Setting National Fuel Quality Standards

Paper 7: Discussion Paper on Diesohol

Renewable Fuels Australia

Introduction:

Diesel fuel has, and continues to be a challenge to public health as it is a major source of particulate matter emissions (PM). The exhaust emission of coarse, fine, and ultra-fine particles are directly associated with a range of identified health risk to the public. These include respiratory, cardiovascular, and a range cancer-related diseases.

By stimulating more efficient combustion of the components of petrol and diesel fuels in the combustion chamber of engines oxygenated fuels such as ethanol and biodiesel have demonstrated a capacity to significantly reduce these emissions, as well as achieving net reductions in greenhouse gas emissions.

The introduction of cleaner burning low sulphur diesel will improve the emission performance characteristics of diesel fuel, but research suggests that while the EURO standards for diesel will achieve reductions in coarse PM, there will be an associated increase in fine and ultra fine particles that have been identified as the primary carriers of the toxic and cancer causing components of petrol and diesel fuels deep into the human body.

If this is the case, the demand for cleaner burning renewable fuel additives to petrol and diesel fuels will not be diminished by improvements otherwise in petrol and diesel fuel quality standards.

The benefits of renewable oxygenated fuels in reducing the exhaust emission of regulated and toxic emissions in transport fuels is usually associated with the blending and use of ethanol with petrol in spark ignition engines. Alcohols (ethanol and methanol) are not miscible with diesel fuel, and require an emulsifier or additive to produce a stable fuel.

Typically this takes the form of adding an emulsion to hydrated ethanol blended with diesel, or the addition of an additive to anhydrous ethanol. Australia, in the form of Apace Research Ltd has led the field in the emulsion/hydrated ethanol approach with a fuel called ‘Diesohol,’ while the additive/anhydrous fuel approach has been adopted in the United States in the form of a fuel called ‘E Diesel.’

Diesohol has been the subject of extensive trials in Australia and South America over the past 15 years, and in Europe. CSR Distilleries at Sarina in Queensland undertook the most recent trials of Diesohol.

While biodiesel’s capacity for use as an additive to, or replacement for diesel has been widely recognised by the major oil companies and diesel engine manufacturers. Diesohol and E Diesel have yet to receive the same level of acceptance in the transport sector.

Both Diesohol and E Diesel have a role to play in the domestic and international diesel fuel market, and particularly in regions where ethanol is the dominant renewable fuel in terms of availability. This includes remote power applications and use in farm equipment and rural transport.

The development of a fuel quality standard for diesohol would be an important step in the delivery of cleaner burning diesel fuel in the future.

Part A – Options for regulating diesohol.

Vehicle Warranties: Biodiesel has demonstrated that renewable alternative fuels can secure public and OEM acceptance, including warranty acceptance.

Development of a fuel quality standard for diesohol would assist in securing the confidence of the major oil companies, diesel engine manufacturers, and diesel fuel users.

Developing a fuel quality standard for diesohol would also facility the adoption of national industry standards for the production, storage and distribution infrastructure for diesohol.

Part B – Technical issues related to a fuel quality standard for diesohol.

With the exception of distillation, colour, cetane number and flashpoint, the parameters of diesohol are the same as for diesel fuel standards. This would require some modification of the existing ASTM standards to accommodate these characteristics of diesohol.

It is unlikely that ethanol blending with diesel would exceed 15% ethanol content. A limit of 15% ethanol content in diesohol would not be unreasonable.

In practice, it is possible that for maximum fuel economy performance, diesohol and E Diesel fuels may be limited to blends of 10% ethanol content. A limit of 15% ethanol content would thus provide flexibility for future technology improvement.

As with refinery produced petrol and diesel fuels, corrosion inhibitors would also be added to diesohol by manufacturers to address any potential corrosion or materials issues that might arise.

Some materials compatibility issues were identified during the 1998/99 Optimisation of Ethanol and Ignition Improver Content of Diesohol to reduce Diesel Engine Exhaust Emissions Trials (SRDC Project No. 2538).

These were minor problems, with correction at relatively low cost.

Ethanol is an efficient solvent in terms of removing gums and residues regularly found in petrol and diesel fuel engines, including fuel systems. In some older vehicles, first time use of ethanol may result in a one-off filter blockage. Some reference to this might be included in information material for users at the point of sale.

Over the past 10 years refinements have been made to the fuel storage and handling of diesohol. Today, diesohol has been demonstrated a stable fuel in storage beyond 6 months. Storage and handling precautions would be as for ethanol (a Class 3 Flammable liquid complying with AS 1940 and other relevant standards).

No adverse health effects during refuelling were recorded during the 1998.99 trials by the NSW Workcover Authority.

The addition of ethanol to diesel does raise vapour pressure. Fuel volatility, however, is an issue for the States, and the outcomes could be expected to be similar to those already put in place by the

respective Environmental Protection Authorities in Queensland and NSW for ethanol petrol blend fuel. In both instances the mass impacts of increases in evaporative emissions were found to be similar to neat petrol, and offset by the lower ozone formation potential of ethanol.

While enforceable fuel standards may have industry cost implications, these are standard practice elsewhere. The critical issue is that any fuel standards be practical, and do not represent unfair market entry barriers for renewable and other alternative fuels.

This can only be achieved if the renewable fuels industry is represented in the formation process of fuel quality standards by the Fuel Quality Standards Committee.

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