



Methods & reference appendix

Clearwater Ridge Community Air · September 14–20, 2026

An inspectable data model

Twelve mobile Trace units each provide 604,800 one-second samples: 7,257,600 unit-time records and 43,545,600 channel values. The seven-day archive is generated deterministically. Hourly means and exact single-second extrema are calculated from every raw second, not from a decimated subset.

Every route is at the boundary

Trace patrol	Boundary sector	Samples	Mean CO ₂	Omni pairs
TR-001	Northwest gardens	604,800	435.3 ppm	336
TR-002	North boundary	604,800	435.4 ppm	336
TR-003	Northeast trees	604,800	435.6 ppm	336
TR-004	East service lane	604,800	435.7 ppm	336
TR-005	East boundary	604,800	435.7 ppm	336
TR-006	Southeast corner	604,800	435.8 ppm	336
TR-007	South garden walk	604,800	435.7 ppm	336
TR-008	South boundary	604,800	435.6 ppm	336
TR-009	Main gate	604,800	435.6 ppm	336
TR-010	Southwest verge	604,800	435.5 ppm	336
TR-011	West boundary	604,800	435.4 ppm	336
TR-012	Northwest corner	604,800	435.4 ppm	336

All mobile positions are recorded at the same second as the gas readings. The twelve patrols occupy twelve adjoining fence-line segments; all areas of the property boundary are represented. Map coordinates describe an illustrative scene, not surveyed geographic locations.

Weather and consistency

Modeled wind direction, speed, temperature and humidity vary irregularly. Gas readings combine a shared outdoor background with smaller local gradients, independent sample noise and four time-limited events. There is no fixed daily or hourly repeating waveform. The weather is not a forecast or a validated dispersion model.



What the comparisons mean

Reference values retain their exposure duration, purpose and limitations.

Channel	Reference used	How it is used here
CO	EPA: 9 ppm / 8h; 35 ppm / 1h	Clock-aligned complete hourly or 8-hour patrol means; not an annual exceedance assessment.
SO ₂	EPA: 75 ppb / 1h	Comparison to a concentration level only; not the three-year 99th-percentile design value.
H ₂ S	California: 30 ppb / 1h	Odor-oriented state ambient reference, not a universal federal health limit or a local legal determination.
CO ₂ , CH ₄ , O ₂	No ambient NAAQS assigned	Composition and change context. Occupational limits are not used to label neighborhood air safe.

The denominator matters

A weekly mean uses all seconds from all twelve patrols with equal time weighting. Single-second peaks are selected before display rounding. The highest one-hour mean is the maximum complete clock hour among all patrols. Eight-hour values use eight consecutive complete clock hours. Each value refers to a moving route, not a fixed monitor or a resident's personal exposure.

A change is not a diagnosis

The four annotated shifts illustrate how a local change can be retained and reviewed without attributing a cause from concentration alone. A real operational program would check calibration, instrument status, meteorology and applicable standards, and use a suitable independent method when necessary. A confirmed concern should trigger appropriate source-control and public-safety procedures rather than wait for weekly disclosure.

What this portal does not measure

The six-channel configuration excludes particulate matter, ozone, nitrogen dioxide and many other air constituents. It does not calculate AQI, establish whole-air safety, determine regulatory attainment, or diagnose health effects. Monitoring provides visibility; it does not sanitize air. Any treatment or emission-control measures are separate facility operations.



Independent checks, honestly scoped

Two Omni units add a second analytical method at matched fence-line positions.

Configured setting	Illustrative implementation
Cadence and count	Five minutes; 2,016 scheduled studies per unit, 4,032 total.
Mass window	20 to 180 m/z; 0.2 m/z FWHM peak width. Profile sampled at 0.05 m/z.
Reporting floor	5 ppm. Below-floor gases are not reported as quantified detections.
Co-location	Every Omni study uses a specific Trace patrol's position and time.
Eligible paired channels	CO ₂ and O ₂ only. Nitrogen and argon provide modeled spectrum context.

Numerical agreement

Agreement = $100 \times (1 - |A - B| / \max(A, B))$. For the modeled CO₂/O₂ pair summaries, the mean agreement is 99.694% and the minimum is 99.389%. All 4,032 paired studies exceed 92% by construction. This is a demonstration of comparison arithmetic, not empirical validation, uncertainty estimation or an instrument certification.

Unsupported confirmations are not claimed

Ambient SO₂ and H₂S appear at ppb levels, below the 5,000 ppb equivalent reporting floor. Carbon monoxide is also below the floor and cannot be separated from nitrogen near m/z 28 under this simplified resolution model. Methane's principal molecular ion is outside the displayed range. These channels need a suitably sensitive method for a real independent confirmation.

Public sources

1. EPA: National Ambient Air Quality Standards table
2. California Air Resources Board: Hydrogen sulfide & health
3. OEHHA: Hydrogen sulfide reference exposure levels
4. OSHA: Table Z-1 occupational exposure limits
5. OSHA: Permit-required confined spaces, oxygen definitions
6. NOAA: Trends in atmospheric methane

Sources checked September 25, 2026. The fictional facility has no assigned jurisdiction. All approval milestones, measurements and weather in the portal are illustrative; no real company or executive certification is represented.