

Oil_Water_Mix_1996.txt

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Oil-water mix may fill fuel tanks in future

Tests show it to be clean, cheap, and safe. What's the catch? So far, there isn't one.

By Ken Miller

Gannett News Service

RENO, Nev. - Actually, oil and water do mix. More surprising, tests show a fuel made by combining those two ingredients could power the nation's vehicles, trains and gas-powered aircraft by century's end. The milky fuel, developed by a Reno inventor Rudolf Gunnerman, is being pushed through the federal fuel-testing labyrinth by Gunnerman and diesel giant Caterpillar Inc. It has passed every test thrown at it. In virtually all categories, it tops conventional gasoline and diesel as a clean, cheap and safe fuel that can be used in almost any combustion engine. If it works - and disinterested outsiders who have tested it say it may - drivers could see the price of gasoline cut more than half.

"Everybody said it cannot work, that I'm a fraud," the German-born inventor said, beginning an interview with the obligatory denial that he's a crackpot.

No one's laughing now: Nevada last November certified the water-based fuel as a "clean alternative fuel," meaning it can be used to meet federal mandates requiring clean fuels in fleets and other vehicles.

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Examining a prototype "automated blending facility" that is about to start mixing 40,000 gallons of fuel daily, Gunnerman said the major hurdle before the fuel will start showing up at gas stations is Energy Department certification that it qualifies as a clean alternative fuel. "The water-fuel technology, or theory, has been around for a number of years, but there have always been problems with it," said Tom Porta, supervisor of planning at the Bureau of AirQuality at Nevada's Division of Environmental Protection.

Timothy Taylor, chief of a Mobile Source Division district in California, said tests using on-road and off-road mobile and stationary engines "show great promise, and we are very excited about being a participant and anxious for the demonstration phase to move forward. We're optimistic."

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Recipe makes oil, water friendly

New A-21 "unifuel" offers many benefits, including greater engine efficiency

Gannett News Service

RENO, Nev. - Scientists have tried for years to stretch gasoline supplies by mixing fuel and water, but until now the goal has been elusive.

But as any salad-maker knows, getting water and oil to stay blended for long is all but impossible.

"Some have found ways to keep them blended for hours, even days," said Rudolf Gunnerman, developer of the new A-21 "unifuel" being tested and

marketed in a partnership with Caterpillar, the Illinois-based diesel giant.

The key, he said, is to find a compound that changes the way water and petroleum look at each other. Not only did Gunnerman finally make that discovery, but his find actually attracts the two conventionally repellent ingredients to each other.

The result is A-21, a liquid that when swirled in a beaker looks like skim milk. Depending on the engine, it can be blended from 30 percent water and 70 percent naphtha to 55 percent water and 45 percent naphtha. Additives - the bonding agent, a lubricant, and a rust-inhibitor - make up less than 1 percent.

The beauty of using water is obvious. But using naphtha is the real breakthrough: It is the first product in the long process of gasoline refining. That means the later steps that produce things such as various grades of gasoline and diesel fuel are irrelevant. Other benefits:

- * At the refinery, naphtha, used today as a hardener in road tars, is siphoned off and trucked or piped to a blending facility to be mixed with water to produce the fuel. That eliminates up to 90 percent of refinery pollutants.

- * Once mixed with the water and a tiny amount of an agent to keep the naphtha and water from separating, the fuel has a "vapor pressure" of about one-fifth that of gasoline. That means vapor-recovery systems won't be needed at the pump. Because gasoline vapor is what catches fire, this fuel is virtually immune to explosions and fire.

- * The fuel can be used in a diesel or spark-ignited engine.

- * A-21 can enter today's petroleum-distribution system immediately and

be dumped into any fuel storage tank and used outright, meaning the only thing a truck stop or convenience store owner would have to change when peddling A-21 is the pump price.

* From a performance standpoint, data from Nevada's certification of A-21 as a clean fuel show the 1991 Taurus test vehicle generated slightly more horsepower on A-21 than on conventional gasoline. Likewise, its mileage per gallon was 24.88 on A-21, compared to 24.47 on gasoline.

* Trucks and automobiles will be able to use A-21 or their other fuel of choice. In the case of A-21, a refit on a diesel truck or bus takes less than two hours and costs less than \$1,000.

In the case of a late-model car, a refit is now a far cheaper matter of switching over to a new set of spark plugs.

"The Advanced Fuels joint venture is one we entered into because we believe this fuel is one of the most promising alternative fuels that's out there today," said Caterpillar spokeswoman Marsha Hausser. She said Caterpillar is testing other fuels, but "we've been pleased with the test results we have seen so far.

"We ... want to verify in our minds in the long term that this is a viable alternative.

"Any time you have an alternative that is cleaner burning, less flammable, and allows you to operate an engine more efficiently, that's a significant advance," Hausser said.

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Inventor's quest for clean air guides fuel search

Rudolf Gunnerman was looking for a way to keep the world running without polluting it.

Gannett News Service

RENO, Nev. - Inventor Rudolf Gunnerman is often described as a low-key Doc Brown, the seemingly erratic if ingenious inventor portrayed by actor Christopher Lloyd in "Back to the Future."

A few hours with the Reno environmental whiz does little to dispel the caricature, although through his soft-spoken German accent, it's clear he has a thing about clean air.

The 68-year-old inventor studied physics at the University of Munich but came to the United States in 1949 before winning a degree. He gave Yale a shot but left for California because the rigidity of college life didn't suit him.

"I used to live in Beverly Hills," Gunnerman said.

"We took the family on a vacation through the Northwest, where we saw those teepee burners that burned wood wastes. There was smoke and more smoke, and I said to myself, 'There must be a better way to burn this without the dirty air and without wasting resources'

"That led me into the wood pellet business," for which Gunnerman secured his first patent in 1977. That invention, converting wood waste into pellets to fuel wood stoves, led to what last year was a 2.5 million-ton industry.

"In the early part of my life, I knew that if we did not clean up the air somehow - and I didn't know how - there would be a tremendous

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amount of problems for people who live on our planet," he said. "It's not just Reno; it's not just L.A.; it's global. It may be visual to you today, but the damage that is being caused is much more severe."

Gunnerman convened a green-house-gas conference in California in 1987 to bring attention to the clean-air issue. He was largely dismissed by the media as an alarmist peddling a nonissue.

"But all these things led me to look at clean fuels," he said. "The wood pellets showed me it can be done."

Gunnerman then plowed his pellet profits into his next venture: finding a way to mix fuel and water to create a clean, cheap fuel for cars and trucks.

The search for a way to combine the two - and keep the combined for more than days or weeks - has been a grail for many scientists.

Six years and \$6 million later, he perfected a process that even jaundiced observers allow could shake up the fossil fuel industry. Gunnerman's concoctions earned him a trip to demonstrate the breakthrough at Disney's Epcot '95 in Orlando, Fla.

That's where he met Energy Secretary Hazel O'Leary, who has since pledged to explore the new fuel.

The results of that investigation, pending test data from Gunnerman's partner, Caterpillar Inc., will determine whether Gunnerman is a flash in the pan or whether Americans will soon be driving on fuel that is more tap water than gasoline.

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