Department of Environment and Heritage

Setting National Fuel Quality Standards: Standardising Diesel/Biodiesel Blends

Australian Farmers Fuel Pty Ltd (SAFF)

Principal Contacts:

Andy Fischer
Managing Director

Mike Jureidini
Biofuels Scientist

Contact Details
P.O. Box 1
Pooraka SA 5095
phone (08) 8262 3002
fax (08) 8262 7575
biofuel@farmersfuel.com.au

February 2007

8th February, 2007

Dr L Dowling
Director
Fuel and Used Oil Policy Section
Department of the Environment and Heritage
GPO Box 787
CANBERRA ACT 2601
per email: fuel.quality@deh.gov.au

Dear Dr Dowling

Re. Diesel/Biodiesel Blends – Discussion Paper

Thank you for providing us with the opportunity to submit our enclosed Response to the 'Diesel/Biodiesel Blends Discussion Paper'.

Our company is a leading distributor of biofuel products in Australia. We believe that biofuels can play an important role in the future of this country, with benefits ranging from Greenhouse gas abatement to health to wider economic growth. We also strongly believe that to truly maximise their potential, there needs to be a legislative framework that allows the widest possible range of quality biofuel products to be made available to the general public.

Our experience over several years in the biofuels industry shows that biodiesel in particular is an extremely safe and reliable fuel with enormous potential in Australia. We hope that any legislative changes that may occur in future will serve to help ensure the viability of the biodiesel industry whilst also maximising the environmental and economic benefits offered by this unique product.

We trust that our Response is given due consideration in the process you are currently undertaking. Should further information be required, please do not hesitate to contact the writer direct.

Yours Sincerely,

Andy Fischer
Managing Director

cc. All members of the Fuel Standards Consultative Committee

Australian Farmers Fuel Pty Ltd
51-61 Cavan Road, Gepps Cross, SA 5094
PO Box 1, Pooraka, SA 5095
Phone: 1800 000 609 Fax: 1300 660 664
Email: admin@farmersfuel.com.au Web: www.farmersfuel.com.au
ABN 77 097 047 464

Table of Contents

Executive Summary

Australian Farmers Fuel Pty Ltd (SAFF) is an Australian privately owned independent distributor, wholesaler and retailer of biofuel products. SAFF has a network of more than 50 service station retail outlets, through which **all** liquid transport fuels contain the maximum biofuel content permitted under the *Fuel Quality Standards Act 2000* as amended.

SAFF was founded in 1999 and began retailing neat Biodiesel (B100) from a single service station retail outlet in Pooraka, SA in 2001. SAFF now retails neat Biodiesel at 14 service stations in 3 states and is currently increasing this number. A highly detailed information sheet is attached to each retail bowser to ensure customers are aware of the critical differences between Biodiesel and diesel, and to provide the customers with advice for ensuring problem-free use of the fuel.

SAFF's main biodiesel product is SAFF Premium Diesel, which is a proprietary blend of up to 20% biodiesel (by volume) with ultra low sulphur diesel. SAFF Premium Diesel, which was introduced to the general public in 2004, is formulated to always meet or exceed the Australian Diesel Standard (*Fuel Standard (Automotive Diesel) Determination 2001*) as well as local climatic requirements. Biodiesel feedstock type and volume blends are changed seasonally in a similar fashion to the standard major oil industry practice of adding lighter petroleum fractions (such as kerosene) to imported or domestically produced gasoil to meet local requirements.

SAFF Premium Diesel is now available at all SAFF branded service station retail outlets across Australia. SAFF supplies substantial volumes of Premium Diesel in bulk to a large variety of commercial clients and Councils around the country. In addition, SAFF's own fleet of utilities, light trucks and prime movers have operated on Premium Diesel and higher biodiesel blends continuously for over 5 years. Experience has overwhelmingly demonstrated that biodiesel is a safe, reliable, high quality fuel and that a 20% blend level meeting the current Australian Diesel Standard presents no disadvantages whatsoever – short term or long term – over regular diesel.

SAFF's commitment to the longevity of the Australian biodiesel industry is illustrated by the recent agreement to become the major sponsor for the Australian Supertruck Nationals for the coming 10 years. The Australian Supertruck Nationals is the peak truck racing series, with strong ties to the transport industry and with a growing spectator support base second only to that of the V8 Supercars. Beginning this year,

the Australian Supertruck Nationals will run exclusively on 100% biodiesel (B100). This world first marketing initiative is expected to vastly improve consumer confidence in – and demand for – biodiesel.

Fuel quality is of the utmost importance. SAFF's strict quality control procedures ensure that each batch of biodiesel supplied to the company has been independently certified as meeting or exceeding the Australian Biodiesel Standard (*Fuel Standard (Biodiesel Determination) 2003*). Duplicate sealed samples are retained by the manufacturer and by SAFF for a minimum of three months. Also, each new batch delivery of B100 to SAFF's storage and blending facility in Green Fields, South Australia is tested for key quality parameters at SAFF's on-site laboratory. Similarly, all petroleum diesel supplied to SAFF (predominantly from Mobil) is accompanied by a statement of compliance confirming that it meets or exceeds the Australian Diesel Standard. SAFF therefore has a high level of confidence that all blends of biodiesel and diesel are manufactured using fuels that meet or exceed their respective Standards.

Throughout this document, SAFF argues that biodiesel blends need not be standardised in Australia. SAFF's opinion is that customers need to be made aware of the maximum biodiesel content of any given blend, and for blends of over 20% biodiesel the customer needs to be informed of the potential performance and operability differences associated with biodiesel.

Most importantly, it is SAFF's opinion that the Australian Diesel Standard should not be changed to limit biodiesel content to 5% maximum (B5). The often-cited overseas limitations of biodiesel content in diesel fuel were brought about by conditions specific to those countries. Australian conditions, including climate, are substantially different to those in the other countries concerned. Low blends such as B2 and B5 serve no substantial environmental advantages, but are favoured by the major oil companies as they improve the otherwise diminished lubricity of ultra low sulphur diesel while still severely limiting the competing renewable fuel's potential market share. Misinformation about biodiesel prevails.

Whether or not a 5% biodiesel limitation is eventually introduced into the Australian Diesel Standard, SAFF is of the strong opinion that Original Equipment Manufacturers (OEMs) should refrain from making misleading, non-factual and unfounded statements regarding the use of higher biodiesel blends – particularly in terms of warranty. As with all fuels, warranty issues relating to damages incurred through the use of biodiesel (or its blends) are the responsibility of the fuel supplier and not the equipment supplier.

The remainder of the document is a direct response to the questions set out in the Department of Environment and Heritage's discussion paper "Setting National Fuel Quality Standards: Standardising Diesel/Biodiesel Blends".

1. Comments on Management Options 1 and 2

1.1 Should biodiesel blends be capped at B5 and meet the diesel standard?

Australian Farmers Fuel Pty Ltd (SAFF)'s main biodiesel blend, 'SAFF Premium Diesel', is essentially a B20 product (refer Appendix D: Premium Diesel Marketing Specification). The blend ratio is varied throughout the year to ensure that the product always meets or exceeds the Australian Diesel Standard and also that the cloud point and cold filter plugging point are appropriate for the geographical area and season for its intended use.

As a leading distributor and retailer of biodiesel products in Australia, SAFF's position is that the biodiesel blend percentage should **not** be capped under the Australian Diesel Standard. SAFF's opinion is that the current Australian Diesel Standard – being the Fuel Standard (Automotive Diesel) Determination 2001, made under the Fuel Quality (Standards) Act 2000 as amended is a sufficient quality control measure and that there is no need to specifically biodiesel content.

SAFF's opinion is that the general negativity from oil companies, fuel injection equipment companies and vehicle companies and their respective associations towards blends of biodiesel greater than 5% has little to do with science and mechanical knowledge and much to do with politics and, in particular, petroleum market persuasiveness. This indeed has been the case in overseas experience as well.

There appears to be a wealth of misinformation being used to support a 5% maximum limit, both in Australia and abroad (where in some countries the 5% biodiesel cap has been successfully implemented). In particular reference to the Fuel Injection Equipment manufacturers' statement (page 67 of Seddon's report), the specific problematic issues attributed to biodiesel (listed in the document as*: free methanol; water; free glycerine; mono, di- and tri-glycerides; free fatty acids; total solid impurity level; alkali/alkaline earth metals; oxidation stability*) are already mitigated in the existing Australian Biodiesel Standard. It follows that biodiesel made to the Australian Biodiesel Standard, and blends of greater than 5% biodiesel, would not cause any problems to fuel injection equipment. Such problems are of course attributable to biodiesel not meeting the Australian Biodiesel Standard, which unfortunately is still a major issue in the marketplace. SAFF provides full warranty

cover for any fuel related damages attributed to the use of any of its fuels including 'SAFF Biodiesel' (which is up to B100), and 'SAFF Premium Diesel' (which is up to B20). A comprehensive claims procedure and insurance policy has been in place since the company's inception.

Bosch Australia's comment, quoted on page 69 of the Seddon report, which is that Bosch does "not provide warranty for damage resulting from (biodiesel's) use", is misleading. In reality, Bosch (or any fuel injection equipment, engine or vehicle supplier for that matter) would not provide warranty for damage resulting from any fuel's use. Unfortunately this kind of statement about biodiesel is typical of Original Equipment Manufacturers (OEMs) and oil companies. Indeed, the Seddon report states "Vehicle manufacturers do not warranty fuel, rather the warranty covers Materials and Workmanship. Engine companies presented with an engine for a warranty claim first examine the engine for fuel related issues…" SAFF suggests that a clearer boundary between fuel supplier warranty and OEM warranty needs to be developed for biodiesel to achieve fair market status.

Importantly, SAFF provides full warranty cover for all fuel related damages.

Lower blends of biodiesel such as B5 also diminish the tailpipe emissions reducing effect that higher blends of biodiesel offer. It is generally accepted that a 20% biodiesel blend is the optimal blend for emissions reduction and fuel economy, with the most widespread benefit. Indeed, there is no demonstrated clear tailpipe emissions benefit for a B5 blend. There is obviously a clear environmental and health case for a B20 blend to be allowed within the parameters of the Australian Diesel Standard.

Dr Seddon's report lists five "key differences that adversely influence properties of the biodiesel blend". We have responded to each of these differences separately in Appendix A of this Response, which we hope to be included in consideration of our response.

1.2 Should flexibility be allowed for density (or any other quality parameter)?

It is SAFF's opinion that the current maximum limit for density in the Australian Diesel Standard actually provides a natural control mechanism for biodiesel content. Blends of greater than 20% biodiesel generally will not meet the Australian Diesel Standard for density – indeed, many blends of 20% biodiesel will not meet the Australian Diesel Standard. SAFF Premium Diesel contains maximum 20% biodiesel by volume. SAFF does not suggest that flexibility be allowed for density of biodiesel blends that are to meet the Australian Diesel Standard. There are no other parameters in the Australian Diesel Standard that SAFF suggests be made flexible for biodiesel blended diesel fuels.

1.3 Is Option 1 or Option 2 your preferred management option?

SAFF does not support either Option 1 or Option 2 for biodiesel blend management.

2. Comments on management Options 3 and 4

2.1 Should a full B20 fuel quality standard be developed as outlined in Option 3?

SAFF's opinion is that blends of biodiesel and diesel should only be produced from fuels that meet or exceed their respective Australian Standards. Provided this is the case, there should not be a need for extensive further testing or certification of the resulting blended fuel product.

SAFF does not support the capping of biodiesel at any blend percentage. As discussed previously, SAFF's opinion is that the current Australian Diesel Standard provides a natural upper limit of biodiesel around 20% by volume and also provides strict quality parameters for the resulting fuel blend. SAFF's Premium Diesel product, which contains up to 20% biodiesel and which meets the current Australian Diesel Standard (refer Appendix D: Premium Diesel Marketing Specification), is a high quality, reliable fuel as a result.

It is also SAFF's position that there should be no standardisation or capping of biodiesel content in other blends of biodiesel and diesel that do not meet the Australian Diesel Standard. Provided the customer is fully aware of the maximum biodiesel content of the fuel, and of the performance and operability issues associated with that biodiesel content, there should be no further need for legislative controls.

2.2 Should a simplified B20 standard be developed as outlined in Option 4?

A simplified B20 standard has merits, although SAFF maintains its position that the Australian Diesel Standard need not be modified to specifically cap the biodiesel content at any particular level. SAFF's opinion is that under all circumstances, only biodiesel and diesel meeting or exceeding their respective Standards should be used in the manufacture of any blended fuel product. The simplified B20 standard would be suited to B20 blends that fall outside of the Australian Diesel Standard.

2.3 If so, which parameters should be included?

Provided that only biodiesel and diesel meeting or exceeding their respective Standards are used in the manufacture of a B20 product, parameters included under a simplified B20 standard need only include those that may not necessarily be directly inferred from the parameters of the parent fuels.

Parameters that may be specifically monitored under such a simplified B20 standard could therefore be limited to:

• Filter Blocking Tendency	IP 387	(2 max)
• Water, sediment and solids	ASTM D 2709	(0.05 vol% max)
• Oxidative Stability	ASTM D 2274	(25mg/L max)
• Cold Filter Plugging Point	ASTM D 2500	(Report value)

3. Comments on other fuel quality management options for biodiesel blends

3.1 Should a 'B5 only' cap be adopted or should both B20 and B5 blends be considered?

As stated above, SAFF does not support any move to cap biodiesel at any volume level. The existing Australian Diesel Standard and associated legislations contain adequate control parameters to ensure that any biodiesel/diesel blends meeting or exceeding the Australian Diesel Standard and comprising only biodiesel and diesel meeting or exceeding their respective Australian Standards will be of sufficient quality for use in all diesel applications. For biodiesel/diesel blends not meeting the Australian Diesel Standard, SAFF does not support the idea of any capping of biodiesel content.

3.2 Are there other management options that should be considered?

One issue of concern to SAFF presented by the proposed standardisation of blends is the potential exclusion of blends higher than 20% but lower than 100% biodiesel. In certain cases, particularly in retail, diesel fuel needs to be added to pure biodiesel (B100) to improve its cold flow properties (refer Appendix D: Biodiesel Marketing Specification). SAFF is of the opinion that if the biodiesel and diesel components meet their respective Standards, and that the customer is fully aware of the maximum biodiesel content of the fuel, and of the performance and operability issues associated with that biodiesel content, there should be no further need for legislative controls. This would allow, for instance, SAFF to retail its 'SAFF Biodiesel' product (already available through 14 service station retail outlets) through wintertime with up to 50% petroleum diesel to improve its cold flow properties and thus substantially reduce the risk of 'waxing' of the fuel in customers' vehicles.

4. Comments on labelling requirements for B5

4.1 Should B5 blends be labelled?

SAFF proposes that all products containing biodiesel be clearly labelled to ensure that the customer is aware of the maximum biodiesel content of the fuel.

4.2 If so, is a statement that the fuel "contains 5% biodiesel" or "up to 5% biodiesel" sufficient?

SAFF's position is that such a label is sufficient for blends of up to 20% biodiesel. More detailed informative labelling should be reserved for blends of over 20% biodiesel. Blends of over 20% biodiesel can impart specific performance, operability and maintenance issues that are not present in blends lower than 20% (despite a plethora of unfounded claims to the contrary) provided that the parent fuels meet their respective Standards.

5. Comments on labelling requirements for higher blends of diesel and biodiesel

5.1 Should higher blends and neat biodiesel (B100) be labelled?

SAFF's position is that all biodiesel-blended fuels be clearly labelled such that the customer is aware of the maximum biodiesel content of the fuel.

5.2 If so, is statement of the biodiesel content (eg "this fuel contains 20% vol biodiesel") sufficient?

For blends up to and including 20% biodiesel, SAFF's position is that this type of labelling statement would suffice. For blends over 20% biodiesel, SAFF's position is that a fully informative label is required (refer Appendix B). This is detailed in the next paragraph.

5.3 Is additional information required?

For blends over 20% biodiesel (but importantly – and despite unfounded arguments to the contrary – not for blends up to and including 20% biodiesel), some materials incompatibilities may occur, as well as pronounced solvency and detergency effects. The customer needs to be made aware of these factors. SAFF has a detailed customer information leaflet "Switching To Biodiesel" that is also present as an A4 sized label atop all of its 'Biodiesel' pumps. This is included in Appendix B of this Response. SAFF recommends such a detailed label for all blends greater than 20% biodiesel.

Appendix A

Responses to the Seddon Report

RESPONSES TO:

"KEY DIFFERENCES THAT ADVERSELY INFLUENCE PROPERTIES OF THE BIODIESEL BLEND"

(Seddon report, Stage One, pages 9-10)

The Seddon report lists five "key differences that adversely influence properties of the biodiesel blend", which follow. After each quoted "key difference" we have provided our own comments on the issue(s) raised:

ALLEGED DIFFERENCE NUMBER ONE (PAGE 9):

"*The production of biodiesel does not involve a distillation process whereas (except for additives) diesel is produced from distilled hydrocarbon streams. The consequence is that the biodiesel components of the blend will contain heavy materials subject to thermal cracking in the hotter parts of the delivery system and the engine, hence potentially increasing engine fouling.*"

In relation to alleged difference number one above, SAFF notes the following:

1. The distillation process for petroleum diesel is rudimentary compared with, say, petrol (gasoline) production, and diesel itself contains a vast range of chemical species – including such "heavy materials" as Dr Seddon appears to be suggesting are limited to Biodiesel.
2. Diesel is also produced by cracking of heavier petroleum fractions. This results in a mixture including a vast range of new chemical species, which is not subsequently purified.
3. The Australian Biodiesel Standard provides a minimum requirement of 96.5% fatty acid alkyl esters in the C14-C24 range – thus limiting the potential total content of all other compounds (which could potentially include but would by no means be limited to such "heavy materials") to 3.5% in B100 – and thus 0.7% in B20. SAFF's own experience with reputable biodiesel producers has shown ester contents to typically be greater than 98%. Further, due to the limitations of the test method (only C14-C24 esters are counted), it is very likely that the actual amount of ester will be even higher than stated in the test method. Thus, even in B100, there is not much room left for problematic "heavy materials".
4. The "heavy materials" should be evident as "unsaponifiables" which is a standard parameter in categorisation of fats and oils and can be extended to biodiesel.
5. Dr Seddon does not provide any evidence to support his claim that biodiesel does contain significant amounts of such "heavy materials", and there are no data given for unsaponifiables content of typical Australian biodiesels.
6. Dr Seddon does not provide any evidence to suggest that such "heavy materials" have been attributed to the thermal cracking problems given in his statement.

ALLEGED DIFFERENCE NUMBER TWO (PAGE 9)

"*Biodiesel contains a high level of olefins relative to diesel, which as a consequence of hydrotreatment to reduce sulphur is generally low in olefins. Olefins lead to poor thermal stability leading to coking and poor oxidative stability leading to inferior storage life.*"

In relation to the alleged difference number two, above, SAFF notes the following:

1. The olefin content of diesel is not limited in the Australian Diesel Standard.
2. Diesel produced by thermal cracking of heavier petroleum fractions contains a vast range of new chemical species, including olefins.
3. Dr Seddon is correct in his statements regarding the low stability of olefins; however he fails to mention the critical point that oxidation stability is already a determining parameter in both the Australian Biodiesel Standard and the Australian Diesel Standard. In both the diesel and biodiesel production industries, fuel stabiliser additives are used to improve the oxidation stability of the respective fuels, which can both contain significant olefins as to otherwise negatively effect this parameter.
4. An alternative route to limiting Biodiesel content in diesel fuel could simply be to limit olefin content in diesel fuel. Thus B20 with low olefins would be allowed but B20 with high olefins would be disallowed. No discrimination towards biodiesel in general, but a direct limitation of the problematic chemical species would result. On page 50 of his report, Dr Seddon hints that the distillation technique in the existing Australian Diesel Standard may already preclude B20 containing high levels of biodiesel olefins from meeting the Standard: "…the T95 point in the Australian specification is 361ºC which is below the normal boiling points of C18:2 and C18:3 methyl esters which are common FAMEs. However, the benefit is that this may act to discriminate against these types of FAME which are known to have poor oxidative stability."
5. In early 2004, SAFF encountered some biodiesel quality issues that were partly attributed to poor oxidative stability of the fuel (both in B100 and in Premium Diesel sold by SAFF). In a number of vehicles, substantial greyish sedimentation was found in the fuel system. The presence of brass and zinc componentry in the fuel systems of these vehicles had caused the oxidation to occur. Since the implementation of the Oxidative Stability parameter in the Australian Biodiesel Standard (September 18, 2004), this issue has not been observed.
6. It is therefore SAFF's opinion that the Australian Diesel Standard and the Australian Biodiesel Standard are both sufficient to mitigate the problems associated with higher olefin contents.

ALLEGED DIFFERENCE NUMBER THREE (PAGE 10):

"*Biodiesel contains oxygen, which as well as lowering the energy content of the blend, fundamentally influences the injection and burning properties of the blend increasing the emissions of nitrogen oxides.*"

In relation to the alleged difference number three, above, SAFF notes the following:

1. Recent evidence strongly suggests that nitrogen oxide emissions are not a major contributing factor to photochemical smog as is widely believed.
2. There is still much dispute as to whether or not B20 actually does in general provide a higher volume of nitrogen oxides than diesel containing no biodiesel.
3. Dr Seddon correctly provides some of the benefits of fuel oxygenation – being the dramatic reduction of harmful exhaust gases such as carbon monoxide, and particulate matter.
4. Thus it is SAFF's opinion that the oxygenation characteristic of Biodiesel is a wholly beneficial effect and should not be taken as something that adversely influences the property of the biodiesel blend. In fact, it is one of the strongest selling points for biodiesel blends.

ALLEGED DIFFERENCE NUMBER FOUR (PAGE 10):

"*The oxygen of biodiesel results in higher solvating and detergent power than hydrocarbons. Biodiesel will absorb more water and suspend solids better than diesel.*"

In relation to the alleged difference number four, above, SAFF notes the following:

1. There is a wide variation in solvating and detergent power amongst the numerous hydrocarbon species in petroleum diesel. A kerosene fraction will have similar solvating power to neat biodiesel. Likewise, a B20 blend would have a similar solvating power to an Australian 'alpine diesel' that would contain around 20% kerosene.
2. In a B20 blend, the detergent power and solvating power of the biodiesel component is mostly diminished. According to the US Government National Renewable Energy Laboratory's Biodiesel Handling and Use Guidelines, "blends of 20% biodiesel or less minimize any cleaning effect or solvency issues with accumulated sediments in tanks, although minor filter plugging may be observed during the initial weeks of B20 use in some cases."
3. According to the US Government National Renewable Energy Laboratory's Biodiesel Handling and Use Guidelines, "Experience over the last 10 years with B20 indicates compatibility with all existing elastomers in diesel fuel systems, even those that are sensitive to higher blends, such as nitrile rubber."
4. Neat biodiesel (B100) is hygroscopic and will absorb up to 1600 parts per million water, which will be in solution. As opposed to free water droplets, which can lead to a host of problems, the water in solution does not directly contribute to any problems. With a B20 blend, the hydrophobic nature of the (80% +) diesel component substantially overcomes the hygroscopic nature of the biodiesel component, such that there is negligible increase in water adsorption with B20 compared with straight petroleum diesel. Again, any increase in water adsorption will only contribute to dissolved water rather than free water in the fuel, hence would not cause any operability problems. Dr Seddon even contradicts his own statement with this comment on page 22: "On storage the B20 blend should not materially absorb water from the surroundings either via air absorption or from condensation within a tank."
5. Dr Seddon's suggestion that B20 would suspend more solids than petroleum diesel does not appear to be supported in the literature.

ALLEGED DIFFERENCE NUMBER FIVE (PAGE 10)

"*The generally larger molecules of biodiesel result in higher cloud points and cold filter plugging points than conventional diesel. These parameters set the lower operability temperature of the fuel, hence, a high cloud point fuel cannot be used at low ambient temperatures.*"

In relation to the above alleged difference number five, SAFF notes that:

1. In Australia the major oil companies produce and import gasoil with a cloud point of around +1°C. To meet local climatic requirements, large volumes of kerosene and other lighter petroleum fractions are blended with this product before dispensing to the market.
2. There is enormous variation in the cloud points (CP) and cold filter plugging points (CFPP) of biodiesels made from different feedstocks and of diesels made from different crude oil sources or by different processing techniques.
3. For example, biodiesel made from rapeseed oil may have a CFPP of -9°C while biodiesel made from beef fat may have a CFPP of +9°C.
4. Likewise, an 'alpine grade' diesel containing a higher content of kerosene may have a CFPP of -20°C, whereas a 'summer grade' diesel containing a higher content of waxy paraffins may have a CFPP of +5°C.
5. The old Australian Standard for Diesel (AS3570) prescribed a CP / CFPP variation for local climates, which is not included in the current Australian Diesel Standard. CP and CFPP are regulated by industry and this would be no different for a biodiesel/diesel blend than for a straight petroleum diesel.
6. For example, SAFF varies both the biodiesel volume content as well as the biodiesel feedstock type used in its 'SAFF Premium Diesel' product over the year. In summer months, 20% biodiesel is used and can contain a wide variety of feedstocks including beef fat; whereas in winter months beef fat is avoided and canola oil is used to a greater extent, while the biodiesel volume content may be reduced to, say, 15%.

Appendix B

Detailed Information Sheet for Higher Biodiesel Blends

This detailed information sheet is provided to all of SAFF's higher biodiesel blend customers. It is available as a point of sale leaflet and is also situated atop each of SAFF's Biodiesel bowsers.

Switching to Biodiesel

Biodiesel is a reliable, environmentally friendly, high performance fuel, however it has some important differences to regular diesel. To ensure trouble-free operation of Biodiesel, SAFF asks that you please adhere to the following recommendations.

1. Biodiesel has a very strong detergency (cleaning) effect. This means it will clean carbon, greases, waxes etc out your entire engine and fuel system and deposit them in your fuel filters. Therefore, **WHEN FIRST SWITCHING TO Biodiesel, SAFF RECOMMENDS THAT YOU CHANGE YOUR FUEL FILTERS AT LEAST ONCE AFTER THE FIRST OR SECOND TANKLOAD AND TO ALWAYS HAVE A SPARE FILTER WITH YOU IN CASE OF BLOCKAGE.**

2. **IN COLDER CONDITIONS, SAFF RECOMMENDS THAT YOU BLEND SAY 50/50 WITH REGULAR OR PREMIUM Diesel.**

   WHY? Because Biodiesel has a slightly higher freezing point than regular diesel. While SAFF does pre-blend some diesel into Biodiesel in winter months, it may still not be suitable for very cold conditions. Blending diesel with Biodiesel will lower the freezing point of the Biodiesel.

3. **OLDER VEHICLES: HAVE YOUR MECHANIC REGULARLY INSPECT FUEL LINES/SEALS AND REPLACE WITH COMPATIBLE PARTS (e.g. VITON) WHEN NECESSARY.**

   WHY? Because Biodiesel can have a softening/swelling effect on some types of rubber and plastic. As a rule of thumb, vehicles manufactured from 1992 onwards have compatible components in the fuel system while older vehicles may have incompatible components. Fuel lines and seals may be at risk and should be replaced as soon as they show signs of deterioration. Please note that modern 'ultra low sulphur' diesel fuel can also affect these same components.

Further info: **www.farmersfuel.com.au** or CALL 1800 000 609

Appendix C

Product Information Brochures: Premium Diesel and Biodiesel

These are the main promotional materials used for SAFF Premium Diesel and SAFF Biodiesel.

Perfect for your
4WD
Truck
Van
Generator
Bus
Ute
Tractor

Lower Pollution
Lower Maintenance
Real Savings
Real Australian

Biodiesel

90873 SAFFE BioD.indd 1

CMYK

Find your nearest retailer:

Call 1800 000 609 Today!

introducing
SAFF Biodiesel

Biodiesel

SAFF

Also available:
SAFF Premium Diesel

PREMIUM Diesel

Bio Premium Unleaded 98

Bio Unleaded 95

innovation
passion
creation

SAFF is involved with the Big Green Umbrella to replant Australian native trees.

Tomorrow's Diesel Today

SAFF AFB

Australian Farmers Fuel Pty Ltd
www.farmersfuel.com.au
biofuel@farmersfuel.com.au

Cleaner Fuel
Cleaner Air
Cleaner
Australia

SAFF is the FIRST government approved & operating Biodiesel retailer in Australia

Higher Quality
Higher Performance
Greater Engine Protection
Greater Environmental Protection

All-Australian SAFF

21/8/06 2:11:45 PM

Others may talk about it
You can drive away with it

Tomorrow's Diesel Today

Biodiesel

SAFF's vision is to make Australia more environmentally friendly by championing the widespread commercial use of renewable Biofuels, with the SAFF brand a recognised symbol of renewable energy supply. SAFF already provides farmers, fishermen and commercial road users access to a bulk delivery service at lower prices. Now, we make it widely available at the pump to every diesel vehicle user.

What is SAFF Biodiesel?

SAFF Biodiesel is a clean burning, high quality alternative to diesel fuel made by chemically altering vegetable oils and tallows.

SAFF Biodiesel is suitable for use in all diesel engines, producing low emissions and odours.

SAFF Biodiesel - More benefits than ever

SAFF's B100 Biodiesel takes environmental protection further than any other Diesel fuel in Australia by using renewable fuel sources. SAFF's low-energy Biodiesel production technology is equally environmentally friendly.

Biodiesel contributes to energy security for Australia because it contains a high percentage of Australian manufactured components.

Environmental Benefits

SAFF Biodiesel is fully renewable and produces low greenhouse gas emissions, reducing air pollution and related health risks.

SAFF Biodiesel is non-toxic and quickly biodegradable on land or water.

Benefits to your Vehicle

SAFF Biodiesel has far greater lubricity than Ultra Low Sulphur or other petroleum Diesels, providing unparalleled protection against engine and fuel system wear & tear.

Safer than petroleum diesel as it is less flammable and is non-toxic.

No engine adaptation is required. See SAFF web site for more information. (www.farmersfuel.com.au)

SAFF Biodiesel provides excellent performance, torque, fuel economy and power.

Q. Where can I purchase Biodiesel?

A. SAFF has the only government approved and operating Biodiesel retail dispensers in Australia.

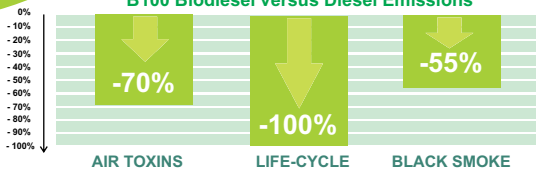
Our Biodiesel retail outlets are listed below. For the bulk orders, call us on 1800 000 609 or visit our web site www.farmersfuel.com.au

Bulk deliveries are available for Biodiesel and any blend of Biodiesel and Ultra Low Sulphur Diesel (our Premium Diesel range).

FAQ

Facts about SAFF Biodiesel*

B100 Biodiesel versus Diesel Emissions



Did you know?

SAFF Biodiesel is the only Biodiesel in Australia that is 100% Greenhouse neutral.**We achieve this by the planting of native Australian trees through a unique agreement with the Australian Carbon Bio-Sequestration Initiative's (ACBI) **Big Green Umbrella** (www.biggreenumbrella.org.au)

ACBI

SAFF Biodiesel Retail Locations

Please refer to our website for site locations.
www.farmersfuel.com.au

Rates for the Energy Grants (Credits) Scheme

Since 1 July 2006, rates for the Energy Grants (Credits) Scheme has changed. For more information, please visit www.ato.gov.au\fuelschemes. SAFF blend has same eligibility as fossil diesel fuel.

Bulk orders call 1800 000 609 Today!

* Winter blends may contain some petroleum diesel

Or Fax us at: 1300 660 664

Perfect for your
4WD
Truck
Van
Generator
Bus
Ute
Tractor

Lower Pollution
Lower Maintenance
Real Savings
Real Australian

PREMIUM Diesel

90873 SAFFE PremD.indd 1

CMYK

Find your nearest retailer:

Call 1800 000 609 Today!

introducing
SAFF Premium Diesel

PREMIUM Diesel

SAFF

Also available:
SAFF BioDiesel

Biodiesel

Bio Premium Unleaded 98

Bio Unleaded 95

innovation
passion
creation

SAFF is involved with the Big Green Umbrella to replant Australian native trees.
www.biggreenumbrella.org.au

Tomorrow's Diesel Today

SAFF AFB

Australian Farmers Fuel Pty Ltd
www.farmersfuel.com.au
biofuel@farmersfuel.com.au

Premium Fuel
at a
Non-Premium
Price

Higher Quality
Higher Performance
Greater Economy
Greater Engine Protection

All-Australian SAFF

21/8/06 2:08:31 PM

Others may talk about it
You can drive away with it

Tomorrow's Diesel Today

SAFF

PREMIUM Diesel

SAFF's vision is to make Australia more environmentally friendly by championing the widespread commercial use of renewable Biofuels, with the SAFF brand a recognised symbol of renewable energy supply. SAFF already provides farmers, fishermen and commercial road users access to a bulk delivery service at lower prices. Now, we make it widely available at the pump to every diesel vehicle user.

What is SAFF Premium Diesel?

SAFF Premium Diesel is a clean burning, high quality diesel fuel, meeting Australian Standard for Diesel [Fuel standard (Automotive Diesel) Determination 2001 as amended].

SAFF Premium Diesel is suitable for use in all diesel engines.

Premium Diesel - More Performance, More Australian

SAFF Premium Diesel is Ultra Low Sulphur Diesel blended with up to 20% Biodiesel.

Premium Diesel is a higher grade diesel fuel with superior environmental benefits, performance & fuel system protective qualities.

Premium Diesel contributes to energy security for Australia because it contains a higher percentage of Australian manufactured components.

Environmental Benefits

SAFF Premium Diesel produces lower lifecycle greenhouse gas emissions than Ultra Low Sulpher Diesel, as well as a reduction in air pollution and related health risks

Benefits to your Vehicle

SAFF Premium Diesel has far greater lubricity than Ultra Low Sulphur Diesel, providing unparalleled protection against engine and fuel system wear & tear.

No engine adaptation is required. See SAFF web site for more information.

SAFF Premium Diesel improves performance, torque, fuel economy and power.

90873 SAFFE PremD.indd 2 CMYK

FAQ

Facts about SAFF Premium Diesel

ACBI

Q. Where can I buy Premium Diesel?
A. Premium Diesel is available at selected SAFF outlets, and also in bulk.

Q. What is the price difference?
A. Premium Diesel is a Premium Product, but we retail it to you at the same price as Ultra Low Sulphur Diesel.

Q. What are the performance benefits?
A. 1. Premium Diesel has a higher cetane level than standard diesel. Cetane can be described as diesel's equivalent of "octane number", that is "anti-knock". Premium Diesel therefore provides better ignition and much quieter, smoother running than Ultra Low Sulphur Diesel.

A. 2. Premium Diesel contains bonded oxygen, which provides more complete combustion and greater energy release from the fuel. This can provide greater power, torque and fuel economy.

Q. What is the Sulphur Content?
A. Premium Diesel contains no more than 50ppm (0.005%) sulphur - the same level as Ultra Low Sulphur Diesel.

Q. What are the Fuel System Protective Benefits?
A. Premium Diesel has far greater lubricity than Ultra Low Sulphur Diesel (which has been the most common diesel in Australia since May 2004). The lubricity of Premium Diesel will protect your metal fuel system components that come in contact with the fuel against wear and tear. This means longer injector life and longer fuel pump life than would be experienced with Ultra Low Sulphur Diesel fuel (please refer our web site www.farmersfuel.com.au for more info).

Q. What are the Environmental Benefits?
A. 1. The oxygen content of Premium Diesel provides more complete combustion and therefore a large reduction in harmful (sometimes lethal) combustion by-products such as carbon monoxide, methane, Poly-Aromatic Hydrocarbons, "black smoke" (soot). (Refer to our web site for more details www.farmersfuel.com.au)

A. 2. Premium Diesel contains up to 20% Biodiesel (see our Biodiesel page for further info) which is a renewable fuel. Premium Diesel produces up to 20% less lifecycle greenhouse gases than diesel fuel or ultra low sulphur diesel fuel. This means a lesser contribution to Global Warming, and a safer future for our children.

Q. What are the Energy Security Benefits?
A. The Biodiesel portion of Premium Diesel (up to 20%) is made in Australia from Australian-grown renewable energy sources (canola oil, vegetable oils and tallows). This reduces the demand on crude oil and diesel imports, and on dwindling Australian crude oil reserves.

Q. Is Premium Diesel suitable for all diesel engines?
A. Yes. Premium Diesel meets or exceeds all of the parameters required for Australian Diesel.

Q. What is the cleaning effect on my fuel system?
A. NEW VEHICLES: No effect
A. OTHER VEHICLES: Premium Diesel may clean existing gums, grime, waxes and sludge (which are normal, from diesel fuel usage) from the fuel system and engine, and eventually deposit them in the fuel filter. Please ensure your fuel filters are changed at your normal maintenance period. This is a minor effect that is also being experienced with Ultra Low Sulphur Diesel in certain cases. It is less pronounced than the cleaning effects associated with Biodiesel.

Q. What is the effect on fuel seals and hoses?
A. FOR NEW VEHICLES: No effect
A. FOR OLDER VEHICLES (Pre-1996): Some minor incompatibility issues with rubber components may be experienced, as with Ultra Low Sulphur Diesel. It is advisable to have your mechanic visually inspect rubber or synthetic fuel lines and to replace, if necessary, with Viton or a similar fluoroelastomer. Note that this advice should also be taken for customers using diesel, as it is increasingly being replaced with Ultra LowSulphur Diesel (May 2004) throughout Australia.

Bulk orders call us on 1800 000 609 or Fax us at: 1300 660 664

21/8/06 2:08:35 PM

Appendix D

Marketing Specifications

The following documents are the “Marketing Specifications” for SAFF Premium Diesel and SAFF Biodiesel.

FUEL QUALITY SPECIFICATION

SAFF Biodiesel

SAFF Biodiesel is sold as 100% pure biodiesel ('B100') where appropriate however during times of cooler weather or as otherwise required SAFF Biodiesel can contain some ultra low sulphur diesel meeting the Australian Standard for Automotive Diesel [*Fuel Standard (Automotive Diesel) Determination 2001, made under the Fuel Quality (Standards) Act 2000, as amended*]. The B100 biodiesel component of SAFF Biodiesel meets or exceeds the Australian Standard for Biodiesel [*Fuel Standard (Automotive Diesel) Determination 2003, made under the Fuel Quality (Standards) Act 2000, as amended*].

Specifications for B100

Test Description	Test Method	Unit	Specification
Ester Content	prEN 14103	%	96.5 min
Cetane Number	ASTM D6890	N/A	51 min
Density @ 15 °C	EN ISO 3675	Kg/L	0.860 – 0.890
Distillation (T90)	ASTM D1160	°C	360 max
Flash Point	ASTM D93	°C	120 min
Viscosity @ 40 °C	ASTM D445	mm²/s	3.5 – 5.0
Carbon residue	ASTM D4530	% (m/m)	0.01 max
Sulphated Ash	ASTM D874	mass %	0.010 max
Water & Sediment	ASTM D1796	volume %	0.05 max
Copper Strip Corrosion	ASTM D130	N/A	3 max
Sulphur Content	ASTM D5453	mg/L	10 max
Group I metals (Na, K)	prEN 14108, 14109	mg/kg	5 max
Group II metals (Ca, Mg)	prEN 14538	mg/kg	5 max
Total Contamination	EN 12662 / ASTM D5452	mg/L	24 max
Oxidation Stability	PrEN 14112	hours	6 min
Alcohol Content	PrEN 14110	%	0.20 max
Free Glycerol	ASTM D6584	%m/m	0.02 max
Total Glycerol	ASTM D6584	%m/m	0.25 max
Total Acid Number	ASTM D974	mg KOH/g	0.8 max
Phosphorous	ASTM D4951	mg/kg	10 max
Cold Filter Plugging Point	ASTM D4539	°C	As per regional or customer requirements

Australian Farmers Fuel Pty Ltd
51-61 Cavan Road Gepps Cross SA 5094
PO Box 1 Pooraka SA 5095
Phone: 08 8262 3002 Fax: 1300 660 664
admin@farmersfuel.com.au www.farmersfuel.com.au
ABN 77 097 047 464

Form No: S0019

FUEL QUALITY SPECIFICATION

SAFF Premium Diesel

SAFF Premium Diesel is a proprietary blend of up to 20% Biodiesel with Ultra Low Sulphur Diesel and meets or exceeds all parameters required by the Australian Standard for Automotive Diesel [*Fuel Standard (Automotive Diesel) Determination 2001, made under the Fuel Quality (Standards) Act 2000, as amended*]. The Biodiesel component of SAFF Premium Diesel meets or exceeds the Australian Standard for Biodiesel [*Fuel Standard (Automotive Diesel) Determination 2003, made under the Fuel Quality (Standards) Act 2000, as amended*]. The Ultra Low Sulphur Diesel component of SAFF Premium Diesel meets or exceeds the Australian Standard for Automotive Diesel [*Fuel Standard (Automotive Diesel) Determination 2001, made under the Fuel Quality (Standards) Act 2000, as amended*].

Specifications

Test Description	Test Method	Unit	Specification
Biodiesel content	Not Applicable	volume %	20 max
Calculated Cetane Index	ASTM D4737 Procedure A / IP380		46 min
Density @ 15 °C	ASTM D4052 / IP365 or ASTM D1298 / IP160	g/mL	0.820 – 0.850
Distillation: Temp. for 95% recovered [T95]	ASTM D86 / IP123	°C	360 max
Flash Point	ASTM D93 / IP 34	°C	61.5 min
Kinematic Viscosity @ 40 °C	ASTM D445 / IP 71	mm²/s	2.0 - 4.5
Carbon residue, micro method: on 10% Distillation bottoms	ASTM D4530 or ASTM D189 / IP13	% (m/m)	0.2 max
Ash	ASTM D482 / IP 4	mass %	0.010 max
Water & Sediment	ASTM D2709	volume %	0.05 max
Filter Blocking Tendency	IP 387 or ASTM D2068	FBT	2.0 max
Lubricity, MWSD	IP450	micrometre	460 max
Total Sulphur Content	ASTM D5453 or D4045 or D2622 or IP243	mg/kg	10 max
Copper Corrosion, 3 hrs @ 50°C	ASTM D130 / IP 154		1 max
ASTM Colour	ASTM D1500 / IP196		2.0 max
Oxidation Stability [Total Insolubles]	ASTM D2274 or D5304	mg/100 mL	2.5 max
Electrical Conductivity ex Terminal	ASTM D2624 / IP 274	pS/m	50 min
Polcyclic Aromatic Hydrocarbon (PAH) Content	IP391	%m/m	11.0 max
Strong Acidity	ASTM D974 / IP 139 or ASTM D664 / IP 177	mg KOH/g	NIL max
Cloud Point	ASTM D2500 / IP 219 or D5771 or D5773	°C	As per regional requirements

Australian Farmers Fuel Pty Ltd
51-61 Cavan Road Gepps Cross SA 5094
PO Box 1 Pooraka SA 5095
Phone: 08 8262 3002 Fax: 1300 660 664
admin@farmersfuel.com.au www.farmersfuel.com.au
ABN 77 097 047 464