

C MAGAZINE

Every Drop Counts

Refineries wring more value from crude oil

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Is Your Data Safe?





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Refineries fine-tune processes to deliver more diesel and find value in byproducts.

ON THE COVER: Lexi White and the CHS refinery team at Laurel, Mont., watch processes closely to get the most value from every barrel of crude oil.

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Jay Debertin, president and CEO, CHS

Working Together with Purpose

No supply chain delivers value to farmers better than one created by farmers and owned by farmers. While that seems obvious, it's something we at CHS never take for granted. Our commitment to the farmers, ranchers and cooperatives who own CHS drives our daily decision-making, long-term strategic planning and investments.

We have invested in our agronomy business to add crop protection products and services to our strength in crop nutrient sourcing and supply. The expanded platform, combined with the local expertise provided by the cooperative system, brings new options for crop producers managing constant shifts in weather, markets and consumer demand.

We are investing in our soybean processing capabilities with significant expansion of our Fairmont, Minn., crushing facility. The updated plant will handle 30 percent more soybeans to produce more quality soy oil, soybean meal and other soy products to feed Midwest livestock and people around the world.

And in this issue of C magazine, you will read about our refinery processes designed to not only get more diesel fuel from every barrel of crude oil, but also to derive more value from the byproducts of those processes, including everything from gasoline to asphalt. Our investments in refinery upgrades over the past two decades allow us to produce more premium diesel from lower-quality crude oil, which helps meet the energy needs of rural America while optimizing our financial results and, ultimately, the patronage we can return to our owners.

As the nation's largest farmer-owned cooperative, we are proud of our role in keeping farms, ranches, local cooperatives and other businesses running efficiently as we all work together to produce food for the world.


A handwritten signature in black ink that reads "Jay D. Debertin". The signature is written in a cursive, flowing style.

Have a question or feedback for the CHS management team? Get in touch with us at feedback@chsinc.com.



Capturing

CHS squeezes more diesel out of every drop of crude oil and creates other valuable products along the way



Operator Chad Blasi checks on the mechanics at the CHS refinery at Laurel, Mont. While crude oil is further refined into gasoline and diesel fuel, byproducts are created.

Crude

By Sarah Haugen

At the CHS refinery in Laurel, Mont., Operations Supervisor Darin Foote explains how the materials inside the fluid catalytic cracker reach temperatures of more than 900 degrees Fahrenheit, causing heat to radiate from the reactor. It's in this unit that the heavier parts of crude oil start their path to becoming lighter petroleum products, like gasoline and diesel.

A quarter-mile away, the product has continued its journey through the refinery at the coker. Here, the long-chain hydrocarbon molecules in the crude are broken down into short-chain molecules. Operator Chad Blasi sits nearly 200 feet off the ground at the top of the coker, while operator Lexi White uses a front-end loader in the coker pit to separate hot petroleum

coke — one of a number of byproducts created when crude is turned into fuel — from water and load it into a railcar loading system.

At the two CHS refineries in McPherson, Kan., and Laurel, scenes like these run around the clock to turn crude oil into diesel fuel for farmers.

From planting crops to harvesting and bringing products to market, agriculture

relies on diesel engines. That thirst for diesel fuel covers every kind of equipment from the farm to the consumer. More than two-thirds of all farm equipment is powered by diesel engines. Ninety-six percent of the trucks that move agricultural commodities run on diesel. And almost every train and ship that takes crops to market and returns with next season's inputs depends on diesel power. >

Refinery Operations Supervisor Darin Foote looks out over the CHS refinery at Laurel from atop the fluid catalytic cracker. The refinery covers more than 250 acres.



➤ This hunger for diesel fuel shapes the energy supply chain that serves cooperatives and farmers. From working to meet daily transportation needs to long-term capital investments, producing more diesel is a driving force for CHS.

CHS refineries have been transformed specifically to maximize diesel production from every barrel of crude oil.

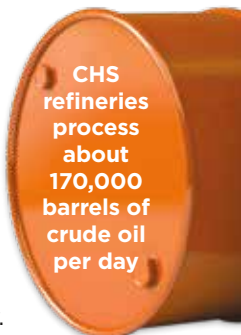
Engineered for Diesel

Manipulating refinery diesel output relies on specialized engineering and investments. In 75 years of refining, CHS refineries have been transformed specifically to maximize diesel production from every barrel of crude oil.

“At many refineries in the U.S., twice as much gasoline is produced as diesel. At our refineries, about 50 percent of the fuels we produce are diesel,” says John Traeger, senior vice president, CHS Refineries, Pipelines and Terminals.

Continued Investments

Making more diesel from every drop of crude requires continuous investments and a unique strategy. The investments are implemented during turnarounds — complete or partial refinery shutdowns when large-scale projects are installed and in-

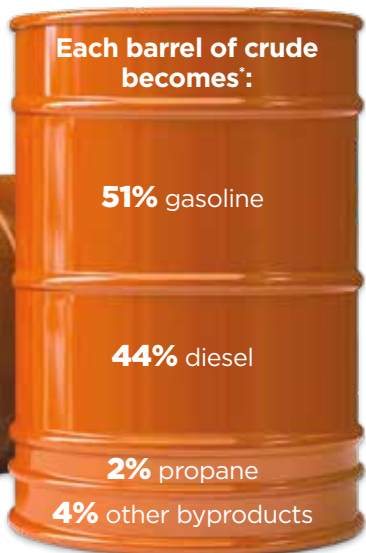


depth maintenance happens. In the past two years, both CHS refineries have undergone turnaround projects focused on processing different grades of crude and wringing more diesel from each barrel.

Both refineries have “metaled up.” The metals in key equipment were upgraded to a special grade of stainless steel, allowing the refineries to process more Canadian crude, a lower-cost but more corrosive crude oil. McPherson also upgraded its hydrocracker, increasing diesel production by 10 percent. “By improving the diesel conversion of the hydrocracker, we’re using this asset to its fullest potential,” says Traeger.

Projects like these create more diesel, as well as more value for CHS owners. “Our focus on the needs of farmers and our owners differentiates us from the other 135 refineries in the United States,” says Traeger.

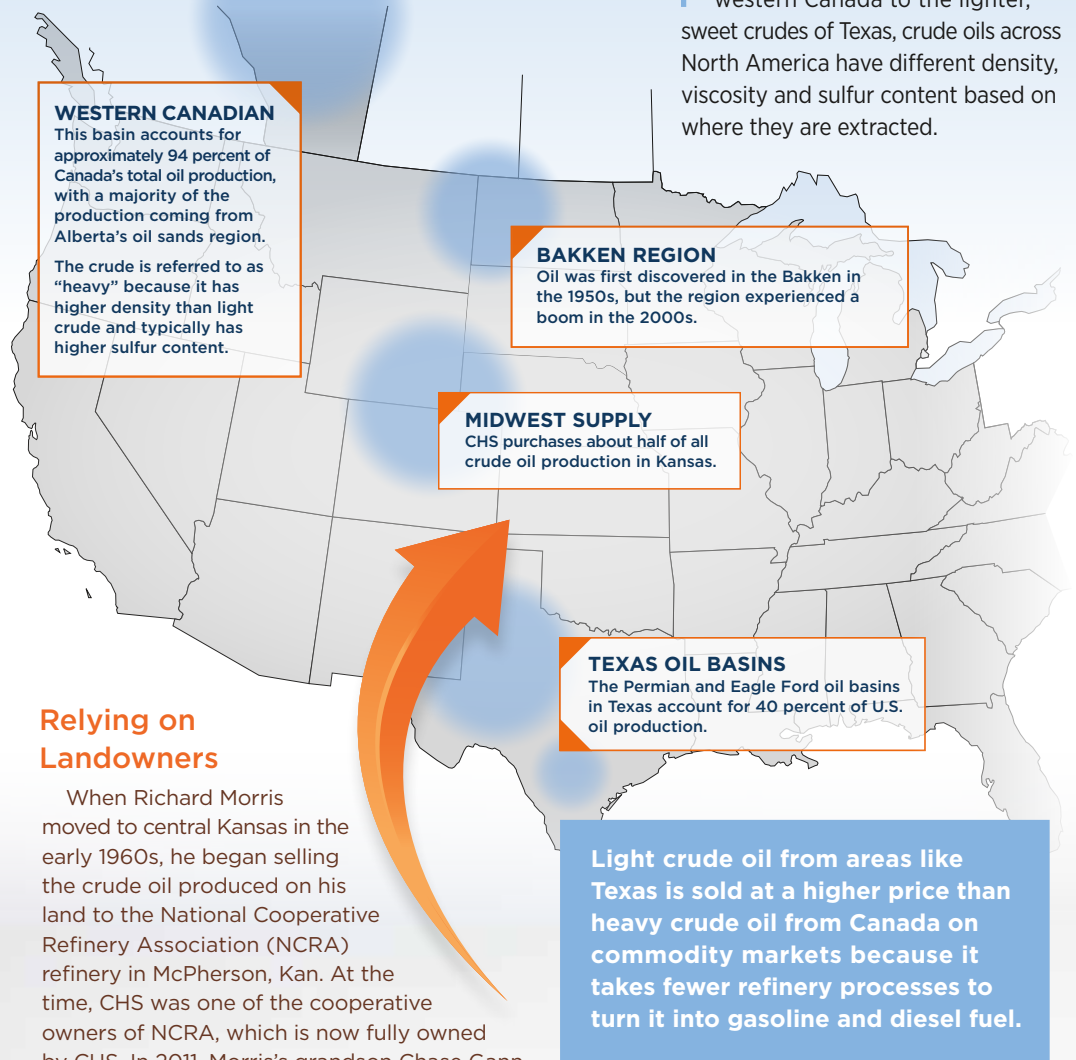
“As the nation’s largest cooperative refiner, our refineries play a vital role in creating connections to power farmers and rural communities across America,” says Traeger. ■



* Processed petroleum products have a lower specific gravity than crude oil, so there is an increase in volume during the refining process, referred to as processing gain.

Sweet to Sour: U.S. Crude Oil Grades

From the heavy, sour crudes of western Canada to the lighter, sweet crudes of Texas, crude oils across North America have different density, viscosity and sulfur content based on where they are extracted.



Relying on Landowners

When Richard Morris moved to central Kansas in the early 1960s, he began selling the crude oil produced on his land to the National Cooperative Refinery Association (NCRA) refinery in McPherson, Kan. At the time, CHS was one of the cooperative owners of NCRA, which is now fully owned by CHS. In 2011, Morris’s grandson Chase Gann took over the operation.

“Grandpa always told me to keep doing business with cooperatives and with CHS,” says Gann, who sells about 1,000 barrels of crude to CHS every month. “We sell grain to CHS and have a longstanding relationship with the cooperative. That loyalty and history means a lot to me and my family.”

In addition to the pump jacks on his land, Gann is a cattle rancher who grows wheat, soybeans and alfalfa. “CHS is a trusted partner for landowners in Kansas,” he says. “We know that our oil is going to our fellow farmers, and we’re proud to help fuel and feed the world.”



Cattle rancher and Kansas landowner Chase Gann and his wife, Ashlee, sell crude oil and grain to CHS.

Building on Byproducts

For crude oil to become refined fuel, it is separated into multiple components by a chemical process called fractional distillation that capitalizes on the boiling point of each component. At cooler temperatures — up to 400 degrees Fahrenheit — propane and gasoline are separated. As temperatures continue to rise to 600 degrees Fahrenheit and hotter, diesel, petroleum coke and asphalt are pulled out of the mix.

“Ultimately, gasoline is also created when creating diesel fuel,” says John Traeger, senior vice president of CHS Refineries, Pipelines and Terminals. The CHS refineries produce a combined 1.4 billion gallons of gasoline every year, which is sold through the Cenex® retail network and to wholesale customers.

The other byproducts, including petroleum coke, asphalt and sulfur, add value for farmers and rural communities. The refineries hold very little storage for these byproducts, which must move out of the refinery so diesel production can continue. “If we don’t sell these byproducts, the refinery simply doesn’t run,” says Mackenzie Nauman, residual marketing manager at the CHS refinery at Laurel.

“From byproducts to fuels, CHS aims to produce the most valuable product for our customers,” says Traeger.



Petroleum coke heats up manufacturing

In the refining process, the heaviest molecule found in crude oil becomes petroleum coke, which has similar properties to coal. There are different grades of petroleum coke depending on the crude oil a refinery is processing. Some grades can be used in making metals like aluminum, but the coke from CHS refineries is generally used as a heat source in industrial facilities, for example kilns at cement plants. These facilities need to heat some products to 2,000 degrees Fahrenheit.



Asphalt paves roads

The CHS Laurel refinery gets about 95 percent of its crude from Canada. The upside of using heavy, sour Canadian crude is its ready availability within North America and lower costs. But that reliable, cost-effective supply produces more asphalt, which must be removed from the refinery to keep it operating efficiently. As the Canadian crude is heated to create gasoline and diesel, about 6,500 barrels of asphalt are created every day. It is sold to contractors to pave roads in Montana, Wyoming, North Dakota, South Dakota and Minnesota.



Sulfur feeds crops

Crude oil sources have varying amounts of naturally occurring sulfur. Kansas crude is about 0.5 percent sulfur, while Canadian crude can be up to 4 percent sulfur. To reduce sulfur dioxide emissions, the U.S. Environmental Protection Agency requires nearly all sulfur to be removed from crude oil in the refining process.

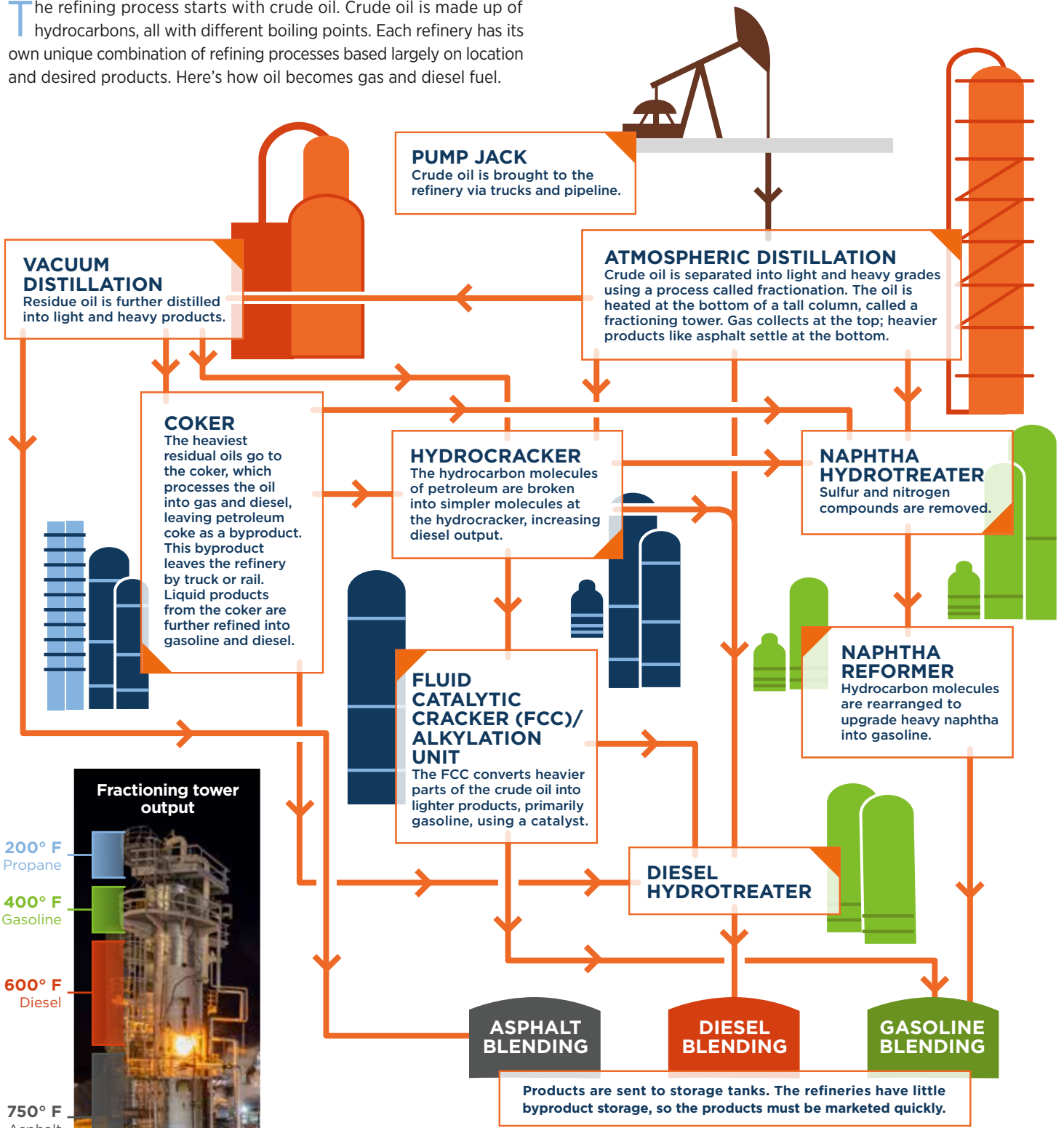
At the CHS McPherson refinery, the sulfur is taken out of the crude and becomes one of two products through a process called hydrotreating. The first is elemental sulfur, which goes into the production of phosphate fertilizers. The second is ammonium thiosulfate (ATS or 12-0-0, 26s), which helps boost levels of the micronutrient sulfur in deficient soils across the Corn Belt and western United States.



In the pit of the coker, petroleum coke is constantly separated from water and loaded into a railcar system. From here, it becomes a heat source in manufacturing plants.

How Crude Oil Moves Through a Refinery

The refining process starts with crude oil. Crude oil is made up of hydrocarbons, all with different boiling points. Each refinery has its own unique combination of refining processes based largely on location and desired products. Here's how oil becomes gas and diesel fuel.



How refined fuels get from the oil well to the pump:
bit.ly/WellstoWheels

Freeing Phosphorus

By Peg Zenk

An innovative option makes broadcast crop nutrient applications more available

Farmers wouldn't be satisfied with just 20 percent weed control from a herbicide application, but that's typically the best nutrient availability they can expect from dry phosphate fertilizer applications.

"Under the best soil conditions, only one-fifth of applied phosphorus may be available to the crop throughout the season," says Steve Carlsen, Levesol and crop enhancement manager, CHS Agronomy. "Availability is even less when soil pH levels are too high or too low or in soils that contain too little organic matter."

The remaining 80 percent of unused phosphorus doesn't help fuel yield and can be susceptible to loss through runoff or soil erosion, he says. Effects have been documented in lower Chesapeake Bay tributaries on the East Coast and in the Lake Erie watershed, which includes portions of Ohio, Indiana and Michigan.

In many of those areas, phosphorus application regulations and management strategies have been adopted or are being discussed and other states may join the list, says Carlsen. >

"Growers have a new tool to help maximize phosphorus efficiency."
— Steve Carlsen

> Better Broadcast

“The good news is that growers have a new tool to help maximize phosphorus efficiency in their fields,” says Carlsen. “Trivar™ fertilizer additive was developed specifically for use on dry phosphate fertilizers for broadcast applications.”

Carlsen says broadcast application of phosphates is used on about 10 times more acres than in-furrow phosphorus applications are used. “CHS Agronomy created Trivar to be applied to dry phosphate forms used for fall or spring applications, including DAP, MAP, triple superphosphate and other sources.”

Soil pH, organic matter levels and cation exchange capacity are the three main factors that impact phosphorus availability, he says. “Those soil characteristics aren’t easily changed.”

Until now, three short-term solutions have been most effective for maximizing phosphorus availability to the crop while committing to improved fertility practices:

- In-furrow applications that place fertilizer close to the seed and developing roots
- Prescriptive applications that tailor rates to soil needs and yield potential
- Applications based on the 4Rs: right source, right rate, right time and right place

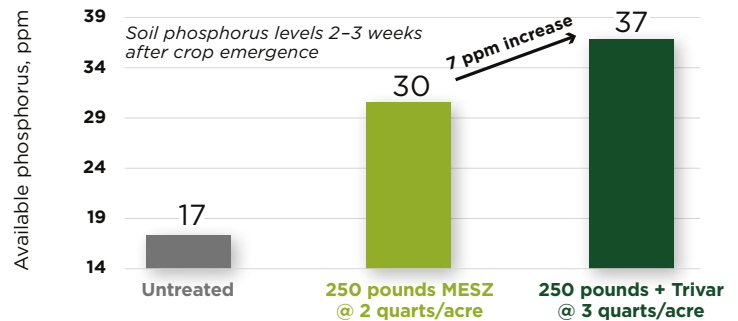
“Using Trivar means one small change in the handling process at the retailer before application can significantly improve phosphorus efficiency,” Carlsen says.

Three-Way Action

Trivar uses three key modes of action to improve phosphorus availability for better plant nutrition.

1 The **Levesol chelate** prevents micronutrients from binding with phosphorus in the soil, making key micronutrients and phosphorus more available for plant uptake. It is an ortho-ortho EDDHA chelate known as one of the strongest and most effective chelating agents available. The chelate works with a wide range of soil pH levels, organic matter levels and cation exchange capacity levels, says Carlsen. “This allows Trivar to be effective across a wide variety of soil types and conditions.”

Spring Broadcast Application Trial



Source: Fred Below, University of Illinois

“Levesol is a proven technology that’s been used as an in-furrow application for more than 18 years,” he adds. “With Trivar, we are able to make its benefits available for more growers using broadcast applications.”

2 A **nutrient-focused enzyme** (phosphatase) converts plant-unavailable organic phosphorus to a readily plant-available inorganic form. The enzyme starts working immediately to free up unavailable phosphorus in the soil.

3 **Zinc and boron** in Trivar improve use of important micronutrients to boost overall plant nutrition. Zinc drives critical plant growth and development, while boron promotes root growth and helps regulate calcium, magnesium and potassium in the plants, Carlsen explains.

Bigger Yields

Last season’s challenging growing conditions allowed the value of Trivar to shine, says Carlsen. In third-party and university replicated corn trials in Iowa, Ohio, South Dakota and Arkansas fields, when phosphate fertilizer treated with Trivar was broadcast before planting, yield increased by an average of 6 bushels per acre over fields that received the same phosphate application without Trivar.

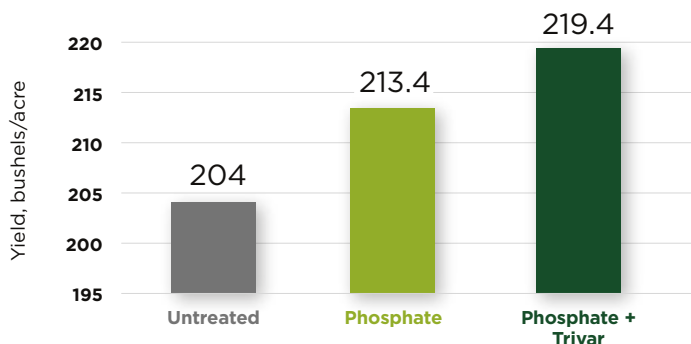
“Any yield increase beyond a few bushels per acre provided a positive return on investment, and most growers saw yield bumps well above that,” he says.

In northeast Nebraska, Jared Jessen, agronomy sales manager for CHS Wausa, reports growers using Trivar for the first time saw average yield increases of 6 bushels per acre, with some fields adding as much as 8 bushels per acre, depending on pH and other contributing factors.

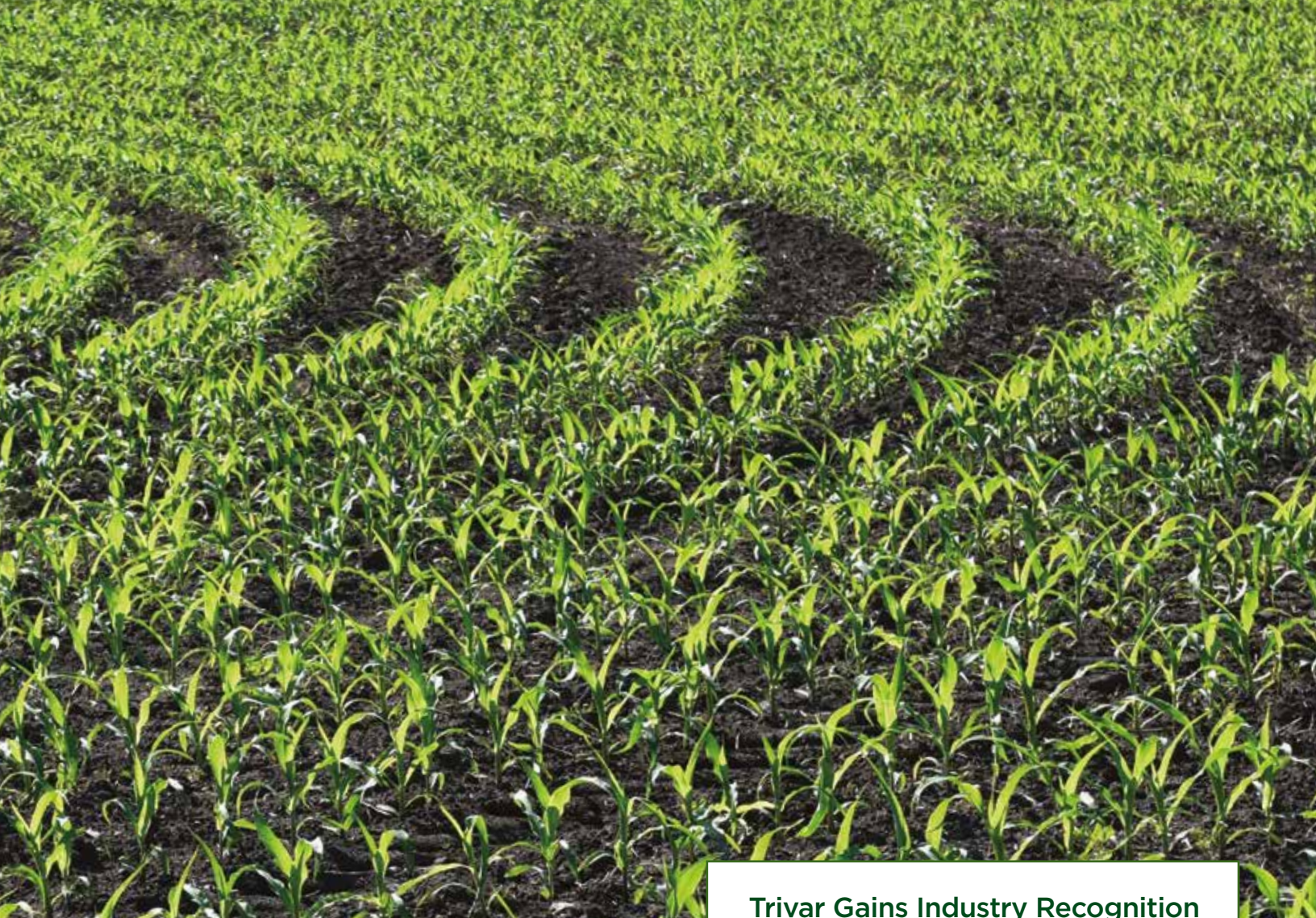
Jessen says there were other benefits as well. “Plants had deeper color throughout the growing season, which is typically a sign of good plant health, and we saw improved stalk strength at harvest.”

Wausa, Neb., farmer Neal Seagren used Trivar-treated MAP on all his corn acres in 2019 and saw a 5- to 6-bushels-per-acre yield increase. “We had noticeably better root development compared to plants of the same hybrid from a neighboring field that didn’t use Trivar.”

Corn Yield Increase with Trivar Use



Source: Averaged results from third-party or university trials in Iowa, Ohio, South Dakota and Arkansas; research funded by CHS Agronomy



Using Trivar fertilizer additive makes phosphorus more available to developing corn and provides key micronutrients.

“I think that was especially important in late-planted corn,” he adds. “Our last corn acres were planted the first week of June, but still yielded around 230 bushels per acre dryland.”

This season Seagren plans to use Trivar on his soybean acres, as well. “With current crop prices and tight margins, every bushel counts.”

Jessen recommends adding Trivar first for cornfields with the greatest variability. “I think at least 80 percent of acres where MAP is applied would see a good payback.”

Environmental benefits are definitely on growers’ minds, too, Jessen says. “There’s already a lot of scrutiny of nitrogen use, and phosphate use will be next here. This is a great tool for helping to reduce runoff, as well as making a farmer’s fertilizer investment more efficient.” ■

LEARN MORE: Get details at trivarfertilizer.com.

Trivar Gains Industry Recognition

Trivar™ fertilizer additive from CHS Agronomy is getting attention, including being named runner-up in the *AgPro* 2019 New Product of the Year award program.

Each year, *AgPro* readers — retailers, agronomists and crop consultants — vote for the product they think will have the most positive impact on agriculture.

“Response to Trivar has been positive. Most growers quickly recognize its agronomic and economic potential,” says Steve Carlsen, Levesol and crop enhancement manager, CHS Agronomy.

Compared to the great strides plant breeding and equipment technology have made in recent decades, changes in crop fertilization practices seem modest, he adds, but “Trivar represents a major advancement in improving phosphorus efficiency that is simple to use and affordable for growers.”



SCULPTED IN STEEL

A cold sun rises above Carhenge, the hulking labor of love planted three miles north of Alliance in west-central Nebraska.

Built as a memorial to his father, the site was created by Jim Reinders who was inspired by Stonehenge, the prehistoric monument in England. Dedicated during the 1987 summer solstice, Carhenge includes 39 vehicles, all sporting a neutral coat of gray paint and welded in place in a circle nearly 100 feet in diameter.

The site draws 60,000 visitors every year. Even more arrived to experience the total solar eclipse on Aug. 21, 2017, which drew more than 700,000 people to Nebraska, making it the largest tourist event in the state's history.

— Cynthia Clanton



PROTEIN POWERHOUSE



A western Nebraska cooperative feeds the world and fuels economic stability for owners

The humble edible bean is an economic star in western Nebraska. Capitalizing on dependably

arid growing conditions, a cooperative-based network of growers and processing expertise, Western Cooperative Company (WESTCO) based in Alliance, Neb., has become a major force in the global dry bean market.

In 1983, WESTCO created New Alliance, a subsidiary dedicated to sourcing, processing and marketing edible dry beans, primarily Great Northern and pinto beans. “New Alliance was started as another option for growers in and around Box Butte County,” says David Briggs, WESTCO general manager. “The Great Northern bean is grown here almost exclusively for the whole world. Growers in this region produce about 80 percent of the world’s supply.”

About 60 percent of the beans raised by WESTCO owners are shipped to quality-conscious customers, from Mexico and Haiti

to France and Turkey. The rest are sold to canners, packagers and food processors across the United States.

Choosy Customers

Dry beans have been the staple of diets around the world for centuries and are seeing new popularity in the U.S., says Jon Sperl, the New Alliance merchandiser.

“Beans are a cheap source of protein and pulse crops — lentils, peas and beans — are used around the world for that reason. In the U.S. a hundred years ago, our forefathers were eating more of those foods as well, then we swung to more middle-class meat-based protein diets. Now U.S. preferences seem to be swinging back to a more plant-based diet due to health concerns, while other countries are moving away from lentils and pulses and eating more chicken, pork and beef.

“The Dominican Republic, Puerto Rico and Haiti are huge pinto bean consumers,” he adds.

Because those countries work to protect their domestic market, there’s a narrow window for selling and shipping to the island nations. “Our crop comes off in September and we have until the end of the year to get beans in country, meaning a shipment has to have gone to Houston or Miami and gotten onto a boat and arrived at its destination by the end of the year because that’s when the domestic market is coming on.”

Supplementing the cooperative’s list of steady customers is a mix of detective work, population science, creative thinking and old-fashioned cold-calling. “The French really like Great Northern, so we call canners and packagers in that part of Europe,” says Sperl. Bulgaria, Hungary and Luxembourg are other targets for the white beans.

“With pinto beans, we look at population centers like the southeastern U.S., since many people originally from the island nations are now in Florida. California >



Precision ag specialist Greta Birch, right, and Agronomist Marcie Oehlke, second from left, discuss pre-season planning with growers, from left, Erik Peterson, Greg Peterson and Davin Peterson.



From left, Erik Peterson, Marcie Oehlke, Davin Peterson, Greta Birch and Greg Peterson review yield maps and crop rotation plans.

father, Greg, and brother, Davin. “We took a big step to maintain that value at harvest by buying a specialty combine designed in Brazil. It’s a pull-type combine that uses gentle threshing and a tipping hopper.

“We cut and windrow the beans in the morning when there’s dew on them to try to minimize losses due to pods dropping or shattering, then come through with the combine when they’re dry,” he adds. “The pods are fragile and if they get too dry, Great Northern pods will pop open and pinto pods will just drop off the stalk.”

New Alliance has made the same sort of investment with storage bins equipped with ladder systems to carefully move beans and more efficient unloading equipment that gets semis in and out in 10 minutes while protecting bean quality.

Inside New Alliance processing facilities in Alliance, Gering and Bridgeport, Neb., beans move on conveyor belts and in bucket lifts to avoid damage. They pass by electronic eyes that trigger a puff of air to blast split or damaged beans off the line and into a separate stream. Split beans can be used for processed foods like refried

➤ and Texas have large Hispanic populations and access to Mexico, so that’s where we look for buyers.”

After more than two decades marketing corn and soybeans, Sperl says he enjoys the process of matching New Alliance beans with customers. “It’s a relationship-based business. You have to know your customer, you have to know your bean and you have to know your growers. We’re sending one- and two-pound samples around the world

to represent our product. Our end customers see the whole bean, so there’s a real passion for the production, the processing and the buyer.”

The New Alliance green triangle logo represents that three-way relationship and has built a strong following. “In the Dominican Republic, they like our white bag with the big green triangle on it,” says Dave Weber, the WESTCO division manager who oversees New Alliance. “There’s loyalty to that brand.”

Handle with Care

Bean buyers typically want uniform, unblemished beans with perfectly smooth seed coats, explains Sperl. Beans with slices or cracks in the seed coat turn to mush when cooked during canning, so beans that pass a soak test to confirm seed coat integrity earn a premium for the grower.

“Dry beans are a value-added commodity crop,” says Erik Peterson, who grows dry beans, corn and dairy-quality alfalfa near Gering, Neb., with his



Dave Weber, who manages New Alliance, shows samples that link every batch of edible beans to their field of origin.



Samples are sent to prospective customers who find value in beans processed under the New Alliance green triangle logo.



beans and bean paste.

While adding efficiency, investments in equipment are also critical to maintaining food safety certification, says Weber. “Over the last four years, we’ve updated three of our four lines. For many of our foreign customers, especially those in the European Union, food safety is a big thing. We’re in our third year of being certified by the British Retail Consortium — it’s a worldwide food safety certification that lets customers know we’re doing the right things and ensuring traceability.”

Every load of beans delivered to New Alliance is sampled and tracked so each product shipment can be traced to the field where the beans were grown and the day they were processed.

Precision Decisions

As a specialty crop, dry beans demand kid-glove treatment. An endless list of factors can hurt bean production and quality. The relatively fragile and highly variable soils around Alliance just outside the Sandhills add to the complex production system.

A 90-day crop, dry beans are the last rows planted in the spring and the first to see the

combine in the fall, with harvest beginning in late August. Preventing erosion means keeping a lid on soil in the off-season, says Peterson.

Each product shipment can be traced to the field where the beans were grown.

“Beans leave very little residue and we often get warm, windy winters, so we have potential for wind erosion. We try to establish a cover crop like wheat, oats or rye right after beans come off the field.” Strip-tillage helps preserve soil-saving crop residue, maintains acceptable emergence and helps build organic matter.

With an average of 15.5 inches of moisture per year, the arid climate is perfect for dry beans, but precision irrigation is necessary for optimal yields. The Petersons add 18 to 20 inches of water via center pivot irrigation systems. “We vary

plant population based on soil type and expected yield potential,” he says. They began yield-mapping in 2001.

“The big thing we deal with here is soil variability,” says Greta Birch, precision ag specialist with WESTCO. “We can have five soil types in a field, so managing for that is a big piece of what I’m looking to help the Petersons do. It all comes down to asking, ‘How can we either boost yield and make more money or cut back and save some money?’ It plays into environmental sustainability, too.”

Birch and Agronomist Marcie Oelke use an extensive zone-mapping system to test soils and create fertilizer plans, then develop prescription maps to inform variable-rate fertilizer applications.

“We pull 8-inch soil samples to test for micronutrients and phosphorus and 36-inch samples to check nitrogen levels,” Oelke explains.

Producing a food-grade product puts added pressure on other inputs. “Our weed-control program is crucial, since there are few herbicides we can use,” says Peterson. “We used to use a lot of hand labor, but we’ve been able to >



Color Counts

To choosy buyers — at food companies or those cooking for their families — bean color makes all the difference.

With Great Northern beans, brilliant white is best. Dry weather and precise production and processing help New Alliance beans meet that standard.

“The beans stay bright white for years, and that’s a sign of quality,” says David Briggs, WESTCO general manager, “but with pinto beans, the beans get darker almost every day. Six months after you harvest a pinto bean, it’s a different color. And the market doesn’t like dark pinto beans. They taste the same, but they look different.”

“Some markets like the Dominican Republic are really particular about pinto bean color,” says Dave Weber, who manages New Alliance. “North Dakota grows about six times as many pinto beans as Nebraska, Colorado and Wyoming, but the pinto beans from western Nebraska and New Alliance are known for being bigger, having better color and holding their color longer.”

Pinto bean breeders thought they’d solved the problem a few years ago by developing varieties of light-colored pinto beans. The beans looked great, but consumers balked when the light-colored beans made dishes like refried beans look more like potatoes than traditional flavorful beans. The new varieties fell flat and growers and processors returned to managing around weather, handling and time to control pinto bean color.



Beans are warehoused in 2,000- and 3,500-pound totes.



Beans are moved onto rail cars or containers in totes or smaller bags for shipping to customers around the world.

From Here to Haiti

The New Alliance distribution process is a complex network of trains, trucks and ships, with the cooperative maintaining control of beans all the way to the customer:

- Cleaned, sorted and graded beans are packed to customer specifications in bags or totes holding from 25 to 3,500 pounds.
- Every package carries information that links it to the field where the beans were raised and where and when the beans were processed.
- Domestic customers often take shipments in 2,000-pound totes shipped by truck to a processing plant where beans are canned or put into retail packages for grocery store shelves.
- Bags are loaded into railcars or trucks for U.S. customers or transit to a port, generally in Houston or Miami. At the port, bags are loaded by hand into containers and put on oceangoing vessels.
- New Alliance controls every shipment to its destination, sometimes hiring a freight forwarder to handle insurance and manage the ocean voyage.
- Some customers request source-loaded shipments, where a container is filled at the processing plant and shipped directly to the customer with no unloading and reloading at the port. This method adds costs but offers more security.



Growers deliver dry edible beans directly to one of four New Alliance facilities for storage and eventual processing, including this facility in Alliance, Neb. Gentle handling maintains bean quality from field to customer.

- handle weeds pretty well with herbicide programs, which helps reduce costs.”

The restrictions extend to other crops in the rotation. “On early crops in the rotation, like corn, we’re restricted on what we can use because any herbicide residual from the prior year can affect the dry bean crop,” he adds.

Finding Value

The 2019 growing season was one of the toughest on record for New Alliance producers. A series of weather events and irrigation system failures cut yields drastically. “We had several hailstorms mid-season,” says Weber. “We probably lost a third of our bean crop in 12 hours.”

The short crop and good worldwide demand helped boost bean prices to about \$32 per hundredweight. A more typical price is \$25 per hundredweight.

WESTCO is the only dry bean player organized as a cooperative and that gives growers extra confidence and

value when selling to New Alliance, says Peterson. “When you’re marketing dry beans, there’s little information from year to year. WESTCO offers contracts early on to reduce our risk, but if the market goes up, we can still participate in that increased price through patronage.”

Briggs reports patronage paid to New Alliance growers has averaged about \$2 per hundredweight.

“Over the years, entities have tried to come in and buy dry beans, offering big contracts to make a quick buck,” adds Peterson. “Growers delivered the crop and the next thing they knew the company was bankrupt and gone and so were their beans. It’s a nice feeling of security knowing WESTCO is standing behind the contract, along with providing great service and the right recommendations. With dry beans, every decision you make, every input you put into the ground has to be right. There’s not a lot of margin for error.” ■

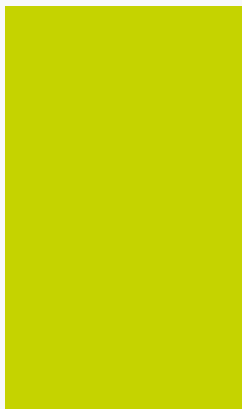
Dry Bean Production: Top States

	Portion of total U.S. production
1 North Dakota	32%
2 Michigan	17%
3 Nebraska	11%
4 Minnesota	9%
5 Idaho	8%
6 Colorado	5%
7 California	5%
8 Washington	4%

Source: U.S. Dry Bean Council

SEE MORE: Watch a video on New Alliance at chsinc.com/c.

**WHEN YOU'RE
A CO-OP OWNER**



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EVERY DAY.**



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HOW SAFE IS YOUR DATA?



One bad click might be one click too late to protect your data

By Jennifer Chick

Customer digital footprints are a hot commodity in today's plugged-in world, especially in agriculture, where personal and farm data are used to make daily decisions.

At companies that sell inputs and buy commodities, data security professionals work tirelessly behind the scenes to protect data.

"We want to worry so much about the data security of our members and customers that they don't have to worry," says Beth Singer, director of information technology compliance with CHS.

Even with the experts watching out for farm data, the first line of defense in data protection begins with individuals, says Singer. The same strategies CHS and other companies use to protect data and privacy can be applied to personal and farm accounts. Here are a few tips you can apply to your own digital footprint.

Learn Your Data

Your personally identifiable information is highly valued by both companies and hackers. That personal information is tied to invoices, orders, grain contracts, patronage forms and farm management plans. Hackers and scammers collect sensitive

data to open up fake accounts, gain access to existing accounts or steal money. Be aware of where and when you give out data. Limiting how often and where you share data will lower your risk of stolen data.

"Notice what data you give out, especially electronically, and question why sensitive data is needed," says Singer. "Ask, 'What are you doing to take care of my data?'"

"The more we talk about data privacy, the more we can put plans in place to protect that data," she adds.

Own Data Protection

"Cybersecurity should be everyone's concern every day," says Aaron De Boer, CHS cybersecurity manager. "Over the past 10 years, the frequency of hacking, malware and social engineering incidents has grown dramatically. The landscape, with more and more network-connected devices like TVs, cars and refrigerators, has increased and attackers' methods and techniques have evolved."

Phishing, spear phishing, malware and ransomware are all used by hackers to grab your digital data.

The FBI calls ransomware attacks a top cybersecurity threat. Resolving an attack can cost \$500 to \$2,500 or more.

Practice Healthy Data Habits

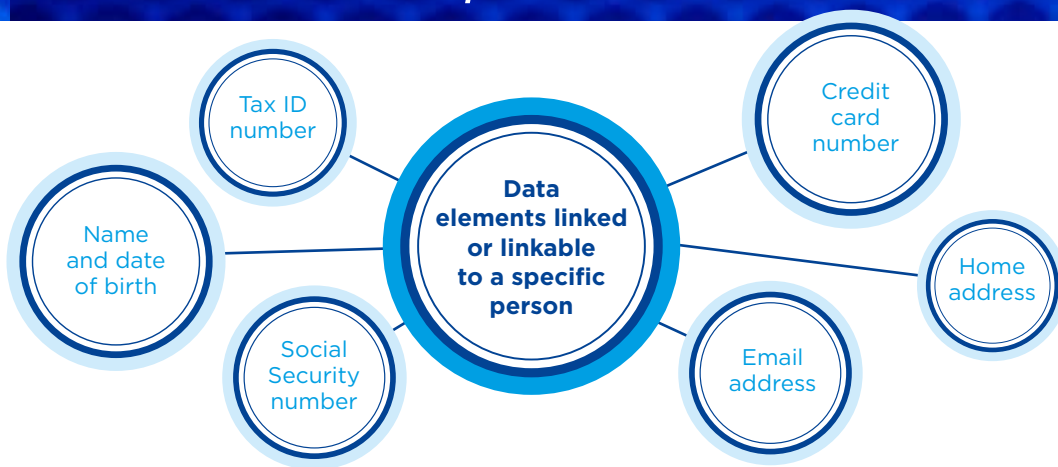
Be aware of every download to your computer, smartphone or other electronic devices. Once your computer or mobile device has downloaded something harmful, it is often too late to protect the data it holds. Evaluate every download request before you click or tap.

Install all operating system and software updates. "If your software has not been updated recently, it is vulnerable," De Boer says. "And those vulnerabilities are a prime target for hackers who want access to your systems and devices through the web."

"The more we talk about data privacy, the more we can put plans in place to protect that data."
— Beth Singer

Don't go to risky websites. If a browser notifies you that a website is unsafe, don't proceed to that website. If the site

What Is Personally Identifiable Information?



appears to belong to a company you do business with, contact it by phone or email to find out if it is having website issues.

Protect Passwords

Have a password strategy. Using “Password1234” is inviting hackers to tap into your accounts and steal data. Tracking passwords on paper might seem old school, but is still a good option, says De Boer, and one still used by many government agencies. Changing from a short password to a longer pass phrase of 15 characters or more with special characters and numbers is also a good idea.

“There are also many password management programs that work very well,” De Boer says.

Be sure to change any default passwords that come with devices and software. “Those default passwords are on the Internet and are known to

everyone,” De Boer says.

Enable multi-factor authentication (MFA), which is becoming much more common and is another way to make it harder for someone to hack into your accounts. It usually requires a two-step process to log into programs by requiring the user to enter a verification code provided through email or text message. MFA is usually an opt-in process.

Be Suspicious

Don’t click on suspicious links. On a computer, hover the mouse over a link and the web address will pop up; on a smartphone, hold on the link to see the address. If the address doesn’t match the website the link indicates, it might be a fake link created by a data thief.

Never enter your login credentials through a link in an email. Instead, go directly to

the website through a known bookmark to verify the communication or notification is legitimate.

If you get a suspicious email from someone you know, focus on sender details, context and content. Would this person normally send you a request for this type of information? If you’re not sure, call that person to make sure he or she is truly requesting the information.

“That one simple action is an easy way to thwart bank or billing fraud,” De Boer says.

While smartphones can fit in our pockets, they carry as much computing power and data as some laptop computers. With that much data on the move, data protection is critical. Educating yourself on the risks and taking a few simple steps will go far in protecting your valuable data. ■

Make Data Privacy a Priority

- Check your privacy settings.
- Share your data with care.
- Question who has your data and how they handle it.
- Tell companies your data privacy is important.
- Talk to your family about data privacy.
- Protect sensitive data sent electronically with encryption and other tools.
- Don’t share personal information over social media.
- Don’t connect to unknown wireless networks or devices.

Phishing

A practice where scammers use deceptive emails to trick people into helping the scammer collect sensitive data, gain access to accounts or steal money.

Spear phishing

The practice of sending emails that appear to come from a known or trusted source with the intent to get people to reveal confidential information.

Malware

Software designed to disrupt, damage or gain unauthorized access to computer or mobile device systems.

Ransomware

Malware that holds data hostage by blocking access to a computer system until a sum of money is paid.



Cooperative partnerships support local communities

BETTER



In a chilly day in January, students are keeping warm in a greenhouse learning about agriculture firsthand. Nearly 700 miles away, firefighters are practicing grain bin rescues in a state-of-the-art facility. These projects are two of the more than 225 projects partnering CHS Community Giving and local cooperatives through the CHS Seeds for Stewardship (SFS) program. The SFS program matches cooperative contributions up to \$5,000 to support local ag safety or ag education projects.

Training Tools

In Ohio, when Jason Nowakowski, safety director of Centerra Cooperative, became aware of local Farm Bureau efforts to build a grain bin training facility, he was excited to get his cooperative involved.

“Many rural fire departments receive grain bin rescue tubes,” he says, “but without targeted training, they can’t use the equipment as effectively as possible. This facility gives them the opportunity to do that.”

Top, Ellsworth (Wis.) High School FFA Advisor Katie Christenson, second from left, helps students explore potential horticultural careers in a greenhouse updated with funds provided by Chippewa Valley Energy and CHS Seeds for Stewardship.

Bottom, local cooperatives and CHS Community Giving partnered with the local Farm Bureau to help develop this Ohio grain bin rescue training facility.

By Tera Stoddard

TOGETHER

Housed at the Wayne County Regional Training Facility in Apple Creek, Ohio, the grain rescue area is one of several training spaces available for rural fire departments. The training options include confined space rescue, trench rescue, oil and gas rescue, and multiple burning buildings. The grain bin training setup consists of a 60-foot grain leg with augers, a 7,500-bushel grain bin and a 15-foot hopper bin.

“Sometimes, there’s a bit of disconnect between how firefighters train and what they experience in real rescue situations,” says Nowakowski. “When they train here, they’re training in facilities they would likely encounter on a farm or at a cooperative facility.”

When Centerra Cooperative received information on the SFS program, Nowakowski and his team saw a perfect opportunity to amplify support for the project. Another local cooperative, Loudonville Farmers Equity, also applied for matching funds from the CHS program to support fundraising efforts. The three cooperatives, in partnership with CHS, helped raise more than

\$30,000 for the training facility.

“This project exemplifies the multiplier effect of the CHS Seeds for Stewardship program,” says Jessie Headrick, director, CHS Community Giving. “By working together on community projects, we’re able to accomplish more and increase our overall impact.”

For Nowakowski, having a training location near the cooperatives and their owners is key.

“The agriculture community has rallied around this project,” says Nowakowski. “There’s a sense of pride knowing that one of the premier training facilities in the state of Ohio is right in our backyard.”

Advancing Ag Education

In addition to ag safety, another key focus of SFS is ag education. The Ellsworth, Wis., FFA program benefited from the program’s support when FFA Advisor Katie Christenson approached Eau Claire (Wis.) Co-op Oil, which does business as Chippewa Valley Energy, with an idea. Christenson’s

familiarity and shared values with the cooperative system made it her first choice when she began fundraising to upgrade the Ellsworth High School greenhouse.

“I grew up in a farm family and we were part of several cooperatives,” says Christenson. “I love the cooperative model and how cooperatives are huge supporters of their communities. When looking for ways to help fund improvements to the greenhouse, I thought the local cooperative would be a great fit.”

CHS matched the cooperative’s support and the combined \$6,000 helped fund improvements to the high school greenhouse, including new doors to increase energy efficiency, installing storage shelves and adding space for student projects. More than 300 students enrolled in plant science, floral design and landscaping classes have benefited from the support.

“Students use the greenhouse as a place to conduct experiments and grow plants,” says Christenson. “In plant science, they start seeds and plant plugs. The greenhouse

class transplants seedlings, starts hanging baskets and monitors growing conditions.”

The floral design class helps students engage in an avenue of agriculture they may not traditionally think of, she says. In the class, they design arrangements with real and artificial flowers, create business plans and keep portfolios of their work. They also donate their time to create arrangements for community events like Veterans Day celebrations.

“When businesses call on you for projects and support those projects with funds, it is an incredible thing,” says Christenson. “Having the community and two cooperatives believe in my program and what my students are doing is one of the best compliments I can get as an ag teacher.” ■

LEARN MORE: Find out how Seeds for Stewardship matching grants can support projects in your community at chsinc.com/stewardship.

CHS REPORTS \$177.9 MILLION OF NET INCOME FOR FIRST QUARTER FISCAL 2020

CHS Inc. has reported net income of \$177.9 million for the first quarter of fiscal year 2020 that ended Nov. 30, 2019. This compares to net income of \$347.5 million in the first quarter of fiscal year 2019.

Results for the first quarter of fiscal year 2020 reflect:

- Revenues of \$7.6 billion compared to revenues of \$8.5 billion for the first quarter of fiscal year 2019.
- Strong supply chain performance in the CHS propane business resulting from efficient sourcing of propane during significantly increased fall demand for crop drying and home heating brought on by unseasonably early cold and wet weather during harvest.
- Less advantageous market conditions in the CHS refined fuels business compared to the first quarter of fiscal year 2019, during which the company experienced historically wide pricing spreads between Canadian crude oil and U.S. crude oil. CHS processes Canadian crude oil at its refineries in Laurel, Mont., and McPherson, Kan.
- Poor weather conditions that occurred in fiscal year 2019 and the first quarter of fiscal year 2020 continued to negatively impact Ag segment operations, resulting in lower crop yields, poor grain quality in some areas and lower fall crop nutrient sales.
- Pressure on grain volume and margins due to slow movement of grain associated with unresolved trade issues between the U.S. and foreign trading partners.

“We are not immune to the challenges of our industry, and our first quarter results reflect difficulties brought on by fall

CHS INC. EARNINGS* BY SEGMENT (in thousands \$)

For the Three Months Ended Nov. 30		
	2019	2018
Energy	\$162,153	\$232,461
Ag	(13,862)	80,318
Nitrogen Production	16,450	23,679
Corporate and Other	20,660	30,774
Income before income taxes	185,401	367,232
Income tax expense	6,664	20,117
Net income	178,737	347,115
Net income (loss) attributable to non-controlling interests	855	(389)
Net income attributable to CHS Inc.	\$177,882	\$347,504

*Earnings is defined as income (loss) before income taxes.

weather and ongoing trade tensions,” says Jay Debertin, CHS president and CEO. “The cooperative system provides CHS and its owners stability to withstand these difficult times. Our focus remains on building efficiencies in our supply chain and on operating in this challenging agricultural environment.”

TWO DIRECTORS JOIN CHS BOARD, THREE DIRECTORS RE-ELECTED

Hal Clemensen, Aberdeen, S.D., and Kevin Throener, Cogswell, N.D., have been elected to three-year terms on the CHS Board of Directors. They succeed Randy Knecht and Dennis Carlson, who have retired from the Board. Re-elected were Mark Farrell, Cross Plains, Wis.; Alan Holm, Sleepy Eye, Minn.; and Steve Riegel, Ford, Kan.

Dan Schurr, LeClaire, Iowa, was re-elected chair for 2020. Other officers are C.J. Blew, Castleton, Kan., first vice chair; Jon Erickson, Minot, N.D., second vice chair; Russ Kehl, Quincy, Wash., secretary-treasurer; and Riegel, assistant secretary-treasurer.

Directors elected and re-elected to the CHS Board were, from left, Kevin Throener, Hal Clemensen, Mark Farrell, Alan Holm and Steve Riegel.



HELP LEAD THE COOPERATIVE SYSTEM

Strong, diverse owner participation is key to a viable, progressive cooperative system. To encourage engagement and input from all farmer-owners, the CHS Board of Directors has adopted a policy on eligibility for service on the CHS Board and committees related to the CHS Annual Meeting, such as committees handling resolutions, rules and credentials.

Any ag producer who is a Class A member of CHS or belongs to a cooperative that is a member of CHS is eligible to serve on the CHS Board or an annual meeting committee. Additional people in a farming entity also are eligible to serve as long as they meet these requirements:

- Actively engaged in the operation of the farming entity (as further defined in the policy),
- At least 18 years of age, and
- Holds ownership interest in the farming entity or is a spouse, parent, sibling or adult child of an owner of the farming entity.

CHS Directors must also meet qualifications for service, including having farming or ranching as their primary occupation.

“Confirming this eligibility policy will help promote diversity in CHS leadership and give farmer-owners more opportunities to share their ideas,” says Dan Schurr, CHS Board chair.

“We need fresh perspectives to drive innovation and better decision-making that adds value for our owners and supports a vibrant cooperative system.”



SUPPORTING THOSE WHO SERVE

Attendees at the 2019 CHS Annual Meeting packed 1,000 care kits for military members. The kits were distributed by Operation Gratitude to deployed service members in the Middle East and Africa in time for Christmas. In the last two years, annual meeting attendees have packed more than 1,700 kits for deployed military members.

CHS OBTAINS RIGHTS TO CORTEVA SUNFLOWER BREEDING PROGRAMS

CHS has obtained exclusive breeding and distribution rights to the Corteva Agriscience confectionary sunflower and conoil sunflower programs in North America. This will expand the number of sunflower hybrids available to CHS contract growers and farmer-owners, providing more high-value market opportunities.

Corteva sunflower varieties will be rebranded under the CHS Royal Hybrid® brand. For the 2020 growing season, Corteva conoil hybrid sunflower seeds will be marketed directly through CHS Sunflower and select CHS retail locations. In 2021, CHS will add the full portfolio of Corteva confectionary sunflower seed to the Royal Hybrid line.



GET MORE: Sign up to receive CHS press releases by email or RSS feed at chsinc.mediaroom.com.





Standing Fast

Mandy Westrom, a farmer-owner from west-central Minnesota, spoke for farmers and ranchers everywhere in a moment of reflection at the 2019 CHS Annual Meeting in December. Her comments crystallized the difficult year and trying harvest season — and celebrated the perseverance of those who choose careers in agriculture. The following are excerpts from her comments at the annual meeting:

“**F**or those who spend time in the confinement of an implement cab for extended periods of time during harvest, you know about time spent hashing the ins and outs of any farming season — the good, the bad and the unpleasant. 2019 was a season few of us will forget.

“My husband, Mark, is attempting to put to rest our 2019 season, so today I am flying solo, as many married farm couples do during the season. We do what is needed to get the job done, going separate ways to complete the tasks on our plates. We always have the end game in mind — we know eventually we will return to normalcy and face-to-face conversations.

“I am happy to be here, as confinement to Stella, my 9420 John Deere 4x4 tractor, was getting to be too much. Pulling my grain cart over frozen ruts in the morning hours, then dreading the melt and the sinking fear of falling through the muddy muck on the last of our untilled fields was not something I was looking forward to. Thankfully, a dear friend also needed a change of pace and graciously took my spot in Stella for the final push.

“The challenges of the season have been raw and they have been real. Still, as always, we in agriculture are standing fast, standing firm and standing upright with both feet firmly planted on the earth. We survived 2019 and we should feel good about that.

“We are doing a job that others can’t or won’t do. Everyone makes choices. Thankfully, we chose agriculture. We are the early adopters, the risk-takers. We see opportunities and take them when others won’t.

“We grow more than food, fuel and fiber — we grow little humans who turn into productive people who contribute to society and see the value in our work. We nurture tribes of people in our towns, fostering communities and growing friendships. We look out for each other.

“We are a community of agriculture. We love our way of life. Through good times and difficult times, a tough day on the farm is still better than a day anywhere else.” ■

Mark, left, and Mandy Westrom raise corn, soybeans and wheat near Barrett, Minn. They added acres as their parents retired and Mark's father passed away in 2016. Mandy left her nursing career to work full-time on the farm. The Westroms are members of CHS Prairie Lakes.



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G TOMORROW

Waiting Game

As the 2020 growing season waits to unfold, crop nutrients suppliers are scurrying to fill warehouses to meet expected fertilizer needs.

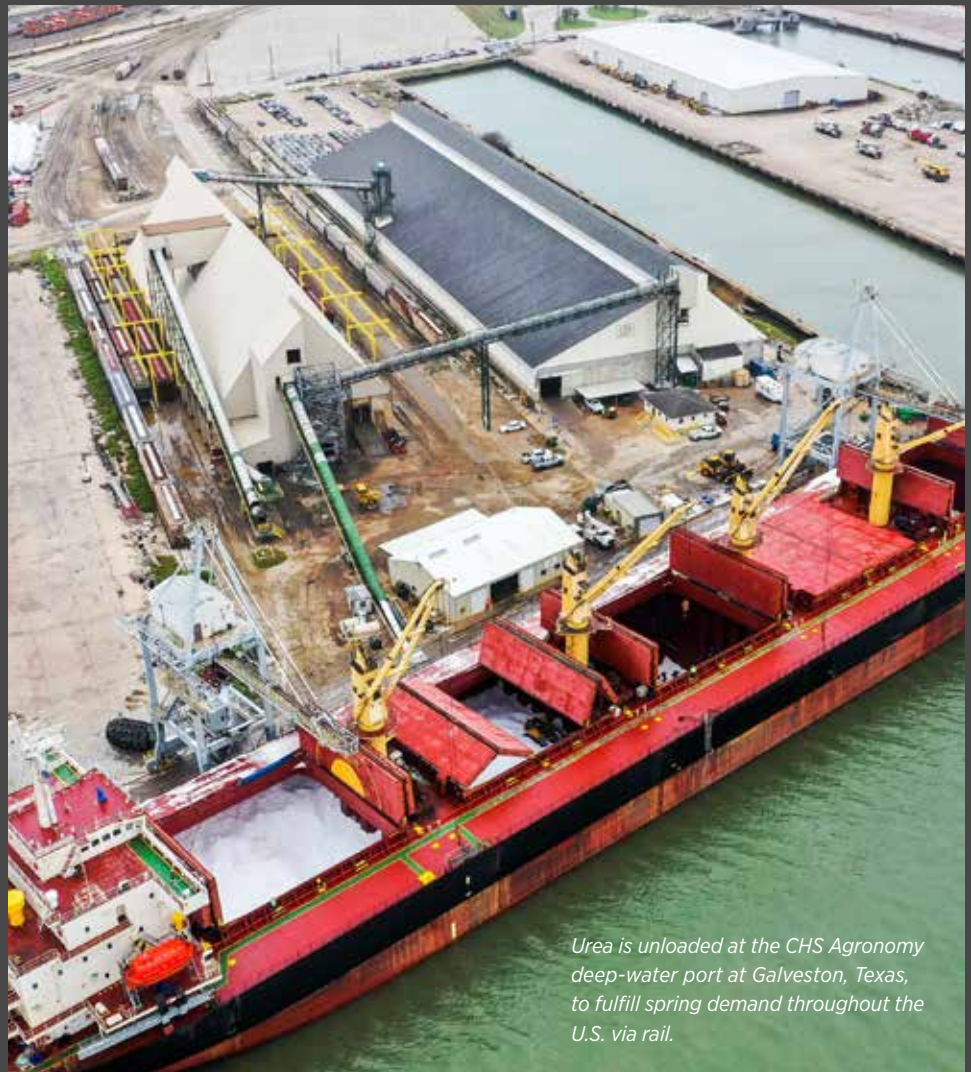
“We have crop nutrient imports arriving at Gulf of Mexico ports in preparation for spring applications in the South and when the northern Mississippi River opens for barge traffic,” says Roger Baker, who leads crop nutrient supply, trading and risk management for CHS Agronomy.

Constant communication along the supply chain helps forecast volumes needed for the next growing season. CHS crop nutrients teams work to have supplies in place before applicators need to fill their rigs.

“Our crop nutrients team works with CHS rail, barge and truck transportation experts to plan for incoming shipments, identify possible disruptions and create back-up supply plans,” says Baker. A key part of the supply chain is a network of terminals that are filled in the quiet time before spring application season, then restocked as nutrients are hauled away.

“Fall fertilizer applications were limited the last few seasons due to weather,” Baker adds. “Soils should be hungry for nutrients and we expect a strong spring application season. We’ll be ready with fertilizer in storage and in the pipeline so farmers and their crops have the nutrients they need.”

— Cynthia Clanton



Urea is unloaded at the CHS Agronomy deep-water port at Galveston, Texas, to fulfill spring demand throughout the U.S. via rail.