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Why is My Leak Survey Picking Up Methane That Isn't a Leak?

How to tell natural gas from biogenic gas in the field, and what the wrong answer costs



Executive Summary

A methane reading does not tell you where the methane came from. Swamps, sewers, landfills and wastewater all produce methane, and a sensitive survey instrument reads it exactly as it reads a pipeline leak. Published street-level studies have found that between one-third and two-thirds of urban methane indications were not natural gas. Some SENSIT customers report that roughly 30% of the potential methane they investigate does not come from a gradable leak.

Each of those indications still costs a dispatch, a technician's time and sometimes an excavation. Our bottom-up estimate puts a single investigation that finds no leak at roughly $110 to $1,000, and a dig that finds no leak at roughly $2,300 to $10,000.

The fix is a second measurement. Pipeline natural gas carries ethane; biogenic methane carries little or none. Testing for ethane at the point of investigation turns "there is methane here" into "this is (or is not) our gas."

The headline points:

- Much of the methane you can find is not gas from a pipeline. Independent studies attribute one-third to two-thirds of street-level methane indications to non-pipeline sources, with biogenic methane rising in summer.
- Ethane is the fingerprint. It is present in pipeline gas, typically at roughly 0.5% to 15% by volume, and effectively absent from swamp, sewer and landfill gas.
- The SENSIT IRED confirms ethane at 250 ppb in a 50 ppm methane sample. Percent-level probe-hole tests need roughly 100 to 200 times more gas in the sample. The IRED sits in the $10,000–20,000 range; laser-based ppb analyzers typically cost several times that.
- The payback is short. At those prices, the IRED covers its cost after roughly 1 to 5 avoided dry digs on paved streets, or as little as 10 avoided dry investigations.

One caution applies throughout: renewable natural gas (RNG) made from landfill or digester gas carries little or no ethane. Where RNG enters your system, “no ethane” needs a second look before you clear an indication.

Why Is My Leak Survey Picking Up Methane That Isn’t a Leak?

Because your instrument is doing its job. A methane detector reports methane, and methane has many sources besides your pipe. As survey tools get more sensitive, they find more of all of it.

Most Of The Extra Methane Is Biogenic
Biogenic methane comes from microbes breaking down organic matter without oxygen. Common sources along a utility right-of-way include sewer lines and manholes, storm drains, wetlands, buried organic fill, landfills and wastewater plants. To a methane-only instrument, this gas looks identical to a leak.

Two peer-reviewed studies show the scale. In a 2020 street-level survey of Hamburg and Utrecht, researchers used ethane ratios and isotopes to attribute each methane indication. About one-third of the indications in Hamburg and two-thirds in Utrecht were of fossil origin, and the smaller indications in Hamburg were often biogenic. An aircraft study of seven U.S. cities found that natural gas made up 20% to 80% of urban methane emissions in summer, when biogenic emissions rise.

SENSIT’s own customer conversations point the same way. Customers report that as little as 30% of the potential methane they identify is not from a true, gradable source, and one utility reported that about 4 in 10 of its excavations were not related to natural gas. These are customer-reported figures, not a controlled study. We include them because they sit inside the range the published research would predict.

Other Reasons A Reading Misleads
Gas migration is the second cause. Real natural gas follows the easiest path through backfill, conduit and frost layers, and it can surface well away from the fault. A crew can confirm the gas is real and still dig in the wrong place.

Ambiguous readings are the third. Low or intermittent concentrations, shifting wind and overlapping sources leave a number that neither confirms nor clears a leak. Without a test that identifies the source, ambiguity defaults to escalation: another visit, a bar-hole survey or a dig.

Regulatory Reality In 2026
The federal picture is unsettled. PHMSA released a final Gas Pipeline Leak Detection and Repair rule on January 17, 2025, which would have required advanced leak detection programs and set leak grading and repair timelines.

States are then moving on their own. Public Utilities Commissions are adopting advanced leak detection rules.

Whatever happens federally, the practical trend is the same. Utilities are adopting more sensitive survey technology, and more sensitive surveys produce more indications to investigate. A growing share of those indications will not be natural gas.

How Do I Tell Natural Gas From Swamp Gas?

Test for ethane. If a methane sample also contains ethane in the right proportion, it is almost certainly pipeline gas. If it contains methane but no ethane, it is almost certainly biogenic.

Why Ethane Works
Pipeline natural gas is thermogenic. It formed over millions of years under heat and pressure deep underground, and that process produces heavier hydrocarbons alongside methane, chiefly ethane. Natural gas typically contains roughly 0.5% to 15% ethane by volume but this varies based on location.

Biogenic methane is made by microbes, and microbes make almost no ethane. Raw biogas from digesters is mostly methane and carbon dioxide, with ethane and other higher hydrocarbons often below 0.1%. That difference is why atmospheric scientists use the ethane-to-methane ratio to separate pipeline emissions from biogenic ones in city-scale studies.

Put simply, methane tells you something is there and ethane tells you what it is. Adding an ethane check converts an ambiguous indication into a yes-or-no answer while the crew is still on site, before anyone schedules a return visit or a dig.

Why The Ratio Matters, Not Just The Presence
Ethane is diluted along with methane. If your gas is 3% ethane and the reading is 50 ppm methane, the sample holds only about 1.5 ppm (1,500 ppb) of ethane. A test that needs percent-level gas will miss it; a test that reads in the hundreds of ppb will not. Detection threshold therefore decides how small a reading you can resolve in the field, and small, dilute readings are exactly the ones that end up ambiguous.

What Are My Options for Confirming Gas in the Field?

Four approaches are in use today. Each has a place. The right choice depends on how small the readings are, how quickly you need an answer and what you can spend.

1. Percent-Level Ethane Analysis
Several combustible gas detectors include an ethane test. The instrument draws a sample and reports whether ethane is present. It is fast and it rides along on an instrument many crews

already carry. Its limit is sample strength: one manufacturer states that the sample must be above roughly 1%, or at least 0.5%, natural gas for a reliable ethane result. That is 5,000 to 10,000 ppm.

2. Infrared Ethane Detection (SENSIT IRED)
A dedicated handheld that uses infrared absorption tuned to ethane to measure it within a methane sample can filter out other gases. The SENSIT IRED detects 250 ppb ethane in a 50 ppm methane sample and returns a result in minutes. It is built for the small, dilute readings that percent-level tests cannot resolve.

3. Laser-Based Ppb Analyzers
Laser spectroscopy analyzers measure methane and ethane together, continuously, at parts-per-billion levels. They give real-time information while the operator walks the area and are well suited to pinpointing and to programs that log every reading. They are also the most expensive option, typically costing several times as much as a dedicated infrared ethane detector.

4. Laboratory Analysis
A sample bag sent to a lab can be analyzed for full composition and for methane isotopes, which is the most definitive attribution available. The trade-off is time. Results generally take one to two days, and the indication has to be treated as a real gas leak until they arrive. Lab analysis is the right tool for disputed or forensic cases, not for daily field decisions.

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Table 1

DIMENSION	PERCENT-LEVEL PROBE-HOLE TEST	INFRARED ETHANE (SENSIT IRED)	LASER PPB ANALYZER	LABORATORY ANALYSIS
Gas needed in sample	~0.5-1% natural gas (5,000-10,000 ppm)	250 ppb ethane in 50 ppm methane	Low ppb	Very low; lab-dependent
Time to answer	Minutes	Minutes	Seconds, continuous	1-2 days
Tells pipeline gas from biogenic?	Yes, on strong samples	Yes, including dilute samples	Yes, in real time	Yes, most definitive
Typical equipment cost	Often an option on a combination detector	$10,000-$20,000	Several times the IRED range	Per-sample fees plus shipping
Best role	Confirm strong probe-hole readings	Confirm small or dilute readings on the same visit	Survey and pinpoint with live attribution	Disputed or forensic cases
Main limit	Misses weak or dilute samples	Sample analysis requires several minutes	Highest cost and complexity	Too slow for field decisions

The Renewable Natural Gas Exception

The ethane test assumes your pipeline gas is fossil gas. That assumption is weakening. Renewable natural gas is biogas from landfills, digesters and farms that has been cleaned up to pipeline quality. EPA describes pipeline-injected RNG “zero to very low levels” of ethane and other heavier hydrocarbons compared with fossil gas. EPA’s data show roughly 237 landfill and agricultural RNG projects operating in the U.S. in 2023, up from 13 in 2005.

In a segment fed mainly by RNG, a real leak could show little or no ethane at all. Three practical rules follow:

- **Know your ratio.** Record the ethane-to-methane ratio of the gas in each part of your system, and update it when RNG supply changes.
- **Treat "no ethane" near RNG injection as inconclusive.** Use other evidence, such as pressure data, odorant, a lab sample or a repeat survey, before you clear an indication.
- **Favor lower detection thresholds where ratios are low.** Blended gas with a reduced ethane fraction pushes the ethane signal down, so a lower threshold buys back margin.

Where the SENSIT IRED Fits

The SENSIT IRED fills the gap between two kinds of tools. Percent-level tests are affordable but need a strong sample. Laser ppb analyzers resolve almost anything but cost several times more. The IRED confirms ethane on small, dilute readings at a price a district can justify on avoided dry runs alone.

Other practical features matter in the field. The IRED uses an internal pump to draw the sample, displays 0–999 ppb and 1.0–500 ppm ethane, logs readings and transmits over Bluetooth. That logged reading becomes the record behind a decision to clear or escalate.

A Good-Better-Best Lineup

SENSIT positions the IRED as the confirmation tier: the instrument a crew carries to settle whether an indication is natural gas. This is more advanced than a CGI with a pipeline gas discrimination feature. SENSIT is also developing a ppb-class handheld that measures methane and ethane together, for programs that want continuous attribution during the survey itself. The two serve different jobs. Utilities that need same-visit confirmation today do not need to wait for the next tier to start cutting dry runs.

What Does a False Positive Cost?

A leak investigation costs the same whether or not it finds a leak. Most utilities do not track the cost of the ones that find nothing, so it stays invisible. The tables below build that cost from published inputs and stated assumptions. Replace any line with your own figures.

For reference, published industry estimates for a single field dispatch range from about $150 to over $1,000 depending on distance, labor rates and time on site. Those estimates come from general field-service settings, so we built our own.

Table 2

INPUT	LOW	HIGH	BASIS
Technician rate	$62/h	$150/h	BLS median wage for gas plant operators. High: overtime or after-hours with full overhead.
Time on task	1 tech x 1.5 h	2 techs x 2 h	45 min on site plus travel and close-out paperwork
Dispatch and supervisor	-	0.5 h = ~ $60	Assumption
Vehicle	20 mi x $0.76 = $15	40 mi x $0.76 = $30	IRS business mileage rate, from July 1, 2026
Cost per visit	**~$110**	**~$690**	**Sum of the rows above**
Repeat-visit factor	1.0	1.5	Unresolved readings are often revisited
Cost per dry investigation	**~$110**	**~$1,000**	**Cost per visit x repeat factor**

One excavation that finds no leak

Table 3

ITEM	SOFT SURFACE, VACUUM EXCAVATION	PAVED STREET, CONVENTIONAL DIG	BASIS
Crew time at $100/h	2 × 4 h = $800	3 × 6 h = $1,800	Burdened rate between the low and high technician rates.
Excavation equipment	$1,000-$1,900	$800-$1,200	Vacuum truck at $235-$485/h for 4 h; backhoe and dump truck (assumption)
Traffic control	-	$300-$1,000	From ~$50/h to a flagging crew
Locate, permit and admin	~$200	$200-$1,000	Varies by municipality
Restoration	~$300	$1,500-$5,000	Turf versus permanent pavement patch
Estimate per dry dig	**~$2,300-$3,200**	**~$4,600-$10,000**	**Sum of the rows above**

How quickly the IRED pays for itself

Table 4

WHAT GETS AVOIDED	TO COVER $10,000	TO COVER $20,000
Dry investigations ($110-$1,000 each)	10-91	20-182
Soft-surface dry digs ($2,300-$3,200)	4-5	7-9
Paved-street dry digs ($4,600-$10,000)	1-3	2-5

Worked examples: one district, one year (use your own figures)

A district closes 1,000 leak investigations a year. If 30% end with no gradable leak, that is 300 dry investigations. At $110 to $1,000 each, they cost $33,000 to $300,000 a year.

If 1 in 20 of those escalates to a dig that finds no gas, that adds 15 dry digs. At $2,300 to $10,000 each, that is another $34,500 to $150,000.

Combined, the non-productive spend is roughly $67,500 to $450,000 a year. An ethane test that resolves even a fraction of the ambiguous cases on the first visit attacks both lines at once. The 30% rate and the 1-in-20 escalation rate are illustrative; measure your own.

The Other Side Of The Ledger: The Leak You Clear By Mistake

Dry runs cost money. A real leak written off as 'swamp gas' costs far more. Every supervisor knows the call that keeps them up at night: an indication near a sewer, a low reading, a crew that has seen a dozen of these turn out to be nothing. Clearing it without a test is a judgment call. If it was gas, that judgment will be reviewed by people who were not there.

An ethane check does not prevent incidents on its own. What changes is the basis for the decision. A crew that clears an indication with a logged ethane result has evidence, not a hunch, and a crew that finds ethane where it expected swamp gas has caught the leak that matters.

What This Means in the Field

For Technicians

You get an answer before you leave the site. When a reading near a manhole or wetland can be checked for ethane on the spot, you can clear a biogenic source in minutes instead of opening a ticket and coming back. The IRED reads small readings, so the 50 ppm hit in the grass verge gets an answer too, not just the strong bar-hole readings. Your day produces more closed cases and fewer dead ends.

For Supervisors

Source confirmation cuts the two costs you feel most: repeat visits and precautionary digs. Fewer ambiguous indications escalate, and the digs that do happen are more likely to find gas.

Each decision to clear or escalate comes with a logged ethane reading, which is the record you want if a call is ever questioned. Where RNG enters your system, set a clear rule for when "no ethane" is enough and when it is not.

For Operations And Compliance Leaders

False positives are a recurring operating expense. An IRED in the $10,000–20,000 range pays back after a handful of avoided digs. Federal leak detection rules remain unsettled, but state programs and more sensitive survey technology are already increasing investigation volume. Measuring your non-productive rate now gives you the baseline to justify the spend and to defend your leak program to regulators.

Summary

A sensitive survey finds methane well. It cannot tell you whose methane it is. In published urban studies, a third to two-thirds of street-level indications were not pipeline gas, and every one of them can still cost a truck roll, a technician's afternoon or a dig.

Ethane is the field test that closes that gap. The SENSIT IRED confirms it on readings as small as 50 ppm methane, far below what percent-level tests require, at a fraction of the cost of laser analyzers. Where RNG is in the mix, pair it with a known ethane ratio and a clear escalation rule.

The next step is to measure. Pull last year's investigations and excavations, count how many found no gradable leak, and apply your own labor, vehicle and restoration costs to the tables in this paper. Then talk to SENSIT about running the IRED alongside your current process and comparing the numbers.

Frequently Asked Questions

Why is my leak survey picking up methane that isn't a leak?
Methane comes from many sources besides pipelines, including sewers, storm drains, wetlands, landfills and buried organic material. A methane detector cannot tell them apart. Published studies have attributed one-third to two-thirds of urban street-level methane indications to non-pipeline sources.

How do I tell natural gas from swamp gas?
Test the sample for ethane. Pipeline natural gas contains ethane, typically around 0.5% to 15% by volume. Swamp, sewer and landfill gas contain little or none. Ethane present in the right proportion means pipeline gas; methane with no ethane is almost always biogenic.

Does swamp gas or sewer gas contain ethane?
Very little. Biogenic methane is produced by microbes, which make almost no ethane. Digester biogas typically carries ethane and other higher hydrocarbons below 0.1%.

Can a regular methane detector tell natural gas from sewer gas?
No. A methane detector or combustible gas indicator measures methane or combustible gas concentration only. You need a second measurement, such as ethane, to identify the source.

How much does a false-positive leak investigation cost?
Our bottom-up estimate is roughly $110 to $1,000 per investigation that finds no leak, depending on crew size, overhead, travel and repeat visits. An excavation that finds no leak runs roughly $2,300 to $10,000 depending on surface and restoration.

How small a reading can the SENSIT IRED confirm?
The IRED detects 250 ppb ethane in a 50 ppm methane sample. That is enough to confirm most pipeline gas on readings far smaller than percent-level probe-hole tests can handle.

Does renewable natural gas contain ethane?
Usually very little. EPA describes pipeline-injected RNG as 96% to 98% methane with zero to very low ethane. Where RNG enters your system, a real leak may show less ethane than you expect, so treat "no ethane" near injection points as inconclusive.

Does an ethane detector replace my survey instrument?
No. The survey instrument finds and locates methane. The ethane detector confirms whether that methane is natural gas. They work as a pair.