

OIL & GAS – CASE STUDY

FOUR+ YEARS

Bio-Diesel Refinery Improves Accuracy of Fuel Delivery, Reduces Delivery Truck Complaints, and Saves on Proving and Maintenance Treating Turbine Meters with e9 Pro Performance



Results

- Extended time between required cleanings from every 30 days to an entire winter season.
- **Saved over \$14,000** per incident in billing reconciliation, cleaning and proving costs; at least \$28,000/quarter. Multiplied by 4 years and running, this totals at least **\$224,000**.
- Treated meters remained within operational specifications for over four winter cycles.
- Reduced environmental impact from fewer cleaning cycles: less use of cleaning agents, less power usage, and less waste



Customer

One of North America's largest independent refineries.

Turbine Flow Meters

Turbine flow meters provide highly accurate and repeatable measurement of oils, water and some chemicals with a low cost of ownership. Turbine flow meters excel at measuring clean, steady and medium-to-high speed flows of low-viscosity fluids, particularly those found in “pump-intensive” heavy industrial environments. However, they are sensitive to buildup in and around the blades of the turbine and in the bearings. Paraffin, polymers, and other contaminants stick to the blades, causing them to change their calibration characteristics.



As turbine flow metering systems are the “cash registers” for many petroleum operations, this means errors in meter factors can generate significant financial errors in a company's invoicing in a short period of time. Therefore, regular meter proving usually is required to ensure accurate measurement to minimize losses and maximize profits.

Application

Located in the Texas panhandle, this refinery achieves a total throughput of approximately 200,000 barrels of fuel per day. The loading facility at the refinery distributes five different blends of fuel to trucks, 24 hours per day, 365 days per year. It distributes jet fuel, two different grades of diesel, and two different grades of gasoline.

In Mid-October, as winter approaches, the facility changes the bio diesel that it blends from an animal-based biofuel to a plant-based land seed oil. This change, along with the lower temperatures in winter, deposits a film on the turbine

OIL & GAS – CASE STUDY

meters the refinery uses to determine the volume of fuel loaded on trucks for distribution. These deposits on the turbine meters significantly affect the meter factor, causing the facility inadvertently to “short” their fuel distribution. In turn, the delivery trucks “short” their deliveries to retail stores. The accumulated shortage can be as much as 1 to 2% per load. When the trucking companies discover these shortages, they request a billing correction. This reconciliation process requires the refinery to reprove and recalibrate the meters to ensure accurate fuel delivery measurements. This billing reconciliation, along with the cost of proving and recalibrating a single meter can be as high as \$14,000 per incident.

On December 18, 2017 the refinery put four, 3” turbine meters through the proving process. One of the meters was new; three were several years old. The refinery proved each meter in line and compared the measured meter factors to normal meter factors taken during summer conditions. Refinery personnel then pulled each meter out of line and removed the meter components from the housings. Meters were caked with a thick layer of film that the diesel flow couldn’t remove. Technicians removed the film deposits caused by the biofuel using a two-step process. First, they used a spray of brake cleaner and compressed air. Second, technicians repeated the cleaning processes using an off the shelf grease cutting agent. Each piece was hand dried. Following cleaning, technicians treated the parts with e9 Pro Performance. The treatment process was performed on site and took 3 to 5 minutes. Following treatment, technicians reassembled the treated meter components in the housings and reinstalled the meters into the original lines. Each meter was re-proved.

Test

All 4 treated turbine meters were installed back into the distribution line at the refinery. A month after the treated meters were put in service (mid-January), the prover returned to the site to test the meters again. During the month in service, there had been no complaints from truck haulers about under filling their tanks. All meters were still in compliance. Normally, under the coldest conditions of the year, the refinery would expect a deviation in the meter factor by 1% or greater. The Table below shows the meter factors for the treated meters before treatment and the 3 months following treatment. The treated meters showed a deviation of less than 0.15%. The refinery brought the prover back at the end of March, 2018. The meters were again run through the prover. This time, the meter factor increased across all treated meters showing that the meters were running in a better state after the winter than when they were in December.

Meter Factor recorded before, after treatment and during winter operational months.

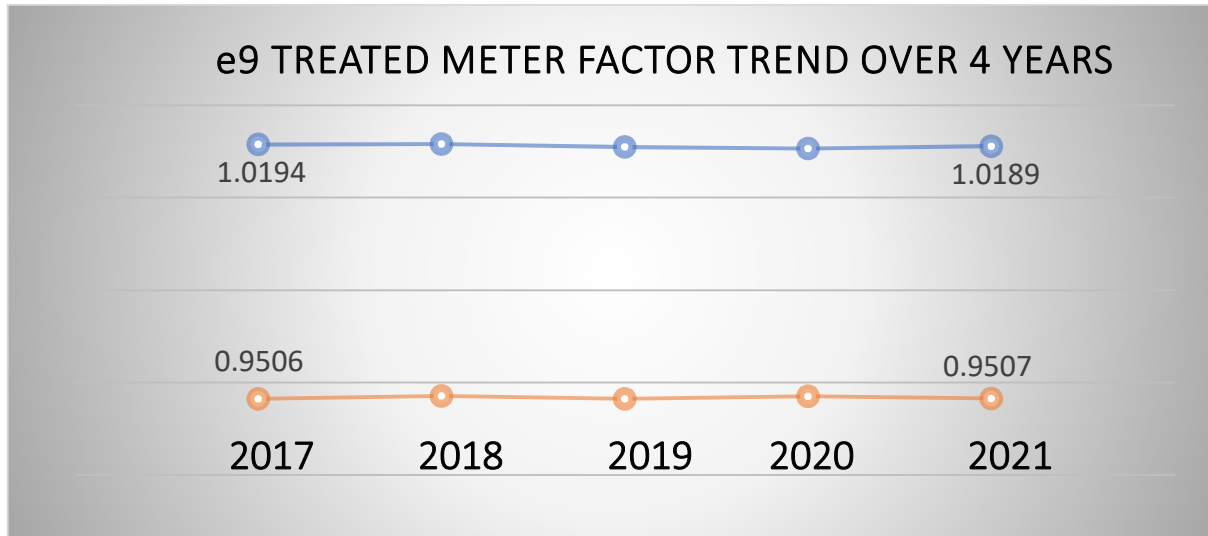
Meter Factor	Summer 2017	December 2017	December 2017 after nano treatment	January 2018	February 2018	March 2018
Meter # 1	0.9835	0.9685	0.9835	0.9810	0.9800	0.9815
Meter # 2	1.0620	1.0575	1.0650	1.0635	1.065	1.0669
Meter # 3	1.0120	1.0000	1.0120	1.0120	1.110	1.0130
Meter # 4 (New Meter)			0.9505	0.9493	0.9505	0.9504

**Note: ± 0.0025 is the tolerance for the meter factor before failing*

The loading station underwent an entire winter season without a single complaint due to faulty meter readings. e9 Pro Performance treated turbine meters not only handled any build up from the conversion of biodiesel material, but the treated meters offered better than expected performance. The loading station returned to a traditional schedule of proving once per quarter. This is a savings of \$14,000 each month in outside proving cost.

The treated turbine meters have remained operational and in service for four winters after being treated. As shown in the graph below:

OIL & GAS – CASE STUDY



Resources

e9 Pro Performance

<https://e9treatments.com/pro-performance-treatment/>

LOWER ENVIRONMENTAL IMPACT

e9 Pro Performance Metal Treatments are environmentally friendly:

- Non-toxic, non-ozone depleting
- Non-flammable
- Reduce cleaning and maintenance
- Low Global Warming Potential (GWP)

Extended maintenance cycles mean:

- Less chemical usage
- Less waste disposal / paraffin remediation
- Less power usage
- Less environmental impact

Use of this technology on devices used in the oil and gas industry and in hydrocarbon environments is patent protected by e9 Treatments, Inc.



e9 Treatments, Inc.
 159 Enterprise Parkway
 Boerne, Texas 78006
 210-742-1051
 InsideSales@e9Treatments.com
 www.e9Treatments.com

The contents of this publication are for informational purposes only, and while efforts have been made to ensure its accuracy, this information should not be construed as a warranty or guarantee, either expressed or implied regarding services described herein.