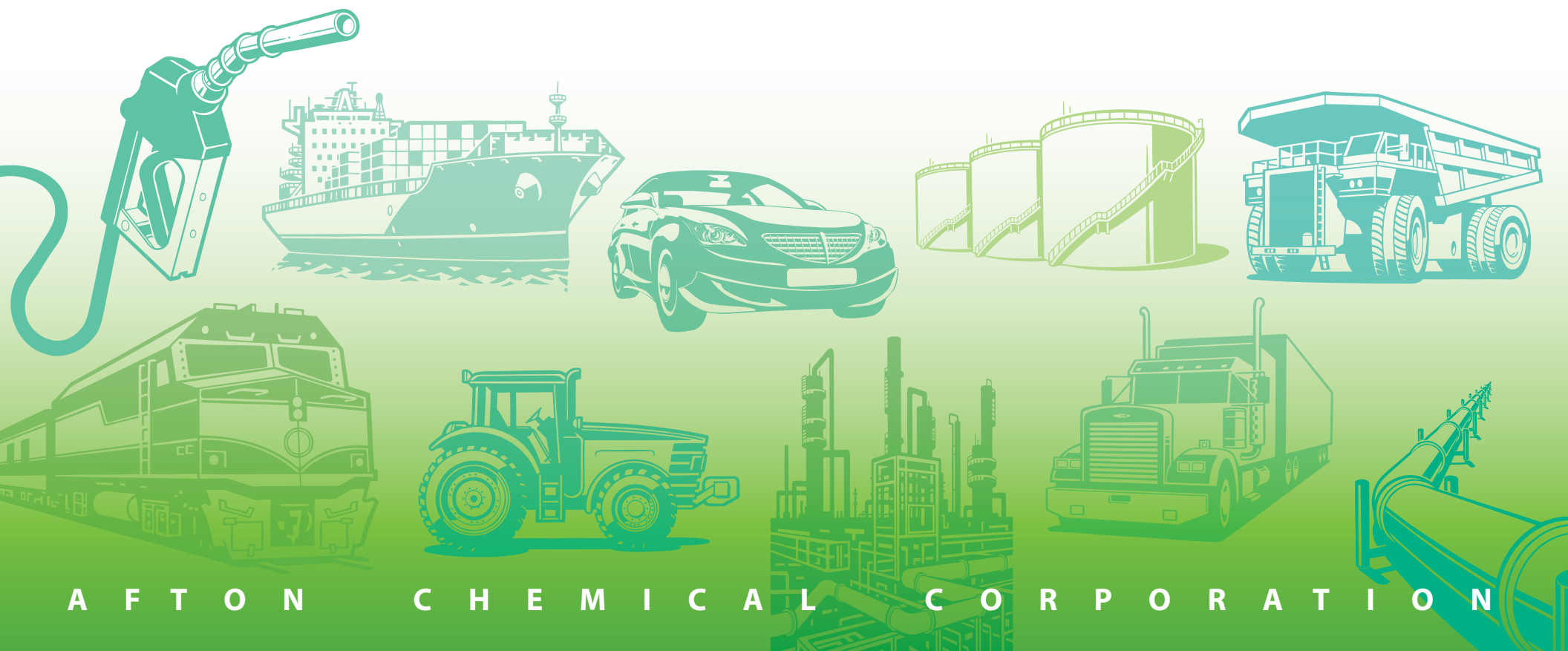




Think Fuels, **Think Afton**



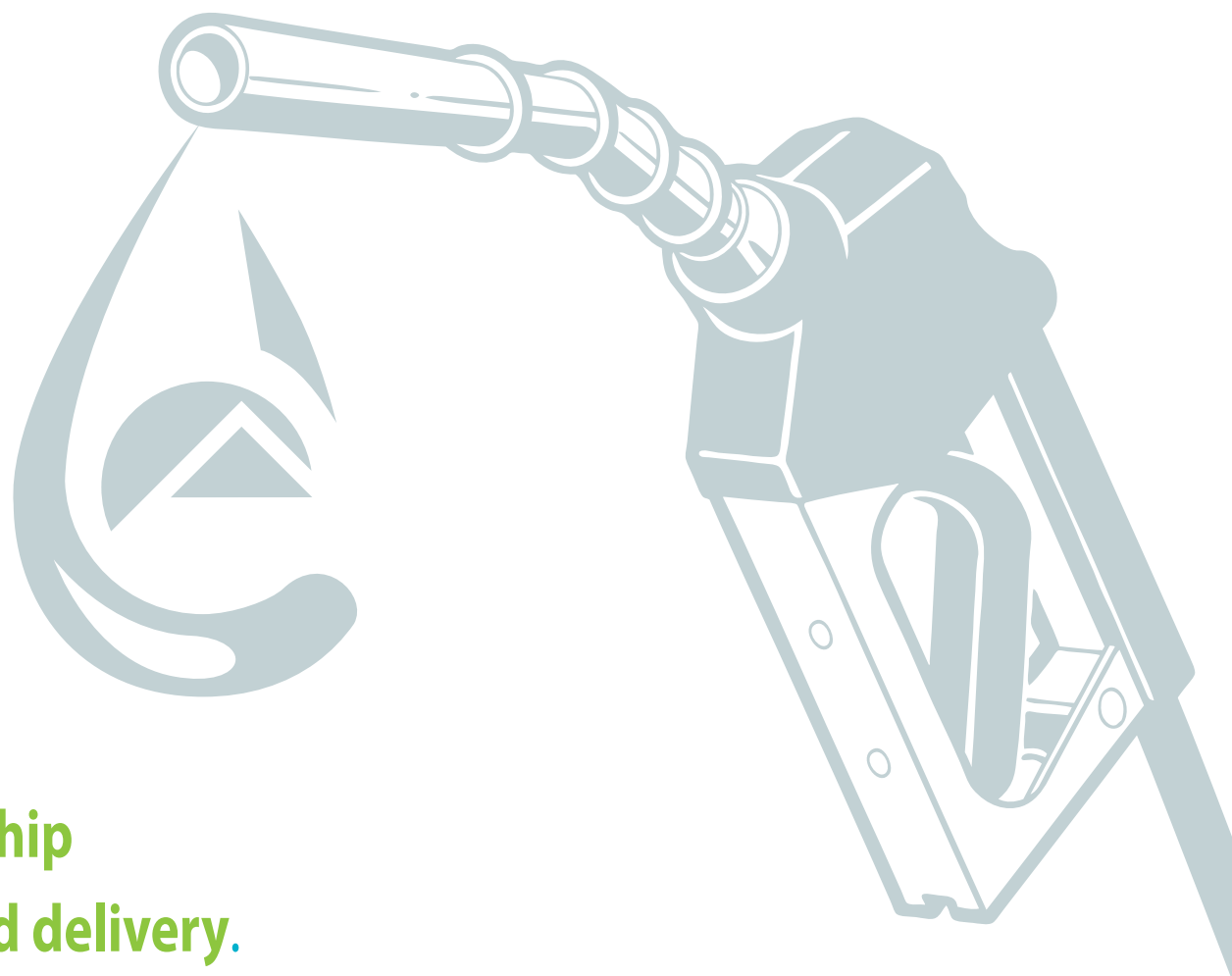
A F T O N C H E M I C A L C O R P O R A T I O N

When addressing the **real-world challenges** facing your team, you need more from a chemical company than just fuel additives. Afton Chemical understands all the possible interactions of fuels and engine oils and gives you **innovative, complete fuel solutions.**

We continue to lead the industry in **investment in research and product development**, to address the entire spectrum of your challenges with **game-changing products and services.** And we bring them to you with a **partnership focused on quality, cost and delivery.**

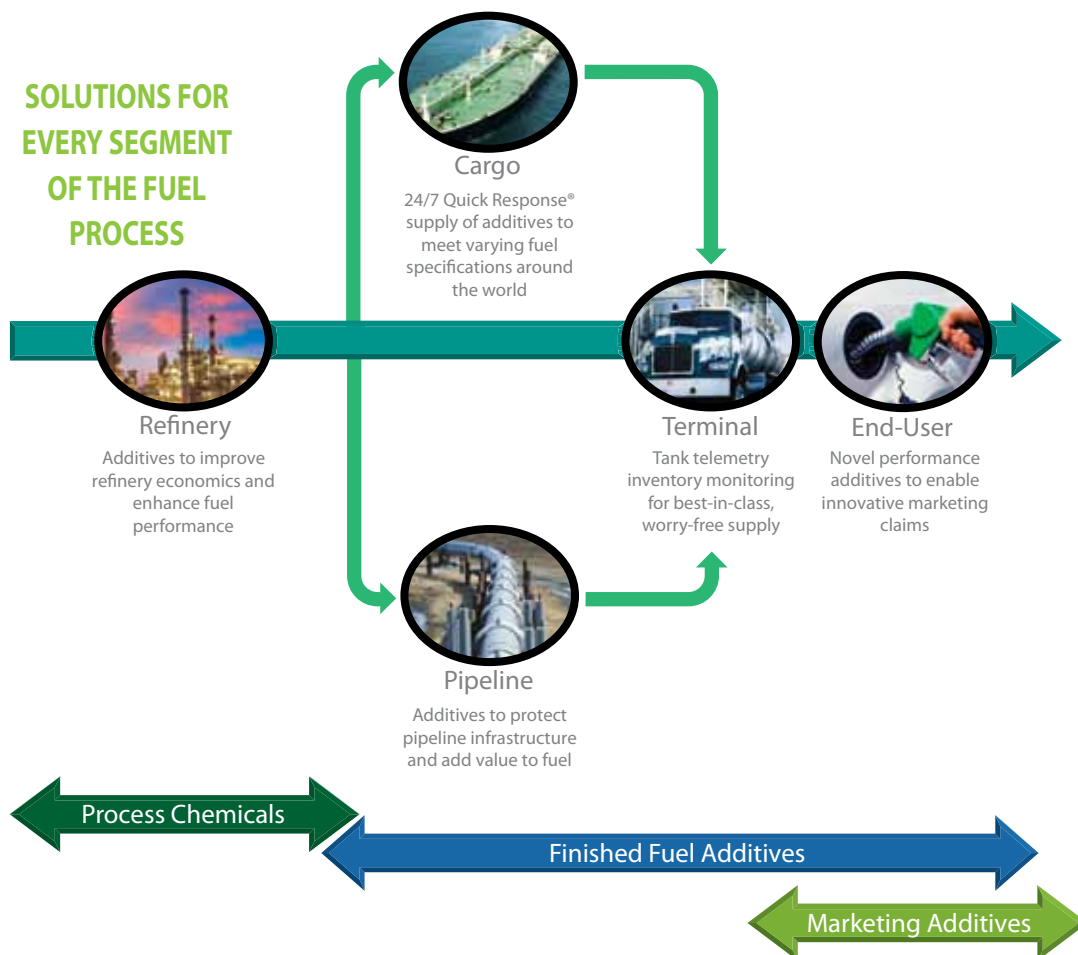
The results are obvious – fuels that perform.

Think Fuels, **Think Afton!**



Complete fuel **SOLUTIONS** based on **LEADERSHIP** in *fuel and lubricant additives*

With nearly a century of experience in **fuel and lubricant additives**, Afton has developed a unique understanding of how fuels interact with engine oils. That broader knowledge has allowed Afton to work closely with OEMs and refineries. We've gained **insight into the latest hardware trends** in gasoline and diesel, and that insight has helped Afton deliver many **next-generation technologies** for cost-effective fuel performance. For complete fuel solutions, **think Afton**.



FUEL FACTS:

- Afton is the largest supplier of specialty fuel additives in the world
- Afton performance additives are used by six out of the top ten U.S. gasoline marketers
- Afton sells over 12 million gallons of gasoline additives per year in the U.S. and Canada, treating over 60 billion gallons of fuel
- Afton sells over 6 million gallons of diesel fuel additives annually in the U.S. and Canada
- Afton fuel additives can be found in over 800 terminals in the U.S. alone



Significant *investment* in **WORLD-CLASS** **R&D** to develop the *best fuels*



Our capabilities are obvious ... but they add up to another important benefit to you: remarkable efficiency and resourcefulness. Throw us a challenge, and you'll see an impressive result ... even if that means bringing in entirely new testing equipment or developing a first-of-its-kind technique.

- A full array of laboratory suites and rig stands
- High-performance chassis dynamometers
- A full dilution tunnel that measures gaseous and particulate byproducts
- Exhaust-particle sizing and counting capabilities
- Certification-level light-duty-vehicle emission testing for both gasoline and diesel fuels
- ASTM PFI to catalyst aging and on-road durability
- Mileage accumulation dynamometers
- A complete vehicle build-up and maintenance facility

TESTING CAPABILITIES

DEPOSIT TESTS

- Ford 2.3L IVD
- Mercedes M120E and M111 IVD
- GM injector poppet sticking tests
- Direct injection gasoline testing
- IVD/CCD/PFI vehicle and rig tests

PERFORMANCE TESTS

- Light duty emissions and fuel economy measurements
- Ford 4.6L V8 – emissions and after treatment research

- Mileage accumulation dynamometers (MADs) with high-speed/load capability
- Performance dynamometer with road load simulation
- Valve sticking test (-20°F soak chamber)

HIGH-SPEED REAL-TIME DATA ACQUISITION AND CONTROL INDUSTRY ENGINE TESTS

- DW-10 (internal and outside)
- XUD-9 (outside test house)

AFTON ENGINE TESTS

- U.S. internal deposits (sticking) test
- LDD coking test in development
- HDD coking test in development
- Outside test houses – LDD and HDD testing

FUELS VEHICLE TESTING

- 40-inch single roll mileage accumulation dynos
- 40 to 50 vehicle test fleet
- Gasoline: DIG and PFI
- Diesel: HPCR and IDI
- On-road fleet testing

- Complete vehicle build-up and maintenance facility
- Access to fleets
- ASTM PFI testing
- Fuel blending and storage



A COMMITTED PARTNER

making you *more successful*

Developing partnerships is in our company's DNA. It's ingrained in our culture to be **more open, more flexible** and **more collaborative**. Partnership starts with hiring the best chemists and engineers in the business ... people skilled in their disciplines who can **work effectively with others**. Then we discuss our customers' needs and aspirations along with the **industry insights** gleaned through our **OEM relationships and market analysis** to develop the right solution to help our customers meet their goals. Where other companies connect, we embrace. Where others are interested, we're passionate. Where others innovate, we break molds. So our teams help you **turn chemistry into solutions and collaboration into value**.

We're a partner who ...

LISTENS AND UNDERSTANDS: Establishment of goals and objectives, market analysis, and infrastructure and supply chain capabilities

RECOMMENDS: Optimal technology, performance claims, effective development pipeline, and promotional plan

IMPLEMENTS: Fuel compatibility, performance testing to support claims, and sales channel training

MEASURES: Consumer satisfaction, ROI, and future consumer needs with continuous market scanning



A **HISTORY** in the *fuel additives* market that *spans more than* **90 YEARS**



1921

General Motors Chemical Corporation founded in Ohio. Charles Kettering forms a new company, which adds chemicals to gasoline to reduce engine "knock."



1962

Albemarle Paper acquires Ethyl Gasoline Corporation and adopts the Ethyl name.



1994

First to introduce a diesel fuel additive with a combustion catalyst, which allowed customers to differentiate their fuel and avoid capital expenditures.



1998

Afton developed the first web-based additive inventory management tool: XChange. X-Change is used today in over 650 terminals in the U.S.

1924

As Kettering's company grows, its name is changed to Ethyl Gasoline Corporation.



1992

Major acquisitions bolster Ethyl's additives strengths as Ethyl acquires Amoco Petroleum Additives in the U.S. and Nippon Cooper in Japan, as global consolidation comes to the petroleum industry.



1996

Further expansion strengthens Ethyl's global presence. With the acquisition of the Texaco Additives Company, Ethyl broadens product lines and enhances research capabilities.



2000

First to help oil companies improve the image of their gasoline through meaningful consumer benefits and ingredient brandings.





2010

SOLUTIONS FOR ULTRA LOW SULFUR DIESEL LUBRICITY:

The introduction of ULSD removed the natural characteristic from diesel fuel creating a need for a trouble-free lubricity additive to lubricate and protect fuel systems.

SOLUTION:

HiTEC® 4898 Diesel Fuel Lubricity Additive, a fully synthetic neutral diesel additive, met the need for comprehensive no-harms performance in critical lube-fuel interactions and offered enhanced fuel system protection to meet the market.

2012

SOLUTIONS FOR STICKY INJECTORS:

As high-pressure common rail (HPCR) engines entered the market, fleet operators began experiencing performance issues with the injectors in these reduced-emission vehicles.

SOLUTION:

With our long industry experience, Afton determined that corrosion inhibitors in diesel fuel were reacting with trace sodium ions, causing "waxy" salt deposits to form on injector needles. That resulted in reduced fuel economy, lost power and increased emissions. From that discovery, we led the industry in developing Greenclean® Technology, which cleans away deposits and keeps engines running smoothly.

And the future promises to be just as innovative...

2004

Ethyl Petroleum Additives, Inc. changes its name to Afton Chemical Corporation.



2008

Afton Chemical acquires the North American fuel additives business of GE Water and Processing Technologies.



2010

SOLUTIONS FOR DIG:

Placement of injectors in direct injection gasoline (DIG) engines subjects injectors to intense heat which can cause deposits on injector heads which can reduce power.

SOLUTION:

Product helps clean away deposits and keeps engines running smoothly.



2014

SOLUTIONS FOR FILTERABILITY:

Contaminants in fuel plug fuel filters and reduce flow to engine.

SOLUTION:

Greenclean® disperses contaminants in fuel to maximize filterability so fuel passes through filters and prevents filter plugging.



