BUSINESS

Biodiesel refinery in Isanti is ready to rev

Ever Cat Fuels aims to put a dent in the amount of oil we import by turning weeds and algae, among other things, into diesel.

SEPTEMBER 28, 2009 — 9:34PM

NEAL ST. ANTHONY

ISANTI, MINN. - Clayton McNeff, a scientist and iconoclastic entrepreneur, inherited the independent streak from his dad.

Larry McNeff, 70, left giant Cargill three decades ago to start SarTec, his own plant-extract company for the agricultural industry in Anoka. He never planned to change the world with clean fuel made from waste products.

But he's on board at the new flagship plant of Ever Cat Fuels, the first of what his son expects to be hundreds of next-generation, compact biodiesel refineries. "I'm kind of the helper," said the senior McNeff. "Being involved from the ground floor gave me the insight and confidence that this will work."

The McNeff family and associates have invested millions and three years of research to achieve the grand opening this week of Ever Cat Fuels, a $9 million pilot plant designed to produce up to 4 million gallons of clean diesel fuel annually.

The inaugural plant also embodies a much larger aspiration: that the "Mcgyan" low-energy, no-waste process will eventually put a dent in the 200 billion gallons of mostly imported fuel burned annually in America.

Clayton McNeff, 40, founder of Ever Cat and a doctorate in chemistry, believes Ever Cat technology has the potential to cut our imported oil tab by producing domestic fuel made from waste oils, weeds, sewage-treatment residue and algae. The Ever Cat system also provides an environmental win and a job-producing economic turbocharger, he said.

"This is much more than our business," McNeff said. "And there are a lot of smart scientists who think carbon-neutral biofuels from waste, byproducts and inedible material will help save the planet."

In an energy landscape dominated by huge subsidies for oil and increased government seed funding of alternative energy, the McNeffs are paying their own way. The plant, which operates 24 hours a day with a staff of 20, already has produced thousands of gallons of diesel this month in test batches made from waste oils. An expansion from 4 million to 10 million gallons annually at Isanti already is on the drawing board.

Several hundred scientists, investment bankers, prospective investors and licensees, politicians, environmentalists, defense industry and other government officials have visited Ever Cat's Anoka facility and the new refinery in Isanti, about 40 miles north of the Twin Cities.

"I was impressed with the science and technology when I first saw it about a year ago," said Doug Cameron, a scientist and head of alternative-energy investments at Piper Jaffray, the investment bank. "I look forward to learning more."

Continuous process

"The Mcgyan technology uses no water and generates no waste," said Greg Mowry, a professor of engineering at the University of St. Thomas, who spent 25 years in industrial technology research and product development. "The implications of what Clayton & Co. are doing are huge. And they are not running to government or a huge company to sell their technology. They are doing it on their own because it is worth being done."

Mowry and a crew of engineering and chemistry students from St. Thomas and Augsburg College, where the Mcgyan process was conceived in 2006, already have developed small, mobile plants that can be mounted on a truck bed to produce fuel to power a Minnesota farm or an African village.

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These stainless steel pressure vessels, each filled with 50 pounds of a metal-oxide catalyst, turn out biodiesel. Clayton McNeff, founder of...

equipment," Mowry said. "We have a start-up company that, I think, can produce these [small reactors] for under $10,000 apiece."

The technology is rooted in a 2006 research project on a better way to make biodiesel by then-Augsburg College student Brian Krohn, now a Rhodes Scholar, and chemistry professor Arlin Gyberg. They turned to McNeff, also an Augsburg-trained chemist, and Ben Yan, chief scientist at McNeff-owned SarTec. Mcgyan, (pronounced Mc-GUY-an) is named for McNeff, Gyberg and Yan.

They developed a fixed-bed reactor that uses a metal-oxide catalyst inside a stainless steel pressure vessel. The collaborative effort helped them develop a continuous process to refine fuels and a near-instantaneous alternative to the slow, energy-, chemical- and water-intensive "batch" process of cooking soybeans or corn to make fuel.

The Mcgyan process, which now holds nine patents, takes place inside two 6-foot "reactor" tubes only 6 inches in diameter. A solution of heated feedstock and alcohol runs through the reactor tubes over metal-oxide, porous spheres that speed the conversion to fuel. The bigger the reactor tubes, the more diesel you can produce. Ever Cat's planned expansion will involve tubes twice as large.

"The catalyst never wears out and it has a self-cleaning mechanism," McNeff said. "Biodiesel is an amazing cleaning solvent."

McNeff said the Mcgyan process yields five units of energy for every one unit of energy used to produce it.

"This plant will provide a good return to investors," said McNeff, whose family owns about 70 percent of the company.

Ever Cat currently produces diesel for $1 to $2 per gallon, depending upon feedstock. Ever Cat and Sartec also run their buildings and trucks on the house brand.

Multiple uses

Around the country, much biodiesel capacity has stopped as fuel prices dropped almost in half since 2008. It's tough to make a profit on biodiesel that costs as much as $3 per gallon to make from food-grade soybean oil when diesel sells at retail for less.

Ever Cat, named after the "ever catalysis" process, has been contacted by hundreds of universities, farm cooperatives, ethanol and sewage-treatment plants looking to get rid of tons of restaurant-trap grease and other accumulated lipids that now are burned, buried or fed to livestock.

Ever Cat also expects to serve existing ethanol plants by turning their waste into biodiesel. What's left after traditional distillation of corn into ethanol is a fatty distillers grain, worth about 4 cents per pound, that's commonly fed to livestock.

Ever Cat removes oil from the grain. The result is several million gallons of biodiesel from a typical 50-million-gallon ethanol plant, worth 40 cents a pound, as well as a more valuable animal feed, said Larry McNeff, who's spent his life in that trade.

That market is estimated at 1 billion gallons a year.

Algae oil market 'unlimited'

"We will eat the elephant one bite at a time," said Clayton McNeff. "There's a 12 billion-gallon potential for stinkweed alone, a potential winter crop on soybean and corn fields. And there is unlimited potential for algae oil."

Algae, particularly high-yield strains, has the potential to yield the equivalent of several thousand gallons of oil per acre, compared with 20 to 100 gallons per acre from corn, soybeans and sunflowers, according to government researchers. Ever Cat is involved with algae-oil development projects overseen by chemical-engineering professor Roger Ruan of the University of Minnesota at the Metropolitan Council sewage-treatment plant south of St. Paul and at ponds around Great River Energy's Coal Creek power plant in North Dakota.

In these test studies, carbon dioxide, the leading greenhouse gas, is being diverted from smokestacks to stimulate algae growth in huge ponds kept open year round by warm-water discharges from power and sewage-treatment plants.

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Clayton McNeff, founder of Ever Cat Fuels

energy business?

"If I didn't believe that this technology can bring us to energy independence, I would not have made this kind of bet," said Clayton McNeff.

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An algae pond in front of Ever Cat Fuels