

**EXPLANATORY MEMORANDUM TO  
THE MOTOR FUEL (COMPOSITION AND CONTENT) (AMENDMENT)  
REGULATIONS 2007**

**2007 No. 1608**

1. This explanatory memorandum has been prepared by the Department for Transport and is laid before Parliament by Command of Her Majesty.

**2. Description**

These Regulations, which further amend the Motor Fuel (Composition and Content) Regulations 1999<sup>1</sup> (“the 1999 Regulations”), transpose those parts of Article 1 of Directive 2003/17/EC<sup>2</sup> which require Member States to ensure the marketing within their territories, of diesel fuel and petrol with a maximum sulphur content of 10mg/kg or less (“sulphur free fuel”) and its availability on an appropriately balanced geographical basis (“marketing requirements”).

**3. Matters of special interest to the Select Committee on Statutory Instruments**

None.

**4. Legislative Background**

4.1 Directive 98/70/EC<sup>3</sup>, which has been amended by directives 2000/71/EC<sup>4</sup> and 2003/17/EC and, in relation to the committee procedure to be used, by Regulation (EC) No 1882/2003<sup>5</sup>, provides the main composition and content requirements for petrol and diesel fuel for use in road vehicles generally and for gas oil used in certain non-road vehicles.

4.2. The 1999 Regulations (as amended) prescribe, so far as is relevant to these Regulations, distribution and sale requirements for petrol and diesel fuels. Different requirements apply in respect of vapour pressure for petrol in winter and in summer. By virtue of the 1999 Regulations, with certain limited exceptions, petrol is required to comply with the environmental specifications in Annex III of Directive 98/70/EC (as last amended by 2003/17/EC) and diesel is required to comply with Annex IV of the same Directive.

4.3 Those parts of 2003/17/EC that require all petrol and diesel fuel to be sulphur-free from 1<sup>st</sup> January 2009 have already been transposed by the Motor Fuel (Composition and Content) (Amendment) Regulations 2003<sup>6</sup> (S.I. 2003/3078) These amending Regulations implement a requirement in directive 2003/17/EC that Member States take measures to ensure the availability of sulphur free petrol and diesel on a balanced geographical basis in advance of 2009. In order to better integrate the changes necessary to the 1999 Regulations as a result of transposing the marketing

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<sup>1</sup> S.I. 1999/3107.

<sup>2</sup> O.J. L76, 22.3.2003, p.10.

<sup>3</sup> O.J. L350, 28.12.1998, p.58.

<sup>4</sup> O.J. L287, 14.11.2000, p. 46.

<sup>5</sup> O.J. L284, 31.10.2003, p.1.

<sup>6</sup> S.I. 2003/3078

requirements, these Regulations rewrite the way in which those parts of directive 2003/17/EC that relate to the position from 1<sup>st</sup> January 2009 were transposed.

4.4. Provision has also been made, in regulation 2(3), to facilitate the transition from 1 January 2009 to sulphur free fuels. This is primarily aimed at ensuring that low throughput filling stations are not penalised. Provision has also been made for a maximum vapour pressure for petrol during the summer period that accords with the specification contained in footnote 5 to Annex III to the Directive. This corrects an omission in previous regulations.

## **5. Extent**

This instrument extends to the United Kingdom.

## **6. European Convention on Human Rights**

As this instrument is subject to negative resolution procedure and does not amend primary legislation, no statement is required.

## **7. Policy background**

7.1. Sulphur free fuels enable optimisation of new petrol engine technology for maximum fuel and CO<sub>2</sub> emissions savings and improve the efficiency of certain emission control systems.

7.2 The possibility of bringing about balanced geographical availability by duty incentives was given detailed consideration by HM Revenue and Customs but changes to fuel duty rates were ruled out due to continued volatility in oil prices. The Department therefore undertook an informal consultation with the oil industry on other options for making sulphur free fuels available on a balanced geographical basis, including a voluntary agreement with fuel suppliers. However since only one fuel producer supported this approach we did not believe that a voluntary agreement would work since participants would be at a competitive disadvantage relative to those not involved. In the absence of other viable options, the Government considers that a regulatory approach is required to ensure compliance with EU directive requirements.

7.3. Those who responded to the consultation agreed that, if regulation was necessary, then a complete market switch of particular fuels to sulphur free fuels would be essential in order to avoid major infrastructure costs and to ensure availability of sulphur free fuel to all retailers.

7.4. A statutory public consultation on the Regulations was therefore undertaken from 24 March to 19 May 2006 on the basis of draft regulations aimed at achieving a complete switch to sulphur free in diesel and super unleaded petrol. Most respondents agreed that the regulations would achieve this aim with costs generally within the ranges cited in the RIA though some thought these could be subject to further pressure should it become necessary to import supplies. Most also thought that the benefits would be limited. Representatives of the road tanker industry drew attention to the potentially serious consequences for them if they were not able to meet the specification requirements should the problem of contamination - through contact with residue from higher sulphur fuels - not be resolved. This should not affect vehicle operation however. Most respondents in the refining/distribution industry considered a revised timing for implementation necessary to avoid further disruption to supplies of

aviation and diesel fuel in the wake of the Buncefield incident. The date set for the Regulations to come into force (4th December 2007) allows for this factor.

7.5 Fuller details of comments received and the Department's response to these may be found in the RIA and at [www.dft.gov.uk/roads](http://www.dft.gov.uk/roads) and [vehicles/consultations](http://www.dft.gov.uk/vehicles).

7.6. The Regulations require all diesel fuel and superunleaded petrol sold by filling stations with an annual combined throughput of diesel fuel and petrol of 3 million litres or more, to be sulphur free. As indicated above, following consultation with the oil industry and other interested parties, the Government considers that this will bring about a complete switch in UK refinery production of these grades. It will ensure an adequate supply of fuel to all retailers and avoid the increased costs in the fuel distribution network which would be caused if distributors and retailers had to handle sulphur free fuel alongside existing higher sulphur fuels of the same grade. The Government therefore considers the provisions in the amending regulations to be the most cost effective method for ensuring compliance with the directive's requirements.

7.7 The provision relating to the maximum vapour pressure of petrol during the summer period makes use of a directive provision which permits Member States with severe winter conditions to allow a slightly higher limit. The UK adopted this provision in 2000 to take account of possible vehicle startability problems in parts of northern Britain during cold winters. It was however accidentally omitted when the regulations were amended in 2003.

## **8. Impact**

8.1 A Regulatory Impact Assessment, prepared in respect of the requirements introduced by the amending Regulations is attached to this Memorandum.

8.2 There is no impact on the public sector.

## **9. Contact**

**Tony Baker** at the Department for Transport (tel: 020 7944 2063 or email: [tonyt.baker@dft.gsi.gov.uk](mailto:tonyt.baker@dft.gsi.gov.uk)) can answer any queries regarding the instrument.

## **FINAL REGULATORY IMPACT ASSESSMENT**

### **EARLY AVAILABILITY OF SULPHUR FREE FUELS (EUROPEAN DIRECTIVE 2003/17/EC)**

#### **1. Title of measure**

The Motor Fuel (Composition and Content) (Amendment) Regulations 2007 implementing Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC on the quality of petrol and diesel fuels as amended by Directive 2003/17/EC.

#### **2. Purpose and intended effect**

##### **Objective**

The main purpose of the regulations is to make sulphur free road fuels (those containing 10 milligrammes or less of sulphur per kilogramme of fuel (mg/kg)) available on a balanced geographical basis in advance of 2009 when all road fuel must be sulphur free. This implements a mandatory requirement of EU Directive 2003/17/EC. However the regulations also clarify the petrol summer vapour pressure requirements and simplify the existing regulations by removing obsolete fuel quality requirements (those which applied prior to 1<sup>st</sup> January 2005).

##### **Background**

Man-made emissions of carbon dioxide (CO<sub>2</sub>) are increasing the concentration of carbon dioxide in the atmosphere to well above natural levels which is having a noticeable effect on earth's climate. Whilst we do not fully understand all the changes that global warming could bring, there are widespread concerns about the serious impacts of climate change. However effective policies to reduce greenhouse gas emissions are, the world will now experience a significant degree of climate change. This is likely to have far reaching effects on all aspects of the world's environment, economy and society. Predicted effects for the UK include flooding in some areas and water shortage in others, especially in England. At a global level, predicted effects include rises in sea levels and increased threats to health.

Carbon dioxide emissions from UK road transport account for around 21% of all total UK CO<sub>2</sub> emissions. In 2001 Netcen (who produce UK emissions estimates under contract to the Department for the Environment Food and Rural Affairs) estimated that cars contributed 59% of total road transport CO<sub>2</sub> emissions; of which petrol cars contributed 53% and diesel cars 6%.

European environment ministers have set a target of reducing average carbon dioxide emissions from new cars to 120 grams of carbon dioxide per kilometre (g/km) by 2010 from an EU average of 186g/km in 1995. The main elements of this strategy are the voluntary agreements between the European Commission and European, Japanese and Korean car manufacturers that commit manufacturers to reduce the average CO<sub>2</sub> emissions from new cars in Europe to 140g/km. The target date for this is 2008 for European manufacturers and 2009 for Japanese and Korean manufacturers. These reductions represent a cut in passenger car CO<sub>2</sub> emissions of around 25%, based on 1995 levels.

Evidence has accumulated in recent years to show that day to day variations in concentrations of airborne particulate matter (PM) are associated with day to day variations in a range of health end points. In addition, there is evidence from the United States that long term exposure to particulate air pollution is associated with a decrease in life expectancy. In 2001 the DoH's Committee on the Medical Effects of Air Pollution concluded that it was more likely than not that a causal association existed between long term exposure to PM and mortality. Sulphur-free diesel has a small, but measurable impact on reducing emissions of PM relative to current (50mg/kg) ultra-low sulphur diesel.

High ambient concentrations of oxides of nitrogen (NO<sub>x</sub>) can increase the sensitivities of airways in the lung and contribute to ground level ozone formation as well as damaging materials and vegetation. In the case of petrol vehicles these emissions are very effectively controlled by the use of catalytic converters. However sulphur in fuel acts as a catalyst poison, over time decreasing the effectiveness of these devices at reducing NO<sub>x</sub>. At current fuel sulphur levels this effect is small, but not insignificant. Sulphur free petrol would reduce the rate of degradation of new catalysts, but also allow recovery of catalysts on existing vehicles, improving their NO<sub>x</sub> conversion efficiency and thus reducing NO<sub>x</sub> emissions.

The commitments of the CO<sub>2</sub> Voluntary Agreement were concluded on the basis of the fuel quality specifications contained in Directive 98/70/EC which permitted up to 50mg/kg sulphur in fuel. Further experience showed that sulphur-free fuel is necessary to maximise the CO<sub>2</sub> reduction potential of new fuel-efficient petrol engine technology (Petrol Direct Injection). EU Directive 2003/17/EC was therefore introduced requiring all road fuel to contain no more than 10 mg/kg sulphur from 1<sup>st</sup> January 2009. This fuel also delivers small reductions in PM and NO<sub>x</sub> emissions from new and existing vehicles and improves the durability of certain exhaust after treatment devices such as catalysed diesel particulate filters. In addition to the 2009 requirement, the Directive also required Member States to make sulphur free fuel available on a balanced geographical basis from 1<sup>st</sup> January 2005. This provision is primarily aimed at facilitating the early introduction of petrol direct injection (PDI) vehicles.

The requirement for all road fuel to be sulphur free from 2009 has been incorporated into UK regulations by means of The Motor Fuels (Composition and Content) (Amendment) Regulations 2003 (SI 2003 No.3078). A copy of the Regulatory Impact Assessment related to this implementation is available from the address below. The part of the directive requiring early availability of sulphur free fuels was not mandated by these regulations as a duty incentive for sulphur free fuels was under consideration, which would have brought about the availability of sulphur free fuels from 1 January 2005. In the event, due to sustained volatility in the oil market planned duty changes did not go ahead.

Consequently sulphur free petrol and diesel are subject to the same fuel duty rates as current Ultra Low Sulphur fuels. However, the fiscal specification for Ultra Low Sulphur Diesel (ULSD) not only requires a maximum sulphur content of 50 mg/kg, but also specifies tighter density and distillation (T95) limits than are mandated by Directive 98/70/EC. The fiscal definition of Sulphur Free diesel is, however, based solely on sulphur content and hence relaxes the density and distillation requirements which apply to ULSD. This has benefits in terms of diesel production cost and capacity, these are discussed in more detail below.

## **Rationale for government intervention**

Sulphur free fuels are not currently being marketed on a basis to ensure the directive's requirement for balanced geographical availability. Although some refineries are switching their diesel production to sulphur free this will only result in availability of sulphur free diesel in certain parts of the UK and no sulphur free petrol will be available. Duty incentives would bring about balanced geographical availability, but, having given detailed consideration to this, HM Treasury have ruled out any changes to fuel duty rates. The Department's informal consultation in 2005 with the oil industry sought views on the feasibility of a variety of options for making sulphur free fuels available on a balanced geographical basis. These options included a voluntary agreement with fuel suppliers, however only one fuel producer supported this approach. Without the support of the majority of fuel producers we do not believe a voluntary agreement would work, since participants would be at a competitive disadvantage relative to those not involved. Since duty incentives and voluntary agreements are not viable options, a regulatory approach is required to ensure compliance with the EU directive requirements on the early availability of these fuels.

### **3. Consultation**

#### **Within government**

The Department has developed draft regulations in consultation with other Government Departments with an interest in fuel quality, principally DTI, HM Revenue & Customs and HM Treasury.

#### **Public consultation**

**i) Prior to the drafting of regulations** on the early availability of sulphur free fuels the Department carried out an informal consultation with the fuel industry on a number of possible options in order to ascertain the most equitable and least costly means of complying with this requirement. The consultation included refiners, importers, distributors and independent retailers (e.g. supermarkets). The options consulted on and the views received on each option were as follows:-

**A - Mandating the availability (not sale) at retail sites of sulphur-free diesel at all filling stations with annual fuel throughput above a high threshold level and of sulphur-free petrol at filling stations with annual fuel throughput above a high threshold level and only where the retailer offers Super grade petrol for sale.**

This would prevent high throughput sites which currently only have the facility to store one grade of petrol from having to install additional storage tanks or switch all petrol supply to sulphur free (both of which would be costly). Views on threshold levels of 8 to 12 million litres per annum (combined petrol and diesel) for retail sites in Great Britain (4 to 10m litres for Northern Ireland) were sought. Some refiners and importers commented that this option would lead to a complete switch to sulphur free

in all diesel and super grade petrol they supply. However other refiners anticipated a different response. One had no high throughput branded retail sites and commented that they would therefore not produce or supply any sulphur free fuel. Another had few high throughput sites which they anticipated they would supply by road tanker deliveries of sulphur free fuel from the refinery rather than via distribution terminals. This suggests this option would disproportionately impact some refiners creating competition problems. In addition due to the refiners' practice of sharing refinery output in order to achieve national coverage, if some refineries produce no sulphur free fuel it could mean no supply of sulphur free in certain parts of the country. Evidently this would fail to deliver the geographically balanced availability of sulphur free fuel required by the Directive. Some refineries not producing sulphur free fuel might also create problems for independent fuel retailers in sourcing a supply of sulphur free fuel. Independent retailers expressed concern that they would be unfairly penalised by adoption of a high threshold option since they operated the majority of these sites (i.e. supermarkets).

**B - Mandating the availability (not sale) at retail sites of sulphur-free diesel at all filling stations with annual throughput of fuel above a high threshold level (as above) and of sulphur-free petrol at all filling stations with annual throughput of fuel above a high threshold level (as above).**

None of the consultees favoured this option. Where they indicated a method of complying with this option it was identical with the method of complying with option A above i.e. they would either switch all diesel and super grade petrol to sulphur free or they would be unaffected. However for high throughput sites that do not have the facility to store two separate grades of petrol, we believe that this option would create significant costs above and beyond option A as they would either have to install additional underground storage tanks or switch all their petrol to sulphur-free.

**C - Mandating the availability (not sale) at retail sites of sulphur-free diesel at all filling stations with annual throughput of fuel above a low threshold level and of sulphur-free petrol at all filling stations with annual throughput of fuel above a low threshold level.**

A threshold level of 4 million litres per annum (combined petrol and diesel) was proposed and information on the effect of changing these threshold levels to 2 or 6 million on the number of filling stations was also sought. This option was favoured by some refiners and supported by independent retailers, although it was suggested that, as in option A, sulphur free petrol should only be required to be made available where Super grade petrol is offered. A number of consultees suggested 3 million litres per annum as the most appropriate throughput threshold. All consultees who provided a response on how they would comply with this option indicated that they would switch all diesel and Super grade petrol to sulphur free. This would ensure geographic availability of sulphur free fuel, ensure supply was available to independent retailers and avoid distribution and storage cost increases for handling sulphur free fuels alongside ultra low sulphur fuels of the same grade.

**D - Voluntary supply and sale by fuel refiners and retailers.**

The need for regulations could be negated if a sufficient number of suppliers could be guaranteed to distribute and offer for sale sulphur free petrol and diesel on a

voluntary basis. This approach was favoured by the independent retailers, but, with one exception not supported by refiners. The Department considers that for a voluntary agreement to work the majority of the fuel producers would have to be involved and this does not appear to be realistic.

### **General Comments in Response to Informal Consultation**

Although consultees favoured different options for early availability of sulphur free fuel, all of them agreed that having to handle additional grades of fuel was impractical due to the necessity for additional storage and distribution facilities to separate ultra low sulphur and sulphur free grades at fuel distribution terminals and forecourts. A complete market switch of particular fuels to sulphur free fuels was therefore essential in order to avoid major infrastructure costs. Importers and distributors also considered that a complete switch was necessary to ensure sulphur free fuel was available to all retailers and competition was preserved. The UK currently has essentially 3 grades of road fuel, diesel, Premium unleaded petrol and Super Unleaded petrol (all 50mg/kg, or 'ultra-low', sulphur). Of the petrol grades, the higher octane (97 RON), Super unleaded is the minority grade accounting for only 4.5% of petrol sales

Refiners' indication of their intention to switch all diesel fuel to sulphur free in the event of regulation stem in part from the HM Revenue and Customs specification under which sulphur-free fuels qualify for the lower fuel duty rate. This reduces the refining cost to the point that sulphur free diesel could be no more expensive to produce than current ultra-low sulphur diesel. In addition, as refiners and other bodies have indicated, because at present only one grade of diesel is distributed, attempting to supply a separate sulphur free diesel grade would incur additional distribution and storage costs e.g. the cost of road tankering from refineries and installing additional storage tanks at filling stations. Further details on costs are given in section 5.

All groups expressed concern that the real danger of contamination would make compliance at the pump very costly and that any requirement to label sulphur free would cause further delay and increase costs. Several respondents provided data on the number of their retail sites at various throughput levels. Several respondents specified a strong preference for a duty incentive, despite this not being an option included in the formal consultation letter. Comments received also suggest that a lead-in period of up to six months for compliance at the retail site might be required.

**ii) Statutory consultation** on draft amendments to the Motor Fuel (Composition and Content) Regulations was carried out between 24 March and 19 May 2006. Twenty three organisations responded including 9 in the oil refining, distribution and retail industry and 5 representing vehicle users. The draft regulations were based on option 2 below. On the basis of its earlier consultations with the refining industry, the Department considered that this option would lead to a complete switch in UK production of super unleaded petrol and diesel to sulphur free, with the advantages described above.

Consultees were asked to comment on the correctness of this assumption; on the cost and benefit estimates, CO<sub>2</sub> impacts and on the assessment of the effects on competition and small business contained in the RIA, whether balanced geographical availability could be met by a voluntary agreement instead of regulation, whether



revised timing was necessary in the light of the disruption to fuel supplies caused by the accident at the Buncefield fuel depot, and whether there were any unintended consequences of implementing the regulations

Most respondents agreed with the assumption that the regulations would produce a complete switch of diesel and superunleaded petrol to sulphur free fuels. A broader range of potential costs were indicated than anticipated, though generally within the ranges cited in the RIA. Some respondents thought there could be further pressure on costs should it become necessary to import supplies. Most agreed that benefits would be limited, a few questioning the need for regulation in light of this. Most also agreed with the assessment of the effect on competition and small business but representatives of the road tanker industry drew attention to the potentially serious consequences for them should the problem of contamination not be resolved. One oil company thought that a balanced geographical availability could be achieved without regulation, while other respondents thought this was a matter for Government to decide. Most respondents in the refining/distribution industry considered a revised timing for implementation necessary to avoid further disruption to supplies of aviation and diesel fuel in the wake of the Buncefield incident.

Full details of all comments received and the Department's response to these may be found at [www.dft.gov.uk/consultations/closed consultations](http://www.dft.gov.uk/consultations/closed consultations)

As a result of the consultation it is proposed to defer the effective date of the regulations to 4 December 2007 take account of concerns raised by some refiners, distributors and importers or their representatives about a) the need for further time to allow restructuring in some sections of the refining industry so as to avoid the need for sourcing from often uncertain import markets and b) the need to avoid further disruption to currently stretched fuel supply chains in the wake of the accident at the Buncefield fuel depot. These concerns will extend throughout summer 2007 when the supply of aviation fuel to Heathrow, Gatwick and Stansted Airports will remain critical. In this Final RIA the costs and benefits have therefore been recalculated according to this revised timescale.

#### **4. Options**

Directive 2003/17/EC sets mandatory standards concerning the early availability of sulphur free fuels that the UK is required to implement under EU law.

##### **Option 1: Take No Action**

This would result in the UK being in breach of our obligations under EU law. We would therefore be subject to infraction proceedings from the European Commission which could result in a substantial fine being imposed on the UK for every day we remained in breach of the Directive requirements.

##### **Option 2: Complete Market Switch of Diesel & Super Unleaded Petrol**

The Department believes that regulations are necessary to bring about the geographically balanced availability of sulphur free fuel. In the light of the responses to both the informal and statutory consultations it also believes that the least burdensome outcome of regulations would be a complete market switch of Diesel and Super grade petrol to sulphur free. To achieve this and considering the primary

legal powers under which the current Motor Fuel (Composition & Content) Regulations are made, draft regulations have been prepared:-

**Mandating that all diesel sold at filling stations with annual throughput of >3 million litres per annum (petrol and diesel) be sulphur free and all Super grade sulphur-free petrol sold at filling stations with annual throughput of >3 million litres per annum (petrol and diesel) be sulphur free**

### **Option 3: Availability of Sulphur Free Fuels alongside ULS Fuels**

The alternative to a complete switch of certain grades of fuel to sulphur free would be a requirement resulting in sulphur free fuels being marketed alongside existing ultra low sulphur fuels. Since this option is specifically regarded as unacceptable by all stakeholders it has not been examined in detail in terms of how it might be achieved. However for comparison purposes some rough cost estimates have been included here.

## **5. Costs and benefits**

### **Sectors and groups affected**

The regulations will impact on 9 refineries in the UK, 6-12 importers and UK filling stations. Option 2 would affect around 5200 filling stations (approximately 50%).

### **5A. Benefits**

#### **Option 1**

##### Economic

There would be no economic benefits in not implementing the early availability requirements of the Directive.

##### Environmental

There would be no environmental benefits in not implementing the early availability requirements of the directive.

##### Social

There would be no social benefits in not implementing the early availability requirements of the directive.

#### **Option 2**

##### Economic

No quantifiable economic benefits to industry have been identified in regulating for early availability of sulphur free fuel. However, the UK refining sector has already invested in equipment to produce sulphur free fuels in order to meet the 2009 requirement for all fuel to be sulphur free and in the expectation of a duty incentive

for these fuels. There may be some benefit to refiners in creating a market for these fuels, thus enabling this equipment to be used.

## Environmental

### CO<sub>2</sub>

Sulphur free petrol enables optimisation of PDI engines for maximum fuel economy and CO<sub>2</sub> reduction provided they have been appropriately calibrated. Running PDI vehicles calibrated for sulphur free fuel on higher sulphur fuels potentially impairs the efficiency of their emissions control equipment resulting in higher pollutant emissions. Consequently, in a market where sulphur free fuels are not the dominant grades it is unlikely that manufacturers will calibrate their vehicles to take advantage of the benefits of sulphur free fuel.

The intention of the early availability of sulphur free fuel requirements in the Directive was to accelerate the marketing of PDI vehicles. This in itself would deliver CO<sub>2</sub> savings as, even when running on higher sulphur fuels, these vehicles emit less CO<sub>2</sub> than conventional petrol vehicles. However, in reality EU market penetration of PDI vehicles has been far lower than expected when the Directive was agreed, in part due to the cost and complexity of the technology. It would now appear that regulating for early availability of sulphur free fuel is unlikely to bring about a more rapid roll-out of PDI vehicles.

Contrary to expectations when the directive was adopted, there is not therefore expected to be any significant reduction in tailpipe CO<sub>2</sub> emissions as a consequence of early availability of sulphur free fuels. A small saving may be delivered by changes in the fuel hydrogen:carbon ratio and calorific value resulting from the desulphurisation process. However, production of sulphur-free fuels is more energy intensive in terms of refinery operation so these efficiency gains need to be set against an increase in refinery CO<sub>2</sub> emissions. Fuller details are given in the Costs section below.

### Local Pollutants (NO<sub>x</sub>, PM)

Lower sulphur fuels help to maintain the performance of vehicle emissions control systems. This will deliver air quality benefits. In addition sulphur free fuel will improve emissions of local pollutants throughout the existing vehicle fleet, through recovery of catalysts suffering from sulphur poisoning and (small) reductions in the sulphate fraction of diesel particulate emissions.

Table 1- NO<sub>x</sub> and PM reductions assuming superunleaded petrol and all diesel switch from Dec 2007

	2007	2008
NO <sub>x</sub> Saving (ktonnes) from cars running on Super	0.26	2.95
PM Saving (ktonnes) from sulphate reduction	0.02	0.19

An assessment of the monetary value in 2005 prices, using damage costs recently agreed by the Inter Departmental Group on Costs & Benefits (6% concentration response function) of the health and environmental benefits arising from the above emissions reductions is given in the Table below. It should be noted that not all of the adverse impacts of NOx and PM emissions can be quantified and hence these values underestimate the total benefit of the above emissions savings.

Table 2 Monetised emissions savings

£m pa		2007	2008
NOx	Low	0.35	4.06
	High	0.54	6.22
PM	Low	0.63	7.07
	High	0.91	10.27
TOTAL	Low	0.98	11.13
	High	1.45	16.49

### Social

No social benefits have been identified as a result of regulating for the early availability of sulphur free fuels.

### **Option 3**

#### Economic

There would be no economic benefits in regulating for the early availability of sulphur free fuel such that it is marketed alongside existing ultra low sulphur fuels.

#### Environmental

Environmental benefits in regulating for the early availability of sulphur free fuel such that it is marketed alongside existing ultra low sulphur fuels would depend upon the consumer uptake of the fuel. It is assumed that for this option all Super grade petrol would be switched to sulphur free and sulphur free diesel would be sold alongside ultra low sulphur diesel. Given the additional distribution costs it is assumed sulphur free diesel would be sold at a premium and sales are likely to be low. As such the savings in PM emissions are likely to be negligible, but NOx savings might approach those for option 2.

### Social

There would be no social benefits in regulating for the early availability of sulphur free fuel such that it is marketed alongside existing ultra low sulphur fuels.

## **5B. Costs**

### **Option 1**

### Economic

Not implementing the early availability requirements of the Directive could result in a substantial daily infraction fine being levied against UK Government until such time as the requirements of the Directive are met.

### Environmental

There would be no environmental costs in not implementing the early availability requirements of the directive.

### Social

There would be no social costs in not implementing the early availability requirements of the directive.

## **Option 2**

### Economic

All UK refineries have already invested in equipment necessary to produce sulphur-free fuel in order to comply with the 2009 requirements for all fuel to be of this quality. As has already been discussed, it is anticipated that industry will respond to these regulations by switching Super grade petrol and all diesel to sulphur free thereby avoiding any increase in distribution costs. There are not therefore expected to be any additional capital costs in complying with these regulations.

However production of sulphur free fuels does entail increased operating costs due to higher energy input and increased catalyst usage in the refining process. On the other hand, there will also be some operating cost savings due to the density and distillation requirements for sulphur free diesel being less strict than those currently applying to ultra low sulphur diesel. We believe that the net operating cost impact on diesel is likely to be negligible. The fact that a number of UK refineries are already switching their diesel production to sulphur free supports this assumption.

Estimates of operating cost increases for producing sulphur free fuel (in terms of pence (per litre of fuel) received in response to the informal consultation are given in Table 3 below. Consultees commented that these costs would be passed on to motorists as far as possible within the constraints of market competition. Based on previous experience of estimated and actual costs for fuel quality improvements it is anticipated that the actual costs will be at the low end of the range. This is supported by a report<sup>7</sup> by the European oil industry association CONCAWE which calculated the EU average cost of producing sulphur free fuel at 4.4 €/tonne and 2.7 €/tonne for petrol and diesel respectively relative to 50mg/kg sulphur fuels. This equates to around 0.22 p/l for petrol and 0.15 p/l for diesel. Not only are CONCAWE's costs less than the mean costs below, but they also include capital expenditure in sulphur removal equipment which is not relevant to the costs of these regulations (as discussed above).

Table 3 additional production (operating) cost increase per litre

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<sup>7</sup> Concawe report no.8/05 'The impact of reducing sulphur to 10ppm max in european automotive fuels - an update'

	Low	Mean	High
Petrol	0.06	0.28	0.55
Diesel	0	0.21	0.5

Using the above unit cost increases in conjunction with projected UK fuel demand gives the following total annual cost increases. Limiting the petrol requirements to Super grade minimises the quantity of sulphur free petrol that must be produced and hence minimises the total costs. We believe that in practice this option will be the lowest cost means of complying with our EU obligations to make sulphur free fuel available.

Table 4 total UK (operating) cost increases

		2007	2008
Petrol cost £m pa	Low	0.1	0.8
	Mean	0.3	3.7
	High	0.6	7.4
Diesel cost £m pa	Low	0.0	0.0
	Mean	4.0	49.5
	High	9.8	120.3
TOTAL cost £m pa	Low	0.1	0.8
	Mean	4.3	53.3
	High	10.4	127.7

As discussed above actual costs are expected to be towards the lower end of these ranges. As fuel would continue to be sold through the existing supply chain and dispensed through existing pumps no additional cost for retail outlets should result.

With regard to fuel supply, the negative effects of increases in refining energy input are offset by relaxation of current Revenue and Customs road diesel specification which allow some gas oil components into the road fuel supply. For petrol, super unleaded constitutes a low proportion of total supply (4.5% total petrol supplies).

### Environmental

This is likely to result in an overall increase in refinery CO<sub>2</sub> emissions due to the increased energy input required in the sulphur removal process. This increase will be partially offset by tailpipe emissions savings brought about by a small change in fuel energy content and hydrogen:carbon ratio as a side effect of the sulphur removal process. Estimated net CO<sub>2</sub> impacts are given below, figures towards the lower end of the range are expected to be most probable. Again this is supported by the recent Concawe report which estimates the EU average increase in refinery emissions per tonne of 10mg/kg sulphur fuel produced is 20kg CO<sub>2</sub> for petrol and 6.2kg CO<sub>2</sub> for diesel. This would give a net CO<sub>2</sub> increase in 2008 of 146 ktonnes CO<sub>2</sub>.

Table 5- Net CO<sub>2</sub> increase

ktonnes CO <sub>2</sub>	2007	2008
Low	4.1	49.7
High	28.0	343.9

The increase due to these regulations is only incurred in the period December 2007 to 1 January 2009. From the latter date existing regulations require all road fuel to be sulphur free. Again limiting the petrol requirements to Super grade minimises the quantity of sulphur free petrol that must be produced and hence the total refinery CO<sub>2</sub> increase. The monetary cost of this increase in CO<sub>2</sub> emissions in 2005 prices is given below.

Table 6- monetised effects of CO<sub>2</sub> increases

£m pa		2007	2008
CO <sub>2</sub>	Min	1.3	16.1
	Max	9.0	111.7

As indicated above these costs will be restricted to the period December 2007 to 1 January 2009. Most of these costs are attributable to the complete market switch to sulphur free diesel.

### Social

There would be no social costs in regulating for early availability of sulphur free fuel.

### **Option 3**

### Economic

A full analysis of the cost to industry of offering sulphur free fuels alongside existing ultra low sulphur fuels has not been conducted. However a rough estimate of the costs of supplying sulphur free diesel alongside current ultra low sulphur diesel has been made for the purposes of comparison. It is assumed that sulphur free petrol would be supplied under option 3 by means of a complete switch in super grade petrol, as per option 2. The estimate also assumes that three quarters of major distribution terminals and 500 filling stations install additional tankage to handle sulphur free diesel. The costs comprise a one-off installation cost and annual tank cleaning costs. Due to the deferment of the effective date maintenance and fuel costs attributable to the regulations will now be restricted to the period 4 December 2007 to 1 January 2009.

Table 7- costs of additional tankage

£m	2007	2008
Installation cost	140	
Maintenance	5.5	5.5

Total additional refining costs will obviously be dependant on the actual sales of sulphur free diesel. It is assumed that these will be low due to increased cost of the fuel, a figure of 4.5% of total diesel sales has been used (in line with Super grade petrol as a proportion of total petrol sales) purely for indicative purposes.

Table 8- Total fuel costs

Fuel cost £m pa	2007	2008
Low	0.1	0.8
Mean	0.5	5.9
High	1.1	13

In total the economic costs are therefore in the order of a one off cost of £140 million plus a running cost in the range of £6.4 - 19.6 million. This does not compare favourably with the costs of option 2 which are no one off costs and running costs cost in the range £0.9 - 138 million with the actual costs expected to be close to the bottom end of the range.

Environmental

As has been explained above production of sulphur free fuel is a more energy intensive process than production of current ultra low sulphur fuels resulting in increased refinery CO<sub>2</sub> emissions. The magnitude of these increases is proportional to the volume of fuel produced. If, as above, it is assumed that sales of sulphur free amount to 4.5% of petrol sales and diesel sales the following CO<sub>2</sub> increases would be accrued. As indicated above deferment of the effective date of the regulations means that net CO<sub>2</sub> increases which are attributable to the regulations will be restricted to the period 4 December 2007 to 1 January 2009.

Table 9 - Net CO<sub>2</sub> increase

ktonnes CO <sub>2</sub>	2007	2008
Low	0.3	3.7
High	2.6	32

The monetary cost of this increase in CO<sub>2</sub> emissions in 2005 prices is given below.

Table 10 - monetised effects of CO<sub>2</sub> increases

£m pa		2007	2008
CO <sub>2</sub>	Max	0.1	1.2
	Min	0.8	10

Social

There would be no social costs in regulating for the early availability of sulphur free fuel such that it is marketed alongside existing ultra low sulphur fuels.

**6. Small Firms Impact Test**

The cost impact of the draft regulations is limited to the refining sector. There are no small businesses engaged in refining. Increased costs are likely to be passed on as marginal increases in the cost per litre of fuel, but these will apply to all fuel distributors and retailers in proportion to the volume of fuel they handle. Furthermore these cost increases are likely to be passed on to motorists. Since the regulations are expected to cause a complete switch in UK production of diesel and Super grade petrol to sulphur free this will prevent limited supply which might drive costs of sourcing the fuel up for independent retailers. Overall there is not therefore expected to be a disproportionate impact on small businesses

In terms of operability of current road vehicles and machinery, the new fuels will be completely interchangeable with current fuels without any detrimental effects. However, sulphur-free fuels are expected to improve the reliability and durability of both new and



existing exhaust emission control systems, resulting in lower maintenance costs, although no data is currently available to permit this benefit to be quantified.

## **7. Competition assessment**

A negative effect on competition is not anticipated. While three of the largest firms account for about 50% of market share, the costs of the regulations are not expected to affect some firms substantially more than others and no effect is anticipated on the market structure. The throughput threshold limits are set at such a level as to capture large and medium sized filling stations operated by both oil majors and hypermarkets. This will ensure production of sulphur free fuel in UK refineries and hence companies independent of the oil majors will not be forced to import sulphur free fuel at high cost to comply with these regulations.

New and potential firms will not have to meet higher set up or on-going costs compared with existing firms. The market is not characterised by rapid technological change and the regulations will not affect the ability of firms to choose the price, quality, range or location of their products.

No effect on international competitiveness is expected since the regulations introduce a mandatory directive that will apply throughout the EU. Many EU countries have already introduced sulphur free road fuels

## **8. Enforcement, sanctions and monitoring**

Fuel quality monitoring and reporting is already required under Directive 98/70/EC. This includes a requirement to sample fuel sulphur content. The UK already has procedures in place to do this. Enforcement provisions and sanctions also remain unchanged from the existing Motor Fuel (Composition & Content) Regulations. Consequently no increase in monitoring or enforcement costs is foreseen.

## **9. Administrative burdens**

Although refiners will need to monitor the sulphur content of their production this does not represent any change to existing procedures. No other administrative burdens are envisaged.

## **10. Implementation and delivery plan**

The primary objective of the regulations is to ensure the availability of sulphur free fuels on a balanced geographical basis. Following consultations with the refining, retail and distribution industry and user groups, the Department considers that this objective can be achieved at least cost to the industry and with minimum possible effects on competition by regulations which will in practice ensure a complete switch of diesel fuel and Super unleaded petrol to sulphur free. This will be achieved by the regulatory requirement for any diesel fuel and super unleaded petrol sold by filling stations with a total motor fuel throughput of 3 million litres per annum or more to be sulphur free.

The Departments for Transport and for Trade and Industry maintain regular contact with the refining and distribution Industry and have in place a system for fuel quality monitoring and reporting which will enable the Departments to assess progress on implementation of the regulations.

In response to its earlier informal consultation and concerns expressed by industry the Department undertook to provide a minimum period of 6 months between the implementation of the regulations and their coming into force.

### 11. Post implementation review

The regulations, to the extent they implement Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC, will cease to have effect on 1 January 2009 when mandatory standards for sulphur free petrol and diesel take effect

### 12. Summary table

Table 11 costs and benefits summary

Option	Total annual costs: economic, environmental, social	Total annual benefits: economic, environmental, social
1.	European Commission fines imposed against UK	None
2.	Economic: <b>£0.8 - £128m</b> operating cost (probably at low end of range)  Environmental: 53.82Mt - 371.9 Mt CO <sub>2</sub> increase equivalent to <b>£16 - £112 m</b> (probably at low end of range)  Social: none	Economic: none  Environmental: 3.0ktonne NO <sub>x</sub> , 0.2 ktonne PM .saving equivalent to <b>£11 -16m</b>  Social: none
3.	NB: Indicative costs only Economic: <b>£140m</b> one off cost plus <b>£6.3 - £18.5m</b> (probably at low end of range)  Environmental: 0.004 - 0.035Mt pa CO <sub>2</sub> increase equivalent to <b>£1.2 - £10m</b> (probably at low end of range)  Social: none	Economic: none  Environmental: up to 3.0 ktonne NO <sub>x</sub> saving equivalent to <b>£4 - £6m</b>  Social: none

NB: These costs and benefits are incurred up until the end of 2008 only. The regulations do not produce any costs or benefits beyond this point.

### 13. Recommendation

The preferred option is Option 2 on the grounds that this is expected to be the least cost means of complying with our EU obligations to make sulphur free fuel available on a balanced geographical basis in advance of 2009.

### 14. Declaration and publication

I have read the regulatory impact assessment and I am satisfied that the benefits justify the costs.

Signed S.J. Ladyman.

Date 4th June 2007.

Dr Stephen Ladyman  
Minister of State for Transport  
Department for Transport

**15. Contact points for enquiries and comments:**

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## TRANSPOSITION NOTE

These Regulations do what is necessary to complete implementation of the Directive, including making consequential changes to domestic legislation to ensure its coherence in the area to which they apply.

<b>DIRECTIVE 2003/17/EC of the European Parliament and of the Council amending Directive 98/70/EC.</b>			
<b>Article</b>	<b>Objectives</b>	<b>Implementation</b>	<b>Responsibility</b>
Articles 1(2) and 1(3)	<p>Article 1(2), so far as is relevant, adds a new sub paragraph (d) to Article 3(2) of directive 98/70/EC requiring that: <i>"...Member States shall take all necessary measures to ensure that in due time, and no later than 1 January 2005, unleaded petrol with a maximum, sulphur content of 10 mg/kg is marketed within their territories. Member States shall ensure that such unleaded petrol is available on an appropriately balanced geographical basis and complies in all other respects with the specifications set out in Annex III."</i></p> <p>Article 1(3), so far as is relevant, adds a new sub paragraph (d) to Article 4(1) of directive 98/70/EC requiring that <i>"...Member States shall take all necessary measures to ensure that in due time, and no later than 1 January 2005, diesel fuel with a maximum sulphur content of 10 mg/kg is marketed within their territories. Member</i></p>	<p>These provisions are implemented by regulation 2 of the Motor Fuel (Composition and Content) (Amendment) Regulations 2007 ("the amending Regulations"), which, in so far as is relevant, substitute new regulation 3 for regulation 3 of the Motor Fuel (Composition and Content) Regulations 1999, ("the principal Regulations").</p> <p>The consequence of the amendments to the principal Regulations is that filling stations that have sold a combined total of 3 million litres or more of petrol and diesel fuel in the preceding calendar year must, from the coming into force of the amending Regulations, if they sell super unleaded petrol, sell super unleaded petrol which has a maximum sulphur content of 10 mg/kg and, if they sell diesel, sell diesel which has a maximum sulphur content of 10mg/kg.</p> <p>These requirements apply in advance of the requirement in</p>	The Secretary of State

	<p><i>States shall ensure that such diesel fuel is available on an appropriately balanced geographical basis and complies in all other respects with the specifications set out in Annex IV.”</i></p>	<p>2003/17EC for all petrol and all diesel at all filling stations to have a maximum sulphur content of 10mg/kg from 1<sup>st</sup> January 2009. This requirement has already been transposed by the Motor Fuel (Composition and Content) (Amendment) Regulations 2003 (2003/3078) (“the 2003 Regulations”) but is restated in an amended form by these amending Regulations.</p> <p>The amending Regulations also include a transitional provision in relation to the position on or after 1<sup>st</sup> January 2009 which was not included in the 2003 Regulations. This transitional provision is contained in regulation 2(3) of these amending Regulations which substitutes new regulation 6(4) for the existing regulation 6(4) in the principal Regulations.</p> <p>The amending regulations also make provision for a maximum vapour pressure for petrol during the summer period that accords with the specification in footnote 5 of Annex III to the Directive.</p>	
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