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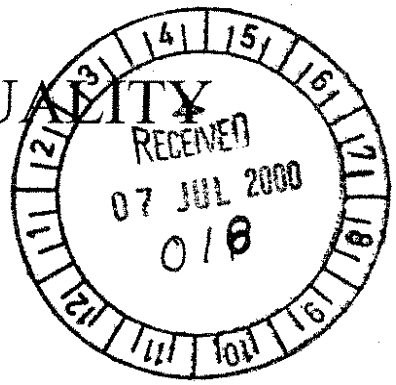

SETTING NATIONAL FUEL QUALITY STANDARDS

RESPONSE TO DISCUSSION PAPERS 1 TO 3

CALTEX AUSTRALIA LIMITED

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For information

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Contents

Executive Summary

1. Caltex supports cleaner fuels

Caltex supports moves to cleaner fuels to help meet greenhouse gas emissions and air quality objectives. We support the general principles set out in Section 3.1 of Discussion Paper 2 as guidance for the determination of fuel specifications. Caltex's proposal for cleaner fuel specifications is shown in Table 1 (page iii) and embodies the general principles.

Caltex proposes:
- an operability/environmental standard based on Euro 2 from 1.1.2001
- "Scenario 3"[1] specifications in 2005/08
  - 150 ppm sulfur and 2% benzene petrol from 1.1.2005
  - 50 ppm sulfur diesel from 1.1.2006
  - 50 ppm sulfur petrol from 1.1.2008

2. Proposals for standards are not cost-effective and threaten refinery viability

The determination of fuel quality standards should take into account both economic considerations, including the impact of cleaner fuels investment on the viability of Australian petroleum refining, and environmental considerations. The policy objective should be to achieve substantial environmental gain at reasonable cost i.e. standards should be cost-effective.

The proposed values for several fuel quality parameters recommended by the Commonwealth in Discussion Paper 2 would result in little environmental gain, or possibly environmental detriment, yet require additional investment of hundreds of millions of dollars in Australia's refineries. An additional impost of this magnitude would greatly reduce the probability of investment to produce cleaner fuels in Australia.

Caltex is particularly concerned at the potential cost impact of proposals for:
- acceleration of timing of 50ppm sulfur in gasoline and diesel to 1.1.2005
- 30ppm sulfur in gasoline and diesel from 1.1.2008
- olefins limit of 16% from 1.1.2005
- aromatics limit of 38% from 1.1.2008 or 2010
- interim 2002 standard, including 350ppm sulfur diesel
- 95 RON gasoline *if* this were to apply to the whole pool in 2005 (for example, through introduction of an excise differential for 95 and 91 RON that induced a widespread change in consumer behaviour).

3. Measures for a Better Environment specifications and timing should be retained

The new fuel standards in *Measures for a Better Environment* (MBE) should be implemented at the values and on the dates set out in MBE. These standards were established by the Government as an appropriate balance of industry and environmental concerns.

Caltex does not support the view that further tightening of standards relative to MBE would be an appropriate way to encourage refinery rationalisation. This view would only have merit if

[1] Scenario 3 refers to the fuel specification in the Fuel Quality Review, as presented in Discussion Paper 1.

there were a policy objective to close a specific number of refineries. On the contrary, unwarranted tightening of specifications could unnecessarily force closure of refineries that would otherwise invest in cleaner fuels and be internationally competitive.

4. Standards should recognise outcomes of the Fuel Quality Review and adopt Scenario 3 as the correct policy approach

The new environmental fuel standards should be consistent with the findings of the Fuel Quality Review (FQR)[2]. In particular, the FQR shows some changes in fuel parameters have little or no environmental benefit and arbitrary changes in these standards therefore should be avoided.

In particular, Caltex notes that FQR Scenario 3 delivers virtually the same air quality benefits as Scenarios 4 to 6 but substantially reduces refining costs and results in a considerable reduction in refinery greenhouse gas emissions relative to theses scenarios. Scenario 3 is the most attractive from a cost benefit viewpoint and should be adopted by the Government as the correct policy approach to regulation of fuel quality.

The increased refinery greenhouse gas emissions of 500kt CO_2 equivalent per year in Scenarios 4 to 6 relative to Scenario 3 are significant in the context of Australia's need to reduce emissions to meet its Kyoto Protocol commitments.

5. Timing of new fuel specifications should not precede ADRs

Caltex believes mandatory fuel standards should not precede the timing of equivalent vehicle emission ADRs. In particular, Caltex does not support introduction of Euro 4 petrol and diesel from 1.1.05, 350ppm sulfur diesel from 1.1.02 or an interim 2002 standard incorporating arbitrary changes to other fuel parameters.

Further, Caltex does not agree that reformulated fuel needs to be available 6-12 months ahead of vehicle ADRs to enable vehicle manufacturers "to have confidence that the appropriate fuel is available". Oil companies can guarantee from extensive experience that the required fuel will be available from the date on which an ADR is mandated.

It could be argued by car manufacturers that new models to comply with the ADRs will need to enter the market ahead of the ADR date because of logistical difficulties. However, Caltex believes this is an issue for the car industry to manage and does not accept that fuel specification timing needs to be brought forward relative to the MBE to provide greater flexibility for vehicle ADR compliance.

[2] The Downstream Petroleum Products Action Agenda (Recommendation 6) states:

> The Government and the industry will continue to support the work of the Fuel Quality Review, and will use its findings and recommendations to guide the development of fuel and emission standards and the implementation of those standards which have not yet been decided.

Table 1

Caltex Recommended Specifications and Timing

Fuel	Parameter	Units	Year *	Caltex Recommendation	Paper 2 Recommendation
Petrol	Octane	RON/MON	2001 2001 2002 2002 2002	91/81 ULP RON/MON 95/85 PULP RON/MON	- - 91 ULP RON 95 PULP RON sensitivity 10 max
Petrol	Summer RVP	kPa	2001 2002 2005 2008	- no change 65 max✞ no change	- 67 max 62 max 58 max
Petrol	Distillation FBP	deg C	2001 2005	228 max 215 max	- 210 max
Petrol	Drivability Index	DI	2001	565 max	- 570 max unspecified time
Petrol	Olefins	%	2002 2005	- 18% max	18% max 16% max
Petrol	Aromatics	%	2002 2005 2008	- 48% max no change	45% max 42% max 38% max
Petrol	Benzene	%	2001 2002 2005	5% max no change 2% max	- 3% max 2% max
Petrol	Sulfur	ppm	2002 2005 2008	- 150 max 50 max	150 max 50 max 30 max
Petrol	Lead	g/L	2002 2005	0.013 max 0.005 max	0.013 max Nil
Petrol	Oxygen	mass %	2001 2002	2.7% max or 10% ethanol	- 2.7 max
Diesel	Sulfur	ppm	2002 2003 2005 2006 2008	- 500 ppm max no change 50 ppm max no change	500 ppm max no change 50 ppm max no change 30 ppm max
Diesel	Cetane		2001 2002 2006	46 min no change no change	- 47 50 min
Diesel	Density		2001 2002 2006	820-860 no change 820 – 845	- 820 – 850 820 – 845
Diesel	Distillation T95	deg C	2001 2002 2006	370 max no change 360 max	- 360 max 350 max
Diesel	PAH	%	2006	11 max	11 max
Diesel	Ash & Susp. solids	%	2001 2002	0.01 max	- 0.01 max
Diesel	Viscosity	cSt	2001 2002	2.0-5.0	- 2.0-5.0
Diesel	Cloud/CFPP /Flash		2001	AS3570	-

* all dates are 1 January

✞ default value in absence of State regulation

Part A

Overarching issues

A.1. Caltex supports cleaner fuels

Caltex supports moves to cleaner fuels to help meet greenhouse gas emissions and air quality objectives. We support the general principles set out in Section 3.1 of Discussion Paper 2 as guidance for the determination of fuel specifications (see box below).

General principles

1. Fuel standards should be compatible with relevant international or internationally accepted standards in order not to impede competition and trade.

2. Fuel standards are intended to be mandated and implemented on a national basis. In particular, fuel standards that are technology enabling must apply nationally. Local environmental circumstances may, however, dictate variation within the national standard to achieve environmental outcomes. Consideration will be given to State by State establishment of fuel standards that address airshed specific environmental conditions, however, in such cases, a national standard will be determined as a default.

3. Fuel standards will apply to, and be enforced equally in respect of, imports as well as domestically produced petroleum fuels. Fuel standards must not impede competition, either between Australian refiners, or with imported refined product.

4. Fuel standards that directly address environmental or health issues will be determined on the basis of Australian-specific requirements. In such instances, harmonisation with European specifications may be neither necessary nor desirable.

5. The timetable for the introduction of new fuel standards will be based on Australian requirements. Harmonisation, in terms of timing, will not be based on European or any other regional timetable, except where there is a previous policy decision to this effect or the standard is technology enabling and the need for such harmonisation is clearly demonstrated.

6. Consideration will be given to setting standards that provide, as far as possible, flexibility in terms of compliance. Flexibility provisions must not impede competition or trade; and flexibility provisions must not add significantly to legislative/regulatory complexity or implementation/enforcement costs to Government.

Caltex's proposal for cleaner fuel specifications is shown in Table 1 and is consistent with the above principles.

A.2. Standards should be national, not State-based

Caltex supports national standards for the mandating and implementation of fuel standards. We support the principle that fuel standards that are technology enabling must apply nationally but local environmental circumstances may justify State Government variations within the national

standard to address airshed specific environmental conditions. However, such variations should have a sound environmental and economic basis.

In particular, it is necessary to set RVP standards on the basis of local environmental conditions, as ozone formation is dependent on local factors including temperature, climate, geography, VOC emissions and NOx emissions from transport and industry. It makes no sense to mandate national standards for RVP except as a compilation of standards established by State jurisdictions. Development of such RVP standards is part of each State's actions to achieve standards for ozone that meet the ambient air quality NEPM.

Caltex does not support State regulatory models that are inconsistent with the national approach, such as the complex model approach proposed by the South Australian Government, or mandated acceleration of the timing of national standards on a State basis through State regulation. A potential problem with such inconsistent approaches is they may act as a restraint or distortion on trade by favouring certain refineries over others.

A.3. Proposals for standards are not cost-effective and threaten refinery viability

The determination of fuel quality standards should take into account both economic considerations, including the impact of cleaner fuels investment on the viability of Australian petroleum refining, and environmental considerations. The policy objective should be to achieve substantial environmental gain at reasonable cost i.e. standards should be cost-effective.

The proposed values for several fuel quality parameters would result in little environmental gain but require additional investment of hundreds of millions of dollars in Australia's refineries. An additional impost of this magnitude would greatly reduce the probability of investment to produce cleaner fuels in Australia.

Paper 2 makes proposals on some specifications that Paper 1 argues have no significant impact on emissions, for example, olefins and aromatics. In addition, Paper 2 suggests some specifications for 2002 for which neither the benefit/cost nor cost-effectiveness have been evaluated.

Further, Paper 2 appears to rely on the observation in Paper 1 that the additional costs to achieve 30ppm sulfur gasoline and diesel will be small[3]. This statement may be true relative to the 50 ppm sulfur level and timing of Scenario 4 but is not true relative to Scenario 3, the most cost effective scenario. This is because the flexibility of Scenario 3 specifications allows a different structure and timing of investment from Scenario 4.

Caltex is particularly concerned at the potential cost impact of proposals for

- acceleration of timing of 50ppm sulfur in gasoline and diesel to 1.1.2005
- 30ppm sulfur in gasoline and diesel from 1.1.2008
- olefins limit of 16% from 1.1.2005
- aromatics limit of 38% from 1.1.2008 or 2010
- interim 2002 standard, including 350ppm sulfur diesel
- 95 RON gasoline *if* this were to apply to the whole pool in 2005 (for example, through introduction of an excise differential for 95 and 91 RON that induced a widespread change in consumer behaviour).

[3] Discussion Paper 1, page 96. Scenario 6 examines the effects of 30 ppm sulfur in gasoline and diesel.

These concerns are discussed in detail in Part C.

A.4. *Measures for a Better Environment* specifications and timing should be retained

The new fuel standards in *Measures for a Better Environment* (MBE) should be implemented at the values and on the dates set out in MBE. These standards were established by the Government as an appropriate balance of industry and environmental concerns. Caltex accepts that MBE establishes the rules for refinery investment in cleaner fuels.

Caltex does not support the view that further tightening of standards relative to MBE would be an appropriate way to encourage refinery rationalisation. This view would only have merit if there were a policy objective to close a specific number of refineries. On the contrary, unwarranted tightening of specifications could unnecessarily force closure of refineries that would otherwise invest in cleaner fuels and be internationally competitive.

Accordingly, Caltex does not support any interim tightening of fuel standards relative to MBE timing. However, Caltex is not opposed to voluntary early action by individual companies to supply cleaner fuels if these have commercial and environmental benefits. As a general principle, such action could be encouraged by government by means of financial incentives which relate to the environmental benefit attainable through voluntary early action.

A.5. Standards should recognise outcomes of Fuel Quality Review and adopt Scenario 3 as the correct policy approach

The Downstream Petroleum Products Action Agenda (Recommendation 6) states

> The Government and the industry will continue to support the work of the Fuel Quality Review, and will use its findings and recommendations to guide the development of fuel and emission standards and the implementation of those standards which have not yet been decided.

The new environmental fuel standards should be consistent with the findings of the Fuel Quality Review (FQR). In particular, the FQR shows that some changes in fuel parameters have little or no environmental benefit and arbitrary changes in these standards should therefore be avoided.

In particular, Caltex notes that FQR Scenario 3 delivers virtually the same air quality benefits as Scenarios 4 to 6 but substantially reduces refining costs and results in a considerable reduction in refinery greenhouse gas emissions relative to theses scenarios. Scenario 3 is the most attractive from a cost benefit viewpoint and should be adopted by the Government as the correct policy approach to regulation of fuel quality.

The increased refinery greenhouse gas emissions of 500kt CO_2 equivalent per year in Scenarios 4 to 6 relative to Scenario 3 are significant in the context of Australia's need to reduce emissions to meet its Kyoto Protocol commitments.

Caltex understands that measures are being advocated by the automotive industry to encourage early replacement of 91 RON petrol with 95 RON. If the whole gasoline pool were to change to 95 RON from 2005 (for example, as a result of changes to the petrol excise relativity for 95 and 91 RON petrol), Australia's greenhouse gas emissions would increase by a *further* 400kt in

2010. This is a result of increased refinery emissions from the more intensive processing required for 95 RON without any improvement in the fuel efficiency of the pre-2005 vehicle fleet.

While Scenario 3 should be adopted as the correct approach to future fuel specification, Caltex recognises the conclusion of Paper 1 that reduction in petrol benzene significantly reduces vehicle emissions. Discussion Paper 2 notes that ambient exposures in major metropolitan areas are likely to be well below 5 ppb for most people and there will be substantial emission reductions in benzene over time. Nevertheless, a reduction in benzene content to 2 per cent would reduce vehicle emissions and could be attained with modest investment. Reduction of benzene content below 2 per cent would incur substantial costs. On this basis, regulation of benzene content at a maximum of 2 per cent is proposed by Paper 2. Given the diminishing benefits of reductions in benzene content below 2 per cent, these should occur when investment for increased octane requirement is likely, in the 2008-10 timeframe.

A.6. Standards should provide investment certainty

Investments to produce cleaner fuels will be large and it is essential that standards, once established, not be changed. It would be unacceptable for future standards to be set this year only to find the Government considering further changes soon afterwards. For example, if a standard were set for 50 ppm sulfur diesel to apply from 2006 (per the MBE) and this standard was intended to apply for many years after that date, it would be unacceptable for the Government next year to consider a 30 ppm standard for 2008.

As discussed above, the investment implications (in terms of both hardware and cost) for 30 ppm sulfur diesel could be quite different from 50 ppm sulfur diesel and it is incorrect to assume there is only incremental investment in tightening the standard relative to FQR Scenario 3. In general, if changes to standards are made after investment is under way, it risks the new investment being "stranded" and made uneconomic.

Caltex suggests that reductions in major fuel quality parameter values should occur at intervals of no less than 5 years.

A.7. An operability/environmental standard should be legislated by 1.1.2001

The current Australian Standard on fuel concentrates on vehicle operability although it does contain some "environmental" parameters. Interest in a mandatory national fuel standard has increased following fuel substitution problems that are considered by government and industry to require changes to both excise arrangements and fuel quality regulation. Overlaid on this fuel specification base is the requirement for regulation of future fuel quality to meet environmental objectives, which is the subject of the discussion papers.

"Operability" fuel parameters could be determined independently of government. The AIP and the Australian Automobile Association (AAA) are currently developing an "operability" standard. However, operability and environmental parameters can not necessarily be separated as operability will affect vehicle performance, hence emissions. Therefore, for pragmatic reasons, Caltex supports a single standard that combines both operability and environmental parameters.

Caltex would like to see such a standard in place by 1.1.2001. It would conform to Euro 2, except for diesel sulfur, as some Australian refineries are not capable of manufacturing 500 ppm sulfur diesel by this date.

The standard would incorporate the future specification parameters resulting from the current review and would be updated over time. Caltex's support for a combined operability/ environmental standard is conditional on a satisfactory process being established to allow it to be updated. Caltex believes this should be a new process, which includes consultation with oil refiners and marketers. Changes to regulation should be approved jointly by industry and environment Ministers or, if a Cabinet submission is required, presented to Cabinet jointly by those Ministers.

It will be important for the standard to be commercially relevant so that, while specifying a necessary minimum set of parameters, it does not inhibit product innovation, including blending of proprietary additives.

A.8. Timing of new fuel specifications should not precede ADRs

Caltex believes mandatory fuel standards should not precede the timing of equivalent vehicle emission ADRs. In particular, Caltex does not support introduction of Euro 4 petrol and diesel from 1.1.05, 350ppm sulfur diesel from 1.1.02 or an interim 2002 standard incorporating arbitrary changes to other fuel parameters. The potential for a few imported vehicles exceeding Australian ADRs to be on Australian roads prior to ADR implementation dates is not sufficient reason for oil companies to be required by fuel standards to supply this limited market, considering that these vehicles will not be damaged by the available fuels.

Further, Caltex does not agree that reformulated fuel needs to be available 6-12 months ahead of vehicle ADRs to enable vehicle manufacturers "to have confidence that the appropriate fuel is available", as suggested on p13 of Discussion Paper 2. Oil companies can guarantee from extensive experience that the required fuel will be available from the date on which an ADR is mandated.

It could be argued by car manufacturers that new models to comply with the ADRs will need to enter the market ahead of the ADR date because of logistical difficulties. However, Caltex believes this is an issue for the car industry to manage and does not accept that fuel specification timing needs to be brought forward relative to the MBE to provide greater flexibility for vehicle ADR compliance.

Caltex also is most concerned that acceleration of 50 ppm diesel sulfur timing could lead to loss of the diesel excise differential for that period. We believe the excise differential will flow at least partially to refiners to create a market incentive for early introduction of ULSD. Loss of the differential for all or part of 2005 would reduce the attractiveness of early refinery investment in Australia.

A.9. Timing of specification changes should match major investment timing

The interim, arbitrary tightening of fuel specifications suggested in Discussion Paper 2 for 1.1.2002 would require smaller, non cost effective changes in fuel quality compared with an approach that allows improvements in fuel quality to be aligned with the major investment that will need to occur to produce 50ppm sulfur fuels. In addition, the means by which refiners

upgrade equipment to meet new fuel standards, including the sequencing of equipment upgrades, may dictate feasible timing for improvements in fuel standards.

Moreover, the proposal has not been subject to any study. There is an implicit assumption that the 2002 changes would be relatively easy to achieve but this is not the case. The changes are not on the optimal investment path, which focuses on an integrated approach to 2005/08 specifications; they are not easily achieved; and do not benefit the environment, as the Discussion Paper recognises. Even if some of the changes did not require investment, they would be likely to increase operating costs or reduce operational flexibility. This is particularly true of the proposals for 150 ppm sulfur petrol and 350 ppm sulfur diesel from 1.1.2002.

A.10. Likely ban on MTBE makes emission standards more difficult to achieve

European fuel specifications (which Discussion Paper 2 has drawn on for guidance) were developed assuming the use of MTBE as an octane enhancer and diluent of sulfur, benzene, aromatics and olefins. European fuel quality standards assume significant use of MTBE (up to 15%). If MTBE is banned in Australia [3](as is occurring in the US), the impact of this on the ability to achieve particular specifications, particularly aromatics, olefins and octane, must be recognised. It is not valid to take parameter values for 'Euro' fuel standards **with** MTBE and apply them to an Australian fuel standard **without** MTBE.

Table 2, "Impact of MTBE on selected petrol parameters" (p 34) shows the extent to which parameter values would have to be revised to take account of not allowing MTBE.

A.11. Pool averaging is appropriate for parameters that are not technology-enabling

Pooling and averaging for many fuel parameters provides flexibility to refiners and importers which is translated into lower costs, smaller investment, and increased certainty of supply. These benefits are delivered without compromising vehicle efficiency or air quality. This issue is discussed further in Part D.

[3] MTBE is banned in WA and Queensland.

Part B

Responses to issues raised in Paper 1, relative to Paper 2 recommendations

Fuel Quality Review

B.1. Key Fuel Quality Review findings

The Fuel Quality Review (FQR) provided an objective framework for considering how fuel standards and vehicle technologies could jointly improve environmental outcomes for Australia on a refinery to exhaust pipe basis. Caltex welcomed this approach as it engaged all the relevant stakeholders and showed how the optimal environmental and industry policy outcome could be achieved.

Key findings from the FQR were:

1. In all instances the fuel standards embodied in Scenario 3 delivered significant environmental benefits over the business as usual Scenario 1.

2. With the exception of benzene, making fuel standards more stringent than Scenario 3 would deliver no significant improvement in vehicle emissions but increase refinery capital and operating costs and increase refinery greenhouse gas emissions.

Caltex is concerned the Government, through Discussion Paper 2, and some stakeholders in the FQR process. are proposing more stringent standards than FQR Scenario 3.

B.2. Implications of setting fuel standards more stringent than Scenario3

As the FQR makes clear, mandating more stringent standards than Scenario 3 would create unnecessary costs without significant environmental benefit. More stringent specifications would result in:

- increased probability of Australian refinery closures;
- increased fuel prices to consumers;
- in the event of increased Australian refinery closures, greater difficulty in obtaining supply of product meeting Australian specification; and
- increased refinery greenhouse gas emissions.

These outcomes are discussed in the following sections.

B.2.1. Increased probability of refinery closure

The eight Australian oil refineries are significant contributors to the national economy through the manufacturing of crude oil into finished fuels and speciality and petrochemical products. The Downstream Petroleum Products Action Agenda states that Australian refineries contribute 0.8% of GDP and directly employ over 3000 people. These refineries provide a high degree of energy security to Australia and, unlike other refineries in the Asian region, are focussed fully on meeting Australian fuel standards and seasonal requirements.

Australian and Asian refineries have been operating under conditions of low profitability for some years. The construction of excess refining capacity in Asia over the past 3 years makes a rapid return to stronger profitability unlikely.

B.2.2. Increased prices to consumers

New fuel standards will increase refining costs. From the FQR, the incremental cost of going from Scenario 3 to Scenario 4 is A$150M in capital and A$80M p.a. in operating costs, which would add up to 0.9 cpl to the cost of locally produced product if mandated. Scenario 6 would result in even higher costs.

The recent tightening of gasoline specifications in the United States has resulted in price increases of 10cpl and serves as a warning as to the possible implications of adopting onerous fuel quality specifications, particularly on petrol where capability for producing large volumes of high quality petrol in the Asia Pacific region is extremely limited.

B.2.3. Greater difficulty in obtaining supply

If all Australian refineries were to remain open, only small import volumes would be required and as a consequence no supply issues would result. If Australian refineries close, significant supply issues arise.

South East and East Asian refiners will be able to produce to Euro 4 diesel sulfur levels but ready availability of Euro 4 cetane could be an issue, particularly in winter when low cloud point product is required in Australia.

We believe large volumes of petrol will be more difficult to source as Asian refineries are generally dependent on MTBE for octane and would find it difficult to supply 95 octane petrol with tighter olefin, benzene and aromatic specifications in the absence of MTBE.

If supply from the South East Asian region is inadequate, product will need to be sourced from the Middle East where refineries are likely to be equipped to supply Euro 4 quality for the European market. Closure of Australian refineries would be likely to shift the supply point of the marginal barrel of petrol from SE Asia into the Middle East, so that import prices would reflect Middle Eastern prices. This shift could add a further 1 to 2 cpl to the cost of product in Australia due to increased freight and working capital costs.

B.2.4. Increased refinery greenhouse gas emissions

The FQR shows that going beyond Scenario 3 would fail to provide significant reductions in air pollution from vehicles, with the exception of benzene. However, it would generate a substantial increase in refinery greenhouse gas emissions without any offsetting reduction in greenhouse gas emissions from vehicles. The only relevant parameters for greenhouse gas emissions for vehicles are sulfur and, to a much lesser extent, octane specification

The reductions in greenhouse emissions from the Australian road transport fleet achieved by increasing fuel standards from Scenario 3 to 4 are negligible.

Emissions from the 2010 Australian road transport fleet (ktpa)[4]

	CO_2	CH_4	N_2O	NO_X	CO	NMVOC	SO_2	Total[5]
Scenario 3	71400	17.7	6.8	226.9	1823.4	353.8	1.9	73880
Scenario 4	71400	17.4	6.8	226.7	1798.0	348.3	1.9	73870
Reduction	0	0.3	0	0.2	25.4	4.5	0	10
%	0	1.9%	0	0.1%	1.4%	1.3%	0	0.01%

The FQR shows that refinery GHG emissions increase by 500 kt pa between Scenarios 3 and 4 while the associated reduction in road transport fleet GHG emissions is about 10 ktpa, an overall increase of 490 ktpa.

Given the Government's objective of a 15 per cent reduction in average new car fuel consumption relative to trend by 2010, it is likely that fuel-efficient Euro 4 petrol engines will be introduced by local manufacturers in 2008-10. If Australia mandated petrol to Euro 4 standard prior to 2008, no vehicles (with the exception of some imports) could benefit but refinery emissions would increase.

[4] *Review of fuel quality requirements for Australian Transport, Volume 2,* Tables 6-53 and 6-62

[5] Total greenhouse gas emissions from each scenario were calculated using global warming potentials for CO_2, CH_4 and N_2O and are expressed as kt p.a. of carbon dioxide equivalent.

Proposal by automotive industry to equate prices of 95 and 91 RON gasoline in 2005

B.3. Background

The automotive industry has proposed the Government should act to equate the prices of 95 and 91 RON petrol from 2005 by introducing an excise differential between the two grades. The practical effect of such a proposal would be to switch the entire gasoline pool to 95 RON as motorists would always choose what they perceived to be "superior" 95 RON petrol.

While this is not an issue considered by the FQR or a proposal in Discussion Paper 2, Caltex is responding to it as we believe it is a very important issue with ramifications as serious as those associated with the most stringent Scenario 6.

Caltex understands the rationale of the automotive industry to be as follows.

1. To help meet the Government mandated fleet efficiency target for 2010, Australian vehicle manufacturers are looking at providing vehicles requiring 95 RON petrol from 2005. These vehicles are said to be 2% more efficient than equivalent vehicles designed to operate on 91 RON petrol.

2. The requirement that these vehicles use more expensive (by possibly 4 cents per litre) 95 RON petrol will cause buyer resistance and therefore vehicles may not sell as well as other makes which use 91 RON petrol. In additional, there is a significant cost in designing and manufacturing new high compression engines.

3. If buyers do buy the 95 RON vehicles, they will be tempted to misfuel the vehicles with 91 RON. The engine management systems on the new vehicles will be capable of adjusting the timing of the engine to avoid knocking but performance may suffer, leading to warranty claims.

4. If 91 and 95 RON gasoline were priced at the same level (or if only 95 RON were available), these problems would be solved.

B.4. Implications of proposal

Caltex is supportive of Government initiatives to promote vehicle efficiency. However, Caltex is very concerned that the proposal to eliminate 91 RON petrol and mandate 95 RON as a minimum octane in 2005 would be detrimental to the consumer, to refineries and to the environment.

- Detrimental to the consumer - the cost of supplying 95 octane is significant given the higher cost of processing required. To mandate a product greater than the needs of a vehicle is asking consumers to pay more for their fuel than necessary. In 2005, over 70% of consumers will own and drive vehicles for which 95RON petrol is of no benefit. If the price premium for 95 RON were 4 cents per litre, the Government and vehicle manufacturers would be requiring those consumers to pay approximately $500 million per year more for fuel than necessary.

- Detrimental to refining – this new scenario of all petrol at 95 RON from 2005 was not studied in the FQR so no estimates of feasibility or cost have been made on a national

basis. Caltex has made its own estimates based on data provided in the FQR and concludes that to produce the required octane all the catalytic reformers in all the Australian refineries would need to increase operating octane by almost 5 RON numbers. This is not feasible and the result would be a shortage of petrol requiring significant imports until additional processing plant was constructed. The cost to the economy would be through additional product imports and additional operating costs in refineries producing a product that provided no benefit to most cars. In addition, the cost to refiners would increase the probability of closures, which could be avoided with a more sensible and environmentally effective policy.

- Detrimental to the environment – to produce this additional octane through catalytic reforming and other processes would increase greenhouse gas emissions from refineries by approximately 600 kt pa in 2005 and 400 kt pa in 2010. This is a result of the additional processing required to make high octane petrol, which requires more crude oil and energy to produce a given volume of petrol. The efficiency gain for a tuned 95 RON vehicle over an equivalent 91 RON vehicle is about 2%. Even if 50% of owners of 95 RON vehicles misfuelled their new vehicles with 91 RON, the increased fleet emissions due to loss of efficiency would be less than 200kt p.a. compared with increased refinery emissions of 600 kt p.a. for production of 95 RON petrol.

Caltex believes that this proposal must not be adopted. Other markets do not proscribe the use of lower octane gasoline in this way, with both Europe and the USA allowing a range of octanes in the market place at differing prices. Consumers decide on their octane of choice based on their motoring habits, vehicle technology and price of fuel. For new car buyers, it is unlikely that an additional 4 cpl is a determinant of vehicle choice unless the buyer feels that the efficiency, performance and other values associated with the use of a higher octane fuel is worth less than $80 p.a.[6]

It also seems unlikely that a consumer would purchase a new car at very substantial cost then deliberately degrade the performance of the car by misfuelling. In addition, we assume that new car handbooks would insist on use of the correct fuel and any warranty complaints arising from misfuelling would not be accepted by the manufacturer.

[6] Based on 2000 litres per year fuel consumption

PART C

Responses to issues raised in Paper 2

In responding to issues raised in the papers, we have identified the issue and presented it in a text box and then presented a Caltex response to the issue. The issues are presented in the same order as they appear in the discussion papers. Many of Caltex's arguments on specific issues relate to common points that are discussed in Part A.

C.1. General principles and policies

> 3.1 General Principles (p8)
>
> The position adopted by the Commonwealth in this paper is that the national fuel standards should concentrate principally on the management of 'environmental' fuel properties.
>
> It has been argued, however, that there are:
> a) advantages to having all standards which relate to fuel quality addressed in a single instrument; and
> b) that to a larger extent 'environmental' and 'operability' fuel parameters are synonymous (particularly in the case of petrol vehicles), as proper engine function is fundamental to maintaining vehicle emissions performance.
>
> Stakeholder views on this issue are requested.

Caltex Response

Caltex recommends the adoption of a national fuel standard for both operability and environmental parameters by 1.1.2001.

The current Australian Standard on fuel concentrates on vehicle operability although it does contain some "environmental" parameters. Interest in a mandatory national fuel standard has increased following fuel substitution problems that are considered by government and industry to require changes to both excise arrangements and fuel quality regulation. Overlaid on this fuel specification base is the requirement for regulation of future fuel quality to meet environmental objectives, which is the subject of the discussion papers.

"Operability" fuel parameters could be determined independently of government and AIP and AAA are currently developing an "operability" standard. However, operability and environmental parameters can not necessarily be separated as operability will affect vehicle performance, and hence emissions. Therefore, for pragmatic reasons, Caltex supports a single standard that combines both operability and environmental parameters.

Caltex would like to see such a standard in place by 1.1.2001. It would conform to Euro 2, except for diesel sulfur, as some Australian refineries are not capable of manufacturing 500 ppm sulfur diesel by this date.

The standard would incorporate the future specifications resulting from the current review and would be updated over time. Caltex's support for a combined operability/environmental standard is conditional on a satisfactory process being established to allow it to be updated. Caltex believes this should be a new process, which includes full consultation with oil refiners and marketers. Changes to regulation should be approved jointly by industry and environment Ministers or, if a Cabinet submission is required, presented to Cabinet jointly by those Ministers.

It will be important for the standard to be commercially relevant so that, while specifying a necessary minimum set of parameters, it does not inhibit product innovation, including blending of proprietary additives.

C.2. Early provision of reformulated fuel

> 4.1.3 Early provision of reformulated fuel (p13)
>
> Stakeholder views on the proposed timetable for the introduction of mandatory fuel specifications for diesel and petrol over the period 2002 - 2010 as requested.
>
> Particular attention should be given to the issue of ensuring the availability of fuel of appropriate quality (with controls on these fuel parameters that are critical to ensuring compliance with the new emission standards) well before new ADRs come into effect.
>
> For instance, should key technology enabling fuel parameters (such as sulfur content in diesel and petrol) be mandated 6-12 months before the ADRs come into effect (and other fuel quality changes are mandated)?

Caltex Response

Caltex has presented its complete proposal for all petrol and diesel specifications in Table 1 of the Executive Summary. Our recommendations differ from those presented in the paper for the following reasons:

- new fuel standards in Measures for a Better Environment (MBE) should be implemented at the values and on the dates set out in the MBE. Section A.4. provides the reasoning behind this position;
- introduction of new fuel specifications should not precede the ADRs, as discussed in Section A.8; and
- timing of specification changes should match major investment timing, as discussed in Section A.9.

C.3. Environmental fuel additives

5.3 Environmental Fuel Additives (p22/23)
"It is proposed that additive use will be prohibited unless written approval has been granted by the Minister."

Caltex Response

Caltex assumes that this refers to after-market additives, in which case we support the measure. However, Caltex would oppose any such approval process for refinery or terminal additives such as anti-oxidants, dyes or detergents. The proposed approval process would have no useful application in this regard.

If however, an additive is actually a blendstock such as rapeseed methyl ester in diesel, then Caltex would support an approval process for these components in order to avoid unintended environmental consequences such as those which occurred with MTBE in ground water in the US.

Caltex would expect the opportunity to participate in the consultative process. Administration issues that need to be considered include transitioning for additives currently in use, cetane improver additives, and policing, including for imported products.

C.4. Diesel sulfur

5.4.6 Key Issues and Recommendations (p30)

It is recommended that:

- diesel sulfur levels be established as maximum limits, as below:
  - 500ppm by 1 January 2002;
  - 50ppm by 1 January 2005/6; and
  - *30ppm by 1 January 2008 - indicative only.*

Caltex Response

1. 500 ppm by 1/1/2002

Caltex accepts 500 ppm but objects to the bringing forward of MBE specifications as explained in Section A.4.

2. 50 ppm by 1.1.2005/06

Caltex accepts 50 ppm sulfur diesel in 2006 but objects to 2005 on the basis of insufficient lead time for investment, impact on the early action incentive, and inconsistency with MBE timing.

3. 30 ppm by 1/1/2008

Caltex objects to implementing even tighter specifications on a nominated future date when the need and benefits have not been demonstrated. Some refiners may be able to meet the 50 ppm specification by revamping existing equipment. However, costs to others may be considerable if the 50 ppm level has been met by extending processing capacity to its limit and new plant is then necessary to reduce this specification to 30 ppm.

The reduction to 30 ppm can only be justified on the basis that it enables emerging vehicle technology as the absolute reduction in emissions from a given technology would be minimal. Before such a change could be mandated, the following must occur:

- the need for 30 ppm sulfur needs to be established, recognising that the future engine and emission control technologies that could require such a specification are quite uncertain e.g. sulfur tolerance of catalysts and particle traps;

- refining and supply implications and costs need to be evaluated and the benefits and costs assessed; and

- vehicle manufacturers and importers must indicate when the new technology will be implemented across the new vehicle fleet.

5.4.6 Key Issues and Recommendations (p31)

Shareholders are specifically requested to provide comment on:

a) the need/desirability of a 350 ppm sulfur standard to support Euro 3 vehicles from 2002;

b) the desirability of mandating key technology enabling fuel parameters (such as sulfur levels) well before the associated ADRs are gazetted (and therefore before other fuel quality parameters);

c) the proposal to move to even lower sulfur levels than those identified in the Euro specifications (i.e. 30pp by 2008); and

d) whether or not specifications concerning lubricity should also be considered on a national basis.

Caltex Response

1. 350 ppm sulfur

Caltex objects to the proposal as the environmental benefit of reducing sulfur content of diesel from 500 ppm to 350 ppm would be small and it is inconsistent with FQR Scenario 3. Moreover, it is unlikely that most Australian refiners could produce to this specification without major investment in new plant, which could not be in operation until well after 2002.

2. Mandate technology enablers well before ADR gazetted

Caltex objects to this proposal, as discussed in Section A.8.

3. Move to lower sulfur levels (30 ppm) by 2008

This issue was discussed above.

4. National lubricity specification

Caltex agrees with the need for a lubricity requirement. There is currently a great deal of overseas interest in developing a new lubricity test (Ball on Three Discs) as the current tests, High Frequency Reciprocating Rig (HFRR) and Scuffing Load Ball on Cylinder Lubricity Evaluator (SLBOCLE), have repeatability problems and are not seen as good indicators of performance in the field.

It is recommended that an industry committee investigate lubricity options and that an appropriate lubricity requirement be set up in a national specification.

C.5. Diesel Cetane

5.5.6 Key Issues and Recommendations (p36)
- the cetane index of diesel fuel be at most three points lower than the cetane number;
- the cetane index of diesel fuel be established as a minimum limits, as follows:
(a) 47 by 1 January 2002 and;
(b) 50 by 1 January 2006.

Caltex Response

Cetane can be expressed as either a number or index. The index is a calculated value which by correlation is indicative of the cetane number as measured on a test engine. Traditionally, refiners have used cetane index as it is simpler to determine. In future if cetane improvers are required, the impact of the improver can only be measured on a test engine i.e. as a cetane number. Caltex proposes that the cetane requirements apply to either the cetane number or the cetane index.

1. Proposed 47 by 1.1.02

Caltex objects to the selective tightening of specifications ahead of the MBE as discussed in Part A, Section 4. Cetane will not be improved by the slightly increased severity that refiners will be using to achieve the 500 ppm sulfur level, hence refiners would be exposed to additional costs to achieve this early introduction of a tighter cetane specification. However, Caltex is supportive of the introduction of a national fuel standard as explained earlier, hence recommends the following cetane specification which can be attained without investment:

- 46 cetane (index or number) by 1.1.2001

2. Proposed 50 by 1/1/06

There are no measurable environmental benefits from increasing cetane above 46 but there are additional refinery costs and hence we do not recommend any further change below the Euro 3 number. Cetane is highly dependent on crude type and tightening the specification could adversely affect supply from Asia. Upgrading cetane by deep hydrotreating or hydrocracking is likely to require additional hydrogen production with associated greenhouse penalties.

Cetane is a parameter that is well suited to the use of averaging in setting its specification. The cetane achieved in the refinery is largely influenced by the crude source and averaging will be of great benefit to refiners who process crudes from a variety of fields.

C.6. Diesel Density

5.6.6 Key issues and recommendations (p41)
- Density levels be established as a range (minimum and maximum) as follows:
(a) 820 to 850 kg/m^3 (at 15°C) by 1 January 2002;
(b) 820 to 845 kg/ m^3 (at 15°C) by 1 January 2006.

Caltex Response

1. 820 to 850 kg/m^3 (at 15°C) by 1.1.2002

Caltex rejects the proposed maximum density of 850 in 2002 and recommends a density range of 820 to 860 be set in 2001. There are no environmental benefits in moving to the stricter Euro 4 specification before 2006.

It is important to note that the mild hydrotreating required to reduce sulfur to 500 ppm will not have a significant impact on diesel density. Hence, it is not appropriate to tighten the specification. Reducing diesel sulfur to 500 ppm will not assist in the meeting of other specs such as density. Only much deeper desulphurisation processes will deliver this quality. As part of Caltex's recommendation for a National Fuel Standard from 1.1.2001, Caltex recommends:

- 820 – 860 from 1.1.2001
- 820 to 845 kg/m^3 (at 15°C) by 1 January 2006.

Caltex accepts this specification as it is consistent with FQR Scenario 3.

Density is a parameter that is well suited to the use of averaging in setting its specification. The density achieved in the refinery is largely influenced by the crude source and averaging will be of benefit to refiners who process crudes from a variety of fields

C.7. Diesel Distillation characteristics (volatility)

5.7.6 Key issues and recommendations (p43)

- maximum distillation limits be established for T95 as follows:

  (a) 360°C by 1 January 2002;

  (b) 350°C by 1 January 2006.

Caltex Response

1. 360°C by 1.1.2002

Caltex rejects the proposal for a max T95 of 360 in 2002. As previously stated we propose adoption of the Euro 2 standard from 2001. The Euro 2 T95 standard is 370C max.

Diesel distillation is not improved in the process of reducing diesel sulfur to 500 ppm. Hence, it is not appropriate to change this specification at this stage.

As part of Caltex's recommendation for a National Fuel Standard from 1.1.2001, Caltex recommends:

- 370 C max from 1.1.2001

2. 350°C by 1 January 2006

Caltex rejects the tightening of the specification to 350 C and believes that the adopted limit should be consistent with FQR Scenario 3. Tightening to 350 C will increase the difficulty in meeting the cetane specification. Hence Caltex recommends:

- 360 C max from 1.1.2006

C.8. Polyaromatic hydrocarbons (PAHs)

5.8.6 Key issues and recommendations (p46)

- maximum limits should be established as follows:
  - *11% m/m by 1 January 2006 - indicative only.*

Caltex Response

Caltex supports the 11% level on 1.1.2006 as no evidence is presented to support any tightening of this specification.

C.9. Diesel ash and suspended solids

5.9.4 Key issues and recommendations (p47)
- the standard be set at a maximum of 0.01% (100ppm) by mass by 1 January 2002.

Caltex Response

Caltex supports max 0.01% and recommends that it be incorporated into the 1.1.001 national fuel standard.

C.10. Diesel Viscosity

5.10.4 Key issues and recommendations (p49)

- the standard be set at 2.0 to 5.0 centistokes (cSt), measured at 40°C, from 1 January 2002.

Caltex Response

Caltex supports specification range of 2 – 5 cSt and recommends that it be brought forward to 1.1.2001 as part of the national fuel standard.

We recommend that the limit be expressed in SI units i.e. 2 – 5 mm^2/s.

C.11 Other Diesel Specifications

5.11 Other Diesel Specifications (Cloud, CFPP & Flash) (p49) Stakeholders are requested to comment on the proposal of having all standards related to fuel quality addressed in a single instrument.

Caltex Response

Caltex supports the current AS3570 requirements for these parameters and recommends that these form part of the National Fuel Standard from 1.1.2001.

C.12 Petrol Octane

6.4.8 Key issues and recommendations (p62)

- petrol octane levels, as RON, be established as minimum values, as follows
  - for ULP, 91 RON from 1 January 2002; and
  - for PULP, 95 RON from 1 January 2002
- petrol octane levels, as MON, be mandated on a national level; and
- the sensitivity (between RON and MON levels) be limited to a maximum 10 points difference

Caltex Response

- Caltex supports ULP/PULP RON of 91/95
- Caltex would support ULP/PULP MON of 81/85
- Caltex opposes a specification on sensitivity. We believes that while the specified minimum octanes (RON and MON) for a particular grade should not differ by more than 10 numbers that there be no further specification on sensitivity. To do so reduces flexibility and potentially increases costs for both refiners and importers without any benefit to consumers.

Caltex recommends these octane specifications be brought forward to 1.1.2001 as part of the National Fuel Standard proposal.

Caltex objects to any move to eliminate the existing 91 RON grade of ULP or creating incentives that would switch all petrol to 95 RON from 2005. Forcing existing vehicles (which are designed for 91 RON) to use 95 RON is wasteful as these vehicles are unable to take advantage of the higher octane. Additionally, higher severity refinery operations would create higher greenhouse gas emissions. This issue is discussed in Part B.

C.13. Petrol vapour pressure

6.5.6 Key issues and recommendations (p68)
- for all grades of petrol 67 kPa by 1 January 2002;
- for all grades of petrol 62 kPa by 1 January 2005; and
- *for all grades of petrol 58 kPa by 1 January 2008/10 - indicative only.*

Caltex Response

Caltex believes that it is necessary to set RVP standards on the basis of local environmental conditions, as ozone formation is dependent on local factors including temperature, climate, geography, VOC emissions and NOx emissions from transport and industry. It makes no sense to mandate national standards for RVP except as a compilation of standards established by State jurisdictions. Development of such RVP standards is part of each State's actions to achieve ambient air quality NEPM standards for ozone.

However, if a National Standard were imposed then Caltex believes that the Euro 3 Best Endeavours specification of 65 kPa should be used as a default , as further lowering will have only marginal benefit.

Caltex notes that the narrative on p65 raises the prospect of a winter RVP specifications with Australia fitting in Euro class 3 (45 – 78 kPa). A max of 78 kPa would be more restrictive than current butane blending into gasoline and would result in restrictions on refinery operation and blending. Caltex objects to this tightening of the winter specifications. Historically we have controlled winter volatility using Flexible Volatility Index and this approach ensures customer satisfaction and should be continued.

6.5.6 Key issues and recommendations (p68)

The issue of pool averaging has been raised in relation to the management of RVP (the NSW MoU is based on pool averages). Stakeholders are asked to comment on the advantages and disadvantages of including the use of a pool average as an alternative compliance mechanism, in conjunction with the proposed flat maximum limit, for RVP.

Caltex Response

Caltex is very supportive of pooling averaging. Pooling and averaging for RVP have been used successfully in NSW for the past 2 years. These mechanisms have delivered considerable flexibility to the refinery without compromising fuel or air quality. (Part D for a more details.)

C.14. Petrol Distillation

6.6.6 Key issues and recommendations (p71)

- be established for Final Boiling Point, as follows:
  - FBP: 210°C max by 1 January 2005

Caltex Response

Caltex supports an FBP of 215 deg C max in 1.1.2005, consistent with the Euro 3 Best Endeavours as there is no identifiable environmental benefit in tightening the specification further (see Overarching Arguments item (5) for more details).

As part of Caltex's recommendation for a National Fuel Standard from 1.1.2001, Caltex recommends:

- 228 max FBP in 1.1.2001

6.6.6 Key issues and recommendations (p68)

Stakeholders are asked to comment on the advantages and disadvantages of including the use of a driveability index (DI) in the management of distillation. An index of 570 is proposed as 'beneficial and prudent'.

Caltex Response

Caltex supports the inclusion of a driveability index in the management of distillation.

Caltex supports a DI specification of 565, which is consistent with the recommendations of the engine manufacturers.

Caltex notes that AIP and FCAI have agreed to form a working group to consider appropriate DI values and we will participate in that process through AIP.

C.15. Petrol Olefins

6.7.6 Key issues and recommendations (p76)

- petrol olefin limits be established as maximum levels as follows:
  - for all grades of petrol 18% vol by 1 January 2002; and
  - for all grades of petrol 16% vol by 1 January 2005

Caltex Response

Caltex does not support any reduction beyond the Scenario 3 (Best Endeavours) level as there is no measurable improvement in 1,3 butadiene emissions compared to Scenario 4.

Caltex can accept an 18% specification in 1.1.2005.

Caltex vigorously objects to a 16% specification. This would require significant additional investment in plant and/or significant increase in operating cost. It would also result in a significant increase in refinery greenhouse emissions. Tightening the specification to 16% has a detrimental impact on the environment (via increased greenhouse emissions) and comes at considerable cost to the refiner.

Caltex depends heavily on catalytic cracking and polymerisation for over a third of our gasoline production. These processes produce high quality gasoline blend components where significant octane comes from the olefinic components. While average olefin levels across our 2 refineries are less than 16%, individual batches frequently exceed that figure. To ensure all batches are below 16% will require significant investment and additional operating and energy costs.

We note that p74 of Paper 2 states " ...An increase in olefins content from 14% to 18% was estimated to result in insignificant changes (<1%) in emissions of benzene, hydrocarbons, NOx, CO and PM."

6.7.6 Key issues and recommendations (p77)

The issue of pool averaging has been raised in relation to the management of olefins. Stakeholders are asked to comment on the advantages and disadvantaged of including the use of pool averaging as an alternative compliance mechanism, in conjunction with the proposed flat maximum limit, for olefins.

Caltex Response

Caltex is very supportive of pool averaging. Pooling and averaging for RVP have been used successfully in NSW for the past 2 years. These mechanisms have delivered considerable flexibility to the refinery without compromising fuel or air quality. (See Part D for a more details.)

C.16. Petrol Aromatics

6.8.6 Key issues and recommendations (p82)

- for all grades of petrol 45% from 1 January 2002;
- for all grades of petrol 42% from 1 January 2005; and
- *for all grades of petrol 38% from 1 January 2008/10 - indicative only*

Caltex Response

Caltex objects to tightening specifications on aromatics beyond the Euro 3 Best Endeavours level of 48% because there is no clear benefit from doing so. Increasing reformer severity is one of the few ways the refiner has available to meet increasing octane demand, particularly in the light of anticipated banning of MTBE.

Catalytic reformers provide the bulk of the aromatics in the gasoline pool, and in doing so provide byproduct hydrogen. The hydrogen is critical in allowing the refineries to increase the volume and severity of hydrodesulfurisation. If refineries move out of hydrogen balance, large capital expenditure in hydrogen manufacturing units will be required, with significant incremental greenhouse gas emissions.

Additionally, work conducted in Europe as part of the EPEFE program showed that reducing aromatics lowers NOx conversion efficiency over exhaust catalysts, leaded to increased NOx emissions.

Caltex recommends:

- for the petrol pool 48% aromatics from 1.1.2005

6.8.6 Key issues and recommendations (p82)

The issue of pool averaging has been raised in relation to the management of aromatics. Stakeholders are asked to comment on the advantages and disadvantages of including the use of pool averaging as an alternative compliance mechanism in conjunction with the proposed flat maximum limits.

Stakeholders are also asked to give attention to the issue of whether or not consideration should be given to setting specific content limits for toluene.

Caltex Response

Caltex is very supportive of pool averaging. Pooling and averaging for RVP have been used successfully in NSW for the past 2 years. These mechanisms have delivered considerable flexibility to the refinery without compromising fuel or air quality. (See Part D.)

Caltex does not support setting specific content limits for toluene, given the total aromatics content is now controlled. There is no sound reason for specifically targeting toluene. Other proposed changes e.g. driveability index will also limit the excessive inclusion of toluene.

C.17. Petrol benzene

6.9.6 Key findings and recommendations (p89)

(a) for all grades of petrol 3% by volume by 1 January 2002;
(b) for all grades of petrol 2% by volume by 1 January 2005

Caltex Response

As part of Caltex's recommendation for a National Fuel Standard from 1.1.2001, Caltex recommends a 5% specification in 1.1.2001

(a) 3% by volume by 1 January 2002

Caltex rejects this change as it is inconsistent with MBE as explained in Section A.4.

(b) 2% by volume by 1 January 2005

Caltex accepts the 2% specification in 2005. While this specification is tighter than the best endeavours limit of 2.5%, we understand the arguments for the 2% specification and therefore are prepared to accept it. However, we do not support a reduction in the specification below 2% as it would involve considerable additional investment for Caltex without commensurate benefits for the environment.

Caltex supports pooling and averaging of benzene across grades of petrol as detailed in Paper 3.

C.18. Petrol sulfur

6.10.6 Key issues and recommendations (p94)

- for all grades of petrol, 150ppm by 1 January 2002;
- for all grades of petrol, 50ppm by 1 January 2005/6;
- *for all grades of petrol, 30ppm by 1 January 2008 – indicative only.*

Caltex Response

- Caltex supports the 150 ppm sulfur level for Euro 3 gasoline in 2005.
- Caltex objects to the introduction of 150 ppm sulfur in 2002 based on minimal benefit – this would significantly affect refiner flexibility and there is insufficient lead time for investment if it was required. We object to the selective bringing forward of some Euro 3 specifications.
- Caltex supports timely implementation of Euro 4 gasoline sulfur (assumed to be 50 ppm in 2008/10)
- Caltex vigorously objects to the mandating of 50 ppm in 2005/6. This would necessitate Caltex investing in additional plant which would operate for only 1 or 2 years when a later implementation (2008+) could allow reuse of redundant diesel hydrotreating plant.
- Caltex objects to the proposal to tighten gasoline sulfur further than Euro 4 as there is no clear need or benefit from doing this at this time. We believe that the issue of further sulfur reduction should be reviewed when it is required as an enabler for the reduction of new technology. We would estimate that this may be in the 2010 to 2012 timeframe.

6.10.6 Key issues and recommendations (p94)

Stakeholders are specifically requested to provide comments on:

(a) the desirability of mandating key technology enabling fuel parameters (such as sulfur levels) well before the associated ADRs are gazetted (and therefore before other fuel quality parameters); and

(b) the proposal to move to even lower sulfur levels than those identified in the Euro specifications (ie 30ppm by 2008)

Caltex Response

Caltex objects to the early mandating of key technology enabling fuel parameters well before the associated ADRs as explained in Section A.8. Caltex objects to the move to even lower sulfur levels (i.e. 30 ppm) because there is no clear need or benefit delivered by such a change. With Euro 4 specifications (50 ppm sulfur) only coming into play in 2008/10 it is premature to speculate about the merits of 30 ppm sulfur gasoline.

C.19. Petrol lead

6.11.6 Key issues and recommendations (p98)

- for all grades of petrol, 0.013g/l from 1 January 2002;
- for all grades of petrol, 0g/l by 1 January 2005*

* at or below the detection limit of the test method used.

Caltex Response

- Caltex supports 0.013 g/l for all grades from 1.1.02, when leaded petrol will no longer be permitted to be sold.
- Caltex supports at or below detection limit by 1.1.05. This should be 5mg/l lead max in line with EU.

C.20. Oxygen content

6.12.7 Key Issues and Recommendations (p104)

(a) The oxygen content of petrol be mandated on a national basis
(b) Petrol oxygen content be established as maximum limits, as follows:
- for all grades of petrol, 2.7% by mass by 1 January 2002;
(c) The use of oxygenates in petrol should be managed on a national basis;
(d) Those oxygenates which can be used should be clearly specified; and
(e) Oxygenates levels should be established as maximum limits by volume.

Caltex Response

a) Caltex agrees.
b) Caltex agrees with 2.7% but points out this would limit ethanol to 7% by volume and is inconsistent with our view that up to 10% ethanol should be allowed in petrol. We note that the USEPA waivers oxygen content when ethanol is used, to allow up to 10% ethanol to be blended. A similar approach is recommended in Australia to allow current ethanol blending to continue. We do not support any interim 2002 standard and would look for this limit to be included in a 2001 standard.
c) Caltex agrees.
d) Caltex agrees.
e) Caltex agrees.

Euro and US specifications were developed with the anticipation that oxygenates would be used to complement the gasoline pool. MTBE was the most widely used oxygenate due to its high octane, low volatility, and relative low cost compared to other oxygenates (although considerably more expensive than gasoline). However MTBE is currently being removed from the US gasoline pool because of concerns about ground water contamination.

Caltex is concerned that the end result of these issues will be to put considerable pressure on the refinery octane leading to the requirement for a large investment. Caltex believes that octane enhancers such as MMT are essential to assist in the meeting of the octane demand. The table below demonstrates the impact that removing MTBE has on the setting of specification. In addition to the specification level impact, there is still additional pressure on refinery plant to meet octane (due to the high octane contribution of MTBE) and the additional pressure on aromatics as the refinery attempts to meet octane via increased reformer severity.

Table 2

Impact of MTBE on Selected Petrol Parameters

	Euro 3		Euro 4	
	With 10% MTBE	Without MTBE	With 10% MTBE	Without MTBE
Olefins	18.0 max	20		
Aromatics	42.0 max	46.7 to 50 due to increased reformer severity to replace MTBE octane	35.0 max	38.9 to 40?
Benzene	1.0 max	1.1		
Sulfur	150 max	167	50 max	56

While Caltex is not arguing for less stringent sulfur requirements, it is interesting to note the impact that MTBE has on the olefin, aromatics and benzene specifications.

Caltex believes that ethanol should be allowed as a gasoline blendstock but the blended fuel should be required to meet the same RVP specification as petrol. Inclusion of 10% ethanol without offsetting changes in other fuel components would increase gasoline volatility by approximately 7kPa.

Part D

Responses to issues raised in Paper 3

Averaging and cap approach (p21) Consideration should be given to both the general approach to averaging (that is averaging over time) and the AIP's suggestion that the model be adapted to allow averaging across grades with a refinery.

Caltex Response

Caltex supports the use of flat limits for parameters that enable technology.

Caltex supports averaging over time and averaging over grades for the following parameters:

- diesel cetane and density
- petrol aromatics, olefins, benzene and RVP.

Averaging across grades of gasoline is important to refiners as aromatics content will tend to reach the maximum limit first in premium unleaded petrol (PULP), while olefins content will tend to reach the maximum limit first in ULP.

If averaging across grades is not permitted, tight limits could force refiners into non-optimal blending, resulting in additional costs that deliver no environmental benefits as the quantity of olefins and aromatics released from the fleet will not be any different.

Moreover, refiners could be forced to invest to meet a specific parameter limit e.g. olefins in ULP, only to find that as ULP volume declines over time, the specific limit can be now met and the investment becomes surplus. This approach is wasteful or resources.

Two approaches to averaging are mentioned in Paper 3:

- average limit set equal to the flat limit; with a narrow band between a specified cap and floor (as currently in use in NSW for RVP);

- average limit set lower than the flat limit, with a high cap and no floor (as used in California).

The first approach provides limited flexibility without penalty (as the average limit remains the same as the flat). The second comes at some penalty to the refiner (the average is lower than the flat limit) but provides greater flexibility (the cap is higher). Both methods deliver benefits to the refiner without compromising vehicle performance or air quality.

The burden of administering the averaging of specifications is expected to reside with the refiner/importer. This is currently the case in NSW with the summer RVP specification.

Some commentators have stated that averaging will advantage refiners over importers. Caltex does not believe this is necessarily so. When Australian gasoline specifications tighten in 2005 it will be difficult to source product to this specification in the region. Any flexibility will be beneficial to those parties seeking a cargo of gasoline. The fact that importers may have less opportunity to use averaging to their advantage is more a reflection of the smaller volumes and infrequent cargoes than any inherent disadvantage. We do not believe that differences in refining and importing should prevent refiners from achieving efficiencies solely because importers have less efficiencies available to them.

Caltex supports adoption of averaging for the parameters mentioned and will work with appropriate regulatory authorities in setting caps and averages so as to provide refinery flexibility without compromising performance or air quality.

Stakeholder Comment Box (p 22)

(a) In addition, how will the outcome of pool averaging across grades guarantee the same outcome as applying a uniform standard?

(b) Views are also sought on any potential impacts either proposal may have on competition and trade – will any sector of the market (domestic refiners and importers) be unduly advantaged or disadvantaged by the increased flexibility?

(c) Stakeholders addressing the issue are also asked to identify those parameters which they consider most amenable to the use of this model, within the context of the Government's overall environmental objectives.

Caltex Response

(a) Guaranteeing the same outcome with pool averaging

Caltex acknowledges that pool averaging must guarantee the same outcome as applying a uniform standard. We therefore accept that the cap and average for product release must be set with this goal in mind. The objective of guaranteeing the same outcome is assisted by the long chain of distribution and storage, from the refinery to pipeline and ship, terminal, depot, service station and finally customer fuel tank. The long lead time and large inventory within the chain ensures a high degree of mixing, which minimises the chance of any one batch quality ultimately being fuelled into an engine.

(b) Impacts on competition and trade

All domestic refiners and importers bringing in product in a structured and frequent manner will benefit from the increased flexibility that averaging will provide. Opportunistic traders who might only import on occasions when regional prices are low are a special case. There is a need to ensure that these one-off cargoes do not compromise the fuel quality objective. One approach to dealing with these infrequent situations would be to provide a longer time frame for averaging, and to require that the first cargo was not inferior to the flat limit.

(c) Parameters suitable for averaging

Caltex supports averaging over time and averaging over grades for the following parameters:

- diesel cetane and density
- petrol aromatics, olefins, benzene and RVP.

Diesel cetane and density values can vary substantially depending on the crude source, hence averaging will greatly assist refiners when blending finished diesel. They are not enabling parameters and in the range envisaged, only provide a marginal environmental benefit.

Petrol RVP is another parameter from which the refiner can obtain good advantage due to the large variations in butane content from crude to crude. Difficulties in managing butane in the refinery can lead to the wasteful practice of flaring, which also increases refinery greenhouse gas emissions. The NSW EPA has had an averaging and pooling mechanism in place for RVP for the past two summers which has worked extremely well and delivered better than the mandated volatility levels while at the same time providing refinery flexibility.

Petrol olefins, aromatics and benzene are key parameters for meeting petrol quality, particularly octane. Refiners will find it increasingly difficult to produce the required octane as the 95 RON component of the total pool grows and other specifications such as sulfur make octane more difficult to achieve. Catalytic reformer and Cat cracker severities are the most important variable in achieving the required octane and these are also the processes that increase olefins (from cracking) and aromatics (from reforming). When a shutdown of one of these processes occurs in a refinery, blending of finished gasoline will become very difficult unless averaging is permitted. In the worst case, the refinery could have adequate blendstock but be prevented from moving finished gasoline to the market due to inflexibility in important specifications.

Averaging across grades of gasoline is important to refiners as aromatics content will tend to reach the maximum limit first in premium unleaded petrol (PULP), while olefins content will tend to reach the maximum limit first in ULP. If averaging across grades is not permitted, tight limits could force refiners into non-optimal blending, resulting in additional costs that deliver no environmental benefits as the quantity of olefins and aromatics released from the fleet will not be any different. Moreover, refiners could be forced to invest to meet a specific parameter limit e.g. olefins in ULP, only to find that as ULP volume declines over time, the specific limit can be now met and the investment becomes surplus. This approach is wasteful or resources.