


An aerial photograph of a harbor filled with numerous sailboats. In the background, a city skyline is visible under a bright, slightly hazy sky. The water is a deep blue, and the sailboats are scattered across the harbor.

Staff Subcommittee on Pipeline Safety

NARUC  Summer
Policy Summit

Staff Subcommittee on Pipeline Safety

Aliso Canyon Update



NARUC SUBCOMMITTEE ON PIPELINE SAFETY

ALISO CANYON UPDATE

San Diego, Ca • July 16th 2017

SoCalGas Overview



SoCalGas Customer Sectors

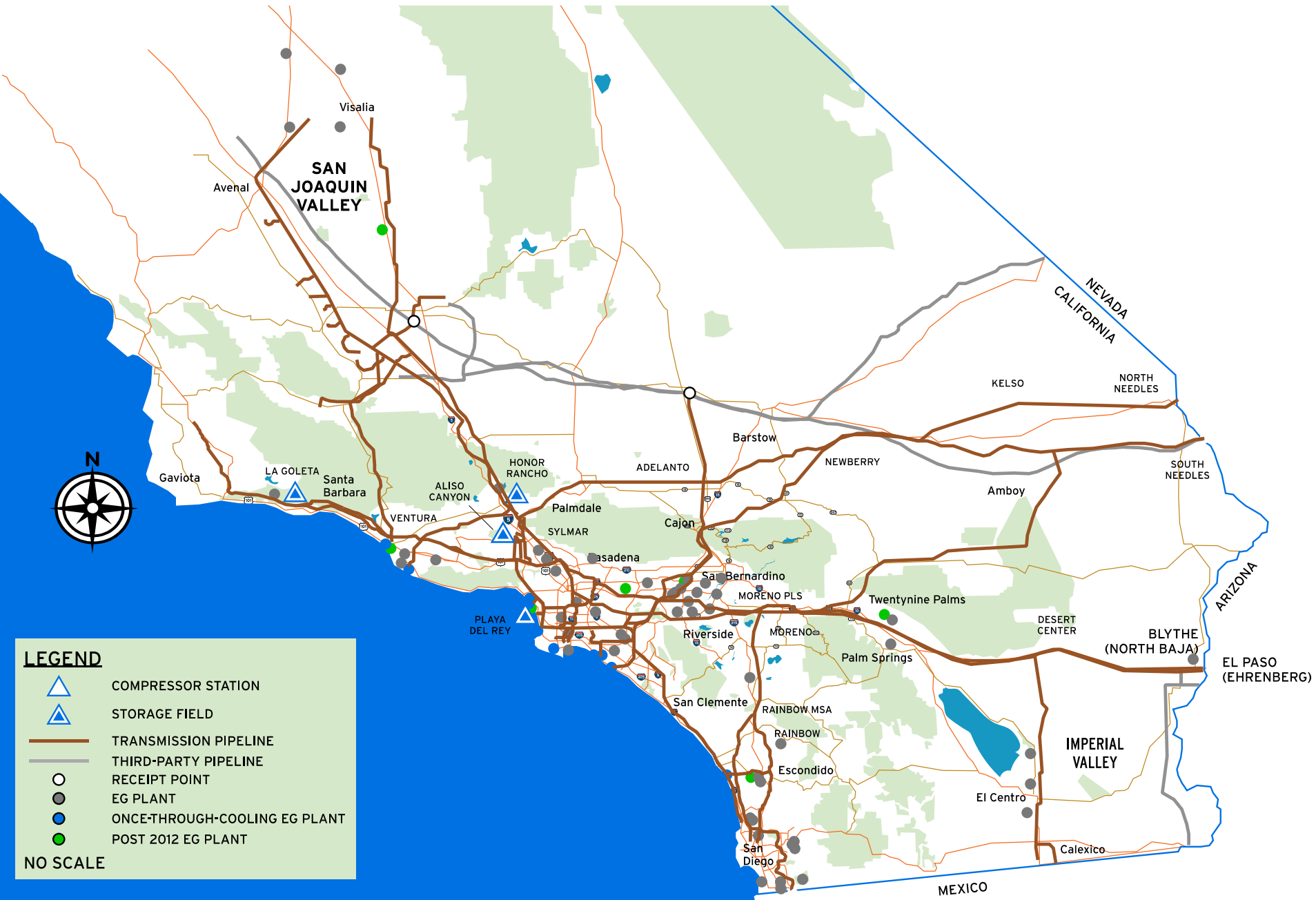
Customer Sector	% Of Total Delivered Gas End Use	Number of Customers
Electric Generation	27%	52
Commercial/Industrial	25%	209,000
Residential	24%	5,500,000
Wholesale	16%	5
Refineries	7%	22
NGV Stations	1%	307
Unbundled Storage	---	100

Southern California Natural Gas Sources



- » Over 90% of gas used in Southern California comes from out of state sources in the Southwest, Rockies, and Canada.
- » Out-of-state gas supplies are delivered to California through a network of interstate pipelines.

SoCalGas/SDG&E Gas Transmission System



SoCalGas/SDG&E System Overview

Utilities gas transmission system (SoCalGas & SDG&E) is comprised of:

**Over 4,000
miles**

of large diameter
pipeline, at
operating pressures
up to 1000 psig.

**Multiple
(13)**

compressor stations
comprising tens of
thousand horse
power

**Four
(4)**

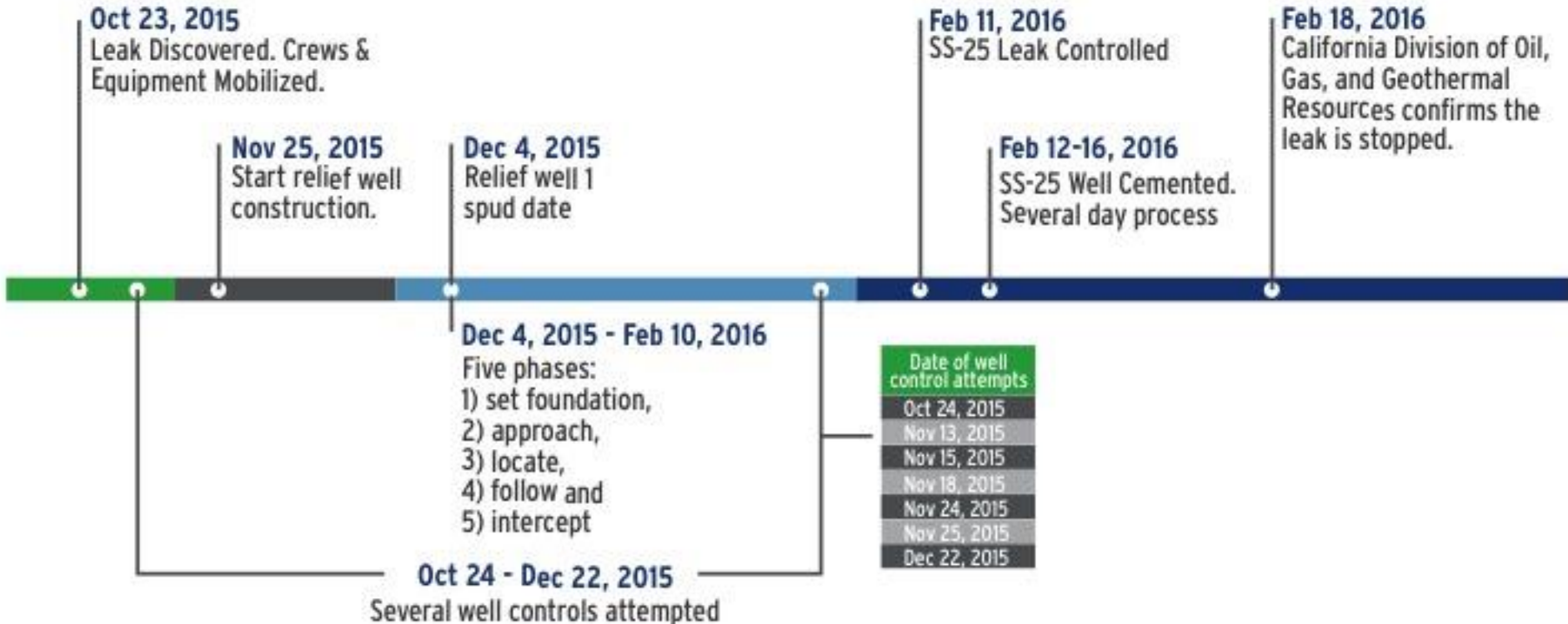
natural gas
unground storage
fields with 137.1 Bcf
of storage capacity
revised to 50.9
excluding Aliso

Aliso Canyon Storage Facility Overview

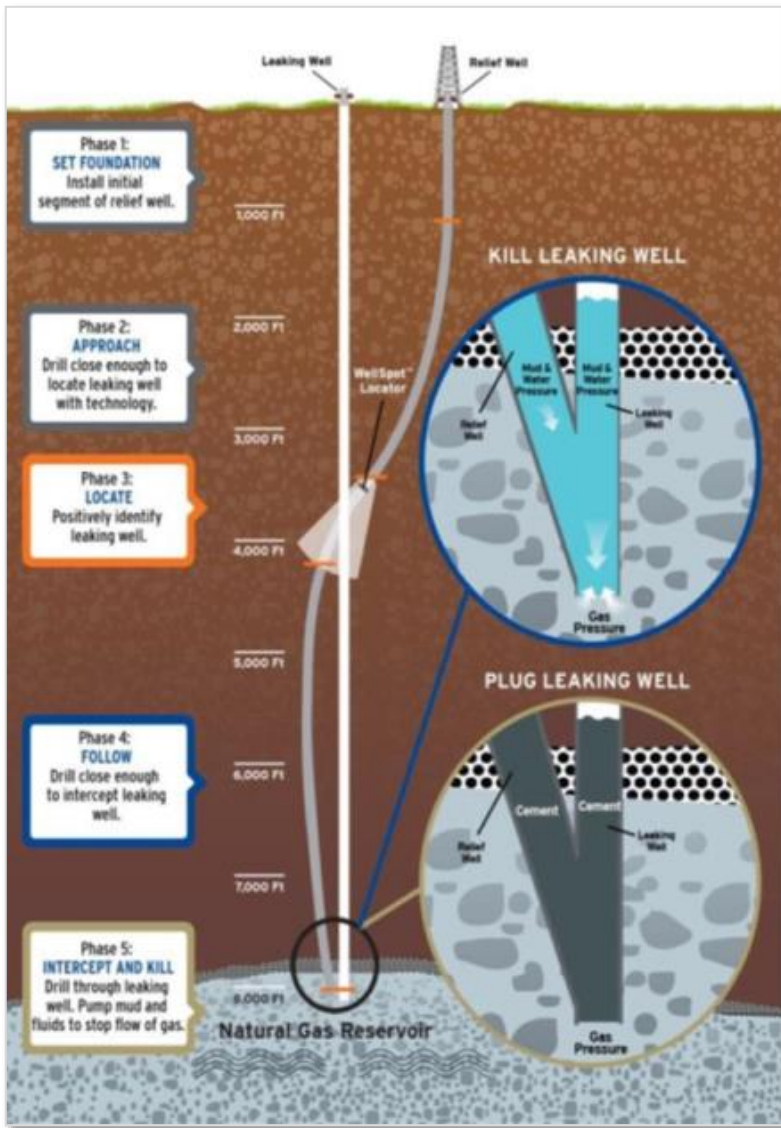


- Depleted oil reservoir (1938-1972) converted to gas storage by SoCalGas in 1972
- Spans ~3,600 acres of land
- Fifth largest in U.S. (86 bcf storage capacity)
- 114 storage wells originally on site
- Pipeline gas is compressed and stored in sandstone at depth of ~8,500 feet and protected by cap rock
- 40,000 HP of Compression (New compression of 66,000 HP)
- 1.8 M3CFD W/D capability pre-leak
- 2 Gathering Facilities

Aliso Canyon Gas Leak Timeline



Relief Well 1 – Phases & Drilling



» December/February – Drilling and Ranging

- Maintain detection & avoid early collision.
- Each ranging run requires a new daily well plan to reflect acquired data and shift in position of the target well.
- Increase effectiveness by running WellSpot tool in DP
- TW interception trajectory established
- Total of 29 ranging runs took place (33 separate plans)
- Intercept phase begins (Jan. 16). Drilling intervals decrease from 90' down to 10' or less

Post Incident Changes

- » DOE/PHMSA Interagency Task Force Report
- » New State Regulatory Requirements - all mandating new testing and/or monitoring requirements
 - State of California Emergency Regulations
 - Division of Oil, Gas and Geothermal Resources (DOGGR) Order 1109
 - California Senate Bill 380
- » DOGGR also promulgating new statewide rules for storage
- » PHMSA Interim Final Rule (enforcement stayed pending final rule)

Aliso Canyon Well Inspection Process

Comprehensive Safety Review

- » Well inspections continue in compliance with the Division of Oil, Gas, and Geothermal Resources' (DOGGR) Order 1109 and as required by California Senate Bill SB 380
- » All 114 active wells have completed “phase one” of testing
- » 49 wells have received final DOGGR approval
- » 54 wells are out of operation either undergoing “phase two” testing or temporarily plugged and isolated and waiting phase two testing
- » 11 wells have been plugged and abandoned and are awaiting final surface work for DOGGR approval
- » DOGGR and California Public Utilities Commission (CPUC) must certify field is safe to resume injection operations

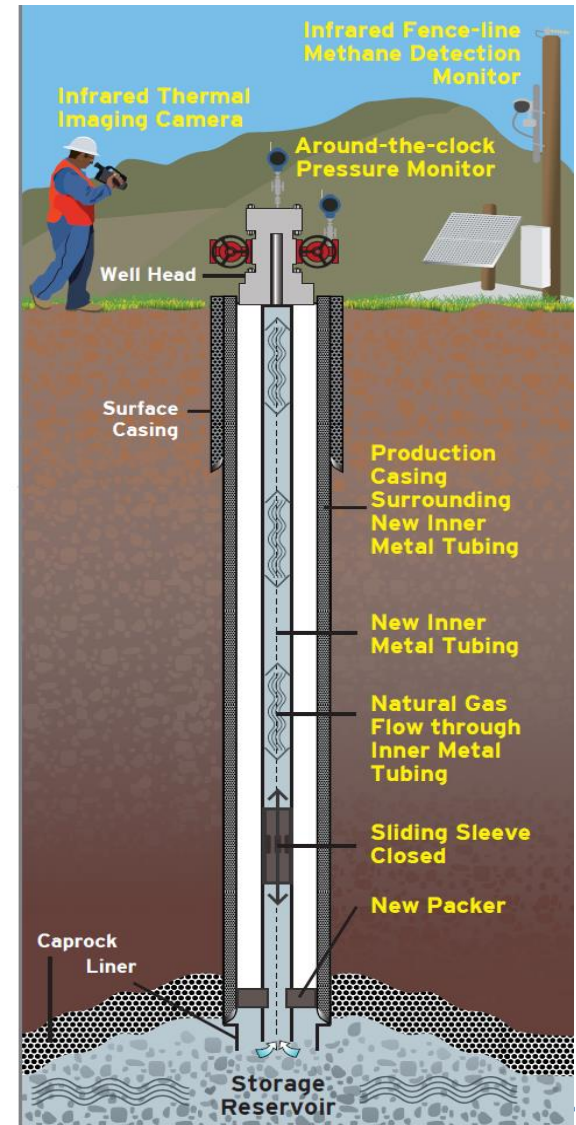
Updated as of July 7, 2017

Storage Safety Enhancement Plan

- » Although not currently required by regulation, SoCalGas is applying the same testing requirements to its other three storage fields
- » Original plan was to convert remaining storage fields (Honor Rancho, Goleta and Playa del Rey) to a tubing flow only regime by April 1st.
- » Any well that cannot be converted will be temporarily plugged and filled with fluid
- » The current Storage Integrity Management Program including the Comprehensive Testing Protocol would be applied at all these storage fields in an accelerated schedule
- » A subsequent CPUC directive required us to modify the plan, keeping a number of wells in the old casing flow regime with no double barrier, to minimize the risk of energy vulnerabilities this summer
- » The pace or rate of inspections was slowed in order to meet the capacity requirements as defined in the directive

Infrastructure, Technology, & Safety Enhancements

- All approved wells at Aliso Canyon have undergone extensive physical enhancements
- A physical barrier, or casing, around this new inner metal tubing will provide a secondary barrier
- Withdrawal/injection only through newly installed inner metal tubing of wells.



Well Inspections & Leak Detection Overview



- » Around-the-clock pressure monitoring of all wells in a 24-hour operations center
- » Daily patrols to examine every well are conducted four times each day
- » Daily scanning of each well using sensitive infrared thermal imaging cameras that can detect leaks
- » Enhanced training for our employees and contractors

Methane Monitoring Technology



One of the methods SoCalGas uses to detect methane is using optical gas imaging technology - FLIR (Forward Looking Infrared)

- » FLIR camera capable of detecting Methane and Volatile Organic Compound (VOC) fugitive emissions from the production, transportation, and use of oil and natural gas
- » FLIR can scan large areas and visualize potential gas leaks in real-time so that multiple components can be checked over the course of one survey
- » FLIR is lightweight and has embedded GPS data that helps in identifying the location of leaks

Real Time Pressure Monitoring



Real-time pressure monitoring at each gas storage well to detect pressure anomalies.

24 / 7 Operations Room & Risk Management



- Around the clock monitoring of facility and wells
- Development of Risk Management plan that provides increased quantitative analysis of well risks & hazards
- Risk Management work with the DOE National Labs

Aliso Canyon Fence-line Monitoring



- » Eight (8) monitoring stations installed along southern edge of facility (Open Path Methane Sensor)
- » 24/7 real-time continuous methane monitoring by Storage Operations
- » Each system measures for methane ppm ~every 30 seconds
 - Data sent electronically to the Aliso Operations Room
 - Alarms generated for operational response when elevated methane levels detected
- » Detection capabilities: approximately ± 3 ppm
- » Range 300ft – 540ft
- » System reliability through multiple stations and design
- » Measurements are verified in the field by trained employees

Aliso Canyon Fence-line Monitoring

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Aliso Canyon Infrared Fence-Line Methane-Monitoring System

The Infrared Fence-Line Methane-Monitoring System is part of a suite of advanced monitoring technologies and practices at the Aliso Canyon natural gas storage facility.

These technologies include:

- An infrared fence-line methane-monitoring system
- Around-the-clock pressure monitoring of all wells in a 24-hour operations center
- Daily patrols to examine every well are conducted four times each day
- Daily scanning of each well using sensitive infrared thermal imaging cameras that can detect leaks
- Enhanced training for our employees and contractors

Report a Gas Leak

If you smell a natural gas odor, hear the sound of gas escaping, or see other signs of a leak, immediately evacuate the area, and from a safe location call **1-800-427-2200**.

[Learn More](#)

California Air Resources Board (CARB)

Methane is measured in parts per million, or ppm. Normal background is approximately 2 ppm as defined by CARB for the Aliso Canyon area. Visit CARB for more information on methane background levels.

[CARB Info](#)

Aliso Canyon Air Quality Notifications

View current and past air quality notifications from SoCalGas.

[View Archive](#)

Opt-In/Opt-Out of Aliso Canyon Air Quality Notifications

Sign up or manage your Aliso Canyon Air Quality Notifications.

[Sign Up/Manage](#)

Infrared Fence-Line Methane-Monitoring System

The infrared methane-monitoring system is composed of eight infrared sensors strategically located near or along the southern border of the facility, or "fence-line." These sensors are being continuously monitored 24 hours a day, seven days a week by our trained staff.

[Current Infrared Methane Monitoring](#)

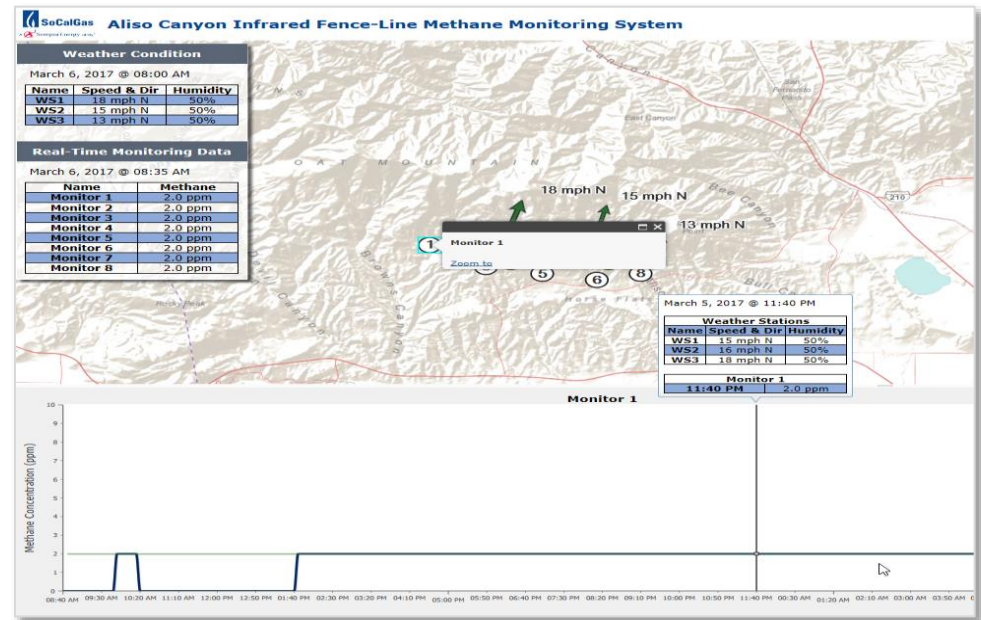
How Infrared Methane Monitoring Works

The eight infrared monitors installed at Aliso Canyon measure the parts per million (ppm) of methane in the air by sending an infrared beam between a sender (1) and receiver (2), as shown in the picture. Methane readings can potentially be impacted by weather conditions, such as rain, fog and dust, that may interrupt the infrared beam.

12/15/2015 This methane monitoring site is maintained and operated by SoCalGas with support from AECOM.

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Gas/Electric Interdependence

- » Not a new phenomenon, but changes in the California marketplace have brought it more to importance:
 - Introduction of Renewable Portfolio Standard (2002)
 - Installation of Quick-Start Turbine Technology
 - Closure of San Onofre Nuclear Generating Station (2012)
- » Update of gas system rules to account for the importance of gas/electric system reliability
- » SoCalGas coordinates closely with multiple electric Balancing Authorities
- » Gas Control receives daily forecasts from the various electric entities which details their expected hourly load profiles for the different pipeline systems.

Gas/Electric Coordination



- » Continual real-time communications and sharing of operational forecast data with grid operators (CAISO, LADWP, IID) - operator to operator
- » Outage coordination between gas/electric projects
- » Account for Grid Operators actions to import and dispatch electric generation during times of gas system concerns
- » Increased use of electric Flex Alert and conservation programs including SoCalGas' gas advisory and unique gas demand response
- » Joint gas/electric studies and analysis for additional reliability solutions

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