COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES

HEARING CHARTER

H.R. 547, the Advanced Fuels Infrastructure Research and Development Act

Tuesday, January 30, 2007
2:00 p.m. to 4:00 p.m.
2318 Rayburn House Office Building

Purpose

On Tuesday, January 30, 2007 the Subcommittee on Energy and Environment of the Committee on Science and Technology will hold a hearing to receive testimony on H.R. 547, the Advanced Fuels Infrastructure Research and Development Act.

H.R. 547 directs the Department of Energy (DOE) and the National Institute of Standards and Technology (NIST) to initiate a research, development, and demonstration program to make alternative biobased fuels more compatible with present-day infrastructure. H.R. 547 also directs these agencies to develop technologies and methods to provide low-cost, portable, and accurate measurements of sulfur in fuels, and to develop a physical properties database and Standards Reference Materials for alternative fuels.

Science and Technology Committee Chairman Bart Gordon introduced H.R. 547 on January18, 2007. This bill was originally introduced in the 109th Congress as H.R. 5658. The language from H.R. 5658 was included as Section 17 of H.R. 5656 – the Energy Research, Development, Demonstration and Commercial Application Act of 2006, which was later passed by the House under suspension of the rules as H.R. 6203.

To date, H.R. 547 is expressly endorsed by the following organizations:

- National Association of Convenience Stores (NACS)
- Renewable Fuels Association (RFA)
- Society of Independent Gas Marketers of America (SIGMA)
- National Association of Truck Stop Owners (NATSO)
- Coalition of E85 Retailers
- Petroleum Marketers Association of America (PMAA)

The hearing will seek to address the following questions related H.R. 547:

1. What infrastructure challenges currently hinder wide scale marketplace distribution of alternative fuels?
2. What are the limitations in the current testing equipment and protocols for verification of the sulfur content of diesel fuel?

Witnesses

- **Mr. John Eichberger** is the Vice President of the National Association of Convenience Stores (NACS) and will also testify on behalf of the Society of Independent Gasoline Marketers of America (SIGMA).

- **Mr. Bob Dinneen** is the President and CEO of the Renewable Fuels Association, the trade association for the U.S. ethanol industry and advocate for the increased production and use of fuel ethanol.

- **Mr. Richard Kassel** is the Senior Attorney and Director of the Clean Fuels and Vehicles Project at the Natural Resources Defense Council which advocates for cleaner diesel fuels and increased use of biobased alternative fuels.

Background

Alternative Fuels and Infrastructure

Rising oil prices and concern about our nation's dependence upon foreign fuel sources have increased interest in diversifying our fuel supply through the development of alternative, domestic sources of fuel.

The development and production of alternative biobased fuels is increasing and there is great interest in expanding the use of these fuels. There are approximately 101 ethanol refineries online today, with many more in various stages of planning. However, due largely to ethanol's hydrophilic properties, ethanol is not compatible with the existing distribution pipeline infrastructure. Therefore it must be transported by tanker truck and rail, making long-distance shipping extremely expensive.

According to the National Ethanol Vehicle Coalition there are already approximately six million E85-compatible Fuel Flexible Vehicles (FFV) on American roads, with auto manufacturers adding several new FFV models to their product lines. The Department of Energy counts over 900 stations to date selling E85, concentrated primarily in the Upper Midwest. While the number of stations is expanding, it is still less than 1% of the approximately 167,000 retail fuel outlets in the U.S. For example, despite being the nation's largest auto market, California currently has one public E85 station. The lack of service stations selling E85 means that in the near-term a very small proportion of compatible vehicles will actually utilize E85.

Ethanol is currently blended with approximately 40% of the nations fuel supply, mostly at concentrations of approximately 10% of the fuel by volume. It is at higher concentrations of ethanol such as in E85 where technical issues arise. Alternative fuels like E85 and biodiesel have different physical and chemical properties that make them incompatible with existing transportation, distribution, and retail infrastructure. These fuels may be associated with a variety of technical issues relating to corrosion of tank and

pipeline materials, increased sediment buildup, filter clogging, electrical conductivity, water and microbial contamination, varying flow rates, and thermal and oxidative instability. Unfortunately, even with federal assistance grants, the cost of replacing or building new infrastructure is simply not feasible for many fuel retailers and distributors, most of whom are small businesses.

Evidence suggests that it may be possible to develop additives and blendstocks that would avoid the need for expensive modification and replacement of existing infrastructure. It may also be possible to develop safer and less destructive infrastructure refurbishment methods and technologies. H.R. 547 directs the Secretary of Energy, in consultation with the National Institute of Standards and Technology to develop additives, blendstocks, technologies and methods to address these concerns.

Ultra Low Sulfur Diesel (ULSD)

In 2000 the U.S. Environmental Protection Agency (EPA) instituted a program to lower the emissions of diesel fuels by approximately 95%. Federal regulations mandated that after an initial phase-in period, beginning June 1, 2006, all diesel fuel refined and sold in the U.S. must be Ultra Low Sulfur Diesel (ULSD). ULSD is diesel fuel containing less than 15 parts per million (ppm) of sulfur.

Prior to this time retailers sold Low Sulfur Diesel (LSD) containing up to 500 ppm of sulfur. The reduction in the sulfur content of diesel fuel served to mitigate the acid rain-causing effects of sulfur compounds and also allowed for the introduction in 2007 of advanced diesel engine technologies that would otherwise foul with high concentrations of sulfur. These new engine technologies reduce the emissions of particulate matter and nitrogen oxides, or NOx, which exacerbate respiratory ailments and react with oxygen to produce ozone. This allows for the introduction of a wide range of clean diesel trucks and passenger vehicles into the U.S. market.

ULSD introduction also presented some challenges at various points of the distribution chain. As ULSD moves from the refinery through the pipelines, tanks, trucks and related infrastructure it can absorb residual sulfur left by other, high-sulfur fuel products. Products such as Low Sulfur Diesel with up to 500 ppm sulfur, Jet Fuel with 3000 ppm, and even Heating Oil with up to 5000 ppm may be moved through the same infrastructure as ULSD. The fuel industry feared that this contamination would result in diesel fuel arriving at fueling stations with sulfur contents that exceeded 15 ppm, thus exposing “downstream” retailers and distributors to liability for sale of non-compliant fuels. Current protocols and equipment for verifying the sulfur content of fuel are expensive and inaccessible to fuel retailers and others along the distribution chain. While the transition to ULSD has gone smoothly by most all accounts, the development of less expensive and more robust testing methods would enable more frequent testing of fuel sulfur content to assure that regulated limits are not exceeded and to quickly identify any contamination problems that may occur along the distribution chain.

The need for advances in testing equipment is not limited to ULSD. Evolution in sulfur analysis technologies may lead to advances in testing for other fuel contaminants. For instance, current standards for biodiesel (ASTM standard D6751) lay out the critical specifications and set limits for manufacturers on maximum allowed concentrations for various contaminants, including sulfur. The biodiesel industry is pushing for strict adherence to these specifications. Because of the low concentrations and narrow tolerances needed to meet these standards, the measurements are difficult to perform accurately, especially in the smaller production facilities that tend to characterize the biofuels industry.

Further steps that can be taken to improve measurement accuracy for diesel fuels involve working with analytical instrument manufacturers and commercial suppliers of calibration materials to transfer the inherent accuracy of Standard Reference Materials developed by NIST to working calibration standards used for field testing instrumentation. Section 4 of H.R. 547 directs DOE and NIST to develop these portable, low cost, and accurate technologies for testing sulfur content of diesel fuels, and begin demonstrations of such technologies within one year.

Standard Reference Materials (SRMs)

NIST prepares SRMs for three main purposes: (1) to help develop accurate methods of analysis; (2) to calibrate measurement systems used to facilitate exchange of goods, institute quality control, determine performance characteristics, or measure a property at the state-of-the-art limit; and (3) to ensure the long-term adequacy and integrity of measurement quality assurance programs.

Industry, academia, and government use NIST SRMs to facilitate commerce and trade and to advance research and development. For example, state governments use SRMs for fuels to certify station pumps and other dispensing equipment.

Market acceptance of any fuel requires a reliable supply of the fuel that consistently meets certain specifications needed to ensure quality and compatibility with engines and infrastructure. Section 5 of H.R. 547 directs NIST to compile a database of physical properties for alternative fuels, and use these data to develop Standard Reference Materials (SRMs) such as those NIST develops for conventional fuels.

Section-by-Section Description of H.R. 547

Section 1. Short Title

The Advanced Fuels Research and Development Act

Section 2. Findings

The nation should have a diverse fuel supply which includes alternative fuels, but incompatibility of some fuels with existing infrastructure presents significant and costly barriers to market penetration. Fuel additives or other technologies may allow such alternative fuels to be distributed and dispensed in existing infrastructure. Fuel retailers and distributors do not have ready access to technologies that verify fuels are in compliance with federal regulations for diesel fuels.

Section 3. Alternative Fuel and ULSD Infrastructure and Additives Research and Development.

Directs the Department of Energy (DOE) and the National Institute of Standards and Technology (NIST) to conduct research and development, demonstration and commercial application of additives for biobased alternative fuels (and ULSD) to address infrastructure compatibility issues such as: corrosion of infrastructure materials, dislodging of storage tank sediment, water and microbial contamination, increased emissions, temperature-sensitivity. The program should also investigate various methods for infrastructure refurbishment and cleaning, and other infrastructure-related problems as identified by DOE and NIST.

Section 4. Sulfur Testing for Diesel Fuels

Directs the Department of Energy (DOE) and the National Institute of Standards and Technology (NIST) to conduct research, development, demonstration and commercial application of portable, low cost, and accurate technologies for testing sulfur content of diesel fuels, and begin demonstrations of such technologies within 1 year.

Section 5. Standard Reference Materials and Data Base Development

Instructs the National Institute of Standards and Technologies (NIST) to collect data on the physical properties of various alternative fuels, and develop the Standard Reference Materials (SRM) such as are available for conventional petroleum-based fuels.