



Petroleum AI Field Report

Less artificial. More intelligence.

October 13, 2026 · This edition: Bulk-Plant Inventory Variance

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QUESTION THE HYPE. KEEP IT FLOWING.

SOURCED. NOT SOLD.

Bottom line: Most of the value in variance work comes from disciplined, daily reconciliation that follows fixed rules, plus simple statistics that tell you which variances are real. Generative AI has a narrow role: drafting the exception write-up and pulling missing paperwork. It should not decide what a variance means.

1. The operator problem

A bulk plant runs on a simple equation: opening inventory, plus receipts (transport BOLs), minus withdrawals (tank-wagon loads, rack loadouts, transfers, pumped-out product), should equal closing inventory. The gap between the book and the stick reading or gauge is the variance. In practice, the books and the tank seldom agree. Gross and net (temperature-corrected) gallons get mixed together. A transport drop gets posted to the wrong tank. A wagon load is metered but never ticketed. A strapping chart is out of date after a tank was re-leveled. Water or product gets drawn off and nobody records it.

When variance goes unmanaged, there are four costs. The first is unexplained shrink that ends up as cost of goods sold. The second is supplier short-loads that nobody catches before the dispute window closes. The third is theft that keeps going because a month-end number is too late to act on. The fourth is a real leak that hides behind bookkeeping noise. For regulated underground tanks, federal rules require monthly inventory control as one release-detection option, and they set a performance standard for statistical inventory reconciliation (SIR). Both are in [40 CFR 280.43\(a\) and \(h\)](#), checked on eCFR as current through 10/07/2026. That section's most recent change is dated 5/30/2017. Many bulk-plant tanks are aboveground and fall outside Part 280, so check your state program and SPCC plan for which rules apply to your tanks. (*Interpretation: for most bulk plants, the case for reconciling is financial and about catching loss early, even where no rule requires it.*)

2. What actually does the work

- **Plain rules (not AI):** The daily book-to-physical calculation, temperature correction to 60°F using the API MPMS Chapter 11.1 tables, delivery matching (BOL against gauge rise), and tolerance thresholds. These are the core of the job.
- **Machine learning and statistics:** Trend tests on cumulative variance, which is how SIR works. Also per-tank baselines that learn each tank's normal noise level, so a slow, steady loss stands out from random error.
- **Generative AI:** Reading scanned BOLs and handwritten load tickets into structured fields. Drafting a plain-language exception note ("Tank 3 diesel: three consecutive short days after receipt on BOL ...") for a person to review. It does not set thresholds or close variances.
- **Optimization:** Not needed for this use case.

3. Data required and where it lives

- **Tank levels, temperature, and water:** The automatic tank gauge or tank monitor. At plants without a gauge, manual stick readings on a clipboard or in a spreadsheet.
- **Receipts:** Supplier BOLs (gross and net gallons, temperature, gravity), usually as PDFs from the terminal or carrier, by email or a supplier portal, plus the AP invoice in the ERP.
- **Withdrawals:** Truck meter tickets, loadout meter registers, and delivery tickets in the ERP or the handheld/dispatch system.
- **Tank reference data:** Strapping (calibration) charts, tank IDs, products, and meter calibration records. These are often stored on paper in the plant office.
- **Adjustments:** Transfers, water draws, and product returns. These are the most likely records to be missing.

4. Build, buy, or configure what you own

Configure what you own first. If your tank gauge supports reconciliation, turn it on and feed it meter data. For example, Veeder-Root's public page for its TLS-450PLUS Business Inventory Reconciliation (BIR) feature says it collects metered sales from dispensers, produces shift-by-shift delivery and reconciliation reports, adjusts deliveries for fuel dispensed during the drop, and has programmable alarms on a rolling 24-hour average variance ([vendor documentation](#)). That page is written for retail dispensing sites with underground tanks. Whether it fits a bulk loadout with truck meters is something to confirm with the vendor. Also look at your ERP's inventory module. Many distributor ERPs already store book inventory. The usual gap is that nobody posts the physical reading every day.

Buy. Wetstock-monitoring and SIR providers offer variance analysis as a service. Back-office fuel platforms say they can track bulk-fuel paperwork and audits. Treat vendor accuracy and savings language as claims until a vendor shows you results on your own tank data.

Build. A spreadsheet or small database that pulls a daily gauge export and ERP ticket totals, applies temperature correction, and charts cumulative variance for each tank is within reach for a capable office manager or contractor. The statistics are standard. The hard part is clean, complete ticket data.

5. A 30-day pilot

- **Scope:** One plant, two or three high-volume tanks (for example clear diesel, dyed diesel, and gasoline), net gallons only, reconciled daily.
- **Human review point:** Each morning, the plant manager or inventory accountant reviews every tank above tolerance and records a cause code (paperwork, temperature, meter, short-load, unexplained) before anything is posted to the general ledger.
- **What to measure:** Minutes per day spent reconciling, compared with the current method. The number of variances explained by a paperwork fix. Supplier short-loads found and claimed. False alarms (flags that turned out to be timing or temperature). Days from a variance occurring to someone reviewing it.
- **Stop condition:** Stop or redesign if, by day 20, most flags are still false alarms after one round of tuning thresholds, or if ticket data is too incomplete to close the daily equation. In that case, fix ticket capture first.

6. Controls and failure modes

- **Audit trail:** Keep the raw gauge reading, the source BOL and ticket, the correction applied, and who reviewed each exception. Never overwrite a reading. Correct it with a dated adjustment entry.
- **Permissions:** The people who load or deliver product should not be the ones who post inventory adjustments. Only accounting books write-offs.
- **Who signs off:** The controller or owner approves any write-off and any month-end shrink entry. Environmental compliance staff own any suspected-release response under the state and federal rules that apply.
- **Failure modes:** Mixing gross and net gallons, stale strapping charts, a gauge probe that has drifted, AI-extracted BOL fields accepted without spot checks, and thresholds tuned so loosely that a slow leak never trips an alarm.
- **Never automated:** Deciding that a variance is a suspected release, or not one. Reporting to regulators. Accusing an employee or customer. Writing off inventory.

7. Current public development

In January 2026, Bulk Transporter reported that Gravitare and Warren Rogers had integrated their systems. Warren Rogers' fuelWRAP tank-gauge, variance, and delivery-audit data now feeds Gravitare's forecasting, ordering, and reconciliation modules. The companies say this produces "cleaner reconciliations." That is the vendors' claim, and the announcement is aimed at retail fuel sites ([source](#)). *Interpretation:* variance data is starting to be wired directly into ordering and supplier reconciliation, a pattern bulk-plant operators may see offered next.

Deeper reads

1. [EPA: Doing Inventory Control Right for Underground Storage Tanks](#). A practical booklet based on the 1988 UST rule. EPA notes that the rule was revised in 2015.
2. [eCFR: 40 CFR 280.43, Methods of release detection for tanks](#). Covers inventory control and the SIR performance standard.
3. [Veeder-Root: Business Inventory Reconciliation for the TLS-450PLUS](#). An example of reconciliation features built into a tank gauge.

Based on public sources only. This is not legal or regulatory advice. Confirm your obligations with your state UST/AST program and EPA.

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