



INCREASES DAILY BARREL COUNT, REDUCES SERVICE COSTS

LARGE-SCALE WATER PRODUCER SOLVES VARIANCE ISSUES WITH e9 TREATED MAG METERS

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Located in the Delaware Basin, this premier, large-scale water producer, operates an extensive water management system that includes nearly 200 miles of pipeline and 12 salt water disposal facilities with permitted capacity of over 300,000 barrels per day. They also operate one of the largest source water platforms in the Delaware Basin with brackish water and produced water pond storage of more than 5 million barrels—500,000 barrels per day.

This large-scale water producer experienced unprecedented fouling of black calcium carbonate on one of their magnetic flow meters, causing large swings in variances in the largest section of their pipeline. e9 treated this magnetic flow meter to increase measurement accuracy, keep variances within specifications, increase daily barrel count, and reduce service costs.

Large-Scale Water Producer Solves Variance Issues with e9 Treated Meters

About the Customer: Located in the Delaware Basin, this premier, large-scale water producer, operates an extensive water management system that includes nearly 200 miles of pipeline and 12 salt water disposal facilities with permitted capacity of over 300,000 barrels per day. They also operate one of the largest source water platforms in the Delaware Basin with brackish water and produced water pond storage of more than 5 million barrels—500,000 barrels per day.

Challenge: This large-scale water producer experienced unprecedented fouling issues on their magnetic flow meters. One specific mag meter was especially troublesome. This mag meter was located on their largest pipeline, which moved on average 75,000 barrels of water a day. The total barrels per day collected by this 8" mag meter were compared to their customer's meter located further down the pipeline. The daily barrel totals for each meter were then divided to calculate a daily variance as a percentage. This daily variance was analyzed every day to ensure neither got shorted or overcharged. When the daily variance reached an imbalance above the agreed upon tolerance, red flags were triggered. This particular flow meter could only operate for an average of three to five days before fouling occurred, causing large variances outside of the agreed upon tolerance. The constant fouling required technicians to spend numerous maintenance hours cleaning and recalibrating the meters to insure the line continued to operate. Shutting the pipeline down for maintenance caused costly downtime and frustration for all parties involved.

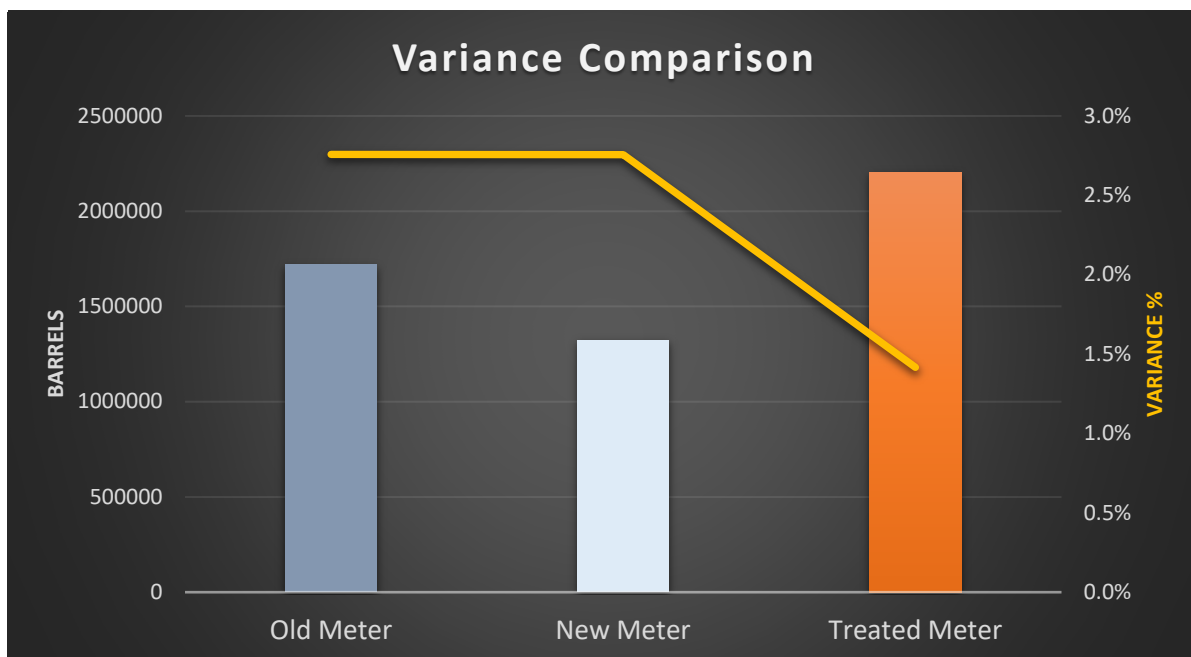
The fouling consisted of a black calcium-like build up, which completely coated the stainless steel electrodes inside the meter. Once fouled, the electrodes could not receive the voltage necessary to accurately measure flow passing through the meter. Technicians found this build up difficult to remove once the meter was pulled resulting in multiple meter swaps.



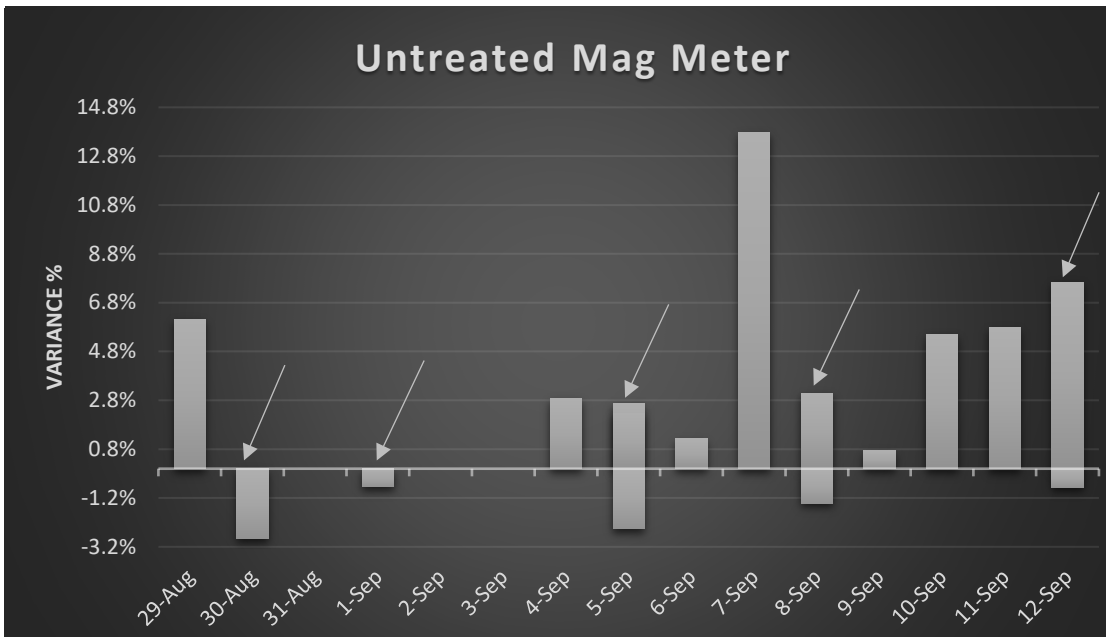
Fouling of magnetic Flow Meter electrodes with black calcium buildup.

Success with e9 Treatments: An e9 Technician thoroughly cleaned and treated the customer's 8" magnetic flow meter with e9's Metal Treatment product, a nanotechnology-based surface treatment. The customer's technicians installed the meter back into service on October 1st. The customer monitored the data from the meter each day to ensure proper functioning of the meter. After 12 days, the meter held within tolerance with a total monthly variance of 1.4% ; staying well under the target tolerance of +/-2%. As a preventative maintenance initiative, the customer decided to pull the meter and replace it with another treated 8" mag meter on November 1st. This second treated mag meter, in service for over three months, has successfully remained within their +/-2% tolerance.

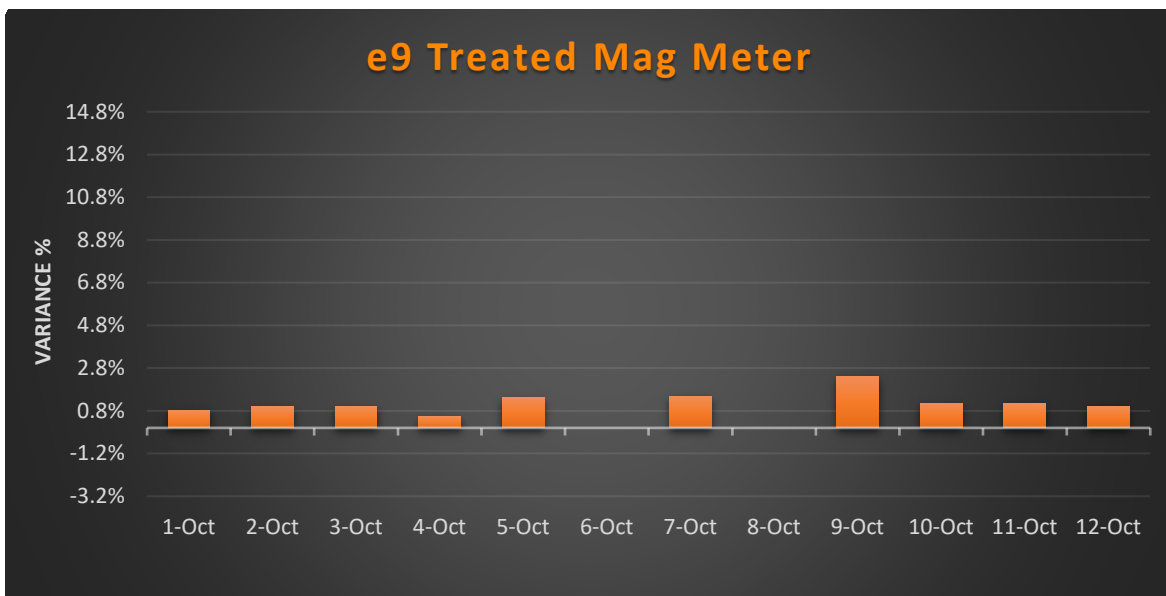
The decrease in monthly variance was achieved by keeping foulants off the electrodes, which in turn increased the overall measurement accuracy of the meter. Daily barrel totals increased, aligning them closer to their customers. On an average, a 1,631 barrel per day increase was documented during this time period. In return, this increased the amount of chargeable barrels and raised profits by ensuring every barrel was accurately measured. **Remarkably, by month end, this totaled to a little over 50,000 more chargeable barrels documented that previously went unaccounted for.**




This graph represents the total daily variance in comparison to the total number of barrels each meter documented in September and October. The treated meter documented the highest number of barrels and achieved the lowest total daily variance. By reducing daily variances e9 Treatments ensured that the customer was able to stay within their target tolerance for a significantly greater period of time. This eliminated maintenance hours, increased profits and restored their customer's trust in the measurement accuracy of the meter.



This graph represents the struggles of an untreated magnetic flow meter. Notice the arrows pointing out the negative variances on Aug 30th, Sep 1st, 5th, 8th, and 12th. This indicates fouling, forcing their technicians to either pull the meter, clean it with hot acid, and return it to operation; or swap the meter out if the fouling experienced was too severe. Associated costs totaled \$2,295 for the cleaning, \$13,802 for two meter swap outs, and \$22,500 in product revenue lost. **This resulted in a grand total of \$38,597 in additional costs and lost revenue during this short 15-day period.**



This graph represents the first twelve days of operation of the e9 Treated magnetic flow meter. The meter achieved a 1.4% variance during this time period, far exceeding what the customer previously had experienced and shows greatly improved measurement consistency.

A decorative graphic consisting of several overlapping, semi-transparent blue shapes that form a pointed, arrow-like shape pointing to the right. The colors range from a medium blue to a lighter, almost white blue.

“e9 TREATMENTS ELIMINATED THE FOULING OUR MAGNETIC FLOW METER WAS EXPERIENCING AND GAVE US CONFIDENCE IN THE MEASUREMENT ACCURACY OF OUR METER” — SENIOR OPERATIONS ENGINEER

Large-scale, mid-stream water producer

Summary: This producer increased measurement accuracy and reduced down time by treating their mag meters. Keeping the mag meters’ electrodes free of foulants greatly reduced the amount of maintenance work needed to keep this line operational, saving tens of thousands of dollars in service costs, and provided time for the producer’s technicians to focus on other important tasks. The lower variances and increased daily barrel totals increased profits by insuring every barrel was accurately measured. The confidence of knowing the mag meter is working properly removed a huge burden for the measurement specialists and led to improved customer satisfaction.