BLUEGREEN ALLIANCE

TAKING STOCK:

Opportunities and Challenges in California's Natural Gas Distribution System

INTRODUCTION

California natural gas distribution pipeline system is a network of more than 150,000 miles of pipe that supplies homes, businesses, and communities with energy.[i] It is an integral part of California's energy portfolio and economy—over two-thirds of California households use natural gas for home heating—and it accounts for more than 40 percent of the state's electricity production.[ii] Unfortunately, California's pipeline system is aging and suffers from thousands of natural gas pipe leaks.

Residents of California have felt firsthand the impacts of the state's aging natural gas distribution pipelines. For example, in September of 2010, a 30" diameter steel natural gas transmission pipeline exploded in San Bruno—a residential area—killing eight people, injuring 60, and destroying over 55 homes[iii].

Additionally, leaking natural gas pipes threaten Californians through intensifying climate change. Natural gas leaks emit methane - a potent greenhouse gas estimated to have at least 25 times the climate change impact compared to carbon dioxide on a pound-for-pound basis[iv].

Repairing aging and leak prone natural gas pipelines has the potential to address climate change as well create and support quality, family-sustaining jobs though building a more resilient pipeline system.

As part of a state-focused education and outreach project conducted throughout 2016, the BlueGreen Alliance convened stakeholder meetings and participated in public forums to build on existing knowledge and to engage frontline gas sector workers, environmental groups, elected officials and community stakeholders to identify challenges and opportunities facing the network of natural gas distribution pipelines in the state of California.

The series of meetings has identified best practices in advancing distribution pipeline repair, replacement, and detection, which may be a model for other states around the nation.

DISTRIBUTION PIPELINES IN CALIFORNIA: SUMMARY

According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), there are 19 operators of natural gas distribution pipelines serving the state of California. Cumulatively, the operators manage a total of 105,458 miles of networked pipeline that runs out from a gate station to 8,684,599 services, the device that connects gas lines directly to homes and businesses.

The three largest distribution pipeline operators account are Southern California Gas Co, which operates 50,156 miles of pipeline in the state, Pacific Gas & Electric, which operates 42,703 miles of pipeline and San Diego Gas & Electric Company, which operates 7,996 miles of pipeline. Together, account for 97 percent of the total miles of pipeline in the state[v].

Each operator in California has an operator ID that is used to track their reported data. Operators are responsible for maintenance and reporting on their pipelines and are subject to inspections

and audits, as well as penalties if requirements are not met. Operators report to the PHMAS at the federal level and to the California Public Utility Commission (CPUC) at the state level. Each operator is required to report annually on the mileage of their pipelines, materials, leaks, incidents and other topics.

As of 2014, California had an estimated 8,430 miles of distribution pipelines made from leak-prone materials: 3,330 miles of bare steel pipeline, 4,871 miles of coated unprotected steel, and 230 miles of cathodically protected steel[vi]. Gas workers engaged in this project noted significant presence of older plastic pipe—which is prone to cracks and leaks—that is not well accounted for in current inventories.

For a more detailed summary of 2014 natural gas distribution pipeline reported data, see Summary of California Natural Gas Distribution Pipeline Systems at end of document.

Causes of Natural Gas Leaks in California

Cause of Leak	Number of Leaks	Percentage
Corrosion	3135	49.4%
Material or Weld	1426	22.5%
Excavation	672	10.6%
Other	550	8.7%
Incorrect Operations	355	5.6%
Natural Forces	153	2.4%
Equipment	44	0.7%
Other Outside Force Damage	7	0.1%
Total	**6342**	100%

BEST PRACTICES

In 2014, the Governor signed the Gas Pipeline Leak Repair and Emissions Reduction Act (SB 1371), which requires all public utilities and storage providers in California to use the most advanced technology to find leaks, and repair the leaks they find. The California Public Utilities Commission (CPUC) was then tasked to determine and to implement best practices for leak identification, repair, and avoidance, as well as better account for the number of leaks and the quantity of natural gas leaked from the systems throughout our cities and communities.

California is in the process of developing an entirely new way of addressing methane emissions through changing policies and practices, implementing better training programs, new job classifications and staffing levels, requiring better leak detection processes, and defining timelines to fix known leaks.

The BlueGreen Alliance held convenings, education and outreach activities to engage frontline gas sector workers, environmental groups, elected officials and community stakeholders to identify challenges and opportunities facing the network of natural gas distribution pipelines in the state of California.

Our activities included various gas conferences including the Pipeline Safety Trust annual meeting, California natural gas conference for unions working in natural gas, a California Public Utilities Commission best practices workshop, and moderating a 3-hour plenary session at the national Inter-Union Gas Conference in San Diego. Additionally, we outreached to several state-based groups and local public officials throughout the state

Our convenings, education and outreach activities identified several best practices that included more frequent pipeline inspection, improved leak classification, requiring repair in addition to leak monitoring, and improved training and safety programs. These ideas are as follows:

1. Consistent statewide standards should be established for gas leak grading. Classification by the utilities have not been consistent across the state. The terminology varies between utilities as some utilities refer to leaks by grades or codes. Additionally, there are some variations between how utilities define leaks.

2. California should repair non-hazardous leaks with a defined timeframe rather that continuous monitoring. Using a consistent California grading system of 1 through 3, grade 2 leaks and above ground grade 3 leaks should be repaired within one year from discovery for all non-hazardous leaks. This would ensure utilities would address leaks in timely fashion as opposing to maintaining tens of thousands of repairs in backlog and/or monitoring leaks for years.

3. California should prioritize the replacement of leak-prone pipe, to include older plastic. The passed recent legislation compelling operators to prioritize the replacement of pipes that are more susceptible to leaks. Aldyl-A plastic and bare steel gas main are much more prone to leakage than advanced materials currently available for gas distribution; bare steel pipes are estimated to be 57 times more prone to leakage than protected steel mains[vii], and Aldyl-A plastic mains often become brittle and crack well short of their anticipated service life[viii].

   These standards should require the replacement of all cast-iron pipes within 10-15 years and ensure that cast-iron pipes are replaced with the best materials, which would be coated steel or polyethylene (PE) plastic pipes.

4. Replacing and repair equipment should target and/or develop polices to address certain equipment areas that have higher chances of leaking. According to the Utility Workers Union of America, a third of reported leaks by the public in the Southern California Gas Company service area involve a Meter Set Assembly (MSA). MSA leaks are recommended to be repaired the same day/within 24 hours of discovery. These devices regulate and measure the volume of natural gas delivered to customers, and like risers, MSAs are

typically located above ground and adjacent to the foundations of homes, schools, hospitals and other residential and public buildings.

Additionally, anodeless (AL) risers in less than good repair (i.e. leaking, swollen, or showing noticeable corrosion) should also be immediately repaired. These conditions indicate that risers have lost their capacity to hold normal gas pressures and may be leaking. AL risers are typically located next to the foundation of homes, schools, hospitals and other residential and public buildings. Because they are located above a shut off or safety valve, a leak cannot be easily turned off, releasing gas within the vicinity of these buildings and serving as potential sources of ignition.

5. Operator Qualifications should include strong standards for worker qualification and proficiency to help ensure the integrity and quality of pipe modernization efforts. Effectively fixing pipes requires a strong focus on workers. Establishing job classifications for apprentices, journeyman, and specialists are critical to ensure that the people doing the work have the training and knowledge to do so.

   These programs should also incorporate comprehensive, formal training and mentorship programs that transfer best practices regarding maintenance, leak repair, and keeping the public safe as the age of the energy sector workforce is increasing much more rapidly than other sectors in the economy.

ENDNOTES

[i] California Public Utilities Commissions, "Natural Gas and California." Retrieved from: http://www.cpuc.ca.gov/general.aspx?id=4802

[ii] U.S. Energy Information Agency, *California State Profile and Energy Estimates.* Retrieved from: https://www.eia.gov/state/analysis.cfm?sid=CA

[iii] City of San Bruno, "Crestmoor Neighborhood Glenview Fire." Retrieved from:https://sanbruno.ca.gov/gov/crestmoor/default.htm

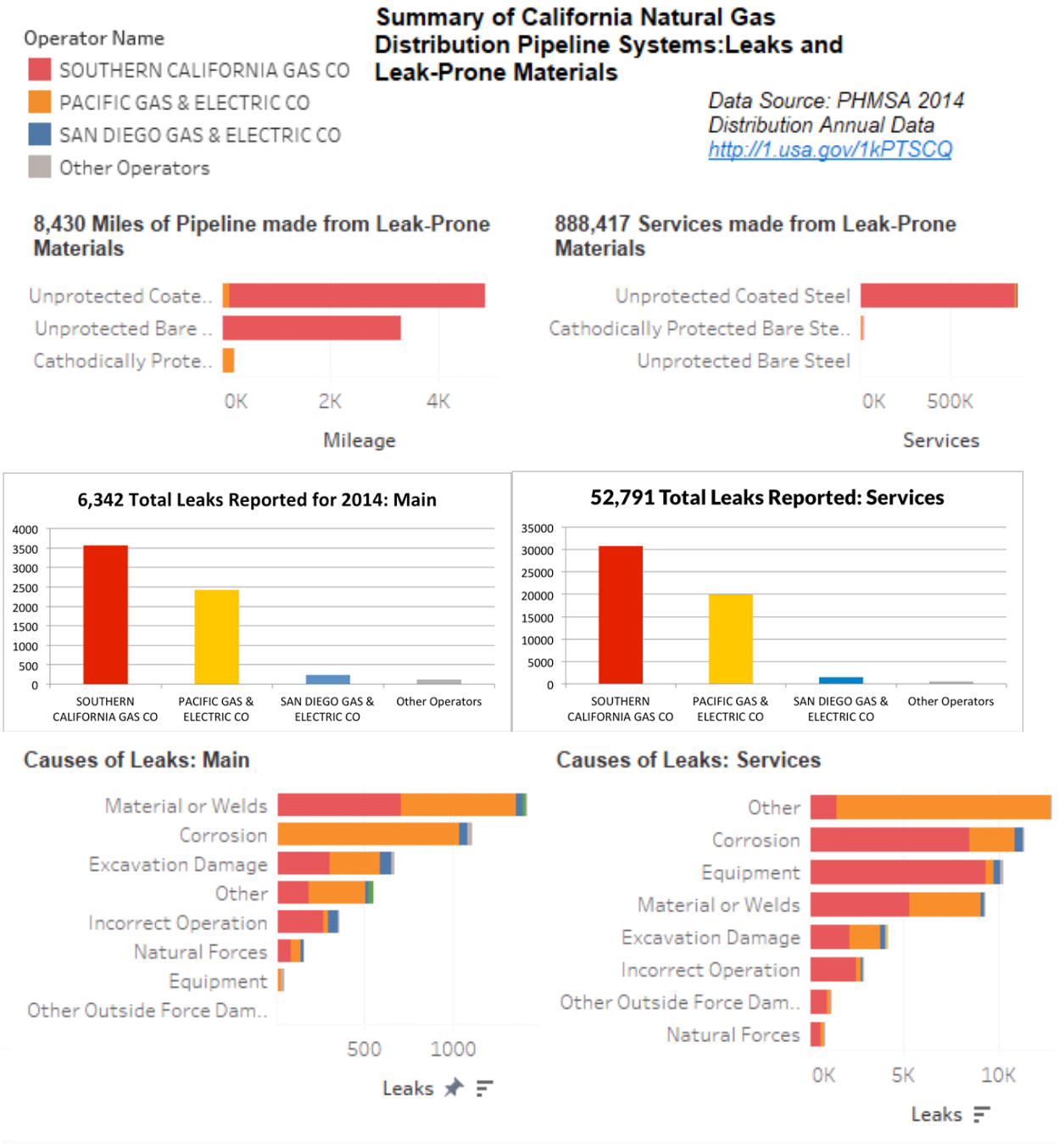
[iv] U.S. Environmental Protection Agency, *Overview of Greenhouse Gases*. 2015. Retrieved from: http://epa.gov/climatechange/ghgemissions/gases/ch4.html

[v] Pipeline and Hazardous Materials Safety Agency (PHMSA). 2014. Retrieved from: http://phmsa.dot.gov/pipeline/library/data-stats/distribution-transmission-and-gathering-lng-and-liquid-annual-data

[vi] Calculated using PHMSA data from 2014, as referenced above.

[vii] 4 This calculation is based on an average of the emissions factors for cast iron and bare steel pipelines assigned by the U.S. Environmental Protection Agency in 40 CFR Part 98, Subpart W, retrieved from: http://www.gpo.gov/fdsys/pkg/FR-2011-12-23/pdf/2011-31532.pdf

[viii] For more details on Aldyl A pipelines, see . California Public Utilities Commission*, Hazard Analysis & Mitigation Report On Aldyl A Polyethylene Gas Pipelines in California*. June 2014. https://primis.phmsa.dot.gov/dimp/docs/AldylA.pdf


Operator Name
SOUTHERN CALIFORNIA GAS CO
PACIFIC GAS & ELECTRIC CO
SAN DIEGO GAS & ELECTRIC CO
Other Operators
Summary of California Natural Gas Distribution Pipeline Systems:Leaks and Leak-Prone Materials
Data Source: PHMSA 2014 Distribution Annual Data
http://1.usa.gov/1kPTSCQ
8,430 Miles of Pipeline made from Leak-Prone Materials
Unprotected Coate..
Unprotected Bare ..
Cathodically Prote..
0K
2K
4K
Mileage
888,417 Services made from Leak-Prone Materials
Unprotected Coated Steel
Cathodically Protected Bare Ste..
Unprotected Bare Steel
0K
500K
Services
6,342 Total Leaks Reported for 2014: Main
4000
3500
3000
2500
2000
1500
1000
500
0
SOUTHERN CALIFORNIA GAS CO
PACIFIC GAS & ELECTRIC CO
SAN DIEGO GAS & ELECTRIC CO
Other Operators
52,791 Total Leaks Reported: Services
35000
30000
25000
20000
15000
10000
5000
0
SOUTHERN CALIFORNIA GAS CO
PACIFIC GAS & ELECTRIC CO
SAN DIEGO GAS & ELECTRIC CO
Other Operators
Causes of Leaks: Main
Material or Welds
Corrosion
Excavation Damage
Other
Incorrect Operation
Natural Forces
Equipment
Other Outside Force Dam..
500
1000
Leaks
Causes of Leaks: Services
Other
Corrosion
Equipment
Material or Welds
Excavation Damage
Incorrect Operation
Other Outside Force Dam..
Natural Forces
0K
5K
10K
Leaks

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