

EXPLANATORY MEMORANDUM TO
THE MERCHANT SHIPPING (PREVENTION OF AIR POLLUTION FROM SHIPS)
REGULATIONS 2008

2008 No. 2924

1. This explanatory memorandum has been prepared by the Department for Transport and is laid before Parliament by Command of Her Majesty.
2. **Purpose of the instrument**
 - 2.1 These Regulations will apply a series of internationally agreed technical standards to UK flagged vessels and foreign flagged vessels which aim to reduce air pollution from shipping. This will be achieved through controls on emissions of Nitrogen Oxides, Sulphur Oxides, Volatile Organic Compounds and Ozone Depleting Substances, which are not Greenhouse Gases. Additionally elements of the Regulations limit the sulphur content of marine fuels and require a register of local marine fuel suppliers.
3. **Matters of special interest to the Joint Committee on Statutory Instruments**
 - 3.1 None
4. **Legislative Context**
 - 4.1 These Regulations implement Annex VI (Regulations for the Prevention of Air Pollution from Ships) to the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (“MARPOL 73/78”).
 - 4.2 Annex VI comprises 19 regulations and was introduced into MARPOL 73/78 by the Protocol of 1997. The object of Annex VI and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NO_x Technical Code) referred to in Annex VI is to control, on an international basis, emissions to the atmosphere from ships and platforms and drilling rigs.
5. **Territorial Extent and Application**
 - 5.1 This instrument applies to all of the United Kingdom.
6. **European Convention on Human Rights**
 - 6.1 As the instrument is subject to negative resolution procedure and does not amend primary legislation, no statement is required.
7. **Policy background**
 - 7.1 The Regulations deal with: –

- ozone depleting substances (ODS);
- nitrogen oxide (NO_x) emissions from marine diesel engines;
- sulphur oxide (SO_x) emissions as a consequence of quality of fuel used (sulphur content);
- volatile organic compound (VOC) emissions from ships in ports or terminals;
- shipboard incineration of ship generated waste;
- fuel oil quality delivered to and used on board ships; and
- compliance requirements, where applicable, for platforms and drilling rigs.

- 7.2 It is estimated that ships currently generate in the region of 6-7% of global SO_x emissions and 7% of global NO_x emissions. Global implementation of the 1997 Protocol will assist significantly in addressing these emissions and will additionally prevent the discharge of ODS from ships.
- 7.3 The Regulations will implement an internationally agreed survey and certification regime for UK ships. This will allow verification of compliance with the measures in the Regulations. For non-UK vessels the Regulations will provide powers for inspection of foreign flagged ships and penalties for non-compliance including detention of the vessel.
- 7.4 The Regulations require platforms and drilling rigs operating offshore to be surveyed and certified.
- 7.5 Public interest in a policy that seeks to reduce the impact of air pollution from ships reflects, in part, current concerns over environmental issues affecting the globe such as climate change.

8. Consultation outcome

- 8.1 These Regulations, along with the associated Merchant Shipping Notice (MSN), Marine Guidance Note (MGN) and Regulatory Impact Assessment (RIA), have been consulted on over a period of 6 weeks between July 2008 and August 2008, which followed a previous consultation on an early draft of the Regulations in 2004. Consultees included Central Government, the Devolved Administrations, Non-Governmental Organisations, industry groupings representing those affected by this legislation (such as the British Chamber of Shipping and Oil & Gas UK), and port and shipping companies.
- 8.2 The consultation package was placed on the MCA's website and a press notice was released by the MCA to inform the general public and industry of this consultation.
- 8.3 A summary of the comments received during the consultation, and the MCA's response to them, is published on the MCA's website:
http://www.mcga.gov.uk/c4mca/annex_vi_air_pollution_-_response_to_consultation-2.pdf

- 8.4 No major amendments to the Regulations were required. Clarification of points raised by consultees has been achieved mainly through amendments to the MSN and MGN. Key points raised in the responses include:
- generally supportive of the proposals;
 - suggested amendments to bring the terminology relating to seafarer qualifications in line with that used by the IMO Convention on Standards of Training, Certification and Watchkeeping (STCW);
 - clarification within the MSN on the timelines for withdrawal of ODS;
 - clarification that platforms and drilling rigs are not generally exempt from the Regulations;
 - clarification on how the Regulations are to be enforced on ships operating outwith UK waters;
 - concern expressed by ship fuel oil supply industry on sampling method prescribed when fuel oil is delivered to ships.

9. Guidance

- 9.1 A Merchant Shipping Notice and a Marine Guidance Note are to be published alongside the Regulations.

10. Impact

- 10.1 The impact on business, charities or voluntary bodies is:
- for ships operating in a Sulphur Emission Control Area the increased variable cost of low sulphur fuel oil or capital cost of an exhaust gas cleaning system to scrub air emissions of pollutants;
 - for ships and ship operating companies additional costs associated with expediting a regime for fuel sampling and storage of such samples;
 - for platforms operating on the UK sector of the continental shelf the cost of survey and certification to demonstrate that they are in compliance with the requirements of Annex VI of MARPOL;
 - for ships the cost of disposal of waste residues from exhaust gas cleaning systems, where fitted;
 - for ship engine manufacturers the cost of development of engines that comply with the NOx Technical Code as required by Annex VI of MARPOL.
- 10.2 The impact on the public sector is to require additional resources to be made available to the Maritime & Coastguard Agency for the following:
- survey and issue certification to UK ships that are in compliance with the requirements of Annex VI of MARPOL (although costs should be recoverable through fees charged for the activity);
 - inspection of non-UK ships on entering UK ports to ascertain compliance by those ships with the requirements of Annex VI of MARPOL;
 - follow up concerns raised by other national Administrations, industry or the public with ships suspected of breaching the Regulations;
 - undertake sampling and analysis of fuel oil to test compliance with the Regulations;

- undertake enforcement action including prosecutions under the Regulations.

- 10.3 A Regulatory Impact Assessment (RIA) was produced for the Merchant Shipping (Pollution) Act 2006 and is attached to this memorandum.
- 10.4 This RIA covers the same policy areas as these Regulations and it is the view of the Department, after consultation with Cabinet Office, that the costs and benefits outlined in the RIA are reasonable for these Regulations and remain accurate in that it reflects the view when Annex VI of MARPOL was ratified.
- 10.5 The impact on the various stakeholders, particularly small businesses, was extensively considered and a reasonable balance obtained.

11. Regulating small business

- 11.1 The legislation applies to small business.
- 11.2 Whilst being mindful of a need to minimise impact of regulation on small business, those primarily affected by these Regulations are fuel oil suppliers. Inclusion of fuel oil suppliers in the Regulations is required to achieve one of the major policy outcomes, that is, to ensure that the quality of fuel oil supplied to ships is improved.
- 11.3 Ship fuel oil suppliers are represented by the International Bunker Industry Association which was included in the consultation.

12. Monitoring

- 12.1 The impact of the policy will be kept under review.
- 12.2 These Regulations are the first stage of implementing international regulations seeking to reduce the impact of air pollution from ships. Further international legislation has been made by both the European Community and the International Maritime Organization.

13. Contact

Edmund Hughes of the Maritime and Coastguard Agency, an executive agency of the Department for Transport, (telephone 02380 329367 or e-mail: environment@mcga.gov.uk) can answer any queries regarding the instrument.

Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2005

Final Regulatory Impact Assessment

1. TITLE

- 1.1 Final Regulatory Impact Assessment on the implementation of Annex VI (Regulations for the Prevention of Air Pollution from ships) of the International Convention for the prevention of Pollution from Ships

1973/1978 (MARPOL 73/78) into UK national legislation through the Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2005.

2. PURPOSE AND INTENDED EFFECT OF THE MEASURE

Objective

- 2.1 The regulations will apply a series of internationally agreed technical standards to UK flagged vessels and aim to reduce air pollution from shipping through controls on emissions of Nitrous Oxides (NO_x) sulphur oxides (SO_x) Volatile organic compounds (VOC's) and Ozone Depleting Substances (ODS). In addition elements of the regulations will require vessels to dispose of ODS to reception facilities in an environmentally sound manner to prevent discharge to air, limit the Sulphur content of Marine Fuel and require a register of suppliers of Marine Fuel.
- 2.2 The Protocol will enter into force for the United Kingdom on 19 May 2005 in accordance with Article 6 of the Protocol. It is essential therefore, that Regulations are in force in the United Kingdom as close as possible to that date.
- 2.3 The regulations will apply to all UK flagged vessels regardless of location internationally while the shore-side measures (Reception facilities and fuel supply) will be applicable throughout the UK.

Background

- 2.4 Ships engines generate various air pollutants including Nitrogen Oxides (NO_x), Sulphur Oxides (SO_x), Carbon Dioxide and Particulates. Additionally tankers generate Volatile Organic Compounds (VOC's) when discharging cargo. Current emissions levels from the global shipping industry are summarised below¹.

	Total amount (tons)	% Global Pollution
Sulphur Emissions	4.5 – 6.5 million tons	6 – 7 %
NO _x Emissions	5 million tons	7 %
CFC Emissions (ODS)	3000 – 6000 tons	1 – 3 %
Halon Emissions (ODS)	300 – 400 tons	8 – 10 %

¹ Information drawn from the International Maritime Organization - www.imo.org

- 2.5 The implementation of Annex VI will control the SO_x and NO_x emissions from vessels in line with the technical code and sulphur cap. While it is impossible to accurately estimate the reductions globally from this measure the EC has attempted to quantify the overall benefit from the reduction in SO_x. This indicates that for Europe as a whole the economic benefit (from reduced pollution and human health impacts) would be in the region of 1.3 Billion Euros against a total Europe wide cost of 0.7 Billion Euros². In addition the implementation of the annex will effectively reduce the release of ODS to zero from shipping.
- 2.6 While international shipping's overall contribution to atmospheric pollution is currently relatively low³ when compared to other modes of transport such as road and air it has been agreed internationally to tackle this issue through the 1997 Protocol to the International Convention on the Prevention of Pollution from Ships (MARPOL 73/78). The 1997 Protocol provides for the establishment of International Regulations for the prevention of air pollution from ships by adding a new Annex VI to MARPOL 73/78. It is particularly important to tackle emissions from shipping through internationally applicable technical standards as the total number of ships is expected to double internationally by 2020 (from 2000 levels) which will increase the amount of traffic calling at the UK and transiting UK waters. As the English Channel is the world's second busiest shipping lane it is likely that such an increase will result in at least a doubling of the number of ships transiting UK waters. Additionally the UK has one of the longest coastlines in the EU and as a result is exposed to higher levels of airborne pollutants from shipping than many other countries although the prevailing westerlies over the channel tend to push most airborne pollutants towards mainland Europe
- 2.7 While ships are the most energy efficient (marine diesel engines generally achieve around 30 – 35% thermal efficiency compared to 20 -25% for car petrol engines or 30% for rail⁴) and environmentally sustainable manner to ship goods (95% of UK trade by volume and 75% by value are carried by ship) there is considerable room for improvement in terms of atmospheric pollutant emissions. Ships generate in the region of 1/7 the amount of CO₂ and ½ the amount NO_x per ton/km compared to road transport and substantially reduced fuel usage when compared to rail⁵, however they produce elevated SO_x levels when compared to other modes of transport.
- 2.8 This is largely due to the fuel that the majority of ships use – Heavy Fuel Oil (HFO) being the “bottom of the barrel” in terms of fuel quality. Ships engines are designed to operate with such heavy fuels but they tend to be high in

² Figures drawn from EC 2002/0259(COD) proposals to amend directive 1999/32/EC on the sulphur content of marine fuels published in 2002, The reports findings are broadly supported by the UK, the margin of error is estimated to be in the region of +/- 50%

³ UK National Statistics indicate that road transport generates around 90 million tonnes of CO₂, shipping generates in the region of 15 million tonnes.

⁴ Energy efficiencies drawn from outcome of “Sustainable Shipping – progress in a Changing World” conference proceedings 2005, for reference current experimental fuel cell installations run at around 40% maximum efficiency although predicted efficiency for such systems should reach 70%.

⁵ Calculated using the EcoTransIT system – www.ecotransit.org figures are in line with other estimates of performance generated by DfT Transport Statistics.

sulphur and other contaminants. Annex VI contains elements to control fuel quality and in particular the Sulphur Content of HFO.

- 2.9 The emissions controlled by Annex VI fall within the sphere of the UK Climate Change Programme, the EC Directive on the Sulphur Content of Liquid Fuels, the EC Acidification Strategy and the EC Directive on National Emission Ceilings for Air Pollution (NO_x, SO_x, and VOC's).
- 2.10 Implementing Annex VI will assist the UK in achieving compliance with these legislative and political commitments. It ensures that all relevant ships are certified, maintained and operated in accordance with Annex VI and its NO_x Technical Code. It limits to 4.5% globally, and 1.5% in a designated SO_x Emission Control Area (SECA) the sulphur content of fuel consumed used on board ships and it allows for Parties to the Protocol to designate ports or terminals under their jurisdiction in which VOC emissions from tankers are to be regulated.
- 2.11 The UK has around **600 vessels** on the registry that currently trade internationally⁶, in addition there are around 1200 vessels that operate domestically the majority of which are smaller vessels below 500gt. Vessels trading domestically may be able to operate internationally but are not currently doing so – it should be understood that many of these vessels are capable of engaging in international voyages and would be required to have full international certificates if they did make such a change. The annex applies to vessels regardless of size although there are derogations for vessels below 400gt that limit the administrative burden placed upon them through the survey and certification regime. These vessels will be exempt from the survey and certification requirements but will still be required to comply with the technical requirements of annex VI and will be inspected as part of the MCA's normal inspection regime for small vessels.
- 2.12 In addition the UK has in the region of **110 Offshore Platforms** and FPSO's (floating production, storage and offloading vessels) operating that will be required to implement elements of the regulations.
- 2.13 There are **120 larger ports** that are expected to be involved in the supply of low sulphur fuel and may need to consider the provision of reception facilities for residues from exhaust gas cleaning systems and for ozone depleting substances in repair and conversion yards within their remit. In addition there are a further **600 smaller facilities** that may be affected by the regulations.
- 2.14 The 1997 Protocol to the International Convention on the Prevention of Pollution from Ships MARPOL 73/78 provides for the establishment of International Regulations for the Prevention of Air Pollution from Ships by adding a new Annex VI to MARPOL 73/78. Annex VI comprises 19 Regulations, 11 of which are of an administrative/certification nature and 8 of which are of a technical nature. In addition a Technical Code on the Control

⁶ Total internationally trading global fleet is in the region of 46000 ships based on Lloyds Register Fairplay study January 2005

of Emissions of Nitrogen Oxides from Marine Diesel Engines (NO_x Technical Code) is included.

2.15 The 8 technical Regulations deal with –

- nitrogen oxides (NO_x) emissions from marine diesel engines;
- sulphur oxide (SO_x) emissions from marine diesel engines as a consequence of quality of fuel used (sulphur content);
- volatile organic compound (VOC) emissions from tankers in ports or terminals;
- shipboard incineration of ship generated waste;
- reception facilities in ports to receive ozone depleting substances from ships;
- ozone depleting substances;
- fuel oil quality delivered to and used on board ships; and
- compliance requirements where applicable for offshore platforms and drilling rigs.

2.16 It should be noted that not all of the 19 regulations contained in Annex VI are mandatory internationally. The following element is at the discretion of individual Governments:

- VOC emissions from tankers may be regulated at ports or terminals dependent upon the pollution policy of a Government of a Party to the Protocol. If VOC emission control systems are fitted at ports or terminals they must be in accordance with the requirements of regulation 15 of Annex VI.

2.17 Implementing this measure on a mandatory basis is considered at option 3 in this RIA.

2.18 The United Kingdom delegation to IMO played a full and active part in securing international agreement on these new measures and the subsequent addition to the MARPOL Convention. The UK Delegation was made up of representatives from the regulatory bodies and all sections of the shipping industry.

2.19 In addition to the briefing and debate on these measures at IMO, MCA wrote to in excess of sixty representatives of the shipping industry and other interested parties during February/March 2001 seeking their views on the implementation of Marpol Annex VI.

2.20 It should be noted that there is existing DEFRA legislation which applies to diesel fuels within UK territorial waters and there is an amending EU Directive on the sulphur content of liquid fuels being drafted which may be applied at a future stage. It is not expected that this amending directive will have any significant impact upon the implementation of annex IV in the UK or Europe. Initial agreement has been reached within Europe on these amendments which are in line with the requirements of Annex VI of Marpol

for 1.5% Sulphur cap in the SECA and acceptance of technical abatement technology.

- 2.21 The UK is politically committed to this air pollution prevention legislation as The Secretary of State for Foreign and Commonwealth Affairs wrote to the International Maritime Organisation in August 2004 confirming the United Kingdom's accession to the protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 relating thereto.

3. RATIONALE FOR GOVERNMENT INTERVENTION

- 3.1 If the Government cannot make the powers to implement Annex VI in UK legislation through the MS Bill 2005 we will be unable to finalise and implement the Merchant Shipping (Prevention of Air Pollution from Ships) Regulations.
- 3.2 As a result the current level of air pollution from UK flagged vessels will continue and there will be economic and practical difficulties for UK flagged vessels.
- 3.3 The pollutants generated by ships engines have environmental, health and economic impacts. A brief synopsis of these is given below:
- 3.4 NO_x reacts with hydrocarbons (including VOC's) at ground level to form ozone when exposed to sunlight. Ozone exacerbates pre-existing lung complaints including asthma and has been demonstrated to increase rates of hospitalisation and use of medication. It is particularly harmful to young children and those suffering from respiratory conditions but can cause lung inflammation in healthy adults. Exposure times of more than one hour have been linked to such effects. Longer term or repeated exposure can cause chronic respiratory conditions such as bronchitis and emphysema.
- 3.5 NO_x additionally alters the nitrate balance in water bodies. This can lead to accelerated eutrophication resulting in algal blooms which lead to low dissolved oxygen levels in the water. This results in a crash in local fish and shellfish populations and damage to the ecosystem as a whole. Such fish kills can also have ruinous impacts upon local fisheries and shellfish beds.
- 3.6 SO_x and NO_x react to form acidic compounds that fall as acid rain, or are deposited as dry particles causing localised acidic damage. Acid deposition in both forms cause severe damage to forests and to water bodies. A US study suggested that acid deposition was responsible for 75% of acidic freshwater bodies in the continental USA.
- 3.7 Acid deposition also has noticeable effects on buildings and can severely impair cultural and heritage value of historic buildings. It has been estimated that implementing Marpol Annex VI would have the effect of reducing by

0.5% the area in the UK in which acidity exceeds normal levels (a reduction of around 400 km²)⁷.

- 3.8 Failure of UK flagged vessels to comply with the requirements of Annex VI will impose a restriction on the ability of UK flagged vessels to trade worldwide, this will impact directly upon the 600 vessels currently operating internationally and prevent the 1200 other UK vessels from operating internationally without a change of flag.
- 3.9 This will negatively impact both upon levels of vessel on the UK flag, the overall value of the UK's maritime industry (£1 Billion) and the level of employment of UK officers and ratings.
- 3.10 If the UK does not implement the Annex through National Legislation then UK flagged vessels will not be able to be issued with International Air Pollution Prevention Certificates and will instead have to carry records of voluntary survey carried out by Class, these would carry the same survey costs and the vessel would risk detention for failing to conform to the accepted international norm under the MARPOL 73/78 conventions "no more favourable" provisions which will require all internationally trading vessels to be in compliance with Annex VI.
- 3.11 It would also severely embarrass the UK as we would not be implementing a Convention on time which we played a key role in contributing to at the International Maritime Organisation and weaken our position in current discussions within the IMO on air pollution from ships. The UK would also seem not to be meeting the original objectives of the proposal.

4. OPTIONS

Specific options

Three options have been identified:

Option 1 Make no change to existing United Kingdom legislation – this is the "Do Nothing" option

- 4.1 With this option there would be no changes to the current UK legislation governing air pollution from ships. Whilst this would reduce elements of the economic cost to the domestic UK maritime industry Annex VI would be in force internationally and UK flagged vessels trading outside of the UK would be required to implement the relevant provisions of the annex.
- 4.2 Additionally the UK would be unable to meet its international commitments within the IMO or its regional commitments within the EU.

⁷ Calculated in the Entec Report 2003 commissioned by DEFRA to assess the impact of proposals relating to the Sulphur content of marine fuels

- 4.3 In this scenario the UK will make no additional moves to prevent air pollution from shipping. This will allow vessels operating under the UK flag to continue to use high sulphur fuels and to avoid the costs to the rest of the global shipping industry associated with implementation of the technical and administrative elements of Annex IV.
- 4.4 This is likely to give UK flagged vessels an extremely short lived economic advantage over competitors as high sulphur fuel will rapidly become unavailable internationally (current global average sulphur content is 2.8%) due to the entry into force of the convention.
- 4.5 Any financial advantage gained will be eroded rapidly as UK flagged vessels trading internationally are likely to be detained by port States and with freight rates in the region of \$45000 - \$60000 a day for larger (100000gt) ships any detention or delay is likely to result in severe financial impacts for the owner compared to the cost of compliance.
- 4.6 This will rapidly dis-incentivise remaining on the UK flag. In addition widespread non-compliance with an international standard by UK flagged ships will impact upon the UK's position as the best regarded flag state internationally.
- 4.7 Detentions due to non compliance will result in the UK losing its position at the top of the Paris Memorandum on Port State Control's white list and may result in the UK slipping to the Grey list. This will impact upon flagging in to the UK, may push concerned owners off the UK flag and will damage the UK's international reputation as a result.
- 4.8 The result of the 'do-nothing' approach for UK vessels trading solely in UK waters will be to maintain current fuel costs and prevent additional certification costs to the industry. These vessels will continue to generate current levels of pollutants and this is likely to have a growing impact upon the balance of pollutants in the UK.
- 4.9 Currently shipping is estimated to generate around 4% of all SO_x in Europe, this ratio is likely to increase to around 20% of SO_x emissions by 2010 as standards for landside industries tighten and shipping will increasingly become a major contributor to national SO_x emissions.
- 4.10 This option is not considered an acceptable way forward as it will deliver very limited economic savings to industry, will result in detentions and subsequent economic loss and is likely to result in acute embarrassment for the UK within IMO and the EU. Option 1 will negatively impact upon the UK's ability to negotiate further on air pollution issues within the international sphere.

Option 2- As a signatory to the MARPOL 73/78 Convention, the United Kingdom implements Annex VI and its NO_x Technical Code into United Kingdom legislation.

- 4.11 With this option the UK will be able to move ahead with the secondary legislation to implement Annex VI of MARPOL into national law. This is the recommended option as it will allow the UK to fulfil its treaty obligations, retain its effectiveness within the international maritime community and ensure that the UK shipping industry can continue to trade internationally while contributing to the initiative to reduce global atmospheric pollution.
- 4.12 This option will allow for voluntary implementation of VOC recovery systems in line with the Marpol Annex. The costs and benefits of this option are explored in detail in sections 4 and 5 of this RIA.

Option 3 - To implement the provisions of Marpol Annex VI and additionally make mandatory VOC recovery at tanker berths.

- 4.13 It was stated in the objective that the fitting of VOC emission control systems at ports or terminals handling tankers was at the discretion of individual Governments as Annex VI does not make this requirement mandatory. At the present moment in time the UK and the EU do not have any mandatory requirements for VOC emissions.
- 4.14 VOC control systems collect and recover the volatile organic gas produced when tankers discharge and load hydrocarbons. Additionally tanker based systems recover gases generated due to the movement of the cargo in the tanks during a voyage. Both types of system use condenser systems to convert the gas to liquids.
- 4.15 If the UK opts to implement Annex VI and make mandatory the provision of VOC recovery systems there will be attendant additional costs and benefits:
- 4.16 For a VOC emission control system to be utilised at a tanker terminal the cost to the loading/discharge berth owners to install the recovery system is of the order of £3 million, with an annual operating cost of around £200,000.
- 4.17 It is reasonable to suppose that some of these costs may be passed to the ship owners in the form of higher berthing fees.
- 4.18 There is also an economic benefit to such a system as it will allow for recovery of VOC's. Such systems are estimated to recover in the region of 1% of total cargo by weight that would otherwise be lost to the atmosphere.
- 4.19 To trade to these terminals would require that the ship be fitted with additional equipment. The average cost of retro fitting such equipment for a 100,000 tons deadweight tanker is approximately £80,000. Cost for a new-build tanker, where the specialised equipment is part of the initial design is estimated at £40,000. As new-build 100,000 tons deadweight tankers cost in the region of \$100 million USD these costs are considered to be reasonable, particularly in light of the voluntary nature of this measure.

- 4.20 The environmental benefit of such a system would be to reduce emissions of VOC's from unloading tankers. These emissions are largely non-hazardous to human health but some (such as benzene) are known carcinogens. Additionally they can cause damage to plant life and when released in conjunction with elevated NO_x levels can form low level ozone with attendant health impacts. There is however very little information about total emissions from shipping of VOC's with only aggregate "supply of fossil fuel" calculations available⁸.
- 4.21 There are ten major oil terminals in the UK which would need one or more recovery systems (depending upon size and usage levels). In addition there are a considerable number of power stations and smaller wharfs that handle fuel deliveries that would need to fit such systems. A minimum compliance cost with this measure would be in the region of £30 million⁹ for the ports with no figures available for the ships themselves.
- 4.22 It is therefore not considered necessary to implement mandatory VOC control at tanker berths at this stage. There is extremely limited information available on amounts and effects of the pollution and the minimum cost would exceed the total estimated cost of all other aspects of Marpol Annex VI while impacting upon a very small subsection of the industry. It would also have a considerable but unquantifiable effect upon smaller fuel oil suppliers and vessel operators.
- 4.23 Option 2 already provides the possibility for control of VOC's if they represent a local problem. Currently there does not appear to be a national problem with VOC's and to require fitting of such systems in terminals would create a substantial cost with limited environmental benefits. If the IMO, EU or UK opted to consider mandatory application at a later date a full consultation process would be undertaken.

⁸ The Environment Agency have estimated (2002) that fossil fuel transport and supply generates around 1/3 (0.27 million/tons) of all UK VOC's, this includes road transport, pipelines and other shoreside systems as well as shipping.

⁹ Based upon estimated costs for systems installed at two ports in Scotland

5. BENEFITS

Environmental

- 5.1 The new international standards and requirements should help to reduce air pollution from ships trading worldwide. With respect to the unique geographical location of the United Kingdom in relation to the sea routes converging on the North West European industrial and trading zone, cleaning of the atmosphere around the United Kingdom shores would facilitate the Government's commitment to controlling climate change.
- 5.2 The UK coast is interspersed with both large and small ports. The large ports are mainly concerned with Internationally trading ships such as container ships, tankers, bulk carriers, cruise ships, passenger and cargo ro-ros etc. The smaller ports deal with passenger and cargo ferries, fishing vessels etc and are predominantly used by domestic trading ships although some have International trade routes to the European Continent. This results in many ship movements per day.
- 5.3 Clearly if such ships are compelled to make less polluting funnel exhaust emissions due to the use of cleaner fuels or improved technology then the air quality around UK sea ports and hence around the UK coastline would be improved.
- 5.4 In addition this would help address concerns over air quality in major UK ports where high concentrations of trucks, ships and heavy industry can cause localised reductions in air quality.
- 5.5 These measures will contribute to the reduction of transboundary air pollution from the UK to the European Continent carried by the prevailing westerly airflow.

Economic

- 5.6 It is assessed that the reductions in SO_x emissions from all vessels in United Kingdom ports and United Kingdom waters equate to an annual reduction of £3 million worth of material damage to buildings and structures in the UK with 1/3 of the benefit in the vicinity of UK ports¹⁰. It is clear that a reduction in air pollution from the marine industry will assist the Government to meet its EC partnership commitments in the EU strategy to reduce atmospheric emissions from seagoing ships.

Social

¹⁰ Entec 2003 study – margin of error is likely to be in the region of 50%, additional cost of damage to cultural and landmark buildings has not been included in this figure as this represents a social valuation rather than economic cost of repair.

- 5.7 There is scope for human health benefits to coastal and port communities in the reduction of localised pollutants such as low level ozone. There is also likely to be a diffuse benefit from the overall reduction of air pollution and its impact on human health and visual amenity in port areas. It is estimated that implementing Marpol Annex VI will result in 20 fewer deaths and a £26 million reduction in attendant economic loss¹¹ annually due to emissions in the UK¹².

6. COSTS

6.1 Business sectors affected

The measures would affect

- Ship owners/operators
- Engine manufacturers, installers and repairers
- Fuel oil refiners and suppliers
- Incinerator manufacturers
- Tanker loading/discharging terminals
- Port and harbour authority reception facilities
- Offshore installation owners and operators
- Certifying authorities (Classification Societies)
- Fuel oil analysing services
- Ship Builders and Ship Repairers

- 6.2 The measures will impact on the majority of the commercial shipping industry and to some small extent the marine leisure industry. Currently the UK shipping industry is worth around £1 billion to the UK economy through ownership and operation of ships and the provision of maritime services, port operation and freight management.

- 6.3 Leisure vessels not exceeding 24 metres in length are covered by the EC Recreational Craft Directive (RCD) which has recently been amended to include engine emission limits equivalent to Annex VI requirements.

- 6.4 The amendments came into effect on 1 January 2005 – full details of the directive can be found at www.dti.gov.uk/strd/recreat.html. Larger leisure craft over 24 metres in length will be affected by the Annex VI measures.

- 6.5 The MCA has in practical terms excluded recreational craft covered by the EC Directive (as amended) from the UK Statutory Instrument (and hence the Annex VI requirements) provided the recreational craft operates in ports or territorial waters of EU States.

¹¹ The UK government has calculated the effective cost to the economy of a death to be £1.3 million

¹² Entec 2003, additional information on this topic can be found in the European Union Strategy to reduce atmospheric emissions from seagoing ships – COM 2002 595

- 6.6 If the manufacturers or owners wish to sell the recreational craft outside the EU or persons take that craft into ports or territorial seas of non EU States then the Recreational Craft Directive vessel owner or manufacturer would need to be possession of the engines technical file and ensure the engine is compliant with the applicable requirements of Annex VI.

(ii) Compliance costs

- 6.7 It should be noted that some of the costs will be at the discretion of the ship-owner such as the installation of incinerators. Therefore, we have not been able to produce aggregate figures hence the costs are set out on a ship by ship basis as far as possible for each identified stakeholder.

Shipowners

- 6.8 Ship-owners will be required to comply with a number of elements of the regulations, these are identified below and cost estimates given where practical.
- 6.9 **Incinerator installation:** The Regulations will not make it mandatory for vessels to have incinerator's installed, they instead establish conditions for the operation of such equipment.
- 6.10 It is important to recognise that Incinerators are fitted as one method of achieving compliance with international requirements on ships waste (eg: MARPOL Annex V, EU Port Reception Facilities Directive 2000/59/EC) and the majority of costs relating to the installation and operation of such equipment are the result of compliance with these requirements to dispose of garbage rather than annex VI which regulates the technical standards for such equipment.
- 6.11 The international and EC requirements relating to ships waste do not set technical standards and are compatible with Marpol Annex VI. If a ship owner chooses to fit an incinerator the purchase cost is £30,000 plus an installation cost estimated at £20,000 dependant upon location on the ship.
- 6.12 In addition there will be an annual running cost for the fuel to fire the incinerator and maintenance and servicing costs for the equipment. These costs will be dependent upon how often the incinerator is operated and its capacity. It is not possible therefore to state an amount for this running cost for a typical incinerator as so many variables exist.
- 6.13 It is not practical to estimate the number of vessel affected and aggregate cost as no figures exist as to how many UK vessels carry incineration systems. The diversity of shipboard incinerators is such that the levels of alteration required (if any) will vary greatly.
- 6.14 **Fuel quality:** At present Annex VI only states that the Baltic Sea Area has been designated a SO_x Emission Control Area where the sulphur content of the

fuel used should not exceed 1.5%. This fuel is likely to be somewhat more expensive than current high sulphur fuels (averaging \$320/tonne compared to \$240/tonne for higher sulphur fuel¹³. However, during the first 12 months immediately following entry into force of the Protocol (19 May 2005) ships entering the SO_x Emission Control Area are exempt from using the reduced sulphur content fuel of 1.5%.

- 6.15 The North Sea area (including the English Channel) has been provisionally designated a SO_x Emission Control Area where the sulphur content of the fuel used should not exceed 1.5%
- 6.16 Total incremental compliance costs of meeting the North Sea SO_x ECA requirements (through use of reduced sulphur content fuel from the average of 2.75% to 1.5%) are estimated to be in the region of £61 million pounds per annum for all ships calling at UK ports of which £29 million pounds per annum can be attributed to United Kingdom owned ships¹⁴.
- 6.17 It is expected that this North Sea area will be declared a SO_x ECA on conclusion of the next IMO MEPC meeting in July 2005, this will be followed with a period of six months for any objections to be raised and, assuming none are upheld the SO_x ECA will enter into force towards the end of 2006.
- 6.18 However for the first 12 months following the declaration of the North Sea area as a SO_x ECA ships entering the area will be exempt from using the reduced sulphur content of 1.5%.
- 6.19 The £29 million cost assumes full compliance which is expected to be achieved towards the end of 2007 and incorporates a considerable error factor of +/- 50% due to the considerable range of unknown values that have been estimated.
- 6.20 There is a possibility that the cost of low sulphur fuel will fall after the introduction of the Annex VI requirements internationally as the major fuel blenders overcome supply issues and produce more to meet demand. This cannot be quantified however with any degree of confidence.
- 6.21 It should be understood that both the £61 and £29 million figure will be heavily influenced by global oil markets and represent best estimates calculated from bunker prices in 2003. The price of bunker fuels has fluctuated in the last five years but has shown a steady upward trend due to increased global demand on petroleum. It is likely that this trend will continue with year on year increases of around 4% for marine fuel in general.
- 6.22 A positive economic effect of the changes in fuel oil quality is the reduction in Sulphur Oxides building up within engine systems, this is likely to reduce maintenance costs and time although it is not possible to calculate this benefit as it will be dependent upon many other variables including engine type, loading, KW output and other contaminants in the fuel.

¹³ Figures drawn from current (March 2005) Rotterdam bunker market prices, Price differential is similar to that estimated by Entec 2003 and DNV.

¹⁴ EC Beicep-Franlab study 2002 and Entec 2003 figures used

- 6.23 **Fuel quality monitoring:** The cost of sampling and analysis of fuel by regulatory bodies and enforcement of monitoring procedures will be met from within current budgets with costs for survey and inspection charged to shipowners at the standard MCA hourly rate of £78. The total survey time cannot be calculated as it will be on a case by case basis and will be dependent upon the type of vessel, type of engine and number of bunker tanks involved in the survey.
- 6.24 **Sulphur oxide emissions:** There are two technical alternatives available to ship-owners rather than limiting the sulphur content of fuel used on board ships.
- 6.25 First, Annex VI allows for an exhaust gas cleaning system approved by the Administration taking into account Guidelines to be developed by The International Maritime Organization (IMO). Such Guidelines have still to be developed consequently no details of costs are available on such units.
- 6.26 As a result there are currently no type approved systems for technical abatement of SO_x emissions, the IMO is currently discussing this issue and it is hoped that progress will be made at the 53rd session of the MEPC (Marine Environment Protection Committee) in July 2005.
- 6.27 Secondly, Annex VI allows any other technological method that is verifiable and enforceable to limit the SO_x emissions to the levels required. These methods shall be approved by the Administration taking into account Guidelines to be developed by The International Maritime Organization (IMO).
- 6.28 Such Guidelines have still be developed consequently no details of costs are available on such methods. Currently there are a number of experimental systems being tested which offer compliance with Marpol annex V but accurate production and operation cost estimates are not available for such prototype systems¹⁵.
- 6.29 **Nitrogen oxide emissions:** If an engine is unable by its design, construction or by its fuel grade use to operate within specified limits of nitrogen oxides emissions there are two alternatives specified in Annex VI.

¹⁵ One such system has estimated costs of £800000 - £1 million per vessel but it has yet to be put into commercial use

- 6.30 One is an exhaust gas cleaning system approved by the Administration in accordance with the NO_x Technical Code which may be applied to the engine to reduce the onboard NO_x emissions to the limits specified in Annex VI.
- 6.31 The other alternative is to use any other equivalent method approved by the Administration taking into account relevant guidelines to be developed by the International Maritime Organisation which may be applied to the engine to reduce the onboard NO_x emissions to the limit specified in Annex VI.
- 6.32 Such guidelines have still to be developed. Consequently no costs are available for either method. The Guidelines will be discussed at MEPC in July 2005 and it is hoped that progress will be made in finalising them.
- 6.33 **Engine certification costs:** Ships engines will need to be certified against the technical standards of annex VI, as a component of this engine families can be certified by manufacturers as compliant with annex VI.
- 6.34 Certification of single engines or engine families or groups is between £1,300 and £2,200 with a maximum of £3,500 including the cost of the certificate itself.
- 6.35 Vessels will additionally need a certificate for the engine installation on board ship - for pre-certificated engines this final certification cost is dependant on engine power in the range of up to 500 kW £250; up to 5,000 kW between £316 and £950; above 5,000 kW £950 up to £1,600.
- 6.36 These costs are per engine and include the survey and issue of the certificate. If vessel's engines are not pre-certified costs to the vessel will increase to include type approval for the type as well as the specific installation. These costs will be similar to those outlined above.
- 6.37 The total cost of certification per vessel cannot be estimated as it will depend upon the type of engine, number of engines found on board the ship and the rated KW output of each engine. Generally smaller vessels will have lower output engines and fewer engine installations and as a result will have lower costs resulting from certification requirements. As an example a Ferry with 2 main engines and 2 auxiliary engines may incur certification costs in the region of £3000.

Engine manufacturers

- 6.38 Engine manufacturers will be required to design or modify their engines to achieve the standards set down in annex VI. They are likely to pass these costs directly to the shipowner purchasing and fitting the equipment.
- 6.38 **Re-design and associated costs:** Obtaining approval from the classification society for engines with already acceptable emission levels is approximately £200 per engine.

- 6.39 For those which require development to meet the required emission standards, depending upon the amount the redesign required, the cost ranges from between £1,300 to £6,000 per engine. On average the cost to produce an engine complying with the Annex VI standards per kW of output is an additional 5%-10% over land or industrial based standards.
- 6.40 It should be stressed that although Annex VI does not come into force until 19 May 2005, it was a requirement that marine diesel engines of over 130 kw power (with a very few exceptions) installed on a ship constructed on or after 1 January 2000 or a marine diesel engine of over 130 kw power which underwent a major conversion on or after 1 January 2000 had to meet the Nitrogen Oxides emission limits specified by Annex VI. This means that the marine diesel manufacturing/conversion industry have, for the past 5 years, been producing engines to meet the required forthcoming NO_x emission levels. The redesign and associated manufacturing costs have therefore been covered and already been absorbed by the customers for these engines. For engines fitted before 1 January 2000 there will however be engines that are non-compliant with the NO_x code and these will require certification and potential redesign with resultant costs to the shipowner as outlined above.
- 6.41 **Engine installers and repairers:** No significant additional installation costs are anticipated. However if the engine is more expensive to purchase from the manufacturer then this additional cost will be passed on to the customer. Repairs carried out may also carry a small premium if specialist parts are required to maintain conformity with the technical requirements of the annex, these costs will again be met by the shipowner and are not expected to have a material impact on the cost of operation. Engine redesign costs outlined above will be the major cost rather than routine maintenance and spares

Fuel oil refiners and suppliers

- 6.42 Fuel oil refiners are likely to see increased demand for low sulphur fuels and a corresponding reduction in demand for higher sulphur fuels. As the global average for sulphur content is already below the 4.5% level and the 1.5% SECA will not be implemented until mid-2006 at the earliest it is expected that refiners will have adequate time to switch production to low sulphur fuel. The increase in cost associated with this switch will be passed directly to the ship-owner and has already been outlined.
- 6.43 Fuel oil suppliers will be required to increase their sampling and monitoring of fuel deliveries. This is likely to result in costs in the region of £3 million annually which is incorporated in the £29 million estimated cost and will be met by the shipowner through the increases fuel costs previously identified.

Incinerator Manufacturers

- 6.44 Incinerator manufacturers will need to ensure that their products are capable of meeting the operational requirements of Annex VI. The cost of achieving

compliance for new installations is not expected to increase the cost of such equipment significantly and will be passed to the shipowner in any event.

Tanker discharging and loading terminals

- 6.45 Implementing Option 2 there will be no additional costs for tanker terminals beyond those applying to all ports and terminals identified above.

Impact on Ports

- 6.46 The only expected impact on ports will come from the need to provide reception facilities for ODS and exhaust gas cleaning residues.
- 6.47 **Port reception facilities:** Disposal of 1 ton of Ozone depleting substances costs in the region of £1000 including collection, transport and final destruction in a licensed facility. This figure has been arrived at after extensive consultation with DEFRA and the Environment Agency and is representative for the range of different ozone depleting substances.
- 6.48 The UK no longer manufactures the majority of ozone depleting substances except for critical use applications, however there is a considerable amount of materials remaining for phase out in the UK – in the region of 800,000kg's of ODS are currently destroyed each year. A single ship is likely to carry in the region of 100 – 1000kgs depending upon its age and trade.
- 6.49 As the wastes are of a specialist nature it is most likely that they would be dealt with on a contractual basis between the ship owner/managers and the waste disposal specialist company rather than by a general waste disposal conducted by the port/harbour authority.
- 6.50 The precise costs of special disposal would depend upon the distance of the disposal facility from the port, the quantity for disposal and the exact nature of the ODS. In general ODS will be disposed of by two facilities in the UK through high temperature incineration, the cost of £1000/ton is calculated from the commercial costs of these operations and it is not expected to vary to any great degree as the majority of the cost is due to the technical processing rather than transport and materials handling.
- 6.51 It should be noted that not all ports offer repair facilities and the measure will not impact upon these ports, in the majority of cases these facilities are privately owned and operated and the requirements of annex VI will fall upon the repair yards rather than the port.
- 6.52 There are around thirty five major repair and conversion facilities in the UK that will be directly affected (out of around 750 ports) but it is also likely that some smaller boatyards and repair facilities may be affected on a case by case basis if they work upon ODS containing equipment.

- 6.53 For any ship breaking facilities developed in the UK in the future such waste disposal costs may be less due to there being a higher throughput and perhaps less need to transfer the waste materials to a third party for ultimate disposal with destruction handled in-house.

Offshore installation owners and operators

- 6.54 Offshore installations will require certification and will be required to use low sulphur fuel and NO_x technical code compliant engines in the same manner as ships. However the annex only requires compliance for those engines that are not used solely and directly for the exploration and recovery of oil, gas and sea-bed minerals which will reduce the burden considerably.
- 6.55 The annex also permits flaring and emissions resulting from the release of VOC's as a result of the drilling and processing of such materials.
- 6.56 In practice this will mean that the additional costs of low sulphur fuel will have a limited effect on platform owners, in particular as many platforms use gas produced during the production process to fuel the generator systems rather than heavy fuel oil.
- 6.57 Certification costs for the platforms will be in the same range as for ships.

Classification Societies

- 6.58 Class will carry out the surveys outlined in the Shipowners section on a commercial basis, as such they will not encounter any additional cost as a result of the measure and are likely to experience increased business opportunities in the certification of ships.

Fuel Oil analysis services

- 6.59 These organisations are likely to find increased business opportunities within the UK and worldwide as the need to monitor fuel quality (and other technical requirements) increases due to the entry into force of Annex VI.
- 6.60 This monitoring will normally be carried out by the fuel oil suppliers but opportunities will exist in professional verification, lab services and provision of equipment to facilitate monitoring.
- 6.61 The cost of such monitoring activities will be met by shipowners and is incorporated into the £29 million aggregate figure for compliance with the annex; the total annual cost of monitoring is estimated at £3 million¹⁶.

Ship builders and repairers

¹⁶ Based upon the results of the Entec study

- 6.62 No additional cost. Any increase in shipbuilding/ship repair costs resulting from the fitting of specialist equipment will be passed on to the shipowner. Provision of specialist services such as fitting of technical monitoring equipment and abatement technology may provide some additional business opportunities for yards.

Regulatory Authority survey and certification costs

- 6.63 All ships of over 400 gross tonnes will require to carry either an International or UK (for domestic trading ships) air pollution prevention certificate valid for 5 years.
- 6.64 The International certificate requires an annual survey to maintain its validity. The UK regulations relating to UK certificates provide for owners to opt for either annual surveys, or unscheduled intermediate surveys. It is likely that the majority of operators will elect for unscheduled surveys which will carry a lower administrative burden.
- 6.65 The survey and certification process for an International certificate is likely to cost £2,000 including the annual surveys. For a UK certificate the cost is likely to be £500 to £750.

Total compliance costs

- 6.66 As ships vary greatly in size, type and trading patterns it is not possible to estimate the total cost of compliance for UK flag ships in any meaningful way.
- 6.67 Small ships which already run on fuel of 1.5% sulphur or less may incur little additional cost except for a general overall increase in the cost of the fuel grade they already use due to the likely increase in demand for this lower sulphur grade fuel. It is not however possible to estimate what percentage of ships this will include as the majority of vessels are capable of using a range of fuel grades including low sulphur fuels and will switch fuel types depending upon availability of fuel, cost and the vessels operational needs.
- 6.68 Ships which have to change fuel grade or fit exhaust gas cleaning systems may incur considerable costs as outlined above.
- 6.69 Taking a very basic measure of the total estimated cost of compliance (£29 million) and the aggregate number of UK vessels operating solely on domestic voyages (1200) and attendant certification and approval costs, the total cost per vessel is in the region of £25000/year with an additional £1000 for the UK certification every 5 years.
- 6.70 The total cost to those 600 UK vessels trading internationally will be dependent upon the cost of bunker fuel where they are trading.
- 6.71 This figure is a best estimate and it will vary greatly depending upon the size of the vessel, fuel consumption and the nature of a vessels trade.

- 6.72 The measure will impact most upon the largest vessels that use the greatest amount of fuel.
- 6.73 There is not expected to be any significant cost associated with businesses familiarising themselves with the legislation and amending procedure as necessary as the administrative regime is comparable to current ships certification and the technical contents of the annex have been widely reviewed and commented upon by the industry.

7. EQUITY AND FAIRNESS

- 7.1 The UK implementation of the provisions of MARPOL Annex VI in line with Option 2 is not expected to impact on equity and fairness issues - the measure is a technical regulation to reduce air pollution.
- 7.2 There may be a positive quality of life impact for those living in close proximity to ports through the reduction in air pollution although the actual pollutant contribution from shipping in any one area is likely to be considerably less than that from road transport.
- 7.3 The regulations will not have any race equality impacts.
- 7.4 The standards imposed by the UK implementation of MARPOL Annex VI follow the international convention and will be applicable globally.
- 7.4 The certification regime for UK flagged ships is in line with UK policy on other shipping issues and is not expected to create a substantial additional burden which would impact on the competitiveness of UK flagged vessels.
- 7.5 The costs would not be disproportionate in relation to the contribution that the shipping industry makes to global air pollution.

8. CONSULTATION WITH SMALL BUSINESS – THE SMALL FIRMS’ IMPACT TEST

- 8.1 No figures are available for the exact number of affected ports, fuel suppliers and vessel operators who could be considered to be small businesses. As a result we have sought additional views from the trade associations including the British Chamber of Shipping, Royal Yachting Association (RYA), British Marine Industries Federation (BMF), British Rig Owners Association (BROA), UK Offshore Operators Association (UKOOA) British Ports Association (BPA) and the UK Major Ports Group (UKMPG).
- 8.2 These organizations include identified small businesses (particularly the BMF) and have collated industry responses to the consultation exercise.
- 8.3 These replies have been largely supportive of the objectives of the regulation and specific technical comments are being considered by the MCA in taking

the regulations and guidance forward. Increased costs and changes to the certification regime are not expected to create an undue burden for industry.

- 8.4 A summary of comments received from these consultees is included in section 11 – Consultation.

9. ENFORCEMENT AND SANCTIONS

- 9.1 Implementation of the provisions of MARPOL VI in the UK through secondary legislation would require enforcement to be carried out by the Maritime and Coastguard Agency as part of its existing enforcement activities. The Regulations would provide for sanctions including criminal sanctions for non-compliance.
- 9.2 These penalties are in line with UK norms for Marpol violations.

10. MONITORING AND REVIEW

- 10.3 The Government would monitor and review the implementation of annex VI through existing consultative arrangements, including DfT's Marine Pollution Advisory Group and the United Kingdom delegation to the International Maritime Organization.
- 10.2 In addition the Government will contact the industry to review the UK implementation of Annex VI of Marpol one year after the UK secondary legislation enters into force.

11. CONSULTATION

- 11.1 The United Kingdom delegation to IMO played a full and active part in securing international agreement on these new measures and the subsequent addition to the MARPOL Convention. The UK consulted throughout the drafting of the Convention and industry was involved with the discussions.
- 11.2 The UK implementation of Annex VI has been consulted upon widely with the draft Statutory Instrument, accompanying MSN and the partial RIA being sent to industry, other regulatory bodies, environmental groups and trade organisations etc for comment.
- 11.3 The majority of comments received referred to small drafting or textual changes relating to legal or technical clarity which have been adopted where appropriate.
- 11.4 Specific concerns were raised by ferry operators with the practicalities of sampling bunker fuels and the retention of samples for future analysis. These concerns do not directly impact upon the structure of the proposed regulation

but will affect the administrative arrangements the Competent Authority (the MCA) put into place alongside the regulations through a Merchant Shipping Notice.

- 11.5 We are currently working with the Bunker Suppliers and Shipowners to develop alternative, practical and auditable sampling arrangements that fulfil the regulations. We do not expect these arrangements to create any substantial financial or administrative difficulties for affected operators.
- 11.6 One of the key purposes of consulting on the partial Regulatory Impact Assessment was to give industry the opportunity to provide further details of the costs involved in implementing Annex VI of MARPOL. While there was a limited response from industry on the estimated cost of compliance some information was received on the cost of Seawater Scrubbing systems which has been included in this final version of the RIA.
- 11.7 In addition a considerable degree of informal consultation has taken place with consultees contacted for additional information and to discuss in more detail concerns.
- 11.8 A full summary of the comments received and the agencies response will be made available in the consultations archive on the MCA website at www.mcga.gov.uk.

12. SUMMARY AND RECOMMENDATIONS

Options 1 and 3 would not be consistent with the Government's duty to respect international regulations and it's Climate Change Programme. We therefore recommend option 2

Expected costs and benefits

	Economic Costs	Environmental benefits
Government	None – any costs arising from survey and inspection work carried out as a result of the regulations implementation will be met through fees charged to the ship-owner.	Reduction in marine air pollution by NO_x, SO_x and ODS in line with international commitments. Compliance with climate change programme and assisting with EC partnership commitments with respect to acidification strategy and national emissions ceilings

Citizens	Possible increase in cost of goods that are transported by sea this is not expected to have any substantive effect.¹⁷	Reduction in marine air pollution with environmental benefits, health benefits including reduction in lung complaints due to low level ozone.
Seafarers	None. There will be no costs to UK or foreign national seafarers.	Reduction in marine air pollution and exposure to localised pollutants such as low level ozone
Ship Owners	See Section 5 £29 Million annual aggregate cost is estimated for UK owned ships. This incorporates the expected costs to the other aspects of the marine industry that will be passed to the ship-owners.	More level playing field. Cleaner fuel and potential for reduced maintenance costs
Marine Industry other than Ship Owners (Classification Societies, Engine Manufacturers and Technical services companies)	See Section 5 Effective cost is likely to be de minimis as any costs will be passed to the shipowners on a commercial basis	Increased business opportunities through market for technical abatement technology, certification and monitoring equipment.

13. DECLARATION

I have read the Regulatory Impact Assessment and I am satisfied that the balance between cost and benefit is the right one in the circumstances.

Signed on behalf of the Secretary of State
for Transport

Stephen Ladyman

Parliamentary Under Secretary of State for Transport

Date 18th May 2005

¹⁷ Any rise in the cost of goods would be shared by the UK economy as a whole; the total size of the UK economy is in the region of £1 trillion using 2003 prices. The total value of goods being imported and exported from the UK is estimated by the Office of National Statistics as being in the region of £38 billion in 2004.

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