EXPLANATORY STATEMENT

(Issued by the authority of the
Minister for the Environment, Heritage and the Arts)

Fuel Quality Standards Act 2000

Fuel Standard (Petrol) Amendment Determination 2008 (No. 1)

The *Fuel Quality Standards Act 2000* (the Act) establishes a regulatory regime in relation to activities involving fuel and fuel additives.

The Act and the *Fuel Quality Standards Regulations 2001* provides the framework for making and enforcing national fuel quality standards and national fuel quality information standards.

Section 21 of the Act provides that the Minister may, in writing, determine that specified matters constitute a fuel standard in respect of a specified kind of fuel.

The *Fuel Standard (Petrol) Amendment Determination 2008 (No. 1)* (the Determination) sets the standard for fuel quality ethanol that may be blended with petrol up to the 10 per cent maximum permitted in the *Fuel Standard (Petrol) Determination 2001*.

The Minister has had regard to the main objects of the Act before making the Determination, as required by subsection 21(5). The objects of the Act are to:

(a) regulate the quality of fuel supplied in Australia in order to:

(i) reduce the level of pollutants and emissions arising from the use of fuel that may cause environmental and health problems
(ii) facilitate the adoption of better engine technology and emission control technology
(iii) allow the more effective operation of engines, and

(b) ensure that, where appropriate, information about fuel is provided when the fuel is supplied.

The Determination is consistent with Section 3(a) Objects of the Act.

The Minister has consulted with the Fuel Standards Consultative Committee as required by paragraph 24A (1) (b) of the Act and has had regard to the recommendation of the Committee arising out of those consultations as required by subsection 24A (4). Industry bodies, including the Biofuels Association of Australia (BAA) and the Australian Institute of Petroleum (AIP) are represented on the Committee as are state and territory governments. A public consultation process commenced in December 2004 with the release of a technical paper to assist in public discussion on setting an Australian quality standard for fuel grade ethanol. An Australian Government position paper taking into account stakeholder feedback was released on 30 July 2005 for comment. In July 2006, a draft standard was circulated for comment to those stakeholders who had made submissions on the technical paper and the government position paper. A further draft was circulated to industry stakeholders on 3 May 2007.

Details of the Determination are set out in Attachment A.

A Regulation Impact Statement is included at Attachment B.

This instrument is a legislative instrument for the purposes of the *Legislative Instruments Act 2003*.

The instrument commenced on the day after registration on the Federal Register of Legislative Instruments.

Attachment A

Fuel Standard (Petrol) Amendment Determination 2008 (No. 1)

Clause 1 – Name of Determination

This clause provides that the name of the Determination is the *Fuel Standard (Petrol) Amendment Determination 2008 (No. 1).*

Clause 2 – Commencement

This clause provides that the Determination takes effect on the day after registration on the Federal Register of Legislative Instruments.

Clause 3 – Amendment of *Fuel Standard (Petrol) Determination 2001*

This clause provides that Schedule 1 amends the *Fuel Standard (Petrol) Determination 2001*.

Schedule 1 – Amendments

Item 1 – Section 2A, definition of *CAS no*., Item 2 – Subsection 3 (1) and Item 3 – Subsection 3 (1), table, heading, column 2

These items substitute the word 'parameter' for the word 'substance'. The *Fuel Standard (Petrol) Determination 2001* has been amended many times since it was first introduced, and the terms 'substance', 'property' and 'parameter' have been used interchangeably and inconsistently. The Determination standardises the use of the word 'parameter' (any constituent variable quality).

Item 4 – Subsection 3 (1), table, item 8, column 2

This item is required to correct a typographical error.

Item 5 – Subsection 3 (1), table, item 9, column 2

This item is required to correct the abbreviated form of tert-butyl to the non-abbreviated form of tertiary butyl.

Item 6 – After section 3

This item inserts a new section 3A – Fuel standard for ethanol. This new section specifies the quality standards for denatured fuel ethanol, such as the minimum ethanol content, and the maximum permissible quantities of parameters such as acidity, copper and water.

The specified parameters are consistent with ASTM D4806 (edition 06b), the Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel, as in force at 1 January 2007. ASTM standards are developed by the standards development organisation known as ASTM International (originally known as the American Society for Testing and Materials). The only difference to the volumes specified in ASTM D4806 are those for the denaturant and ethanol.

Subsection 3A (1) clarifies that the standard relates only to ethanol that is intended for blending with petrol in accordance with the *Fuel Standard (Petrol) Determination 2001*.

Subsection 3A (2) specifies the minimum ethanol content.

Subsection 3A (3) specifies that the ethanol must be denatured. There is no technical reason for denaturing ethanol; this is an Australian Taxation Office requirement for the ethanol to attract the fuel excise rate.

Subsection 3A (4) specifies that the denaturant must be unleaded petrol or premium unleaded petrol. Denaturing can be achieved with other undrinkable substances but, when testing fuel ethanol for compliance purposes, it is important to know what type of denaturant has been used.

Subsection 3A (5) specifies the minimum and maximum volumes of denaturant that should be added. The minimum volume reflects Australian Taxation Office requirements. A maximum volume is necessary to enable the volumes of other parameters to be determined.

Subsection 3A (6) provides that the ethanol must be clear and bright and visibly free of suspended or precipitated contaminants. Whilst such a definition of quality may be open to a degree of subjectivity, ‘clear and bright’ is a common screening and 'fit for purpose' criterion used in many specifications and petroleum products literature in reference to both virgin and re-refined oils. A ‘clear and bright’ appearance in combination with the other specified tests is considered to be a good indicator of end-product quality.

Subsection 3A (7) specifies that the pHe value of ethanol must be less than 6.5 and no more than 9.0 to harmonise with the US standard D4806.

Subsection 3A (8) specifies that ethanol must not contain more of a parameter set out in the following table, than the specification for that parameter to harmonise, where possible, with the US standard ASTM D4806.

Item 7 – Section 4, heading

This item is a consequential amendment to the heading of Section 4 (which specifies testing methods for petrol) resulting from the introduction of a new Section 4A which specifies testing methods for ethanol.

Item 8 – Subsection 4 (1) and Item 9 – Subsection 4 (1), table, heading, column 2

These items substitute the word ‘parameter’ for the word ‘substance’. The *Fuel Standard (Petrol) Determination 2001* has been amended many times since it was first introduced, and the terms ‘substance’, ‘property’ and ‘parameter’ have been used interchangeably and inconsistently. The Determination standardises on the word ‘parameter’ (any constituent variable quality).

Item 10 – Subsection 4 (1), table, item 1A, column 3

This item is required to correct a typographical error.

Item 11 – After section 4

This item inserts a new section 4A which specifies the testing methods for the various parameters that will be used by the Australian Government to ensure that ethanol complies with the standard. As ASTM testing methods are updated periodically, subsection 4A (2) specifies that the testing methods are those in existence on 1 January 2007.

Attachment B

REGULATION IMPACT STATEMENT (ID 6454)

For a
FUEL GRADE ETHANOL QUALITY STANDARD
Through the

Fuel Standard (Petrol) Amendment Determination 2008 (No. 1)

22 April 2008

1. INTRODUCTION

The *Fuel Quality Standards Act 2000* (the Act) provides the framework for the establishment of national fuel standards to ensure a nationally consistent approach to the regulation of fuel quality in Australia. The objects of the Act are to:

(a) regulate the quality of fuel supplied in Australia in order to:
- (i) reduce the level of pollutants and emissions arising from the use of fuel that may cause environmental and health problems
- (ii) facilitate the adoption of better engine technology and emission control technology
- (iii) allow more effective operation of engines, and

(b) ensure that, where appropriate, information about fuel is provided when the fuel is supplied.

On 1 January 2002 the first set of Australian fuel quality standards under the Act— petrol and automotive diesel— came into effect.

In April 2003 the Government set a standard to allow up to 10 per cent fuel grade ethanol in petrol through the Fuel Standard (Petrol) Determination 2001. The Fuel Quality Information Standard (Ethanol) Determination 2003 took effect on 1 March 2004 requiring labelling of all ethanol blended petrol up to and including the 10 per cent limit. However, no standard quality was set for the ethanol that could be blended into petrol.

These policies aimed to allow effective operation of engines, recognising that not all vehicles in the current Australian fleet were designed to run on ethanol blended petrol; and to ensure that appropriate information was provided to consumers and increase consumer confidence in ethanol blended petrol. However, no standard was established for the quality of the fuel grade ethanol that could be blended with petrol. Both the Government and the ethanol industry in Australia acknowledge that a quality standard is critical for vehicle operability, environmental and health reasons as well as for consumer protection.

The Australian petrol-ethanol blended fuel market is currently small relative to the market for conventional petrol. The production of fuel grade ethanol for 2007 is estimated at 112 million litres[1] compared with annual petrol sales of approximately 20 billion litres.

This regulatory impact statement considers the costs and benefits of introducing an Australian fuel quality standard for fuel grade ethanol for use as blendstock with petrol up to the 10 per cent level.

As there is presently a 10 per cent limit on ethanol in petrol, the quality standard for fuel grade ethanol is being set by amendment to the Fuel Standard (Petrol) Determination 2001, rather than through establishment of a separate standard.

[1] AusIndustry

2. STATEMENT OF THE PROBLEM

Fuel grade ethanol currently produced and supplied in Australia for use as a blendstock with petrol, is not subject to any regulatory quality standard. Neither is there is an agreed voluntary industry standard to which all ethanol is produced. Consultation to date has revealed that although fuel grade ethanol is produced to different voluntary 'in-house' quality specifications, Australian ethanol is produced to a high standard[2] that is similar to the ethanol standards proposed in this amendment. Current production facilities are capable of producing high quality ethanol suitable for pharmaceutical and food use in addition to use as a fuel. Quality fuel grade standards for ethanol would not exclude new producers, nor reduce competition, as the costs of producing quality standards are not considered to be a financial barrier to ethanol production when compared to infrastructure costs to produce most grades of ethanol.

In the absence of a regulated standard, and as the industry develops with new producers entering the market, inferior quality fuel grade ethanol may enter the fuel market. New production facilities may be dedicated to the production of fuel grade ethanol, rather than also producing food/pharmaceutical purposes. In which case, it may be considered unnecessary to produce ethanol for use as a fuel to the high quality required in the food and pharmaceutical markets.

The absence of a minimum standard for fuel grade ethanol could lead to the ineffective operation of engines. These operational problems could then result in negative environmental and health impacts, as well as consumer protection issues.[3] Currently the DEWHA has commissioned CSIRO to investigate the environmental and health impacts of up to 10 per cent fuel grade ethanol blended with petrol. This study also includes a comparison of emission control technology in the Australian fleet and its effectiveness to utilise E10. Improved emission control technology has protected the community by reducing the amount of air pollutants emitted. Further improvements to the emission control technology can be achieved through using quality grade ethanol that allows for more efficient burning of the proposed fuel grade ethanol and produces less of the harmful air pollutants. The final CSIRO report is due before June 2008.

Without a minimum quality standard limiting substances in, and properties of, fuel grade ethanol, a number of issues could arise. A range of substances that can be present in fuel ethanol (for example methanol, non-volatile matter and acids) could lead to engine problems such as increased wear, deposits and filter blocking. In addition to this ethanol is hygroscopic and easily picks up water from ambient air and the fuel distribution system. The water content of fuel grade ethanol needs to be controlled; otherwise when ethanol is blended with petrol, phase separation can occur. This is particularly of concern with low ethanol blend fuels and phase separation can cause serious operating problems for vehicles.[4]

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[2] Department of the Environment and Heritage International Fuel Quality Centre, Hart Downstream Energy Services, *DEH Ethanol Standard 18/2004 Report.*

[3] Potential Health Risks of Ethanol in Gasoline Office of Environmental Health Hazard Assessment California Environmental Protection Agency October 29, 1999.

[4] Setting a Fuel Quality Standard for Fuel Ethanol (2004), International Fuel Quality Standard http://www.deh.gov.au/atmosphere/fuelquality/publications/standard.html.

The Federal Chamber of Automotive Industries outlines reasons why vehicle manufacturers do not recommend the use of any ethanol/petrol blended fuels in vehicles made before 1986. This information is also applicable to post-1986 vehicles listed as unsuitable to use ethanol blend petrol and non-fuel grade ethanol. The FCAI notes that in addition to problems with carburettor equipped engines, the use of ethanol blended petrol in fuel injection systems will result in early deterioration of components such as injector seals, delivery pipes, fuel pump and regulator.[5]

An important element of the fuel grade ethanol standard is to limit the amount of unwanted by-products which low grade ethanol may contain. The proposed denaturant for fuel grade ethanol in Australia is ULP or PULP, which must be no less than 1 one per cent volume by volume and no more than 1.5 per cent volume by volume and must be clear and bright in appearance and visibly free from suspended or precipitated contaminants. This component of the standard addresses some concerns about what by-products will be produced and what may remain in the ethanol, if the ethanol remains unregulated.

Corrosion in pipelines is one of the major concerns that is addressed by the standard. According to a US study, "Corrosion in unprotected pipelines causes millions of dollars (US$) worth of damage every year".[6] Ethanol has a higher corrosive potential than petrol. The fuel grade standard addresses this issue by prescribing an acidity level (as acetic acid CH_3COOH) with a specification of 0.007 per cent mass by mass in order to minimise the acidity of the ethanol. This acidity parameter, combined with a corrosive inhibitor, minimises the corrosion that may result from the use of ethanol.

Low grade ethanol increased fuel pump wear in a section of the US vehicle fleet. Furthermore, General Motors (GM) also confirmed that the pHe of ethanol decreased (became more acidic) during long term storage, owing to the formation of acidic by-products. Low pHe correlates strongly with increased corrosiveness as demonstrated by poor performance in the NACE (TM-01-72) rust test. To address this problem GM recommended a range of solutions that included: the development of an acid detection method – the "pHe method; that ethanol manufacturers should control pHe; and the incorporation of a pHe specification."[6] The Australian proposed amendments to the Fuel Standard (Petrol) Amendment Determination 2008 include a fuel standard for ethanol with a pHe value for ethanol between 6.5 and 9.0 and an ASTM testing method.

Currently Australian ethanol producers are producing ethanol that is of equivalent standard to the proposed standard for the fuel grade ethanol blended up to 10 per cent with petrol. The development of these standards has been made in consultation with industry. Ethanol producers however, may not continue to produce ethanol to a fuel grade standard without an incentive or regulatory requirement. Ethanol producers may not be inclined to ensure fuel grade quality ethanol as some of the negative effects on vehicles may not always be attributed to ethanol, as engine deterioration takes time and it is often difficult to diagnose a specific cause. A direct cause and effect may not be easily identified given other variables such as regular services on vehicles which could mask or reduce the effect.

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[5] www.fcai.com.au.

[6] Octel Refinery Specialties Technical Marketing Report DC-11 Corrosion Inhibitor Issue 1 March 2002.

A fuel grade standard for ethanol: incurs minimal costs to producers; is supported by the Fuel Quality Standard Committee (FQCC); harmonises with international standards; is a legislative requirement; and reduces the risk of vehicle inoperability. A fuel grade standard for ethanol also protects consumers from low grade ethanol which has detrimental effects on the environment and vehicles, as well as potential negative health impacts by increasing the air pollution through incomplete combustion.

Any vehicle operational problems resulting from inferior quality ethanol would have significant impacts on consumer confidence in ethanol, and biofuels more generally. Quality ethanol standards blended with petrol will ensure clean blendstock fuel which most vehicles can use and encourage the adoption of better engine technology.

The adverse health effects, and ambient concentrations/trends of those pollutants with a strong linkage to motor vehicles, are briefly discussed below (Grant *et al*, 1993; Sivak, 1993; NSW EPA, 1996b; Vic EPA, 1994)[7].

Air quality benefits from purer forms of ethanol can be substantial[8]. Negative air quality impacts from impure ethanol include the emission of primary Particulate Matter (PM). The benefits of reduced PM are achieved by using fuel grade quality standards for ethanol. The Biofuels Taskforce concluded that the previous assumption of negligible impact of E10 on particulate matter (PM) tailpipe emissions needs to be revisited and that health benefits may be higher than previously thought. Overseas studies have shown a reduction in PM emissions when using E10, and in the absence of equivalent Australian studies, the Biofuels Taskforce has concurred and indicated a possible 40 per cent reduction in PM emissions from E10 in comparison to petrol. DEWHA has commissioned CSIRO to investigate the potential benefits of fuel grade quality E10 under Australian conditions (the report on the study is due in 2008).

Secondary particles are also emitted into the atmosphere from fuel based vehicles and other sources. Secondary organic aerosol (SOA) formation is the result of chemical and physical processes that transform the emitted gaseous compounds into non-gaseous phases or aerosols. There has been increasing interest in the contributions of total loading of atmospheric particulate matter in the atmosphere and the impact on human health.[9] However, there is a lack of empirical evidence in Australia. In California according to the Office of Environmental Health Hazard Assessment

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[7] Grant, L.D., Graham, J.A., Kotchmar, D.J. & Tilton, B.E. (1993) *Health effects of motor vehicle related criteria air pollutants*, International workshop on human health and environmental effects of motor vehicle fuels and their exhaust emissions, Sydney

Sivak, A. (1993) *Characterisation and health effects of gasoline and exhaust emissions*, International workshop on human health and environmental effects of motor vehicle fuels and their exhaust emissions, Sydney 6-10/4/92, International Programme on Chemical Safety, Department of Health, Housing, Local Government and Community Services, and the Clean Air Society of Australia and New Zealand, pp 101-173.

NSW EPA (1996b) Developing an Air Quality Management Plan for Sydney, the Illawarra and the Lower Hunter, Chatswood, NSW.

Victorian Environment Protection Authority - Vic EPA (1994) *Victorian Transport Externalities Study: Volume 4*, Vic EPA, Melbourne.

[8] CRS Report for Congress: Fuel Ethanol: Background and Public Policy Issues 3 March 2006 by BD Yacobucci, Specialist in Energy Policy Resources, Science and Industry Division.

[9] Victorian Environment Protection Authority - Vic EPA (1993) *Annual Report 1992-3*, Vic EPA, Melbourne.

(1999) Air Emissions Inventory – Port Phillip Region.

(1999) there is no evidence that ethanol is carcinogenic via the inhalation route[10]. However, exposure to high concentrations of ethanol vapour may result in transient irritation to eyes and the respiratory system under either acute or chronic conditions. Other studies state respirable particles, those with a diameter of less than 10 μm (PM_{10}), are a particular health concern because they are easily inhaled and retained in the lung (Concawe, 1998)[11]. Although the mechanisms are not clear, epidemiological studies in the US and elsewhere consistently show a relationship between particles and a range of respiratory, cardiovascular and cancer related morbidity and mortality (Concawe, 1996; Ballantyne, 1995)[12]. The NSW HARP study estimated that particle pollution contributed to nearly 400 (2 per cent) premature deaths in Sydney each year between 1989 and 1993. The study also estimated that days of high particle concentrations were associated with: a 3.5 per cent increase in hospital admissions for cardiovascular disease; a 3 per cent increase in chronic obstructive pulmonary disease hospital admissions; and a 3 per cent increase in heart disease admissions in the elderly. Fuel grade ethanol should reduce PM emissions when compared to low grade ethanol that would have a higher risk of incomplete combustion.

Supporters of ethanol argue that its use can lead to lower emissions of toxic and ozone-forming pollutants, and greenhouse gases, especially if higher-level blends are used.[13] Yacobucci (2006) further argues that in the US fuel ethanol is heavily dependent on federal incentives and regulations. Other issues of congressional interest in the US include the support for purer blends of ethanol and promotion of ethanol vehicles and infrastructure.[14] Australia is harmonising with international standards and trends by setting fuel grade standards for ethanol which can be blended up to 10 per cent with petrol.

Currently the NSW Government has a mandate to encourage up to 10 per cent ethanol (E10) in petrol. To assist with environmental and vehicle operability objectives in the Act, a fuel grade ethanol standard for up to 10 per cent blended with petrol is warranted.

[10] Potential Health Risks of Ethanol in Gasoline. 1999 Office of Environmental Health Hazard Assessment 29 October 1999

[11] Concawe (1998) A Study of the Number, size and Mass of Exhaust Particles Emitted from European Diesel and Gasoline Vehicles under Steady-state and European Driving Cycle Conditions, Report No 98/51, Brussels, February 1998.

[12] Concawe (1996) *Air quality standard for particulate matter*, Concawe Health Management Group, Brussels.
Ballantyne, V (1995) *Particulates and other motor vehicle emissions*, Clean Air Society Seminar: Health Effects of Particulates, Brisbane, 8 December 1995.

[13] CRS Report for Congress: Fuel Ethanol: Background and Public Policy Issues 3 March 2006 by BD Yacobucci, Specialist in Energy Policy Resources, Science and Industry Division.

[14] CRS Report for Congress: Fuel Ethanol: Background and Public Policy Issues 3 March 2006 by BD Yacobucci, Specialist in Energy Policy Resources, Science and Industry Division.

3. OBJECTIVES

The objectives of the Act are to:

> (a) regulate the quality of fuel supplied in Australia in order to:
>
> (iv) reduce the level of pollutants and emissions arising from the use of fuel that may cause environmental and health problems
>
> (v) facilitate the adoption of better engine technology and emission control technology
>
> (vi) allow more effective operation of engines, and
>
> (b) ensure that, where appropriate, information about fuel is provided when the fuel is supplied.

Two objectives of Government action in this case are as follows:

- To further the objectives of the *Fuel Quality Standards Act 2000*, and[15]
- To provide certainty to consumers of the quality of ethanol being supplied to the market and in so doing, helping to ensure consumer protection and meet consumer expectations.

[15] *Fuel Quality Standards Act 2000*

4. OPTIONS

Option 1: No fuel grade ethanol quality standard (status quo)

In the absence of a regulated standard, inferior quality ethanol may enter the Australian market, potentially leading to negative environmental and health impacts, vehicle operational problems, and consumer protection issues.

Option 1 is not feasible as it does not meet the objectives outlined above.

Option 2: Voluntary industry fuel grade ethanol quality standard

A voluntary industry standard will not provide an enforceable minimum quality standard across the ethanol industry. As with Option 1, inferior quality fuel grade ethanol may enter the Australian market, potentially leading to negative environmental and health impacts, vehicle operational problems and consumer protection issues.

A voluntary system does not provide a legislative instrument to formalise current production methods and standards and will not ensure that future ethanol producers continue to meet these standards. Emerging ethanol producers may not agree with the voluntary industry standard and would have no reason or incentive to produce fuel grade ethanol. In addition, ethanol cannot be tested for its compliance with a fuel grade standard once it is mixed with petrol. Producers could sell the ethanol and once it is blended with petrol it would not be possible to determine its quality or even its source. Washington industry guidelines specifications and procedures for ethanol (2002) state "ethanol will affect a number of properties of the gasoline to which it is added. There properties include octane, oxygen content, volatility and water solubility".[16]

A fuel grade standard for ethanol would require compliance that would be regulated through the Petrol Determination. The costs for monitoring the quality of fuel grade ethanol would be covered by the Government's quality monitoring component of the budget. There is a financial commitment of funds to monitor for all fuel standards, including this amendment to the Petrol Determination.

Although currently in Australia there is no laboratory accredited to test fuel grade ethanol Departmental funds are allocated to test the ethanol quality overseas, under regulation (e.g. an amendment to the Petrol Determination). In addition, there would be no cost to the consumers for a fuel grade ethanol standard, as there are Government funds available for compliance to ensure all fuel standards are maintained.

[16] Fuel Ethanol Industry Guidelines Specifications and Procedures, Washington, May 2002.

Approximate costs for the Government to test the ethanol standard (two *major* producers in Australia) would be less than $2 000 per sample (Government rates in an accredited laboratory) out of the $6.3 million budget covering four years commencing in 2006. Costs to the ethanol producers to test a sample of their ethanol are not known but could be less than $2 000 as they do not require an accredited laboratory to perform the tests. Therefore, Government funds are available to test for ethanol under a regulated system, whereas, under a voluntary system there is no incentive to even test in a non-accredited laboratories.

Through this proposed fuel grade ethanol standard Australia would be harmonising with international standards. Harmonisation is important to some of our key trading partners. The US has congressional interest in harmonising standards for fuel, including ethanol.[17] A voluntary system cannot deliver consistent harmonisation, nor certainty to consumers of the quality of the ethanol being supplied to the market, and consumer protection and expectations could not be met. Harmonisation of fuel standards allows Australia to meet international health and environmental standards and reduces barriers to the import and export of fuel.

As discussed in section 2, market incentives/forces are insufficient to reduce vehicle operability problems as they are difficult to detect and therefore a legislated fuel grade standard for ethanol is required. This can be most efficiently implemented through the amendment to the
Fuel Standard (Petrol) Amendment Determination 2008 (No. 1).

Option 2 will not ensure a nationally consistent approach to fuel quality standards and does not meet the Government's objectives and is therefore not considered feasible. A discussion of this option is included in the Impact Analysis section below.

Option 3: State and Territory fuel grade ethanol quality standards

Almost all the States and Territories currently have some form of fuel quality regulatory regime. For example, the majority of States regulate fuel volatility. In addition, States have existing consumer affairs legislation that could be used to require labelling or to prosecute retailers that misrepresent the quality of their fuel (e.g. NSW *Fair Trading Act 1987*, Victoria *Fair Trading Act 1999*).[18]

Current State fuel quality legislation is not nationally consistent and there are currently no State or Territory regulations regarding the quality of fuel grade ethanol, even though some States are considering or have introduced a mandate to promote the use of ethanol. DEWHA is not aware of any jurisdiction's intention to introduce such legislation.

Option 3 is not likely to meet the Government's objectives in the foreseeable future. Option 3 is therefore not considered feasible.

[17] CRS Report for Congress: Fuel Ethanol: Background and Public Policy Issues 3 March 2006 by BD Yacobucci, Specialist in Energy Policy Resources, Science and Industry Division.
[18] NSW *Fair Trading Act 1987*, Victoria *Fair Trading Act 1999*

Option 4: Introduce a fuel grade ethanol quality standard under the Act

An Australian fuel quality standard for fuel grade ethanol under the Act will specify parameters to ensure consistency in fuel grade ethanol quality, thus ensuring the availability of fuel that:

- reduces the level of pollutants and emissions arising from the use of fuel that may cause environmental and health problems
- facilitates the adoption of better vehicle technologies
- allows more effective operation of engines, and
- consistently meets consumer expectations.

DEWHA is aware of stakeholder support for the introduction of a fuel grade ethanol quality standard.

Option 4 is the only option that meets most of the Government's objectives. It is therefore the preferred option. Option 4 is considered further in the Impact Analysis section below.

Affected Parties

The parties likely to be affected by the introduction of an Australian fuel grade ethanol quality standard are ethanol producers and importers, petrol suppliers and retailers, Government, consumers and the community as a whole.

Ethanol producers and importers

DEWHA is aware of three ethanol producers at the time of this statement; Manildra Group, CSR Limited and Schumer - Rocky Point Sugar Mill. Currently in Australia, fuel grade ethanol is predominantly produced from wheat starch with a smaller amount produced from molasses (a sugar cane by product). In 2007, approximately 112 ML of ethanol was produced for use as a transport fuel in Australia.[19] This represents less than 0.1 per cent of the petrol market. Table 2 provides details of fuel ethanol production from 2002-03 onwards.

Table 2: Fuel Ethanol Production (ML)[20]

Year	Ethanol Production
2002-03	56.8*
2003-04	28.5
2004-05	22.1
2005-06	40.3
2006-07	83.6
2007-08	91.1^

* from 28 September 2002
^ to February 2008

Production capacity for 2006-07 was higher than actual production levels at 83.6 ML. Currently, the two major producers of fuel ethanol in Australia are Manildra and CSR. The Manildra plant near Nowra, NSW uses wheat starch as feedstock and has a production capacity of approximately 170 ML per annum. CSR has a production capacity of 64 ML per annum of fuel ethanol at its Sarina plant in Queensland. The Rocky Point plant, also in Queensland, has a production capacity of approximately 15 ML.

Preliminary consultation on the technical issues associated with a standard revealed that the Manildra Group and CSR Distilleries Operation currently produce fuel grade ethanol to in-house or industry-accepted standards. Plans to expand ethanol production capacity could, in theory, bring total ethanol production capacity across Australia to 1005.2 ML in 2011. It should be noted that some of the current producers propose to increase their production capacity. Given the current high grade production of ethanol in Australia, it is considered that production costs involved in meeting the suggested ethanol standards would be low. It is also considered that

[19] AusIndustry
[20] AusIndustry: based on claims made under the Ethanol Production Grants Program

compliance costs would be minimal as facilities required to produce fuel grade ethanol are not considered to be a barrier to production.

Initially there were concerns that setting a maximum denaturant content of 1.5 per cent, would act as a trade barrier to importation of ethanol from the US where denatured fuel ethanol is required to have a minimum of 1.96 per cent denaturant. This concern was based on the premise that the international trade in fuel ethanol involves the exportation and importation of denatured ethanol. This is not the case. The international trade in fuel ethanol involves shipment of undenatured ethanol that is transferred to tanks at the destination for blending with denaturant to the local specification. Accordingly, the denaturant content specified in Australian fuel ethanol standard will not act as a barrier to prevent ethanol importation from the USA or any other country.

DEWHA is unaware of any substantial imports of fuel grade ethanol.

Petrol suppliers and retailers

Ethanol petrol blends are available at around 900 service stations in Australia including major oil companies, supermarket outlets and independent service stations. This number has risen from just 70 service stations in 2005.[21]

Ethanol consumers

Consumer protection was improved by the introduction of a 10 per cent ethanol limit in petrol and the requirement to label ethanol blend fuels. Further improvements can be achieved by quality standards for ethanol to meet consumer expectation; by providing fuel that is fit for its purpose that is, it provides protection for their vehicles, as well as minimising environmental and health impacts.

Automotive Industry

The Federal Chamber of Automotive Industries (FCAI) provides consumers with advice as to which vehicles can operate satisfactorily on E5 and E10 blends.[22] The FCAI states that most new and many older vehicles can run on ethanol blended petrol. This vehicle list is meant as a statement of the suitability of ethanol blend fuels for certain vehicles. Typically, a vehicle manufacturer will define what fuel the engine was designed for and will recommend the use of that fuel to their customers in their owner's manuals.

Vehicle problems arising from fuel use (and not a fault in materials and workmanship) are the responsibility of the fuel supplier and not the engine manufacturer. Quality standards for ethanol will provide consumer protection and improve vehicle operability.

Wider community

The wider community will be affected by any health and environmental benefits. Non-fuel grade ethanol would negatively affect vehicle operability, the environment and the health of the Australian population.

[21] The Department of the Energy and Tourism
[22] www.fcai.com.au/ethanol.

Government

The Government will be affected by the introduction of a fuel quality standard for fuel grade ethanol through increased monitoring and compliance costs and subsidy payments. However, additional funding for quality monitoring activities was provided in the 2006 Budget. A commitment of $6.3 million over four years from 2006-07 was provided to increase fuel quality compliance inspections.

Impact on existing regulations

DEWHA is not aware of any existing national or state legislation governing the quality neither of fuel grade ethanol nor of any jurisdiction's intention to introduce such legislation.

The proposed fuel ethanol quality standard will be set through amendment to the *Fuel Standard (Petrol) Determination 2001*. This Determination already permits up to 10 per cent ethanol to be blended with petrol.[23]

Likely benefits to ethanol producers and importers from a fuel grade ethanol quality standard

A fuel quality standard will introduce a 'level playing field' for Australian ethanol producers and importers, promoting competition on an even footing.

Enforceable minimum quality standards will also ensure a high quality product and increase consumer protection.

The consistently high quality product resulting from a fuel grade ethanol standard for E5 and E10 blends may also lead to greater confidence in and acceptance of the product by vehicle manufacturers.

A standard would provide certainty to the producers and importers as to the quality requirements for fuel grade ethanol in Australia.

Likely costs to ethanol producers and importers from a fuel grade ethanol quality standard

Fuel grade ethanol producers will need to undertake regular testing of their product to ensure it complies with the fuel quality standard. However, this is not a direct cost of implementing a standard as testing is not a specific requirement under the Act.

Current ethanol producers have advised that they already quality test their product voluntarily. For some parameters, however they may wish to adopt different testing methods from their current practice. However, it should be noted that there is no obligation on producers to use these tests to determine the quality of their product for the purposes of the Act. Neither does the Act specify the frequency at which testing must be conducted. It is the responsibility of individual producers to ensure that their product meets the requirements set out in the Act.

[23] *Fuel Standard(Petrol) Determination 2001* http://intranet.environment.gov.au/About/legislation

It would appear that ethanol from existing ethanol producers already meets the proposed standard to a large extent on most parameters. It is therefore unlikely that current producers will incur increased production costs.

It is not anticipated that the introduction of a standard in Australia would impede imports of ethanol. As can be seen from Attachment A, standards exist in a range of other countries. An International Energy Agency (IEA) paper has highlighted that production costs for ethanol in Brazil are generally lower than productions costs in IEA member countries, including Australia.[24]

The Act imposes record keeping and annual reporting requirements on suppliers of fuel. Annual reports must include information on fuel quality including details of any testing undertaken. Records are to be kept for two years and include information such as type and quantity of fuel produced, details of any testing done on the fuel and stock reconciliation records.

Likely benefits to petrol suppliers and retailers from a fuel grade ethanol quality standard

A quality standard for fuel grade ethanol will result in a consistent minimum quality of ethanol that is blended with petrol for blends up to 10 per cent as allowable under the *Fuel Quality (Petrol) Determination 2001*. This will provide certainty for petrol suppliers and retailers in the quality of ethanol to be blended with petrol and hence the end product.

Likely costs to petrol suppliers and retailers from a fuel grade ethanol quality standard

It is anticipated that costs to petrol suppliers and retailers from a fuel quality standard for fuel grade ethanol would be limited.

Likely benefits to ethanol consumers from a fuel grade ethanol quality standard

A fuel grade ethanol standard will result in a consistent minimum quality of ethanol blendstock to be used in ethanol petrol blends up to 10 per cent. With a standard in place, consumer expectations are met and the risk of ambiguity with respect to the exact composition of fuel minimised.

Likely costs to ethanol consumers from a fuel grade ethanol quality standard

It is anticipated that there are likely to be limited costs to consumers from a fuel quality standard for fuel grade ethanol. The Government commissioned a testing programme in 2006 to assess the operation of petrol engine vehicles in the Australian fleet on ethanol blend fuels. This study assessed vehicle performance and durability and the materials compatibility of fuel system components when using 5 per cent and 10 per cent ethanol blends (E5 and E10). Using 2006 vehicle fleet statistics, the study estimated that about 60 per cent of petrol vehicles in the Australian fleet are suitable for use with E10. Since the mid 1990's, all new Australian made cars have been suitable for E10 ethanol blended fuel. The vast majority of new imported car models sold in Australia today are also suitable for use with E10.

[24] *Biofuels for Transport: An International Perspective* (2004) International Energy Agency

The Australian Government recommends that consumers check with the Federal Chamber of Automotive Industries (FCAI) website for information on the suitability of their vehicle to operate with ethanol blended fuel. Currently consumers are protected by the availability of clear information about their vehicles' suitability. Consumers will be even better protected when a quality fuel grade standard for ethanol is set.

Likely benefits to the wider community from a fuel grade ethanol quality standard

Quality ethanol standards for fuel grade ethanol to be blended up to 10 per cent with petrol will more consistently meet community expectations by providing less pollutants and emissions that cause environmental and health problems, allowing more effective operation of engines and encouraging the adoption of better vehicle technologies.

Likely costs to the wider community from a fuel grade ethanol quality standard

The potential costs to the wider community are likely to be minimal, as the proposed standard for fuel grade ethanol is formalising an existing situation and ensuring that such standards are maintained in the future.

Likely benefits to government from a fuel grade ethanol quality standard

The implementation of a quality standard for fuel grade ethanol will further the objectives of the Act.

Likely costs to government from a fuel grade ethanol quality standard

Government will incur some additional costs associated with monitoring compliance with the Act. As previously noted, current fuel grade ethanol production is currently less than 0.1 per cent of the petrol fuel market in Australia, so the additional cost is not anticipated to be significant. In any case the Australian Government has allocated funds to monitor all fuels with regulated standards in Australia. This amendment will include fuel grade ethanol as part of the petrol standard.

5. IMPACT ANALYSIS

Introduce a fuel grade ethanol quality standard under the Act

Setting a standard will provide consumers with certainty as to the quality of ethanol being used in ethanol petrol blend fuels available in the marketplace.

As discussed in Section 2 and 4, market incentives/forces are insufficient to reduce vehicle operability problems caused by low grade ethanol as they are difficult to detect and therefore a legislated fuel grade standard for ethanol is required. This can be most efficiently implemented through the amendment to the *Fuel Standard (Petrol) Amendment Determination 2008 (No. 1).*

The proposed standard, which is outlined in Table 1, harmonises with the existing United States standard ASTM D4806. The minimum level (1 per cent) of denaturant complies with Australian excise requirements whereas, in the USA, the level ranges between 1.96 per cent and 4.76 per cent according to State requirements. The draft standard was adjusted in response to stakeholder feedback in order to better harmonise with the US minimum level of ethanol.

ASTM D4806 provides alternative testing methods for some parameters but, for reasons of legal certainty, the proposed Australian standard specifies only one test method for each parameter. DEWHA sought advice from its contracted laboratory on the most appropriate test method for each parameter in the Australian context. Stakeholders were consulted on the proposed testing method, and no objections were raised.

Ethanol fuel quality standards are in place in a number of countries internationally. Currently fuel ethanol standards have been implemented for Brazil, Canada, Columbia, China, India, Paraguay, Philippines, Poland, Sweden, Thailand (E20 and E10), Ukraine and the U.S. In the United States there is a standard for ethanol to be blended with petrol up to the 10 per cent level. There are also separate standards for regulated E85 Class 1 in California and for E85 class 1/2/3 in the U.S. In Poland in January 2007 the European Commission proposed to introduce a new high biofuel petrol blend on the market (up to 10 volume per cent of ethanol) and this move is supported by France and Sweden. Standards for 5 per cent maximum and 85 per cent ethanol volume maximum are in the process of being drafted in Poland. Sweden is a major ethanol supplier, and the European Union allows 5 per cent maximum ethanol as long as it complies with conventional petrol requirements. Standards for 5 per cent and 85 per cent ethanol are in the process of being drafted for Sweden.[25] A comparison of Brazil and India fuel quality standards is at Attachment A.

[25] International Fuel Quality Center 2007 Worldwide Automotive Fuel Specifications

Given the international trend to enforce ethanol standards, it is not anticipated that setting an Australian standard for ethanol will impact on new ethanol producers in Australia or internationally. Current ethanol producers (in Australia and internationally) are concerned about consumer safety and protection against non-fuel grade ethanol fuel. There is every probability that the industry will continue to grow in the future so these concerns may well increase in importance to both producers and consumers. As a consequence, similar stringent standards for ethanol have been established in many countries (e.g. Brazil) who could export ethanol to Australia in the future.

Table 1

Parameter	Standard	Test Method	Comments
Ethanol	95.6 volume per cent min (after denaturing)	ASTM D5501	Minimum ethanol content is required to ensure that other components that may have detrimental effects on vehicles or fuel performance are minimised. Ethanol content is associated with lubricating properties of the fuel, water tolerance and volatility. ASTM D4806 sets a minimum ethanol content of 92.1 per cent and maximum levels of methanol at 0.5 per cent, water at 1 per cent and denaturant at 5 per cent, giving a total of 98.6 per cent which allows 1.4 per cent for the fusel oils that are produced during fermentation of the feedstock. By setting the Australian standard at 95.6 per cent minimum ethanol and 1.5 per cent maximum denaturant (with the other parameters remaining as per the ASTM), the allowance for fusel oils remains at 1.4 per cent and, consequently, the Australian standard would be no more and no less stringent than the ASTM.
Methanol	0.5 volume per cent max	ASTM D5501	Methanol is corrosive and can cause engine wear.
Solvent washed gum	5.0 mg/100ml max	ASTM D381	Used to detect components that are associated with the blocking of fuel filters and deposits on the engine system.
Water	1.0 vol per cent max	ASTM E203	To reduce the risk of phase separation when ethanol is blended with petrol. Phase separation can cause serious operational problems in vehicles.
Denaturant	1 volume per cent min 1.5 volume per cent	ASTM D5501	The volume of denaturant is set at a minimum of 1 per cent because this reflects Australian excise requirements for fuel, which attracts a much lower taxation rate than potable ethanol. A maximum of 1.5 per cent is necessary to ensure that the volume of the fusel oils is limited and the standard remains consistent with

	max		the US standard, ASTM D4806 (refer to comments under *Ethanol* above).
Inorganic chloride	32 mg/l max (40 ppm max)	ASTM D512C (as modified in ASTM D4806)	Even very low concentrations of chloride ions can be corrosive to metals vehicle components
Copper	0.1 mg/kg max	ASTM D1688A (as modified in ASTM D4806)	Copper is a very active catalyst for the low-temperature oxidation of hydrocarbons, significantly increasing the rate of gum formation.
Acidity	0.007 mass per cent max	ASTM D1613	Very dilute aqueous solutions of low molecular weight organic acids are very corrosive to a wide range of metals and alloys.
pHe	6.5 - 9.0	ASTM D6423	Very low levels of strong acids might not always be detected by the acidity test.
Appearance	Visually free of sediment or suspended matter	ASTM D4806	Suspended or precipitated contaminants would have a detrimental effect on engines, increasing wear and causing blockages.
Sulfur	30 mg/kg	ASTM D5453	Consistent with petrol standard sulfur limits to protect catalyst systems from deactivation. Effective catalyst operation is required to minimise vehicle emissions.

6. CONSULTATION

Summary of the consultation process

DEWHA has undertaken extensive consultation in developing the proposed fuel quality standard for fuel grade ethanol. Consultation has included:

- The Biofuels Interdepartmental Committee oversaw the development of the standard and was the mechanism for securing whole of government agreement. Membership of the Biofuels IDC includes the Department of Agriculture Fisheries and Forestry, the Department of Treasury, the Department of Defence, the Department of Finance, the Department of Foreign Affairs and Trade, the Department of Innovation, Industry, Science and Research, the Department of Infrastructure, Transport, Regional Development and Local Government, the Department of Health and Aging and the Department of Prime Minister and Cabinet.

- In December 2004, the then Minister for the Environment and Heritage, Senator Ian Campbell, released a technical paper to assist in public discussion on setting an Australian quality standard for fuel grade ethanol. Comment closed in February 2005, with seven submissions received.

- An Australian Government position on a proposed standard for fuel grade ethanol was drafted following consideration of submissions to the technical paper. The position paper was cleared through the Biofuels IDC and released on 30 July 2005 for three weeks public comment. The position paper set out the Australian Government's preferred position on a draft Australian fuel quality standard for fuel grade ethanol. Availability of the position paper was advertised in the press, on the internet, by direct email and via the *Clean Fuels Bulletin*.[26] A reminder was emailed to stakeholders ten days before close of comment. Ten submissions were received in response to the position paper.

- The availability of the technical paper and position paper were also reported in two international electronic trade bulletins produced *World Fuel Today* and the *International Fuel Quality Center*.[27]

- In July 2006, DEWHA circulated a draft standard for comment to stakeholders who had made submissions on the technical paper and the government position paper.

- The Act requires that the Minister must consult the Fuel Standards Consultative Committee (FSCC) before making a fuel standard. Membership of the FSCC currently includes a representative from each State and Territory, the Australian Institute of Petroleum, the Clean Air Society of Australian and New Zealand, the Australian Automobile Association, the Federal Chamber of Automotive Industries, the Independent Petroleum Group, Bioenergy Australia and representatives from DEWHA and the Department of Industry, Tourism and Resources**.** The FSCC recommended the introduction of a quality standard for ethanol that is to be blended with petrol up to the 10 per cent limit, and that the Australian standard should harmonise with the American standard (ASTM D4806).

<u>Consultation outcomes arising from the technical paper</u>

The technical paper was intended to inform stakeholders about fuel grade ethanol and its use in fuel blends. It provided information on the quality and characteristics of fuel grade ethanol internationally and of ethanol use in particular blends. The paper did not recommend limits for fuel grade ethanol parameters.

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[26] *Clean Fuels Bulletin: Clean Fuels Bulletin DEH 2000*, www.environment.gov.au/atmosphere/cleaner-fuels/publications/july-2005.

[27] *World Fuels Today*, 19 December 2005, www.worldfuel.com; *International Fuel Quality Centre Setting a Quality Standard for Fuel Ethanol, IFQC DEH Ethanol Standard 18/2004 Report.*

Stakeholder comment was requested on a series of technical issues relevant to the development of parameters and characteristics of the standard as a whole.

A summary of outcomes are as follows:

- Four of the seven submissions supported the introduction of an Australian quality standard for fuel grade ethanol. This view was held by government agencies, the petroleum industry and the relevant consumer association. The remaining submissions were silent on whether or not they supported the introduction of a standard. No submission opposed setting of a standard for fuel grade ethanol.
- Of those submissions which made comment on harmonising with existing standards, all four submissions suggested that harmonising with the US standard would be appropriate. One submission suggested Brazil or Sweden's standards could also be appropriate.
- Comment was also received on individual parameters that could be included in a fuel grade ethanol standard. Comments received on these parameters and the issues above were taken into consideration in drafting the Australian Government position paper.

Consultation outcomes arising from the position paper

The position paper put forward a proposed standard for fuel grade ethanol including limits and test methods for individual parameters. This proposal was broadly based on the US ASTM standard with some variations. Comment received on this paper was taken into account in developing the fuel grade ethanol standard as outlined in the regulatory impact statement.

Of those submissions that commented, there was no opposition to the introduction of an enforceable standard. Generally, there was support to harmonise with international standards, in particular the US ASTM standard.

Industry

Test methods

Although stakeholder comment was specifically requested on test methods, very few submissions included comment relating to the proposed test methods. Some submissions representing existing producers recommended the use of test methods which they currently utilise.

The test methods nominated in the proposed standard for fuel grade ethanol are the methods the Commonwealth will use to determine whether fuel grade ethanol conforms to the standard. There is no obligation on producers to use these tests to determine the quality of their product for the purposes of the Act. The proposed standard will avoid wording that implies the listed test methods are prescribed for all use.

Ethanol and Methanol Content

The majority of ethanol producers (current and future) commented that the proposed limits for ethanol and methanol were stricter than in the US standard. Some submissions noted that future producers may have difficulty meeting these stricter limits. After further consideration, the proposed standard adopts the ethanol and methanol contents specified in the US ASTM standard.

Water Content

Three submissions expressly supported the proposed limit. Two submissions suggested a more stringent limit at the point of production to allow for water pickup during distribution. As the standard is to apply for all blendstock regardless of its location in the distribution network, only one limit can be included in the standard and producers and distributors will have the capacity to undertake commercial agreements on lower limits.

Sulfur

There was limited concern surrounding the sulfur parameter although, one submission suggested waiting until the US or Europe had established a sulfur standard. A standard is in place in the US. This was noted by one submission which suggested harmonising with international standards. The proposed standard now harmonises with this US approach for 10 per cent ethanol blended with petrol.

Phosphorous

There was a view that it would be premature to set a phosphorous limit now as no international standard currently includes such a limit. In line with harmonising with the US standard, a phosphorous limit is no longer proposed for 10 per cent ethanol blended with petrol.

Consumers

The Australian Automobile Association, representing motorists supported the proposal put forward in the position paper to broadly harmonise with the US American Society for Testing and Materials (ASTM) standard.

Government

All state and territory governments are represented on the Fuel Standards Consultative Committee. As noted below, the FSCC proposed fuel quality standards for fuel grade ethanol.

Fuel Standards Consultative Committee

The FSCC proposed amendments describe eight fuel standard requirements for ethanol and methods for testing the quality of ethanol by twelve chemical parameters as defined by the American Society for Testing and Materials (ASTM). The FSCC also recommended two changes to the parameters set by ASTM D406: that the volume of denaturant should be set at a minimum of 1 per cent because this reflects Australian excise requirements and a maximum level of 1.5 per cent; and the minimum ethanol content should be set at 95.6 per cent. The ASTM method also provides several methods for some parameters, however under Australian law the Determination should specify only one test method for each parameter.

As noted above in 'Summary of Consultation Process', after consideration of the Australian Government position on a proposed standard for fuel grade ethanol, the FSCC agreed that the amendments be sent to the Minister for the Environment and Water Resources that he make a determination in accordance with section 21 of the *Fuel Quality Standards Act 2000* to make a fuel quality standard for fuel grade ethanol.

7. CONCLUSION AND RECOMMENDED OPTION

Option 4 (Introduce a fuel grade ethanol quality standard under the Act) is the option that best meets the Government's objectives. Option 4 provides fuel grade ethanol that reduces pollution compared to low grade ethanol which can lead to incomplete combustion. It also encourages the adoption of better engine

technology and allows for effective operation through a consistent quality fuel grade ethanol standard for compatible vehicles.

In addition, option 4 is the only option that harmonises with international standards as opposed to the proposed voluntary system (option 2) which would not provide consistent harmonisation, nor certainty to consumers of the quality of the ethanol being supplied to the market. Consumer protection and expectations could not be met under option 2.

Option 2 does not provide any assurance that fuel grade ethanol will be produced. There is insufficient incentive for industry to voluntarily comply with the fuel grade ethanol standards. In addition, there is no assurance that future production and emerging industries will produce fuel grade quality ethanol.

Therefore option 4 is the preferred option as it: meets the objectives of the Act and the two objectives of the Government action to further the objectives of the Act; provides consumers with certainty about ethanol quality; as well as harmonising with the US standard and international standards.

8. IMPLEMENTATION AND REVIEW

It is proposed to set the Australian fuel grade ethanol standard by amendment to the *Fuel Standards (Petrol) Determination 2001*, and that all of the parameters of the Australian fuel grade ethanol standard commence concurrently on the date of registration of the amendments. Current production largely meets the parameters of the proposed standard and as such this implementation date will not create an unreasonable burden for existing ethanol producers.

The Act permits electronic lodgement of annual reports, significantly reducing the cost of compliance to industry.

The Minister must cause an independent review of the operation of the Act to be undertaken at intervals of not longer than five years. The first review of the Act was tabled on 14 June 2005.

After Ministerial approval of this amendment it is likely that the proposed amendments to the Petrol Determination could be implemented in 2008.

APPENDIX A – COMPARISON OF INTERNATIONAL STANDARDS[28]

Parameter	US	Sweden	Poland	India	Brazil
Ethanol Content (volume % minimum)	92.1 [1] (99.0 prior to denaturing)	99.8 (99.7 mass%)	99.6	99.5	99.3
Methanol content (volume % maximum)	0.5 [1] (0.007%)	20 ppm (0.002%)	0.2	300 ppm (0.03 %)	-
Solvent-washed gum (mg/100 ml maximum)	5.0 [1]	-	-	-	-
Involatile matter (mg/100 ml maximum)		1 (10 mg/l)		0.005 mass %	5 (hydrous)
Water content (volume % maximum)	1 [1]	0.3 % by weight (~0.2 vol %)	0.4 % by weight	0.5 (~0.6 mass%	0.5 (hydrated)
Denaturant content (Volume % min Volume % max)	1.96 [1] 4.76	-	0.1 g Bitrex per 100 litres of ethanol	As prescribed by law from time to time	3.0
Inorganic Chloride (mass ppm maximum)	40 [1] (32 mg/l)	-	40		1 (hydrated)
Copper content (mg/kg maximum)	0.1 [1]	-	0.1	0.1	0.07
Acidity	0.007 [1]	0.0025	30 ppm	30 ppm	30 ppm

[28] Taken from *Setting a Fuel Quality Standard for Fuel Ethanol* (2004), International Fuel Quality Standard, http://www.deh.gov.au/atmosphere/fuelquality/publications/standard.html and Worldwide Automotive Fuel Specifications, 2007, International Fuel Quality Centre (IFQC).

(% mass maximum)			(0.03 g/l)	(30 mg/l)	
pHe	6.5-9.0[1]	-	-	-	6-8
Appearance	Visibly free of suspended or precipitated contaminants (clear & bright)	Clear, without particles	-	Clear & bright	Clear & free of suspended impurities
Fusel Alcohol (amyl alcohol) (mg/l maximum)	-	50	2 vol % max	-	-
Density (g/ml maximum)	-	0.790 (D 20/4)	-	0.7961 @ 15.6 ^{0}C	0.7915 @ 20 ^{0}C
Sulfur	30				
Aldehydes		0.0025 max % weight	0.2 g/l max (incl ketones)	0.6 (g/l, EtOH)	
Phosphorous					
Refractive index		1.3618			
Colour		5 hazen max			
Explosion limits/ Electrical conductivity		3.5 – 15 % volume in air		300 E S/m, max	500 E S/m, max
Sulphates	4 mg/kg				

[1] after denaturing