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Vehicle Emissions Working Group  
The Department of Infrastructure and Regional Development  
GPO Box 594  
Canberra ACT 2601

Dear Working Group

**BP Submission on Vehicle Emissions Discussion Paper (VEDP) February 2016**

BP welcomes the opportunity to contribute to the discussion on vehicle emissions in Australia as the Ministerial Forum contemplates measures to reduce noxious and carbon dioxide (CO<sub>2</sub>) emissions from the road transport sector. Our full submission is attached.

BP is a significant participant in fuel supply chains in the Australian market as such has an interest in regulatory development in vehicle emissions and their interaction with fuel quality and the maintenance of liquid fuel supply reliability. Respecting the communities in which we operate is a fundamental value of BP. We respect the community need for improving air quality and responding to climate change and support a policy development process that is based on sound science, robust economic analysis and comprehensive consultation.

The VEDP is a comprehensive and broad discussion on vehicle emissions, though we have an opinion on a range of topics conferred in the paper, in this instance we have deliberately chosen to focus on the impact of fuel standard changes on our business. Any changes to the current Fuel Quality Standards Act 2000 (Cth) (the FQSA) will result in considerable, unplanned costs to our business. We do not support the position suggesting petrol with 10 part per million (ppm) sulfur is required to implement Euro 6 light vehicle emissions standards. Our view is that there are no operability benefits and indeed immaterial environmental gains (CO<sub>2</sub> or other) from changing the sulfur content to 10ppm. **BP believes Euro 6 certified vehicles can meet Euro 6 emission limits using current Australian market fuels.**

Australian petroleum refining is already under economic pressure. The viability of BP's refinery will be challenged with any changes made to the current FQSA. We therefore urge the working group to consider that any recommended changes to FQSA must be thoroughly assessed in a Regulatory Impact Statement (RIS). In our view introducing 10ppm sulfur petrol – which will yield minor environmental benefit must be weighed against the significant costs of additional refinery infrastructure, operating costs and the increased costs to motorists.

BP is a member company of the Australian Institute of Petroleum (AIP). We are active contributors to the AIP submission and wholly support the positions and messages provided in that submission. This submission is best read in conjunction with the AIP submission for a clear industry perspective and recommendation.

For further information, please contact me 

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**Director Policy, Environment and Community Affairs**

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### 1. BP in Australia

BP in Australia is the only global fuel retailer engaged in the Australian market from well to bowser – from exploration and production of crude oil and natural gas (upstream) to refining and marketing of petroleum products (downstream). As a company we operate in every state and territory in Australia, headquartered in Melbourne. BP currently employs 6000 employees and long term contractors in Australia. BP owns and operates Kwinana Refinery in WA. Kwinana is Australia's largest refinery processing 146KBD of crude. Kwinana employs approximately 380 staff and in steady-state operations, some 300 contractors. Kwinana produces LPG, petrol, diesel, kerosene, jet fuel, bitumen and heating oil.

BP in Australia has a network of specially designed Truckstops on major trucking routes, and a retail network of some 1,400 service stations. We also operate a substantial wholesale business, B2B bulk businesses, and distributor businesses that supply mining and rural customers. In 2014 BP affirmed plans to increase investment (\$150 million per annum) over a 3 year period across the retail network.

BP's interest with regard to changes in vehicle standards is primarily regarding the impact such changes would have on fuel specifications. Any modifications to the fuel quality standard may impact Kwinana Refinery's sustainability.

### 2. BP's view on the FQSA 2000

BP does not support changes to the FQSA. Sulfur is a key quality parameter in petrol. The current sulfur standard in unleaded petrol ULP (91 RON) is 150 ppm, and for premium unleaded petrol PULP (95 RON) is 50ppm. Over the past few years there has been increasing pressure from manufacturing interest groups to reduce sulfur limits in petrol to 10ppm. They claim this to be a requirement for the introduction of Euro 6 vehicle emission standards and CO<sub>2</sub> standards. BP disputes this claim and support the AIP position that questions the credibility of such a claim. In reference BP recommends the working group consider the Orbital report of June 2013 – which concluded that the Euro 6 vehicles can operate satisfactorily on PULP with a sulfur standard of 50ppm.

For nearly 10 years, there has been engagement and discussion with government and other stakeholders on amendments to the sulfur content parameter in the standard. The basis of this suggested change has been an environmental rationale, and yet there has been very little science to support the argument that a reduction in sulfur content from 150ppm or 50ppm to 10ppm would result in any significant environmental benefit. In fact over the past 20 years, numerous studies have been conducted to assess sulfur limits on other emissions (inclusive of NO<sub>x</sub> and CO), these have concluded that below 150ppm sulfur, the sulfur curve is flat, meaning there is no response of other emissions to sulfur.

A requirement to reduce sulphur in petrol to 10ppm came about with the introduction of lean burn direct injection spark ignition engines to enable CO<sub>2</sub> reduction. As with diesel engines lean burn operation increases the production of NO<sub>x</sub> and reduces CO<sub>2</sub>.

In petrol engine technology the higher NO<sub>x</sub> was managed using a DENOX catalyst which requires regular regeneration. Higher fuel sulphur levels required more frequent regeneration which increased fuel consumption and resulting CO<sub>2</sub> emissions thereby defeating the purpose of lean burn operation.

In diesel engines the increase in NOx was dealt with via exhaust gas recirculation and then an after treatment DENOX catalyst using diesel emission fluid. Currently the use of diesel emission fluid in an exhaust gas treatment system is enabling diesel vehicles, large and small to meet Euro 6 diesel requirements. Therefore dealing with NOx emissions can be easily addressed using alternative exhaust technologies.

In spark ignition engines using petrol, the lean burn engine technology with a DENOX catalyst in the exhaust has not become popular and currently is limited to a small number of high performance vehicles. The predominant developing technology involves downsized turbo charged engines with stoichiometric direct injection which have better control of emissions and do not require an exhaust DENOX catalyst. We estimate that some 15% of vehicles in the market have this technology and it is increasing at about 5% per year as more new vehicles enter the market and manufacturers adopt this technology. Our projections suggest very limited application of lean burn technology requiring an exhaust DENOX catalyst. In our view, this suggests that the requirement for 10ppm sulphur is substantially diminished.

A requirement for BP to produce 10ppm sulfur fuels, would be a material cost that would impede the viability of Kwinana refinery. The introduction of 10ppm sulfur would result in major costs including refinery construction costs (Capex >\$100M) and increased ongoing operational costs (Opex >\$5M/per annum). Complying with a reduced sulfur standard will increase Kwinana Refinery facility Greenhouse Gas emissions due to increased energy input to produce the low sulfur fuel.

In addition to the above costs, there is a cost implication to responding to the Regulatory Impact Statement (RIS). This is likely to be a two year process, where teams of engineers, project managers, asset economists, chemists and experts in logistics, modelling and finance are brought together to fully understand and plan for the changes. The cost of such a project team is approximately \$10M. Greater detail regarding impacts and costs in a general sense have been explained in the AIP submission.

### 3. The Australian Refining Industry

Australian refineries are a key source of liquid fuel supply for the economy and any further impacts on capacity needs to be carefully considered for impacts on supply security. The industry has gone through a period of structural adjustment, mainly by consolidation and transition to an import market. Refining is an important economic activity in its own right and reinforces the competitive advantage of major exporting industries. Currently the industry enjoys a steady state and BP is optimistic about the ongoing future for Kwinana given the current approved capital investment programme to ensure reliability and competitiveness into the future.

Australian refineries are vulnerable in that they compete against pricing set by large export refineries in Asia. The Kwinana Refinery, though the largest refinery in Australia, is relatively small when compared to regional refineries, and as such this relatively small capacity impacts economies of scale and hence production costs. In addition we have had to compete with a regional supply excess. The combination of such external forces has and continues to negatively impact profitability.

#### 4. The role of market forces

BP believes that existing market forces are already producing desired environmental outcomes. These include:

- prolific uptake of fuel efficiency technology in all forms of motor vehicles resulting in improvements in fuel economy (established trend),
- policy outcomes of existing policies aimed at improving air quality being captured,
- natural turnover of the vehicle fleet increase the volume of efficient vehicles in the market,
- substitution to alternative fuels,
- changing patterns of fuel demand towards higher grade fuels (increased fuel economy),
- substitution for alternative technologies or forms of transport.

BP believes improvements to the fuel standard orchestrated in 2000, 2006, 2008 and 2009 continue to be captured delivering on the air quality intent of the FOSA. In addition there is a changing pattern of demand which means the average levels of sulfur will continue to decline as we see a grade switching to higher grades (hence lower sulfur) especially in large markets like NSW.

BP agrees with the AIP submission that forecasts increases in market substitution from ULP to PULP and/or Ethanol blends (due to state-based mandates) which will ultimately lower sulfur levels used in the Australian gasoline fleet, expecting total emissions to decline on this grade switch basis. Important to note is the point made on the NSW market ".....NSW has a PULP proportion of 42% of the petrol market which has been driven by the ethanol mandate. In response to the removal of ULP from service station forecourts, consumers chose to switch to PULP rather than consume E10 blends."

#### 5. Key issues to consider

As the working group deliberates recommendations, BP suggests the following issues or points of fact be considered;

##### **5.1 The market**

Total petrol demand in Australia has been flat for over 10 years. This is mainly due to technological gains in fuel economy. This is regardless of the growth in vehicle fleet and changes in distance driven.

Australian Design Rules (ADR) regulate vehicle emissions in Australia, these are harmonised with UN Standards and hence EU standards. Australia is currently at Euro 5. It is worth noting that the limits of emissions (NOX and CO) are the same for Euro 5 and Euro 6 in petrol engines.

A recent industry assessment<sup>ii</sup> suggest the Australian market fuel quality is generally significantly better than the standard. In Sydney in 2014/15 sampling of ULP averaged a sulfur level of 28ppm and PULP of 16ppm. Melbourne's results were equally low, at 60ppm for ULP and 28ppm for PULP. In addition, growth in PULP uptake by the market has gone from 10% - 30%, resulting in compounded reduction in sulfur content. Any changes to the sulfur standard on ULP and PULP could yield large costs for changes already occurring through natural market forces and indeed with very little over-all environmental benefit. It is also worth considering that motorists are consuming this better quality of fuel without having to pay a premium.

## 5.2 Currently Australian market fuels can be used in Euro 6 vehicles

BP believes that Euro 6 certified vehicles can operate effectively on current Australian market fuel quality and indeed meet Euro 6 emissions requirements. We recognise that an exception does exist and this is lean burn Gasoline Direct Injection (GDI), a technology requiring 10ppm. However this type of technology is only being used in a few very high end vehicle models. Our studies suggest lean burn GDI vehicles can indeed operate satisfactorily on Australian specification fuels, but with no optimal environmental benefit.

## 5.3 Costs across the supply chain

Changing the fuel standard and indeed initiating a RIS is a significant undertaking, it is costly and disruptive to business as such we believe that a robust environmental case for initiating a change to the fuel quality standard must be demonstrated before we embark on this expense, time consuming process.

Any changes in the fuel quality standard will have direct financial impacts on Kwinana Refinery. The changes required are complex and capital intensive. Complex in that construction of a new unit is required and can only take place during a scheduled maintenance shut down period. Scheduled shut downs (sometimes referred to as turnarounds) are planned (Four years in advance) and are managed events for maintenance, statutory inspections and or infrastructure upgrades or plant expansions. There is a delicate system across the refining industry to manage these turnarounds in a synchronised way so as not to impact fuel supply across the country. This means lead times for any changes would need to consider the timing of these turnarounds.

In the case of the Kwinana Refinery an additional process unit will need to be constructed and installed at the refinery. This will require large amounts of energy input to operate. BP cautions the working group to consider upstream emission consequences of attempting to reduce tail pipe emissions. In effect the net outcome may result in higher CO<sub>2</sub> emissions over the production consumption lifecycle of petrol.

BP suggest the working group consider that increases in fuel prices are likely to result in any FQSA changes, this will be a cost to motorists. In Australia the domestic wholesale prices are based on Import Parity Prices (IPP), 10ppm sulfur petrol is a higher quality fuel and hence will attract a premium given the lower sulfur requirement.

## 5.4 The Regulatory Impact Assessment

BP supports the need for a full RIS should recommendations include changes to the fuel standards, although this is an expensive process for refiners. We support the AIP position stating **'It is essential that the scope and objectives of the petrol standards review be clearly defined before undertaking any RIS and it is recognised that all the parameters of the standard will need to be considered'**<sup>1</sup>

Options for changing the standard must be clearly defined before undertaking a RIS. A complete review of petrol standards will need to consider a range of parameters including sulfur, aromatics, olefins and oxygenates changes to any or all of these parameters will have an impact on refineries and will need to be assessed for feasibility and costs. BP supports the details discussed in the AIP submission under 'The implications of a fuel standard RIS' which discusses in great detail the type of cross-industry, multi-disciplinary approach required for such process.

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<sup>1</sup> AIP Submission to the Vehicle Emissions Working Group on the Vehicle Emissions Discussion Paper February 2016, (page 9)

BP is committed to working with the government as it deliberates a way forward with regard to vehicle emissions standards and by virtue assess the FQSA, though we support that such a large scale change must have a full scale RIS process, such a process is a complex and expensive exercise for us.

It is essential that the options for changing the standard are clearly defined before undertaking any RIS. The working group should recognise that should they pursue a RIS, all the parameters of the standard will need to be considered and these may have further implication (cost and feasibility) on Kwinana refinery. These may include; Aromatics, Olefins and Oxygenates. The cost impacts (both capex and opex) of the changes to fuel standard suggested in the Discussion Paper are considerable therefore we strongly recommend that comprehensive due diligence is embarked upon to clearly evaluate the environmental benefit and indeed case for change to the standard. It is BP's view that immaterial environmental benefit may result from what could be large investments at a time when the industry is vulnerable to external economic pressures.

### **5.5 Timing**

BP believes it will take two years to service RIS requirements. As discussed above, the cost implications are estimated at approximately \$10 million.

BP currently estimates a minimum of five years to implement any changes in the fuel standard once a decision has been finalised.

## **6. Conclusion**

BP's view is that current fuel quality standards do not limit the adoption of any technology (except in niche circumstances such as GDI, where environmental performance is lowered). BP does not have an opinion on the introduction of Euro 6 standards, as long as such an introduction does not influence the FQSA and further place unnecessary, costly burden on Kwinana Refinery. The cost impact for our business in the event of a FQSA amendment especially to limits on sulfur content, may impact refinery viability into the future.

As disclosed above the cost impact of a RIS and indeed a final implementation of 10ppm is a material cost to our business. This level of cost should not be embarked on unless a vigorous environmental case exists for the change. BP believes the current environmental gains from such a costly proposal are unwarranted.

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