White Paper

Picarro and ANSI-GPTC Appendix G-192-11

How Picarro's mobile and handheld leak detection integrated platform aligns with the Gas Pipeline Technology Committee (GPTC) leak survey and classification guide material — and how that positions operators for the direction of federal rulemaking under PHMSA.

Executive Summary

ANSI-GPTC Appendix G-192-11 is the primary industry guide material interpreting the distribution system leakage survey requirements of 49 CFR Part 192 §192.723. It defines accepted survey methods, investigation procedures, and the Grade 1/2/3 system that determines repair urgency. G-192-11 is not itself a federal regulation — legal obligations flow from 49 CFR Part 192 — but it is the document PHMSA and state regulators look to when evaluating whether an operator's program meets federal intent. State regulations may impose additional requirements beyond the federal floor.

Picarro's vehicle-mounted CRDS platform is a recognized surface gas detection survey method under G-192-11 Section 4.4. The Picarro Handheld supports the close-range investigation and localization steps. With P-Cubed as the record-of-truth platform, Picarro delivers the complete workflow the guide material describes: detect > investigate > localize > document — and the prioritization framework that makes annual AMLD workable at network scale.

PHMSA issued a Final Rule on Gas Pipeline Leak Detection and Repair (Docket PHMSA-2021-0039) on January 17, 2025. As of this writing it has not been published in the Federal Register, meaning the rule has no effective date — operators face no current compliance obligation under it. The rule as issued would formally adopt the Grade 1/2/3 framework, mandate AMLD-class technology, and require repair of all ALDP (Advanced Leak Detection Program)-detectable leaks. Operators planning their leak detection programs should understand how that framework maps to G-192-11 — which is what this document addresses.

1. What G-192-11 Requires

GPTC Guide Material Appendix G-192-11 is the primary industry interpretation document for distribution system leak survey requirements under 49 CFR Part 192. It does not itself create federal obligations; those flow from the Code of Federal Regulations. It defines how the industry interprets those requirements in practice: which survey methods are acceptable, what investigation procedures look like, and how to assign repair priority.

The central federal requirement this document addresses is:

§192.723 — Distribution Systems: Leakage Surveys. Requires surveys of distribution lines using leak detector equipment at prescribed intervals: in business districts, not exceeding 15 months and at least once per calendar year; outside business districts, not exceeding 63 months (once every five years); for cathodically unprotected steel without electrical test monitoring, not exceeding 39 months. The five-year interval for outside-business-district lines is the current practical ceiling for much of the US distribution network. The regulation does not specify survey technology, sensitivity, methodology, or repair timelines for non-hazardous leaks found.

G-192-11 fills in what §192.723 leaves unsaid. It defines five accepted survey methods with sensitivity thresholds, provides investigation and pinpointing procedures, establishes the Grade 1/2/3 repair priority framework, and describes what records operators must maintain. Operators are required to have written leak detection procedures; G-192-11 is the framework those procedures are expected to reflect. It is the playbook operators and regulators use to evaluate whether a leak detection program meets federal intent.

What §192.723 Says — and What G-192-11 Adds

49 CFR Part 192 §192.723 says: Survey distribution lines using leak detector equipment at prescribed intervals (annually in business districts; every five years outside business districts). No technology specification, no sensitivity threshold, no investigation procedure, and no repair timeline for non-hazardous leaks.

G-192-11 adds: Surface surveys must use equipment capable of detecting ≥50 ppm gas in air, conducted at adequate sampling speed. Investigations must follow prescribed procedures. Leaks are classified as Grade 1 (immediate hazard — act now), Grade 2 (probable future hazard — repair within one calendar year, not to exceed 15 months; reevaluate at least every six months until cleared), or Grade 3 (expected to remain non-hazardous — reevaluate at next survey or within 15 months).

2. Survey Methods: Where Picarro Fits

G-192-11 Section 4.4 enumerates five authorized survey methods. Operators may use any combination of them, and may use additional methods if demonstrated to be equal or superior to those listed. This clause explicitly accommodates newer technology such as CRDS-based mobile detection.

Recognized Methods Under G-192-11 Section 4.4

Method 1 — Surface Gas Detection Survey
Atmospheric sampling at or near ground level using equipment capable of detecting ≥50 ppm gas in air. Equipment may be portable or mobile. In paved areas, sampling should also occur at curb lines and available ground openings. G-192-11 requires survey to proceed "slow enough to allow adequate sampling" and directs operators to consult manufacturers for equipment speed restrictions.

The traditional execution of Method 1 is a technician walking a route with a probe wand near the ground. Walking surveys technically satisfy the 49 CFR Part 192 §192.723 interval requirements — the five-year outside-business-district cycle can be met this way — but the pace makes annual full-network coverage of a large system impractical. G-192-11's speed guidance was written with walking-pace equipment in mind.

Picarro Position

Picarro's vehicle-mounted CRDS platform is a recognized Method 1 surface gas detection survey. The system continuously samples the roadside atmosphere through a bumper-mounted inlet at 4 readings per second, with GPS logged for every measurement.

The "slow enough for adequate sampling" requirement warrants a direct answer. G-192-11's speed guidance was written for instruments that could physically miss a plume if passed too quickly — instruments with slow response times or open-path designs where higher transit speeds reduce the number of measurements taken across a plume. Picarro's closed-path CRDS design operates differently: ambient air is continuously drawn through the inlet, and every molecule entering the sample stream is measured. The total integrated signal captured over a complete pass does not change with vehicle speed. A Picarro survey vehicle at 20 mph captures the same plume signal as one at 5 mph. The Field of View (FOV) algorithm provides the documentary evidence: it computes, in real time and from actual measured wind and concentration data, which pipe segments were within the detection envelope during each pass.

A practical consequence: mobile surveys cover ground significantly faster than walking programs, typically 16 to 20 miles of mains per day (with multiple passes on each pipeline segment) against 2 to 4 miles of mains per day. Annual full-network coverage of large distribution systems becomes operationally achievable in a way that walking surveys cannot match.

Method 2 — Subsurface Gas Detection Survey (Barholing)
Sampling of the subsurface atmosphere with a CGI capable of detecting ≥0.5% gas in air (10% LEL) at the sample point. Points must be ≤15 feet laterally from the pipeline and spaced no more than 30 feet apart along the route (or half the distance to the nearest building wall, whichever is shorter). Coverage must include service taps, intersections, branch connections, and service lines at building walls.

Picarro Position

Subsurface barholes are an investigation tool used within Step 2 of the Picarro two-step workflow. Step 1 is the vehicle survey, which generates Leak Indication Search Areas (LISAs) that direct field crews to specific GPS-tagged locations. Step 2 is field investigation of each LISA using the Picarro Handheld: the instrument maps the surface concentration gradient and finds surface expression points. Where investigation requires measuring subsurface concentrations to support grade assignment, barholes are placed within the identified area, guided by the Handheld's concentration contour. See Section 4 for a full discussion of how pinpointing and barholing work together.

Method 3 — Vegetation Survey
Visual observation for dead patches, discolored growth, or bare lines over buried pipe. Only valid where established vegetation exists; not usable during dormancy or when soil moisture is abnormally high. All positive visual indications must be confirmed with a gas detector. Not a primary network survey method.

Method 4 — Pressure Drop Test
A segment is isolated and monitored for pressure loss over a defined period, confirming whether a leak exists. Primarily used for targeted segment testing, not continuous network survey.

Method 5 — Bubble Leakage Test
A bubble-forming solution is applied directly to exposed pipe joints, fittings, and connections after excavation. The presence of bubbles confirms leakage at the specific application point. Used post-excavation to pinpoint the exact leak location on exposed piping. It is not a network survey method; it is a confirmation technique used at the end of the investigation chain once pipe is exposed.

3. Picarro Detection Performance vs. the Standard

G-192-11 Table 2 catalogs recognized methane detection technologies with typical sensitivities. The standard's threshold for surface surveys is 50 ppm. Picarro's CRDS platform is explicitly listed in the 2025 edition as a commercialized technology, alongside FID, TDLAS, and other modern approaches. At sub-ppb sensitivity, CRDS exceeds the threshold by orders of magnitude, enabling detection of small and distant leak plumes that would be invisible to traditional CGI equipment. That sensitivity is what gives the FOV algorithm the dynamic range to compute a meaningful detection envelope at typical street-level concentrations.

G-192-11 Surface Survey Minimum

50 ppm

Sensitivity required for surface gas detection survey equipment

Picarro CRDS Sensitivity

<0.5 ppb

Sub-parts-per-billion; exceeds the threshold by orders of magnitude — detects plumes too dilute for traditional CGI equipment

What distinguishes Picarro in the context of G-192-11 is the ability to prove coverage. G-192-11 requires that surface surveys provide adequate, continuous sampling. Picarro's patented FOV algorithm computes in real time — from measured wind speed, wind direction, and atmospheric stability — the lateral and longitudinal detection envelope for each survey pass. The output is a GPS-tagged per-pass coverage record tied to actual conditions at the time of survey. This is a fundamentally different evidentiary product from a route log, and it is unique to Picarro among AMLD providers.

Detection performance is validated annually using the Probability of Detection (POD) methodology derived from API Recommended Practice 1163 (In-Line Inspection Systems Qualification Standard). Controlled leaks at precisely measured flow rates are released from above-ground and below-ground configurations; the survey vehicle follows a structured multi-pass driving protocol; results are evaluated using statistical analysis of detection outcomes. The FOV algorithm is calibrated against a validated detection threshold — a minimum leak flow rate at a defined detection probability. The standard published parameterization is 0.5 SCFH at greater than 90% POD, reflecting typical operational conditions; the FOV contour can be set to any threshold-probability pairing the operator's program requires. Annual validation results have consistently met or exceeded our POD specifications across all test conditions.

Beyond coverage documentation, the vehicle survey produces a flow rate estimate for every indication — a capability whose significance extends beyond quantification alone. Flow rate matters because it, not concentration, is what determines a leak's hazard potential. Concentration at the measurement point depends on distance from the source, wind speed, and atmospheric stability. Flow rate is reconstructed from the concentration signal together with real-time atmospheric data, estimating what the source was emitting at measurement time rather than what arrived at the measurement point.

The physical basis: hazard is gated by leak flow rate, not by the concentration reading at any single measurement point. A small leak cannot accumulate to the Lower Explosive Limit even if it vents directly into a structure — normal building ventilation continuously dilutes the incoming gas below the flammable threshold. What determines whether accumulation to a hazardous level is physically possible or not is the flow of gas the source is releasing. This is why flow rate is the right variable for risk-based triage of a network-wide indication population, and why the vehicle survey's quantification output matters as much as its detection output.

All-Weather and All-Speed Operation

Picarro has been validated for a large range of environmental and operational conditions.

Rain. Validated under simulated heavy rainfall at 25.4 mm/h (Heavy rain under Marshall-Palmer classification). Zero false negatives observed under rain conditions, identical to dry-weather performance. The multi-stage inlet filtration system prevents moisture from reaching the CRDS measurement cell.

Wind. Higher wind speeds dilute plumes and reduce FOV depth. Within the reduced FOV, detection probability is unchanged. The onboard anemometer continuously updates the FOV calculation so reported coverage reflects actual conditions. The operational limit of 20 mph (32 km/h) applies to sustained conditions.

Vehicle speed. The closed-path CRDS design captures every methane molecule entering the inlet regardless of transit speed; the total integrated plume signal is the same at 20 mph as at 5 mph. This is in contrast to open-path instruments, where higher speeds reduce the number of measurements taken across a plume. Operational limit is 40 mph (64 km/h). The transit time controlled by a pump through the sampling line is compensated in order to accurately synchronize methane readings and car location.

Temperature. Picarro's analyzer is installed inside the vehicle. It is therefore protected from the conditions that would affect external equipment: shock, vibration, road debris, precipitation, and extreme temperature. A filter eliminates water and dust to maintain high quality measurements.

As noted by G-192-11 Section 4.4, some adverse conditions such as water tables, frost, ice, and snow may reduce the escape of gas through the ground and increase the risk of migration into buildings. The vehicle-based Picarro system has shown that it can detect the presence of gas in buildings through their ventilation that emits methane back to the atmosphere.

4. Leak Investigation and Pinpointing

A G-192-11-compliant leak detection program does not end when the survey vehicle completes a route. Every indication must be followed by a field investigation to determine whether a pipeline leak exists. If confirmed, a pinpointing procedure traces the gas to its source before repair.

For that reason, Picarro offers both vehicle systems and handheld devices fully integrated in the P-Cubed cloud software to streamline workflows and ensure full traceability of the integrated process.

G-192-11 Section 5 governs investigation procedures, including response to inside and outside odor complaints and handling of non-typical soil conditions. G-192-11 Section 7 governs pinpointing. Both require personnel qualified under 49 CFR Part 192 Subpart N.

Subpart N — Operator Qualification (§§192.801–192.809)

Subpart N is 49 CFR Part 192's Operator Qualification requirement. Operators must maintain a written OQ program that identifies "covered tasks" — operations and maintenance tasks performed on pipeline facilities that, if performed improperly, could affect safe operation.

Performing a leakage survey using detection equipment is a covered task. Whether and how personnel performing survey or investigation tasks qualify under an operator's OQ program depends on the operator's program design, task role, and applicable state requirements. Field investigators confirming and documenting leak indications are generally performing covered tasks. Picarro provides instrument-specific training to support operator OQ documentation. In addition, a gas operator has independently shown recently that Picarro's handheld device reduced by 39% the time of investigation of a leak indication provided by the vehicle-mounted instrument. Substantial reduction of cost can therefore be captured by a more effective use of high value and heavily trained workforce.

The Two-Step Investigation Workflow

Picarro's workflow maps directly to G-192-11's detection and investigation structure:

Step 1 — Picarro vehicle survey. The mobile platform identifies Leak Indication Search Areas (LISAs) across the network and measures flow rate for prioritization. This is the surface gas detection survey under G-192-11 Method 1.

Step 2 — LISA investigation using the Picarro Handheld. Field crews dispatch to each LISA with a Picarro Handheld. Using ppb-level sensitivity, 1 Hz measurement rate, and real-time ethane/methane co-measurement, the technician maps the surface concentration gradient within the LISA to identify where gas is breaking through to the surface.

Handheld Sensitivity

ppb-level CH_4

Parts-per-billion sensitivity with a wide dynamic range suitable for both surface leak detection and high-concentration confined-space readings

Response Time

sub-second

1 Hz measurement rate; ppb-level gradient leads investigator to the surface expression point before physical proximity

Source Discrimination

C_2H_6 co-measurement

Real-time biogenic vs. thermogenic attribution eliminates false reports on sewer, landfill, or compost gas

Positioning

sub-meter GPS / RTK

GPS breadcrumb trail documents the investigation path and surface expression points for the audit record

Pinpointing and Barholing (G-192-11 Section 7)

G-192-11's pinpointing procedure and its grading criteria use two complementary but distinct techniques, and the Picarro workflow supports both.

Handheld — surface localization. The Handheld is the most efficient tool for rapidly mapping a LISA and finding surface expression points: the locations where gas migrating from a subsurface source breaks through to the atmosphere. At ppb sensitivity with sub-second response, the instrument registers a measurable concentration gradient well before the technician is physically over the source. The GPS breadcrumb trail in P-Cubed documents the path walked and the concentration contour, providing the basis for G-192-11 Section 7's requirement to establish the outer boundaries of the indication before placing barholes.

Barholes — subsurface concentration measurement and pinpointing. The G-192-11 grading criteria (Grade 1 and Grade 2 thresholds) are defined in terms of percent Lower Explosive Limit readings in confined spaces, substructures, and subsurface locations — concentrations that are measured below the pavement surface, not at the surface. Barholes are the means to obtain these readings. After the Handheld has defined the surface expression area and narrowed the search zone, targeted barholes are placed to measure subsurface concentrations, characterize the migration pattern, pinpoint the leak, and support the final grade assignment.

Leak Grading

G-192-11 establishes a three-grade classification system that determines the urgency of the operator's response after a leak is confirmed. Grading is performed by qualified field personnel following the investigation, based on instrument readings, site conditions, and proximity to buildings and confined spaces. It is a judgment the field technician makes — Picarro's role is to deliver the investigation data that informs it.

Grade 1 — Immediate Hazard

≥80% LEL in a confined space; any reading at the outside wall of a building; gas migrated into or under a structure; escaping gas that has ignited. **Action: immediate and continuous until the hazard is eliminated.**

Grade 2 — Non-Hazardous at Detection, Probable Future Hazard

≥40% LEL under sidewalk in a wall-to-wall paved area; reading that would migrate to a building wall under frozen conditions; ≥80% LEL in gas-associated substructures. **Action: repair within one calendar year (≤15 months); reevaluate at least every six months until cleared.**

Grade 3 — Non-Hazardous, Expected to Remain Non-Hazardous

<80% LEL in small gas-associated substructures; reading under street without wall-to-wall paving where migration is unlikely; <20% LEL in confined space. **Action: reevaluate at next survey or within 15 months.**

Picarro's two-step workflow supports this process by providing the investigation inputs grading depends on: precise GPS coordinates of surface expression points, a documented concentration contour from the Handheld, and barholing results targeted to the highest-concentration areas. The grade assignment and its repair or reevaluation obligation belong to the operator. Section 6 addresses how operators manage the resulting indication population at network scale.

Managing the Indication Population

Advanced leak detection at annual cadence changes the fundamental economics of an LDAR program. Because a vehicle survey covers a large distribution network more frequently and more completely than a walking survey, it naturally surfaces a larger indication population per cycle, and the PHMSA Final Rule's direction toward mandatory Grade 3 repair extends the potential repair obligation accordingly. This creates a real trade-off: broader, more frequent coverage means earlier risk visibility, but without a principled prioritization threshold, it can also push LDAR budgets to an unmanageable level.

The answer lies in what the vehicle survey produces alongside detection: a flow rate estimate for every indication. As established in Section 3, flow rate is independent of atmospheric conditions at measurement time. This makes it stable and comparable across the network in a way that raw concentration readings are not. More fundamentally, it is emission rate that determines whether a leak can ever accumulate to a dangerous level and ignite: a leak too small in flow rate cannot reach the Lower Explosive Limit regardless of where it vents, because normal ventilation continuously dilutes the incoming gas below the flammable threshold.

Flow rate addresses the emission severity dimension of risk. The consequence dimension is already captured in the operator's Distribution Integrity Management Program under Subpart P: Consequence of Failure scores for each pipeline segment encode location class, proximity to occupied structures, high consequence areas, and pipe material. Together, flow rate and CoF produce a risk score for each indication that is grounded in existing regulatory methodology — DIMP logic applied to leak response.

This risk score determines which indications are surfaced to the operator as LISAs requiring field response. The threshold is the operator's documented program design decision, set as part of the DIMP-based LDAR program. Indications above the threshold are dispatched for investigation under the Section 4 workflow; formal G-192-11 grading proceeds for each. Indications below the threshold are retained for annual trend monitoring but are not presented to the operator as action items; they resurface automatically if emission rate or consequence grows.

The result reframes the economics of LDAR entirely. Today, many utilities spend significant effort investigating and repairing leaks that pose little measurable risk while higher-flow-rate leaks in consequential locations wait their turn over months or even years. Flow rate and CoF prioritization invert that pattern: operators can repair fewer leaks and reduce more risk, concentrating resources where they have the greatest safety and emissions impact. AMLD does not have to mean more work — it can mean better-directed work.

Records and Reevaluation Requirements

G-192-11 Section 6 requires operators to maintain leak records sufficient to complete DOT Forms F-7100.1, F-7100.1-1, F-7100.2, and F-7100.2-1. These forms capture the date found, location, grade, date regraded, repair date, and responsible personnel for every leak. Grade 2 leaks must show a reevaluation entry at least every six months until cleared.

Picarro's software platform, P-Cubed, generates the detection and investigation record for every leak indication, from initial vehicle survey detection through Handheld investigation and grade entry. The lifecycle management of graded leaks (repair scheduling, reevaluation tracking, and closure) is typically managed in the operator's own asset management or work order system. Picarro supports this handoff through data delivery in standard GIS and enterprise data formats, providing the outputs utility systems expect.

Immutable timestamped records. Every CRDS measurement and every Handheld reading carries a GPS coordinate, UTC timestamp, and operator ID that cannot be edited after creation. This supports the G-192-11 records requirement and the PHMSA DIMP NPRM's proposed "Traceable, Verifiable, Complete" (TVC) standard (proposed §192.638).

FOV-based coverage documentation. Each survey pass produces a FOV record showing which portions of the network were within the detection envelope under the actual atmospheric conditions at the time of survey. This gives operators a continuous, conditions-aware coverage record — demonstrating not just that a route was driven, but which pipe segments were actively covered on each pass.

Emissions reporting. Picarro's Emissions360 module produces the auditable, source-level emissions inventory needed for PHMSA's Part 191 annual reporting requirements (number of leaks by grade found and repaired; estimated emissions from each), as well as OGMP 2.0 Level 5 submissions for utilities with voluntary reporting commitments.

8. Connection to the PHMSA Final Rule

PHMSA issued a Final Rule on Gas Pipeline Leak Detection and Repair (Docket PHMSA-2021-0039) on January 17, 2025. As of this writing, the rule has not been published in the Federal Register and therefore has no effective date — operators face no current compliance obligation under it. Operators should treat it as a strong signal of regulatory direction rather than enforceable current law — and should note that state regulations may impose AMLD requirements that exceed the current federal floor.

Three provisions of the Final Rule as issued are directly relevant to G-192-11 compliance programs:

Proposed §192.763 — ALDP Performance Standard
Would require operators to use commercially available leak detection equipment meeting the Advanced Leak Detection Program performance standard — eliminating sole reliance on human senses. PHMSA's rulemaking record (88 FR 31890, p. 166) explicitly names mobile detection systems of the type Picarro provides as a qualifying approach. Picarro's AMLD has been independently validated at 0.5 SCFH with ≥90% POD through an annual controlled-release and field verification program.

Proposed §192.760 — Grade Classification with Mandatory Repair Timelines
Would codify the G-192-11 Grade 1/2/3 system in 49 CFR Part 192 with binding repair timelines: immediate action for Grade 1; six-month default (30 days in HCAs and Class 3/4 transmission locations) for Grade 2; mandatory repair — not just reevaluation — for all ALDP-detectable Grade 3 leaks. This is the most significant change from current practice: to repair Grade 3 leaks, operators must first find them. Identifying the full population of Grade 3 leaks across a large distribution network requires systematic AMLD-class survey coverage at annual or near-annual cadence. Section 6 addresses how operators manage the resulting repair population without expanding LDAR budgets proportionally.

Strengthened §192.723 — Annual Surveys for At-Risk Distribution Lines
Would require annual surveys for distribution pipelines outside buildings that lack cathodic protection or are known to leak based on material or O&M history. Picarro's solution is designed for annual full-network survey or faster cadence and has successfully supported such programs worldwide since 2018.

What This Means for Program Planning

The rule is not yet in force. The direction, however, is clear: PHMSA intends to require AMLD-class technology, mandate repair of all detectable leaks, and tighten survey frequency for at-risk lines. State regulators, including Colorado, have already moved in this direction independently.

Operators who begin annual AMLD programs now build operational fluency and a demonstrated track record before any federal deadline takes effect — and satisfy state requirements in the interim.

9. Requirements Summary Table

G-192-11 Requirement	Picarro Capability	Status
Surface gas detection survey ≥50 ppm sensitivity (49 CFR Part 192 §192.723 / G-192-11 §4.4, Method 1)	Sub-ppb CRDS sensitivity exceeds the threshold by orders of magnitude; FOV-documented coverage goes beyond what any sensitivity specification requires	**Meets/Exceeds**
Mobile equipment option (G-192-11 §4.4)	Vehicle-mounted platform; operates at traffic speed; FOV documents which pipe segments were within the detection envelope per pass — unique to Picarro among AMLD providers	**Meets**
Additional methods allowed if equal/ superior to listed methods (§4.4)	CRDS is explicitly listed in G-192-11 Table 2 (2025 edition) as a recognized commercialized methane detection technology	**Meets**

G-192-11 Requirement	Picarro Capability	Status
Coverage of curb lines and available openings in paved areas (§4.4)	Vehicle detects from passing distance; FOV algorithm quantifies which pipe segments were within the detection envelope, verifying lateral coverage of curb lines and further as well as all available openings	**Meets/Exceeds**
Adverse-condition awareness (frost, moisture, wind effects) (§4.4)	Validated across a range of wind speeds, rainfall conditions, and vehicle speeds; onboard anemometer adjusts FOV dynamically for actual conditions; software automatically flags out-of-spec data. Emissions detected from buildings in case of sealed ground provides an additional layer of safety.	**Meets**
Personnel qualification under Subpart N (§4.1)	Picarro provides instrument-specific training; operators maintain Subpart N qualification for their field technicians; Picarro program supports OQ documentation	**Meets**
Leak investigation following surface indication (§5)	LISA-based dispatch directs field crews to precise GPS coordinates; Handheld performs close-range investigation; ppb sensitivity; C_2H_6 biogenic discrimination	**Meets/Exceeds**
Inside/outside odor complaint response (§§5.3, 5.4)	Handheld + P-Cubed Mobile App enables rapid response with instrument-grade readings and real-time breadcrumb trail; P-Cubed logs the response for records. Safely shutoff if methane concentration exceeds 500ppm (1% LEL) ensures safe operation.	**Meets**
Pinpointing to leak source (G-192-11 §7)	Handheld: ppb sensitivity + 10 Hz + sub-meter GPS + RTK option; concentration gradient leads investigator to source; P-Cubed records every step. It can then be supplemented by a low-cost detector for down-bar hole measurements for pinpointing.	**Meets**
Leak records for DOT Forms F-7100.1 / F-7100.2 (G-192-11 §6)	P-Cubed maintains immutable, GPS-timestamped records for every detection, investigation, and initial grade entry; integrates with operator asset management systems in standard GIS and enterprise data formats for lifecycle tracking and closure	**Meets**

The Bottom Line

ANSI-GPTC G-192-11 reflects decades of industry practice and provides a clear expression of a PHMSA-compliant leak detection program. The 2025 edition explicitly refers to mobile leak survey and lists CRDS as a recognized technology, and the standard has always allowed methods that are equal or superior to those enumerated.

Picarro's platform aligns with all elements of the G-192-11 framework and adds capabilities the framework did not anticipate. The closed-path CRDS design enables compliant mobile surveys at traffic speed, with the FOV algorithm providing per-pass coverage documentation that a route log cannot. Flow rate quantification allows prioritization by measured emissions risk. The Handheld accelerates investigation by mapping the surface concentration gradient within a LISA to locate surface expression points; barholes are then used to confirm subsurface concentrations for grade assignment. P-Cubed captures the detection and investigation record and feeds it to operator enterprise systems for records and lifecycle management.

The direction of federal rulemaking under PHMSA points toward AMLD-class technology and annual survey frequency for at-risk lines. Operators building annual AMLD programs now are not waiting for a compliance deadline — they are finding leaks earlier, reducing emissions, and building the operational infrastructure that a tightened regulatory environment will require.

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