

GUNNERMAN, RUDOLF (1928-)

Rudolf Gunnerman, a German-born U.S. scientist from Nevada, researched into and then developed water-based fuels. Essentially, he invented an emulsifier additive that allows for the creation of a fuel mixture of alcohol and water, gasoline and water, diesel fuel and water, and also naphtha and water.

Born in 1928 in Munich, GERMANY, Gunnerman studied mathematics and physics, and then immigrated to the United States in 1949, apparently with only \$20 on him. He was keen to become an inventor,

but it was not until 1976 that he was able to patent a process for the burning of wood pellets. These were useful for wood fires in people's homes and for household barbecues, making him his first fortune. He also worked on fire proofing for homes, and then he worked on a method of reducing nitrous oxide, which remains a major source for the depletion of the ozone layer, leading to global warming.

In 1987 Gunnerman, who had moved to Reno, Nevada, decided to work on water-based fuels. With up to three billion gallons of petroleum being used every day, Gunnerman wanted to work out a system of having a cleaner and cheaper fuel. While it was obvious that oil and water are not able to mix, he wanted to invent a special emulsifier additive that could overcome this problem. Initially Gunnerman worked with combinations of alcohol and water, then gasoline and water, followed by mixing diesel fuel and water. In 1992 he was able to mix naphtha with water, and this became known as A-21—the term referring to aqueous fuel for the twenty-first century.

It was not until 1994 that Gunnerman was able to perfect the blend. By this time collectively these mixtures became known as A-55® Clean Fuels, and Gunnerman registered the name as a trademark to protect them. He holds seven patents in the United States in regard to this and other related inventions, and he has lodged patent applications in countries around the world. The A-55 Limited Partnership of Gunnerman then combined with the Engine Division of Caterpillar to form Advanced Fuels LLC, a joint venture to test and then promote the fuel for its use in trucks, cars, airplanes, and various other vehicles.

In some ways Gunnerman's ideas had been around for some years long before his design. During World War II, some U.S. fighter planes (and indeed many bombers) were already using a watered-down blend of fuel and water, and according to work by David B. Kittelson, a professor of mechanical engineering at the University of Michigan, some engines were running

on 50 percent water fuels in the 1940s. The reason for this was essentially because the use of water kept the engine running on a cooler level, which stopped engines from "melting down." However, a problem with this new fuel blend was that the mixture was more susceptible to freeze, so it was necessary to add some ethanol antifreeze to overcome this.

One of the main effects was that the fuels developed by Gunnerman were able to reduce the emissions of pollutants by an average of 50 percent, and with the fuel being used in cars, efficiency rates were increased by over 25 percent. Just as important, however, the fuels were safer to use and transport than normal gasoline because Gunnerman's design was essentially flame resistant outside the car engine. It has also been shown that crude oil refineries could use water as their base, and this was able to reduce water pollution. However, adapting the car engine to be able to use this fuel was initially expensive, although with mass manufacture, this was reduced to about \$300 per car.

Many oil companies welcomed the inventions by Gunnerman because it helped reduce their emissions at a time that there have been more restrictions on these because of environmental considerations. It also promises to provide a method of “diluting” the existing supplies of gasoline, helping increase the sales possibilities with each oil tanker of fuel. Indeed, Gunnerman won the Albert Einstein Gold Medal of Honor for the Advancement of Science and Technology. He has also been given honorary doctorates by three universities.

Rudolf Gunnerman is now the founder, chairman, and chief executive officer of SulphCo Inc., and a trustee of the DRI Research Foundation. He also sponsors the Gunnerman Silver State Award for Excellence in Science and Technology, with a prize of \$25,000.

See also: PETROLEUM.

—Justin Corfield

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