Australian Institute of Petroleum

DRAFT REGULATION IMPACT STATEMENT

Better Fuel for Cleaner Air

Ministerial Forum on Vehicle Emissions

AIP SUBMISSION

Department of Environment and Energy

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AIP Submission to the Draft Regulation Impact Statement: *Better Fuel for Cleaner Air*

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SUMMARY: KEY MESSAGES

AIP supports Option F under a 2027 timetable as it will maximise community benefits while minimising the risks of refinery closures and increased fuel prices. AIP also supports Option A which is the least cost for industry and consumers. AIP does not support Options B and C, as the minimal community and vehicle operability benefits demonstrated are outweighed by significant costs and risks, including the expected closure of Australian refineries under these two options.

- AIP welcomes the draft RIS includes Option F and incorporates much of the advice provided by AIP in its submission to the Discussion Paper.
- AIP supports Option F (a maximum of 10 ppm sulfur in petrol from 2027 with no changes to other fuel parameters and supported by a reporting regime) as it will maximise community benefits whilst minimising the risks of refinery closure and increased fuel prices. AIP also supports Option A being the least cost option to industry and consumers.
- The draft RIS confirms **Option F** best achieves these objectives and delivers a net community benefit. According to the RIS, it *"provides the most cost-effective approach"* to delivering health benefits and the lowest impact on fuel prices over the next decade.
- There are considerable additional costs and economic uncertainties which have not been included in the RIS modelling for Option B and Option C. In particular, the draft RIS does not reflect that Options B and C would not be viable for the Australian refining industry to implement and the economic impact of resulting refinery closures. Both options will be NPV negative once the correct assumptions and full costs are incorporated.
- AIP has always supported orderly transitions to tighter fuel standards where a community benefit has been demonstrated in terms of health and environmental outcomes, and where the cost impacts on refineries and consumers can be managed.
- AIP has historically been opposed to the introduction of 10ppm sulfur petrol because of the lack of operability benefits for vehicles, limited environmental benefits, and the significant cost impact on consumers, refineries, and on the community.
- AIP continues to maintain that the science does not support the need for 10ppm sulfur petrol. However, in responding to the Government's imperatives, the AIP Board in good faith proposed an introduction of 10ppm sulfur across all petrol grades by 1 July 2027 (Option F) to support effective implementation and management of significant costs associated with this change for the industry.
- The current petrol average sulfur levels in the Australian market are already well below the regulated maximum limits. AIP suggests the transition to 10 ppm sulfur by 1 July 2027 could be supported by an interim reporting regime on sulfur and aromatic levels in Australian petrol which will demonstrate these are well below regulated limits without unnecessarily impacting refinery costs and operation.
- There are two key aspects to Option F that will allow refineries to minimise cost of compliance and best support their ongoing operation: a long-term transition (implementation of 2027), and no changes to any other parameters. Any earlier implementation timeframe for the move to 10ppm sulfur or changes to other parameters will put significant pressure on Australian refinery viability.
    - The refining industry remains concerned that it would have to invest approximately $979 million to deliver just 10ppm sulfur petrol by 2027.
    - The costs to refineries will significantly increase should government choose to pursue an accelerated timeframe (eg. 2022 to 2025), because of non-optimal timing for the refineries.
    - These additional, significant costs, would threaten the economic viability of the remaining Australian refineries.
- Independent modelling has found that each Australian refinery contributes around $1 billion each year on average in economic activity to the local economy. This does not include the important indirect benefits of refineries – security of fuel supply, input sharing with other industries, innovation, technology and knowledge spillovers, and significant investment in their local communities and businesses.

AIP has identified critical flaws and omissions in the cost-benefits analysis in the draft RIS. If addressed, this would significantly widen the RIS difference between community and economic outcomes for Option F versus Options B/C, and will generate a net community cost for Option C and worsen the already negative NPV for Option B.

- AIP is concerned that the draft RIS cost-benefits analysis has several serious omissions in the analysis of Option B and Option C. Both options involve onerous and costly regulatory changes for refineries which will deliver unclear benefits and threaten refinery viability irrespective of the implementation timeframe.
- Addressing the omitted costs and shortcomings with the analysis will significantly widen the RIS difference between community and economic outcomes for Option F and Options B and C, and will generate a net community cost for Option C and worsen the already negative NPV for Option B.
- Also, it is essential that the evidence base for Option C be released for analysis as many of the claims in the supporting (unpublished) reports are contrary to the peer reviewed scientific evidence and global research provided in AIP's previous submission.
- This AIP submission identifies seven critical flaws (summarised below) in the draft RIS analysis for Options B&C which, if addressed in the final RIS, would provide a more reliable basis for government decision-making and community acceptance, which will be crucial given the significant economic, employment and consumer impacts involved with these draft RIS proposals.

(1) The RIS incorrectly assumes no refinery closures under any of the RIS Options

- This is inconsistent with AIP's advice to Government. For example, AIP has advised that all refineries would be driven to close under RIS Options with a 2022 compliance date. We strongly recommend the modelling (or at least the sensitivity analysis) reflect the lost economic benefits (average of $1billion per refinery per annum) due to closure of one/more refineries driven by the policy options.
- The risk of refinery closure under the RIS options is real. The Australian refineries are trade-exposed and have no scope to pass on cost increases to motorists if they are to remain competitive with imports. All the RIS Options (other than Option A) significantly increase refinery costs, operational complexity and emissions, but will not deliver any additional fuel to the Australian market or benefits to the refineries themselves.
- The RIS options would also significantly and unnecessarily reduce operational flexibility of our local refineries and would undermine their considerable efforts and recent investments to remain competitive with Asia's large-scale refineries.

(2) Full harmonisation with European fuel standards is not feasible nor appropriate for our market

- AIP reiterates that any alignment of fuels quality specifications with European standards should consider the FQSA principle that harmonization must be subject to Australian conditions.
- There is no single "international" standard as fuel standards need to align with local conditions.
- AIP advises again that there are key differences between European and Australian conditions, such as environmental concerns regarding the impact of MTBE on drinking water resources (leading to a MTBE ban in Australia), and Australia's more temperate climate, which have important implications for key parameters in petrol and diesel.
- Further, the very different climatic conditions between Australia and Europe have important implications for cold start emissions and some performance issues which are reported to be experienced in Europe in sub-zero temperatures.
- The ban on MTBE in Australia also has a critical connection with the ability of Australian refineries to achieve other specification changes (eg. to achieve 35% aromatics in high octane petrol noted below). This is a fundamental omission in the draft RIS discussion and assessment.
- Further, whilst Option B and Option C are characterised through the Draft RIS as being harmonisation with Europe, this is somewhat misleading as the absence of harmonisation on MTBE is a crucial difference. It would be more transparent to describe the options as partial-harmonisation.

- Hart Energy's report referenced in the draft RIS shows wide-ranging fuel specifications globally. There are also wide-ranging specifications across US States.
- The pursuit of a 'uniform global standard' for fuel is a myth and not technically feasible, given countries *"have different configurations in place for their refining industries, diverse vehicle fleets and air quality issues, as well as varying political & market conditions."*
- Instead, Australia should align some key fuel specifications (e.g. sulfur content) where it is appropriate for Australian conditions and where a net community benefit can be demonstrated. This is the same approach adopted by other countries in our region and globally.

(3) The RIS overstates health and operability benefits under Options B and C

- The health benefits of introducing 10ppm sulfur in petrol are unclear as consultant modelling has not been released with the RIS and there is an apparent contradiction with previous government modelling indicating much lower health benefits ($30 million) from this move in sulfur specification.
- It appears the health benefits from lowering aromatics in petrol to 35% is estimated in the draft RIS at around $50 million per annum. It is unclear lowering the aromatic content will deliver such health benefits as the pool average for all petrol in the Australian market is already below 35%.
- The RIS notes (p37) that reducing aromatic content under Option C is expected to lead to only a small reduction in $PM_{2.5}$ particulate emissions (a maximum 2% reduction by 2030).
- A 2% reduction is a poor return considering the refining complexities involved and the small and diminishing contribution of vehicles to total airshed PM inventories. AIP suggests more cost effective measures are available to address the high PM contributors like tighter regulations on wood heaters.
- Also, detergent additive packages are in common use in the Australian market for managing engine deposits.
- Given the market aromatic levels for Australian petrol (without Government regulation), AIP recommends a review of aromatic levels in Australia petrol in 2022.
- In relation to diesel, AIP has not been able to identify in the draft RIS any health or operability benefits associated with the proposed diesel changes associated with Option C, and we would like to understand the provenance of these estimates.

(4) The RIS does not recognise obvious market risks from lowering aromatics in Australian petrol under Options B and C

- While the current market fuel quality for aromatics is well below 35% for ULP, considerable market risks have been identified in this submission which lead AIP to oppose the introduction of a 35% limit across all petrol grades in the longer term.
- These known market risks are not identified in the draft RIS and include:
    - *Australia's MTBE ban, which limits oxygenate options for our local refineries*
    - *higher petrochemical demand in the Asian region for aromatic feedstocks*
    - *considerable uncertainties around MARPOL regulations commencing 2020*
    - *increasing numbers of vehicles in Australia requiring premium petrol grades over time*.
- The potential impacts of these market risks and trends include, for example, no viable alternatives to MTBE for refineries to meet octane requirements in Australian premium petrol grades on an ongoing basis, considerable difficulty in sourcing low-aromatic-MTBE-free material in the region, and increased price premiums for crudes and products required in Australia.
- These impacts have a considerable bearing on the cost-benefit analysis and the viability of some RIS proposals which should be recognised and reflected, at least, in sensitivity analysis.

(5) The RIS underestimates refinery costs associated with lowering aromatics for all petrol under Options B&C and does not recognise that it is infeasible to blend, under current refinery configurations on an ongoing basis, 98RON petrol with less than 35% aromatics without oxygenates (MTBE/ethanol)

- The RIS indicates that reducing all petrol aromatic content to 35% max requires capital investment by refineries ($52m) and increased operating costs ($46m pa increasing to $72m over time).
- Given the effective MTBE ban in Australia (1% max compared with 22% max under the EU specs), it is unclear what 'technical solution' the RIS has assumed for refineries to achieve 35% max aromatics for the high octane 98RON grades as it is not possible to blend on an ongoing basis 98RON without high-octane low-aromatics oxygenates (MTBE or ethanol) with current refinery configurations.
- Alkylate and isomerate can be used to manage aromatics in lower-octane grades, but many imports have too low an octane for blending 98RON grades to 35% max aromatics or a too high final boiling point to blend. These blendstocks may not be available at Australian specifications in sufficient and reliable quantities, creating significant risks for supply reliability and security, as well as significant price premiums in the market with four local refineries competing for these specialised materials.
- E10 petrol has low consumer acceptance in Australia and so, while the ban on MTBE remain in place, it will not be possible to supply 98RON ethanol-free petrol into the Australian market (either via domestic refinery production or via imports) under a max 35% aromatics limit no matter the level of investment.
- Apart from the significant technical challenges of producing low-aromatics 98RON with current refinery configurations, AIP believe the costs of producing 35% max aromatics, by batch, across all grades are understated.
- The RIS capital costs would appear manifestly too low and would need to be at least doubled while operating costs estimates could easily be significantly higher (eg. 3-4 times higher).
- Further, the RIS's unclear/small benefits associated with 35% aromatics do not justify the costs estimated by the RIS.
- AIP continues to recommend a detailed holistic review of the costs of any aromatics change alongside other parameter changes such as sulfur as each refinery will be impacted differently.
- In lieu of this approach, AIP strongly recommends a review of fuel aromatics in 2022 before locking in an aromatic parameter change.
- We note aromatic limits are not specifically limited in the United States and Japan.

(6) The RIS does not include any refining costs associated with the Diesel Specifications changes under Options B&C and provides no details of the claimed benefits

- There is no explanation, evidence, or costings of the benefits included in the draft RIS for the three key changes proposed to the current diesel fuel standard (PAHs, cetane, and density).
- No operability, environmental or health benefits have been explained or demonstrated in the draft RIS for any further changes to the diesel specification.
- On this basis, AIP supports no changes to any of the current diesel fuel standard parameters.
    - AIP strongly supports setting both Cetane Index (CI) and Derived Cetane Number (DCN) for the diesel standard (both mineral diesel and biodiesel blends) at the current 46 minimum. This is because local refineries have very limited capability to control diesel cetane levels without incurring major cost. There is also no compelling evidence of operability impacts or environmental improvements for cetane levels above 46 minimum for Australian vehicles and conditions.
    - Given no clear benefits have been identified in the draft RIS, AIP strongly opposes a reduction in maximum density specification for diesel, which will significantly impact refinery operations and ongoing viability for no demonstrated benefit. This view is supported by the 2014 Hart Energy Report (page 134).
    - AIP strongly opposes a reduction in the PAH limit (from 11% to 8%) as AIP members believe there would be negligible environmental and operability benefits of reducing the PAH limit in vehicles with modern after-treatment systems based on available evidence. Limiting PAH to 8% would require expensive investments for some refineries which would threaten viability.

(7) The RIS underestimates consumer price impacts for Options B&C

- It is unclear why the Draft RIS assumed market price impacts are similar for Options F (only changing the petrol sulfur specification) and Option C (changing multiple fuel specifications across both petrol and diesel).
- The proposed specification changes under Options B and C will create a more tightly restricted, boutique specification in the Asian region for Australian fuel, likely to lead to larger price impacts than calculated in the RIS (ie. moving Australia away from commonly traded Platts specifications).
- The AIP Submission to the Discussion Paper advised that there is considerable uncertainly in relation to price impacts over the next decade and we consider a 1.6 cpl impact is extremely conservative.
- At the very least, the final RIS should undertake sensitivity analysis using significantly higher price premiums than calculated in the draft RIS because this outcome is highly probable.
- We believe further analysis is warranted (particularly in the context of premiums related to the ban on MTBE in Australia), given the potential impact on consumers.

AIP recommends serious consideration of these seven identified issues be reflected in the final RIS and, in this light, a review of the economic modelling and sensitivity analysis where appropriate to ensure the final RIS presents an accurate assessment of potential economic, industry, and consumer impacts.

- AIP looks forward to ongoing consultation with Government and relevant Departments on these issues and on any proposals to change Australian fuel standards, including those in the draft RIS.

- Given the potential for the proposed policy changes to require major investment and ultimately could bring about further refinery closures, each AIP member company commits to keep the Government closely informed throughout any proposed implementation period.

1. ABOUT AIP AND MEMBER COMPANIES

About AIP

The Australian Institute of Petroleum (AIP) was established in 1976 as a non-profit making industry association. AIP's mission is to promote and assist in the development of a sustainable, internationally competitive petroleum products industry, operating efficiently, economically and safely, and in harmony with the environment and community standards. AIP provides a wide range of factual information and industry data to assist policy makers, analysts and the community in understanding the key market and industry factors influencing Australia's downstream petroleum sector. AIP is represented on key advisory bodies including the ATO Petroleum Corporate Consultation Forum (PCCF), the Fuel Standards Consultative Committee (FSCC), the National Oil Supplies Emergency Committee (NOSEC) and National Plan Strategic Industry Advisory Forum (NPSIAF) and AIP sponsors or manages important industry environmental and health programs. The Australian Marine Oil Spill Centre (AMOSC) is a wholly owned AIP subsidiary.

AIP presents this Submission to the Department on behalf of AIP's core member companies:

- BP Australia Pty Ltd
- Caltex Australia Limited
- Mobil Oil Australia Pty Ltd
- Viva Energy Australia Pty Ltd.

Should you require additional information, the relevant contact details are:
Paul Barrett, CEO, Australian Institute of Petroleum at aip@aip.com.au

About AIP Member Companies

AIP member companies operate across all or some of the liquid fuels supply chain including crude and petroleum product imports, refinery operations, fuel storage, terminal and distribution networks, marketing and retail. Underpinning this supply chain is considerable industry investment in supply infrastructure, and a requirement for significant ongoing investment in maintaining existing capacity. Over the last decade, AIP member companies have invested over $10 billion to maintain the reliability and efficiency of fuel supply meeting Australian quality standards.

Moreover, AIP member companies deliver the majority of bulk fuel supply to the Australian market.

- In relation to conventional petroleum fuels, AIP member companies operate all major petroleum refineries in Australia and supply around 90 percent of the transport fuel market with bulk petroleum fuels.
- In relation to gaseous fuels, AIP member companies are the major suppliers of bulk LPG to the domestic market, representing around two thirds of the market.
- In relation to biofuels, AIP member companies are the largest suppliers of ethanol and biodiesel blend fuels to the Australian market.

The Australian petroleum industry is also a significant contributor to the domestic economy providing direct and indirect economic benefits from its own activities and underpins the competitiveness of key export industries like mining, agriculture and manufacturing. In addition, as a technologically advanced industry, the refining industry employs and trains many highly skilled technical staff and international expertise flows readily into the Australian workforce.

Given their significant role and investment, AIP member companies have a very strong interest in consultations relating to government policy proposals impacting on the downstream petroleum industry, including the refining industry's ongoing viability and competitiveness, given their significant contribution to local economies and communities. Since the commencement of the *Fuel Quality Standards Act* (FQSA), AIP has strongly supported orderly transitions to cleaner fuel standards where a community benefit has been clearly demonstrated in terms of environmental and health outcomes, and where the cost impacts on refineries and consumers can be managed effectively.

Competition Law Considerations

- *To protect commercial confidence and to manage competition law sensitivities, AIP requested each individual member company to provide data directly to the AIP in strict confidence. AIP aggregated all data and will not share individual company data with other member companies.*
- *The assumptions made regarding oil price, product produce, and key differentials (such as the sweet/sour crude differential) for use by the member companies were set by AIP based on its own industry and market knowledge.*
- *The long time-horizon for some of the analysis presented in this AIP Submission creates natural uncertainties, so the estimates presented should be treated as a reasonable estimation by AIP and independent third parties for the purposes of this consultation process.*
- *For avoidance of doubt, each member company will individually develop and implement its own plans and manage its own budget program independently of AIP and the other members.*
- *References to "Industry" in this document should be construed as being AIP's assessment, rather than individual company views.*

2. INTRODUCTION

Australian refineries have been longstanding participants in the local market as major transport fuel suppliers, with all current refineries being operational for over 50 years. These key facilities refine about 27 billion litres of crude oil a year (including 7 billion litres of local crude and condensate) into the high value products needed by industry, business and consumers. Given this significant role and investment, AIP member companies have a very strong interest in consultations relating to government proposals impacting on the refining industry's ongoing operations, viability and competitiveness, given their significant contribution to the economy, local communities and Australia's fuel supply security.

AIP welcomes the opportunity to provide a submission to this consultation process and looks forward to ongoing consultation with relevant Departments on any proposals to change Australian fuel quality standards, including those identified in the draft Regulation Impact Statement (RIS).
AIP's feedback and analysis throughout this submission is intended to provide guidance on the three key questions identified for this draft RIS phase of the consultation process, namely:

- *does the Draft RIS adequately assess main costs and benefits;*
- *how and when should policy options be implemented; and*
- *will options achieve desired health, environmental and technological outcomes?*

In answering these questions, much of AIP's assessment and evidence base is provided in AIP's April 2017 Submission to the Department's Discussion Paper - Better Fuel for Cleaner Air. This submission is available from http://www.aip.com.au/resources/better-fuels-submission and contains comprehensive analysis, evidence and data and should be read alongside this current contribution to the consultation process.

For over two decades, AIP has strongly supported orderly transitions to tighter fuel standards where a community benefit has been clearly demonstrated in terms of environmental and health outcomes, and where the cost impacts on refineries and consumers can be managed effectively.

In AIP's initial submission, and again in this submission, we strongly argue that the proposed Option F (a maximum of 10 ppm sulfur in petrol from 1 July 2027 with no changes to other fuel parameters and supported by a reporting regime to safeguard market fuel quality) will maximise community benefits whilst minimising the risks of refinery closure and of increased fuel prices.

AIP's advice is supported by the draft RIS cost-benefit analysis which shows a clear net community benefit from Option F's proposed implementation of 10ppm sulfur petrol from 1 July 2027 and has the lowest impact on fuel prices over the next decade. The RIS also concludes that Option F *"provides the most cost-effective approach"* to achieving health benefits related to use of vehicle fuels.

AIP considers that Option F is the only option which actually provides a material net community benefit.

The estimated positive community outcome for Option C in the draft RIS is overstated as, despite AIP advice to the contrary in previous AIP submissions, a simplifying modelling assumption was made that no Australian refineries would close under this approach. Therefore, the modelling does not reflect the resulting loss of significant economic benefits from refinery closures (average of $1 billion per refinery per year). The draft RIS notes that *"if refinery operators choose to close, the results of the (cost-benefit) analysis are likely to be different than those detailed".* Option B already presents a negative community outcome before the impacts of refinery closure are even considered/modelled. Options B and C are therefore not supported by AIP, given the major uncertainties and economic risks associated with these options (outlined in this submission). Option A is also supported by AIP as being the least cost to industry and consumers. It is certainly the lowest risk to the ongoing viability of Australian refineries, including compared to Option F, as there is no requirement for the significant ($979 million) investment by refineries to meet new fuel standards which have no direct benefits for the industry.

3. ASSESSMENT OF KEY RIS ASSUMPTIONS & MARKET DATA

This section and Section 4 presents AIP's views on crucial aspects of the Draft RIS – including the underpinning assumptions and data, the cost-benefit-analysis approach and findings, the supporting evidence base in relation to potential economic, industry and consumer impacts, and health and operability impacts of changing Australian fuel standards. Our concerns regarding shortcomings in the RIS assumptions and analysis of Options B and Option C are identified in the next two sections.

Introduction

AIP and its member companies continue to be willing to work with Government on this review process to deliver a significant policy outcome, whilst minimising risks to the industry, consumers and the community. AIP and its members have already extended considerable effort and resources in supporting this review process and have been consistent in our advice and proposals put forward.

However, a significant policy outcome needs to be underpinned by a robust analysis of options, a complete survey of available evidence, and a clear preferred option on the basis of this analysis taking into account a full consideration of risks and costs.

AIP welcomes the work in the draft RIS that validates Option F and much of the advice provided by AIP in the submission to the Discussion Paper. However, AIP has very serious concerns with the underpinning assumptions, key exclusions and oversights in the RIS analysis for the cost-benefit analysis of Options B&C which involve an extensive and costly range of regulatory changes delivering no or unclear benefits and threatening refinery viability under all timeframes.

Addressing these shortcomings (which largely only apply to Options B and C) will significantly widen the RIS difference between community and economic outcomes for Option F and Options B&C, and generate a net community cost for Option C alongside the already negative NPV for Option B.

Also, it is essential that the evidence base for Option C is released for analysis as many of the claims in the supporting (unpublished) reports are contrary to the peer reviewed scientific evidence and global research provided in AIP's previous submission.

A number of critical flaws in the draft RIS analysis for Options B&C are identified below and in Section 4 which, if addressed in the final RIS, would provide a more confident basis for government decision-making and community acceptance, which will be crucial given the significant economic and employment risks and potential consumer impacts involved in the draft RIS proposals.

The RIS incorrectly assumes no refinery closures under any of the RIS Options

The Draft RIS and its cost-benefit estimates for proposed options are predicated on the assumption that *"all currently operating Australian refineries remain open".* This simplifying assumption, for reasons not provided in the draft RIS, is misaligned with the advice provided by AIP that the harmonisation of Australian petrol standards with Europe (under Options B and C) may result in the closure of one or more Australian refineries, and would most likely result in the closure of all domestic refineries under an accelerated implementation timeframe.

Moreover, AIP considers that AIP's capital costs estimate of $979 million has been misapplied in the draft RIS. This AIP cost estimate relates specifically to implementation in 2027 only, however the same $979 million has been used in RIS for implementation in 2022 and 2025 without recognition of the substantial additional costs associated with earlier implementation.

Implementation in 2025 would likely incur additional costs in the order of $400 million due to the direct expense and gross margin losses associated with sub-optimisation of refinery shutdown cycle timings. Implementation in 2022 would incur further prohibitive project acceleration costs and unacceptable project risk to the refineries.

The risk of refinery closure under the RIS options is real.

The Australian refineries are trade-exposed and have no scope to pass on cost increases to motorists if they are to remain competitive with imports. All the RIS Options (other than Option A) significantly increase refinery costs, operational complexity and emissions, but will not deliver any additional fuel to the Australian market or benefits to the refineries themselves. The RIS options would also significantly and unnecessarily reduce operational flexibility of our local refineries and would undermine their considerable efforts and recent investments to remain competitive with Asia's large-scale refineries. As a result, a long transition period is needed to help industry manage substantial costs and optimise the timing of these major investments to the greatest extent possible (eg. alignment with major turnaround cycles).

The impact of changing fuel standards on Australia's refineries, and their significant contribution to the economy, direct and indirect employment and supply security, is summarised in Section 7 of this submission and is outlined in detail in AIP's original Submission to this policy review process which is available from http://www.aip.com.au/resources/better-fuels-submission.

Independent economic modelling found that the economic benefits forgone if one refinery closed is around $1 billion on average in lost economic activity per annum to the local economy, including losing the direct impact of refinery value added as well as the flow on impacts to other industries. This contribution does not include the important indirect benefits of refineries including security of fuel supply, input sharing with other industries, innovation, technology and knowledge spillovers, and significant investment in each refinery's local community and business service providers.

This forgone benefit, from even only one refinery closure, far exceeds the RIS estimated net benefit of Option C. The RIS itself notes that *"if refinery operators choose to close, the results of the (cost-benefit) analysis are likely to be different than those detailed.*

AIP therefore considers that the risk of local refinery closures from any proposed policy or regulatory change is fundamental to the assessment of the RIS options and to the Government's consideration of fuel standard changes, particularly in the context of the current evidence base which shows limited operability benefits for vehicles, limited health and environmental benefits, and a significant cost impact on refineries, consumers and on the community.

AIP strongly recommends that, for the purposes of modelling the net benefit (NPV) of the RIS options, that plausible refinery closure 'scenarios' be incorporated into the modelling.

So as to better inform decision-makers of the risks involved with each Option and the relative risks between each RIS option, the sensitivity analysis should at the very least present an assessment of how refinery closures would influence the NPV outcomes for each Option currently modelled in the draft RIS.

If this further modelling and sensitivity analysis cannot not be undertaken, then it is important that the modelling recognises the increased construction costs and refinery debits associated with implementation earlier that 1 July 2027 and also with harmonisation with Europe standards under Options B & C.

AIP has not modelled these costs because, as we indicated in previous submissions, there is high likelihood of refinery closures.

AIP suggests that the independent modelling assessment noted above (of $1billion pa on average for a refinery's economic contribution) be used as a simple benchmark for this modelling or sensitivity analysis. Alternative economic modelling and advice could be used/commissioned, but AIP expects that any modelling will produce a refinery economic contribution in the range of $700 million to $1.3 billion pa.

AIP's previous submission to this process (pages 57-60) outlined the detailed and costly investigative and assessment processes that each refinery would undertake to consider whether meeting a proposed fuel standard change was technically feasible for the refinery, and the cost justified economically. This requires detailed engineering and financial assessment, which are complex and expensive exercises for the Australian refineries, a comprehensive market assessment of the outlook for refinery margins, and lengthy approval processes to secure Board/Shareholder approval for the necessary investment.

For refineries to commit to undertake this costly and extensive work, it is essential that clear decisions or advice is provided by Government on preferred option/s, and the scope and objectives of fuel standards changes are clearly defined, as all the parameters of any standard will need to be considered in totality to fully understand the impact to the refinery.

Sufficient detail and clear directions have not yet been provided in this review process for AIP member companies to robustly assess refinery viability in normal commercial terms. However, a preliminary assessment has been made of moving to 10ppm sulfur petrol by 1 July 2027 with no changes to other parameters across all fuels.

AIP has also advised that Options B and Option C represent significantly more extensive and costly changes to refinery operations (than just 10ppm sulfur petrol) as confirmed in the draft RIS, for no demonstrated benefit to refineries.

In the context of this advice, AIP recommends the following estimates for the modelling and sensitivity analysis purposes (not informed by the detailed evaluation required by each refinery noted above), but being reflective of plausible scenarios given the very significant increase in capital and operating costs to Australian refineries associated with Option B, C and F – for no economic or operational benefit – and real technical barriers to the achievement of Options B and C.

It is critical to understand that this proposal is made for modelling purposes and gives no indication of the likely decision by any individual refinery. Any such decision would be made by individual companies after a pre-FEED assessment.

Modelling of RIS Options & Timetables: Economic Benefits Foregone from refinery closures
(most likely impact)

Implementation Date Proposed	**Option A**	**Option B**	**Option C**	**Option F**
2022	$0	-$4 billion	-$4 billion	-$4 billion
2025	$0	-$4 billion	-$3 billion	-$2 billion
2027	$0	-$3 billion	-$2 billion	$0

The RIS assumes full harmonisation with European standards is feasible and appropriate

The Draft RIS states that Australian fuel quality and standards *"are out of step with European fuel standards"* and our trading partners, and *"could be better aligned with best practice international fuel standards"* through harmonisation with Euro standards. This is explicitly recognized as one of the key policy assessment criteria in the draft RIS (ie. the extent to which RIS policy options "*achieve harmonization with European standards")* and underpins the formulation and intent of Options B and C in the draft RIS.

Fuel quality standards are not uniform nor harmonised across the world for all fuel parameters.

The Hart Energy report (XIII Appendix, pages 151-175) prepared for the RIS, clearly demonstrates the wide-ranging variances in fuel specifications and test methods across the globe, which underscores that there is no single international standard, and fuel standards need to align with local conditions. This is underscored in the Hart Report by recognizing that the reference countries they have used in their report *"have different configurations in place for their refining industries, diverse vehicle fleets and air quality issues, as well as varying political and market conditions".* There are demonstrably different standards in every country in Asia and in each state in the United States.

Fuel quality standards in Australia have always been subject to Australian conditions and there have been important variations from other country standards such as volatility (Reid Vapour Pressure – RVP) and the banned use of Methyl Tertiary Butyl Ether (MTBE).

While there are moves to standard global benchmarks for some key fuel parameters (like sulfur content), the composition of petrol varies markedly across the globe due to wide ranging differences in other petrol parameters. For example, aromatics are not specifically limited in the United States or Japan, and many fuel specifications vary widely across US States.

Each region, and countries within each region, have different specifications for fuel depending on their specific market conditions and circumstances, and more stringent standards than others depending on controls for specific environmental factors locally (air quality, ground water contamination).
For example, Australia effectively bans MTBE given potential impacts on potable groundwater supplies particularly in Western Australia and regional NSW, Victoria and Queensland, whereas Europe and parts of Asia are less exposed to this vulnerability.

AIP reiterates that any harmonisation of fuels quality with European standards should take regard of the FQSA principle that harmonisation must be appropriate under Australian conditions. AIP advises there are important differences between European and Australian conditions, such as environmental concern regarding MTBE's impact on drinking water resources in Australia and our warmer climate which have important ramifications for key parameters, particularly petrol octane and diesel cetane. Further, the very different climatic conditions between Australia and Europe have important implications for cold start emissions and performance issues which are reported to be experienced in Europe in sub-zero temperatures.

The ban on MTBE in Australia also has a critical connection with the ability of Australian refineries to achieve other specification changes (e.g. to achieve 35% aromatics in high octane petrol, as discussed in Section 4. Given the typical refinery configuration of most refineries globally, they are extremely challenged in producing higher octane fuels (98RON petrol) without the use of oxygenates (MTBE/ethanol), so it is demonstrated as a critical factor in the determination of fuel standards and consequent impacts on the Australian refining sector.

Further, whilst Option B and Option C are characterised through the Draft RIS as being harmonisation with Europe, this is somewhat misleading as the absence of harmonisation on MTBE is a crucial difference.
It would be more transparent to describe the options as partial-harmonisation.

AIP believes that Australia should align some key fuel specifications (e.g. sulfur content) where it is appropriate for Australian conditions and where a net community benefit can be demonstrated. This is the same approach adopted by other countries in our region and globally.

Finally, some studies and commentators choose to reference 'league tables' providing notional world rankings of petrol quality. Such petrol quality rankings are usually based on "regulated sulfur content" as the draft RIS acknowledges. Under Option F in the draft RIS which AIP supports, Australia would move to the highest levels of such rankings amongst OECD nations and globally.

AIP also notes that such league tables do not adequately account for specific market conditions and circumstances across countries which legitimise natural variance in fuel parameters. For example, global petrol quality rankings typically do not account for the proportion of MTBE allowed in petrol. Australia has banned MTBE – delivering material environmental and community benefits – so AIP questions why this is not considered "best practice" by the draft RIS nor by European standards themselves. Additionally, Australia's very tight limits on petrol specifications like benzene, olefins and final boiling point are already "best practice".

AIP Supports Market Data to be used in the RIS Analysis

Market Sulfur Level Data used in the RIS Analysis

AIP supports the market sulfur assumptions used in the draft RIS, but emphasizes that these are average sulfur levels and that flexibility to produce batches above this average level gives the Australian refineries important operational flexibility that underpins their economic viability.

AIP's initial Submission to this review process encouraged the RIS cost-benefit analysis to model health and environmental impacts on the basis of the (better) fuel quality currently available in the Australian market, rather than on the basis of the regulated specification limits. This would help to ensure that benefits are not overestimated.

AIP collected data for every batch of petrol produced or imported to Australia during 2014, 2015 and 2016 by AIP member companies. This was an extensive data collection exercise comprising 7,300 batches. The summary of these results below was provided to the Department and to the RIS consultants as AIP committed to do in its original submission.

Actual Sulfur levels in Australian petrol

	2014	**2015**	**2016**
	Pool Average	*Pool Average*	*Pool Average*
Sulfur (mg/kg)			
91RON	54	63	61
95RON	26	29	27
98RON	26	27	25
Total PULP	26	28	26

As noted in the draft RIS, these results confirm that *"the average concentration of sulfur in petrol* (in Australia) *is substantially lower than the regulated limits of 150ppm in 91RON and 50ppm in 95RON or 98RON".* These averages were used in the draft RIS to provide more accurate estimates of the costs and benefits of options.

It is important to note that while the pool averages are low in the table above, about 30 percent of the Australian produced petrol is above 70ppm sulfur and this gives the Australian refineries flexibility that underpins their economic viability.

Market Aromatic Level Data used in the RIS Analysis

AIP supports the 'pool average' market aromatics levels used in the draft RIS.

The RIS cost-benefit analysis modelled the health and environmental impacts related to changing aromatic concentrations based on the results of fuel sampling undertaken by the Department.

This sampling indicated that *"the pool average aromatics levels in petrol is probably around 27.3% at present, with 91RON petrol having an average of about 24%, 95RON petrol having an average of about 29% and 98RON petrol having an average of about 36%".*

Importantly, the RIS modelling correctly indicates that the pool average aromatic content under business as usual is expected to increase over the decade to 2030, which we assume is based (correctly) on the gradual move over time to higher octane fuels in Australia which have higher aromatic content.

Pool average estimates below are based on extensive data collected by AIP from member companies from every batch of petrol produced or imported to Australia during 2014, 2015 and 2016. This was an extensive data collection exercise which is broadly aligned with the Department's data, albeit a percentage point or two higher than that used for the RIS modelling purposes.

Actual Aromatic levels in Australian petrol

	2014	**2015**	**2016**
	Pool Average	*Pool Average*	*Pool Average*
Aromatics (%)			
91RON	25	25	25
95RON	31	30	29
98RON	37	37	37
Total Petrol Pool	28	28	28

However, it is important to note, that pool averages do not provide a representation of the range of aromatic levels above and below the averages noted above.

AIP anticipates that it will provide the Department with a confidential submission (given the commercial sensitivity of the data) detailing the distribution of aromatics levels by petrol grade over this period, which is important to the consideration of any health benefits from lowering aromatics for higher grade petrol under Options B and C.

The key conclusions from this analysis include the following.

- The period considered (2014-2016) cannot be used to establish any trends because the period is too short and was subject to refinery turnaround events where imports for some grades were substantial.
- The overwhelming majority of ULP (91RON) loads are below 35%, nonetheless some ULP loads are above 35%.
- PULP 95RON shows the greatest variability across the period; however, it would appear that less than 20% of batches are above 35% aromatics with the overwhelming majority in the 35%-38% range and less than 3% above 40% aromatics. The proportion of batches is still considerable and will be expensive to blend below 35%, especially since the industry will be aiming to blend to 33% for example.
    - AIP infers from these observations that there are very small health benefits from changing the aromatics standard in PULP which will reduce even further once normal mixing of petrol batches in the supply chain is taken into consideration.

- PULP 98RON shows only approximately 25% of batches are below 35% aromatics, which demonstrates the very significant challenges in meeting a 35% limit. Also, as only 20% of loads are above 40% aromatics, with 60% of loads within the range of 35%-40%, this limits the available health benefits from specifications changes in Options B and C. The batches above 40% are material and will be extremely difficult, if not impossible, to address by blending solutions (see Section 4).

AIP is also aware that there is seasonality associated with the aromatics data where the lower aromatics levels are typically found in winter grades. This is because a refinery can place butane in petrol in winter whereas this option is not open to refinery in summer because of volatility requirements. Further data collection and analysis would be required to determine the extent of this phenomenon (we suggest as part of the 2022 aromatics review proposed by AIP), but summer grade petrol would tend to have higher aromatics.

4. ASSESSMENT OF RIS COST-BENEFIT ANALYSIS

Introduction

The cost benefit analysis in the RIS is not transparent as many of the key underlying assumptions and estimates are drawn from consultants' reports prepared for the Department which have not been made available for review.

A major weakness of the cost benefit analysis in the RIS is that many of the specific estimates are not included in the main report but are derived from separate reports, several of which have not been made public. Furthermore, in many cases the provenance of these estimates is not transparent and the consistency is also questionable.

AIP believes it is essential that the reports underpinning the estimates (e.g. FuelTrac and, Hale and Twomey for assessment of aromatics impacts and Pacific Environment for health benefit modeling) be released so that these estimates can be scrutinised and validated.

The following discussion covers AIP's main concerns and issues with the robustness of the cost benefit analysis and its supporting evidence and discussion.

Addressing these weaknesses in the cost benefit analysis, and in the draft RIS more broadly, would provide a more confident basis for government decision-making and also community acceptance. This is crucial given the major economic, employment and consumer impacts involved with some of the draft RIS proposals.

Overstated health and operability benefits under Options B&C

Unclear health benefits of introducing 10ppm sulfur in petrol

The Pacific Environment health benefit modelling has not been released with the RIS, so it is impossible to determine whether the estimates for health benefits are valid. Further, there is an apparent contradiction between the results in the draft RIS and the modelling completed for the Fuel Quality Standards Act review.

The 2015 FQSA review found there were $100 million in health benefits from moving the current petrol standard to 10ppm sulfur petrol. However, this does not take into account the market quality of petrol currently supplied in Australia which generally has much lower sulfur content than the regulated maximum. If it is assumed the sulfur response curve for pollutants is linear, then applying the lower sulfur levels already in the market used in the draft RIS against the 2015 FQSA review's health benefits of $100 million, would imply avoided health costs **below $30 million**.

AIP and member companies would like to understand the discrepancy between the estimates which are critical to the NPV results for each option.

This is also important given the RIS finding that *"reducing sulfur is the major factor driving avoided health impacts under options B, C and F, being responsible in options B and C for 97 and 89 per cent respectively of avoided health costs, and 100 per cent of avoided health costs in Option F."*

Assuming this modelling is robust, it also clearly highlights that apart from reducing sulfur in petrol (under Option F), there are no significant 'health benefits' delivered from Options B&C, despite the extensive range of parameter changes proposed at significant cost to Australian refineries (including to aromatics and key diesel parameters).

In the context of these limited identified health benefits, this also places a very significant focus and spotlight on rigorously testing any claimed 'operability' benefits, particularly of reducing aromatics in petrol.

Overstated health & operability benefits of lowering aromatics in petrol

AIP considers that no clear case has been established in the draft RIS for a reduction of petrol aromatics to achieve significant health benefits and improved vehicle operability, and the benefits that have been presented have been overstated and would not be cost effective.

It appears the health benefits from lowering aromatics to 35% max is estimated in the draft RIS at around <$50m per annum. It is unclear lowering aromatic content will deliver this limited health benefit as the pool average for all petrol in the Australian market is already below 35%. AIP notes again that the health benefit modelling prepared by Pacific Environment should be released so that these estimates can be scrutinised and validated.

The RIS notes (p37) that reducing aromatic content under Option C is expected to lead to only a small reduction in PM2.5 particulate emissions (a maximum 2% reduction by 2030). AIP notes that a 2% reduction is a poor return in the context of the major refining costs and complexities involved and the diminishing contribution of vehicles to total airshed PM inventories (currently less than 2% according to 2015/16 National Pollutant Inventory data).

AIP does not agree that tighter controls on aromatics are required to achieve better air quality outcomes. The argument that emulating aromatics controls found in European standards is necessary to have a measurable impact on ambient air quality ignores alternative controls already in place that mitigate particulate emissions and control for engine deposits and vehicle operability issues, explained below.

The impact of aromatics on gasoline engines has been reviewed in the literature with a relatively direct correlation between aromatics content in the fuel being linked to particulate material (PM) levels in exhaust emissions (eg. *ACS Env. Science & Technology, 2015, 49, 7021; SAE J. Fuels Lubr, Vol 8 Issue 1 (April 2015); and SAE Technical Paper, 2015-01-1072*). However, it is also noted in the literature a high degree of variability to levels of particulates caused by engine design, the stage of the warm up cycle the engine is in, the types of aromatics in the fuel, and the presence or absence of ethanol in the petrol mix.

In all cases studied, the engine operating temperature and type of aromatic present in the fuel were shown to have a significant impact on the level of particulates.

It has been noted, in particular, that high molecular weight hydrocarbons (particularly aromatics with 10 or more carbon aromatics – C10+), have the strongest influence on PM emissions due to their lower volatility. More volatile light aromatics like toluene (C7) were shown to have significantly less impact on increasing emission particulates. It has also been noted that particulates emission levels peak at lower operating temperatures and reduce in level as engine temperature rises. In all cases it has been the less volatile C10 and above aromatics levels that are associated with elevated particulates levels.

- For example, the 2015 EPA authored SAE paper (*A Pilot Study of Fuel Impacts on PM Emissions from Light-Duty Gasoline Vehicles*) explored the effects of PM Index, low and high molecular weight aromatics, and ethanol content on particulate matter (PM) emissions from light-duty gasoline vehicles. The four test vehicles were tested on seven fuels spanning PM Index values from 0.9 to 2.7, aromatic content from 14 to 38%, and ethanol content from 0 to 15%. The effects varied in magnitude between the different vehicles and between the test cycles used. The study results suggest that heavy aromatics (C10+ aromatics) have the strongest influence on PM emissions from petrol vehicles and the addition of ethanol was found to increase PM emissions.

It can be inferred from these study findings that 'total aromatics content' may be a poor predictor of the tendency to form exhaust PM because there is no guarantee that reducing total aromatics will proportionately reduce C10+ aromatics. AIP suggests that this could be reviewed more comprehensively as part of the proposed AIP review of petrol aromatics in 2022.

The draft RIS also links current aromatics levels with vehicle operability issues and engine deposits and suggests a correlation with reduced aromatics levels and a reduction in engine combustion chamber deposits. There is no associated reference cited to allow for clarification and an understanding of these relationships.

In relation to operability issues, AIP and member companies are unaware of any reports of engine deposit problems linked to the current aromatic content of Australian fuel. The lack of adverse feedback from the market indicates that petrol with current aromatics limits as supplied to the market, is fit for purpose.

AIP also notes that detergent additive packages are in common use in the Australian market for managing engine deposits. One method fuel suppliers use to differentiate their petrol products from their competitors' fuels is by the use of additives to control vehicle engine deposits. Minimising or eliminating deposits has potential fuel economy, driveability and emission benefits which are all of interest to customers and, as a result, are a key focus for fuel suppliers. Control of engine deposits, which occur in the form of injector tip deposits in direct injection engines or inlet valve deposits in port injection / carburettor systems have been a source of fuel supplier differentiation in the Australian fuel market for well over two decades.

Environmental concerns have also been raised in relation to tailpipe benzene emissions both from benzene present in the fuel and benzene generated by the decomposition of aromatics under combustion conditions during the initial engine start and hard driving. The AIP submission to the Discussion Paper discussed this and relevant international research. This highlights that benzene levels in fuel has the largest influence on exhaust benzene emissions and such concerns are already well-managed by the existing benzene limits in petrol. Australia already substantially reduced the benzene in petrol by 80 percent in 2006 from 5 percent max to 1 percent max and is now at the same level as Europe. The Australian refining industry had to invest approximately $800 million at that time to meet the new benzene limit.

Unclear Health and Operability Benefits of Changing the diesel fuel standard

In terms of diesel, AIP has not been able to identify in the draft RIS any operability or significant health benefits associated with the proposed diesel changes associated with Options B and C, and we would like to understand the provenance of these estimates.

We note again the overall findings of the draft RIS that reducing sulfur is the major factor driving avoided health impacts and, given Australian diesel fuel is already ultra-low sulfur and regulated at 10ppm sulfur maximum, most health benefits will have already been realized.

The discussion below relates to the proposed Diesel specification changes and that there has been no identification of clear operability and other benefits, however there will be significant expected costs for Australian refineries.

Obvious market risks from lowering aromatics in Australian petrol should be recognised

While AIP acknowledges that the current market fuel quality for aromatics is well below 35% for ULP, considerable market risks have been identified which lead AIP to oppose the introduction of a 35% limit across all petrol grades in the longer term. The four primary risks are:

(1) Australia's MTBE ban limits oxygenate options for our local refineries

The current European Standard on aromatics is currently achieved through the blending of (up to 22%) ethers. Methyl Tertiary Butyl Ether (MTBE) is an oxygenate with an octane number of 104 which enhances the octane rating of petrol. Given the typical configuration of most refineries globally, they are extremely challenged in producing higher octane fuels (98RON petrol) without the use oxygenates (MTBE/ethanol).

There are no viable alternatives to the use of MTBE to meet octane requirements in the Australian premium petrol grades. Ethanol has been proposed as an alternative, however, there are significant barriers to the uptake of ethanol in the Australian market including limited local supply, sustainability concerns and considerable consumer resistance to this fuel blend. These barriers were canvassed in the AIP submission to the discussion paper with consumer resistance being considerable (eg. despite mandates in NSW and Queensland ethanol only accounts for 2.4% of total petrol consumption).

Blending ethanol into all petrol grades has significant barriers in terms of potentially voiding engine warrantees and impacting on other fuel parameters (eg. volatility). Blending ethanol into petrol also results in an increase in volatile organic carbon emissions.

The regulated or forced presence of ethanol in all petrol grades will also have significant cost impacts for refineries and the broader fuels supply chain, given the necessity for dedicated storage, handling and distribution infrastructure for ethanol blended petrol, particularly to ensure segregation from jet fuel supply chains.

(2) Considerable uncertainties around MARPOL regulations

AIP members (and market participants globally) consider there are considerable uncertainties in the oil market related to MARPOL regulations for low sulfur bunker fuels.

The introduction date of 2020 could see an increase in the premium of sweet crudes thereby forcing refiners to utilise sour (high sulfur) crudes in order to maintain viability. In order to meet lower sulfur levels the refiners would need to process these streams more harshly leading to a greater destruction of octane in the refining process. The steps needed to restore the octane will impact on costs and capability and may also increase aromatics.

These market uncertainties and directional trends are important to the consideration of reported and regulated pool averages and limits for aromatic content across the petrol pool in Australia, and ensuring sufficient flexibility for refiners to adjust to these market trends without compromising their business viability or operational flexibility.

For these reasons, AIP has recommended no change to aromatic specifications, and the reporting of pool averages of 35% in ULP to demonstrate the higher fuel quality available in the market compared to the regulated standard.

(3) Higher petrochemical demand in the Asian for aromatic feedstocks

There is also evidence that the aromatic content of imported petrol to Australia is increasing and with imported petrol representing 35% of all petrol consumed in Australia this will put further pressure on the overall aromatics pool.

Availability of aromatic material in the Asian market is being heavily influenced by traditional petrol blendstocks being diverted to meet higher value chemical manufacturing demand.

(4) More vehicles requiring Premium Grade Petrol over time

Petrol demand in Australia has remained constant as vehicle fuel efficiency has continued to improve. Use of regular unleaded petrol (ULP, 91RON) has declined by more than 40 percent as consumers chose new vehicles that recommend the use of higher octane fuels.
For example, since 2001 premium petrol grades (95 and 98RON) have grown from 10 percent of the market to 30 percent and this trend is expected to continue as more vehicles require premium petrol.

There are also significant variations in petrol grade demand across the Australian states and territories, which reflect a range of differing factors. For example, there is higher use of premium grades of petrol in NSW as a consumer preference response to the government's ethanol mandate policy.

As the range of aromatic content in petrol increases with higher petrol grades (see Section 3), these trends put upward pressure on aromatic content across the petrol pool and have important implications for the consideration of reported and regulated pool averages and limits for aromatic content across the petrol pool in Australia. It is critical that sufficient flexibility is preserved for refiners to adjust to these market trends without compromising their business viability or operational flexibility. There are no details in the draft RIS of how petrol demand across the grades will change over time and how this will influence crucial petrol parameter changes proposed under Options B and C.

Given the uncertainties in the global crude demand, the nature of product quality demand (i.e. ULP/PULP distribution) and the diversion of product to chemical markets, we consider a review of aromatics content in petrol supplied to the Australian market and of the aromatics specification itself would be warranted in 2022 when there will be greater certainty around some of these market developments and impacts (particularly MARPOL and ULP/PULP ratios).

This is underscored by the trends noted above having important implications for different fuel standards, which need to be considered holistically, particularly as it relates to refinery technical flexibility.
For example, sulfur levels in the petrol pool are expected to gradually decline over time as penetration of this premium fuel increases in the market without changes to any fuel standard, and sulfur levels in petrol will be well below the current regulated standard within a 10-year horizon.

Refinery costs and challenges have been underestimated for lowering aromatics for all petrol under Options B&C

Aromatics are the highest octane molecules in petrol and are a crucial component of petrol manufacture, particularly the higher octane grades. AIP notes that refineries will seek to achieve specification outcomes well below regulated limits to ensure consistent fuel quality and compliance, and to allow for natural variations in crude and other refinery feedstocks and blending variances.

The RIS indicates that reducing all petrol aromatic content to 35% max requires capital investment by refineries (of $52 million) and increased operating costs ($46 million pa increasing to $72 million over time). Even if these cost estimates were robust, they are not justified by the small health benefits ($50 million) and unclear/limited operability improvements noted above from lowering aromatics.

To meet the 35% max aromatics specification for all petrol grades, we expect that the RIS modelling and consultant report has assumed that refineries would import significant volumes of low aromatic and high octane components or finished (market) grade premium petrol to blend down their own refinery production which is currently fit for purpose.

If this is the case, then AIP considers that the draft RIS has significantly underestimated refinery costs for lowering aromatics for all petrol and further the RIS has not recognised that it is infeasible to blend, under current refinery configurations on an ongoing basis, 98RON petrol with less than 35% aromatics without oxygenates (MTBE or ethanol).

The RIS estimate of $52 million of capital investment relating to the introduction of a 35% aromatics limit for blendstock import and blending facilities implies an average of $13 million for each of the four refineries. This capital cost would appear manifestly too low and would need to be at least doubled. Similarly, the draft RIS operating costs estimates are extremely low end and could easily be significantly higher (eg. 3-4 times higher).

Establishing robust capital and operating costs estimates would need to be the subject of a detailed assessment by the refineries and government.

In the context of the effective MTBE ban in Australia (1% max and 0.1% max in WA) compared with 22% max under the European specifications), it is unclear what 'technical solution' the RIS has assumed for refineries to achieve 35% max aromatics for the high octane 98RON petrol grade. This is because it is technically infeasible to blend, under current refinery configurations on an ongoing basis, 98RON petrol grades to 35% max aromatics without high-octane zero-aromatics oxygenates (such as MTBE or ethanol).

As further explanation, while oxygenates like MTBE and ethanol are very high octane and contain no aromatics, all very high-octane blendstocks produced within refineries (such as reformate) inherently contain high levels of aromatics (it is the aromatics which give reformate its high octane).
While some refineries are able to produce some high-octane zero-aromatics streams such as alkylate and isomerate, the octane level of these streams is too low to consistently make 98 RON petrol without the use of at least some reformate. Unfortunately, the high aromatics content of the reformate can cause the final 98RON blend to exceed 35% aromatics.

In additional, while alkylate and isomerate can be used to manage aromatics in lower-octane petrol grades, many imports have too low an octane for blending 98RON grades to 35% max aromatics or a too high final boiling point to blend. These blendstocks may not be available at Australian specifications in sufficient and reliable quantities, raising concerns about supply reliability and security. Blendstocks like alkylate are highly specialised and typically expensive, and much higher market premiums could also be expected from all four local refineries competing to source these materials.

While there are expensive refinery investment options available for some refineries to overcome the limitation imposed by this fundamental octane/aromatics interaction with respect to 98RON petrol blending, there is still significant risks to sustainably meeting a 35% max aromatics limit even if investments can be identified. This is due to the uncertainty and unpredictability of securing the right blend stocks, and in ongoing and sufficient quantities, to meet the Australian specifications. Further, the costs of implementing these options are very significant and would threaten the viability of ongoing refinery operations in Australia.

This limitation cannot be overcome by importing 98RON petrol or blendstocks rather than manufacturing in Australia because the MTBE restriction also applies to imported petrol and overseas refineries will also be faced with this same technical limitation when blending 98RON for the Australian market.

AIP is also aware that there is seasonality associated with the aromatics content of petrol where the lower aromatics levels are typically found in winter grades. This is because the refinery can place butane in petrol in winter whereas this option is not open to refineries in summer because of State legislated volatility requirements. Further data collection and analysis would be required to determine the extent of this phenomenon (we suggest in the 2022 review of aromatics proposed by AIP), but summer grade petrol would tend to have higher aromatics.

AIP does note that overseas refineries are often integrated with petrochemical plants and this might generate unique blending scenarios where there are some unusual circumstances under which they can meet a 35% aromatics limit in petrol without MTBE. However, our understanding is that increased future demand for chemical blendstocks in the region will likely further exacerbate the blending challenge in this respect and certainly in relation to ongoing reliable supply of MTBE free petrol.

Apart from the significant technical challenges of producing low-aromatics 98RON with current refinery configurations, AIP believe the costs of producing 35% max aromatics, by batch, across all grades are understated. This is because there are major market uncertainties and logistical challenges domestically, and the project economics would be strongly negative.

- Assuming low aromatics components or finished grades were available in the region for import (which has not been established), the cost impacts of this approach could be significant for refineries.
    - Australian refinery infrastructure and logistics do not currently exist to handle and segregate the import of these components nor the export of high aromatic components or grades.
    - Capital expenditure on additional infrastructure to import and store these specialty components/grades would be required and alternative supply chain logistics established.
- Segregating refinery tanks for import components further restricts the refinery's logistics, adding complexity, distribution costs and reducing margins.
- There will be a significant premium payable to purchase these specialty blendstocks and further refineries will then have to export their excess petrol production displaced by the import volume. This will transfer gross margin from Australian refineries to overseas suppliers and shippers resulting in margin loss for refiners and increased cost to motorists.
- We also note that the reduction in sulfur content in petrol to 10ppm also destroys octane and will change refinery balances, which is why these two fuel changes need to be considered in parallel.
- Aromatics management is of particular concern into the future as the continued grade migration from 91 ULP to higher grades 95RON / 98RON will further constrain aromatics management flexibility.

The combination of these impacts suggests an importing/blending technical solution for Australian petrol will be a significant challenge for Australian refineries and would threaten refinery viability.
Again, it is imperative that the reports on which these estimates are based are released so that the veracity of the underlying claims can be tested. AIP continues to recommend a detailed holistic review of the costs of any aromatics change, as each specification change impacts other refinery units and other fuel specs, and each refinery will be impacted differently. The AIP recommended review of market fuel aromatics in 2022 could achieve this.

Refining costs and benefit details for Diesel spec changes should be included under Options B&C

There is no explanation, evidence, costings or demonstrated benefits provided in the draft RIS for the three key changes proposed to the current diesel fuel standard (PAHs, cetane and density). In particular, no operability, environmental or health benefits have been explained or demonstrated in the draft RIS for any further changes to the diesel specification.

Also, it appears that there are no capital or operating cost or refining margin impact included for achieving the PAH, Cetane and density proposals in Option C. Contrary to the advice provided in the AIP submission to the discussion paper there are significant costs associated with the Cetane changes and substantial risks with cetane additives that may preclude their use in certain locations. PAH changes will also lead to substantial capital costs that will almost certainly lead to refinery closures. The RIS does not consider any of these impacts which is a major deficiency.

On this basis, AIP does not support any changes to the current diesel fuel standard parameters.

AIP does strongly support setting both Cetane Index (CI) and Derived Cetane Number (DCN) for the diesel standard (both mineral diesel and biodiesel blends) at the current 46 minimum.

This is because local refineries have very limited capability to control diesel Cetane levels without incurring major cost. There is also no compelling evidence of operability impacts or environmental improvements for cetane levels above 46 minimum for Australian vehicles and conditions.

The main operability and environmental issues associated with Cetane are related to potential cold starting issues that are unlikely to be a factor with Australia's warmer climate, particularly with the evolution of engine technology and higher performance fuel injection systems.

Given no clear benefit has been identified in the draft RIS, AIP strongly opposes a reduction in maximum density specification for diesel, which will significantly impact refinery operations and ongoing viability, for no demonstrated benefit.

AIP strongly opposes a reduction in the PAH limit (from 11% to 8%) as AIP members believe there would be negligible environmental and operability benefits of reducing the PAH limit in vehicles with modern after-treatment systems based on available evidence, and ongoing viability would be threatened for some refineries. Some domestic refineries would likely need investment in expensive diesel hydrotreater reactors to achieve any substantial reduction in PAH, for limited benefit.

In this regard, AIP notes CONCAWE report 4/05 which concludes that:

- *"In older technology vehicles, reducing fuel poly-aromatics content gave lower PAH emission, although reducing fuel poly-aromatics content even to zero would not eliminate PAH emissions, as a significant proportion of the total PAH is combustion derived."*
- *"In the newer technology diesel vehicles with effective exhaust after-treatment, either oxidation catalysts or diesel particulate filters, PAH emission were so low that there was no longer any sensitivity to fuel poly-aromatic content."*

However, AIP does support a new biodiesel blend standard for B20 (see Section 5) as one does not currently exist and this will obviate the need for further applications and costs for Section 13 waivers, as noted in draft RIS, which is a demonstrated benefit.

AIP also supports the expansion of the diesel standard to non-road (non-automotive) uses, as this will have limited operational implications as diesel produced or imported by AIP members meets the Automotive diesel specification regardless of who this fuel is supplied or how the fuel is used.

Consumer price impacts for Options B&C have been underestimated

It is unclear and illogical why the market price impacts are broadly similar for Options F (only changing the petrol sulfur specification) and Option C (changing multiple fuel specifications across fuels).

The proposed specification changes under Option C will create a more tightly restricted boutique specification in the Asian region for Australian fuel (ie. moving Australia away from Platts specifications commonly traded). This will likely lead to considerable market premium for Australian specification fuel and therefore larger price impacts on consumers than calculated in the RIS.

As AIP Submission to the Discussion Paper advised, there is considerably uncertainly in relation to price impacts over the next decade and we consider a 1.6 cpl impact is extremely conservative.

We believe further analysis is warranted (particularly in the context of premiums related to the ban on MTBE in Australia), given the potential impact on consumers.

More comprehensive Sensitivity Analysis is needed

The draft RIS notes that the cost-benefit analysis is based on assumptions and there is a degree of uncertainty around the results. It notes that sensitivity testing was conducted on a range of assumptions and modelling inputs, focusing on those inputs which would *"materially change the results"* in their view.

The draft RIS identifies 'inputs' to the cost-benefit analysis which were subjected to sensitivity analysis. Based on this list, AIP considers that crucial inputs underpinning the cost-benefit analysis results have not been included for sensitivity testing, and therefore do not provide a robust basis for the Government's consideration of fuel standard changes.

The cost-benefit estimates for proposed options are predicated on the assumption that *"all currently operating Australian refineries remain open"* and no sensitivity analysis is conducted on the potential impact on the CBA results of refinery closures.

As noted in Section 3 of this submission, the risk of refinery closure under the RIS options is real and there is no doubt that the closure of even one refinery would "materially change the results" for Option C. The forgone economic benefit, from even only one refinery closure, far exceeds the RIS estimated net benefit of Option C. The RIS itself notes that *"if refinery operators choose to close, the results of the (cost-benefit) analysis are likely to be different than those detailed.*

AIP has strongly recommended that, for the purposes of modelling the net benefit (NPV) of the RIS options, that plausible refinery closure 'scenarios' be incorporated into the modelling. Also, so as to better inform decision-makers of the risks involved with each Option and the relative risks between each RIS option, the RIS sensitivity analysis should present an assessment of how refinery closures would influence the NPV outcomes for each Option currently modelled in the draft RIS. AIP provides advice for this purpose.

As noted in Section 4 of this submission, the cost-benefit analysis has underestimated refinery costs associated with lowering aromatics for all petrol under Options B and C and does not recognise that it is infeasible to blend on an ongoing basis 98RON petrol with less than 35% aromatics without oxygenates (MTBE/ethanol). We expect that the consultant report presented a range of refinery cost estimates under different scenarios and market assumptions/impacts.

AIP recommends that the sensitivity analysis recognizes the range of potential refinery costs and sensitivity tests the NPV of the RIS options under low and high refinery cost scenarios, including potential refinery closures, given the substantial costs involved. These refinery costs also need to be sensitivity tested for different implementation dates.

Similarly, the RIS does not recognise known market risks from lowering aromatics in Australian petrol under Options B and C (and four key market risks are identified).

The impact of these risks include no viable alternatives to MTBE for refineries to meet octane requirements in Australian premium petrol grades on an ongoing basis, considerable difficulty in sourcing low aromatic MTBE free material in the region, and increased price premiums for crudes and products required in Australia. These risks would have a material bearing on the cost-benefit analysis and the viability of some RIS proposals, and should therefore be recognised in the draft RIS and subject to sensitivity analysis.

The sensitivity analysis could also usefully consider the impact on the NPV of the RIS options of:

- different petrol demand scenarios and grade switching (which will influence refinery costs);
- a range of market price premiums for each specification change (and the interactions between spec changes for price premium outcomes);
- different price elasticity of demand scenarios (which will influence consumer impacts); and
- the impact of different electric vehicle (EV) penetration rates on fuel volumes and vehicle emissions, particularly as most EVs will be operational in urban areas.

5. ASSESSMENT OF RIS POLICY OPTIONS: SUMMARY

Introduction

The initial Discussion Paper in this consultation process discussed five policy options for changing Australian fuel standards, and also invited feedback on other options or *"possibilities for the Government to consider"*. AIP responded to this invitation by recommending Option F which is outlined in the Box below.

Now, in the draft RIS, two previous options are not being pursued – namely, Option D and Option E related to alignment of Australian fuel standards with the WorldWide Fuels Charter and a phased introduction of new fuels standards respectively.

The Draft RIS now focuses on four options:

- *Option A* – No Change to current fuels standards (business as usual)
- *Option B* – Partial Harmonisation with European Standards (with the exception of MTBE) and removal of 91RON petrol from the market
- *Option C* – Partial Harmonisation with European Standards (with the exception of MTBE) and retention of 91RON petrol in the market
- *Option F* – Implementation of 10pppm sulfur across all petrol grades on 1 July 2027 (with no changes to other petrol parameters).

A summary of AIP's high level views on these options is outlined below, and the supporting evidence and assessment for these views is outlined in subsequent sections of this submission and in AIP's previous submission to this review.

Option A - Supported

AIP supports Option A as being the least cost to industry and consumers.

Option A is certainly the lowest risk to the ongoing viability of Australian refineries, including compared to Option F, as there is no requirement for the significant ($1 billion) investment by refineries to meet new fuel standards which have no direct benefits for the industry. The RIS itself confirms that *"lower costs for refineries increase the prospect of retaining domestic refinery capacity"*.

The only apparent barrier to retaining current fuel standards appears to be the introduction of Euro 6C and the impacts on triggering of On Board Diagnostics (OBD). It is claimed by the vehicle industry that this requires the whole of the gasoline pool to be converted to 10ppm sulfur petrol. These claims need to be fully tested because it will only apply to new vehicles when Euro 6C is introduced and there may be ways of capturing most of the benefits of Euro6 without introducing the OBD requirements.

Option B – Not Supported

Option B is not supported because it may result in the closure of one or more Australian refineries resulting in net community costs and removes ULP from the market with negative consumer impacts, including forcing existing vehicles to use premium grade petrol although their vehicles cannot derive the full benefit of the fuel.

AIP further observes that as cars requiring 95RON petrol enter the market place in increasing numbers, the demand for ULP will naturally fall and phase out over time similar to the phase out of Leaded Fuel in the late 1990s.

When premium petrol becomes the fuel demanded by the majority of Australian motorists, the industry will adjust to this in an orderly fashion, without the need for regulatory intervention. Refineries and distribution infrastructure will have to incur significant costs if there was a forced removal of ULP from the market. These distribution cost impacts have not been assessed by AIP members.

The draft RIS supports these views by estimating a net cost to the community from Option B.

However, as part of Option B, there are a number of specific proposals identified in the RIS to harmonise with the European Union on selected approaches or standards where relevant to Australian market conditions. AIP views on these proposals are outlined in Section 6.

Option C – Not supported

Option C is not supported as the minimal community and vehicle operability benefits demonstrated in the draft RIS are outweighed by significant costs and risks, including the expected closure of Australian refineries under this option.

As noted in Sections 3 and 4 of this Submission, AIP is concerned that the draft RIS cost-benefits analysis has several serious omissions in the analysis of Option C. This option involves onerous and costly regulatory changes for refineries which will deliver unclear benefits and threaten refinery viability irrespective of the implementation timeframe. Refinery costs and market and consumer impacts have been underestimated for this Option, and the health and operability benefits overstated.

We are certain that addressing the omitted costs and shortcomings with the RIS analysis will generate a net community cost for Option C alongside the already negative NPV for Option B, particularly if refinery closure scenarios are appropriately considered (rather than 'assumed away' in the analysis).

This AIP assessment would be supported if the evidence base for Option C is released for analysis as many of the claims in the supporting (unpublished) reports provided to the draft RIS process are contrary to the peer reviewed scientific evidence and global research provided in AIP's previous submission.

Option F - Supported

In AIP's initial submission, and again in this submission, we strongly argue that the proposed Option F will maximise community benefits whilst minimising the risks of refinery closure and of increased fuel prices. Option F involves a maximum of 10 ppm sulfur in petrol from 1 July 2027 with no changes to other fuel parameters and supported by a reporting regime to safeguard market fuel quality (see summary below).

A summary of the economic impacts of Option F is outlined in Section 7.

AIP's advice is supported by the draft RIS cost-benefit analysis which shows a clear net community benefit from Option F's proposed implementation of 10ppm sulfur petrol from 1 July 2027 and has the lowest impact on fuel prices over the next decade. The RIS also concludes that Option F *"provides the most cost-effective approach"* to achieving health benefits related to use of vehicle fuels.

AIP considers that Option F is the only option which actually provides a material net community benefit. The estimated positive community outcome for Option C in the draft RIS is overstated as, despite AIP advice to the contrary in previous AIP submissions, a simplifying modelling assumption was made that no Australian refineries would close under this approach. Therefore, the modelling does not reflect the resulting loss of significant economic benefits from refinery closures. The draft RIS notes that *"if refinery operators choose to close, the results of the (cost-benefit) analysis are likely to be different than those detailed"*. Option B already presents a negative community outcome before the impacts of refinery closure are even considered/modelled.

AIP member companies have agreed to the implementation of 10ppm sulfur in all grades of petrol from 1 July 2027 subject to no changes to other parameters in the petrol and diesel standards such as changes to Aromatics and Olefins in petrol and Cetane, Density and PAH in diesel.

However, the environmental benefits of 10ppm sulfur in ULP are still yet to be tested and therefore AIP advocates the further investigation of 30ppm sulfur in ULP to manage pipeline interface issues at distribution terminals.

This position however does not guarantee that each of Australia's refineries will continue to operate into the future but rather allows the necessary timeframe for each member company to carefully consider the most cost-effective solution to meet this new specification. It also supports the most effective way of scheduling the required construction works with planned major turnarounds and other intended investments at each refinery.

The potential for this additional investment to ultimately bring about further refinery closures is a major risk, therefore each AIP member company has committed to keep the Government closely informed of its respective options and decision making processes throughout the proposed implementation period.

Rationale for the Reporting Regime

The fact that the quality of market fuels is substantially better than current standards would indicate that there may be scope to lock in the current average market quality of fuel via industry reporting. Consequently, AIP member companies undertook a detailed examination of the possible sulfur and aromatic levels that could be achieved under an interim reporting process that would be delivered with minimal cost but ensure that there was consistency across Australia. By definition, this approach limits the proposal to the sulfur and aromatic levels of the highest sulfur and aromatic producing refineries in Australia.

In this examination, and also confirmed by the aggregate data presented in Section 3, there are relatively few production batches that are at very high sulfur and aromatic levels in the grade but the flexibility this gives the refineries i`s absolutely critical to their commercial viability. Therefore, the maximum allowable levels for this AIP proposal were only able to be reduced to those specified in the Option F summary below.

There are also issues with how any compliance regime would work under a pool average arrangement. Given that the majority of supply in Australia is sourced from co-mingled terminals, it is impossible to trace the individual molecules to the original owner. The quality of fuel is managed from the original certification documentation when the fuel is manufactured or imported, however, the Fuel Quality Standards Act requires the fuel to be compliant throughout the supply chain to the retail bowser. Therefore, it is impossible to demonstrate compliance under a pool average arrangement for the sulfur parameter.

To overcome this issue, it is proposed that the fuel standard is not altered and compliance is achieved by an annual reporting requirement utilising the certification documentation. Alternatively, if the Government wished to introduce a strict compliance regime, it would need to change the structure of the Fuel Quality Standards Act.

OPTION F

- Option F involves:
  - Introduction of 10ppm sulfur petrol in all grades on 1 July 2027
  - No changes to any other fuel parameter (e.g. MTBE or other oxygenates, aromatics)
  - Continuation of the ULP petrol grade.
- Option F also proposes an interim step involving a reporting regime for sulfur and aromatics to safeguard market fuel quality and capture some minor environmental benefits before 2027.
- The interim reporting regime step involves annual industry reporting to Government on sulfur and aromatic levels in Australian petrol in the market.
- The annual reporting would seek to demonstrate, on an industry and best endeavours basis, the following benchmarks from 1 July 2021:
  - 91RON:
    - Sulfur - 70ppm pool average and 150ppm maximum in ULP
    - Aromatics – 35% pool average and 45% cap
  - 95RON & 98RON:
    - Sulfur - 35ppm pool average and a 50ppm maximum
    - Aromatics – 42% pool average and 45% maximum
  - No changes to any other parameter.
- The reason for commencing these proposals in 2021 is because of the considerable uncertainty for some industry participants that will be caused by the introduction of the MARPOL requirements in 2020 and the potentially significant impacts on the global crude oil market (see main body of this submission).
- AIP members have also proposed to Government that industry reporting can commence well ahead of 2021 to demonstrate current market fuel quality, including meeting a 35% aromatic pool average for ULP from the commencement of reporting.
- It is critical that non-AIP members are also required to report on this basis to ensure the obligation applies across the whole fuels industry.
- It is also critical to understand that a pool average cannot be regulated under the current FQSA structure and would need to be monitored by regular reporting.
- While Option F delivers a net community benefit in the draft RIS, it is important to note that there will still be adverse consequences (see Section 7):
  - Motorists will face a price premium of up to 2 cpl.
  - There are large capital costs ($979m) and increases in operating costs (1.1-1.7cpl) for refineries
  - Increases in greenhouse gas emissions at the refinery of 5-10 percent.
  - Threats to refinery viability, risking $1 billion on average in economic contribution per refinery per year and impacting Australia's liquid fuel supply diversity and security.
  - In the event of refinery closures there will be knock on impacts that will affect specific local communities such as Geelong and to other industries with key links to the refining industry.
- Also under Option F:
  - There are limited health benefits (estimated at around $350 million NPV)
  - Mandatory vehicle standards can be introduced without changes to fuel standards (as has been demonstrated with Euro 5)
  - The environmental benefits of 10ppm sulfur in ULP are yet to be tested and therefore AIP advocates for further investigation of 30ppm sulfur in ULP to manage pipeline interface issues at distribution terminals.

6. ASSESSMENT OF OTHER RIS PROPOSALS

The draft RIS also presents a range of other policy proposals for changes to Australian fuel and information standards, across three topic areas:

(1) Fuels supplied in Australia which are not regulated by the Act

- A new 98RON petrol standard
- Octane Enhancing Additives in Petrol
- Diesel for non-road purposes
- A new B20 diesel standard
- Defining renewable and synthetic diesel

(2) Proposed amendments to fuel quality information Standards

(3) Proposed amendments to the Register of Prohibited Fuel Additive Guidelines

AIP's views on these proposals are outlined below. We note that some specific proposals in (1) also form part of the extensive package of measures included in Option B, but are considered and discussed here on their own merits. This includes because AIP does not support Option B, but can support some individual measures where a net benefit has been demonstrated.

98 RON Petrol Standard

AIP and member companies do not consider that a PULP 98 standard is necessary.

However, if Government considers that such a standard should be made (for example, for implementation and reporting purposes), then we strongly recommend that the new 98RON Petrol standard mirrors the current standard applicable to all Australian petrol, with no changes to any parameters (apart from sulfur from 1 July 2027 as per Option F).

In particular, it is critical that there are no changes to the specification of aromatic content (45% maximum and 42% pool average) and no change to the specified MON level (85%).

Octane Enhancing Additives in Petrol

As outlined in AIP's initial submission, AIP supports an approach where individual refineries are able to freely choose their preferred method within the bounds of the stipulations outlined in the FQSA. This may include use of ethanol, but AIP is opposed to mandating specific technologies or approaches for the purpose of octane enhancement.

The only octane enhancers that AIP and member companies are aware of are ethanol, aromatics such as benzene, toluene, xylene and ethyl benzene, or Octane (the chemical). All are either limited by regulation with respect to final concentration in retail fuel or limited in availability.

Other octane enhancing additives are either restricted by regulation such as Tetra Ethyl Lead / Tetra Methyl Lead by the lead limit in the Petrol standard, or restricted by industry self-regulation for additives such as MMT, Ferrocene and most recently N-methyl aniline (NMA).

Other octane enhancers pose other problems. Ethanol/oxygenate containing fuels are not allowed into supply chains shared with Aviation fuels without more stringent testing regimes being imposed on the Aviation fuels, so are generally not accepted due to contamination concerns. Incompatibility with Aviation fuels results in dosing of biofuels only at terminal gantries such as the case with E10 or B5 blending. This maintains complete segregation to prevent accidental contamination of aviation fuels. Also, other octane enhancers pose problems of scale/volume and supply.

The draft RIS seeks stakeholder views in particular on related ethers, such as ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME) and ethyl tertiary amyl ether (ETAE) and *"whether their properties are similar enough to MTBE to require a new limit of 1 per cent in the petrol standard, or whether they can be adequately managed and their use encouraged as safe sources of octane."*

AIP considers that these additives would need to be independently reviewed on a case-by-case basis for environmental and engine operability impacts. This could form part of the review of aromatics in 2022 proposed by AIP.

Extend the scope of the Fuel Standard (Automotive Diesel) to Offroad Diesel Use

The draft RIS proposes that the diesel standard be expanded to non-road (non-automotive) uses (eg. *"generators, grades, tractors, trains"*) to reduce emissions of particulate matter and NOx emissions.

The RIS states that *"the application of the fuel standards to the supply of fuel regardless of its use, with only minimal exceptions, would be beneficial to engine operability generally and would improve environmental and health outcomes. Non-road engines operate near humans and therefore should use fuels that comply with a standard that meets community expectations. Extending the scope of the standard could mean that those who use non-road diesel would be able to seek recourse under the Act if non-compliant diesel were supplied to them."*

While the stated benefits of this proposal have not been quantified or identified, AIP supports this proposal because it will have limited operational implications/costs for AIP member companies. Diesel produced or imported by AIP member companies meets the Automotive diesel specification regardless of who this fuel is supplied or how the fuel is used.

New Fuel Standard for B20

As indicated in AIP's initial submission to this review process, AIP supports the creation of biodiesel blend standard for B20. This will obviate the need for further applications and costs for Section 13 waivers, as identified in the draft RIS.

Please refer to the AIP Submission dated 11 May 2012 to the Department of Sustainability, Environment, Water, Population and Communities on the Discussion Paper for Developing a B20 fuel quality standard in which the proposed B20 test properties and test methods are discussed extensively.
Primary comments raised in that submission relevant to the currently proposed B20 Diesel Biodiesel Blend standard are outlined below.

Density
The proposed density range of 820-860 poses no obstacles to B20 blending using mineral diesel that meets current standard.

Viscosity
The range needs to be adjusted to 2.0-4.6 so as to align with the resultant viscosity from blending the raw diesel and biodiesel. AIP recommends setting a range for Kinematic Viscosity @ 40 °C of 2.0 – 4.6 mm^2/s by ASTM D445 rather than 2.0 – 4.5 mm^2/s, to allow for the situation where both blend components are at their legislated maxima. Restriction of the B20 specification of 4.5 max, indirectly places restrictions upon the mineral diesel and biodiesel blend components.

Derived Cetane Number
AIP is not aware of any compelling environmental or operability reasons for specifying a DCN of 51 for B20 that will outweigh the considerable costs. AIP strongly recommends a minimum DCN of 46 for the proposed B20 standard (in alignment with the Cetane requirement for mineral diesel).

Acid Value

AIP recommends setting a limit for Acid Value of 0.5 mg KOH/g maximum by ASTM D664 rather than 0.3 mg KOH/g maximum proposed in the discussion paper to compensate for the currently specified Acid Value maximum of 0.8 mg KOH/g in the Australian fuels standard for B100.

Oxidation Stability

AIP recommends setting a limit for Oxidation Stability of 6 hours minimum by EN15751 to align with the Australian fuel standard for B100. Oxidation Stability is heavily influenced by the biodiesel content and so it is appropriate to align with the B100 standard. AIP recommends that reference should be made to an established comparable product specification such as ASTM D7467 B6 - B20 to support the proposed limit. The US standard for B6-B20, ASTM D 7467, defines a minimum 6 hour induction period for blended fuels with no obvious quality concerns being detected in the American market. AIP recommends the most appropriate starting position for oxidative stability is harmonisation with ASTM D7467, which defines a minimum 6 hour induction period.

Biodiesel content

AIP proposes that the biodiesel content be specified as 5.1 - 20 percent v/v maximum biodiesel content limit by EN 14078.

Water & Sediment

AIP supports setting a limit for water and sediment of 0.05 vol percent maximum by ASTM D2709. However, please see the 2012 submission regarding a discussion relating to harmonisation with ASTM and the current Australian standards for Automotive Diesel and biodiesel.

Filter Blocking Tendency

AIP supports a maximum limit for FBT by ASTM D D2068/IP387 of 2.0 to align the B20 specification with the diesel quality standard.

Summary of AIP position on Test Properties and Test Methods

Test Property	Test Method	AIP Submission
Flash Point , °C	D93	61.5 min
Water & Sediment %v/v	D2079	0.05 max
Distillation , 90% recovered, °C	D1160	360 max
Kinematic Viscosity @ 40 °C, cSt	D445	2.0 – **4.6**
Ash , mass%	D482	0.01 max
Sulfur content, mg/kg	D5453	10 max
Copper Corrosion (3h @ 50 °C)	D130	1 max
Derived Cetane Number	D6890	**46 min**
Carbon Residue(10% bottoms), % mass	D4530	0.3 max
Lubricity, HFRR @ 60 °C , µm	IP450	460 max
Biodiesel Content, vol%	EN14078	5.1 – **20.** (Note 1)
Acid Number, mg KOH/g	D664	**0.5 max**
Oxidation Stability, hours	EN15751	**6 min**
Density, kg/m³	D1298	820 – 860
Conductivity @ ambient temperature, pS/m - Needs to be agreed with AIP members	D2624	50 pS/m min
Filter Blocking Tendency	D2068	2.0 max

Note 1: Results to be rounded to two significant figures only for purposes of determining compliance with the standard

Include a definition of renewable and synthetic diesel

The draft RIS proposes a definition for renewable diesel and for synthetic diesel, with the objective of confirming that both are subject to the diesel fuel quality standard. AIP notes that all fuels employed on Australian roads must comply with stringent and comprehensive FQSA standards that define fit-for-purpose fuels regardless of manufacturing process or raw material source. Regulation in the FQSA by source or process adds complexity without any benefits to consumers or the environment. There is also no way for companies to easily verify what manufacturing process or source material is involved in the manufacture of imported fuels.

With respect to the definition of 'renewable diesel', AIP notes that the definition in the draft RIS includes plastic waste or waste rubber (such as tyres) in the list of feedstocks, which are not renewable in nature and are usually derived from crude oil. We suggest the definition is refined.

With respect to the definition of 'synthetic diesel', the consideration should be broadened to include any non-petroleum sourced fuel, including Fischer-Tropsch gas to liquids/biomass to liquids/coal to liquids, hydrogenated vegetable oil or other non-crude oil refining process derived diesel or motor spirit components.

Proposed Amendments to Fuel Quality Information Standards

Fuel Quality Information Standard (Ethanol) Determination 2003
No changes are proposed to this determination.

Fuel Quality Information Standard (Ethanol E85) Determination 2012
It is proposed that there will be a minor amendment to this information standard to clarify that Ethanol (E85) will be read as "x% ethanol, where x is a number more than 70 but less than or equal to 85" and with no changes to the words/description on the bowser. AIP notes that D6839 Part B is applicable to ethanol content 50 - 85%.

Proposed Amendments to the Register of Prohibited Fuel Additives Guidelines

AIP supports the proposal to list Tetraethyl Lead (TEL) on the Register of Prohibited Fuel Additives, allowing for trace concentrations (to be defined) of these additives in imported petrol batches, similar to lead and MTBE limits already present in the current Petrol Standard. TEL is already effectively prohibited in road fuels however it is not intended that placing TEL on the Prohibited Fuel Additive list prevents the manufacturing or importation of Aviation Gasoline. Importation of TEL for Aviation Gasoline manufacture at Geelong refinery and in Aviation Gasoline imported fuel is necessary for the Aviation industry.

AIP supports the proposal to list N-Methylaniline (NMA) on the Register of Prohibited Fuel Additives, allowing for trace concentrations (to be defined) of these additives in imported petrol batches, similar to lead and MTBE limits already present in the current Petrol Standard. It should be noted that NMA is used in quantities which might be considered to be a blendstock rather than an additive and therefore it needs to be considered whether it would be captured within the fuel additive definition. NMA has a questionable impact on engine oil residues and performance (refer to *SAE 'Impact of Aniline Octane Booster on Lubricating Oil' Report #2016-01-2273*) which indicates some potentially adverse impacts on engine oil. The acute toxicity of NMA also makes it a questionable component to expose operational personnel and customers to. It should also be noted that NMA has also been banned in some jurisdictions (eg. China).

AIP recommends the Department should consult with OEMs and additive suppliers on the treatment of MMT. MMT's effect on emission catalysts systems, spark plug life and on-board diagnostic systems via deposits on oxygen sensors (Refer to *CRC 2015 Literature review Report E-114 and SAE Report 2016-01-9073*) is questionable.

7. SUMMARY: THE ECONOMIC IMPACTS OF OPTION F

Option F: Impacts on Refinery Costs, Operation & Viability

- The industry analysis and case presented in AIP's previous submission to the Discussion Paper is for the impacts and costs on refineries of implementing 10ppm sulfur petrol and utilises some key simplifying assumptions, in particular, that sulfur is the only parameter considered.
- The costings are based on the AIP proposal to introduce 10ppm sulfur petrol from 1 July 2027, with no changes to other fuel parameters and supported by an interim reporting regime step.
- In the time available for the submission on the Discussion Paper, each AIP member undertook significant investigation and modelling of the solution with optimal construction times, i.e. to synchronise construction around scheduled maintenance events ("turnarounds") that occur every 4-6 years.
- It is critical that any changes to fuel standards are coordinated with scheduled maintenance periods, otherwise substantial costs could be incurred that have not been estimated in that work.
- The estimates do not include changes to other petrol parameters such as aromatics, Methyl Tertiary Butyl Ether (MTBE) and other oxygenates, octane or olefins, but does take account of the changing requirements of the octane pool, i.e. the ongoing switch to Premium Unleaded Petrol (PULP) from Unleaded Petrol (ULP).
- It is absolutely critical that all fuel standard parameters are clearly defined by Government before final construction costs, operating costs and refining margin impacts are calculated for a Regulation Impact Statement (RIS) assessment.
- The AIP estimates are in 2017 dollars and no provision has been made for pre Front End Engineering and Design (FEED) work that must be completed or loss of business and opportunity costs of resources diverted during the construction period (5 years).
- The costs were benchmarked against similar construction projects at other refineries using standard engineering estimation techniques and the cost variances utilised are standard internal practices for each AIP member.
- The resultant costs will be different for each AIP member and depend on the strategy employed to reach the 10ppm sulfur standard in petrol, however, each refinery will be required to construct a de-sulfurisation unit, address the loss of octane from the desulfurisation process either through construction or blending or both, and augment infrastructure and utility facilities.
- AIP's assessment of the likely total capital cost to the Australian refining industry of Option F would be $979m, similar to the advice provided by AIP in its submission to the Ministerial Forum on 8 April 2016.
- Using standard company approaches to construction cost variances the total capital expenditure is likely to range from $703m - $1,408m; however, the qualitative feedback is that it is likely to be at the higher end of the estimates.
- There is a considerable range of likely construction costs between the individual refineries that reflects the different refinery configurations and the strategies employed to meet the reduction in sulfur (but the average is just below $250 million per refinery).
- Increased operating costs include direct costs (labour, catalyst, materials), additional operating costs and refinery margin impacts due to downgrading (octane destruction) of product streams in the process.
- The expected increase in operating costs is $128m - $192m which equates to a cost of 1.1.-1.7 cents per litre.
- This result confirms the previous advice provided by AIP on 8 April 2016 that increased operating costs will likely exceed any price premium for improved quality.
- AIP estimates that the increase in refinery emissions will be between 160,000 and 320,000 tonnes pa. By way of example, at a $20 per tonne assumed carbon price, this would equate to an additional impost on refineries of between $3.6m and $7.2m per annum.

Option F: Impact on Australian Economy and Communities

- Australian refineries have been long standing participants in the local market as major transport fuel suppliers, with all current refineries being operational for over 60 years.
- The Australian refineries refine about 27 billion litres of crude oil a year (including 7 billion litres of local crude and condensate) into the high value products needed by industry and consumers.
- In 2016, the refineries produced 26 billion litres of refined products, with petrol and diesel accounting for approximately 80 percent of this production.
- From this refinery production, the four Australian refineries typically supply around 40-50 percent of Australia's total liquid fuel needs, and more than 60 percent of petrol consumed in our market.
- Other Australian industries are positively impacted by refineries which provide key inputs to their own activities. Approximately 65 percent of the total value of Australian liquid fuel consumption is in the transport, mining, construction, agriculture and manufacturing industries.
- Total new capital investment in the refining industry was $2 billion over the last 5 years.
- As a high-tech industry, the refining sector has highly skilled workforces with an even mix between direct employees and contractors whose numbers can double during major turnaround work.
- Australian refining companies directly employ 2,000 highly skilled workers at their refineries, and over 10,000 employees nationally. Their workforce is significantly higher when including contractors.
- The Australian refineries also spend hundreds of millions each year purchasing goods and services in their local area and State, contributing to significant jobs and business opportunities.
- The refineries also make a very significant contribution to government revenue, including collecting and paying around $15 billion in fuel excise to the Federal Government from fuel sales in our market.
- As a result of these direct economic benefits, the refining industry's contribution to GDP/GSP is significant and comparable to other important Australian industries, and the presence of a refinery leads to higher private consumption (economic welfare) and business investment.
- Independent economic modelling has found that an Australian refinery contributes around $1 billion in economic activity on average to the local economy, including the direct impact of refinery value added and flow-on impacts to other sectors.
- However, such economic modelling does not capture key positive externalities and indirect benefits generated by the refining industry which are also economically important, including contributing to the reliability and security of fuel supply, sharing inputs with other industries, innovation, technology and knowledge spillovers, and community development and investment activities.
- *Reliability & Security of Supply*: The domestic refining capacity contributes to the overall health of the Australian economy through its contributions to the level of fuel supply reliability and flexibility. Supply security is enhanced in Australia through the availability of both domestically refined and imported fuels from a wide diversity of supply sources.
- *Input Sharing*: The refining industry benefits other sectors through increasing demand for certain inputs shared with other industries (e.g. engineering services, chemicals, electronic equipment and mechanical components); this assists these sectors achieve economies of scale and benefit from lower costs in their supply chains (e.g. petrochemicals, plastics and heavy industry/manufacturing).
- *Innovation & Spillovers*: As a high-tech industry, the refining industry benefits the economy through innovation, technology and knowledge spillovers occurring when these are transferred to other sectors (inc. through the mobile contractor workforce). Major technological investments made by the refining industry include improvements in safety, environmental management, new product development, and production improvements and de-bottlenecking. This stimulates innovation and technological improvements in other sectors, without them having to bear the full costs.
- *Community Development & Investment:* Companies that own and operate Australian refineries actively participate in several community development activities and groups to enhance the education, environment and health outcomes of the local area (inc. grants, donations, volunteer work, and sponsorship). Refineries are also strong supporters of local apprenticeship, trainee and tertiary internship programs, employing a large number of apprentices across a range of trades. Such initiatives can be expected to have wider economic benefits like higher GDP and living standards.

Option F: Impact on the Fuels Market & Consumers

- According to the ACCC, Australian wholesale prices are set by Import Parity Price (IPP) and are therefore a result of the supply and demand in the Asian region.
- Australia specification fuel (known as Oz spec) attracts a quality premium because the Australian regulated specification is different to other regional standards, largely because of the prohibition of MTBE which has implications for octane levels.
- AIP commissioned Facts Global Energy (FGE) to undertake a price premium assessment of Australian specification 10ppm sulfur petrol, in particular to gain some insight on the drivers of the supply and demand in the Asian region.
- There has been good availability of 10ppm material in the market, which explains why Australian companies are able to source low sulfur material to meet Australian PULP demand. FGE assesses this situation will continue until 2025 which underpins the continuation of low sulfur imports into the Australian market. This is not to say, however, that there aren't periods of tightness in the market for 10ppm (no MTBE) material, particularly given large markets such as China are heading to compliance with 10ppm.
- Currently the 10ppm market is oversupplied which explains why Australian companies are able to source low sulfur material to meet Australian PULP demand. FGE assesses this situation will continue until 2025 which underpins the continuation of low sulfur imports into the Australian market.
- At an assumed AUD/USD exchange rate of 75 cents, the estimated price premium is **0.6 cents cpl in 2017 growing to 1.75 cents cpl in 2027.**
- AIP and member companies consider that with a continuing ban on MTBE, the price premium for Oz spec is likely to be higher than that assessed by FGE.
- In this sense, these FGE estimates could be considered as being highly conservative.

8. AIP VIEWS ON PROPOSED PARAMETER LIMITS AND TEST METHODS IN FUEL (RIS APPENDIX B)

Introduction

The draft RIS presents a suite of proposed changes to fuel parameters and respective measurement units and test methods for each parameter, covering the dedicated fuel standards for petrol, ethanol in petrol, diesel, biodiesel, LPG, and E85 and a new standard for B20.

The suite of proposed changes are predicated on two very important principles – namely, 'harmonisation with Europe' and 'no demonstrable cost impacts' for the range of proposed technical changes outside the main policy options. These two predications are flawed, as explained below, and this is the key rationale underpinning AIP views presented in the tables below on each proposal in Appendix B.

AIP does not support those changes proposed in Appendix B of the draft RIS where they generate costs and complexity on the industry without delivering measurable environmental, health or vehicle operability benefits to the community.

Against these benchmarks, most 'change proposals' in Appendix B are not supported by AIP, with some key exceptions where the proposals are appropriate. AIP takes no exception to the proposed changes in 'units of measurement', except in instances where there would be a misalignment with the relevant test method.

We note that AIP's support for the introduction of 10ppm sulfur petrol in 2027 was conditional on no changes to other fuel parameters and approaches. This also underpins AIP support in the tables below for the current parameters in the fuel standards where "no change" is identified in the draft RIS Appendix.

AIP recommends that the changes proposed in the draft RIS (Appendix B) are not progressed unless a detailed review (including of AIP's advice in the attached tables) demonstrates a clear net community benefit for any proposal. No clear case or explanation has been made for most of these technical changes to Australia's well established and understood quality standards, apart from referencing Reports to Government which are flawed in key instances as they do not properly or accurately account for Australia's specific market circumstances.

Predication: Harmonisation with Europe

The suite of proposed changes *"are predicated on the principle of harmonisation with European Standards",* and are largely based on the Hart Energy (2014) report recommendations prepared for the Department.

AIP reiterates again that any harmonisation of fuels quality and test methods with European standards should also take regard of the longstanding FQSA principle that harmonization must be appropriate under Australian conditions. This important principle supports many of the AIP views expressed here and in the following tables. Once again, there are important technical barriers to Australian market fuel becoming "harmonised" with Europe, like the effective ban on MTBE.

Instead, Australia should align some key fuel specifications and test methods with Europe and elsewhere where it is appropriate for Australian conditions and where a net community benefit can be demonstrated. This is the same approach adopted by other countries in our region and globally.

For example, the Hart Energy report (XIII Appendix, pages 151-175) clearly demonstrates the wide-ranging variances in fuel specifications and test methods across the globe, which underscores that there is no single international standard, and fuel standards need to align with local conditions.

This is explicitly recognised in the Hart Report by highlighting that the reference countries they have used *"have different configurations in place for their refining industries, diverse vehicle fleets and air quality issues, as well as varying political and market conditions."*

However, the Hart Energy report (Table VII.2, pages 128 - 132) does not recognize that the effective ban on MTBE in Australia is a critical differentiator with the European specifications, and its direct connection with the ability of Australian refineries to achieve other specification changes (eg. to achieve 35% aromatics in high octane petrol). This is a fundamental omission in their assessment.

Predication: No Demonstrable Cost Impacts

The suite of proposed changes are also predicated on the assumption *that "with the exception of the parameters associated with the main elements of the proposed policy options,* (the proposed parameter and test method changes) *are not intended to result in demonstrable cost impacts".*

Overall, AIP considers that most of the proposed changes to significant figures and test methods will add complexity, red tape and cost on the Australian fuels industry, with some cost impacts being significant (discussed further below), and certainly so in a cumulative sense across the range of proposed changes. In addition, most of the proposed changes are unnecessarily restrictive, and will deliver no measurable environmental, health or vehicle operability benefits to the community. No case has been demonstrated for these changes.

Proposed Changes to Measurement Units

There are a number of proposals in Appendix B to change parameter 'units of measurement'. For example, a change is proposed to the unit of measurement for the 'oxidation stability' specification for diesel from 25 mg/L to 2.5 mg/100 mL aligning reporting units with that identified in the referee method. AIP takes no exception to the proposed changes to measurement units, except where there would be a misalignment with the relevant referee test method.

Proposed Changes to Significant Digits ('trailing zeros')

There are a number of proposals to change the number of significant digits (i.e. additional decimal places). For example, a change is proposed to the significant digits in the Ash specification for diesel from 0.01% m/m to 0.010% m/m, despite there being no ash related quality issues associated with Australian diesel.

Such changes may appear to be cosmetic or inconsequential to observers, but they would have meaningful and in some cases significant cost impacts on fuel suppliers, particularly when considered as a package. For example, these changes may result in material cost increases stemming from:

- an increased frequency of resampling and retesting;
- an increased frequency of reblending of batches at local refineries;
- additional administrative costs to change all related specification documentation underpinning commercial fuel transactions;
- additional laboratories costs to change all sample types in various laboratory information management systems and documentation; and
- a potential increase in the price premium for imported fuel to Australia which are traded against the Platt's market specifications which do not include significant digits; that is by more tightly (and unnecessarily) restricting the Australian fuel specifications, will move Australian fuel away from the more commonly traded regional specifications, a move which normally attracts a market premium.

Balanced against these costs and unnecessary red-tape on industry, AIP member companies consider that an extra significant figure/s are unnecessary and will deliver no measurable environmental, health or vehicle operability benefits. As a result, many proposals are not supported.

However, where an additional significant digit would align with actual general industry practice (thereby limiting cost impacts) and is consistent with policy objectives (intended environment/community outcomes and benefits), these proposals can be supported.

For example, AIP considers that a change to 1.0 v% for the benzene specification would be appropriate. Reporting to 1 decimal place would be aligned with general industry practice and is consistent with environmental objectives. However, AIP does not support reporting to two decimal places as this would impose operational costs and flexibility restrictions without meaningful environmental outcomes.

Proposed Changes to Test Methods

There are a number of proposals in the draft RIS to change test methods for specific fuel parameters.

AIP member companies do not support changes to test methods unless they deliver meaningful benefit to the industry, laboratories and the community. Apart from generating additional (unnecessary) industry costs like those identified above, changing methods can introduce significant statistical bias between methods which could have considerable unintended consequences for fuel producers and suppliers. Against these benchmarks, almost all identified proposals for changes to test methods are not supported.

AIP does support changes to test methods where a test method is not currently specified and/or where a case for change is clearly demonstrated. This will provide clarity to market participants and fuel suppliers and surety for customers, whilst supporting fuel quality compliance overall.

In this instance, we support the proposal in the Appendix for the petrol standard to replace "Not specified" with "ASTM D86" as the test method for 'Distillation - max final boiling'.

We also support the introduction of an additional test method in the petrol standard identified in the original AIP Submission to the Discussion Paper phase of this consultation. AIP recommends the addition of a Silver Corrosion test for petrol (ASTM D7671 or D7667) with a specific limit of 2 maximum to protect customer vehicle fuel tank level sensing equipment. This test was introduced globally by most oil companies after incidents in the United States. The intent within the industry is to manage to a maximum result of 1. However, occasional batches with a result of 2 may pose no operability risks and the industry requires flexibility to allow management of batches with a 2 rating.

In the abovementioned Submission, AIP also recommended that the 'colour' parameter in the Diesel Regulation be removed. Colour of diesel does not in any way reflect the quality of diesel. Different refineries utilise different technologies to deliver ultra-low sulfur diesel, with the colour of the finished product reflecting the technology employed. Consequently, diesel colour varies from the traditional ASTM D1500 amber/yellow/brown standard colours making measurement meaningless. Given the comprehensive nature of the current Diesel quality standard which defines key operability parameters, variations in colour are only of interest in the supply chain and do not relate to customer amenity, vehicle performance or tail pipe emissions.

Proposed Substantive changes to Fuel Standards

The proposed substantive changes to the key specifications in the petrol and diesel fuel standards (eg. sulphur and aromatics content in petrol, and density, cetane and PAHs in diesel) are discussed in the main body of this submission. These major changes to fuel specifications would require very major capital and operational expenditure by Australian refineries, threatening their ongoing viability. The only major specification change supported by AIP is to the sulfur content (10ppm) across all grades of petrol commencing 1 July 2027.

Detailed Tables & AIP Views

Appendix A to the draft RIS details an extensive suite of proposed changes to fuel parameters and respective measurement units and test methods for each parameter, covering the dedicated current fuel standards for petrol, ethanol in petrol, diesel, biodiesel, LPG, and E85 and a new proposed standard for B20.

The Appendix tables compare the limits for each fuel parameter under each RIS option with Option A, which reflects the current parameter limits. The RIS notes that most of the changes proposed in Options B and C align with either the relevant EU fuel standard or recommendations in the Hart Report.

Where a proposed new parameter, test method or unit of measurement is different from the current approach, it is shaded either pale or dark green, depending on whether the change is minor or major respectively in the Department's view.

The tables below present AIP positions and comments on the change proposals identified in the draft RIS (Appendix B). For completeness, AIP positions are also presented on the other parameters proposed to be retained in their current form (i.e. no change).

AIP has also suggested additional parameters and test methods where none are currently specified to provide clarity to market participants and fuel suppliers and surety for customers, whilst supporting fuel quality compliance overall. Additional specifications proposed by AIP are shaded 'orange'.