STORAGE SAFETY ENHANCEMENT PLAN

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About SoCalGas®

SoCalGas® provides natural gas to 21.6 Million Customers

1 Trillion cubic feet (Tcf) of natural gas delivered annually

135 Billion cubic feet (Bcf) of natural gas storage capacity

5% of US gas deliveries

3% of US storage capacity

Serving customers for 150 Years

More than 101,000 miles of distribution pipelines

Over 4,000 Miles of natural gas transmission lines

5.9 million meters
Understanding Storage Operations

- Natural gas is delivered to SoCalGas storage fields through a network of transmission pipelines, and is compressed and injected underground into storage reservoirs through piping networks and storage wells.

- Underground storage reservoir is comprised of porous rock formations thousands of feet below the earth’s surface, where oil and gas originated.

- The formations are sandstone, made up of sand with spaces between the grains. Natural gas is contained in the reservoir by an overlying non-porous “caprock.”

- SoCalGas operates four underground natural gas storage fields with a combined working storage capacity of approximately 135 billion cubic feet (Bcf).
Importance of Gas Storage

Today, more than 90 percent of residents use clean natural gas to heat their homes and water. Natural gas storage facilities help to:

✓ Manage fluctuations in gas supply and demand;
✓ Mitigate risk of electric outages during peak demand;
✓ Fuel critical electric power plants;
✓ Keep gas affordable; and
✓ Support expanded use of renewable energy resources.
Gas Storage Supports Reliability

Natural gas powers local electricity-generating plants, acting as a vital link in producing electrical power that keeps the lights on for everyone.

Did you know…

60% of California’s electricity comes from natural gas power plants.
Storage Regulation & Safety Maintenance

Storage wells are regulated by California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR).

California Public Utilities Commission (CPUC) regulates the use of storage supplies in our utility operations.

California Air Resources Board (CARB) and the South Coast Air Quality Management District (SCAQMD) regulate emissions.

Regular maintenance and inspection:
- Daily observations of equipment and conditions;
- Weekly surface pressures measured and recorded;
- Monthly wellhead inspections and average pressures submitted to DOGGR; and
- Annual well inspections.

SoCalGas underground storage maintenance and safety programs
- Started piloting storage well integrity assessments in 2012.
- Application for “storage integrity management program” (SIMP) filed with CPUC in 2014 implement program.
We continue to work with DOGGR and CPUC to complete a comprehensive safety review of all wells at Aliso Canyon, in compliance with DOGGR Order 1109 and as required by SB 380.

“...the most comprehensive tests in the nation.”

-DOGGR
SoCalGas provides an updated well inspection report to DOGGR on the first and third Friday of every month.
Fence-line Monitoring System

SoCalGas also installed an infrared fence-line monitoring system at Aliso Canyon that detects and measures the amount of methane in the air along the border of the facility nearest the Porter Ranch community.

The data is recorded in five-minute increments over the previous 24 hours and posted online: https://socalgas.esriemcs.com/MethaneMonitoring/.
On July 19, 2017, the CPUC and DOGGR cleared SoCalGas to resume limited injections at Aliso Canyon.

Injection operations began on July 31, 2017, after SoCalGas completed additional monitoring and reporting activities to meet compliance requirements.

**BEFORE RESUMING INJECTION**

- Submit Risk Management Plan.
- Submit Well Inspection and Leak Detection Protocol.
- Submit Fitness for Service Analysis.
- Conduct full facility leak survey.
- Conduct flyover to survey background methane emissions.
- Complete steps in pre-start compressor and equipment checklist.
What is SSEP?

On February 15, 2017, SoCalGas submitted a letter to the CPUC detailing the company’s plans to begin implementing many of the safety enhancements already in place at its Aliso Canyon Natural Gas Storage Facility at its three other storage fields: La Goleta, Honor Rancho, and Playa del Rey.

SSEP is consistent with the Storage Risk Management Plan required under Senator Fran Pavley’s SB 887 – natural gas risk management and methods to mitigate risks on gas storage wells, including mechanical integrity testing and primary and secondary barriers.
Well Integrity Assessments

All storage wells across each of our four (4) storage facilities Aliso Canyon, Honor Rancho, La Goleta & Playa del Rey are now undergoing the same comprehensive battery of tests designed by state regulators and the National Labs.
Phase 1 – Initial Testing

✅ Temperature:
A thermometer is lowered down the well on a weighted wire through the tubing to test for temperature variations. A temperature drop could indicate a leak.

✅ Noise:
The noise test is conducted as the wire is pulled back to the surface using a sensitive microphone to record and listen for sound frequency changes that might indicate a leak.

Phase 1 approved wells will either move directly to phase 2 testing or be temporarily sealed and isolated from the reservoir until phase 2 can take place. Phase 1 non-approved wells will be temporarily sealed and isolated from the reservoir and scheduled for repairs or permanent abandonment.
Phase 2 – Diagnostic Testing

1. Ultrasonic Imaging
2. Cement Bond
3. Magnetic Flux Leakage
4. Multi-arm Caliper
5. Hydro Pressure Test of Well Casing
6. Hydro Pressure Test of Inner Metal Tubing
Phase 3 – Confirmation

CONFIRMATION

The Division of Oil, Gas, and Geothermal Resources (DOGGR) must confirm in writing that all wells in the storage field have either completed and passed the full battery of tests required in the safety review, been taken out of service and isolated from the underground gas reservoir, or been permanently plugged and abandoned.
Infrastructure Upgrades

As part of the SSEP, SoCalGas has made significant upgrades to our natural gas storage operations at each of our four (4) storage facilities, including:

- Replacing the inner steel tubing of every well.
- Reconfiguring all storage wells so that natural gas flows only through the new inner steel tubing; and
- Using the outer casing of every well as a second barrier of protection.
Advanced Monitoring Methods

We have also introduced a suite of advanced technologies and practices to quickly identify anomalies and potential leaks, including:

✓ A remote pressure monitoring system for all wells at each of our four (4) storage facilities;
✓ Around-the-clock monitoring in our 24-hour control room; and
✓ Daily patrols of every well at each of our four (4) storage facilities.
SoCalGas’ Storage Wells
Then & Now
Questions?

Thank you for your time and attention.