

Alternative **FUELS**

Vol. 2, Number 3



WISCONSIN'S ALTERNATIVE FUELS PROGRAM

By Governor Tommy G. Thompson (R-Wisconsin)

When 18-wheelers roll across Wisconsin, not only do they find some of the best maintained roads in the nation, but a state that is ready for the future.

Federal Clean Air Act regulations are changing the way this country does business. Wisconsin has taken the lead in meeting requirements that alternative fuels be used in an increasing number of vehicles. I directed state agency heads three years ago to gear up for the future.

Wisconsin has responded to the challenge. We have heavy duty trucks and passenger vehicles operating on alternative fuels as part of our state fleet. Our six-truck compressed natural gas (CNG) demonstration project is, in fact, an all-Wisconsin venture. The GMC TopKicks, medium-duty trucks, are built at our own General Motors plant in Janesville, and assembled by Monroe Truck Body in Monroe, Wisconsin. Automotive Natural Gas Incorporated (ANGI) of Milton, Wisconsin built the fuel systems and two refueling stations.

The six CNG TopKicks are operated alongside six gasoline TopKicks by the Wisconsin Department of Transportation for sign and road maintenance. The University of Wisconsin-Milwaukee monitors the CNG

demonstration project, collecting emissions, cost, and user convenience data, and provides this data to equipment manufacturers for use in developing dedicated equipment.

ANR Pipeline Company is providing funding for vehicle conversion costs and refueling stations for the CNG demonstration

"We work closely with fleet operators to create demonstration projects that will lay the groundwork for their future alternative fuel needs."

project. We have recently developed a similar business/government partnership for propane, and we now have four propane-dedicated TopKicks on the road.

The secret to the outstanding success of the Wisconsin program is the public/private partnerships we've formed to develop common-sense, market-driven solutions to the new challenges we face. We work closely with fleet operators to create demonstration projects that

will lay the groundwork for their future alternative fuel needs.

We are also encouraging local governments to become active in alternative fuel demonstration projects and have made available conversion funds for over 160 vehicles so far.

We've worked with a variety of businesses to develop an ethanol vehicle, and we currently operate twelve ethanol Chevrolet Lumina in our state fleet. Our objective is to have 2,000 alternative fuel vehicles in state service by the year 2000 and countless more operated by local governments and private companies.

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METHANOL PROVES ITSELF IN CALIFORNIA TRUCKS

By Mike Jackson, Manager, Alternative Fuels, Acurex Environmental Corporation

Detroit Diesel Corporation (DDC) has been an industry leader in the development of methanol-powered heavy-duty engines. Its developmental work began in 1981. In 1988, sponsored by the California Energy Commission and the South Coast Air Quality Management District (the air quality agency for the greater Los Angeles metropolitan area), DDC began a demonstration project of low-emission alternative fuel engines in heavy-duty trucking applications. DDC supplied five of nine engines used in various test sites for the methanol portion of the study. Acurex Environmental Corporation, a nationally recognized firm in heavy-duty alternative fuel technologies, including methanol, CNG, LNG, and propane, was contracted to provide engineering support.

Two of the test sites have particular relevance to regional freight hauling and excellent conversion potential for traditional tractor-trailer freight haul services. Golden

State Foods supplies food products to McDonald's restaurants. This site is demonstrating the DDC 6V-92TA, a classic workhorse engine now performing on methanol in hundreds of city transit buses. Federal Express is demonstrating a DDC 6L-71TA. Both engines are rated at 300 horsepower, and both are installed in new Freightliner chassis.

increases the temperature of the residual gases in the cylinder, partially compensating for the poorer ignition quality of methanol. In addition, the compression ratio of each methanol engine was increased from 17:1 for diesel engines to 23:1. This increase also assists methanol ignition by increasing the inlet air temperature into the cylinders. A fuel additive



Methanol – powered Golden State Foods tractor-trailer demonstrating the DDC 6V-92TA.

Methanol has a low cetane number, meaning it resists ignition more than conventional diesel fuel. Heavy-duty engines can compress and ignite methanol when they are at operating temperature, but otherwise need help getting started. The DDC dedicated methanol engines are designed with glowplugs to provide ignition assistance during starting. Other modifications to the traditional engine configuration include special cylinder heads, redesigned fuel injectors, and a modified blower bypass to reduce the amount of air entering the cylinders. This reduced scavenging

manufactured by Lubrizol is used at low concentrations to keep the fuel injectors clean, and catalytic converters help reduce emissions.

The Golden State Foods truck runs a sixteen-mile route four times a day, carrying 40,000 pounds of beef each trip. Monthly mileage is 1,500 - 2,000 miles a month. The Federal Express truck averages about the same mileage. Its job is to carry supplies to Federal Express offices located throughout the greater Los Angeles area. Both trucks are leased from Penske

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I N T R U C K I N G

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Timothy R. McGrath, Editor

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Truck Leasing, which supplies a refueling site at the City of Industry, in the Los Angeles area.

Development and demonstration of these engines is a joint public/private partnership between DDC and the California agencies. The objective of this unique partnership is to help engine manufacturers develop low-emission technologies needed to improve air quality in California. The experience gained in this project is being used by DDC to improve its methanol engine so that it provides diesel-equivalent reliability, durability, and efficiency. These trucks have now accumulated over 130,000 miles in service. Not unexpectedly for a demonstration project, both trucks have had periods of downtime as a result of performance and emission testing, and also as a result of component design upgrades. Nevertheless, drivers of the methanol Golden State Foods and Federal Express trucks find the overall performance of these technologies quite satisfactory.

The Golden State Foods and Federal Express trucks have demonstrated that methanol can perform well in heavy-duty applications. Methanol is particularly good at reducing oxides of nitrogen (NOx) and particulate emissions, both of which are major control targets by air quality authorities all over the country. NOx itself is a health hazard, and in combination with hydrocarbons and sunlight, produces photochemical smog. Diesel particulates are a known carcinogen. These prototypes were designed to "get the trucks running" and are not optimized for emission reductions. Even so, when first placed in ser-

vice they performed at forty percent below the prevailing NOx engine standard of 5 grams per brake/horsepower-hour (the official unit of emissions measurement for engine manufacturers). Particulate matter emissions of 0.11g/bhp-hr were less than half the current standard of 0.25g/bhp-hr.

In transit buses the methanol 6V-92TA has gone well below these

"The objective of this unique partnership is to help engine manufacturers develop low-emission technologies needed to improve air quality in California."

limits, to 1.7g/bhp-hr NOx and 0.03 g/bhp-hr particulate emissions. DDC expects to get similar results with performance- and emissions-optimized truck engines.

Emission reductions and fuel efficiency are key to doing business in the increasingly regulated environment of the 1990s. By the end of this decade, the Energy Policy Act of 1992 passed by Congress will begin to mandate alternative fuels in fleet applications. In poor air quality areas, such as Sacramento, California, local air quality authorities are passing their own "fleet rules" designed to get low-NOx, low particulate technologies into

earlier general use. Fleet operators that comply with these rules ahead of schedule will be eligible for credits that can be sold to businesses that find the costs of reducing NOx from their own facilities to be excessive. These credits have significant economic value and can offset, at least in part, the potentially higher total operating costs of alternative fuel trucks, whether *methanol, CNG, LNG, or propane*. Fleet operators that choose to get early experience with these clean-fuel technologies will thus benefit from saleable credits that they would not get if they delayed until the technology is required. Taking advantage of credit markets being developed in California and along the eastern seaboard is a good way to get alternative fuel experience ahead of schedule and at lower cost. The DDC heavy-duty methanol-fueled engines at Golden State Foods and Federal Express have shown that methanol is a viable fuel for the future.

Mike Jackson is an internationally known expert on the use of alternative fuels in transportation systems. He currently manages the Alternative Fuels Program Area for Acurex Environmental Corporation. He has published numerous reports, articles, and papers on the use of alternative fuels in light- and heavy-duty applications. He has worked closely with engine and vehicle manufacturers on the use of fuels like natural gas, methanol, ethanol, and LPG as well as current and future gasoline and diesel fuels.

ATA FOUNDATION DEMONSTRATION PROJECTS ASSIST FLEETS IN MEETING ALTERNATIVE FUELS REQUIREMENTS

By Timothy R. McGrath, Editor, *Alternative Fuels in Trucking*

Recently passed environmental legislation such as the Clean Air Act Amendments in 1990 and the Energy Policy Act of 1992 will result in the establishment of air quality standards that mandate the use of alternative fuels in heavy-duty trucks by the year 2000. Trucking executives must be prepared to meet the challenges posed by these regulations and take steps to ensure that their fleets will meet these mandates. To assist fleets in meeting alternative fuels requirements, the ATA Foundation, through a contract with the Department of Energy, coordinates and develops demonstration projects using alternative fuels in heavy-duty trucks.

The passage of the Clean Air Act Amendments in 1990 shifted much of the burden for compliance with air quality standards to states and regions. Over the past few years, many regions that do not meet air quality standards have begun to formulate plans to bring their areas into compliance. Under the current mandates of the Clean Air Act's Clean Fuel Fleet Program, which take effect in 1998, there are twenty-one covered "non-attainment" areas for ozone in the United States. This means that these areas are significantly out of compliance with the National Ambient Air Quality Standard (NAAQS) for ozone. Led by California's South Coast Air Quality Management District, these regions are formulating and adopting rules to bring themselves into compliance with the Clean Air Act State Implementation Plans (SIPs) and

are the areas most likely to implement strong clean fuel fleet programs.

The goal of the Energy Policy Act of 1992 is to decrease our nation's dependence on fossil fuels and to encourage the use of renewable energy sources, such as alternative fuels. These alternative fuels include liquefied and com-

"The goal of the Energy Policy Act of 1992 is to decrease our nation's dependence on fossil fuels and to encourage the use of renewable energy sources, such as alternative fuels."

pressed natural gas, ethanol, methanol, liquid propane gas, ether, and bio-diesel. The Energy Policy Act also includes tax incentives of interest to the trucking industry. For example, one type of incentive is a tax deduction for the incremental costs of using alternatively-fueled vehicles and alternative fuel facilities instead of diesel vehicles and fueling facilities.

As a result of these environmental regulations, competition will become even more fierce in the trucking industry. As more and

more shippers seek to form close relationships with transportation providers, they will be increasingly interested in the special features of trucking companies that set one apart from the rest. One of those features will be the type of environmental program the fleet has, and what its record of compliance is in its area. Another feature will be whether or not a trucking company uses alternative fuels, so that in the event of the enactment of Transportation Control Measures (TCMs), that carrier's service will be uninterrupted, while its competitors may face delays.

The Department of Energy has awarded the ATA Foundation a contract to expand its research into alternative fuels in heavy-duty trucks by developing demonstration projects and working with fuel suppliers and governmental agencies to set up demonstrations of all types. These demonstration projects include a wide variety of truck engines and truck duty cycles. Using the data collected from the demonstration projects, fleet operators will be better able to decide which alternative fuel is best suited for their fleets. They will also become better aware of the "players" involved in converting their fleets to alternative fuels. These players include utility companies, engine manufacturers, and state and local officials under whose jurisdiction lies the issue of alternative fuels.

Trucking executives can enhance their knowledge of alternative fuels through participation and member-

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ship in the ATA Foundation's Alternative Fuels Task Force. This group consists of over sixty people from a variety of occupations dealing with alternative fuels. These people include government and agency executives whose interests include the environment and energy conservation. Motor carrier executives with expertise in operations, safety, maintenance, and marketing are also involved in task force activities. Executives of engine and truck manufacturers, as well as members of fuel supplier companies in the natural gas and alcohol fuel industries, are also active participants. Membership is open to anyone interested in alternative fuels. The next meeting of the Alternative

"There is no better time to find out which alternative fuel is best suited for your fleet."

Fuels Task Force will be at the ATA Management Conference & Exhibition in Orlando, Florida on October 31, 1993. All ATA and ATA Foundation members are encouraged to attend this important meeting.

I strongly urge trucking execu-

tives to take advantage of the Foundation-sponsored demonstration projects. There is no better time to find out which alternative fuel is best suited for your fleet. By investing the time and energy in demonstration projects now, fleet operators will increase their ability to comply with the federal regulations mandating the use of alternative fuels in heavy-duty trucks.

Timothy R. McGrath, Editor of Alternative Fuels in Trucking, is also a Research Associate at the ATA Foundation and Trucking Research Institute where he conducts a number of research initiatives examining the safety and productivity of the trucking industry.

WISCONSIN

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Wisconsin already boasts many alternative fuel stations to support the vehicles now on the road: 139 propane, 27 CNG, and 2 ethanol (E-85) stations are on-line. We're looking ahead to the day when truck drivers from companies such as Schneider National, one of our largest home-based firms, will be able to purchase the fuel of their choice on any highway in Wisconsin.

We're miles ahead of the rest of the states in developing technology that will meet Clean Air Act requirements. And rest assured, while taking this leadership role we've kept our business taxes among the lowest in the nation, and we're the only state to have a sixty percent capital gains exclusion. We've reduced state income taxes,

eliminated the inheritance tax, and we've pushed our unemployment rate far below the national average. Wisconsin was recently ranked the third most fiscally sound state in the nation by City & State magazine. In the past five years, 10,000 new businesses have incorporated in Wisconsin.

I invite trucking firms around the nation to work with us in our goal of meeting and exceeding federal clean air requirements. Check out Wisconsin - you'll find a government that understands your company's needs today and is preparing for your future.

Governor Tommy G. Thompson is currently serving his second four-year term as Governor of Wisconsin. He is a member of the Governors Ethanol Coalition and the Council of Great Lakes Governors. He created the Wisconsin Alternative Fuels Task Force in 1990.

**1993
ATA Management
Conference &
Exhibition
Oct. 31 - Nov. 3**

**Alternative Fuels
Task Force
Meeting
Oct. 31 • 3:00 - 4:30**

**For more information on
Alternative Fuels
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