

## Overview

Mobil Oil Australia Pty Ltd (Mobil) is pleased to make this submission in response to the Department of Environment and Heritage's (DEH) Standardising Diesel/Biodiesel Blends discussion paper.

Mobil is a major refiner and marketer of petroleum products in Australia and is the largest importer of finished transport fuels into Australia. Mobil and its predecessor companies have marketed petroleum products in Australia for over 110 years, commencing operations in Melbourne in 1895. Through Standard Vacuum Refining Company Mobil commenced refining operations at Altona in 1949.

Mobil has a long and proud tradition of reliable supply of high quality petroleum products to its customers throughout Australia. Quality is a core value for Mobil and it is critical to ensuring customers receive product that is fit for purpose.

Mobil is a member of the ExxonMobil worldwide group of companies (ExxonMobil). ExxonMobil has substantial experience in the blending and marketing of biofuel blends globally.

The key issues that need to be taken into account when deciding the best approach are that the fuel must be fit for purpose and supported by the vehicle manufacturers, consumers must have confidence that the fuel will not adversely affect the performance of their vehicle and there must be a level playing field for all suppliers.

## Discussion

Biodiesel has some significant differences to conventional diesel and it must be introduced in a way that does not undermine the increasingly stringent quality requirements for diesel fuel, or the application of national fuels standards.

It should be noted that raw vegetable and animal derived oils are not biodiesel and they should not be added to diesel fuel as they can cause operating problems even at low concentrations.

The overarching principles that need to be applied to the use of biodiesel are:

1. The use of the fuel should not have any adverse environmental effects, i.e. it should not increase emissions from diesel vehicles using the fuel.
2. The fuel should have no adverse performance effects on vehicles using the fuel, i.e. it should be fit-for-purpose in the existing diesel vehicle fleet both on-road and off-road without modification. However, any regulation should allow for the use of higher biodiesel content and even 100% biodiesel in the relatively small number of dedicated vehicle fleets that can satisfactorily operate on those fuels.
3. The consumer has the right to know if the fuel may contain biodiesel and should be explicitly advised when the fuel contains more than 5% v/v biodiesel. Mobil would suggest a general communication program by fuel suppliers and Government to advise consumers that the diesel standard is being changed to accommodate up to 5% bio component and they can expect to see such fuel marketed more widely - if they have any concerns they should consult their fuel supplier (this is similar to what was done with the phase-out of leaded gasoline and the introduction of 50 ppm S diesel).

To ensure a fuel that is fit-for-purpose in all diesel vehicles that could be expected to use that fuel, Mobil recommends the following strategy for biodiesel standards:

1. The biodiesel component must meet the Australian Biodiesel (B100) standard or equivalent ASTM or EN standards.
2. A cap should be set on biodiesel blend rates for normal on-road and off-road use, at a level acceptable to vehicle manufacturers. This should be a level at which biodiesel blends can be used without modifying engines, and at which the energy loss is manageable. Mobil suggests that a cap of 5% be set for normal diesel, consistent with the European diesel specification and consistent with most light duty diesel engine manufacturers' recommendations. It may be possible to increase the maximum biodiesel content in future when there has been more experience with its use and Original Equipment Manufacturers (OEMs) are comfortable that it will not cause operating problems in the engines they supply. Diesel containing less than 5% v/v biodiesel and meeting the diesel standard should be permitted to be sold as diesel to Retail customers without labelling
3. A clear regulation that any blends sold as diesel at Retail sites must meet the conventional diesel standard.
4. Labelling of pumps dispensing diesel/biodiesel blends containing more than 5% v/v biodiesel so that it can not be mistaken for normal diesel and prevent mis-fuelling.
5. The government should enforce quality standards for all fuels, including the maximum biodiesel content of diesel, in order to protect consumers and assist to maintain consumer confidence.

### **Mobil Recommendations:**

- ◆ Option 1 for Retail sales and this will require the Diesel Standard to be modified to include a maximum FAME (fatty acid methyl ester) content of 5% v/v (not 5.0% v/v) and to exclude the addition of non-esterified vegetable or animal oils. Currently, EN 14078 is the most appropriate test method for determining the FAME content of diesel fuel. The maximum FAME content for normal diesel may be reviewed in the future once there has been sufficient operating experience for the OEMs to be comfortable that higher biodiesel content will not cause operating problems. At 5% maximum biodiesel content, the maximum diesel density should not be an issue. Diesel with a density less than 848 kg/m<sup>3</sup> when blended with 5% biodiesel at the maximum B100 specification of 890 kg/m<sup>3</sup> will still meet the diesel standard of 850 kg/m<sup>3</sup>.

It should be noted that a maximum FAME limit of 5% v/v needs to be included in the diesel standard irrespective of which option is adopted.

We note that this will have an impact on payment of grants for the biodiesel components under the cleaner fuels grant scheme and the Government should consider the implications.

- ◆ The sale of higher biodiesel content fuel to specific customers whose vehicles can safely operate on this fuel should be permitted but the mechanism for this is

unclear. Any diesel/biodiesel blend containing more than 5% biodiesel must not be labelled or sold as diesel.

- ◆ The government should enforce quality standards for biodiesel blends in order to protect consumers and assist to maintain consumer confidence.

The following 2 mechanisms are being discussed amongst the oil and biofuels industries as possible means of allowing the sale of biodiesel blends containing more than 5% v/v to commercial customers whose vehicles can operate satisfactorily on higher biodiesel content fuel:

- ◆ Allow suppliers to apply for permission to sell biodiesel blends containing more than 5% to particular customers using s13 of the Fuel Quality Standards Act 2000.
- ◆ Establishing a biodiesel blend standard for blends containing more than 5% biodiesel, e.g. a B20 standard for blends containing between 6 and 20% biodiesel,

Mobil does not favour the use of s13 approvals for the ongoing sale of transport fuels and would prefer that use of this mechanism be confined to short term disruptions to supply. However, unlike fuel standards, a s13 variation can have conditions attached which could potentially limit sales to commercial customers whose fleets can handle the fuel. A s13 approval will need to include additional specification parameters that are not in the diesel standard in order to protect the consumers.

Mobil does not support the establishment of a biodiesel blend standard (for example B20) under the existing Fuel Quality Standards Act & Regulations, as we understand that there is no way under existing legislation of restricting sale of the product to particular customers and B20 could be sold at Retail sites to customers whose vehicles are not able to operate satisfactorily on that fuel. If this legislative issue can be overcome, the establishment of a B20 standard for non retail sales is our preferred option.

If either of these options is progressed, Mobil is able to provide the Department with a list of additional parameters that would need to be included as condition to a s13 approval or in a B20 standard in order to ensure the product is "fit for purpose" and consumers are protected. Storage / oxidation stability and cold flow properties become more critical as the biodiesel content is increased. We are aware from experience in the US that biodiesel can drop out of solution above the cloud point of the blended diesel fuel.

In all cases, the biodiesel components used in the blends should meet the Australian Biodiesel (B100) standard or the equivalent ASTM or EN standards.

Mobil recommends that, providing the diesel and B100 both meet the Australian standards, then the only additional testing required for diesel containing less than 5% biodiesel would be to ensure that the blend is adequately mixed, i.e. is homogeneous. and to demonstrate that the blend contains no greater than 5% FAME It would be prudent for suppliers to also undertake some testing of the cold flow properties on a frequency basis to ensure the product is "fit for purpose" in the geographical areas that the product is being used.

We have included some specific technical comments on Duncan Seddon & Associates September 15th, 2006 report in Attachment 1.

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**Attachment I - Specific technical comments on the Duncan Seddon & Associates report:**

Page 5

The proposed Filter Blocking Tendency specification of 2 (maximum) is inconsistent with the current Australian diesel standard which is 2.0. The decimal point is extremely significant.

Page 19

Regarding sulfur, properly manufactured and stored biodiesel will usually easily pass requirements for ultra low sulfur diesel. Used cooking oils may have higher sulfur and we have heard of one manufacturing process that could produce B100 with sulfur on the order of 20 ppm.

There is a lot of literature and discussion on the increase of NOx, however, there may be a complex vehicle/driving cycle effect that makes comparison across studies difficult.

Page 21

Biodiesel boils in the high end of diesel fuel and this has the potential to lead to increased fuel dilution of lubricating oils in the sump.

Page 22

The comment "B20 should not materially absorb water from the surroundings." does not make sense. We expect that B20, like any other substance, will eventually come to equilibrium with the gases above it. At equilibrium, B20 will contain more water than conventional diesel.

Page 25

Low temperature operability of conventional diesel is not well correlated with density, so characterising conventional diesel fuel by density will not give a good matrix for these properties.

Page 27

Demulsifiers will not prevent B20 from absorbing water, nor will they cause dissolved water to drop out. The author may be confusing water present in micro-droplets and truly dissolved water. Biodiesel simply dissolves more water than conventional diesel and that won't be fixed with an additive.

Page 32

There have been recent credible reports of low temperature operability problems for B100 and biodiesel blends at temperatures above the cloud points. These reports are being investigated and we expect this may result in future changes to the biodiesel specs. There is very little data to say that CFPP, LTFT or cloud point adequately predict low temperature operability of biodiesel blends. Industry has been assuming that they will predict operability.

Page 33

US Experience with B20 - At a December 2005 ASTM Workshop, the US Department of Defence said they do not use B20 at northern bases during winter in order to avoid low temperature operability problems. By not raising this point in the report, people may infer that there is no low temperature operating issue associated with using B20 which is not correct.

Page 34

The EMA specifications are for test fuels used to compare engine test results and are not intended to be commercial fuel specifications. At the beginning of their posting it says "These specifications for biodiesel were developed by the EMA to identify a standard biodiesel blend fuel with consistent properties suitable to be used for testing and evaluation."

Page 35

There is now a stability requirement in ASTM D6751 and it is 3 hours in EN14112 (Rancimat). There is concern that this test may not provide an adequate indication of the stability of biofuel blends and this requirement is under active review. We anticipate that it will probably be changed.

Discussions with additive vendors have indicated that new additive technology may be needed for biodiesel low temperature operability additives.

Page 36

Data in literature and the fatty acid profiles in this review indicate that palm olein FAME will have worse low temperature operability than rapeseed FAME. We do not understand how authors drew the conclusion in the 4th bullet point that the FAME from palm olein will be similar to rapeseed derived FAME.

Regarding filter plugging due to the increased solvency of biodiesel blends, it should also be noted that switching back and forth between biodiesel blends and conventional diesel can also lead to increased filter plugging. Solvation of deposits will occur each time the system switches to biodiesel, with the severity of the problem depending on the time the system was on conventional diesel, the quality of the conventional diesel and housekeeping practices.

Page 38

There is conflicting data as to the effect of cetane improvers on NOx in conventional diesel. The question is whether additive induced cetane increase provides the same exhaust emission benefits as natural cetane from compositional changes. We are not aware of any data on biodiesel, so the claim that cetane improver will fix a NOx problem with biodiesel blends is not proven.

It should be noted that increased cetane will reduce ignition delay and hence advance ignition timing this usually results in increased combustion temperatures and NOx emissions with a reduction in particulate emissions.

Cetane derived from additive addition generally delivers the same emissions performance as natural cetane at temperatures above -10°C. Below -10°C natural cetane provides faster starting and less white smoke (unburned fuel) emissions.

Page 41

Phosphorus and trace metals should be controlled because in addition to the effect they have on fuel stability; they can lead to engine deposits/wear and can damage after-treatment devices when those are present.

Page 43

It is incorrect to conclude that at biodiesel contents less than 5%, the biodiesel component is too small to create operational problems with the blended fuel. This is why Europe and various state governments in the US require the B100 component to meet an applicable specification such as ASTM D6751 or EN 14214.

Page 47

It is likely that a filterability test is needed, but limits and the test itself are still under discussion overseas.

It should be noted that in Australia, the diesel standard includes Filter a Blocking Tendency using IP387 limit of 2.0 and not 2 as written in the report.

Page 48

Test methods may not yet be available for the very low concentration of metals found in blended fuels.

Page 53

D6751 and EN 14214 have harmonized on 0.5 mg KOH/g for acid number.

Page 54

As mentioned above, cloud point and CFPP may not be good measures on low temperature operability for biofuels.

Page 57

Oxidation Stability - D2274 is not suitable for biodiesel blends because the filter medium may not be compatible with biodiesel.

Total Acid Number should be 0.5.

Suitable test methods and limits for measuring the tendency to plug fuel filters are still being discussed globally.