

Company: Southern California Gas Company (U 904 G)
Proceeding: 2028 General Rate Case
Application: A.26-06-XXX
Exhibit: SCG-06-WP-S

**SUPPLEMENTAL WORKPAPERS TO
PREPARED DIRECT TESTIMONY
OF DEVIN K. ZORNIZER
(GAS MAJOR PROJECTS)**

ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

VOLUME 4 OF 6

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SCG Control Center Modernization – HCA Methane Sensor Project Workpapers

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**SCG Control Center Modernization – Methane
Sensor Project Workpapers**

HCA Methane Sensor Project

1. Project Overview

The HCA Methane Sensor Project is requesting authorization of a forecasted total amount of \$8.8 million between 2026-2028 within this 2028 General Rate Case. The HCA Methane Sensor Project was initiated as part of post-San Bruno pipeline safety enhancements and the broader Pipeline Safety Enhancement Plan (PSEP)¹. Its objective is to strengthen methane leak detection in high-consequence areas (HCAs)². Early proof-of-concept work, conducted in 2015–2016, deployed ten sensors using Advanced Meter radio modules in support of General Rate Case (GRC) filings.

The project was formally approved in the 2019 GRC³, authorizing the deployment of approximately 2,100 pole-mounted sensors. Additional support for the project, including continuation under the Control Center Modernization (CCM) program and construction of the new Gas Control Room and Emergency Operations Center, was authorized in the 2024 GRC⁴.

Originally proposed in 2019 to provide methane detection near high-occupancy and hard-to-evacuate locations, the program moved into implementation in late 2024 following the development of foundational business processes required for installation and ongoing operational readiness and IT/OT system enhancements for data collection and control room visualization.

2. Organizational Readiness and Early Execution

2.1 Business Readiness (2023–2024)

To prepare for deployment, Southern California Gas Company (SCG) carried out organizational change management and readiness efforts across operational groups including Transmission, the Network Operations Center (NOC), and Gas Control. These efforts were designed to ensure teams were fully prepared to respond to methane alarms and effectively integrate new technologies and

¹ The project was first introduced in 11-02-019 at p.86-89, then re-introduced in SCG-08-R_Bermel at p.MAB-30-32

² “A High Consequence Area (HCA) is a location defined by the Pipeline and Hazardous Materials Safety Administration (PHMSA) where a natural gas transmission pipeline failure could have significant impacts on people or property, including Class 3 and Class 4 locations or areas within the pipeline’s potential impact radius that contain a sufficient population or identified sites, as defined in 49 CFR § 192.903.

³ Project approval received in D.19-09-051 at p.127-132

⁴ Updates to the scope including a name change from DOCC to Control Center Modernization (CCM) introduced in SCG-06-2R at p.CHB-85-87 and described further in Appendix D. The Commission approved a portion of the request in D.24-12-074 at p.192-194

procedures into daily operations sought to properly equip teams on how to respond to methane alarms and integrate new technology and procedures into their daily workflows.

2.2 Process & Engineering Development

As these readiness activities progressed, SCG developed the processes and engineering foundation required to support a large-scale deployment of this new technology. The work was centered on defining end-to-end workflows, validating technical design elements, preparing training materials for field personnel, and establishing the teams required to support a sustained multi-year rollout. More specifically, these efforts consisted of:

- Enterprise-wide collaboration that resulted in comprehensive Business Process Designs (BPDs) which define installation, monitoring, maintenance, and incident response activities.
- Engineering teams finalized and validated a sensor design utilizing long-established industry technologies suitable for installation within public rights-of-way.
- Version 1 (V1) site maintenance training materials were developed in support of maintaining and responding to leak indications.
- A dedicated deployment and business-development team was established to support a multi-year rollout.

2.3 Site Selection

Initially, prior to the 2019 GRC application, a system-wide analysis across SCGs' territory was performed to identify potential sites for future installation between high-pressure pipelines and evacuated challenged infrastructure within defined HCAs. The originally estimated 2,100 sites were selected by factoring in high-occupancy, evacuation challenged buildings within HCAs that are located within 220 yards of a high-pressure, large diameter gas transmission pipeline. Of the 2,100 sites, 1,700 were in SCG territory. Upon project initiation, site selection criteria were further refined to identify sites for installation near specific types of evacuation challenged infrastructure within HCAs.

It was determined that an increased focus would be placed on areas with higher occupancy and facilities of large gatherings such as schools, hospitals, event centers, and places of worship. Additional criteria included identifying evacuation challenged locations, distance from transmission pipeline and evacuation challenged facilities, wind direction for sensor placement, and constructability. The number of sensors to install would be one sensor per building that is 200 ft. or less in length. Buildings greater than 200 ft. in length would get two or more with at least one sensor at each end. The outcome of refining these criteria reduced the previous projected total from 2,100 to 1,400 sites of those, 1,230 are SCG's.

3. New and Evolving Technologies

SCG continually evaluates advancements of field related hardware and communication technologies. While V1 sensors were being deployed, the company simultaneously investigated and ultimately pursued the next-generation of methane sensors to improve affordability, installation efficiency, and ease of maintenance.

This work led to the development of the Version 2 (V2) sensor design, which modernizes the approach to methane monitoring for the HCA Methane project scope.

3.1 V1 vs. V2 – Key Improvements

- **Optimized site design:** The V2 sensor’s site design has a smaller footprint, simplified construction, and integrated milepost marker and pedestal mounting design — reducing overall costs, installation time, permitting needs, and long-term maintenance costs while enabling faster deployment across field locations.
 - Example: The V1 sensor requires a seven-foot concrete foundation, which involves substantial excavation, a fabricated re-bar support structure and a full concrete pour, and several weeks of curing time before the pole and associated equipment can be installed. Alternatively, the V2 installation does not require a concrete foundation and can be secured either by direct attachment to a concrete surface (sidewalk, existing footing, etc.) or direct bury it in the ground at one and half feet below the surface.
- **Improved sensing technology:** Leveraging emerging methane sensor technology with higher detection capability, lower power usage, and a smaller form factor.
 - V2 can operate all features for over one-year on a single set of four D-cell lithium batteries, whereas V1 relied on two 37-pound gel deep-cycle batteries that provided only about five-days of operation without solar charging.
 - V2 operates solely on batteries, improving field reliability by eliminating dependence on solar power and enabling installations in areas with limited or obstructed sunlight.
 - The V2 design uses a more sensitive and accurate sensor optimized for low-level methane detection, down to accuracy of +- 5 PPM opposed to V1’s accuracy of +- 1,500 PPM.

Increased site diagnostics capabilities: Additional sensor status monitoring points such as battery voltage, signal strength, and tilt alarms improve diagnostic capabilities and

methane-monitoring performance. V1 sensors only provide concentration level data without the other system health indicators that the V2 unit can provide.

- **Modern communications protocol:** Leverages Message Queuing Telemetry Transport (MQTT), a lightweight, secure communications protocol optimized for low-power devices and reliable data delivery in challenging field environments. MQTT reduces data usage and improves transmission efficiency through the following features:
 - Efficient binary encoding minimizes data volume transmitted.
 - Small, optimized message payloads designed to reduce overhead and conserve bandwidth.
 - Publish/subscribe architecture that ensures only relevant data is delivered to subscribed systems, eliminating unnecessary transmissions.
 - Persistent session support, which reduces connection re-establishment overhead and lowers overall data usage.

Collectively, these advancements reflect the natural progression from the V1 design to V2, with V2 providing improved capabilities and increased operational performance.

4. Benefits

After the 2024 GRC decision, SCG began installing V1 sensors and determined that the design entailed higher costs, increased operational complexity, more demanding long-term maintenance and safety considerations than could be fully identified during earlier planning. Due to these factors, SCG reassessed the deployment approach and transitioned future installations to the V2 design to better manage risk, enhance safety, and control program costs while continuing to meet the program's safety objectives.

4.1 V2 Cost Benefits

As mentioned in Section 3, transitioning from the V1 to the V2 sensor improved the overall affordability and effectiveness of the methane sensor project as summarized below:

- **Installation costs are reduced** due to simplified hardware, no concrete foundations, and no need for specialized equipment or activities (i.e.: extensive traffic control, crane or bucket truck use).
 - Costs for V2 installations are consistent versus V1 which can vary widely depending on local site conditions, fluctuation in material and services pricing, and differing requirements from the jurisdictions for construction.

- **Operational (O&M) costs are reduced** due to fewer materials, better accessibility, and less time-consuming annual service requirements. Overall, there's a significant forecasted reduction in cost for O&M with going from the V1 design to the V2 design.
- **Potential lower vandalism** since the equipment being used is low profile and inconspicuous compared to the V1's sixteen-foot pole with solar panels displayed.
- **Lower remediation cost** since the V2 installation is ground based and does not require extensive traffic control or bucket trucks to service or maintain related equipment.
- **Simplified maintenance** due to V2 only requiring annual battery replacements, which can be completed at ground level without special equipment.

As V2 testing and development advanced, a planned V1-to-V2 transition was established to facilitate V2 deployment. See section 5, Deployment Schedule for latest deployment timeline.

4.2 V2 Safety Benefits

Safety is the primary driver of the HCA Methane Sensor Project and the V2 sensor contributes meaningful operational and public-safety improvements in addition to 24/7 monitoring and near real-time methane detection, such as:

- **Enhanced telemetry** improves situational awareness and supports preventative maintenance.
- **Reduced installation risk** from minimized ground disturbance and fewer underground utility conflicts.
- **Lower employee exposure** by eliminating elevated height work, removing bucket truck activities, and reducing interactions with work zone traffic.
- **Lighter, simpler equipment** reduces risk of vehicle-related injuries during transport and installation.

Overall, V2 improves leak-detection performance while reducing safety risks across construction, maintenance, and emergency-response operations.

5. Deployment Schedule

5.1 Deployment Timeline

Deployment of the V1 methane sensors began in 2024 and continued into 2025, at which point V1 installation activities were phased out as V2 sensor design, data path development, and production readiness work progressed. During this period, the foundational processes and business readiness

materials established for V1 were updated to incorporate the requirements of the new V2 technology. The finalized V2 design began deployment in 2026.

By the end of 2027, SCG anticipates installing an additional 125 V2 methane sensors, supplementing the 73 V1 installations previously completed. As part of the continued assessment of Transmission system HCAs, the total program installation target has been updated to 1,230 sites across the service territory. From 2028 through 2031, SCG plans to deploy 1,032 of these remaining V2 installations.

5.2 Installation Summary Table

V1 Sensors (Installed)		V2 Sensors (Plan)							
2024	2025	2026	2027	2028	2029	2030	2031	2028-2031 Sub Total	Total
12	61	50	75	260	260	260	252	1032	1230

6. Cost Estimate Methodology

6.1 Basis of Estimated Costs

Overview

The capital cost methodology for the HCA Methane Sensor program uses a zero-based forecasting method for both labor and non-labor costs. This method is utilized because the program’s historical costs do not reflect the future deployment conditions of the V2 sensor design, which differs from V1 in technology, physical design, and installation process.

Labor Cost Methodology

Labor costs are estimated using a per-unit forecast, multiplied by the planned number of annual installations. The estimate includes end-to-end project activities such as project management, planning, permitting, configuration, construction, commissioning, and closeout. For the V2 per-unit labor cost estimate, V1 cost data was used as a baseline and updated to reflect current labor rates and revised levels of effort based on the latest design.

Non-Labor Cost Methodology

Like labor, non-labor costs use a per-unit forecast, multiplied by the annual target number of installations. These costs include contractor labor, unit purchases, engineering design support, material storage, and site document and system update reconciliation activities. For the V2 per-unit non-labor cost estimate, V1 cost data was used as a baseline and updated to reflect current

contractor rates, revised levels of effort based on the latest design, and the most recent material cost estimates.

CCM - High Consequence Area (HCA) Methane Sensors								
Unit Count - HCA Methane Sensors								
	2026	2027	2028	2029	2030	2031	2024-2027 Total	2028-2031 Total
HCA Methane Sensors	50	75	260	260	260	252	198	1032
Cost Per Sensor Breakdown & Assumptions								
Cost Per Sensor: Project Management & Field Engineering								
COST TYPE	LABOR/NON-LABOR	CLASSIFICATION	DESCRIPTION	V2 COST				
Capital	LABOR	INTERNAL RESOURCES	Project Mgmt, Construction Mgmt, Business Readiness, Ad	\$ 5,861.23				
Capital	NON-LABOR	EXTERNAL RESOURCES	Procurement, Engineering Support, Construction Mgmt	\$ 1,892.31				
Capital	NON-LABOR	MATERIALS & EXPENSES	Materials and Misc.	\$ 110.77				
Total Unit Cost				\$ 7,864.31				
Cost Per Sensor								
COST TYPE	LABOR/NON-LABOR	CLASSIFICATION	DESCRIPTION	V2 COST				
CAPITAL	NON-LABOR	EXTERNAL RESOURCES	ENVIRONMENTAL, OTHER REVIEWS	\$ 750.00				
CAPITAL	NON-LABOR	EXTERNAL RESOURCES	DRAWINGS	\$ 2,000.00				
CAPITAL	NON-LABOR	EXTERNAL RESOURCES	CONTRACT INSTALL/CONFIGURE	\$ 2,000.00				
CAPITAL	NON-LABOR	MATERIALS & EXPENSES	PERMIT	\$ 850.00				
CAPITAL	NON-LABOR	MATERIALS & EXPENSES	V2 SENSOR/COMMUNICATION UNIT	\$ 2,411.00				
CAPITAL	NON-LABOR	MATERIALS & EXPENSES	ENCLOSURE/MOUNTING HARDWARE	\$ 800.00				
Total Unit Cost				\$ 8,811.00				
Capital Forecast								
		2026*	2027*	2028	2029	2030	2031	Total
Labor	Internal Labor	\$ 880,900	\$ 938,850	\$ 1,523,920	\$ 1,523,920	\$ 1,523,920	\$ 1,521,840	\$ 7,913,350
	External Resources	\$ 222,000.00	\$ 384,000.00	\$ 1,207,000.00	\$ 1,207,000.00	\$ 1,207,000.00	\$ 1,185,000.00	\$ 5,412,000
Non-Labor	Construction	\$ 374,500	\$ 555,450	\$ 520,000	\$ 520,000	\$ 520,000	\$ 504,000	\$ 2,993,950
	Materials & Expenses	\$ 174,950	\$ 254,025	\$ 1,084,660	\$ 1,084,660	\$ 1,084,660	\$ 1,052,172	\$ 4,735,127
Total Capital		\$ 1,652,350.00	\$ 2,132,325.00	\$ 4,335,580.00	\$ 4,335,580.00	\$ 4,335,580.00	\$ 4,263,012.00	\$ 21,054,427.00
Assumptions								
<p>This information will allow Gas Control to complement existing pipeline safety efforts to identify abnormal operating conditions or emergency conditions more quickly for increased system integrity and remediation response in support of enhanced public and employee safety.</p> <p>The CCM HCA Methane Sensor project will not replace any existing activities intended for pipeline safety. This includes but is not limited to leak surveys, aerial monitoring, and vehicle monitoring. Permits will be needed for all installation sites as they will be installed in public right of way (PROW).</p> <p>*2026 and 2027 include costs of finalizing V1 installations, and ramp up of V2 deployment activities (design finalization, product development, and material procurement and testing)</p>								

Figure-1

V1 and V2 Comparison

(left - the V1 sensor design, center – V2 integrated milepost marker, right – V2 integrated pedestal)



Figure-2
V1 Sensor

Enclosure, Sensor, Pole, Foundation (solar panel not shown)



Figure-3
V2 Sensor

Integrated Milepost Maker and Pedestal Designs
(V2 integrated milepost marker on the left, V2 integrated post on the right)

