planning and Compliance Plan development, as they are used to strategically select repair durations that will maximize emission reductions in the most cost-effective manner.

Additional tools in the ERAT portfolio are currently under development. Future enhancements are discussed in Part 2 of this chapter.

Milestones Completed:

- Developed requirements.
- Produced a tool for forecasting emissions from Distribution Mains and Service line leaks.
- Initiated development of several tools for forecasting emissions and identifying areas to focus emission reduction efforts.

Milestones Proposed:

- Implement ERAT tools (Pilot Phase) expected by Q3 of 2024.

Measure 8: Program Process Improvement

The NGLAP focused on the technology, data, and Best Practices (BP) that guide SoCalGas in reducing emissions. The NGLAP is structured to support the elements of developing and submitting regulatory requirements, tracking financials, and compliance requirements, guiding consistent messaging, responding to data requests, establishing dashboard(s) with metrics/project controls, and implementing the projects as outlined in the SB 1371 Compliance Plan for emission reductions.

The NGLAP developed and integrated tools to support these efforts that help enhance consistency and accuracy across the Program. This allowed for improved tracking of key performance indicators and decision-making. This process improvement utilized tools and methodologies to effectively manage the Program's workflow, including the below workstreams:

- Digitize paper forms and processes by Q3 of 2024.
- Data storage and report creation by Q4 of 2024.
- Create metrics dashboard in support of analytics for decision making and resource planning by Q1 of 2023.
- Finance & Regulatory.
- Project Execution.
- Research & Development.
- Policy & Communication.

Project Milestones:

- Created metrics dashboard in support of analytics for decision making and resource planning by Q1 of 2023.
- Digitized paper forms and processes by Q2 of 2024.
- Data storage and report creation by Q4 of 2024.

Emission Reductions Achieved:

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific recordkeeping enhancement was designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 9.

Cost Effectiveness Evaluation on Historic Work:

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific recordkeeping enhancement was designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 9.

Part 2. Proposed New or Continuing Measure

Measure 1: Data Lake

The measure's objective is to maintain the existing Data Lake while also integrating asset data and capturing updates to reporting requirements, such as template changes and emission estimation methodologies. The Data Lake will continue to implement additional automated integration from new operational systems and updates to existing operational systems. The measure will support maintenance of the internal emissions dashboard mentioned in Part 1 of this chapter.

Project Milestones:

- Integrate asset data.
- Capture changes and updates to regulatory reporting requirements.
- Complete updates and integrations as source systems are updated or modified.

Measure 2: Emission Reduction Analytical Tools, i.e., ERAT

ERAT applies major data analytics to emissions and other utility data (e.g., operational and maintenance data) to analyze and understand trends and convert the emissions data to emission reduction Best Practices (BP). ERAT helps identify efforts with the best cost-emission reduction ratios based on actual emissions, asset data, and maintenance data. ERAT will be developed to identify emission sources, associated assets, maintenance processes, and process frequencies. Industry benchmark data and statistical techniques can be employed to determine the emission reductions that can be achieved by modifying maintenance and operational practices. Other initiatives may also be identified and developed by recognizing emission reduction opportunities when replacing equipment at end of life.

Project Milestones:

- Identify the ERAT tools that were most effective during pilot phases in 2024.
- Implement the most effective tools in the NGLAP during 2025.
- Analyze and select additional analytical tools during 2025.
- Initiate pilot phases of additional analytical tools during 2026.

Measure 3: Emissions Data Validation and Governance

The NGLAP gathers and utilizes the best available data for emissions reporting, emissions forecasting, and project development. Millions of relevant data are input into several source systems by multiple departments each year. Although numerous quality control steps are already in place, there is a need for additional validation and governance because these data are critical to the Program.

The Emissions Data Validation and Governance project will assess the Company's relevant data sets and streams, identify areas for improvement, and implement solutions to enhance data quality. This project will assess data that are directly used for emissions reporting and are ingested by data analytics tools. As such, the results of the Emissions Data Validation and Governance project will directly impact the results of the Data Lake and ERAT projects by bolstering the accuracy and reliability of data inputs.

Measure 4: Program Process Improvement

This measure will support maintenance of the developed tools as outlined in Part 1 Measure 8 of this chapter, which establish consistency and accuracy across the Program and allow for better tracking of key performance indicators and decision making.

Part 3. Abatement Estimates

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific recordkeeping enhancement was designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 9.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	2025	2026	2025 – 2026
	Direct	Direct	Total Loaded O&M Cost with Contingency
Data Lake	$41,840	$41,840	$113,133
ERAT	$59,284	$43,256	$157,179
Validation and Governance	$42,400	$24,400	$100,628
Program process improvements	$11,630	$11,630	$28,145
Total	$149,334	$115,306	$399,085

Total Revenue Requirement over Expected Life of Investment
$0.4 million
Average Annual Revenue Requirement
$0.2 million

Part 5. Cost Effectiveness/Benefits

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific recordkeeping enhancement was designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 9.

Part 6. Supplemental Information/Documentation

Attachment 4A: Historical Project Schedule for Recordkeeping IT Project-Transmission Facilities

Attachment 4B: Historical Project Schedule for Recordkeeping IT Project-ERA Tool (Machine Learning)

Attachment 4C: Historical Project Schedule for Recordkeeping IT Project-ERA Tool (Emissions Forecasting)

2024 SB 1371 Compliance Plan
Chapter 5: Geographic Tracking

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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 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.
Best Practice 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.

Historic Project Achievements:

To improve capabilities of leak surveys performed at complex high-pressure facilities, SDG&E modeled and created the digital twin for the existing facility to enable a quick query of its facility. The intelligence found in the 3D model and the P&IDs will enable engineering and operations to identify, track and keep proper documentation of the digital asset records. It will enable future reporting from these databases that can include mileage of pipeline/service, the type of equipment and location, and the capability to connect the 3D model database systems to other SDG&E database systems.

In the 2020 Compliance Period,[1] SDG&E completed the digitizing and mechanical walkdown of 15 Piping & Instrumentation Diagrams (P&IDs) and one (1) 3D modeling for its facilities. These intelligent P&IDs allowed engineering to locate tags for equipment or instrumentation that is currently found in these facilities. SDG&E is able to query data based on a tag, type of equipment, service, location, etc. The tags in the 3D model links to the P&IDs, enabling proper engineering information to be provided. The 3D model provided material information to help identify connection points and support queries for potential leak points in the existing facilities.

[1] 2020 Compliance Plan described scope and work conducted for SoCalGas instead of SDG&E. This scope has been corrected for SDG&E in this statement for the time frame 2020-2022.

Emission Reductions Achieved:

Because this measure is a technology enhancement and/or process improvement(s) that supports the overall Program, emission reductions and cost effectiveness benefits directly attributed to its implementation cannot be calculated.

Cost Effectiveness Evaluation on Historic Work:

Because this measure is a technology enhancement and/or process improvement(s) that supports the overall Program, emission reductions and cost effectiveness benefits directly attributed to its implementation cannot be calculated.

Part 2. Proposed New or Continuing Measure

SDG&E has completed the project objectives and will not propose new or continuing measures.

Part 3. Abatement Estimates

There are no abatement estimates because SDG&E will not pursue measures in this Chapter in this Compliance Period.

Part 4. Cost Estimates

SDG&E will not request funds for this initiative in this Compliance Period.

Part 5. Cost Effectiveness/Benefits

Cost effectiveness cannot be calculated because SDG&E will not request funding for this Chapter during this Compliance Period.

Part 6. Supplemental Information/Documentation

Attachment 5A: Historical Project Schedule for Geographic Tracking

2024 SB 1371 Compliance Plan
Chapter 6: Electronic Leak Survey

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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.

Historic Project Achievements:

SDG&E developed a mobile application for the Electronic Leak Survey (ELS) process. Leak surveyors will carry iPads loaded with a mobile application to use GIS-generated leak survey routes instead of paper maps. Leak survey instrumentation will be used to identify leaks, and leak data will be electronically uploaded into GIS. Breadcrumb (GIS Location) data will be collected for the survey path walked. Requirements gathering and vendor selection for mobile application were completed in 2018, and system design activities were completed in 2019. Development of mobile applications and supporting portal applications will be completed in 2024. The overall project schedule has been extended due to more complex technical issues that were discovered and resulted in phasing the deployment schedule. Required hardware (iPad mini, accessories, storage) and support software has been acquired to conduct system integration testing to validate integration paths and end-to-end functionality. Application rollout to districts and deployment activities for all distribution districts will be initiated in 2024. A change management team engaged stakeholders to provide information on the mobile application through Digi Boards at district locations, intranet articles, and district visits. Once the scopes outlined in the 2022 Compliance Plan including deployment of ELS in distribution routine leak survey, Abnormal Operating Conditions (AOC), and Pipeline Patrol are completed, it will become the prerequisite for the future scope Advanced Analytics as discussed in Part 2 of this chapter.

Emission Reductions Achieved:

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. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 20b. Once fully deployed, the project will improve geographic tracking and evaluation of gas system leaks. We will showcase these benefits with specific metrics in future Compliance Plans.

Cost Effectiveness Evaluation on Historic Work:

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. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 20b. Once fully deployed, the project will improve geographic tracking and evaluation of gas system leaks. We will showcase these benefits with specific metrics in future Compliance Plans.

Part 2. Proposed New or Continuing Measure

As the initial distribution routine survey implementation for ELS continues, there is an expectation that new enhancement requests will become apparent as the digitization of paper maps is deployed and employees utilize it in the field. Software packages will go through upgrade cycles and the underlying product will continue to be upgraded by vendor to provide additional functionality and stability. After deployment is complete, SDG&E will maintain distribution routine leak survey implementation as well as Pipeline Patrol and AOC implementation.

At the time of this submittal, the following scopes are anticipated to be completed by the end of the 2022 Compliance Period.

Electronic Leak Survey: Abnormal Operating Conditions (AOC)

This project includes build/configuration, test, and deploy of Special leak survey functionality including:

- Leverage existing ELS mobile application deployed on mobile devices and Breadcrumb Tracking.
- Capture and record conditions found during special leak survey that require follow-up such as leak indications or other AOCs.
- SAP Work Order (SAP WO) generation and enhanced integrations, transferring captured AOC data to SAP.
- Capability to create special leak surveys on demand and confirm all identified pipelines are leak surveyed / patrolled before completion.
- Leverage GIS capacity to quickly identify locations requiring special leak survey and generate leak survey work orders.

Electronic Leak Survey: Pipeline Patrol

- Mobile application and Pipeline Patrol maps on mobile devices and capture Breadcrumb data.
- Capturing conditions that require follow-up such as missing markers, class location changes, encroachments, etc.
- SAP WO order generation and enhanced integrations.
- Confirm all required high-pressure pipelines have been patrolled as required.

2024 SB 1371 Compliance Plan
Chapter 6: Electronic Leak Survey

The following scope is anticipated to be completed by the end of the 2024 Compliance Period.

Electronic Leak Survey: Advanced Analytics

- Through the implementation of ELS, SDG&E will collect quality data on pipeline assets, gas leaks, and other AOCs. Leveraging ELS data to conduct advanced analytics can provide opportunities to understand and proactively address gas leaks. These analytics include:
    - Predicting and preventing failing assets through machine learning algorithms.
    - Optimizing maintenance schedules and work assignments [i.e., Can't Get In's (CGIs)] by correlating geo-spatial information of follow-up orders with customer data (advanced meter).
    - Producing plume maps to visualize areas with increased methane concentration; expanding visibility of surveys with interpolation to identify potential gas leaks.
- By analyzing data from ELS, patterns and trends in gas leaks and conditions that require follow-up can be identified, allowing for more targeted corrective measures.

Benefits:

- Creates l cost savings associated with plotting, printing, reviews, and mailing of paper-based leak survey maps. Eliminates preparing, printing, review, monitoring, re-work, associated with paper maps that are lost and result in re-work.
- Reduces risk and wait times for leak survey maps during significant events such as system overpressure, earth movement, fires, floods, etc. which improves productivity, increases safety, and enables field personnel to respond more quickly.
- Automates the leak survey process in distribution creating efficiency, flexibility in cross district assignment and routing, and improves utilization of workforce since there is no longer dependency on paper maps.
- Integrates with SAP and improves geographic location data, tracking of leaks, and other AOCs that require follow-up. GIS coordinates will be auto-populated minimizing room for user error.
- Improves efficiency by eliminating manual processes and allows the ability to track pipelines that are surveyed or patrolled.
- Results from advanced analytics can lead to benefits such as reduced costs, improved safety, and increased operational efficiency.
- Patrollers can receive near real-time status updates of activities via the app which was previously not accessible on-the-go.

Project Milestones:

- ELS – Advanced Analytics: Q4 of 2026.

Part 3. Abatement Estimates

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. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 20b. Once fully deployed, the project will improve geographic tracking and evaluation of gas system leaks. We will showcase these benefits with specific metrics in future Compliance Plans.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	**2025**	**2026**	**2025 – 2026**
	Direct	**Direct**	**Total Loaded O&M Cost with Contingency**
Contractors	$63,000	$32,000	$209,000
Internal Labor	$33,000	$17,000	$110,000
Total	$96,000	$49,000	**$319,000**

Capital Cost Estimates			
Activity	**2025**	**2026**	**2025 - 2026**
	Direct	**Direct**	**Total Loaded Capital Cost with Contingency**
Software	$46,000	$23,000	$83,490
Hardware	$10,000	$0	$12,100
Contractors	$77,000	$38,000	$232,320
Internal Labor	$40,000	$199,000	$882,200
Vendor Services	$47,000	$23,000	$84,700
Total	**$220,000**	**$283,000**	**$845,240**

Total Revenue Requirement over Expected Life of Investment
$2.8 million
Average Annual Revenue Requirement
$0.2 million

Cost Assumptions:

- Contractor Support and Vendor Services line items include cost estimates from multiple vendors based on total project scope performing services for system maintenance, design, development, testing, training, and deployment.
- Software purchase includes vendor license and software upgrades for enterprise license.
- Hardware purchase includes server cabinets, devices, and accessories.
- Internal labor will cover multiple FTEs conducting various tasks, such as system maintenance, project management, coordination with contractors, and internal departments and QA/QC.

Part 5. Cost Effectiveness/Benefits

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. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 20b. Once fully deployed, the project will improve geographic tracking and evaluation of gas system leaks. We will showcase these benefits with specific metrics in future Compliance Plans.

Part 6. Supplemental Information/Documentation

Attachment 6A: Historical Project Schedule for Electronic Leak Survey

2024 SB 1371 Compliance Plan
Chapter 7: Damage Prevention Public Awareness

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 24: Dig-Ins and Public Education Program
Expand existing public education program to alert the public and third-party excavation contractors to the Call Before You Dig – 811program. In addition, utilities must provide procedures for excavation contractors to follow when excavating to prevent damaging or rupturing a gas line.
Best Practice 25: Dig-Ins and Company Standby Monitors
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.
Best Practice 26: Dig-Ins and 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 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.

Historic Project Achievements:

SDG&E implements a federally mandated Public Awareness program, as prescribed in 49 CFR § 192.616, which contributes 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, the technical document, Public Awareness Programs for Pipeline Operators, API RP 1162, and program expansion recommendations by regulators.

During the 2022 Compliance Period, SDG&E conducted the following activities:

- *Paradigm Excavator Outreach meetings* – Additional excavator safety outreach meetings throughout service territory.
- *Solar/Electrical Contractor printing & postage, printing and postage* – Stand-alone solar/electrical contractor mailer for pipeline safety.
- *Landscaper/Fencer contractor printing, and postage* – Developing new stand-alone pipeline safety mailer for landscaper/fencer contractors.
- *Plumber/sewer contractors* – Developing new stand-alone pipeline safety mailer for plumber/sewer contractors.
- *SDG&E Community Relations Pilot Partnership* – Damage prevention/public awareness partnerships with major nonprofit organizations utilizing Community Relation's relationships and contacts.

- *SDG&E Public Affairs Pilot Partnership* – Support for damage prevention/public awareness outreach with local nonprofits, cities, municipalities utilizing RPA's relationships.
- *Common Ground Alliance Collaborations* - 811 Day collaboration with other operators at various MLB games and other events.
- *SDG&E Community Outreach team* – Partnering with the Community Outreach team to include public awareness and damage prevention materials at various community events throughout the service territory. *Social Media Boosts* - social media boosts that target certain areas in the service territory.
- *Major League Baseball (MLB) San Diego Padres Outreach* - Damage prevention messaging at Padres Stadium throughout season with emphasis during National Safe Digging Month and 811 Day.
- *811 Media Campaign* - Damage prevention messaging during timeframe to include 811 Day. Campaign includes damage prevention and 811 digital contents with social media ads and streaming.
- *Enertech geofencing program* – Targeted messaging around home improvement stores, heavy equipment rentals, landscaping nurseries, plumbing supply stores that would direct stakeholders to SDG&E pipeline safety webpages.

Emission Reduction and Cost Effectiveness Evaluation on Historic Work

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, these specific marketing campaigns and technology enhancements were designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits, which align with Best Practices 24, 25 and 26. Through the frequency of 811 calls, SDG&E demonstrates reduction in damage count resulting in emissions savings as shown below:

Metric	2019	2020	2021	2022	2023
Number of Distribution 811 Tickets	164,364	180,875	168,232	194,218	203,026
Damages Resulting in Emissions	431	357	345	302	293
Damages per 1000 tickets	2.62	1.97	2.05	1.55	1.44

Part 2. Proposed New or Continuing Measure

Because of the benefits as observed above, SDG&E proposes to continue conducting incremental outreach and education to the general public, contractors, excavators, mailing safe digging procedures to contractors, and maintain the existing number of Full Time Employees (FTE) staffed to support the Public Awareness Program. Continued activities to support this measure include, but are not limited to:

- Utilize the analysis of excavation damage data and cause of incidents to develop and implement a target communication plan that will effectively address the damaging parties and reduce incidents.
- Analyze the effectiveness of pipeline safety communications and engagement strategies; use data and analysis to develop strategies to increase effectiveness for continuous improvement plans.
- Conduct focus groups and refine messaging and strategies based on findings
- Collaborate with other departments to analyze repeat offender data and develop strategies to reduce damages.
- Work with other departments to leverage external relationships and provide public awareness and damage prevention outreach.
- Be a point of contact for assisting with education services for pipeline and public awareness programs or concerns.
- Lead an employee volunteer program that would be aimed at educating our employees about safe excavation practices and encouraging them to report any observed unsafe digging activities. The 811 Ambassador program would ensure our employees have the necessary tools and knowledge to actively participate in this effort.

The relationship between investment in the Public Awareness Program and third-party damages shows that investment in public awareness is negatively correlated with the number of third-party damages to company property, as shown below. Thus, an increase in public awareness campaigns and outreach should result in decreased damages and, therefore, lower emissions.

SDG&E proposes to increase funding in these areas to further contribute to lowering the number of third-party damages. To continue to maintain the expanded Public Awareness Program, SDG&E will focus on outreach and education to the general public, outreach to contractors and excavators and mailing safe digging procedures to contractors. The expanded Public Awareness Program allows SDG&E to increase focus on minimizing emissions. This measure will require partial time of two (2) existing employees, equivalent to ½ of an FTE. An Advisor will continue to analyze damage data and use it to help strategize effective communications. The Project Manager will continue to manage incremental projects and programs implemented for the measure.

Part 3. Abatement Estimates

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, these specific marketing campaigns and technology enhancements were designed to improve processes

to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits, which align with Best Practices 24, 25 and 26.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	**2025**	**2026**	**2025 – 2026**
	Direct	**Direct**	**Total Loaded O&M Cost with Contingency**
Marketing	$700,000	$700,000	$1,694,000
1/2 FTEs	$55,000	$55,000	$133,100
Total	**$755,000**	**$755,000**	**$1,827,100**

Total Revenue Requirement over Expected Life of Investment
$1.9 million
Average Annual Revenue Requirement
$0.9 million

Cost Assumptions:

- Annual cost estimate of $110K per FTE for one half (1/2) FTE.
- Marketing material includes production and distribution of mailers, pamphlets, brochures, promotional items, and additional materials for customers to bring awareness of the requirements, cost estimates for these materials are based on historical cost and implementations.
- Partnership and sponsorship costs to provide outreach in cities and communities within the service territory.

Part 5. Cost Effectiveness/Benefits

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, these specific marketing campaigns and technology enhancements were designed to improve processes to support the overall Program's goals and objectives, including enhancing public safety and reducing the risk of natural gas leaks and explosions. SoCalGas remains committed to demonstrating its benefits, which align with Best Practices 24, 25 and 26.

Part 6. Supplemental Information/Documentation

Attachment 7A: Historical Project Schedule for Damage Prevention Public Awareness

2024 SB 1371 Compliance Plan
Chapter 8: Pipe Fitting Specifications

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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.

Historic Project Achievements:

SDG&E has a Supply Management department that works with vendors in purchasing materials that meet SDG&E Material Specification Properties (MSP) requirements for all components. When materials are received, samples are inspected at a warehouse facility to verify requirements are met. Pipe fittings are components used to join pipe sections together with other fluid control products like valves and pumps to create pipelines. If there are any concerns regarding the quality of materials, including the threaded components and fittings, the Supply Management department is engaged to correct the issue and either engage the current vendor to increase quality assurance standards or begin contract negotiations with alternative vendors to confirm all concerns are addressed.

In 2019, SDG&E hired a third-party consultant to review its quality control (QC) process and MSP standards to identify consistent requirements across component categories. The results from the investigation identified the need to improve the following processes:

1) Manufacturing and QC.
2) Shipping, Handling, and Storage.
3) Construction and Installation.
4) Operations and Maintenance.

The purpose of these improvements is to reduce emissions from threaded pipe fittings by improving manufacture tolerances and thread quality. In 2021, SDG&E hired a Project Manager to create a project plan necessary to drive the project to completion. Within the project plan, the scope was separated into two (2) phases. Phase 1 of the project focused on updating all the material specifications and QC inspection instruction standards. A third-party consultant was hired to assist with updating all standards. Phase 2 focused on implementing the updated standards during the inspection process, shipping and handling, and construction and installation. A training program was completed during Phase 2 to introduce company stakeholders to recommended best practice improvements. San Diego Gas & Electric's Gas Standard G8304, *Threaded Connections* was updated with quality improvements for threaded connections. A pilot program was conducted with a QC inspection team at a central location to evaluate process controls during inspection of select

threaded components while using a temporary outdoor covered storage area. The pilot program was successful as components were protected with a storage solution that also fit QC and Logistic team needs. Visual quality inspections were conducted and SDG&E was better able to anticipate future storage and staffing needs. The study also highlighted improvements needed in manufacturing quality.

Additional accomplishments include:

- Required manufacturers' thread fabrication process and product conform to the National Pipe Thread (NPT) tolerances.
- Developed and implemented a training program for QC inspection team focusing on updated material standards.
- Required indoor storage of all threaded components at QC inspection location.
- Conducted quarterly inventory studies and established metrics to monitor thread quality and NPT thread tolerance from manufacturers.
- Required manufacturers to demonstrate higher level of thread quality.
- Confirmed manufacturer conformance to updated material standards from QC programs.
- Provided leak survey fitting repair and replacement reports to all internal stakeholders of the process, including QC and MSP engineer, for further evaluation.
- Developed recommendations for fitting replacement program.

Emission Reductions Achieved:

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, these specific QC and QA enhancements were designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 22. Once fully implemented, the project will prevent significant leaks from poor quality pipe threads.

Cost Effectiveness Evaluation on Historic Work:

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, these specific QC and QA enhancements were designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 22. Once fully implemented, the project will prevent significant leaks from poor quality pipe threads.

Part 2. Proposed New or Continuing Measure

SDG&E will continue to maintain inspection enhancements initiated by Best Practice (BP) 22 which requires funding of QC inspectors hired as part of the 2022 Compliance Plan. The QC inspectors will continue to perform inspections on new incoming material received in 2025 and

2026 to maintain the current procedure of inspecting NPT threads per the Quality Control Inspection Instructions (QCII).

Part 3. Abatement Estimates

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, these specific QC and QA enhancements were designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 22. Once fully implemented, the project will prevent significant leaks from poor quality pipe threads.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	**2025**	**2026**	**2025 – 2026**
	Direct	**Direct**	**Total Loaded O&M Cost with Contingency**
Inspector	$110,000	$110,000	$484,000
Contractor Inspectors	$399,360	$399,360	$966,451
Total	**$509,360**	**$509,360**	**$1,450,451**

Total Revenue Requirement over Expected Life of Investment
$1.5 million
Average Annual Revenue Requirement
$0.7 million

Cost Assumptions:

- Annual cost of $110K for one (1) QC Inspector.
- Annual estimated cost of $96 per hour for 2,080 hours per Inspector for two (2) contractor Inspectors (Total: $399,360).

Part 5. Cost Effectiveness/Benefits

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, these specific QC and QA enhancements were designed to improve processes to support the overall Program's goals and objectives. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 22. Once fully implemented, the project will prevent significant leaks from poor quality pipe threads.

Part 6. Supplemental Information/Documentation

Attachment 8A: Historical Project Schedule for Pipe Fitting Specifications

2024 SB 1371 Compliance Plan
Chapter 9: Repeat Offenders IT Systems

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 26: Dig-Ins and 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 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.

Historic Project Achievements:

Best Practice 26 (BP 26) developed a solution for capturing and reporting all dig-in incidents. Incidents caused by contractors are identified using contractor identification data from the California Contractor State License Board (CCSLB). CCSLB data enabled accurate identification and reporting of repeat offenders. Incident information was captured on a paper form called the Company Property Damage Report (CPDR). The Repeat Offenders IT System project converted the paper form to an electronic form called the eCPDR and made it available on mobile devices. The eCPDR shared the form data across the systems used by the Customer Service, Distribution, and Claims departments. The data is also shared with the Data Lake (discussed in Chapter 4), which enables automated regulatory reporting. There were technical challenges in sharing data in real time with robust data security across six (6) automated systems, with some systems cloud-based and some supported by different IT vendors. In addition to identifying repeat offenders, Repeat Offenders IT System eliminated manual effort and potential for data errors in managing paper damage forms as well as improved the timeliness of reporting through automated sharing of data and automated claim creation. The implementation of Repeat Offenders IT System commenced in Q4 of 2020.

Milestones Completed:

- Converted the legacy paper form known as the Company Property Damage Report to electronic form.
- The electronic form eCPDR is available on Customer Service and Distribution mobile solutions to capture and update damage information.
- The electronic form eCPDR was integrated with mobile solution.
- The eCPDR data was integrated with other SDG&E systems for incident tracking, claims, and regulatory reporting.

Emission Reductions Achieved:

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 26.

Cost Effectiveness Evaluation on Historic Work:

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 26.

Part 2. Proposed New or Continuing Measure

The Dig-Ins and Repeat Offender measure will continue evaluating the digitized process and will support integration in case new operational systems and/or changes to existing operational systems take place.

Part 3. Abatement Estimates:

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 26.

Part 4. Cost Estimates

SDG&E will not request funds for this initiative in this Compliance Period.

Part 5. Cost Effectiveness/Benefits

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 26.

Part 6. Supplemental Information/Documentation

Attachment 9A: Historical Project Schedule for Repeat Offenders IT System

2024 SB 1371 Compliance Plan
Chapter 10: Gas Speciation

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 17: Enhanced Methane Detection
Utilities shall utilize enhanced methane detection practices (e.g. mobile methane detection and/or aerial leak detection) including gas speciation technologies.

Historic Project Achievements:

SDG&E has a robust laboratory known as the Environmental Analysis Laboratory (EAL). When a methane source is in question, the EAC dispatches a mobile gas speciation van to identify the chemical content of the gas and identify its source.

SDG&E expanded the capacity of the EAC by increasing staff and equipment to respond to requests from Operations for leak speciation where a methane source is in question. These resources were also required to address lower detection limits of new advanced leak detection instrumentation and the increased level of leak survey activities being driven by the Program.

Emission Reductions Achieved:

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific resource and equipment expansion was designed to improve processes to support the overall Program's goals and objectives, including public safety. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 17.

Cost Effectiveness Evaluation on Historic Work:

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific resource and equipment expansion was designed to improve processes to support the overall Program's goals and objectives, including public safety. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 17.

Part 2. Proposed New or Continuing Measure

SDG&E proposes to continue funding the existing lab technician and provide funding for lab materials to support the expanded capacity of the Environmental Assessment Center (EAC). The technician and lab materials are needed to respond to requests from Operations for leak speciation due to increased leak surveys and the lower detection limits of new advanced leak detection instrumentation.

Part 3. Abatement Estimates

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific resource and equipment expansion was designed to improve processes to support the overall Program's goals and objectives, including public safety. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 17.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	**2025**	**2026**	**2025 – 2026**
	Direct	**Direct**	**Total Loaded O&M Cost with Contingency**
One (1) Technician	$110,000	$110,000	$484,000
Lab Materials	$20,000	$20,000	$48,400
Total	**$130,000**	**$130,000**	**$532,400**

Total Revenue Requirement over Expected Life of Investment
$0.6 million
Average Annual Revenue Requirement
$0.3 million

Cost Assumptions:

- Annual cost of $110K for one (1) Technician.
- Lab materials cost estimate based on historical cost for similar materials/tools.

Part 5. Cost Effectiveness/Benefits

While Senate Bill 1371 generally requires cost-effectiveness analysis for certain projects, this specific resource and equipment expansion was designed to improve processes to support the overall Program's goals and objectives, including public safety. SDG&E remains committed to demonstrating its benefits, which align with Best Practice 17.

Part 6. Supplemental Information/Documentation

Attachment 10A: Historical Project Schedule for Gas Speciation

2024 SB 1371 Compliance Plan
Chapter 11: Public Leak Maps

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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 an agreement on a similar methodology to improve geographic evaluation and tracking of leaks to assist in 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

Historic Project Achievements:

In 2020, SDG&E developed and published publicly available geographic maps of Distribution Mains and Services leaks information, e.g., zip codes & volume of emissions. The list of the Distribution Mains and Services leaks is also available to the public under Appendix 4 of the Annual Emissions Reports. SDG&E updates the leaks' information in Q3 of each year because the submission date of the Annual Emissions Report is usually June 15th of each year. The maps allow customers to navigate the map[2], via zip codes and view the current and historic volume of emissions associated with the zip code.

Emissions Reductions Achieved:

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 20b.

Cost Effectiveness Evaluation on Historic Work:

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 20b.

Part 2. Proposed New or Continuing Measure

SDG&E will maintain and annually update the publicly available geographic maps of Distribution Mains & Services Leaks information with the latest data of the Annual Emissions Report.

[2]https://www.sdge.com/sdge-distribution-mains-services-methane-emissions-map

Project Milestones:

- Update the maps with the Annual Emissions Reports: Q3 Annually.

Part 3. Abatement Estimates

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 20b.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	**2025**	**2026**	**2025 – 2026**
	Direct	**Direct**	**Total Loaded O&M Cost with Contingency**
Labor	$250	$250	$1,100
Non-Labor	$280	$280	$678
Total	$530	$530	$1,778

Total Revenue Requirement over Expected Life of Investment
$0.002 million
Average Annual Revenue Requirement
$0.001 million

Part 5. Cost Effectiveness/Benefits

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. SDG&E remains committed to demonstrating its benefits through the execution of Best Practice 20b.

Part 6. Supplemental Information/Documentation

Attachment 11A: Historical Project Schedule for Public Leak Maps

2024 SB 1371 Compliance Plan
Chapter 12: Accelerated Leak Repair - Transmission

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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.

SDG&E has historically repaired transmission leaks to meet requirements of 49 C.F.R. Part 192 and CPUC's G.O. 112-F based on safety risk, and has coded leaks as grades 1, 2, or 3 based on proximity to buildings, population density, and concentration of the leak. In the past, leak repair prioritization was solely based on safety and was not correlated to emission volumes.

In the 2022 Compliance Plan, SDG&E was approved to fund accelerated leak repairs beyond the normal repair timeframes. From 2018 to 2021, SDG&E did not have the opportunity to accelerate any leaks for repair on Transmission assets.

Emission Reductions Achieved:

The emission reductions for this program were not evaluated because SDG&E did not request any funding for this period.

Part 2. Proposed New or Continuing Measure

Due to improvements in outage coordination, SDG&E does not have the opportunity to save on substantial emissions when accelerating leak repairs. SDG&E will not be requesting funds for the 2024 Compliance Period.

Part 3. Abatement Estimates

There are no abatement estimates because SDG&E will not pursue measures in this Chapter in this Compliance Period.

Part 4. Cost Estimates

SDG&E will not request funds for this initiative in this Compliance Period.

Part 5. Cost Effectiveness/Benefits

Cost effectiveness cannot be calculated because SDG&E will not request funding for this Chapter during this Compliance Period.

Part 6. Supplemental Information/Documentation

Not applicable.

2024 SB 1371 Compliance Plan
Chapter 13: Distribution Above Ground Leak Surveys

Part 1. Evaluate the Current Practices Addressed in this Chapter

This Chapter addresses the following Best Practice:

Best Practice 19: Aboveground 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.

Historic Project Achievements:

In the 2018 Compliance Plan, SDG&E requested and was approved funding to provide M&R Technicians with instrumentation to begin performing and recording instrumented leak surveys. SDG&E purchased the required instruments to perform instrumented survey.

No incremental staffing was required to implement this measure. Training of existing M&R Technicians on the new instruments was completed at the end of 2020 along with using the purchased equipment to measure and document emissions found at regulator stations.

2022 was the first full year that the implementation of instrumented survey on M&R stations were used.

Emissions Reduction Achieved:

Historical Emission Reductions (MCF)

2018	2019	2020	2021	2022
N/A	N/A	35	85	132

Due to the COVID-19 pandemic, it was not feasible to assess the cost effectiveness of this measure in the 2022 Compliance Plan. However, in 2019 the combination of accelerated surveys and the use of instrumentation to detect leaks at above ground facilities, resulted in a net increase in emissions. This increase was expected in the first year of deployment, however, starting in 2020 emission reductions were achieved as leaks were detected and repaired sooner than they otherwise would have been. Since SDG&E has limited above ground facilities including just two (2) compressor stations, the reductions achieved from 5-year to 3-year survey cycles were small, but significant relative to the number and size of facilities. These reductions, along with those achieved in 2020-2022, are reflected in the table above.

Cost Effectiveness Evaluation on Historic Work:

Historical cost effectiveness was not evaluated for the 2024 Compliance Plan because SDG&E did not request any additional funding for the program since the 2018 Compliance Plan submittal.

Part 2. Proposed New or Continuing Measure

SDG&E will continue performing instrumented above ground leak surveys along with the current process of site, sound, and smell. The instruments required to perform above ground leak surveys have already been purchased and training to use the tools has been completed. SDG&E is not requesting additional funding in this Compliance Period.

Part 3. Abatement Estimates

Forecast of Emission Reductions from Baseline (MCF)

2025	2026	2027	2028	2029	2030
108	108	108	108	108	108

The forecasted emission reductions through 2030 represent the average achieved in 2021 and 2022. The reductions are expected to remain similar as the above ground equipment surveyed will remain the same.

Part 4. Cost Estimates

SDG&E will not request funds for this initiative in this Compliance Period.

Part 5. Cost Effectiveness/Benefits

Cost effectiveness cannot be calculated because SDG&E will not request funding for this Chapter during this Compliance Period.

Part 6. Supplemental Information/Documentation

Attachment 13A: Distribution Above Ground Leak Surveys

2024 SB 1371 Compliance Plan
Chapter 14: Aerial Monitoring

Part 1. Evaluate the Current Practice Addressed in this Chapter

This Chapter addresses the following Best Practice(s):

Best Practice 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 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.
Best Practice 17: Enhanced Methane Detection
Utilities shall utilize enhanced methane detection practices (e.g. mobile methane detection and/or aerial leak detection) including gas speciation technologies.
Best Practice 20a: Quantification
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 in the demonstration of actual emissions reductions.

Historic Project Achievements:

As discussed in Chapter 1, leak survey on distribution lines has historically been performed according to the requirements in 49 C.F.R. § 192.723. SDG&E pipelines are typically leak surveyed at intervals of one (1) or three (3) years. The frequency of this survey is determined by the pipe material involved (i.e., plastic or steel), the operating pressure, whether the pipe is under cathodic protection, and the proximity of the pipe to various population densities. Survey is typically performed by walking over the pipeline and using handheld infrared methane detection tools, or by driving over the pipeline using optical methane detection. While these tools can detect pipeline leaks, they do not have the capability to measure the leak flux rate, referred to as leak quantification in this Chapter.

Part 2. Proposed New or Continuing Measure

In 2024, SDG&E will 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.

Proposed Milestones:

- Secure vendor contract: Estimated Q1 of 2025.
- Train Existing FTEs: Estimated Q1 of 2025.
- Determine scope of work: Estimated Q1 of 2025.
- Update leak survey maps: Estimated Q1 of 2025.
- Begin performing aerial monitoring: Estimated Q2 of 2025.

Part 3. Abatement Estimates

Distribution Mains & Services

SDG&E estimates emission reductions achieved by performing aerial monitoring at 5,660 MCF reduced from Distribution Mains and Services (DM&S).

This estimate was generated by making the following assumptions:

- Based on historical leak findings and the aerial monitoring pilots, SDG&E anticipates finding approximately 36 emissions sources on its DM&S system.
- The number of square miles flown per year is estimated to be 354.

Forecast of Emission Reductions from Baseline (MCF)

Source of Emissions	2025	2026	2027	2028	2029	2030
System Emissions (M&S)	5,660	5,660	5,660	5,660	5,660	5,660
Customer Emissions	50,222	50,222	50,222	50,222	50,222	50,222

The emission reductions for this project may increase over time if there are improvements in the detection capabilities of LIDAR technology and/or if post-meter incomplete combustion is considered in the future.

Since there is less than a full year's worth of data collected from full-scale implementation, there may be incorrect assumptions and factors in the forecast explanation provided above. These factors will be updated to reflect actual implementation results in the next Compliance Plan.

Post-Meter Emissions

Since the current reporting structure does not currently provide a means of accounting for mitigation of post-meter emission reductions, the estimated emissions mitigated through repair of leaks on the customer system are shown below by post-meter leaks and emissions sources count. A rough approximation of customer emissions sources is provided for the mitigation of incomplete combustion emissions from customer equipment. Improved data collection and emissions

abatement estimation methods are currently being researched for post-meter emissions. Customer leak abatement and resolution of incomplete combustion will be tracked in a data system. This data system will assist in following up customers and provide accurate calculations for future customer emission adjustments.

The following assumptions were made:

- 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 finding approximately 126 emissions sources due to incomplete combustion from 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 it will be able to call back and reach 50% of those customers and confirm 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.

SDG&E has limited available data to evaluate how emissions reduced will change over time as a result of this implementation. It is also challenging to account for how this technology will improve over time. As such, emission forecasts are estimated to be linear. SDG&E will continue to expand its efforts with aerial monitoring as technology improves and as more data becomes available after implementation, a more accurate forecast will likely be achievable in future Compliance Plans.

Part 4. Cost Estimates

O&M Cost Estimates			
Activity	**2025**	**2026**	**2025 – 2026**
	Direct	**Direct**	**Total Loaded O&M Cost with Contingency**
Flights and Project Management Support	$1,041,460	$1,041,460	$2,430,183
Field Support	$84,711	$84,711	$372,728
Field Repair	$139,663	$139,663	$607,864
IT Support	$147,727	$147,727	$334,749
Total	**$1,413,561**	**$1,413,561**	**$3,745,525**

Capital Cost Estimates			
Activity	**2025**	**2026**	**2025 - 2026**
	Direct	**Direct**	**Total Loaded Capital Cost with Contingency**
Distribution Tools and Trucks	$27,125	$27,125	$65,643
Total	**$27,125**	**$27,125**	**$65,643**

Total Revenue Requirement over Expected Life of Investment
$4.0 million
Average Annual Revenue Requirement
$1.9 million

Cost Assumptions:

- 1/2 FTE for distribution leak investigation.
- 1/2 FTE for customer leak investigation.
- 1/2 Project Manager.
- 1/4 Data Analyst for customer leak investigations.

Vendor costs for aerial monitoring are based on preliminary numbers. A contract has not been generated with a fixed cost for the proposed scope of work. Actual costs may differ at the time of contract.

Part 5. Cost Effectiveness/Benefits

System emissions only calculation:

Forecast of Cost Effectiveness Calculations (2025-2030) ($/MCF)

Standard Cost Effectiveness	With Cap and Trade Cost Benefits	With Cap and Trade, and Social Cost of Methane Cost Benefits
$339	$337	$313

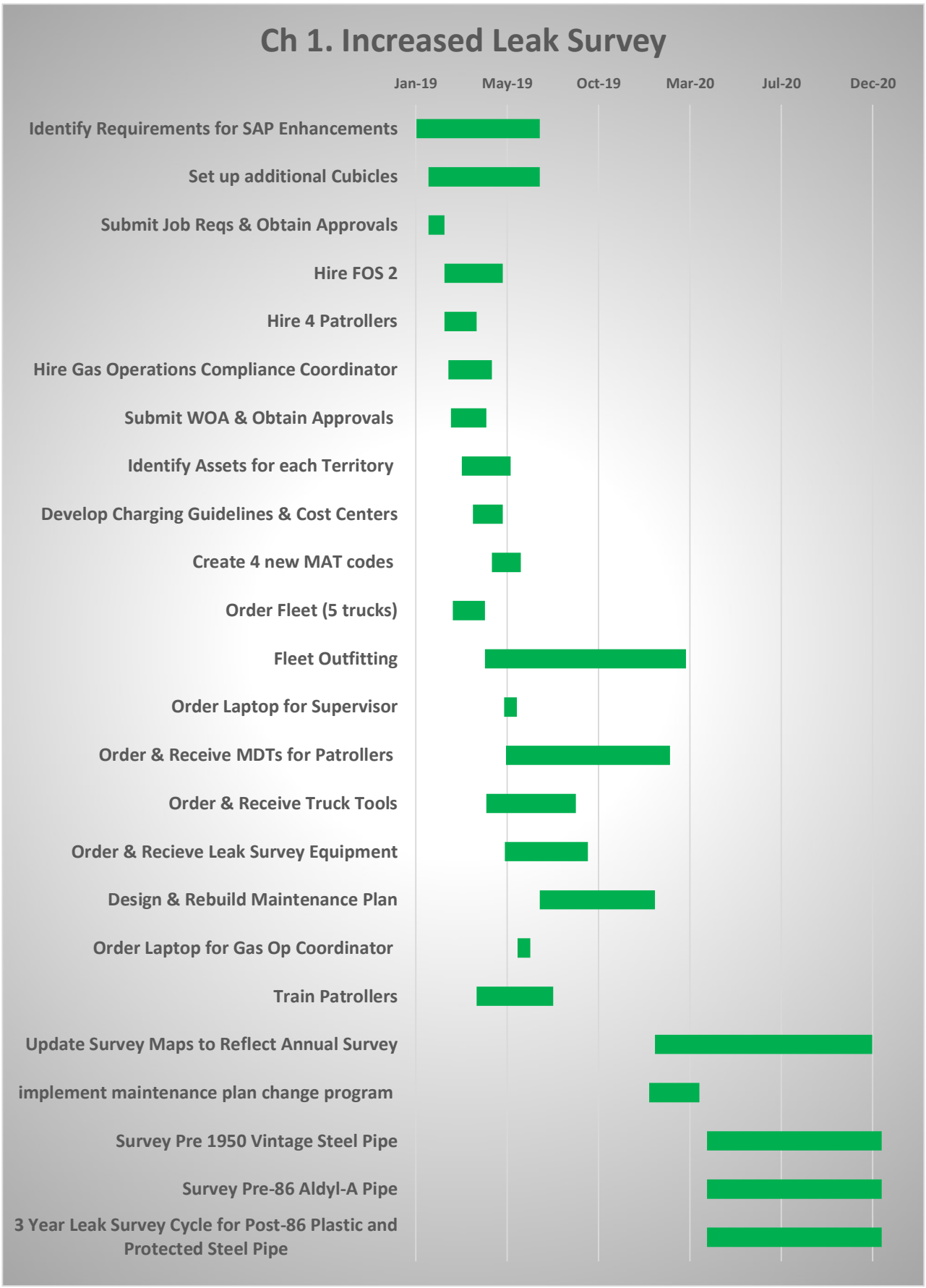
System + Confirmed Non-system emissions calculation:

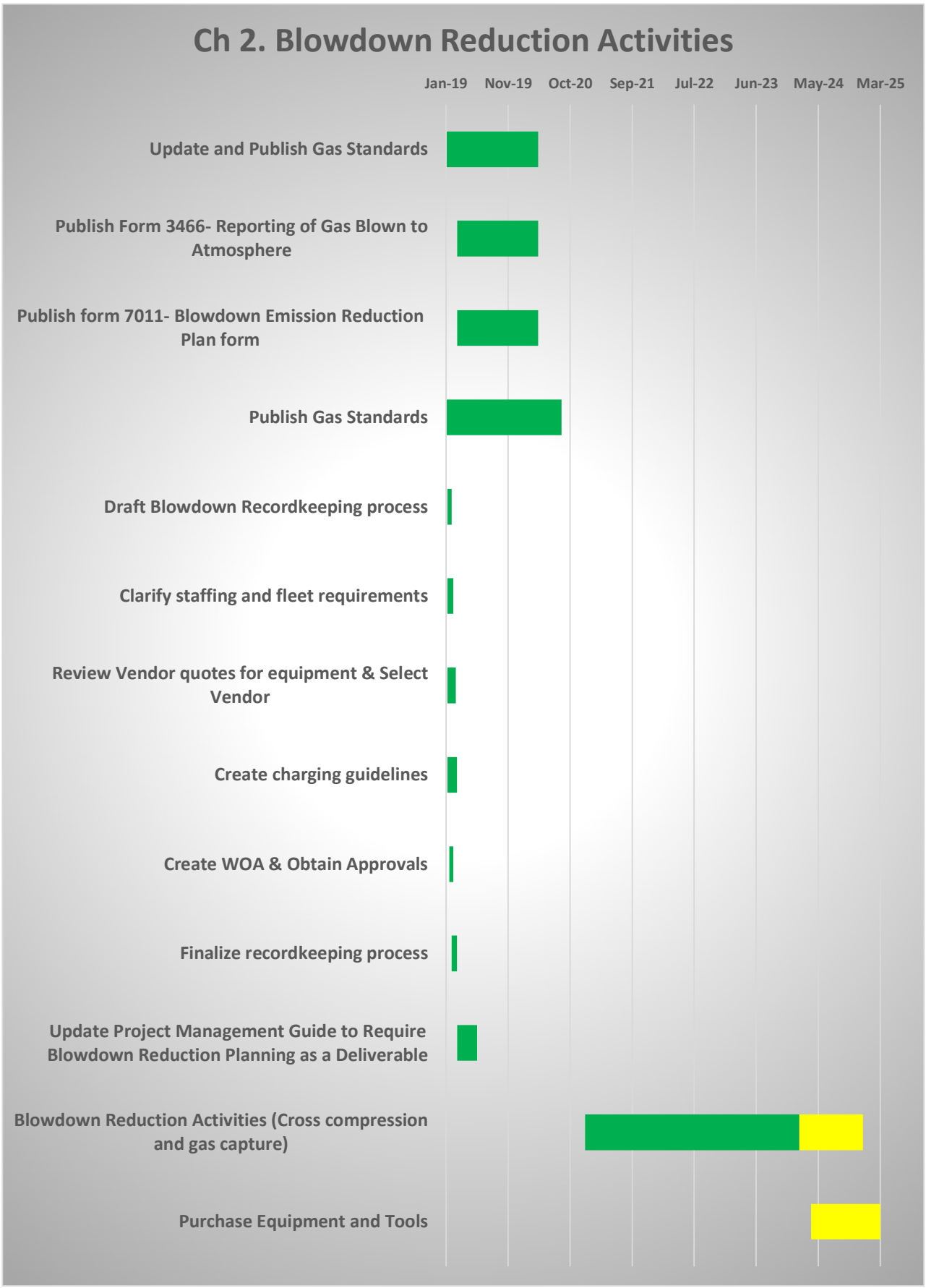
Forecast of Cost Effectiveness Calculations (2025-2030) ($/MCF)

Standard Cost Effectiveness	With Cap and Trade Cost Benefits	With Cap and Trade, and Social Cost of Methane Cost Benefits
$32	$30	$5

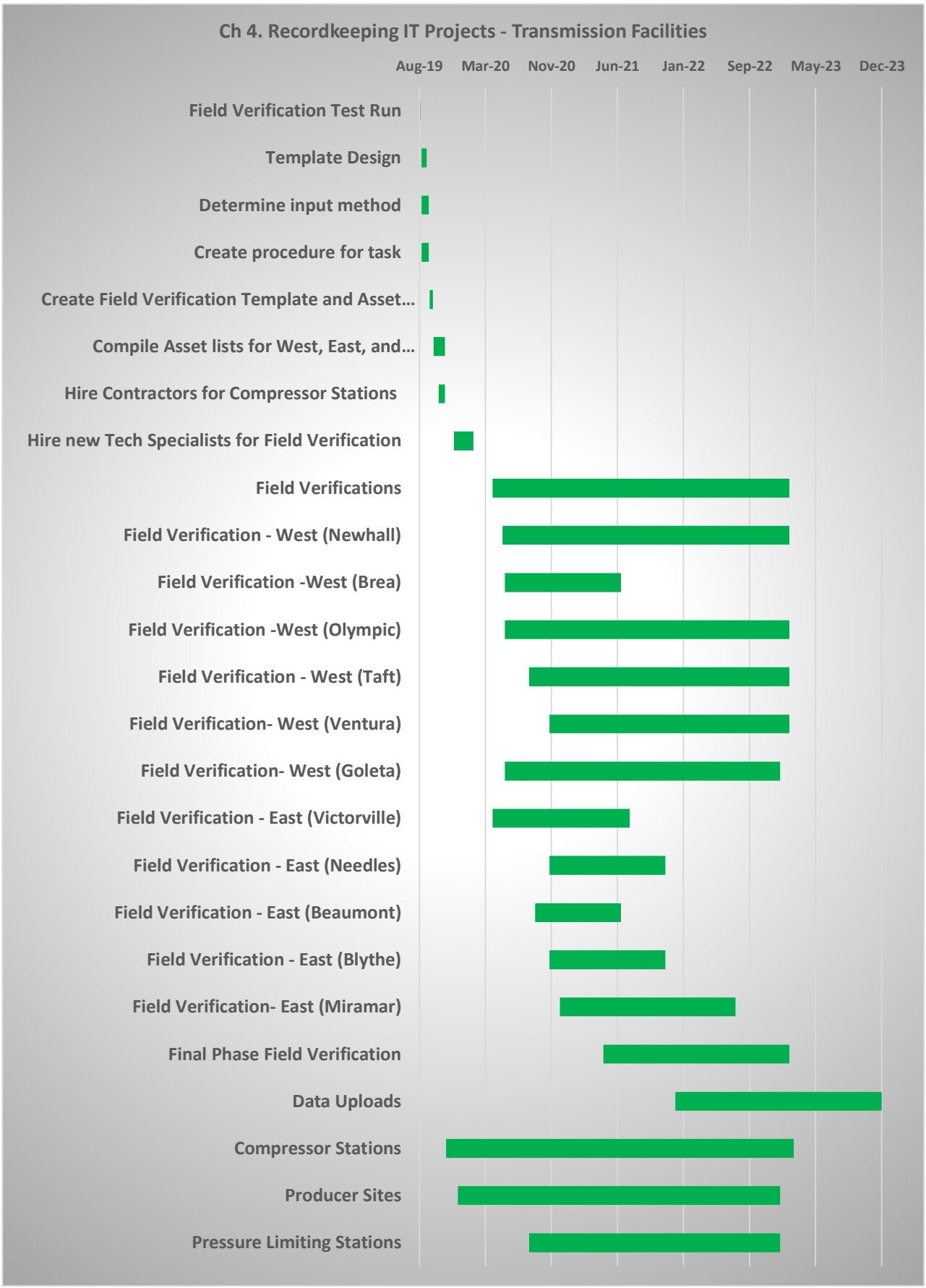
Part 6. Supplemental Information/Documentation

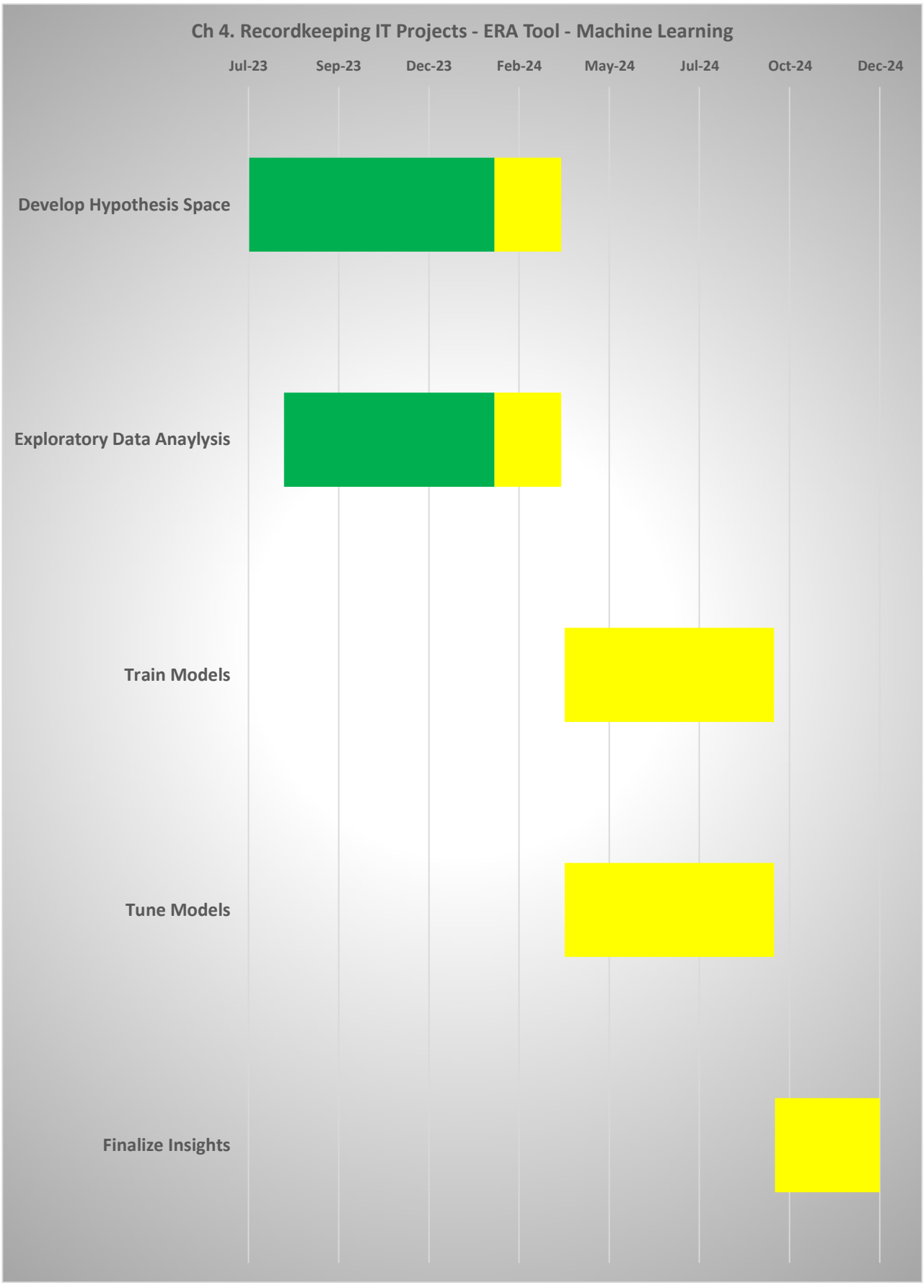
Not applicable.

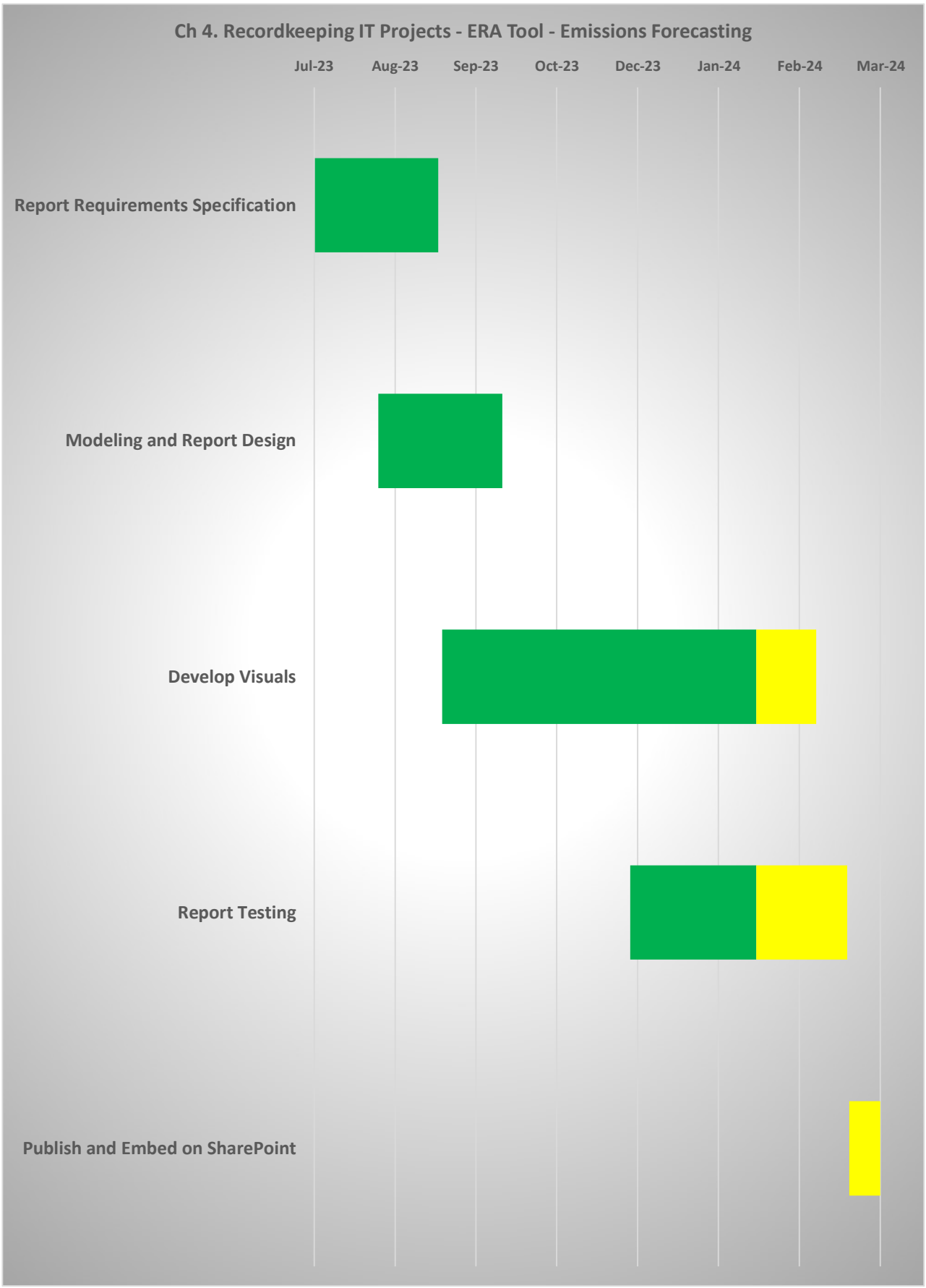

Ch 1. Increased Leak Survey
Jan-19
May-19
Oct-19
Mar-20
Jul-20
Dec-20
Identify Requirements for SAP Enhancements
Set up additional Cubicles
Submit Job Reqs & Obtain Approvals
Hire FOS 2
Hire 4 Patrollers
Hire Gas Operations Compliance Coordinator
Submit WOA & Obtain Approvals
Identify Assets for each Territory
Develop Charging Guidelines & Cost Centers
Create 4 new MAT codes
Order Fleet (5 trucks)
Fleet Outfitting
Order Laptop for Supervisor
Order & Receive MDTs for Patrollers
Order & Receive Truck Tools
Order & Recieve Leak Survey Equipment
Design & Rebuild Maintenance Plan
Order Laptop for Gas Op Coordinator
Train Patrollers
Update Survey Maps to Reflect Annual Survey
implement maintenance plan change program
Survey Pre 1950 Vintage Steel Pipe
Survey Pre-86 Aldyl-A Pipe
3 Year Leak Survey Cycle for Post-86 Plastic and Protected Steel Pipe

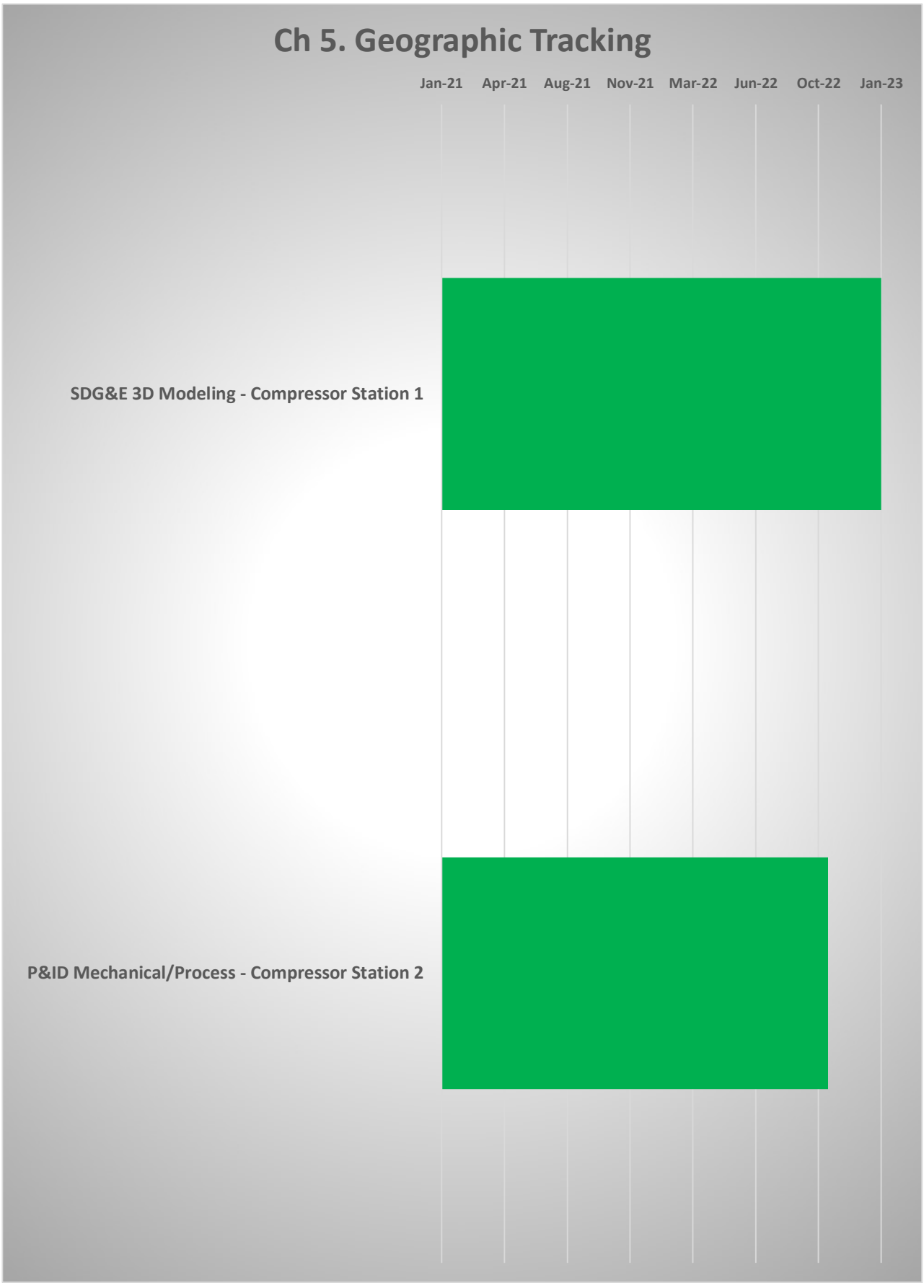

Ch 2. Blowdown Reduction Activities
Jan-19
Nov-19
Oct-20
Sep-21
Jul-22
Jun-23
May-24
Mar-25
Update and Publish Gas Standards
Publish Form 3466- Reporting of Gas Blown to Atmosphere
Publish form 7011- Blowdown Emission Reduction Plan form
Publish Gas Standards
Draft Blowdown Recordkeeping process
Clarify staffing and fleet requirements
Review Vendor quotes for equipment & Select Vendor
Create charging guidelines
Create WOA & Obtain Approvals
Finalize recordkeeping process
Update Project Management Guide to Require Blowdown Reduction Planning as a Deliverable
Blowdown Reduction Activities (Cross compression and gas capture)
Purchase Equipment and Tools

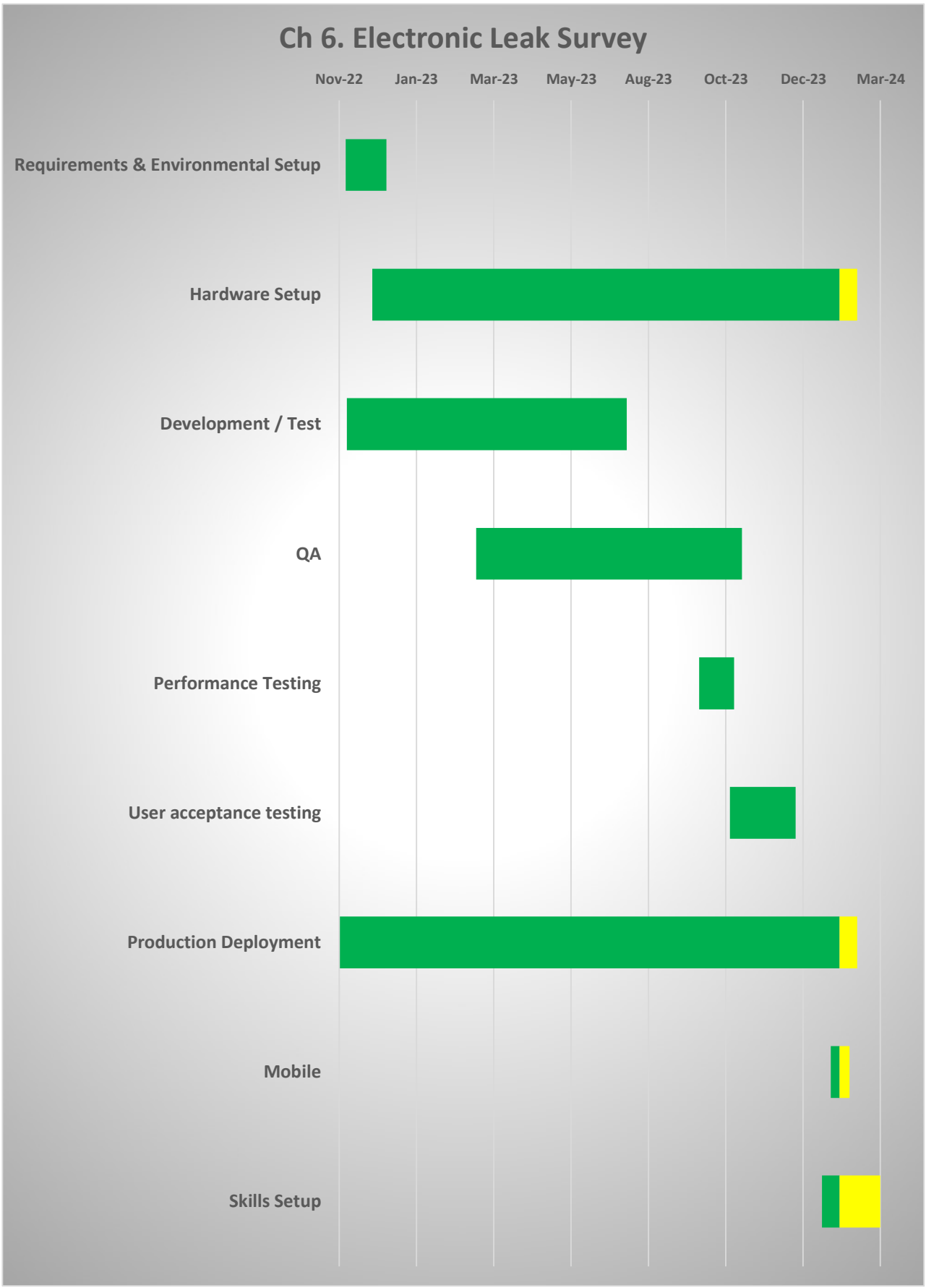

Ch 3. Damage Prevention Algorithm & Proactive Intervention
Jan-19
Sep-19
May-20
Dec-20
Aug-21
Apr-22
Dec-22
Develop a Methodology for Risk Ranking one call...
Develop & Test the Algorithm
Research Vendors
SoCalGas Agreement with Urbint
Phase I- Project Kickoff
Phase I- Gather Data
Model Training
Preliminary Analysis Presentation
On-the-ground Validation Kick-off
Mid-Validation Sync & No-call In Analysis...
Phase 2- Initial Model Creation (phase 2)
Initial Model Results Delivery (Phase 2)
Iteration & Validation of AI model (phase 3)
Final Presentation (phase 3)
Expanded standby at medium pressure systems...
Evaluate pilot results
Hire and train incremental FTEs
Update gas standards
Implement expanded standby program on...
Hire and train incremental FTEs
On-going analysis and evaluating model
Test and validate model
Develop Process for identifying repeat offenders
New Model into Production
On-going analysis and evaluating model
Evaluate Results
Propose Changes
Calculate Emission Reductions

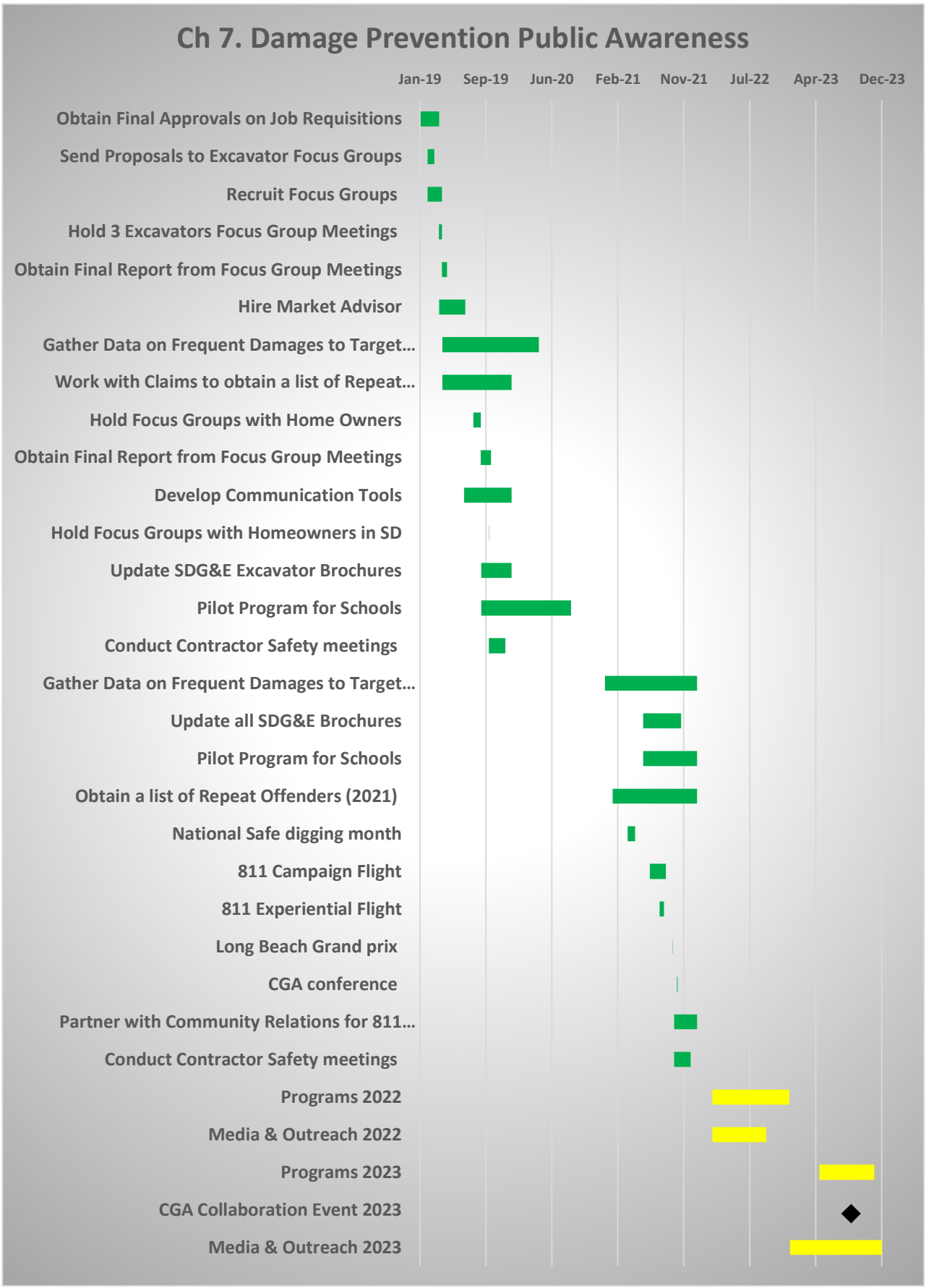

Ch 4. Recordkeeping IT Projects - Transmission Facilities
Aug-19
Mar-20
Nov-20
Jun-21
Jan-22
Sep-22
May-23
Dec-23
Field Verification Test Run
Template Design
Determine input method
Create procedure for task
Create Field Verification Template and Asset...
Compile Asset lists for West, East, and...
Hire Contractors for Compressor Stations
Hire new Tech Specialists for Field Verification
Field Verifications
Field Verification - West (Newhall)
Field Verification -West (Brea)
Field Verification -West (Olympic)
Field Verification - West (Taft)
Field Verification- West (Ventura)
Field Verification- West (Goleta)
Field Verification - East (Victorville)
Field Verification - East (Needles)
Field Verification - East (Beaumont)
Field Verification - East (Blythe)
Field Verification- East (Miramar)
Final Phase Field Verification
Data Uploads
Compressor Stations
Producer Sites
Pressure Limiting Stations

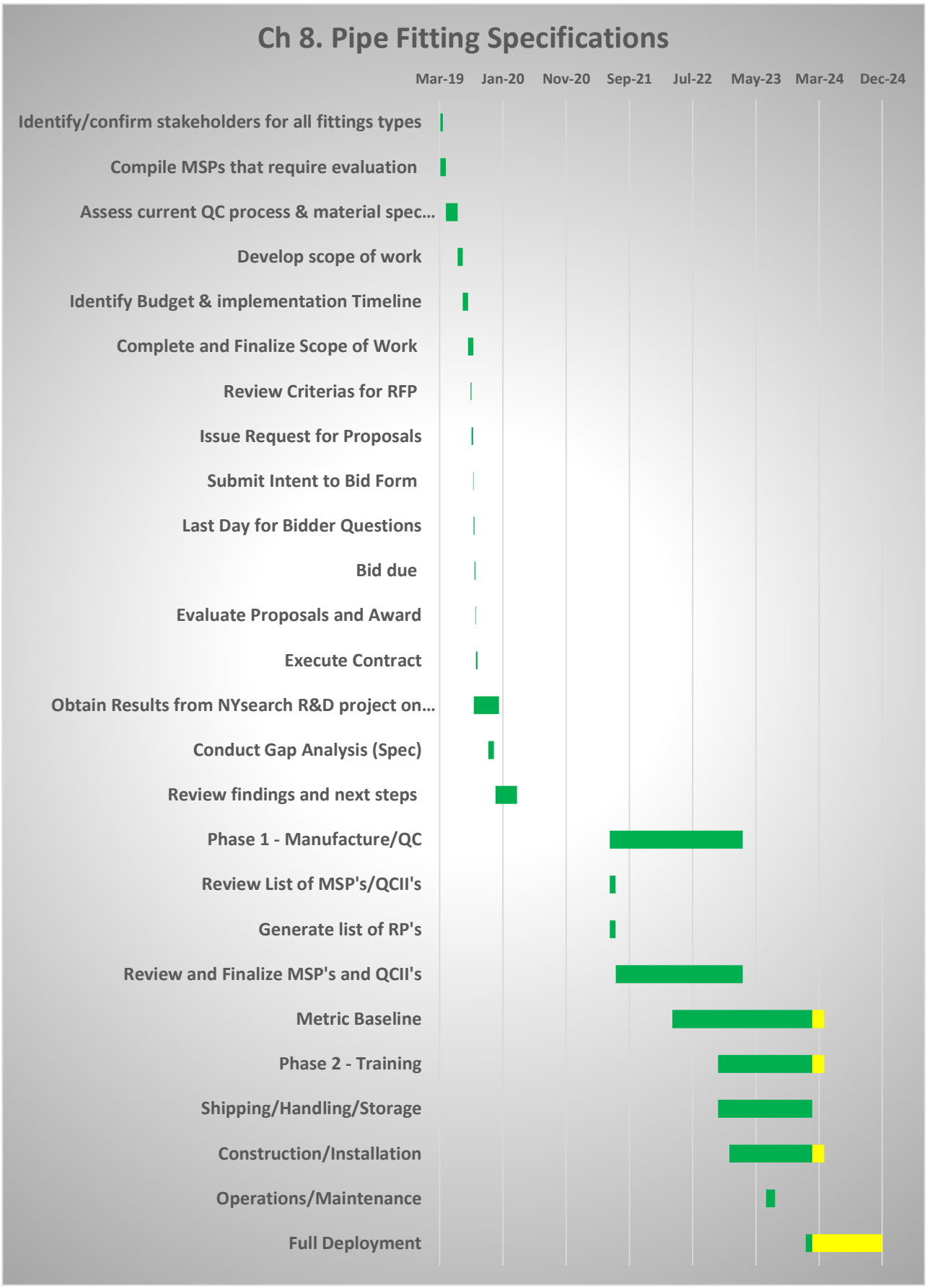

Ch 4. Recordkeeping IT Projects - ERA Tool - Machine Learning
Jul-23
Sep-23
Dec-23
Feb-24
May-24
Jul-24
Oct-24
Dec-24
Develop Hypothesis Space
Exploratory Data Anaylysis
Train Models
Tune Models
Finalize Insights


Ch 4. Recordkeeping IT Projects - ERA Tool - Emissions Forecasting
Jul-23
Aug-23
Sep-23
Oct-23
Dec-23
Jan-24
Feb-24
Mar-24
Report Requirements Specification
Modeling and Report Design
Develop Visuals
Report Testing
Publish and Embed on SharePoint

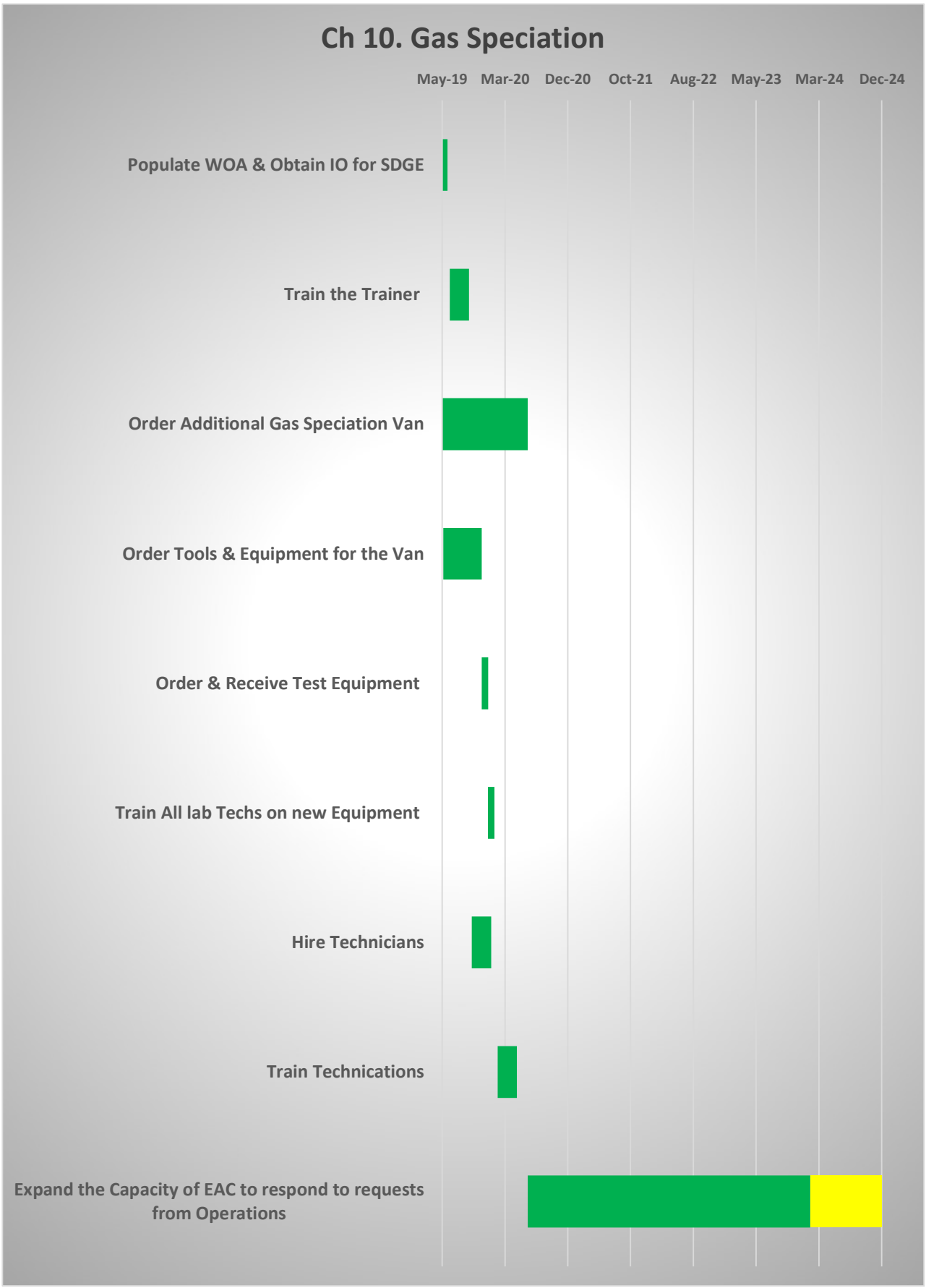

Ch 5. Geographic Tracking
Jan-21
Apr-21
Aug-21
Nov-21
Mar-22
Jun-22
Oct-22
Jan-23
SDG&E 3D Modeling - Compressor Station 1
P&ID Mechanical/Process - Compressor Station 2

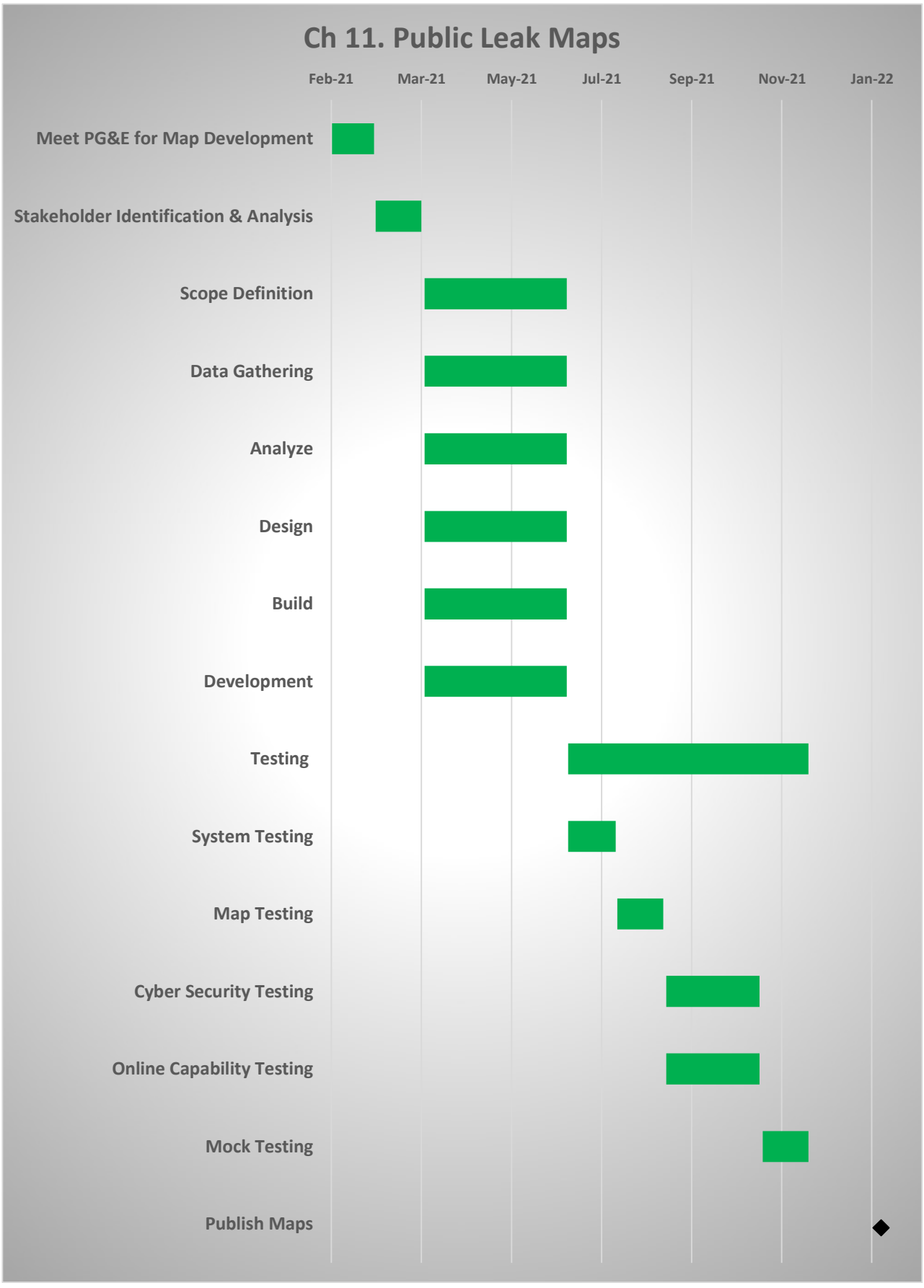

Ch 6. Electronic Leak Survey
Nov-22
Jan-23
Mar-23
May-23
Aug-23
Oct-23
Dec-23
Mar-24
Requirements & Environmental Setup
Hardware Setup
Development / Test
QA
Performance Testing
User acceptance testing
Production Deployment
Mobile
Skills Setup

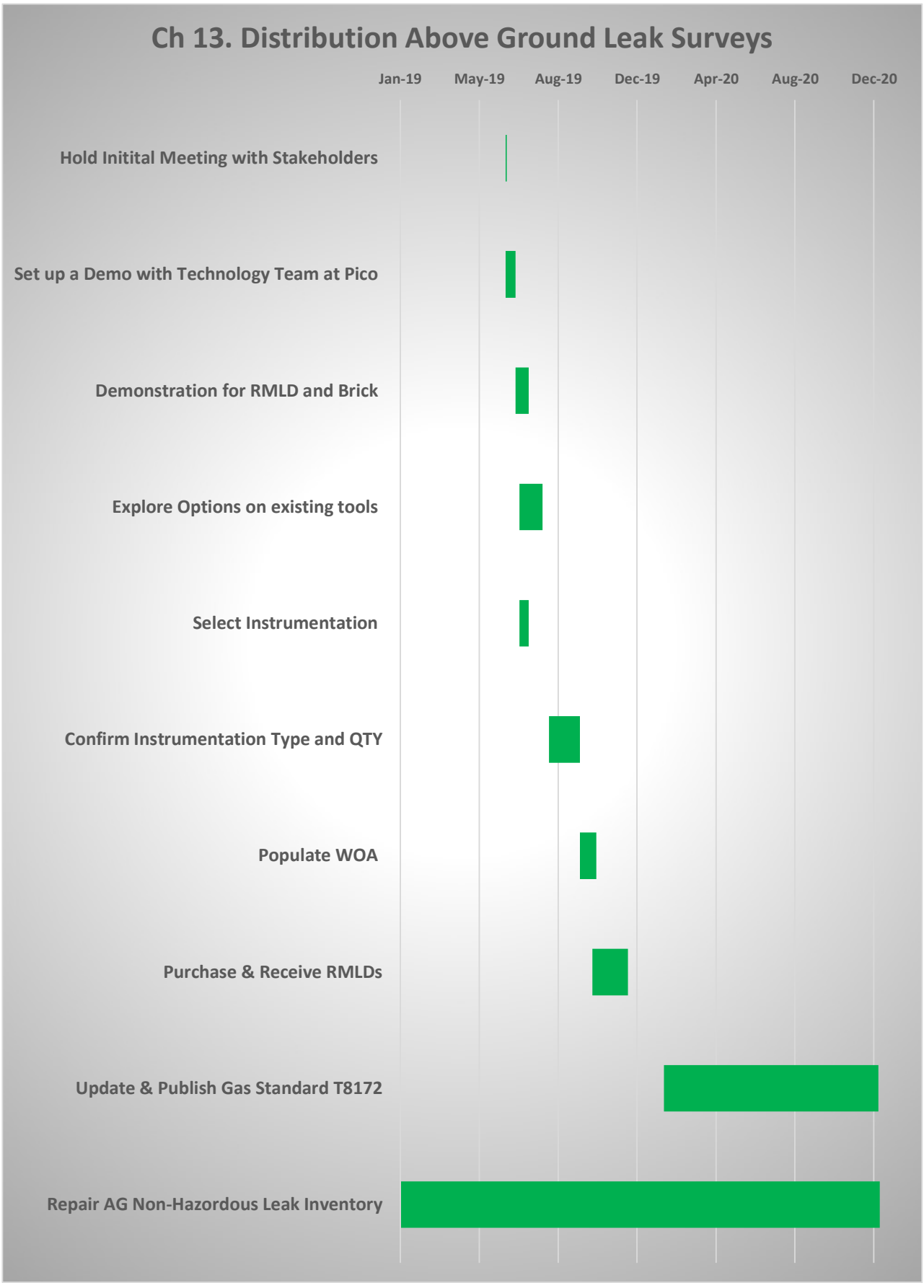

Ch 7. Damage Prevention Public Awareness
Jan-19
Sep-19
Jun-20
Feb-21
Nov-21
Jul-22
Apr-23
Dec-23
Obtain Final Approvals on Job Requisitions
Send Proposals to Excavator Focus Groups
Recruit Focus Groups
Hold 3 Excavators Focus Group Meetings
Obtain Final Report from Focus Group Meetings
Hire Market Advisor
Gather Data on Frequent Damages to Target...
Work with Claims to obtain a list of Repeat...
Hold Focus Groups with Home Owners
Obtain Final Report from Focus Group Meetings
Develop Communication Tools
Hold Focus Groups with Homeowners in SD
Update SDG&E Excavator Brochures
Pilot Program for Schools
Conduct Contractor Safety meetings
Gather Data on Frequent Damages to Target...
Update all SDG&E Brochures
Pilot Program for Schools
Obtain a list of Repeat Offenders (2021)
National Safe digging month
811 Campaign Flight
811 Experiential Flight
Long Beach Grand prix
CGA conference
Partner with Community Relations for 811...
Conduct Contractor Safety meetings
Programs 2022
Media & Outreach 2022
Programs 2023
CGA Collaboration Event 2023
Media & Outreach 2023


Ch 8. Pipe Fitting Specifications
Mar-19
Jan-20
Nov-20
Sep-21
Jul-22
May-23
Mar-24
Dec-24
Identify/confirm stakeholders for all fittings types
Compile MSPs that require evaluation
Assess current QC process & material spec...
Develop scope of work
Identify Budget & implementation Timeline
Complete and Finalize Scope of Work
Review Criterias for RFP
Issue Request for Proposals
Submit Intent to Bid Form
Last Day for Bidder Questions
Bid due
Evaluate Proposals and Award
Execute Contract
Obtain Results from NYsearch R&D project on...
Conduct Gap Analysis (Spec)
Review findings and next steps
Phase 1 - Manufacture/QC
Review List of MSP's/QCII's
Generate list of RP's
Review and Finalize MSP's and QCII's
Metric Baseline
Phase 2 - Training
Shipping/Handling/Storage
Construction/Installation
Operations/Maintenance
Full Deployment


Ch 9. Repeat Offenders IT System
Apr-19
Jul-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Plan
Scope Definition
Project Schedule
Data Gathering
Scope Complete
Analyze
Design
Create SAP objects for Noggin solution
SAP reconciliation for CPDR form
Build
Noggin Build
SAP Build
Risk Master Mapping Analysis
Data Mapping
Testing
Analysis
System Test Condition Creation
Design
Build
Testing
Training
Deployment


Ch 10. Gas Speciation
May-19
Mar-20
Dec-20
Oct-21
Aug-22
May-23
Mar-24
Dec-24
Populate WOA & Obtain IO for SDGE
Train the Trainer
Order Additional Gas Speciation Van
Order Tools & Equipment for the Van
Order & Receive Test Equipment
Train All lab Techs on new Equipment
Hire Technicians
Train Technications
Expand the Capacity of EAC to respond to requests from Operations


Ch 11. Public Leak Maps
Feb-21
Mar-21
May-21
Jul-21
Sep-21
Nov-21
Jan-22
Meet PG&E for Map Development
Stakeholder Identification & Analysis
Scope Definition
Data Gathering
Analyze
Design
Build
Development
Testing
System Testing
Map Testing
Cyber Security Testing
Online Capability Testing
Mock Testing
Publish Maps

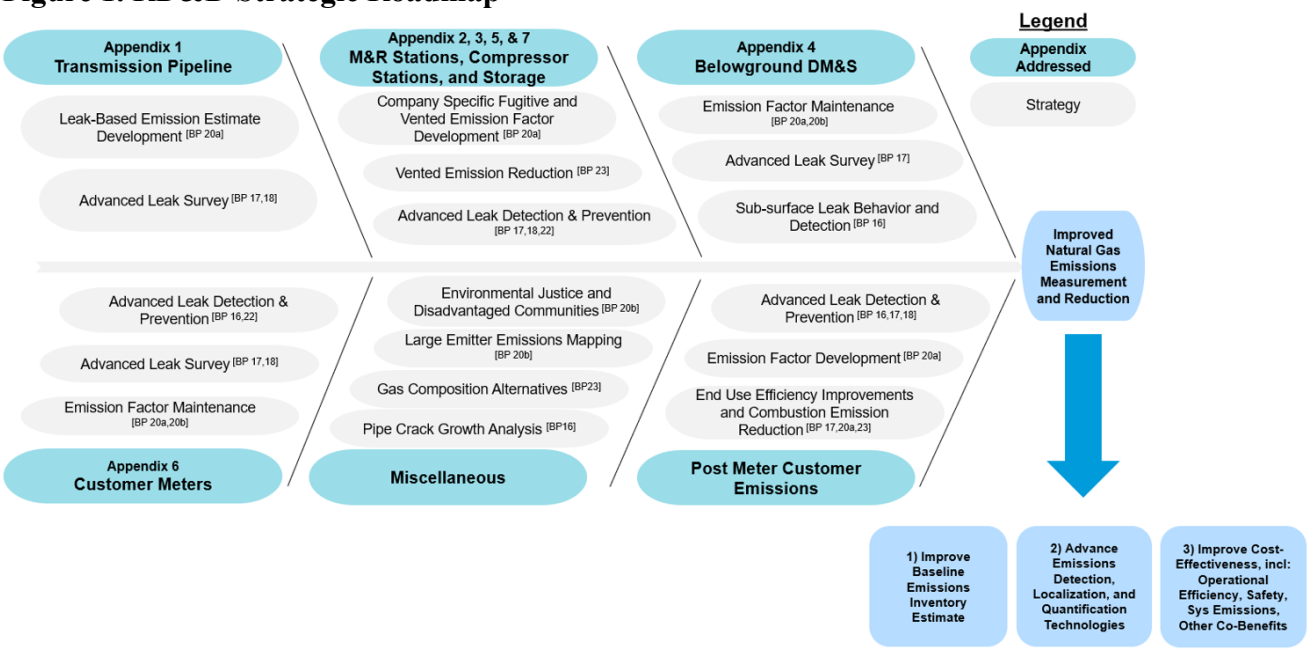

Ch 13. Distribution Above Ground Leak Surveys
Jan-19
May-19
Aug-19
Dec-19
Apr-20
Aug-20
Dec-20
Hold Initital Meeting with Stakeholders
Set up a Demo with Technology Team at Pico
Demonstration for RMLD and Brick
Explore Options on existing tools
Select Instrumentation
Confirm Instrumentation Type and QTY
Populate WOA
Purchase & Receive RMLDs
Update & Publish Gas Standard T8172
Repair AG Non-Hazordous Leak Inventory

2024 SB 1371 Compliance Plan
RD&D Summary

Best Practice Addressed	RD&D Project	Subject
16	16	Leak Detection and Prevention Algorithms
17, 20a	17	Evaluation of Instruments and Methods for Leak Detection, Quantification, Localization, and Speciation
18	18	Evaluation of Stationary Methane Detectors
20a, 20b	20a	Develop and Maintain Company-Specific EFs
22	22	Leak Prevention for Threaded Connections
23	23	Evaluation of Technologies to Mitigate Gas Blowdowns & Vented Emissions

Figure 1 provides a strategic roadmap for developing solutions (to the maximum extent cost-effectively feasible) for preventing or mitigating system emissions of natural gas for each section of Appendix 8 in the Annual Reporting requirements pursuant to R.15-01-008. The Miscellaneous research branch addresses Best Practices which are not directly reflected in annual emissions report, such as BP 20b Geographic Tracking, and gas composition alternatives which are integral to the underlying calculations within Appendix 8. The Post Meter Customer Emissions research branch addresses customer side methane emissions from leaks and incomplete combustion which, while not currently included in annual emissions report, do contribute to greenhouse gas emissions into the atmosphere. Based on CPUC guidance, the goal of the research proposed within this Compliance Plan aims to improve estimates of system emissions and strategically reduce system emissions while considering operational efficiency and cost effectiveness. Each section of this RD&D chapter is associated with the Best Practices provided in the strategy of the RD&D Strategic Roadmap which is focused on improving the cost effectiveness of these leak abatement Best Practices. These sections include estimates of the emission abatement potential and associated implementation cost.

Figure 1. RD&D Strategic Roadmap



2024 SB 1371 Compliance Plan
RD&D Summary #16
Leak Detection and Prevention Algorithms

Part 1. Best Practice Addressed in this Chapter

This section addresses the following Best Practice(s):

Best Practice 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 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.

Part 2. Name and Type of RD&D Objective or Program Pilot

Name: Leak Detection and Prevention Algorithms

Type of Objective(s) or Program Pilot:

- Improve understanding of underground methane concentration "background" and leak migration behavior and validate current practices for belowground methane concentration threshold(s), resulting in improved leak detection efficiency.
- Continue advancing the understanding of how leak flow rates evolve over time on various pipeline materials.

Part 3. RD&D Objectives

Study methane environment around below-ground pipelines and determine factors that contribute to leak development and migration. Understanding of these factors will be used to develop numerical models to predict gas behavior in the distribution environment. Additionally, this research may be used to determine the appropriate below-ground methane concentration threshold(s) that should trigger the creation of a leak record and investigation. This knowledge will assist in improving system leakage estimates and EFs and help to optimize leak survey intervals based on projected emission growth rates. This research area has potential pipeline safety, integrity, and reliability co-benefits. The table below shows the primary and secondary focus areas across Transmission, Distribution, and Storage that would benefit from this research.

2024 SB 1371 Compliance Plan
RD&D Summary #16
Leak Detection and Prevention Algorithms

Areas Targeted

Transmission			Distribution			Storage	
Pipeline	M&R	Compressor	Pipeline	M&R	MSA	Well/Lat	Compressor
f			F		f	f	

Primary Area of Focus: F – Fugitive; V – Vented
Secondary Area of Focus: f – Fugitive; v – Vented

Part 4. Current and Proposed Projects

Current Projects (2022 Compliance Plan):

1. Leak Prevention with Intelligent Image Processing (SCG-2021-004)
   Explore the prevention of leaks on aboveground assets by automatically recognizing conditions that lead to leaks using intelligent image processing, such as corrosion condition, facility damage, encroachment, and tampering.
   - Anticipated Project Close Out: Q3 of 2024.
2. System Emissions Using Mass Balance with Advanced Meter Technology Research Project (SCG-2018-006)
   Assess the feasibility of developing algorithms designed for early detection of distribution system leaks using a mass-balance approach and leveraging consumption data from the Advanced Meter (AM) network for a defined study area.
   - Anticipated Project Close Out: Q3 of 2024.
3. PE Leak Growth Rate from Slow Crack Growth Research Project (OTD 7.15.c)
   Evaluate how leaks evolve over time due to slow crack growth on polyethylene (PE) pipe to gain a better understanding of its contribution to methane emissions from PE pipelines.
   - Anticipated Project Close Out: Q4 of 2024.

New Proposed Projects:

1. Leak Prevention through Root Cause Analysis of Large Leaks in the Distribution Environment and integration with DIMP risk algorithms
   - Anticipated Start Date: Q1 of 2025.
   - Anticipated End Date: Q4 of 2026.
2. Evaluate Leak Detection Threshold(s) for Distribution Leak Survey by Material
   - Anticipated Start Date: Q3 of 2025.
   - Anticipated End Date: Q3 of 2026.
3. PE Leak Growth Rate from Slow Crack Growth (Phase II)
   - Anticipated Start Date: Q1 of 2025.
   - Anticipated End Date: Q2 of 2026.

2024 SB 1371 Compliance Plan
RD&D Summary #16
Leak Detection and Prevention Algorithms

Part 5. Expected Results

- Use acquired understanding to determine the appropriate below-ground methane concentration threshold(s) that should trigger creation of a leak record and investigation.
- Use acquired understanding to enable field technicians to determine if below-ground methane indications are due to a leak from the natural gas piping system.
- Increase understanding of the impact on methane emissions from the leak growth rate due to cracks in the Polyethylene (PE) pipeline.

Part 6. Estimated Emissions Impact

- This research category has an estimated emission abatement potential of 5%-10% of total system emissions. To meet a target cost effectiveness of $22/MCF, this would require a solution with an estimated implementation cost of $2.5 million.
- Knowledge of the below-ground methane threshold may reduce both false positives (recording a leak when there is no leak) and false negatives (not recording a leak when one exists), which would increase operational efficiency and result in overall shorter leak duration and emission reductions.
- Potential co-benefits associated with this research category include improvements in pipeline safety due to early leak detection and/or prevention. These co-benefits should be considered in future implementation cost effectiveness calculations.

Part 7. Data Collection and Analysis Plan

The RD&D approach to meet the objective will involve a series of planned evaluations, that can include one or more of the following:

a) Simulated Field Evaluation (Emissions Sources)
   - Evaluate each test matrix in a simulated field environment utilizing controlled natural gas releases.

b) Pilot Study
   - Collect methane concentration samples.
   - Perform follow-up leak investigations.
   - Evaluate various methane concentration thresholds for early leak detection and compare to current practices.

c) Statistically analyze collected below-ground methane concentrations and flow rate data.

2024 SB 1371 Compliance Plan
RD&D Summary #16
Leak Detection and Prevention Algorithms

Part 8. Expected Utility Total Cost

Incremental Cost Estimates (Provided in 2024 Dollars and Direct Costs)

SoCalGas

2025	2026
$384,864	$488,576

SDG&E

2025	2026
$38,063	$48,321

Rate-Recoverable Loaded Costs Submitted in Advice Letters (NGLAPBA One-Way Balancing Account)

Utility	Total Loaded Costs
SoCalGas	$1,169,472
SDG&E	$115,662

2024 SB 1371 Compliance Plan
RD&D Summary #17
Evaluation of Instruments and Methods for Leak Detection, Quantification, Localization, and Speciation

Part 1. Best Practice Addressed in this Chapter

This section addresses the following Best Practice(s):

Best Practice 17: Enhanced Methane Detection
Utilities shall utilize enhanced methane detection practices (e.g. mobile methane detection and/or aerial leak detection) including gas speciation technologies.

Best Practice 20a: Quantification
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 an agreement on a similar methodology to improve emissions quantification of leaks to assist the demonstration of actual emission reductions.

Part 2. Name and Type of RD&D Objective or Program Pilot

Name: Evaluation of Instruments and Methods for Leak Detection, Quantification, Localization, and Speciation.

Type of Objective or Program Pilot:

- Improve efficiency and reduce cost of system operations.
- Reduce emissions and improve efficiencies by detecting, differentiating, and rapidly responding to large leaks.
- Pilot studies to validate actual costs and leak detection, localization, and system capabilities of next generation.

Part 3. RD&D Objective

Develop and demonstrate instruments and/or methods to improve the efficiency and output of leak detection, localization, and quantification processes. Evaluate the performance and features of new instruments and/or methods and perform comparative analysis to existing methods for leak detection, source localization, and speciation of natural gas to estimate potential incremental benefits. The tables below show the primary and secondary focus areas across Transmission, Distribution, Storage, and Post-Meter emissions that would benefit from this research.

2024 SB 1371 Compliance Plan
RD&D Summary #17
Evaluation of Instruments and Methods for Leak Detection, Quantification, Localization, and Speciation

Areas Targeted

Transmission			Distribution			Storage	
Pipeline	M&R	Compressor	Pipeline	M&R	MSA	Well/Lat	Compressor
F,v	F,v	F,v	F,v	F,v	F,v	F,v	F,v

Primary Area of Focus: F – Fugitive; V – Vented
Secondary Area of Focus: f – Fugitive; v – Vented

Post-Meter (Customer Emissions)			
Yard Line	House Line	Incomplete Combustion	Vented Emissions
F	F	V	V

Part 4. Current and Proposed Projects

Current Projects (2022 Compliance Plan):

1. Integrate Mobile Methane Mapping w/ Mobile Leak Survey Research Project (SCG-2018-005)
   Evaluate possibility of integrating GIS and wind (speed and direction) data into traditional mobile leak survey applications where mobile leak survey is conducted directly over the pipeline right-of-way. Increase the leak detection capabilities of mobile methane mapping by integrating multiple methane detection systems to increase lower detection limit and minimize false-positive indications.
   - Project Completed: Q1 of 2022.
2. Evaluate Mobile Mapping Services (SCG-2021-009)
   Evaluate algorithms to identify which mobile methane measurements have a high likelihood of being associated with natural gas emissions over multiple drives.
   - Project Completed: Q4 of 2022.
3. Aerial Methane Mapping (SCG-2019-012)
   Pilot studies were conducted in several distribution service areas and conditions to measure system capability for methane emissions detection, localization and quantification. As result of this study, additional insight was gained as to the varied sources of methane emissions in the distribution operating environment.
   - Project Completed: Q3 of 2023.
4. First Pass Leak Detection Optimization (NYSEARCH T-784)
   Develop and evaluate walking survey approach using various instruments to enhance walking leak survey detection and localization of leaks.
   - Anticipated Project Close Out: Q2 of 2024.

5. BackPack & Handheld Methane Detection Tools (Sensor) & Systems Research Projects (a.k.a. Next Generation Walking Leak Survey) (SCG-2018-004)
   Evaluate and develop the use of portable ppb-detection capable instruments to enhance walking leak survey detection and localization of leaks.
   - Anticipated Project Close Out: Q3 of 2024.
6. Evaluate New Mobile Leak Detection, Localization, and Speciation Technologies (SCG-2022-007)
   Evaluate new advanced mobile leak detection systems and compare with existing approved mobile technologies.
   - Anticipated Project Close Out: Q4 of 2024.
7. Aerial (sUAS) Leak Detection Research Projects (SCG-2016-001)
   Progressive development of drone and sensor instrument by respective manufacturers.
   - Anticipated Project Close Out: Q4 of 2024.
8. Aerial Leak Detection - Satellite (SCG-2021-005)
   Evaluate and demonstrate the capabilities of satellite technologies for leak detection and localization in transmission and distribution applications using satellite systems, and to evaluate the cost effectiveness in reducing emissions.
   - Anticipated Project Close Out: Q4 of 2024.

Lessons Learned:

- Handheld ppb-detection capable instruments have not yet shown significant advantages over traditional handheld ppm-detection instruments in leak detection capabilities. The next generation of this technology would attempt to improve detection capabilities (e.g., true positive rates), leak localization, quantification efficiency, and source attribution, to increase cost effectiveness.
- Mobile ppb-detection capable instruments have claimed improved detection capabilities over mobile ppm-detection instruments in some operating environments. However, the hardware technology alone does not produce adequate true positive detection rates. Further innovations (e.g., filtering algorithms) are needed. The next generation of this technology would attempt to improve detection capabilities (e.g., true positive rates), leak localization, quantification efficiency, and source attribution, which are expected to improve cost effectiveness.
- Technologies deployed on aerial platforms continue to show promising results during the 2022 Compliance Period. Further research efforts will attempt to improve probabilities of detection (detection at lower flow rates) and source attribution, which may increase cost effectiveness. The inclusion of program co-benefits, such as safety improvements associated with detection and repair of customer leaks, would further improve cost effectiveness.

- Aerial Methane Mapping (AMM) has been shown to be an effective incremental leak survey methodology (incremental to compliance walking leak survey). Unmanned aircraft technology platforms need to be developed for the next-generation advancement of the AMM program to improve the probabilities of detection at lower leak flow rates and overall cost effectiveness.
- Other aerial technologies (such as satellite-based methane detection and tethered balloons) continue to be evaluated as these methods mature over time from their current early-stage status, which is limited to leaks that exceed the size of typical fugitive emissions from the distribution environment.

New Proposed Projects:

1. Develop and pilot advanced handheld leak detection, localization, and speciation technologies.
    - Anticipated Start Date: Q2 of 2025.
    - Anticipated End Date: Q3 of 2026.
2. Develop and pilot next generation LiDAR sensors for aerial leak detection, localization, and speciation technologies.
    - Anticipated Start Date: Q1 of 2025.
    - Anticipated End Date: Q4 of 2026.
3. Develop and pilot augmentations for Advanced Meter algorithms to improve the cost-effectiveness and safety benefits of LiDAR based technologies.
    - Anticipated Start Date: Q1 of 2025.
    - Anticipated End Date: Q4 of 2026.

Part 5. Expected Results

- Identify more accurate, precise, reliable, and/or cost-effective instruments and methods for leak detection, localization, and speciation processes.
- Use acquired knowledge to improve the efficiency of current manned aircraft operations.
- Use acquired knowledge to determine the usefulness of each application to both small scale and large-scale needs in practical applications of gas utility routine or emergency operations.
- Use acquired knowledge to determine the feasibility of applying these technologies to both routine operations in difficult-to-access locations or for emergency response.
- Develop capability for quick response to assess emissions from the natural gas system during routine operational requirements or emergency response.

Part 6. Emissions Impact

- This research category has an estimated emission abatement potential of 10%-30% of the total natural gas emissions. To meet a target cost effectiveness of $22/MCF, this would require a solution with an estimated implementation cost of $7.5 million.

- Emission reductions could be realized by improving detection, leak localization, and quantification efficiency. Leaks detected and repaired earlier in the lifecycle would result in a reduction of emissions, while leak detection and localization efficiency would reduce operational costs.
- Potential co-benefits associated with this research include improvements in pipeline safety associated with early leak detection and/or prevention. These co-benefits should be considered in future implementation cost effectiveness calculations.

Part 7. Data Collection and Analysis Plan

The RD&D approach to meet the objective will involve a series of planned evaluations that can include one or more of the following:

a) Manufacturer Demonstration
   - Perform manufacturer demonstration to identify potential capabilities that could be leveraged for leak detection, speciation, and localization.

b) Laboratory Evaluation
   - Perform laboratory evaluation to demonstrate capability for intended applications, and that the technology, practices and/or procedures can meet research objectives (Go/No-Go Decision).
   - Leverage results of laboratory data to guide simulated field-testing plan.

c) Evaluate Cost of Implementation
   - Estimate cost to conduct simulated field evaluation.
   - Estimate emission reduction, cost reduction, and cost avoidance benefits (Go/No-Go Decision).

d) Simulated Field Evaluation (Controlled Environment)
   - Perform simulated field evaluation to demonstrate capability for intended applications, and that the technology, practices and/or procedures can meet research objectives (Go/No-Go Decision).
   - Leverage results of simulated field evaluation data to guide pilot study plan.
   - Evaluate integration of instrument data into Enterprise Data Management Systems and business process workflows.
   - Re-evaluate/update the estimated implementation costs and benefits (Go/No-Go Decision).

e) Pilot Study
   - Verify capability for intended applications, and that the technology, practices and/or procedures can meet research objectives (Go/No-Go Decision).

Part 8. Expected Utility Total Cost

Incremental Cost Estimates (Provided in 2024 Dollars and Direct Costs)

SoCalGas

2025	2026
$1,536,908	$1,575,331

SDG&E

2025	2026
$152,002	$155,802

Rate-Recoverable Loaded Costs Submitted in Advice Letters (NGLAPBA, One-Way Balancing Account)

Utility	Total Loaded Costs
SoCalGas	$4,091,724
SDG&E	$404,676

2024 SB 1371 Compliance Plan
RD&D Summary #18
Evaluation of Stationary Methane Detectors

Part 1. Best Practice Addressed in this Chapter

This project addresses the following Best Practice(s):

Best Practice 18: Stationary Methane Detectors for Early Detection of Leaks
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.

Part 2. Name and Type of RD&D Objective or Program Pilot

Name: Evaluation of Stationary Methane Detectors

Type of Objective or Program Pilot:

- Reduce emissions through earlier leak detection and repair.
- Develop new stationary leak detection technologies or deployment strategies.
- Perform pilot studies based on results of instrument evaluations and evaluate implementation costs and emission reductions.

Part 3. RD&D Objective

Develop and/or evaluate stationary methane sensors for early detection of leaks. The table below shows the primary and secondary focus areas across Transmission, Distribution, and Storage emissions that would benefit from this research.

Areas Targeted

Transmission			**Distribution**			**Storage**	
Pipeline	M&R	Compressor	Pipeline	M&R	MSA	Well/Lat	Compressor
	F,V	f,v		f,v	F,V	F,V	f,v

Primary Area of Focus: F – Fugitive; V – Vented
Secondary Area of Focus: f – Fugitive; v – Vented

Part 4. Current and Proposed Projects

Current Projects (2022 Compliance Plan):

1. Develop Remote Sensing and Leak Detection Platform with Multiple Sensors (OTD 7.20.a)
   Improved and deployed additional instances of a defensive pipeline right-of-way (ROW) monitoring system based on stationary sensors mounted on and near the

pipeline. Sensor data from multiple locations along the pipe was wirelessly forwarded to a central location for processing. Analytics at the central location correlated data from multiple sensors to rapidly alert operators to events occurring in the ROW. One prototype system was deployed.
    - Project Completed: Q4 of 2023.
2. Evaluate New and/or Prototype Stationary Methane Sensor Technologies
   Compare sensors with manufacturer's specifications, measurement accuracy, efficiency, and repeatability as compared to similar sensors.
    - Anticipated Project Close Out: Q1 of 2024.
3. Stationary Methane Detector for Facility Applications (SCG-2021-003)
   Evaluate application of residential methane detectors (RMDs) that detect at 10% Lower Explosive Limit (LEL) to indoor and difficult to reach meter locations. Detectors to be evaluated during one-year pilot field study.
    - Anticipated Project Close Out: Q4 of 2024.
4. Stationary Methane Sensor Evaluation for Transmission M&R (SCG-2021-010)
   Evaluate additional stationary methane sensor technologies and perform a pilot study at transmission M&R stations.
    - Anticipated Project Close Out: Q4 of 2024.

Lessons Learned:

- Stationary methane detection instruments showed reasonable methane detection capabilities during previous Compliance Periods.
- For distribution and transmission M&R facilities, stationary methane sensors did not produce a cost-effective mitigation approach to the relatively low fugitive emissions present at these facilities.
- Research related to detecting vented emission events from actuators at transmission M&R facilities demonstrated that understanding temporal release data is critical to properly estimating emissions.

New Proposed Projects:

1. Evaluate Potential Cost-Effective Applications for New Stationary Methane Sensors.
    - Anticipated Start Date: Q2 of 2025.
    - Anticipated End Date: Q2 of 2026.

Part 5. Expected Results

- Identify viable cost-effective applications for stationary sensors to accurately detect and/or quantify emissions from leaks and actuators.
- Accurately assess the performance of stationary sensors that are fit-for-purpose regarding field deployment to provide actionable data leading to quicker leak detection,

localization, and repair.
- Identify opportunities to detect and mitigate abnormalities in vented emissions associated system actuators

Part 6. Emissions Impact

- Studies quantifying emissions were conducted during the previous Compliance Periods. As a result of this research, the estimated mitigation potential from this best practice for M&R and storage, from both leak mitigation and more accurate accounting of emissions, is approximately 10% of total emissions. To meet a target cost effectiveness of $22/MCF, this would require a solution with an estimated implementation cost of $2.5 million.
- Potential co-benefits associated with this research include improvements in system reliability by leveraging automation of data gathering and analytics.

Part 7. Data Collection and Analysis Plan

The RD&D approach to meet the objective will involve a series of planned evaluations that can include one or more of the following:

a) Manufacturer Demonstration
   - Perform manufacturer demonstrations to identify potential capabilities that can be leveraged for leak detection, speciation, and localization.

b) Laboratory Evaluation
   - Perform laboratory evaluation to demonstrate capability for intended applications, and that the technology, practices and/or procedures can meet research objectives (Go/No-Go Decision).
   - Leverage results of laboratory data to guide simulated field-testing plan.

c) Evaluate Cost of Implementation
   - Estimate cost to conduct simulated field evaluation.
   - Estimate emission reduction, cost reduction, and cost avoidance benefits (Go/No-Go Decision).

d) Simulated Field Evaluation (Controlled Environment)
   - Perform simulated field evaluation to demonstrate capability for intended applications, and that the technology, practices and/or procedures can meet research objectives (Go/No-Go Decision).
   - Leverage results of simulated field evaluation data to guide pilot study plan.
   - Evaluate integration of instrument data into EDMS and business process workflows.
   - Re-evaluate/update the estimated implementation costs and benefits (Go/No-Go Decision).

e) Pilot Study
   - Verify capability for intended applications, and that the technology, practices and/or procedures can meet research objectives (Go/No-Go Decision).
   - Re-evaluate/update the estimated implementation costs and benefits (Go/No-Go Decision).

Part 8. Expected Utility Total Cost

Incremental Cost Estimates (Provided in 2024 Dollars and Direct Costs)

SoCalGas

2025	2026
$76,321	$78,228

SDG&E

2025	2026
$7,548	$7,737

Rate-Recoverable Loaded Costs Submitted in Advice Letters (NGLAPBA One-Way Balancing Account)

Utility	Total Loaded Costs
SoCalGas	$238,651
SDG&E	$23,603

2024 SB 1371 Compliance Plan
RD&D Summary #20a
Develop and Maintain Company-Specific Emission Factors

Part 1. Best Practice Addressed in this Chapter

This project addresses the following Best Practice(s):

Best Practice 20a: Quantification
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 an agreement on a similar methodology to improve emissions quantification of leaks to assist the demonstration of actual emission reductions.

Best Practice 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 emission 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.

Part 2. Name and Type of RD&D Objective or Program Pilot

Name: Develop and Maintain Company-Specific Emission Factors.

Type of Objective of Program Pilot:

- Company-Specific Emission Factors (EFs) would result in more accurate quantification of emissions than current methods.
- Facilitate cost-effective reduction of emissions through defining leak-based EFs and reduction in time to repair and increase frequency of leak survey.

Part 3. RD&D Objective

Develop Company-Specific EFs based on SoCalGas and SDG&E data. These EFs would replace current “facility-based” or “population-based” EFs. The tables below show the primary and secondary focus areas across Transmission, Distribution, Storage, and Post-Meter emissions that would benefit from this research.

2024 SB 1371 Compliance Plan
RD&D Summary #20a
Develop and Maintain Company-Specific Emission Factors

Areas Targeted

Transmission			Distribution			Storage	
Pipeline	M&R	Compressor	Pipeline	M&R	MSA	Well/Lat	Compressor
F,V	F,V	F,V	F		F	F,V	F,V

Primary Area of Focus: F – Fugitive; V – Vented
Secondary Area of Focus: f – Fugitive; v – Vented

Post-Meter (Customer Emissions)			
Yard Line	House Line	Incomplete Combustion	Vented Emissions
F	F	V	V

Part 4. Current and Proposed Projects

Current Projects (2022 Compliance Plan):

1. Develop Company-Specific EFs for Customer Emissions
   Estimated emissions associated with customer side sources such as leaks and incomplete combustion. Results provided in AMM research report.
   - Project Completed: Q2 of 2023.
2. Develop Company Specific Emission Factors for Customer Meter Facilities (60 PSI or less)
   - Anticipated Project Close Out: Q2 of 2024.
3. Methane Emissions Studies (Distribution Main & Services Additional Sampling - SoCalGas and SDG&E) (SCG-2019-011)
   Develop Company-Specific EFs for buried Distribution Mains and Services (DM&S).
   - Anticipated Project Close Out: Q2 of 2024.
4. Transmission M&R Station Emission Factor Study (SCG-2021-002)
   Obtain aerial (top-down) and ground level (bottom-up) emissions profiles from transmission M&R stations to develop EFs for these facilities while also evaluating the accuracy of top-down quantification.
   - Anticipated Project Close Out: Q4 of 2024.
5. Develop Company-Specific Leak-Based EFs for Above Ground Leaks Using Concentration Method
   Determined if an accurate and reliable quantification relationship exists between leak concentration and leak rate for aboveground fugitive emissions. Results were provided in above-ground EF research report.
   - Project Completed: Q4 of 2022.

6. Geographic Leak Data Environmental Justice Analysis (SCG-2021-006)
   Determine if correlations exist between different populations in the SoCalGas service area (in terms of demographic parameters such as residential location, income, minority populations, or age) and quantity of methane emissions, especially those related to system leaks.
   - Anticipated Project Close Out: Q4 of 2024.

Lessons Learned:

- Several Company-Specific EFs were developed during the previous Compliance Periods, including EFs for transmission M&R stations, transmission compressor stations, DM&S pipelines, distribution M&R stations, and meter set assemblies (MSAs). The next phase of EF development would focus on Company-Specific EFs and/or engineering estimate methodology for transmission pipeline leaks and storage facilities. Quantifying emissions from customer leaks and incomplete combustion would also be evaluated.

New Proposed Projects:

1. Evaluate Framework for Emission Factor Maintenance and Quality Control
   - Anticipated Start Date: Q2 of 2025.
   - Anticipated End Date: Q4 of 2026.
2. Leak-Based Emission Estimate Development for Transmission Pipeline Leaks
   - Anticipated Start Date: Q2 of 2025.
   - Anticipated End Date: Q2 of 2026.
3. Evaluate Emission Estimates for Customer Leaks
   - Anticipated Start Date: Q2 of 2025.
   - Anticipated End Date: Q3 of 2026.

Part 5. Expected Results

- EFs based upon present day conditions and local leak measurements would improve emission estimates and support better strategic decisions.
- Creation of repeatable process for annual maintenance of EFs to account for any system changes.

Part 6. Emissions Impact

- Leaker-based EFs would enable more accurate emissions reporting to facilitate proper planning and resource allocation to the emissions sources that provide greater emission reductions.
- Studies quantifying emissions were conducted during previous Compliance Periods. As a result of this research, an adjustment of approximately 1,200,000 MCF has been made to the emission baseline because of inaccuracies associated with population-based factors. This continues to identify and focus efforts on mitigation strategies with a more

significant impact on methane emissions, thus improving cost effectiveness across all aspects of the NGLAP.

Part 7. Data Collection and Analysis Plan

The RD&D approach to develop Company-Specific EFs would involve a series of planned evaluations that could include one or more of the following:

a) Field Measurements
   - Determine statistically significant number of samples needed based on population of facilities and annual number of leaks as well as conduct leak measurements on a statistically random basis.
   - Evaluate leak quantification method in an actual field environment which may include controlled natural gas releases.

b) Statistically Analyze Leak Data
c) Analyze System Population and Perform Inferential Statistics
d) Develop Company-Specific EFs

Part 8. Expected Utility Total Cost

Incremental Cost Estimates (Provided in 2024 Dollars and Direct Costs)

SoCalGas

2025	2026
$1,146,975	$1,175,649

SDG&E

2025	2026
$113,437	$116,273

Rate-Recoverable Loaded Costs Submitted in Advice Letters (NGLAPBA One-Way Balancing Account)

Utility	Total Loaded Costs
SoCalGas	$3,131,121
SDG&E	$309,671

2024 SB 1371 Compliance Plan
RD&D Summary #22
Leak Prevention for Threaded Connections

Part 1. Best Practice Addressed in this Chapter

This project addresses the following Best Practice(s):

Best Practice 22: Pipe Fitting Specification & Tolerances
Utilities shall eliminate or greatly reduce emissions from metal pipe and fitting threaded connections most commonly used on aboveground facilities, such as on customer meter set assemblies and meter and regulation stations. This is accomplished with improved quality control inspection of supplier's threaded products and the application of high-performance thread sealant compounds during construction.

Part 2. Name and Type of RD&D Objective or Program Pilot

Name: Leak Prevention for Threaded Connections

Type of Objective of Program Pilot:

- Reduce emissions by reducing fugitive gas loss at threaded connections.
- Pilot studies to be initiated based on results of sealant evaluations. Pilot studies would validate actual costs and emission reductions.

Part 3. RD&D Objective

Analyze most common failure modes and components for threaded connections, especially those associated with customer MSAs. Evaluate the sealing performance of pipe thread specifications, tolerances, and sealing compounds (spray-on, brush-on, putty, or epoxy leak sealant products) for threaded fittings to lock and prevent gas leakage under varying environmental conditions, internal pressures, and external loading. Identify the technologies that can seal low pressure (7 IWC or 2 PSIG) thread leaks on existing MSAs and conduct a thorough evaluation of these products. The table below shows the primary and secondary focus areas across Transmission, Distribution, and Storage emissions that would benefit from this research.

Areas Targeted

Transmission			**Distribution**			**Storage**	
Pipeline	M&R	Compressor	Pipeline	M&R	MSA	Well/Lat	Compressor
f	f		f	f	F	f	

Primary Area of Focus: F – Fugitive; V – Vented
Secondary Area of Focus: f – Fugitive; v – Vented

2024 SB 1371 Compliance Plan
RD&D Summary #22
Leak Prevention for Threaded Connections

Part 4. Current and Proposed Projects

Current Projects (2022 Compliance Plan):

1. Study Quality of Existing Pipe Fitting Inventory Research Project (NYSEARCH M2018-001)
   To understand the influence thread quality has on sealing performance by evaluating the thread specifications from National Pipe Taper (NPT) and Aeronautical NPT and test representative samples for sealing performance. Project also investigating workmanship, sealant application method, and applied torque to determine if these factors influence leak rate.
   - Anticipated Project Close Out: Q2 of 2024.
2. Pipe Thread Sealant Performance in Storage Applications
   To understand the effectiveness of various thread sealants on sealing performance for high pressure, high temperature storage applications. Project also investigating workmanship, sealant application method, and applied torque to determine if these factors influence leak rate.
   - Anticipated Project Close Out: Q4 of 2024.

Lessons Learned:

- Threaded connections remain an area of fugitive emissions that require further research to preemptively mitigate. Reducing the frequency of leak occurrence and simplifying the repair process are critical to reducing these emissions in a cost-effective manner.
- Data from MSA EF study could facilitate fitting replacement program for components identified to have significant leak volumes.

New Proposed Projects:

1. Threaded Connection Failure Mode Analysis
   - Anticipated Start Date: Q2 of 2025.
   - Anticipated End Date: Q4 of 2025.
2. Evaluate Threaded Connection Alternatives
   - Anticipated Start Date: Q3 of 2025.
   - Anticipated End Date: Q3 of 2026.

Part 5. Expected Results

- Reduce or eliminate fugitive methane emissions from aboveground threaded connections on customer MSAs, M&R stations, and storage facilities.
- Evaluate potential alternatives to threaded connections, such as welded assemblies, which could potentially lead to a significant reduction in leak frequency.
- Use of high-performance thread sealants could eliminate fugitive methane emissions.

- Implement a threaded fitting replacement program for threaded components identified to have significant thread leaks.
- Identify the most economical thread sealants that resist leakage when exposed to varying pressure, temperature changes, vibration, and general environmental conditions that provide a cost-effective solution when considering any recommended changes to operational practices.

Part 6. Emissions Impact

- Studies quantifying emissions were conducted during previous Compliance Periods. As a result of this research, the estimated mitigation potential for this emission category is 10%-30% of the total emissions. To meet a target cost effectiveness of $22/MCF, this would require a solution with an estimated cost of $8 million, with an average mitigation cost of approximately $120 per leak event (averaged over the life of the technology).
- Applying a solution across all 6 million customer meters in the system would require a solution with an average cost of approximately $33 per meter (averaged over the life of the meter), which would only be achievable by prioritizing work on the highest emitting MSA components. Research proposed in this Compliance Plan will determine which components should be prioritized and how to cost-effectively address them through additional leak sampling and failure mode analysis.
- Potential co-benefits associated with this research include minimizing impacts to the public through avoidance of service interruptions, construction disruptions, reduced customer odor complaints, and service trips associated with this work, which leads to improved ratepayer satisfaction. These co-benefits should be considered in future implementation cost effectiveness calculations.

Part 7. Data Collection and Analysis Plan

The RD&D approach to meet the objective would involve a series of planned evaluations that could include one or more of the following:

a) Laboratory Evaluation
   - Perform laboratory evaluation to establish performance baselines and to determine which sealants proceed to the field evaluation.

b) Field Evaluation (Controlled Environment)
   - Perform field evaluation to compare to company specifications and guide the pilot study.

c) Evaluation Cost of Implementation
   - Estimate cost to conduct pilot studies.
   - Estimate emissions reduction cost reduction, and cost avoidance benefits (Go/No-Go Decision).

d) Pilot Study
   - Perform pilot study to evaluate system facilities for implementation.

Part 8. Expected Utility Total Cost

Incremental Cost Estimates (Provided in 2024 Dollars and Direct Costs)

SoCalGas

2025	2026
$578,898	$608,593

SDG&E

2025	2026
$57,254	$60,190

Rate-Recoverable Loaded Costs Submitted in Advice Letters (NGLAPBA One-Way Balancing Account)

Utility	Total Loaded Costs
SoCalGas	$1,516,494
SDG&E	$149,983

2024 SB 1371 Compliance Plan
RD&D Summary #23
Evaluation of Technologies to Mitigate Gas Blowdowns & Vented Emissions

Part 1. Best Practice Addressed in this Chapter

This project addresses the following Best Practice(s):

Best Practice 23: 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.

Part 2. Name and Type of RD&D Objective or Program Pilot

Name: Evaluation of Technologies to Mitigate Gas Blowdowns and Vented Emissions.

Type of Objective(s) or Program Pilot:

- Emission reduction effort through mitigation of natural gas released during normal system operation and customer end use.
- Perform pilot projects to demonstrate efficacy of technologies and establish basis for cost effectiveness estimates.

Part 3. RD&D Objectives

Evaluate the effectiveness of various technologies (new or as discovered during records search) to mitigate vented emissions and gas blowdowns. Evaluate emissions from system components designed to have vented emissions. Identify opportunities to reduce vented emissions through improved maintenance practices, component designs, new materials, or novel solutions. Review relevant operating procedures where gas is currently released as part of the operation to identify opportunities to reduce methane emissions by changing current practices and utilizing new technology, tools and equipment, and/or practices. The table below shows the primary and secondary focus areas across Transmission, Distribution, and Storage emissions that would benefit from this research.

Areas Targeted

Transmission			**Distribution**			**Storage**	
Pipeline	M&R	Compressor	Pipeline	M&R	MSA	Well/Lat	Compressor
V	V	V	V	V	V	V	V

Primary Area of Focus: F – Fugitive; V – Vented
Secondary Area of Focus: f – Fugitive; v – Vented

2024 SB 1371 Compliance Plan
RD&D Summary #23
Evaluation of Technologies to Mitigate Gas Blowdowns & Vented Emissions

Part 4. Current and Proposed Projects

Current Projects (2022 Compliance Plan):

1. Rod Packing Study (SCG-2020-003)
   Perform a study on compressor rod packing emissions examining multiple stations and collecting data in different operating conditions. Conduct a survey of the equipment and current operating practices. The data collection of this project would support multiple implementation projects (e.g., valve maintenance procedures).
   - Anticipated Project Close Out: Q3 of 2024.
2. Linear Compressor (OTD 7.20.L)
   Design, build, and test a high-pressure linear motor leak recovery compressor for cost-effective recovery of methane leaks within the transmission, storage, gathering, and processing sectors of the natural gas value chain. The linear compressor would be designed and built using a proven linear motor compressor architecture.
   - Anticipated Project Close Out: Q4 of 2024.
3. Alternative Fuel Substitution Analysis (SCG-2021-007)
   Estimate the impact on total methane emissions from the incorporation of renewable natural gas and hydrogen blending into the natural gas system.
   - Anticipated Project Close Out: Q4 of 2024.

Lessons Learned:

- Studies quantifying the vented emissions from pressure regulating components are being conducted during the 2022 Compliance Period. Cost-effective emission reduction technologies for this category need to be investigated. These technologies would focus on improved operational practices and/or replacing existing equipment/materials/components with new designs that reduce these emissions.
- Compressor-based technologies demonstrated promising potential for mitigating gas blowdowns for high pressure pipelines. The size and cost of these technologies, however, make it unfeasible for medium- and low-pressure applications. The next generation of this technology would attempt to reduce system size and cost, which would increase cost effectiveness for non-high-pressure applications.

New Proposed Projects:

1. Field Demonstrations and Evaluation of Mitigation Technologies
   - Anticipated Start Date: Q2 of 2025.
   - Anticipated End Date: Q4 of 2026.
2. Evaluate Impact of Utilizing New Technology, Tools, and Equipment on Practices and Procedures
   - Anticipated Start Date: Q2 of 2025.
   - Anticipated End Date: Q4 of 2026.

3. Develop Method for Tracking Vented Emissions at Compressor, M&R, and Storage facilities.
    - Anticipated Start Date: Q1 of 2025.
    - Anticipated End Date: Q3 of 2026.

Part 5. Expected Results

- The evaluation of various technologies to mitigate gas blowdowns and vented emissions would result in recommendations to reduce blowdown events and vented emissions.
- Opportunities that are identified during the review of operating procedures could result in recommendation to change existing practices or to utilize new practices, tools, and equipment/technology.

Part 6. Emissions Impact

- The estimated mitigation potential for blowdowns across all system categories is 1%-3% of the total emissions. To meet a target cost effectiveness of $22/MCF, this would require an average mitigation cost of approximately $14 per blowdown event (averaged over the life of the technology).
- Studies quantifying vented emissions are being conducted during the current Compliance Period but the current estimated mitigation potential for this emission category is 1%. To meet a target cost effectiveness of $22/MCF, this would require an average mitigation cost of approximately $26 per device (averaged over the life of the technology).
- Note that focusing on blowdown and vented emissions related to compressors may be more cost-effective. This represents 42% of the emissions from the above two categories, with a target cost effectiveness of approximately $493 per event/component (averaged over the life of the technology).
- Potential co-benefits associated with this research include minimizing impacts to the public through avoidance of service interruptions, construction disruptions, reduced customer odor complaints, and service trips associated with this work, which leads to improved ratepayer satisfaction. These co-benefits should be considered in future implementation cost effectiveness calculations.

Part 7. Data Collection and Analysis Plan

The RD&D approach to meet the objective would involve a series of planned evaluations that could include one or more of the following:

a) Manufacturer/In-house Demonstration
    - Facilitate demonstrations by manufacturers or set-up in-house prototypes of new technologies, tools, or equipment.

b) Laboratory Evaluation
- Establish baseline performance for technologies, tools or equipment that are evaluated.
- Comparative evaluation to manufacturer specifications and currently approved methods.
- Evaluate the technologies, tools, or equipment to Company requirements for intended applications.
- Evaluate technologies, tools, or equipment in a simulated field environment.
- Compare to currently approved technologies, tools, or equipment.

c) Pilot Study
- Evaluate technologies, tools, or equipment in an actual field environment, including controlled natural gas releases.
- Compare to currently approved technologies, tools, or equipment.

Part 8. Expected Utility Total Cost

Incremental Cost Estimates (Provided in 2024 Dollars and Direct Costs)

SoCalGas

2025	2026
$500,146	$512,649

SDG&E

2025	2026
$49,465	$50,702

Rate-Recoverable Loaded Costs Submitted in Advice Letters (NGLAPBA One-Way Balancing Account)

Utility	Total Loaded Costs
SoCalGas	$1,324,934
SDG&E	$131,037

a. Tools for Predicting Gas Migration and Mitigating its Occurrence/Consequence, available at https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=748.
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