

THE BOERNE STAR

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Avid science guy applies green concepts to black oil business

This is part of an ongoing series looking at ways local businesses and residents are living green.

by **Elena Tucker**
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Not everyone is gnashing their teeth over high oil prices. Thirty-eight-year-old Duke Cooper, founder and president of Oil Filtration Systems Inc. is one of those rare business owners who's feeling boom over pinch these days. Because the more precious black gold becomes, the more sought-after his oil cleaning machines become too.



Cooper's not exactly rubbing his hands together in glee, but given all indicators, today's global petroleum circumstances have set this Boerne entrepreneur up for wins on just about every front. "Now that we're seeing oil go up so much we're getting a lot more of 'hey, we shouldn't throw away this oil,'" Cooper said. "Now they just want to reclaim it and reuse it."

What sorts of enterprises recycle oil? Those with enough oil-volume to make the process cost-effective, which is usually somewhere around 10,000 gallons, said Cooper, whose first customer eight years ago, was big-city electric server Austin Energy.

Since then Oil Filtration Systems has acquired more than 1,000 accounts across a spectrum of countries including Nigeria, Peru, Mexico, Russia and Chile – accounts serving companies that mine minerals, manufacture airplanes, and send man out beyond the atmosphere.

The advantages of oil recycling are at least three-fold and the first among them is as simple as basic accounting. It's cheaper to purify existing oil than it is to replace it with new.

This is especially true given that, according to James C. Fitch, internationally recognized lubrication consultant, oil will last indefinitely when protected from excessive heat, moisture, air, and particles.

"Before, where you had, say, a power plant with oil contaminated by water and dirt, you'd have to pretty much discard it," Cooper said. "But you can take a system and purify and put it right back in the turbine – you just reuse it. It's like oil never wears out. You can invest in a system for \$50,000 and one 20,000 tank of oil will pay for it times two."

Not only do the costs of the oils and lubricants themselves affect the economics equation, but the

value of the machinery that these oils are engineered to protect is a huge factor as well.

Fitch said that \$240 billion dollars — 6 to 7 percent of America's gross national product — is spent annually to repair avoidable machinery damage. That damage comes about because of lubricant and hydraulic fluid contamination.

When Japanese industries Nippon and Kawasaki Steel adapted oil purification systems, their machine failures were reduced by as much as 97 percent.

The downstream environmental and economic effects of maintaining industrial oil filtration systems seem so vast as to be almost beyond calculation.

Although Cooper suspects that oil filtration in one form or another “has probably been in existence ever since oil extraction began, to get the sand out of it,” such systems have evolved to a point where they are now “taking out particles much finer than white blood cells out of oil,” Cooper said. “We're talking four to 10 microns,” he said. “Particles that you don't even really see, can make a lot of wear.”

So small are the contaminants, he said, that a hundred gallons of fluid may harbor only 50 grams of retrievable dirt.

But these micro-contaminants can't be underestimated since the smaller the particle, the more potentially damaging it can be.

“According to a study by Cummins Engine,” Fitch said, “particles smaller than 10 microns generated about 3.5 times more wear (rods, rings and main bearings) than particles greater than 10 microns.”

And if a micron sounds tiny, that's because it is. A recent report by Xerox describes a newly developed toner as being particles 3-5 microns in size. It would take one hundred of these particles to fill in the period at the end of this sentence, according to Xerox.

Cooper started up his oil recycling company in 1999 with \$30,000, a garage, three employees, and a lot of work, he said. As with many nascent operations, Cooper said that for several years all of the business' profits were fed back into the company.

But nine years later Cooper oversees 30 employees in a space that's so large, it spans both sides of the road on which his manufacturing facility is located.

Perhaps because he is only one of about 10 such companies in the United States, Cooper's business continues to grow.

“We have a huge rental fleet,” he said. “So we might have Exxon in Baytown call and say, ‘I've got a system that's about to go down and then the whole plant will shut down. Do you have a vacuum dehydrator that we can rent?’ So they'll rent it and they'll keep their operation going.”

As well, Cooper's machines are the functioning “organs” for IsoClean, Chevron's trademark reclamation program.



His are “kidney-lube filtration systems,” said Cooper, providing, in essence continual dialysis for huge operations all around the world.

The locally manufactured oil-cleaning systems have a wide array of uses and applications. They are used, for example, to maintain polyalphaolefin coolant maintenance for Lockheed-Martin's F-35 Strike fighter. The machines can be also used to reclaim turbine oils, lubricating oils, gear oils, hydraulic oils – anything, Cooper said, that hasn't been involved in a combustion process, since combustion moves oil purification into a whole different realm of science.

One place where Cooper's oil filtration systems are utilized is

NASA's ground operating equipment, which is serviced from a 40,000 oil tank that was continually getting water in it, Cooper said. NASA's oil is now systematically filtered and heated under low pressure until all contaminating water is boiled off. "So, we're keeping that 40,000 tank clean," Cooper said.

Another example is an Exxon-Mobile distributor in Houston that must regularly water-flush its huge system as production moves from one substance to another.

Where once, thousands of gallons of water and rinsed-out oils were used each week, now the water is released into the air as clean, purified steam and the flushed hydrocarbons are recaptured.

Which leads easily to the third benefit of the oil filtration systems.

"I like to constantly be able to regenerate, reuse," Cooper said. "We're very much a throwaway society. So the concept of being able to reclaim product that's unusable, and keep (machines) from breaking. It's a neat concept." He shrugged. "I'm an avid science guy and it's really just knowing a lot about science."

And clearly it's science that Cooper is using to generate gains on several different levels.

"I would think it's safe to say," Cooper remarked, "that we're saving millions of gallons (of oil) a year."

Cooper touched the valve on one of his machines, one of his thousands of machines that are in operation all around the world. "At 50 gallons per minute," Cooper said, "this system over its lifetime can reclaim 200 million gallons of oil."