



CASE STUDY

LOCI CONTROLS ACCURACY IN THE FIELD VS. GAS CHROMATOGRAPH

Case Study Summary

A 5-month field trial was initiated at a private landfill in the Southwestern USA to compare the gas-composition accuracy of the Loci Controls automated gas-collection system to a gas chromatograph.

Table 1: Summary of Loci Controls' Performance

Location	Objective	Status
Southwestern USA	Compare accuracy of product/service suite to gas chromatograph	Result: <ul style="list-style-type: none"> • Better than 2% accuracy for CH₄, CO₂, and balance gas-composition • Better than 0.2% accuracy for O₂ measurements vs. GC data

Southwestern USA private landfill with a LFG-to-electricity project

Loci Controls Gas-Composition Accuracy vs. Gas Chromatograph

Loci Controls maintains high degree of accuracy compared to gas chromatograph

Project Objectives:

- Compare the accuracy of the Loci Controls automated gas-collection system with a gas chromatograph
- Validate calibration intervals

Background and Process

Loci Controls installed a single Sentry-H—a monitoring only product—on the main header just prior to its entrance into the LFGE power station. Loci Controls also placed a Sentry-H unit in-line with an ABB total flow natural gas chromatograph (NGC) at a private landfill in the Southwestern USA. Loci Controls benchmarked its measured LFG concentrations against this NGC unit in a full-operating environment over a 5-month period. Loci Controls has prepared a white paper with more detailed information on this field trial, which can be found on LociControls.com/Publications. Highlights from that white paper are shared below.

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WHY LOCI CONTROLS?

With financial, operational, and environmental benefits, Loci Controls' product / service suite helps streamline and optimize facility management and gas-collection for power-plant operators and landfill owners alike.



INCREASE REVENUE

- Maximize methane gas flow
- Optimize gas-composition
- Automate real-time wellhead adjustment and data collection
- Boost plant uptime



DECREASE COSTS

- Lower labor costs for wellfield tuning and O&M
- Reduce equipment maintenance costs



REDUCE RISKS

- Reduce fugitive LFG emissions
- Prevent significant maintenance issues

Performance and Results

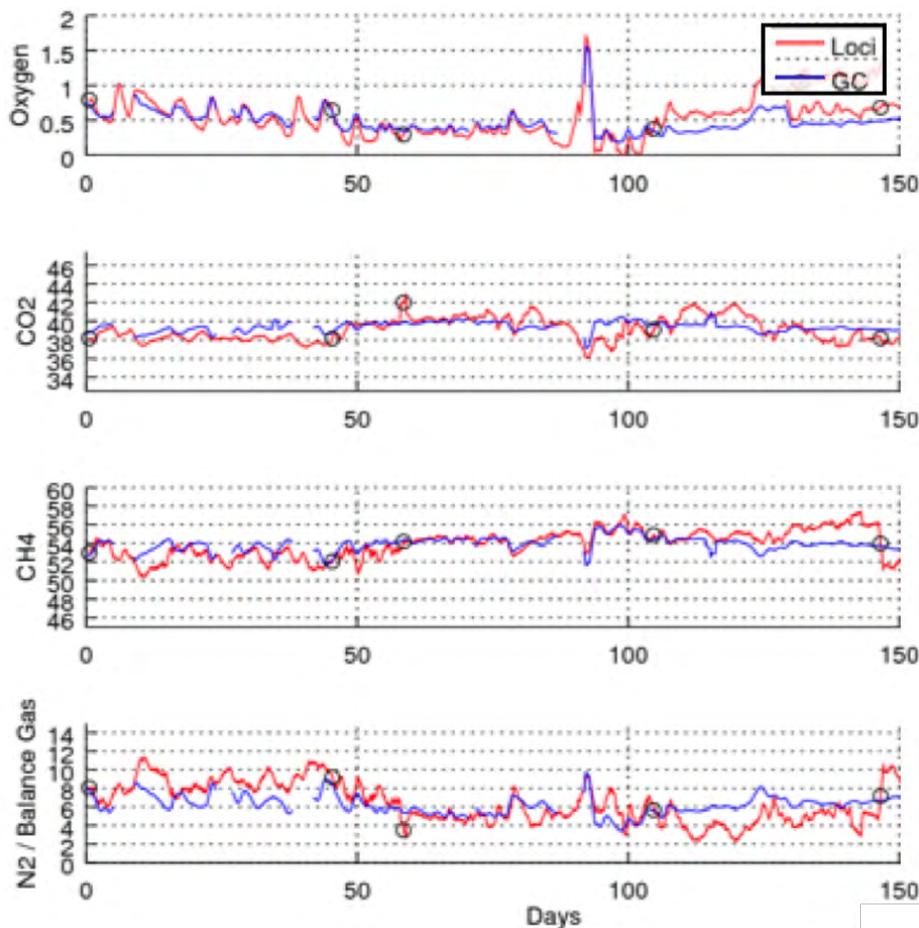
Over the 5-month field trial, Loci Controls' equipment demonstrated a high degree of accuracy and reliability.

Table 2: Summary of comparison between Loci Controls' sensors and gas chromatograph

Landfill gas component	Field trial results: Loci Controls accuracy compared to gas chromatograph	NGC ABB Total Flow 8203 accuracy (per mfg. specs)
O2	±0.2%	± 1%
CO2	±1.0%	± 1%
CH4	±1.0%	± 1%
Balance Gas	±2.0%	± 1%

¹ ABB, "Natural gas chromatograph landfill application information", section 2.2, Table 2-1.

Figure 2: Gas-composition - Loci Controls' sensors vs. gas chromatograph



Note: (o) symbols on the graph above denote the dates of calibration

Performance Specifications

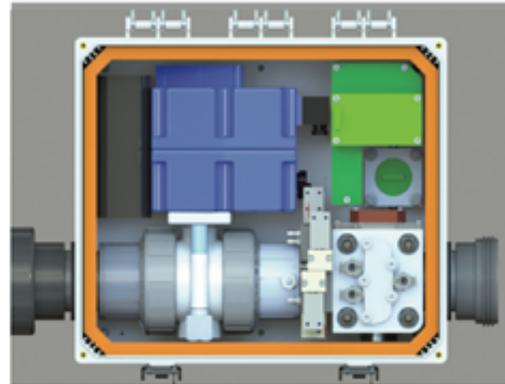
Loci Controller Specifications are as follows:

LOCI CONTROLLER SPECIFICATIONS

AREA	RATING	METRIC
Flow	0 - 110	scfm
Remotely Activated Flow/ Valve Control	0 - 100%	Fully Closed Fully Open
Pressure Readings (Above and Below the unit, P _A and P _B)	0" to -138.5"	Inches of H ₂ O
Differential/ Pressure	0" to 10.0"	Inches of H ₂ O
Flow Accuracy	± 1% ± 2%	2.5–55 scfm 55–110 scfm
Pressure Accuracy	± 0.25%	% of Full Scale
Maximum/ Operating Temperature	140°F (60°C)	Deg F (Deg C)

GAS COMPOSITION	RANGE	ACCURACY 0% - 70%	% OF FULL SCALE
Methane	0% - 100%	± 1%	0% - 70%
Carbon Dioxide	0% - 100%	± 1%	0% - 70%
Residual Gas (O ₂ , N ₂ , trace gasses)	0% - 100%	±3%	0% - 70%

Typical accuracy after calibration as recommended by Loci.



Additional Technical Specifications

Power: Solar w/ rechargeable battery

Battery Charge Time: Three weeks

Compatible Pipe Sizes: 1" - 24" (varies for control and flow measurement)

Required Maintenance: Monthly Calibration/Filter Change

Connectivity: CDMA Wireless

Installation Location: Mounted to wellhead, bolted onto riser/header

Default Measurement Frequency: 1/hr

Operating System Compatibility: Windows, MAC, Linux

Optimization Target: Maximized energy collection, minimize odors, specific gas composition requirements

Conclusion

The 5-month field trial demonstrated that Loci Controls' automated gas-collection system performs with a high degree of accuracy over an extended period of time in various weather conditions in the field. This is especially notable when compared to the accuracy of a gas chromatograph, which operates in a temperature-controlled, indoor, plant environment, and costs approximately 10x as much.