

The Silent Thief

**Case Study for
Statistical Inventory Reconciliation**

simmons

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Profits Lost Through Miscalibrated Meters

Statistical Inventory Reconciliation (SIR) is a proven methodology to accurately manage fuel inventories. Through an algorithm process, SIR analyzes fuel inventory data (sales, deliveries, product levels, and meter readings). From this analysis, it is possible to determine:

- Tank and Line Integrity
- Delivery Accuracy
- Tank Tilt/Incorrect Tank Charts
- Miscalibrated Meters
- Pilferage

In underground storage tank (UST) systems, there are three areas where fuel can be lost: sales, deliveries, or a leak in the tank and lines. In order to lose fuel through sales, the dispenser pumps more fuel than the meters register.

The only way to lose fuel through deliveries is a discrepancy in the number of gallons reported delivered and the number of gallons actually received. If the integrity of the tank or line is compromised, then fuel can be lost as a result.

Focus on the Sales Process

The most common area where fuel losses are identified is in the sales process with the miscalibration of meters. While individual meter miscalibrations may appear to be small and insignificant, the aggregate of these miscalibrations results in the loss of significant profits.

Sales are recorded from a mechanical totalizer located on the pump or from a console inside the store. Both numbers are generated by a flow meter inside the dispenser. The flow meter is located between the fuel line and hose, which dispenses the fuel product.

As fuel passes through the flow meter, a small fan or turbine spins, measuring the amount of product that passes through the meter. This small fan turns the cable that drives the mechanical totalizer and console, where the sales (in gallons) are registered.

The flow meter measures the fuel in increments known as "cubic inches". There are 231 cubic inches per gallon. Flow meters are designed to be adjusted or calibrated to precisely measure cubic inches. This dial allows the flow meter to be adjusted; allowing for more or less product to flow through.

The Environmental Protection Agency (EPA) requires meters be calibrated within plus or minus 6 cubic inches. To aid in this process, a five-gallon calibrating container, which measures five gallons plus or minus 20 cubic inches was developed.

The procedure calls for a calibration technician to dispense exactly five gallons of fuel according to the pump's meter. A comparison is then made between what the five gallons the meter says was dispensed and the amount of fuel actually in the calibrating container.

EPA regulation consider meters to be within tolerance if the amount is plus or minus six cubic inches. State and local agencies regularly check meter calibrations to protect the public's interest.

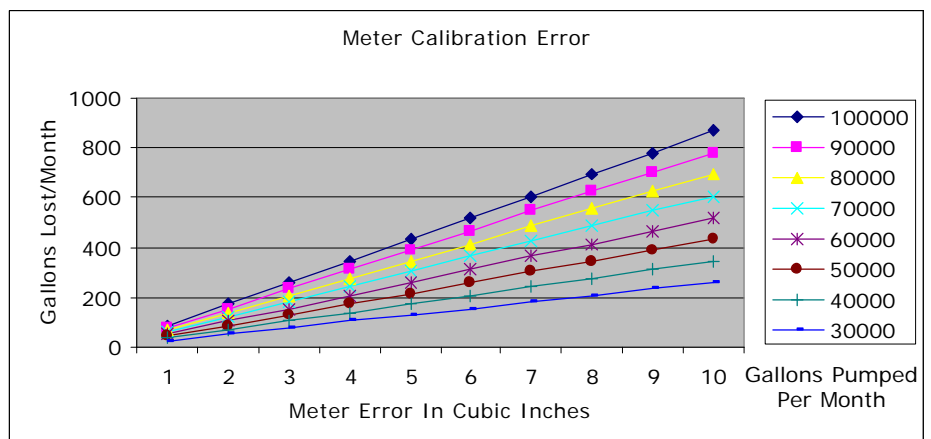
Meters Drift Over Time

It has been Simmons experience that the accuracy of meters tend to shift over time. In a large majority of cases, meters tend to give product away, letting more fuel pass through than is accurately recorded. Simmons EPA Compliance Service affords retailers peace of mind by detecting miscalibrations monthly.

Statistical inventory reconciliation continuously identifies meter miscalibrations within close tolerances. Beyond meeting the accepted tolerances set by federal and state agencies, retailers need to focus on maintaining a 'zero' tolerance policy to minimize the loss of profits.

In high volume fuel locations, retailers can lose hundreds of gallons of fuel and still be within government tolerances! *The Silent Thief* is the miscalibrated meter that allows more fuel to pass through than it should. For many retailers experiencing low margin pools, this loss can deeply cut into fuel margins.

To illustrate this point, review the Meter Calibration Error chart. In a tank selling as little as 30,000 gallons per month, with a meter miscalibration at plus or minus six cubic inches, the tank would be giving away 156 gallons per month.



If the sales amount increased to 90,000 gallons per month, the amount of product given away is 468 gallons. In both examples, these tanks meet federal and state government tolerances.

Fuel Compliance Audit

Simmons performed a fuel audit for a major oil company. A series of monthly statistical inventory reconciliation analyses were performed from a time period beginning in December and concluding the following May. The process called for a calibration of the meters after the SIR analysis was completed. The results of the meter calibration exercise are shown below:

Major Oil Case Study Results

	Hose 1	Hose 2	Hose 3	Hose 4	Hose 5	Hose 6	Hose 7	Hose 8
Calibration Results (+)	8	2	4	8.5	4	4	4	5
% Sales Per Hose	27.10%	17.10%	12.60%	8.40%	13.60%	7.10%	9.80%	4.20%
Gallons Lost Per Day	3.58	0.57	0.83	0.69	1.91	0.47	0.65	0.35
3 Month Gallon Loss	322	51	75	62	172	42	58	31

This audit revealed the average daily sales were 1,909 gallons. Average monthly sales were 52,270 gallons. The net meter miscalibration for all eight hoses was about +5.47. In other words, for every five gallons dispensed, 5.47 cubic inches of fuel was given away.

When the meter miscalibration percent is applied to the monthly throughput of fuel, it revealed in this one tank, 271 gallons of fuel were given away! Over a three month period, 813 gallons were lost; annualized the total loss from this one tank was 3,252 gallons!

When the actual meter calibration was compared to the calculated loss identified by Simmons through the SIR calculations, it was revealed that Simmons had accurately identified the meter miscalibrations within .15 cubic inches.

This audit served as a case study and led this particular company to implement statistical inventory reconciliation as part of their fuel management program.

Calculating The Financial Loss of Miscalibrated Meters

To this point, we've discussed the loss of miscalibrated in terms of gallons. To fully appreciate the financial impact it has on a company's bottomline, lets look at the financial implications.

Using the 'Financial Impact of Miscalibrated Meters' chart below, let's review the three examples covered in our case study. It should be noted, the pump price for each gallon is calculated at \$1.25.

In the first example, 30,000 gallons of fuel per month was pumped and the miscalibrated meter was +6 cubic inches.

Using the pump price of \$1.25 per gallon, the annual loss is \$2,340. If the retailer has an 8¢ per gallon pool margin, 29,250 gallons would need to be sold to just break even!

In our second scenario of 90,000 gallons per month and the miscalibrated meter of +6 cubic inches, the annual loss is \$7,020. Again, using an 8¢ margin, 87,750 gallons would need to be sold to break even.

In both cases, roughly one month's worth of volume would need to be sold to just break even on the losses created by miscalibrated meters.

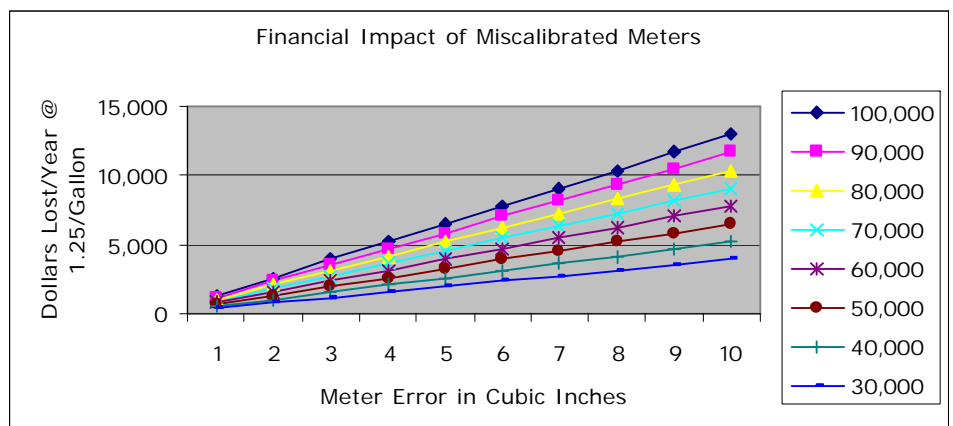
In the fuel compliance audit, the oil company lost \$2,035 in the six months prior to the meters being correctly calibrated. Their annual loss would have been \$4,065. With the six month loss and an 8¢ pool margin, they pumped 25,406 gallons to break even.

To better understand the true financial impact of miscalibrated meters, expand the calculations of our examples to a 25 or 50 store chain. The cost of implementing statistical inventory reconciliation is minor when compared to even a +1 cubic inch loss in a low volume tank.

The additional benefit of SIR is EPA compliance without the investment of capital. Retailers are afforded a flexible compliance strategy that is consistent with their existing store automation strategy.

Today's underground storage tank owners are faced with increasing regulations. From a retail perspective, they face stiff competition from high volume retailers. Implementing strategies that allow for the reduction of costs/losses and maximization of profits not only makes good sense, but shall help to ensure they remain in business.

Statistical inventory reconciliation is one such strategy that meets the criteria for retailers working to make a profit in a penny business.



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