DIGITAL ADVANCEMENTS IMPROVE FUEL & DATA INTEGRITY — AND ANSWER TOUGH SUPPLY CHAIN QUESTIONS

Fuel integrity failures lead to significant revenue losses, brand damage, environmental pollution, poor vehicle performance and increased consumer complaints. To avoid these industry challenges, many branded fuel companies and government agencies are implementing fuel authentication programs throughout the supply chain. As more of these programs are implemented worldwide, stakeholders are finding significant return on investments as fuel quality is greatly improved, revenue and tax collections increase, and the overall integrity of the downstream supply chain is confirmed.

Digital Transformation in the Fuel Supply Chain — Right Data, Right Time

The responsibility of managing the complex fuel supply and distribution chain falls on multiple stakeholders within a commercial brand or governmental agency. The value added through a reliable flow of accurate and timely data provides actionable insight for these stakeholders to measure and reconcile information quickly and enforce, react and remediate fuel fraud. In national fuel integrity programs for example, the agencies responsible for the collection of fuel excise taxes use data analytics to quickly detect the introduction of illicit fuel in the supply chain and, through fast enforcement action, increase tax collections and provide tremendous societal benefits.

"Digital transformation in fuel authentication programs such as Wi-Fi-enabled mobile devices that communicate directly with our data analysis and reporting platform, AXIS®, can reduce data collection and reporting time in the field by 50 percent or more. The automated data uploads increase the speed and accuracy of data entry, eliminating errors resulting from manual processes used in the past."

— Jeff Conroy, Chief Technology Officer, Authentix

Additionally, reliable digital data flow enables branded fuel owners to answer critical business questions about their downstream retail operations. Using a fuel marking program, coupled with digital data analytics, can ensure that premium additized fuel products are being distributed correctly under the right brand retail operations.

Authentix®

Authentix has been a pioneer in combining physical fuel marking programs and the collection and automated analysis of supply chain data, and it has led the way on this digital transformation. Advancements in digital technologies have made fuel authentication programs and the resulting data analytics easier to collect, secure and provide both enterprise and mobile reporting capabilities for its customers, driving improved supply chain security and integrity. Instead of gathering, entering and storing data manually, as in the past, Authentix field inspectors use portable, handheld analyzers digitally connected to the cloud. These advanced mobile devices record supply chain data and communicate directly with our cloud-based data analysis and reporting platform, AXIS® (Authentix Information System).

The slow collection and reporting velocity of manually supplied data greatly increases the risk of fuel manipulation. Today, with advances in mobile or electronic telemetry data collection technology, AXIS® can enable users to quickly correlate fuel supply chain data with other correlated data from field devices and lab-based results for rapid response capability. For over 20 years, Authentix has been executing data reporting for our customers in real-time, analyzing supply chain results and creating actionable insights for improved program management and decreased opportunities for fuel manipulation or adulteration.

How Does AXIS® Work?

AXIS® is an integrated set of software applications designed to aggregate, store, analyze and present data from multiple and disparate sources to solve for potential supply chain integrity problems. Accessible through a remote web application, the system also presents dashboards and user-configurable reports to enable data-driven decisions and confident actions. Collected data could include geolocation, date and time of collection, retail or terminal IDs, and other identifiers and contextual data.

These identifiers ensure data integrity by establishing a chain of custody and providing contextual information to ingest and analyze. The correlation and analysis processes generate alerts and insights to ensure any needed revisions and optimization. For example,

contextual data (e.g., truck tracking, bills of lading, retail pricing, etc.) provides insights beyond simply providing fuel integrity confirmation. It can also help determine how, when and where fuel supply chain fraud has occurred.

The insights and analytics provided by a robust information system like AXIS® can help prevent supply chain interruptions, program stoppage and lost revenue, while employing strict cybersecurity controls to ensure IT environment security. By generating answers and recommended actions through data analytics, AXIS® helps commercial brand owners and governments better understand and secure their fuel supply chains for the long-term.

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Understanding Your Fuel Supply Chain

What has happened? Historical data is gathered — including store and terminal IDs, and date and time stamps — and correlated with similar data. Through data analysis, patterns and anomalous behavior become evident, potentially indicating manipulation or fraud. These descriptive insights are used to flag those incidents.

Why did it happen? Diagnostic insights from sales and supply chain data can help determine how a retail location received illegal or illicit fuel and point to specific transactions and individuals involved. Using that data, AXIS® can help users ascertain if all the non-compliant retail stations in a designated region received their fuel from the same terminal, implying that the exceptions noted could be quality control problems and not fraud. Data such as temperature and voltage records also help field inspectors monitor portable device performance, flagging potential servicing requirements that may be needed.

What will happen? Authentix is accelerating digital transformation for customers with a focus on advancing predictive analytics capabilities. For example, AXIS® can correlate and analyze program data and other external data sources to spot patterns and anomalous behaviors. This provides unique insight into new threats and accelerates detection and learning to provide a significant competitive advantage.
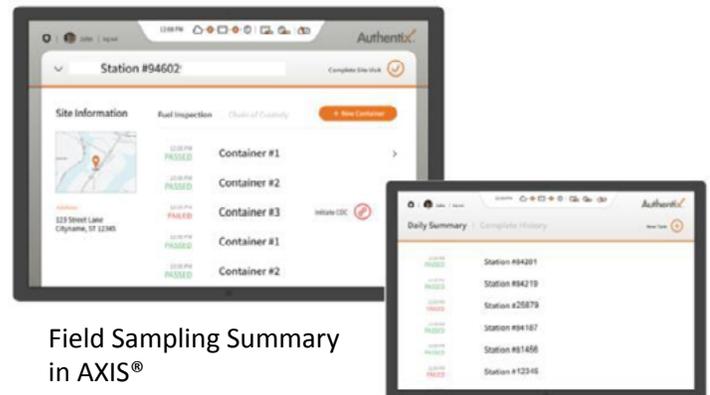
Can it be repeated? Prescriptive insights can help define possible actions needed to prevent fraud, enabling branded fuel companies and governments to create processes and improve supply chain management.

Leveraging Data Analytics to Drive Actionable Insights

Organizations often discover illicit fuel in certain markets, such as tax-evaded fuel sold as premium or transit fuel outside of an intended designated region. Comprehensive, end-to-end fuel authentication programs — from marker injection at the terminal down to field or lab testing results, and data analytics and resulting actionable insights — empower organizations to discover the origin of illicit fuels and prevent these events from happening in the future. By providing contextual information, Authentix fuel authentication programs help pinpoint trouble spots in the fuel supply chain that would not be discovered through normal security audit processes. With the technology to collect, upload and aggregate data using portable web-based devices, the workflow becomes truly automated, assuring greater fuel and data integrity through increased insights and accuracy.

> **"There is still a global underestimation of the vulnerability of paperwork, and many of the world's largest companies are failing to recognize the risk of fraudulent or inaccurate documentation — not just their products."**
> — *Downstream Fuel Manipulation: The threats that could cost you, Oil & Gas IQ, 2018*

Field Sampling Summary in AXIS®

Authentix: Accelerating Digital Transformation for Competitive Advantage

Authentix's 25 years of industry experience and advanced technology provides customers with a distinct competitive advantage. Our secure marking technology, flexible implementation, proactive program support and actionable insights through the AXIS® platform, help customers thrive in a global economy. For more information, visit authentix.com.

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