MINNESOTA DOT'S EXPERIENCE WITH A-55 TECHNOLOGY FUEL

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"How would you like to save $0.33 per gallon of fuel the next time you fill up?" That is possible with the watered-down fuel that A-55 Limited Partnership hopes to market. During the TRB Committee on Maintenance Equipment meeting in January 1993, an informal presentation was made about Mr. Gunnerman's A-55 Limited Partnership invention and the potential savings with using watered-down fuel. Mr. Gunnerman's Reno, Nevada firm has developed a unique fuel mixture consisting of approximately equal proportions of water and carbon fuels, such as gasoline or diesel with a surfactant added. This new fuel mixture was reported to burn more cleanly, cheaply and safely than conventional gasoline or diesel fuel. The new fuel delivers comparable mileage per gallon as regular gasoline and seems to cause the engines to run cooler.

The inventor has found a way to make carbon fuel and water mix, with the water molecules enveloping the gas or diesel molecules, locking in the fumes and essentially fireproofing the mixture. This is accomplished with a solution of readily available chemicals that acts as a surfactant. The surfactant, essentially a detergent, causes the water molecules to merge with the gas or diesel molecules. One end of the surfactant molecule acts like a water molecule, the other end acts like an oil molecule enabling the surfactant to link an oil molecule to a water molecule.

However, the fuel mixture is only one part of the water-based fuel technology. The other part is the engine modification. One will not work without the other. The engine modification is reported to be relatively minor and inexpensive. It involves removing the engine head and applying a nickel-based catalyst on the cylinder walls of the combustion chambers. The interaction of the nickel catalyst and the watergas causes the watergas to combust more thoroughly and burn for a longer time than ordinary fuels. The combination of heat, pressure and the catalyst breaks down at least some water into its base components, hydrogen and oxygen, both of which apparently add to the combustion process. The exhaust is about 70 percent water vapor, A-55 company data indicates. Tests by the Nevada Environmental Protection Division and the California Air Resources Board reportedly have found reduced levels of emission pollutants. The company claims significant reductions in hydrocarbons, carbon monoxide, carbon dioxide, nitrogen oxides, diesel smoke, and cost. A common car or pickup can be converted at a cost approaching $1,500. The cost would drop as production increases. Conversion of a very large diesel engine such as a stationary power plant may cost around $15,000.

Following the presentation in January 1993, the Nevada firm was invited by the Minnesota Department of Transportation to St. Paul to demonstrate the technology. Representatives from cities, counties, industrial equipment manufacturers doing business with the State, and Metropolitan Transit Commission attended the demonstration in December of 1993. A convoy of a half dozen trucks and cars using the water-fuel technology traveled from Reno, Nevada to St. Paul, Minnesota for the demonstration. A stationary diesel engine was demonstrated using the water-based fuel. Following the demonstration, Mr. Bruce Anderson of the Reno Regional Transportation Commission related their experience with using this unique fuel mixture for the previous three months. At the time, a specially adapted 40 foot city bus operated by the Regional Transportation Commission in Reno had logged 7600 miles in daily trips using diluted diesel fuel. This test bus was getting 2.2 miles per gallon on the 50-50 mixture of water and diesel fuel, compared with an average of 3 miles per gallon straight No. 2 diesel fuel. The Reno bus agency had not conducted emission tests, however, they had conducted opacity tests. The results were zero, no smoke. A small amount of exhaust smoke and steam was experienced on cold mornings, but it clears up in about five minutes as the engine warms. Oil analysis is conducted every 3000 miles. The results show no unusual engine wear, no soot and no change in the viscosity or appearance of the oil since being put in the engine.

During the question and answer period, a question was raised whether the water-based fuel would freeze in Minnesota temperatures. If 10 percent ethanol alcohol is added to the mixture, the material will perform. The Reno bus has operated in temperatures close to zero with no freezing problems.

As a result of the demonstration, Mn/DOT requested that A-55 Limited Partnership cooperate with a diesel engine manufacturer to modify an engine for a 1994 snowplow truck and the manufacturer of the highway patrol car. Since March of 1994, the people

from the A-55 company quit returning Mn/DOT's telephone calls. As a result, Mn/DOT could not obtain a modified engine for either the snowplow truck or the highway patrol car. On July 6, 1994, the Caterpillar Engine Division and A-55 Limited Partnership of Reno, Nevada announced the formation of a joint venture to develop and commercially apply an alternative fuel and new technology that enable internal combustion engines to operate on a mixture of water and carbon-based fuel. It appears that the engine division of Caterpillar will have exclusive rights to develop the technology commercially.