

18th February 2005

Setting a Quality Standard for Fuel Ethanol

This letter is in response to the email from the Department of Environment and Heritage (DEH), seeking comment from members of the Fuel Standards Consultative Committee (FSCC) on the analysis and conclusions of the technical paper commissioned by DEH from the International Fuel Quality Centre (IFQC) on *Setting a Quality for Fuel Ethanol*.

My comments, as the representative of the Australian Institute of Petroleum (AIP) on the FSCC, are given in the Attachment.

AIP supports the establishment of a quality standard for fuel ethanol. The reasons for this, and detailed recommendations on the standard, are given in the Attachment.

Setting a Quality Standard for Fuel for Fuel Ethanol.

The Need for a Standard

AIP supports the development of a mandatory fuel standard for fuel ethanol, regulated under the Commonwealth *Fuel Quality Standards Act (2000)*.

Mandatory vehicle engine emission standards have been established as part of the Government's strategy to achieve air quality and greenhouse gas emission objectives, and engine operability. A key factor in the achievement of vehicle emission standards is fuel quality that complements the required changes in vehicle engine technology. Mandating fuel standards is an important factor in assuring that fuels are of the required quality.

Government has established targets for the introduction of biofuels, such as ethanol, and has put in place a framework of support and regulation for the biofuel industry, to assist the development of the biofuels industry. There are now a number of producers of fuel ethanol, and this is set to increase. At least two ethanol producers are selling ethanol blend petrol in at least two States. Two AIP refiner-marketers are retailing ethanol blend petrols in Queensland and New South Wales, either directly or through subsidiaries. The possibility of extending ethanol blending into diesel is also under consideration.

There is, therefore, the potential for ethanol blend fuels to form a significant component of the overall fuel supply framework.

Given this, it is important to ensure that the increasing penetration of ethanol blend fuels into the fuel market is done in manner which is consistent with the overall Government objectives for air quality and greenhouse gas emissions and engine operability, and also for vehicle engine technology and fuel quality.

Mandating a quality for fuel ethanol would be consistent with these objectives and strategies, and essential in ensuring the successful adoption of ethanol blended fuel.

The Policy Context for Fuel Ethanol Standard

The recommendations in the IQFC Report are based to a large extent on the premises of:

- The experience of ethanol in the USA provides the most points of commonality with the Australian fuel ethanol market;
- The nature of the Australian fuel ethanol market is defined by the two current major producers – Manildra and CSR
- Fuel ethanol is becoming a globally traded commodity, and so any ethanol fuel standards in Australia should allow Australia to participate in this trade – presumably both as an exporter and importer.

AIP believes that an Australian fuel ethanol standard should be based on what is directly relevant for the Australian market. The three IFQC listed above are relevant, but there are other important policy criteria to be factored in.

A fuel ethanol standard must be:

1. Consistent with the Australian petrol standard, and diesel standard if diesel/ethanol blends are to be marketed. Any fuel ethanol standard must not in any way undermine the petrol and diesel standards.
2. Consistent with the vehicle engines and fuel systems in the Australian vehicle market, rather than those of overseas markets. This does not mean that the overseas experience is irrelevant, but rather that it should not necessarily predominate. What is important is that a fuel ethanol standard is suitable for the existing and future Australian vehicle fleet.
3. Consistent with the regulations regarding ethanol in fuel that are already in place - notably the 10 per cent maximum on ethanol in petrol/ethanol blends.
4. Relevant to fuel ethanol produced by any current or future ethanol producer – not just Manildra or CSR. It is perfectly possible that ethanol may be produced from a wide range of feedstocks in the future. The quality of fuel ethanol, and its feedstock sources, in the future may differ significantly from the quality of fuel being produced now.
5. Related directly to the quality of fuel to be sold in the Australian market – not necessarily on overseas markets. AIP accepts that there are clear benefits in having a fuel standard that encourages the import/export of fuel ethanol, as this increases the potential for a viable fuel ethanol supply framework. However, the global trade criteria should be a secondary consideration to that of ensuring the correct quality of fuel for vehicles in Australia.

In addition the Fuels Quality Standards Act, Petrol determination, should be amended to specify that any ethanol blended into petrol must meet the fuel ethanol standard.

The Process for Establishing a Fuel Ethanol Standard

The IFQC Report recommends that a committee of stakeholders be established to debate the parameters that could be included in a fuel ethanol standard. The IFQC lists Manildra and CSR, National Refiners Association, Automobile Association, and the Australian Standards Bureau.

There are clear problems with this. In particular:

- Other potential ethanol producers or importers are excluded - giving a potential commercial advantage to current producers.
- The identity of the National Refiners Association is not clear – presumably the AIP is meant.
- The vehicle industry is not represented. AIP believes that the vehicle industry is an essential stakeholder in this process.
- There seems no clear reason for the inclusion of an Australian Standards Bureau – presumably Standards Australia. The fuel ethanol standard would be a regulation under the *Fuel Quality Standards Act*. This leaves no clear role for a standards body.

Above all, there already is a stakeholder body in existence, the FSCC, which seems to encompass all relevant stakeholders. AIP recommends that the FSCC remain the body tasked with providing advice to the Minister on the appropriate fuel ethanol standard. If necessary, this could be supported by a technical working group.

Elements of an Australian Fuel Ethanol Standard

Hydrous or Anhydrous

As noted in the IFQC Report, most countries base their fuel ethanol use on high purity anhydrous ethanol. This includes the USA and Europe, the two regions which have the most commonality with the likely patterns of usage of fuel ethanol in Australia. The two current Australian producers base their fuel ethanol on high purity anhydrous ethanol.

Hydrous ethanol is used in Brazil, and in some diesel/ethanol blends. The Brazilian usage of ethanol is based on E20 or higher blends, and their vehicle fleet is adapted to this. It is less relevant for the Australian market.

The IFQC Report recommends that a fuel ethanol standard be based on high purity anhydrous ethanol; if other standards are required, they can be developed off this. AIP supports this conclusion.

Denatured or Undenatured

Denaturing of ethanol is required for excise reasons. The US ASTM D 4806 standard is based on denatured ethanol, and this is the route followed by the two current Australian producers.

The IFQC Report notes that the New York Stock Exchange has opened an International Fuel Ethanol Futures contract, which is likely to support the expansion of international trade in ethanol; an undenatured specification provides more flexibility for trade.

However, ethanol will be sold for fuel blending in Australia on a denatured basis. The primary objective of an Australian fuel ethanol standard is to ensure that fuel ethanol is fit for purpose for blending in to fuels for use in Australia. Therefore the relevant specification for an Australian fuel ethanol standard is denatured.

The Basis for Individual Specifications

Australian petrol and diesel standards are based on the European Euro standards. It would be logical to adopt a fuel ethanol standard based on a common European standard. However, as pointed out in the IFQC report, there is no European Union fuel ethanol specification at present, and there seems little likelihood that one relevant to Australia will be in place in the near future. Moreover, any such specification might be based on the European pattern of E5 blends, rather than the E10 blends prevalent in Australia.

Usage of ethanol in petrol in the USA is based on E10 blends. The primary US fuel ethanol standards are set out in two ASTM standards – ASTM D 4806 for Denatured Fuel Ethanol and ASTM D 5798 for Denatured Fuel Ethanol suitable for E85 blends. The D 4806 seems the most relevant to Australian conditions.

AIP recommends that an Australian fuel ethanol standard takes ASTM D 4806 as a base, to be adapted where necessary to suit Australian conditions, similar to the approach taken with Euro standards for petrol and diesel.

- Ethanol content. The ASTM D 4806 specification equates to approximately a minimum undenatured ethanol content of 95 vol%; adding the minimum denaturants gives a maximum of 3% for any other impurities. There is some pressure to increase the minimum ethanol content in the standard.

Current Australian production is a high purity ethanol, which meets specifications in excess of 99 vol%. There seem clear benefits in maintaining this performance, as it minimises the risk of unnecessary or harmful impurities. The IFQC Report recommends a minimum ethanol content of 99% prior to denaturing, and AIP regards this as reasonable.

- Denaturant content. The ASTM D 4806 specification contains a minimum denaturant of 1.96 vol%, the denaturant being unleaded petrol. The Australian producers currently use a denaturant at 1% minimum, again unleaded petrol. While there are other denaturants, these are effective also at very low dose rates. There seems no pressing reason to require Australian producers to increase their denaturant contents, and so AIP recommends a rate of 1% minimum. The type of denaturant allowed in fuel ethanol must be specified and must be of a suitable no-harm quality.
- Other ASTM D 4806 Specifications. The other specifications in ASTM D 4806 have strong relevance to suitability of the fuel for engines. The specifications of current Australian producers, given their high grade nature, make some of these specifications seemingly redundant. However, they may be more relevant to other future Australian producers. AIP recommends that they be retained in an Australian standard. This would also help the tradeability of Australian ethanol.
- Appearance. Both CSR and Manildra use Appearance as a specification. AIP believes that this specification is open to subjective interpretation and so would be difficult to regulate.
- Sulfur, Benzene, Olefins and Aromatics. The IFQC report notes that California regulates the levels of these elements in denatured ethanol and in the denaturant itself. This is to ensure that the denatured product allows the ultimate blend to meet Californian fuel standards. The IFQC report seems to support a sulphur standard for Australia, but is silent on the other elements.

AIP believes there is merit in the Californian approach. Without this, it would technically possible (for example, if the denaturant had very high levels of these elements) to sell a fuel ethanol that was impossible to blend to meet the petrol or diesel standards. To rule out this possibility, AIP recommends that an Australian fuel ethanol standard includes specifications for these elements at the prevailing standards for these elements in the petrol (in the case of benzene, olefins and aromatics) and diesel standards (in the case of sulfur).

- Corrosion inhibitors. The manufacturers sometimes add corrosion inhibitors to ethanol. This is to provide adequate protection for some metal types against corrosion. Any corrosion inhibitor used must be suitable for use and of an approved type. Some corrosion inhibitors could interact with other petrol performance additives.