

Don Heck, director of the Renewable Fuels Testing Laboratory at Iowa Central, looks back at how a new research and testing facility was first established on site

Testing facility helping to fuel the future

It all began in 2005 in a leaky greenhouse on the campus of Iowa Central Community College in Fort Dodge, Iowa.

I was tasked with the job of creating a biofuels technology programme and teaching laboratory for students, who could then learn the basic skills to allow them to work in one of the many surrounding biofuels processing facilities here in Iowa and in the Midwest.

Early development

In 2006, we were approached by a local trucking firm (Decker Truck Lines) with an interest in studying the effects of biodiesel in an OTR (over the road) application.

The proposal quickly involved several interested parties: the National Biodiesel Board (now Clean Fuels Alliance America), Renewable Energy Group (recently acquired by Chevron Corp.), Iowa Soybean Association, Caterpillar Engine Company and the US Department of Agriculture. It ran for two years from the autumn of 2006 through to the fall of 2008.

The study involved 10 tractor trailers using diesel and 10 tractor trailers using B20, all with matched equipment and vehicle configurations, running dedicated routes for a combined two million miles over two years.

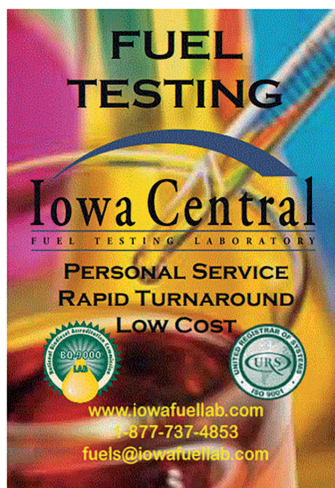
While several real-world application studies had been performed previously, they were generally limited in scope, time and the number of units.

This was the first robust study of its kind looking at the use of B20 in a long-haul trucking application over a period of two



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A new facility will be completed next year



years, year-round, including the harsh Midwest winters.

This undertaking led to discussions about creating an independent fuel testing laboratory that could serve the needs of the renewable fuels industry.

Born from those discussions was a public-private collaboration that included funds and support from local, state and federal agencies along with other interested parties

to establish the Iowa Central Fuel Testing Laboratory.

This included establishing the laboratory as the official fuel testing facility for the Iowa Bureau of Weights and Measures.

With the help of a bond issue passed by the College in 2008, and financial support from Helen Miller and Senator Daryl Beal, along with Jim Kersten, from Iowa Central, and Matt Caswell, from the Iowa Soybean Association we were able to occupy a portion of one of the newly constructed academic buildings in 2009 and have been housed there since.

Recognising the need for quality analytics and customer service, the Laboratory pursued certification with the National Biodiesel Accreditation Commission (NBAC) and in 2010 became the first laboratory in the nation to achieve the BQ-9000 LAB® designation for quality testing of biodiesel

products. In 2012 we achieved ISO 9001 certification to cover all our other testing capabilities.

The uniqueness of our operation cannot be understated. To my knowledge, we are the only accredited, independent fuel testing facility in the nation hosted by a community college.

Being an academic institution, we routinely give tours of the lab to students and other interested groups.

Every couple of years we even host a group of middle schoolers who come in and learn about renewable fuels and make their own biodiesel.

It's a lot of energy in the room but it is fun for all! We also offer internships to qualified students who are interested in laboratory science.

In fact, that is how we hired one of our full-time technicians, and our laboratory supervisor is also a graduate of the college.

What we do

We test motor vehicle and home heating fuels including diesel, biodiesel, gasoline, ethanol and blends.

Our clients send samples from across the Midwest and coast to coast, and even internationally in a few cases.

Our friendly, personalised service allows us to help clients with atypical samples such as raw feedstocks, crude glycerin, fouled filters, and we can even help with insurance claims.

We can help design projects like cold flow additive testing, monitoring of underground storage tanks for cleanliness, or even provide assistance to university research projects.

The revenue we generate from our operations fully supports all of our salaries and benefits, travel, marketing, supplies and equipment needs.

We are even able to contribute to the college for some of our utilities and shared building maintenance expenses. A typical day will start with sample deliveries which are unboxed, verified and logged into our system.

Testing is then coordinated by the laboratory staff with special attention given to samples requiring rush results which, in most cases, can be completed on the same day that we receive them.

Once testing is complete, the Certificate of Analysis (COA) is prepared, checked and double checked and then emailed to the client.

“Assessing fuel quality also drives confidence in renewable fuels as a clean, reliable source of sustainable energy”

As there are many biofuel refineries and other facilities in Iowa, it is not unusual for clients to deliver samples personally.

Why it is important

Transportation is critical infrastructure and helping to monitor fuel quality is vital to keeping that moving.

Assessing fuel quality also drives confidence in renewable fuels as a clean, reliable source of sustainable energy.

Early on, some of the biodiesel production was problematic and quality issues gave the fuel a black eye.

With the tireless work of organisations like the Clean Fuels Alliance America and the BQ-9000 Certification programmes, biodiesel quality has significantly improved.

Any issues that do arise are generally from handling and storage concerns, which is much the same for diesel and gasoline/ethanol blends.

The fuel distribution system is vitally important as well, and the state of Iowa monitors the pipeline supplies coming into the state very closely.

We work diligently with Iowa Weights and Measures to help monitor these supplies and I will give two examples

of how we are able to monitor and maintain quality fuels coming into our state.

Several years ago, we had a particularly cold winter and much of the fuel coming into the state was causing gelling and filter plugging.

From all the filters we analysed that year, the vast majority of them showed high concentrations of diesel “waxes”, which is an industry term for the higher mass diesel hydrocarbons that have very poor cold flow qualities.

The outcry from our retail fuel marketers and other interested parties prompted Weights and Measures to investigate the diesel supply coming into the state and they were able to determine that high cloud product was being shipped in [Iowa tended to serve as the anecdotal “dumping ground” for lower quality product from the refiners].

Due to the headaches and inconveniences caused all-around, we worked with Weights and Measures to begin a winter diesel fuel monitoring programme where the organisation takes diesel samples from several pipeline terminals on a weekly basis during the winter months of November through February or March.

We then test these samples for quality parameters such as cloud point, plug point, moisture level and flash point.

Since we began this programme, we have not had issues with our winter diesel supply coming into the state.

One other example of how we help Weights and Measures monitor fuel quality stems from another pipeline issue where a few years ago a very large quantity of pipeline drag reducing agent was inadvertently placed

into the pipeline supply.

This is a polymer product that, in the appropriate concentration, helps “lubricate” the pipeline by reducing the friction of the fuel on the pipeline wall, thereby helping it to flow more smoothly and quickly.

However, at higher concentrations, this product will form an extremely viscous, gelatinous film with the diesel fuel and very rapidly plug up fuel filters. Once again, the headaches experienced by our wholesale and retail fuel marketers prompted Weights and Measures to investigate the source of the mishap.

Once the matter was cleared up, Weights and Measures decided that the concentration of drag reducer needed to be monitored, especially in the winter, and we were able to research and purchase an analytical system that helps us do just that. We now include this measurement along with our regular winter diesel pipeline quality monitoring programme.

Moving forward

With the success of our current operations, we have long been planning for an expansion of the facility.

With the help of another bond issue [and other funds] we have now broken ground on a new state-of-the-art analytical facility dedicated to our fuel testing operations.

This new facility will be constructed adjacent to the college campus with great visibility where we can show off our new home.

In addition to our current capabilities, the new facility is designed to accommodate additional test equipment for jet/SAF and will have a dedicated engine room designed to house a cetane test engine and two octane engines for RON and MON testing. Completion of the new facility is projected to be August/September next year. ●

For more information:
Visit: www.iowafuelab.com



The Decker 2 Million Haul Study led to the independent Iowa Central Fuel Lab serving the globe