IMO
INTERNATIONAL MARITIME LAW INSTITUTE
Established under the auspices of the International Maritime Organization
A specialized agency of the United Nations

THE GREENHOUSE GASES (EMISSIONS FROM SHIPS) REGULATIONS 2016

A Legislation Drafting Project submitted in partial fulfillment of the requirements for the award of the Degree of Master of Laws (LL.M.) in International Maritime Law at the IMO International Maritime Law Institute

Submitted By: Georgette Grant (Jamaica)

Supervisor: Ms. Ramat Jalloh

Academic Year 2015-2016

TABLE OF CONTENTS

Dedication

This paper is dedicated to the curbing of Greenhouse Gas Emissions from Ships in Jamaica.

Acknowledgements

The completion of this process was not accomplished singlehandedly. First and foremost, I thank God Almighty for his sustaining grace and favour on my life. Without his mercies, I would have been consumed. Thanks also go out to my wonderful parents for their unconditional love, unfailing support and encouragement throughout my life. Everything I am today, I owe to their years of toiling.

I would also like to thank The Maritime Authority of Jamaica specifically Rear Admiral Peter Brady, Director General for believing in me, and subsequently nominating me to undertake this course of study. In addition, expressions of gratitude go out to Mr. Bertram Smith, Legal Director at the Maritime Authority of Jamaica for all his assistance throughout the compilation process of this piece of work.

It would be remiss of me not to extend expressions of appreciation to Ms. Verica Cole, Librarian at the IMO International Maritime Law Institute for pointing to me the right resources; which were used throughout the body of this work.

Finally, I owe a debt of gratitude to my supervisor Ms. Ramat Jalloh without whose consistent guiding and supervision, I would have been lost, like a ship without a sail.

1. Introduction

Established under the auspices of the United Nations, the International Maritime Organisation (hereinafter referred to as the "IMO") has a mandate to protect the oceans and ensure preservation of the marine environment. The Torrey Canyon accident of 1968 prompted a new discussion on ship safety and the protection of the marine environment leading to a decision on the development of a comprehensive instrument regulating the prevention of pollution from ships. The Instrument was named the International Convention for the prevention of pollution from ships 1973 and was signed at a Diplomatic Conference. In 1978, a Protocol was later introduced to deal with tanker safety and pollution. To keep it as one Convention, it was decided that the 1978 Protocol should be married with the 1973 Convention. Upon its entry into force up until present, the Convention has been referred to as MARPOL 73/78.

1.1 MARPOL 73/78

The MARPOL Convention addresses operational and accidental actions that result in pollution caused by oil, noxious liquids in bulk, hazardous substances in packages, sewage, garbage and air pollution.[1] Failure to comply with MARPOL could result in rather costly sanctions. Thereafter, there was a subsequent adoption of the 1997 Protocol. However, it was decided not to add '97' to the name MARPOL 73/78, but instead to keep it as MARPOL 73/78.

At present, MARPOL has six Annexes; each Annex aimed at regulating maritime issues. The Annexes are Annexes I through to VI.

- Annex I, was introduced in 1983 and it addresses oil-related pollution. This pollution is most likely to occur as a result of operational or even accidental events. An important aspect in this Act is the stipulation that oil tankers should have double hulls. The second hull would act as a preventative barrier to an oil spill in the event that something was wrong with the first hull.

[1] Fitzmaurice, Malgosia et al; **Research Handbook on International Environmental Law,** Edward Elgar Publishing Ltd, 2010; p

- ∝ Annex II was also introduced in 1983 and it establishes a framework for the discharge and carriage of noxious liquid substances that are transported in bulk. One of the significant aspects of this annex is the prohibition of the discharge of residual substances within 12 miles of shore.
- ∝ Annex III came later in 1992 and it addresses standards for packing, labeling, stowing and so forth of harmful materials transported by sea.
- ∝ Recognizing still the need for additional regulations, the IMO introduced another Annex- Annex IV in 2003. This Annex deals with vessel sewage and the discharge of those substances into the oceans.
- ∝ Annex V introduced in 1988, with later revisions in 2013 addresses the disposal of garbage at sea. The Act has, in some provisions placed the responsibility on both the shipowner to alert the ports where he carried cargo likely to cause problems, and the port is responsible to provide the necessary reception facilities to hold certain substances; for example dry bulk cargo residue and wash water.
- ∝ Consideration was later given to the fact that ships plying the world's oceans could contribute to air pollution. As a result, it was felt that the maritime industry should not be left out of the growing worldwide trend to regulate air pollution. The provisions of MARPOL in 2005 were later expanded to take into account, the emissions of harmful substances from ships. The guidelines regulating such activity are embodied in Annex VI.

1.2 Annex VI Updated

In 2008, the Marine Environment Protection Committee (MEPC) developed further guidelines imposing stricter limits of control on ship emissions. These amendments adopted by resolution MEPC.203 (62) in July of 2011 added a new chapter 4 to Annex VI of MARPOL. This chapter includes regulations on energy efficiency for ships with an entry into force date. The Annex contains in total 18 regulations and eight appendixes which carry in each appendix certain key documents to aid a state party in its enforcement.

1.3 The International Community's Response to Greenhouse Gases

Preceding MARPOL and hailed as the first piece of Convention to consider the effect of greenhouse gases on the environment was the United Nations Framework Convention on

Climate Shipping (UNFCCC). Adopted in 1992 at the United Nations Headquarters in New York and later opened for signature and ratification at Rio Janeiro, this Convention urged states to create legally binding obligations to reduce their greenhouse gas emissions. Subsequent to this was the Kyoto Protocol to the United Nations Framework Convention on Climate Shipping (UNFCCC) adopted on December 11, 1997 at Kyoto, Japan during the 15th Conference of Parties (COP 15). It aimed as did its predecessor to combat climate change through the reduction of greenhouse gas emissions. It comprises two Annexes each aimed at curbing greenhouse gas emissions. Annex A deals with six greenhouse gases subject to binding reduction targets. These gases are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. Annex B goes on to list the reduction targets for 38 states including the industrialised States and the European Community.[2] The Protocol faced much debate in relation to the exclusion of developing countries from Annex B.

The International Maritime Organisation ("IMO") which some refer to as the vanguard of safety of life at sea has generated many studies seeking to determine the exact contribution of the shipping sector to the emissions of greenhouse gases. In a study conducted in 2007, the IMO concluded that ocean going vessels released 1.12 billion metric tons of carbon dioxide.[3] A further study conducted in 2009 credits exhaust gas as the major source of greenhouse gas. Based on the study, some States have utilised the method of slow steaming. This slow steaming is felt cuts down on the emission of carbon dioxide.

[2] Palassis, Stathis; *Climate Change and Shipping* in **Climate Change and the Oceans; Gauging the Legal and Policy Currents in the Asia Pacific and Beyond**. Edited by Warner, Robin and Schofield, Clive, Edward Elgar Publishing Ltd, 2012; p 204.

[3] Sub-Committee on Bulk Liquids and Gases; *Review of MARPOL Annex VI and the NOx Technical Code: Report on the outcome of the Informal Cross Government/Industry,* Scientific Group of Experts established to evaluate the effects of the different fuel options proposed under the revision of MARPOL Annex VI, IMO, 2007.

2. Greenhouse Gases Explained

2.1 Understanding Greenhouse Gases

The earth benefits from a correct balance of greenhouse gases. Advocates of this view note that greenhouse gases assist in the natural temperature regulation of the planet. They comment further that the absence of them would make earth inhabitable and colder on average.[4] Since recent times, greenhouse gases have been receiving much attention regarding their harmful effects. These effects are only felt if these gases operate outside their established equilibrium. While the problem of emissions is not a recent phenomenon, it cannot be disputed that the effects have increased exponentially over recent times. These effects have championed awareness concerning the link between emissions and their harmful effect on the marine environment.

The shipping industry has been viewed as one of the contributing sectors to the imbalance of greenhouse gases. Vessels that ply various ocean routes bring with them over 90 percent of the world's trade[5]. Unfortunately, they also bring with them emissions of harmful substances that have a disastrous effect on the environment. The emissions of carbon dioxide (CO2), nitrogen oxides (NO), sulphur dioxide (SO2x), volatile organic compounds (VOC), particulate organic matter (POM) and other ozone depleting substances have been the major players.

2.2 Carbon Dioxide ('CO2')

As part of the natural carbon balance, carbon dioxide commonly referred to as 'CO2' is absorbed into the world's oceans and immediately thereafter becomes a part of the carbonate system. Here it is broken down in the following forms namely through dissolved carbon dioxide, bicarbonate ions or carbonate ions. The movement of carbon dioxide from the earth's atmosphere into the ocean causes a chemical reaction with seawater molecules.[6] That chemical reaction subsequently forms carbonic acid or 'H2CO3', the result of which is the change in concentration levels of

[4] Le Treut. H et al; *Historical Overview of Climate Change* in **Climate Change 2007: The Physical Science Basis.** Edited by Qin, Solomon, S., D., et al; Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2007; pp 96-97.
[5] Kolieb-Harrould, Ellycia; *Shipping Impacts on Climate: A Source with Solutions,* Published in Oceana, July 2008;
[6] Griffin, Jenny; *Ocean Acidification & Methane Hydrates.* Accessed at: http://www.climateemergencyinstitute.com/uploads/Ocean_Acidification_Methane.pdf.

hydrogen carbonate and carbonate ions. The change in concentration contributes to a change in the natural pH balance of the ocean giving way to a more acidic situation.

That change, some scientists believe interferes with the flourishing of marine life in the water and the organisms that inhabit therein are in jeopardy of becoming extinct[7]. For example, corals and other solidifying organisms are unable to make their skeletons and shells from calcium carbonate minerals. Other marine species that may be affected include lobsters, snails, starfish, oysters, clams, and various species of phytoplankton; all of which are known to occupy vital places in the global-ocean food chain. As most recent as 2014, the statistics revealed that there has been a 26 percent increase in ocean acidity since pre-industrial levels as a result of the release of carbon dioxide into the atmosphere and the current rate of ocean acidification is over ten times faster than that of any other period in the last 55 million years[8] data show. This certainly presents a ghastly picture of our current reality.

2.3 Nitrogen Oxide ('NOx')

CO2 emissions are the most talked about contributors to greenhouse gases. However, other harmful substances such as nitrogen oxides are most times not given as much attention. As with everything there is the innate need to have a correct balance of everything. Too much of any one thing or substance will certainly wreak havoc on the equilibrium. As with CO2 emissions, the oceans are also heavily reliant on the appropriate distribution of nitrogen cycling through them.

Touted as one of the most important nutrients in the oceans, all organisms, from tiny microbes to blue whales use nitrogen to make proteins and other important compounds. The net forcing from Nitrogen Oxides otherwise known as "NOx", however, involves both warming and cooling components. Nitrogen oxides (NOx) emissions, whether from ships or other sources, favor ozone production (warming) as well as hydroxyl (OH) production that destroys methane (cooling).[9] NOx emissions from shipping are relatively high because most marine engines operate at high temperatures and pressures without effective reduction technologies. The depositions of nitrogen

[7] IPCC; *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Summary for Policymakers], 2007. Accessed at: http://www.ipcc.ch/spm2feb07.pdf.
[8] Honisch, B., et al; The Geological Record of Ocean Acidification, Science 335, 2012; pp 1058-1063.
[9] Holmes, C. D, Prather M. J. et al; *Climate impact of ship NO emissions: An improved estimate accounting for Plume chemistry, July 2, 2014;* p 6801.

compounds cause acidification, eutrophication of natural ecosystems and fresh water bodies and threaten biodiversity through excessive nitrogen deposition.[10]

2.4 Sulphur Oxides ('SOx')

Sulphur oxides (SO) also play their role in affecting the planet's climate globally but more specifically the marine environment. Like nitrogen oxides, the depositions of sulphur oxides contribute to acidification, eutrophication of natural ecosystems and freshwater bodies and threaten biodiversity. Its deposits into the ocean, some scientists and marine biologists say, have a more lasting effect than carbon dioxide. Carbon dioxide can be reversible however when deposited into the sea, as opposed to sulphur oxides. Upon release into the atmosphere, it reacts with water present in the atmosphere and locally forms acid water droplets which fall into the ocean. Aside from its marine effects, sulphur oxides are able to adversely affect the air quality of a population, despite its emission being done at sea. It has been said that the emissions of sulphur oxides as with other notable pollutants are known to occur along heavily trafficked trading routes. One such example is the Baltic Sea which marine specialists claim has been greatly affected by the emission of sulphur oxide which significantly reduced its water buffer capacity. As a result it is particularly sensitive to strong acids. The presence of high SO emissions can be credited to the high sulphur content of marine fuels used by most ocean-going ships.

2.5 Volatile Organic Compounds ('VOC')

Volatile organic compounds or "VOC" are yet another contributor to the emissions of greenhouse gases from ships. Considered tolerable in its normal production amounts and not particularly destructive; volatile organic compounds help to preserve the gas balances. The harmful effects of volatile organic compounds can become quite harmful when mixed with other gases. Atmospheric volatile organic compounds are primarily of interest because of their impact on other atmospheric elements, including oxidants and aerosol. Most of the global annual volatile organic compounds originate from biomass burning, fossil fuel combustion and

[10] Eyring, Veronika, Corbett, J. James et al; *Brief summary of the impact of ship emissions on atmospheric composition, climate, and human health*. Document submitted to the Health and Environment sub-group of the International Maritime Organization on 6 November 2007; p 5.

industrial activities. The mixture of these compounds with other harsh gases such as nitrogen oxides, sulphur and carbon all help to adversely affect air quality and the marine environment.

2.6 Particulate organic matter

Particulate organic matter and other ozone depleting substances that come from ship incineration among other activities aboard the vessel all play their respective roles in impacting the marine environment and ultimately climate change.

2.7 Conclusion

It is important to note that these pollutants may or may not be long-range pollutants depending on how high into the atmosphere they are emitted, how strong the predominant winds blow and so forth.[11] Many have buried their heads in the proverbial sands for years refusing to believe that the marine environment would become affected by this issue. However, these pollutants are not static and there interactions span not only the atmospheric environment but also the aquatic and terrestrial environments.[12] It would be prudent for this problem to be arrested. Failure to do so will result in dire consequences on Jamaica's marine environment, air quality and the ultimate destruction of the planet.

[11] Flinterman Cees et al; **Transboundary Air Pollution: International Legal Aspects of the Co-operation of States,** Martinus Nijhoff Publishers, 1986; p 2.
[12] Ibid; p11.

3. Situational Analysis-Jamaica

With shipping being a borderless means of trade and commerce, countries whose ports regularly accommodate ocean-going vessels are even more at risk to reap the impact of greenhouse gas emissions from ships. Jamaica for example is once such area that stands to be affected by the emission of greenhouse gases.

3.1 Jamaica's Composition

Strategically located, Jamaica houses one of the most beautiful coastlines, some of the most inviting turquoise beaches and many other wonderful tourist attractions. Aware of its appeal, it markets itself as a desired tourist destination with innumerable hotels positioned along the coastline. In addition, its location allows it to be used as a major transshipment port with its ports all positioned on the coastline.

Jamaica's marine biodiversity includes three thousand five hundred different species of plant and animal. This covers everything from corals, fishes, lobsters and other recognized sea inhabitants, and also includes organisms living in a very wide variety of marine habitats namely in the corals, lagoons, beaches, rocky shores, sea grass beads and even down to depths of over 2,000 metres existing in the Walton Channel between the Pedro Bank and the St. Elizabeth coastline; an area ripe with specie richness.[13] Ecosystems such as coral reefs and mangroves represent a part of Jamaica's biodiversity and need special attention for protection and conservation. Both reefs and mangroves are a part of the natural protection against coastal erosion and each provides a barrier against abnormal wave action.[14] This role of coastal protection was ably demonstrated on our very own shores and proved effective along the north coast during the events of several hurricanes, notably 'Allen' in 1980 and 'Gilbert' in 1988.

[13] Goodbody, Ivan Professor; *Jamaica's Marine Biodiversity*, Department of Life Sciences; University of the West Indies; p 2.
[14] Ibid; p 3.

3.2 Potential Effect of Greenhouse Gases

The climatic consequences of the emissions of these greenhouse gases could see increased coastal erosion, increased inundation of coastal wetland and lowlands, increased risk to coastal housing and infrastructure and loss of coastal habitats and species. A rise in sea level of 30-35 mm raises concern for the low lying coastal areas of Jamaica, with high population densities, industrial, commercial and tourism development at risk. Among the ecosystems most vulnerable to sea-level rise are: beaches, wetlands, sea-grass beds and coral reefs. Beach erosion patterns are expected to experience change due to the increased forces of wind, tides and currents. Coral reefs are expected to be impacted significantly due to their sensitivity to temperature changes brought about by climate change.[15]

In addition, as a transshipment port, Jamaica regularly receives ships in its waters whether they are cruise liners, bulk carriers, tankers among others. The frequency with which it receives these ocean-going vessels makes it more susceptible to the consequences of greenhouse gas emissions.

3.3 Jamaica's Response to Greenhouse Gas Emissions

Jamaica is a signatory to many international conventions aimed at protecting the marine environment. Examples of such Conventions are: the United Nations Convention on Biological Diversity (UNCBD) and the Marine Pollution 1973/78 International Convention for the Prevention of Pollution from Ships (MARPOL).

The United Nations Convention on Biological Diversity places a responsibility on the State, as the Contracting Party, to document, conserve and protect the genetic resources in all areas under national jurisdiction.[16] In response to this responsibility the Government of Jamaica prepared and published a "National Strategy and Action Plan on Biodiversity in Jamaica". Under the Marine Pollution 1973/78 International Convention for the Prevention of Pollution from Ships, the Government of Jamaica published a Vision 2030 Transport Sector Plan. In that document it

[15] Richards, Allison; *Development Trends in Jamaica's Coastal Areas and the Implications for Climate Change;* Urban and Regional Planner Sustainable Development and Regional Planning Division, Planning Institute of Jamaica, March 2008; p 14

[16] Goodbody, Ivan Professor; *Jamaica's Marine Biodiversity*, Department of Life Sciences; University of the West Indies; p 5.

highlights inter alia, Jamaica's need to establish implementing legislating to protect the marine environment from air emissions from ocean-going vessels.

Further and most recently, September 28 to October 1, 2015 marked Jamaica's position as a key player in the international shipping community. Held in Singapore, the International Maritime Organisation launched the Global Maritime Energy Efficiency Partnerships Project (GloMEEP) Project. The aim of the project is to support increased uptake and implementation of energy-efficiency measures for shipping. This Global Environment Facility (GEF)/United Nations Development Programme (UNDP)/IMO project, formally designated "Transforming the Global Maritime Transport Industry towards a Low Carbon Future through Improved Energy Efficiency", focuses in particular on building capacity to implement technical and operational measures in developing countries, where shipping is increasingly concentrated.[17] Jamaica was a part of the leading ten pilot countries present at the Conference.

State parties to MARPOL are expected to conform to their varying obligations under the Convention. Jamaica has ratified the MARPOL Convention. Once a state has ratified the MARPOL Convention, it undertakes to give effect to the provisions of the Convention including and automatically binds itself to all such other Annexes, inclusive of amendments and/revisions. As a party to MARPOL, Jamaica is a party to all the Annexes and as such has consented through its ratification to give effect to all such provisions of MARPOL.

As a party to MARPOL, it is imperative that Jamaica domesticates this international instrument into national law. At present, this Convention is not replicated into national law, which places Jamaica at severe disadvantage in discharging its obligations under the Conventions. It is this writer's opinion, that the Convention be domesticated into national law.

[17]GloMEEP project for a low-carbon maritime future formally launched in Singapore. Accessed at: http://www.imo.org/en/MediaCentre/PressBriefings/Pages/43-glomeep-launch.aspx.

4. Transposition of the Convention into National Law

The Shipping Act of Jamaica 1999 is the principal piece of legislation governing the maritime sector. Surrounding it are other pieces of maritime legislation, however none regulating the prevention of air pollution from ships.

It is recommended that as a party to MARPOL, Jamaica stays true to the obligations imposed on it as a state party under the Convention; particularly Annex VI.

4.1 Amendment

Accepting its international obligations is only the first step but the essential question that needs to be answered is how will Jamaica transpose that international obligation to function on a national level?

It is the recommendation of this writer that an amendment of Section 454 (e) of the Shipping Act is done and Regulations be made accordingly under this section.

One might question the need for the amendment since a reading of the above mentioned section seems wide enough the cover the making of Regulations under the section. Section 454 (1)(e) reads thus:

1. Without prejudice to any other power to make regulations conferred upon him by this Act, the Minister may make regulations generally for carrying this Act into effect, and without limiting the generality of the foregoing, by such regulations may provide for

(e) the control of ships, the regulation of maritime traffic and the administration of maritime search and rescue within Jamaican waters [.....]

In its broadest sense, any legislation regulating the emissions of greenhouse gases would effectively control ships. Such control would be exercised by the Administration in implementing strategies to curb the emission of these harmful substances. However, subsequent pieces of legislation that aim at protecting the marine environment might not be able to avail themselves of such similar interpretation. It appears then that if left un-amended, each

subsequent piece of maritime legislation would have to accurately defend why it should be able to fall under this interpretation. If such a position is not adequately defended, that legislation would suffer an untimely death.

In line with the foregoing, the writer recommends that the section be amended by inserting the words **"for the preservation of the marine environment"** immediately following the words "the control of ships". Therefore, if that is done, the section would read:

(e) the control of ships, for the preservation of the marine environment, the regulation of maritime traffic and the administration of maritime search and rescue within Jamaican waters. [….]

An amendment of the section would be the best option to successfully accommodate not only the making of these draft Regulations under the Act but to cater for future pieces of legislation that aim at protecting the environment.

5. Effective Implementation

The proposed law has created certain performing obligations. These obligations need to be discharged effectively for the law to have full effectiveness. Failure to do this would liken the law to a 'dog without any bite'. It would not be able to effectively police the obligations of the Regulations without the necessary frameworks in place.

5.1 Provision of Reception Facilities

Part II of the Regulations stipulates that certain key things need to be in place to effectively deal with the pollutants covered under the law. Sections 4 and 5 of the Regulations deal with ozone-depleting substances. There is a requirement that ozone-depleting substances when collected from a ship are to be disposed of in the appropriate reception facility made for destruction. Closer to the end of Part II, the obligation to provide an appropriate reception facility for these gases is further highlighted.

If these facilities are not provided, then upon removal of these gases from the ships, they will return to the environment in even more harmful quantities than there were before. In addition to this, the reception facilities should be able to effectively deal with exhaust gas and its residues from the exhaust cleaning gas system. The section further advocates the taking of a proactive approach; in that these reception facilities should be already in place at the respective port or terminal. Therefore, there is no place under this legislation or retroactivity and much alacrity needs to be employed in affixing the port or terminal with these reception facilities.

5.2 Provision of Specific Personnel to aid Removal of substances

A further reading of Part II highlights that when these gases are collected from the ship, they are to be collected in a controlled manner. 'Controlled manner' contextually seems to suggest that they should be collected in a careless or reckless manner having no regard for their environmental effects. It seems therefore, that certain key personnel specifically environmentalists should be responsible for the removals of these gases as they would be better able to appreciate their effects.

5.3 Provision and Monitoring of Logbook

Section 10 of Part II covers the log-book to be kept by the Maritime Authority of Jamaica. It is recommended that the log-book be duly monitored and that entries are accurately made. This logbook should be present at the time of change-over of the fuel. It should record, the quantities of the emission control fuel, along with the date, time and position of the ship at the time the change-over occurred.

5.4 Equipping Ports with Vapour Emission Control System

Recognising that many vapours created by tankers are harmful to the environment and are often discharged during loading and tank cleaning, Section 11 imposes an obligation on ports to be fitted with a vapour emissions control system. Vapour Emission Control (VEC) allows vapours from oil or chemical tankers to be returned to shore in a closed system and then either converted back into oil through adsorption, or burned. The installation of this system would be integral to combatting pollution of volatile organic compounds and it should be utilized. Therefore, certain training would be necessary to ensure the correct operation of the system and there should be regular maintenance.

5.5 Provision of Compliant Fuel Oils

Part III of the Regulations specifically Section 14 imposes duties on the Administration to provide fuel oils compliant with the law to ships that are found not be in compliance. This requirement would have to be spearheaded by the Government in conjunction with the Oil Refineries in Jamaica. Instructions would need to be provided regarding those compliant fuels under the Regulation and they would need to be sourced.

The section further highlights that the fuel should be available and housed within the ports. It therefore means that an arrangement would need to be reached between the various stakeholders to allow for the housing of the fuels within the ports. The transfer of such fuel from the place of storage to the non-compliant ship would best be done by a trained representative of that furl company. In furtherance to the obligation, the Administration should notify the Organisation (IMO) of the progress.

5.6 Nominated Surveyors

Part IV of the Regulations deals with surveys that are to be carried out by surveyors nominated by the Administration. The requisite training would have to be undertaken to ensure that the surveyors are full ofay with survey procedures. The surveyors should be made to understand the importance of surveys and the steps to be taken when non-compliance is detected. The Administration should ensure that the surveyors are trained in the inspection procedures as per the guidelines developed by resolution MEPC.129 (53) of the Marine Environment Protection Committee. They would need to be fully conversant with the certificates that are issued under this Part specifically the International Air Pollution Certificate under Part III, the Energy Efficiency Design Index Certificate under Part IV and the purpose of the Ship Energy Efficiency Management Plan (SEEMP). Training should be ongoing as amendments are frequently made to Annex VI.

Inspectors have additional duties under Section 23. This section covers the detection of emissions discharged into the air. Detections of emissions are not easily detected by the lone eye. It's best detected via examining the actions taken, or not taken, procedures followed by the ship's crew coupled together with the actual condition of relevant equipment or aspects of fuel consumption. Hence, the surveyors would need to be trained in how to examine and detect these violations. They should know exactly what equipment to check to obtain detection information, how it should be checked, the documents, logbooks and other ship entries that ought to be inspected, how they should be inspected and be able to identify equipment that are in compliance.

5.7 Receiving Reports of Emission Violations

Contained in section 23 is the duty of the Administration to receive reports of emissions violations and promptly investigate those matters. Therefore, the Administration should ensure that there is a framework in place to accommodate the report of these violations whether through the use of certain radio technology or otherwise that can be accessed by ships. This radio system should be monitored frequently to ascertain if any reports have come in from masters about emission violations.

5.8 Prosecution of Violations

Investigations subsequent to reports, when carried out should be prompt and if there is sufficient information to trigger an offence under the Regulations, such information should be handed over to the Office of the Director of Public Prosecution for the prosecution proceedings to ensue. Given the technical nature of this Regulation, the Office of the Director of Public Prosecution is to maintain constant contact with the Administration to ensure that significant details, technical and otherwise are not overlooked.

Training seminars should also be done for the Office of the Director of Public Prosecution. The purpose of which would be to introduce the Regulation, the purpose of it and the effects that the law attempts to address. The seriousness of the Regulations should be highlighted and it should be outlined to them that successful prosecution of offences under this law can only be done through cooperation with the Maritime Authority of Jamaica.

5.9 Penal Provisions

Part VII of the Regulations aims at penalizing any non-compliance detected under the Regulations. A breach of the Regulations shall be punishable by a fine not exceeding four million Jamaican dollars ($4,000,000) and no less than one million Jamaican dollars ($1,000,000). This figure was a product of the writer's thought. The reasons behind the figure are many. Where an offence under this Regulation is a continuing one, every person who commits that offence, in addition to any other liability, is liable to a fine of five hundred thousand dollars ($500,000) for every day or part thereof during which the offence continues after conviction.

Firstly, pollution of the marine environment is a serious offence and for all the reasons that have been afore mentioned, the amount was created. Secondly, the amount is to serve as a deterrent to prospective violators. In shipping, time is money and therefore any shipowner would not be amenable to paying out the respective amounts for an offence. Such payouts will delay the ship which will ultimately dent productivity and produce ramifications that stand to follow for delay in delivery by the shipowner.

During the prosecution of the offence, a warrant of arrest shall be served on the vessel and shall only be lifted after the fine has been paid. The fines shall be paid within five working days (5). Failure to pay the fine will result in the master being imprisoned for no less than 3 years.

The prosecution of these offences should be accorded priority as the ship should not be unduly delayed.

6. Explanation of the Draft Law

The draft law of this paper has eight Parts, each part focusing on a key aspect of the Convention. The arrangement of the law is somewhat different compared to the one in the Convention. **For example the numbering format, the lines placed to connect the first subsection of any section inter alia**. The rationale behind this is to conform to particular style of drafting replicated in our legislations. Notwithstanding this, the content is the same as prescribed under Annex VI.

6.1Part I

Part I of the Regulations is the Preliminary Section and constitutes the title of the legislation, the scope of application and the definition section.

6.2 Part II

Part II of the Regulations focuses on the various greenhouse gases and aims at controlling these pollutants namely, ozone depleting substances, nitrogen oxides, sulphur oxides, volatile organic compounds and shipboard incineration. The effects of air pollution unlike an oil spill are not seen immediately. Rather, it thrives on a more cumulative effect from shipping and contributes to its fair share of air pollution. The fact that air travels silently and stealthily across distances away from the point of discharge makes it even more important that emissions be regulated.

6.2.1 *Sections 4-5*

Sections 4 to 5 deal with ozone depleting substances. Included in the definition of ozone depleting substances are chlorofluorocarbons otherwise known as ‘CFC’s’ and halons and hydrocholorofluorocarbons (HCFC’s). Ships are prohibited from having traces of these substances evident in any of their equipment.

There is recognition in this section that existing systems and equipment might have been in use long before this law. As such, those existing systems and equipment are allowed to continue in service and may be recharged as is necessary. However, deliberate emissions of ozone-depleting substances are prohibited. Where ships have systems containing ozone-depleting substances or

equipment, said ships are required to have an International Air pollution Prevention Certificate (IAPP) and keep in addition to the certificate an ozone-depleting substances record book. This recording should be done in kilograms and should contain information related supply, recharging, repair and discharge operations.

6.2.2 ***Sections 6-9***

Sections 6 through to 9 turn their attention to nitrogen oxides emitted from marine diesel engines installed on a ship. Installed according to Section 3 is defined to mean a marine diesel engine that is or is intended to be fitted on a ship, including a portable auxiliary marine diesel engine, only if its fuelling, cooling, or exhaust system is an integral part of the ship.

6.2.3 ***Section 7 and Tier Control Limits***

There are different tiers of control specifically three which are detailed in section 7(5), (6) and (7). The limit value outlined in the above stated subsections is determined based on the engine's rate of speed. The limit value is also determined for a ship that has been subjected to a major conversion. Subsection (7) of Section 7 which houses Tier III of the Annex applies only to specific ships while they operate in Emission Control Areas as referred to in Section 8 of the Regulations. Outside of these areas, Tier II or subsection (6) applies. There is a duty on all ships to comply with the nitrogen oxides emissions limits set out in the sections when operating within the named emissions areas.

The emission value for a diesel engine is to be determined in accordance with the Nitrogen Oxides (NOx) Technical Code of 2008 re limits in Tier II (sub-section (6)) and Tier III (sub-section (7)). It is important to note that there are certain marine diesel engines that have been previously certified with the Technical Code of 1997. Those engines that have been so certified in line with the earlier code are allowed to stick to those provisions until the service life of such an engine is over.

As per the 2008 Technical Code, it is allowed for an engine family or group to be certified collectively to instead of certifying every single engine for compliance with the section. In the case of a family engine or group, the engine tested out of the group is what is referred to as the 'parent engine'. The parent engine is the one that has the combination of rating, i.e. power and

speed and nitrogen oxides critical components, settings and operating values that results in the highest nitrogen oxides emission value or where more than one test cycle is to certified, values, which to be acceptable must be no higher than the applicable Tier limit.[18] Subsequent to which, all other engines are judged from the parent engine. For each engine that has been so approved, such vessel should have on board a file evidencing such an approval and detailing actual findings at the time the ship is checked.

6.2.4 ***Section 9***

Section 9 of the Regulations turns its attention to marine diesel engines of more than 5,000 kW power output and per cylinder displacement of 90 litres and above that have been installed on ships constructed on or after January 1, 1990 but before January 1, 2000. Such a scheme will only have an effect on the main engines on ships of this type.

Certification of the method approved for the engine is dependent on whether such a method has been taken in line with the Approved NOx Technical Code 2008. The approved method detailed in the Regulations must be applied no later than the first renewal survey which occurs no later than 12 months. If the shipowner of a ship as dealt with in subsection(2) of Section 9 is able to prove that the 'approved method' is commercially unavailable, despite his best efforts to obtain it, then he is given an extension to install the compliant engine no later than the next annual survey after it has become available.

6.2.5 ***Section 10***

Sulphur Oxide is the next gas defined and outlined in section 10. This section applies to the use of all fuel on board including main and auxiliary engines together with boilers and inert gas systems. Fuel used on board ships must comply with the standards developed by the International Maritime Authority. The limits of control of sulphur oxide are regulated in subsection (3) to sulphur oxide emission control areas. Ships that operate both outside and inside an emission control area, pursuant to sub-sections (5) and (6), are required to have on board written procedure on how to change over fuel.

[18] Marpol: How to Do it. 2013 Edition

At the time of the change-over, the quantities of the emission control fuel are to be recorded, along with the date, time and position of the ship at the time the change-over occurred in a logbook prescribed by the Maritime Authority of Jamaica. This is dealt with in subsection (6) (B).

6.2.6 ***Section 11***

Section 11 outlines the obligations on tankers that emit volatile organic compounds. It places a responsibility on terminals or ports to combat emissions by utilizing a vapour emissions control system. Where such a system has been fitted, it should comply of course with the requisite safety standard outlined by the International Maritime Organisation.

Secondly, as per sub-section (6) of this section, tankers carrying crude oil are to implement and have on board a Volatile Organic Compound Management Plan. It should not be a general plan but must be specific to that particular ship.

6.2.7 ***Section 12***

Section 12 covers shipboard incineration. Though not a greenhouse gas itself, shipboard incineration does contribute to the air pollution problem. As the section denotes, it applies only to shipboard incinerators. It covers on board incineration and as such is applicable to all ships. Sub-section (2) of the section prohibits the incineration of certain substances on board ships and sub-section (4) of section 12 allows for sewage sludge and sludge oil generated during normal operation of a ship to take place in the main or auxiliary power plant or boilers. However, at the time that this is being done, it should not be done within ports, harbours and estuaries.

Most notably, sub-sections (6) and (7) deal with ships whose incinerators are constructed on or after 1 January 2000 or which is installed on board a ship on or after 1 January 2000. Such incinerators are to be compliant with the guidelines laid down by the International Maritime Organisation (IMO) be operated in line with the instructions laid down in the manufacturer's manual and conform to the various temperature limits to ensure handling of the incinerator.

6.2.8 ***Section 13***

Section 13 ends by talking about reception facilities that ought to be in place at the respective port or terminal to further combat pollution. To ensure optimal results, the reception facilities require the necessary infrastructure to prevent environmental damage once these gases are removed from the ships. These reception facilities should have certain mechanisms in place to effectively dispose of ozone depleting substances when they are removed from ships in their ports.

6.3 Part III

Part III of the Regulations sets out the criteria to be followed regarding fuel oil quality; as well as fuel oil availability. Prima facie, this Part is not geared at ships per se but at fuel oil suppliers. However, this section does have the ability to affect ships.

6.3.1 ***Section 14***

Section 14 imposes duties on the Administration to provide fuel oils compliant with the law to ships that are found not be in compliance. The availability of such fuel should be housed within its ports and the Organisation (IMO) should be notified of it. If a ship is found non-compliant, it is not an excuse for the Administration to unduly delay the ship. It should take certain affirmative and timely administrative action to allow for the ship to be on its way.

The onus has also been placed on shipowners' to alert its Administration and the relevant port of destination beforehand of its efforts to purchase compliant fuel before it got into its ports and none was available. Such information must be communicated with dispatch to the Organisation and shall serve as the launchpad for the port of destination to determine the appropriate action to take.

6.3.2 ***Section 15***

Section 15 notes quite specifically, that the fuel oil used for combustion purposes on board a ship should consist of blends of hydrocarbons derived from petroleum refining. Also, the fuel oil should be free from inorganic acid, shall not include any added substance or chemical waste

which jeopardizes the safety of ships or adversely affects the performance of the machinery, is harmful to personnel, or contributes overall to additional air pollution.

There is a requirement for a ship to retain its bunker delivery note for inspection by the Administration of a port of destination or it's Administration subsequent to the delivery of its oil. Such bunker note should be accompanied by a representative sample of the fuel oil delivered taking into account guidelines developed by the Organization.

Further where non-compliant fuel oil has been detected, all steps should be taken to ensure that such fuel is brought into compliance as soon as possible.

6.4. Part IV

Part IV of the Regulations deal with Surveys, Certification and Means of Control.

6.4.1 *Section 16*

Section 16 (1) deals with surveys at the initial stage, the renewal stage, the intermediate stage, the annual stage and at the additional stage. All these inspections are applicable to ships of 400 gross tonnage, fixed and floating drilling rigs and other platforms and are carried out by surveyors nominated by the Organization for that purpose.

When inspections are carried out by the surveyor and it is recognised that the ship equipment does not correspond with the ship's certificate, then the surveyor shall ensure that corrective action is taken by the shipowner. If such corrective action is not taken, the certificate shall be withdrawn by the Administration.

Sub-section (4) of the section relates to ships that subscribe to the Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan as noted in Part IV of the Regulations.

There is an obligation on parties inspected not to change or alter equipment settings, fittings, arrangements or material covered after the survey has been done. Direct replacement of equipment and fittings is permitted only if the replacement fittings and equipment conform to the provisions of the Regulation.

6.4.2 ***Section 17***

Section 17 provides for the issuance of an International Air Pollution Prevention Certificate and the International Energy Efficiency Certificate after an initial or renewal survey is done. In addition, there is an added obligation that the air pollution certificate when issued must be done in accordance with the provision stipulated in Section 15 of the instant Regulation. The Certificate is applicable to ships of 400 gross tonnage that are engaged in voyages either to ports or offshore terminals and fixed and floating drilling rigs similarly engaged in voyages.

Ships that might have been constructed prior to 2005 should also be issued with an International Air Pollution Prevention Certificate no later than the first scheduled dry-docking but no later than three years. The Certificate should be issued and or endorsed by the Administration or by any other person duly so authorized. At all times, the Administration retains responsibility for the preparation for the certificate.

6.4.3 ***Section 18***

There is a sense of cooperation between parties to MARPOL Annex VI that has been transposed to Section 18. A party under this section may at the request of the Administration cause a ship to be surveyed and if satisfied upon survey that the provisions of this Regulation are complied with, shall issue or authorize the issuance of an International Air Pollution Certificate.

The Certificate should contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a certificate issued under Section 16 of the Regulation. Thereafter a copy of the Certificate and survey report should be transmitted as soon as possible to the requesting Administration.

6.4.4 ***Section 19***

The Certificate has a particular form, structure and style as noted in Section 19. It is housed in Schedule I of this Regulation and when issued should be issued in any of three main languages recognizable under the Convention namely, English, French or Spanish.

6.4.5 ***Section 20***

The life- span of an International Air Pollution Prevention Certificate should not exceed five years. Sub-section (2) paragraphs (a) through to (c) of Section 20, maintain the general life span of five years but extend themselves to considering specific situations likely to arise.

Subsection (4) of the Regulation seeks to address a situation where all the necessary steps to renew the certificate were done well in advance, however no certificate has been issued. In such a case, the person or organization authorized by the Administration may endorse the existing certificate and such a certificate shall be accepted as valid for a further period that shall not exceed five months from the expiry date.

Due to the constant movement which permeates shipping, there may be situations where ships are not in their flag State port even though there certificates are set to expire. In such circumstances, the Administration may extend the period of validity of the certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. Despite this allowance, it is not unlimited.

The Administration under subsection (7) does not require the dating of a new certificate in special circumstances in special circumstances. These special circumstances are determined by the Administration.

It is incumbent that the surveys be completed within the stipulated time frames. Subsection (9) shall cease to be valid if the relevant surveys are not completed in time, if the certificate is not endorsed and ultimately upon transfer of the ship to another State. If the parties agree, the certificates issued to the ship when it was entitled to fly the flag of the 'defunct' state, can now be sent to the new state that the ship has transferred to.

6.4.6 ***Section 21***

Under section 21, ships are entitled to be issued with an International Energy Efficiency Certificate. This certificate remains valid throughout the life of the ship. This section can be read

in tandem with section 17(4) which also caters for the issuing of this certificate. However, if the ship undergoes major conversion, has been withdrawn from service or has been transferred to the flag of another state, the certificate issued under this Regulation shall cease to have validity.

6.4.7 ***Section 22***

Section 22 outlines the importance of port state control regarding operational requirements. In order to effectively discharge the obligations of this section, guidelines developed by the Marine Environment Protection Committee by resolution MEPC.129 (53), empowering inspectors of the various port states with the knowledge of how they should inspect a ship to ensure compliance under this Regulation, should be followed.

6.4.8 ***Section 23***

Section 23 deals with an integral part of the Regulation. It refers to detection of violation and environment. Unlike with oil pollution, it is not that easy to detect the discharge of emissions from ships. Detection of emissions discharged into the air is best detected via examining the actions taken, or not taken, procedures followed by the ship's crew coupled together with the actual condition of relevant equipment or aspects of fuel consumption[19].

Examination of these factors among others will help a port state to detect if an emission violation has taken place.

6.5 Part V

Shipping is constantly developing new ways to be more fuel efficient. The publication of the second IMO Greenhouse House Gas Study in 2009 identified significant potential for further improvements. The vehicle of these improvements was to be energy efficiency, mainly through the use of already existing technologies such as more efficient engines and propulsion systems, improved hull designs and larger ships: or, in other words, through technical- and design-based measures that can achieve noteworthy reductions in fuel consumption and resulting CO2 emissions on a capacity basis[20].

[19] MARPOL-How to do it. 2013 Edition

[20] Hughes, Edmund. A new chapter for MARPOL Annex VI – requirements for technical and operational measures to improve the energy efficiency of international shipping. Technical Officer, Marine Environment Division, IMO

6.5.1 ***Section 24-25***

Part V of the Regulation entails the new chapter Four of Annex VI. This Part regulates the Energy Efficiency for Ships and is found in Section 24 and the Attained Energy Efficiency Design Index (EEDI) as per Section 25.

The Energy Efficiency Design Index (EEDI) is a non-prescriptive, performance-based mechanism that leaves the choice of technologies to use in a specific ship design to the industry. It addresses the level for new ships by stimulating continued technical development of all the components influencing the fuel efficiency of a ship; and by separating the technical and design-based measures from the operational and commercial ones.[21]

The EEDI formula is not supposed to be applicable to all new ships of 400 gross tonnes and above engaged in international trade. It is important to note, that each vessel would have its own individual EEDI.

It's applicable to new ships, ships that have undergone a major conversion so much so that they are virtually 'new' and existing ships which have undergone a major conversion As long as the required energy efficiency level is attained; ship designers and builders would be free to use the most cost-efficient solutions for the ship to comply with the regulations.

6.5.2 ***Section 26***

The corresponding formula for calculating the EEDI is given in section 26(1)(d) and is further calculated by utilizing certain tables of the Convention. The EEDI has been purposefully developed for the largest and most energy-intensive segments of the world merchant fleet, thus embracing approximately 70 per cent of emissions from new ships and covering the following ship types: tankers, gas carriers, bulk carriers, general cargo ships, refrigerated cargo carriers and container ships.[22]

February 2013.
[21] Ibid, page 2.
[22] Ibid, page 2.

6.5.3 ***Section 27***

Section 27 addresses the Ship Energy Efficiency Management Plan (SEEMP). The SEEMP provides a management framework that may form part of the ship's safety management system, for improving the energy efficiency of a ship whilst operating at sea and in port.[23]

The duty devolves on each ship to keep on board a ship specific Ship Energy Efficiency Management Plan (SEEMP). This may form part of the ship's Safety Management System (SMS).

6.6 Part VI

Part VI of the Regulations relates to the general exceptions. These exceptions are provided for in Sections 29, 30 and 31.

6.6.1 ***Sections 29, 30 and 31***

These sections indicate that any emissions discharged for the purpose of securing the safety of a ship or saving life at sea and any emission resulting from damage to a ship or its equipment shall be excused. However, the general exception provisions shall be suspended if it can be proved that the owner acted either with intent to cause damage or recklessly and with knowledge that damage would probably result.

Further, the Administration is allowed to issue an exemption from specific provisions of this Regulation to allow for a ship to conduct trials for the development of ship emission reduction and control technologies and engine design programmes.

6.6.2 ***Section 32***

The Regulations allow for equivalent material, fitting, equipment or apparatus or other procedures to include alternative fuel oils if such fitting, material, equipment, apparatus, fuels oils inter alia are at least effective in terms of reducing emissions. This is catered for by Section 32. However, before exhibiting its approval in the allowance of the equivalent, the

[23] Ibid, page 2

Administration should ensure that they take into account any relevant guidelines developed by the Organisation pertaining to such equivalents.

JAMAICA

No. 1-2016

I assent,

[L.S.]

_____
Governor-General.

_____
Date

AN ACT to Amend the Shipping Act of Jamaica.

[insert date]

BE IT ENACTED by The Queen's Most Excellent Majesty, by and with the advice and consent of the Senate and House of Representatives of Jamaica, and by the authority of the same, as follows:-

1. This Act may be cited as the Shipping (Amendment) Act, 2016, and shall be read and construed as one with the Shipping Act 1999 and all amendments thereto.
2. Section 454 (e) is amended by inserting the words “for the preservation of the marine environment” immediately following the words “the control of ships”.
3. Section 454 (e) shall now be read as follows:
   the control of ships, for the preservation of the marine environment, the regulation of maritime traffic and the administration of maritime search and rescue within Jamaican waters.

THE SHIPPING ACT
REGULATIONS
(under section 454(e))

THE GREENHOUSE GASES (EMISSIONS FROM SHIPS)
(Made by the Minister on the 22nd February 2016)

ARRANGEMENT OF SECTIONS

THE SHIPPING ACT
REGULATIONS
(under section 454(e))

THE GREENHOUSE GASES (EMISSIONS FROM SHIPS)

(Made by the Minister on the 22nd February 2016) L.N. 1A/2016

PART I- *Preliminary*

1. This Regulation may be cited as the Greenhouse Gases (Emissions from Ships) Regulations, 2016. **Short Title**
2. The provisions of this Regulation shall apply to all ships, except where expressly provided otherwise in sections 6, 10, 11, 13, 15, 16 and 28 of this Regulation. **Scope of Application**
3. In this Regulation:- **Interpretation**

"Administration" means the Maritime Authority of Jamaica

"Anniversary date" means the day and the month of each year that will correspond to the date of expiry of the International Air Pollution Prevention Certificate.

"Attained EEDI" is the EEDI value achieved by an individual ship in accordance with section 24 of this Regulation.

"Auxiliary control" means a system, function, or control strategy installed on a marine diesel engine that is used to protect the engine and/or its ancillary equipment against operating conditions that could result in damage or failure, or that is used to facilitate the starting of the engine. An auxiliary control device may also be a strategy or measure that has been satisfactorily demonstrated not to be a defeat device.

"Cargo residues" are defined as the remnants of any cargo which remain on deck or in holds following loading or unloading. They include loading and unloading excess or spillage, whether in wet or dry condition or entrained in wash water, but do not include cargo dust remaining on deck after sweeping or dust on the external surfaces of the ship.

"Chemical tanker" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product.

"Continuous feeding" is defined as the process whereby waste is fed into a combustion chamber without human assistance while the incinerator is in normal operating conditions with the combustion chamber operative temperature between 850°C and 1,200°C.

"Defeat device" means a device that measures, senses, or responds to operating variables (e.g., engine speed, temperature, intake pressure or any other parameter) for the purpose of activating, modulating, delaying or deactivating the operation of any component or the function of the emission control system, such that the effectiveness of the emission control system is reduced under conditions encountered during normal operation, unless the use of such a device is substantially included in the applied emission certification test procedures.

"EEDI" means Energy Efficiency Design Index

"Emission" means any release of substances, subject to control by this Regulation, from ships into the atmosphere or sea.

"Emission control area" means an area where the adoption of special mandatory measures for emissions from ships is required to prevent, reduce and control air pollution from NOx or SOx and particulate matter or all three types of emissions and their attendant adverse impacts on human health and the environment. Emission control areas shall include those listed in, or designated under, sections 5 and 9 of this Regulation.

"Existing ship" means a ship which is not a new ship.

"Fuel oil" means any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including distillate and residual fuels.

"Garbage" in relation to Section 12 means all kinds of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically.

"Gross tonnage" means the gross tonnage calculated in accordance with the tonnage measurement regulations contained in Annex I to the International Convention on Tonnage Measurements of Ships, 1969 or any successor Convention.

"Installed" means a marine diesel engine that is or is intended to be fitted on a ship, including a portable auxiliary marine diesel engine, only if its fuelling, cooling, or exhaust system is an integral part of the ship. A fuelling system is considered integral to the ship only if it is permanently affixed to the ship. This definition includes a marine diesel engine that is used to supplement or augment the installed power capacity of the ship and is intended to be an integral part of the ship.

"Installations" in relation to Sections 3 and 4 of this Regulation mean the installation of systems, equipment including portable fire-extinguishing units, insulation, or other material on a ship, but excludes the repair or recharge of previously installed systems, equipment, insulation, or other material, or the recharge of portable fire-extinguishing units.

“Irrational emission control strategy” means any strategy or measure that, when the ship is operated under normal conditions of use, reduces the effectiveness of an emission control system to a level below that expected on the applicable emission test procedures.

“Major conversion” in relation to Part V of this Regulation means a conversion of a ship:

(a) Which substantially alters the dimensions, carrying capacity or engine power of the ship; or
(b) Which changes the type of the ship; or
(c) The intent of which in the opinion of the Administration is substantially to prolong the life of the ship; or
(d) Which otherwise so alters the ship that, if it were a new ship, it would become subject to relevant provisions of this Regulation not applicable to it as an existing ship; or
(e) Which substantially alters the energy efficiency of the ship and includes any modifications that could cause the ship to exceed the applicable required EEDI; as set out in this Regulation.

“Marine diesel engine” means any reciprocating internal combustion engine operating on liquid or dual fuel, to which section 5 of this Regulation applies, including booster or compound systems if applied.

“New ship” means:
(a) For which the building contract is placed on or after January 1, 2013; or
(b) In the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after July 1, 2013; or
(c) The delivery on which is on or after July 1, 2015.

“NOx Technical Code” means the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines adopted by resolution 2 of the 1997 MARPOL Conference, as amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the MARPOL Convention.

“Organisation” means the International Maritime Organisation.

“Ozone-depleting substances” means controlled substances defined in paragraph (4) of article 1 of the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, listed in Annex A, B, C or E to the said Protocol in force at the time of application or interpretation of the MARPOL Convention.
Ozone-depleting substances that may be found on board ships include, but are not limited to:

(a) Halon 1211 Bromochlorodifluoromethane
(b) Halon 1301 Bromotrifluoromethane

(c) Halon 24021, 2-Dibromo -1,1,2, 2-tetraflouroethane (also known as Halon 1I4B2)
(d) CFC-11 Trichlorofluoromethane
(e) CFC- I2 Dichlorodifluoromethane
(f) CFC-I13 1, 1,2 - Trichloro - 1,2,2 - trifluoroethane
(g) CFC-114 1, 2 - Dichloro -1, 1, 2, 2 - tetrafluoroethane
(h) CFC-115 Chloropentafluoroethane

"Required EEDI" is the maximum value of the attained EEDI that is allowed by section 25 of this Regulation for the specific ship and size.

"SEEMP" means Ship Energy Efficiency Management Plan

"Shipboard incineration" means the incineration of wastes or other matter on board a ship, if such wastes or other matter were generated during the normal operation of that ship.

"Shipboard incinerator" means a shipboard facility designed for the primary purpose of incineration.

"Ships constructed" means ships the keels of which are laid or that are at a similar stage of construction.

"Sludge oil" means sludge from the fuel oil or lubricating oil separators, waste lubricating oil from main or auxiliary machinery, or waste oil from bilge water separators, oil filtering equipment or drip trays.

"Similar stage of construction" means the stage at which:
(a) construction identifiable with a specific ship begins; and
(b) assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

"Tanker" means a ship constructed or adapted primarily to carry oil in bulk in its cargo spaces and includes combination carriers.

PART II- *Greenhouse Gases*

Ozone-depleting substances

4. -----(1) This section does not apply to permanently sealed equipment where there are no refrigerant charging connections or potentially removable components containing ozone-depleting substances.
(2) Subject to the provisions of Section 29, any deliberate emissions of ozone-depleting substances shall be prohibited.

Prohibition of ozone-depleting substances

(a) Deliberate emissions include emissions occurring in the course of maintaining, servicing, repairing or disposing of systems or equipment, except that deliberate emissions do not include minimal releases associated with the recapture or recycling of an ozone-depleting substance. Emissions arising from leaks of an ozone-depleting

substance, whether or not the leaks are deliberate, may be regulated by the Administration.

(b) Installations that contain ozone-depleting substances, other than hydrochlorofluorocarbons (HCFCs) shall be prohibited:

(i) on ships constructed on or after May 19, 2005; or

(ii) in the case of ships constructed before May 19, 2005, which have a contractual delivery date of the equipment to the ship on or after May 19, 2005 or, in the absence of a contractual delivery date, the actual delivery of the equipment to the ship on or after January 1, 2020.

Ozone-depleting substances to be delivered to reception facilities provided by the Administration

(c) The substances referred to in this section, and equipment containing such substances, shall be delivered to appropriate reception facilities provided by the Administration when moved from ships.

5. ----(1) Each ship subject to section 17 shall maintain a list of equipment containing ozone-depleting substances.

Ships to keep record of equipment and systems containing ozone-depleting substances

(2) Each ship subject to section 17 that has rechargeable systems that contain ozone-depleting substances shall maintain an ozone-depleting substances record book. This record may form part of an existing logbook or electronic recording system as approved by the Administration.

(3) Entries in the ozone-depleting substances record book shall be recorded in terms of mass (kg) of substance and shall be completed without delay on each occasion, in respect of the following:

(a) recharge, full or partial, of equipment containing ozone-depleting substances;

(b) repair or maintenance of equipment containing ozone-depleting substances;

(c) discharge of ozone-depleting substances to the atmosphere, deliberate and non-deliberate;

(d) discharge of ozone-depleting substances to land-based reception facilities and

(e) supply of ozone-depleting substances to the ship.

Scope of Application-Nitrogen Oxides (NOx)

6. ----(1) This section shall apply to:

(a) each marine diesel engine with a power output of more than 130 kW which is installed on a ship constructed on or after 1 January 2000; and

(b) each marine diesel engine with a power output of more than 130 kW which undergoes a major conversion on or after 1 January 2000 except when demonstrated to the satisfaction of the Administration that such engine is an identical replacement to the engine that it is replacing and is otherwise not covered under sub-paragraph (a) of this section.

(2) This section does not apply to:

(a) a marine diesel engine intended to be used solely for emergencies, or solely to power any device or equipment intended to be used solely for emergencies on the ship on which it is installed, or a marine diesel engine installed in lifeboats intended to be used solely for emergencies;

(b) a marine diesel engine installed on a ship solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the

ship is entitled to fly, provided that such engine is subject to an alternative NOx control measure established by the Administration.

(c) Notwithstanding the provisions of section 5(1) of this section, the Administration may provide an exclusion from the application of this section for any marine diesel engine which is installed on a ship constructed, or for any marine diesel engine which undergoes a major conversion, before May 19, 2005, provided that the ship on which the engine is installed is solely engaged in voyages to ports or offshore terminals within the State the flag of which the ship is entitled to fly.

Major conversion of engines

7. -----(1) For the purpose of this regulation, major conversion means a modification on or after January 1, 2000 of a marine diesel engine that has not already been certified to the standards set forth in subsections (5),(6) and (7) of this section where:

(a) the engine is replaced by a marine diesel engine or an additional marine diesel engine is installed or,

(b) any substantial modification, as defined in the NOx Technical Code 2008, is made to the engine, or

(c) the maximum continuous rating of the engine is increased by more than 10% compared to the maximum continuous rating of the original certification of the engine.

Major conversion involving replacement engines

(2) For a major conversion involving the replacement of a marine diesel engine with a non-identical marine diesel engine or the installation of an additional marine diesel engine, the standards in this section in force at the time of replacement or addition of the engine shall apply. On or after January 1, 2016 only in the case of replacement engines, if it is not possible for such a replacement engine to meet the standards set forth in subsection (7) of this section, then that replacement engine shall meet the standards set forth in subsection (6) of this section.

(3) The Organisation shall in accordance with this section develop guidelines to set forth the criteria of when it is not possible for a replacement engine to meet the standards set out in subsection (7).

Criteria to be met for marine diesel engines referred to in subsection (1) (a)(b)

(4) A marine diesel engine referred to in sub-section 1(a) and (b) of this section shall meet the following standards:

(a) for ships constructed prior to January 1, 2000, that standards set forth in section 7(1)(b)and(c)shall apply; and

(b) for ships constructed on or after January 1, 2000, the standards in force at the time the ship was constructed shall apply.

Acceptable emission of nitrogen oxides from engines installed on ships constructed on or after January 1, 2000

(5) Subject to the provision of section 29 of this Regulation, the operation of a marine diesel engine that is installed on a ship constructed on or after January 1, 2000 and prior to January 1, 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO2 from the engine is within the following limits, where n=rated engine speed (crankshaft revolutions per minute):

(a) 17.0 g/kW h when n is less than 130 rpm

(b) 45.06n(±0.2) g/kW h when n is 130 or more but less than 2000 rpm

(c) 9.8 g/kW h when n is 2000 rpm or more

Acceptable emission s of nitrogen oxides from engines installed on ships constructed on or after January 1, 2011

(6) Subject to section 29, the operation of a marine diesel engine that is installed on a ship constructed on or after January 1, 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO2 from the engine is within the following limits, where n= rated engine speed (crankshaft revolutions per minute):

(a) 14.4g/kWh when n is less than 130 rpm;
(b) 44. N (-0.23)g/kWh when n is 130 or more but less than 2,000 rpm;
(c) 7.7 g/kWh when n is 2,000 rpm or more.

Acceptable emissions of nitrogen oxides from engines constructed on or after January 1, 2016

(7) ----(1) Subject to section 29, the operation of a marine diesel engine that is installed on a ship constructed on or after January 1, 2016:

(a) is prohibited except when the emission of nitrogen oxides (calculated as the total weighted emission of NO2) from the engine is within the following limits, where n= rated engine speed (crankshaft revolutions per minute):

(i) 3.4g/kWh when n is less than 130 rpm;
(ii) 9.n (-0.2) g/kWh when n is 130 or more but less than 2,000 rpm; and
(iii)2.0 g/kWh when n is 2,000 rpm or more;

(b) is subject to the standards set forth in sub-section(7)(1)(i) when the ship is operating in an emission control area designated under section 8 of this Regulation; and
(c) is subject to the standards set forth in sub0section (6) of this section when the ship is operating outside of an emission control area designated under section 8 of this Regulation.

Exceptions to subsection (7)(1)(a)

(8) The provisions set forth in subsection (7)(1)(a) shall not apply to:

(a) a marine diesel engine installed on a ship with a length (L) as defined in Section 2 of these Regulations, less than 24m when it has been specifically designed and is used solely for recreational purposes; or

(b) a marine diesel engine installed on a ship with a combined nameplate diesel engine propulsion power of less than 750kW if it is demonstrated, to the satisfaction of the Administration, that the ship cannot comply with the standards set out in sub-section (7)(1)(a)due to design or construction limitations of the ship.

Emission Control Areas

8. ----(1) For the purposes of this section, emission control areas shall be:
(a) the North American area , which means the area described by the coordinates provided in Schedule ……..to this Regulation;
(b) the United States Caribbean sea area, which means the area described by the coordinates provided in Schedule…… to this Regulation; and
(c) any other sea area, including any port area, designated by the Organization in accordance with the criteria and procedures set forth in Schedule…….to this Regulation.

Marine diesel engines installed on a ship constructed prior to January 1, 2000

9. ----(1) Notwithstanding section 5(1)(a) of this Regulation, a marine diesel engine with a power output of more than 5,000 kW and a per cylinder displacement at or above 90L installed on a ship constructed on or after January 1, 1990 prior to January 1, 2000 shall comply with the emission limits set forth in subsection (4) of this section, provided that an approved method for that engine has been certified by the Administration and notification of such certification has been submitted to the Organisation by the certifying Administration. Compliance with this sub-section shall be demonstrated through one of the following:
   (a) Installation of the certified approved method, as confirmed by a survey using the verification procedure specified in the approved method file, including appropriate notation on the ship's International Air Pollution Prevention Certificate of the presence of the approved method; or
   (b) Certification of the engine confirming that it operates within the limits set forth in section 7(5), (6) and (7) of this Regulation and an appropriate notation of the engine certification on the ship's International Air Pollution Prevention Certificate.

   (2) Subsection (1) shall apply no later than the first renewal survey that occurs 12 months or more after deposit of the notification in subsection(1). If a shipowner of a ship on which an approved method is to be installed can demonstrate to the satisfaction of the Administration that the approved method was not commercially available despite best efforts to obtain it, then that approved method shall be installed on the ship no later than the next annual survey of that ship that falls after the approved method is commercially available.

(3) With regard to a marine diesel engine with a power output of more than 5,000 kW and a per cylinder displacement at or above 90 L installed on a ship constructed on or after January 1, 1990 but prior to January 1, 2000, the International Air Pollution Prevention Certificate shall, for a marine diesel engine to which sub-section(1) applies, indicate that either an approved method has been applied pursuant to subsection(1)(a) of this section or the engine has been certified pursuant to sub-section(1)(b) of this section or that an approved method does not yet exist or is not yet commercially available as described in sub-section(2) of this section.

(4) Subject to section 29 of this Regulation, the operation of a marine diesel engine described in subsection(1) of this section is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO2) from the engine is within the following limits, where n= rated engine speed (crankshaft revolutions per minute):

(a) 17.0 g/kWh whn n is less than 130 rpm;
(b) 45.n (-0.2) g/kWh when n is 130 or more but less than 2,000 rpm; and
(c) 9.8 g/kWh when n is 2,000 rpm or more.

Certification of approved method

(5) Certification of an approved method shall be in accordance with Chapter 7 of the revised NOx Technical Code 2008 and shall include verification:

(a) by the designer of the base marine diesel engine to which the approved method applies that the calculated effort of the approved method will not decrease engine rating by more than 1.0%, increase fuel consumption by more than 2.0% as measured according to the appropriate test cycle set forth in the revised NOx Technical Code 2008, or adversely affect engine durability or reliability; and

(b) that the cost of the approved method is not excessive , which is determined by a comparison of the amount of NOx reduced by the approved method to achieve the standard set forth in sub-section(4) of this section.

Sulphur oxides used on board ships

10. ---(1) The sulphur content of any fuel oil used on board ships shall not exceed the following limits:

(a) 4.50% m/m prior to January 1, 2012;

(b) 3.50% m/m on and after January 1, 2012; and

(c) 0.50% m/m on and after January 1, 2020

(2) The worldwide average sulphur content of residual fuel oil supplied for use on board ships shall be monitored taking into account guidelines to be developed by the Organization.

Sulphur oxide emission control areas

(3) For the purpose of this section, SOx emission control areas shall include:

(a) the Baltic Sea area and the North Sea;

(b) the North American area as described by the coordinates provided in Schedule……. to this Regulation;

(c) the United States Caribbean Sea as described by the coordinates; and

(d) any other sea area, including port areas, designated by the Organization in accordance with criteria and procedures for designation of SOx emission control areas with respect to the prevention of air pollution from ships contained in Schedule …… to this Regulation.

Conditions to be fulfilled when in sulphur oxides emission control areas

(4) While ships are operating within an emission control area, the sulphur content of fuel oil used on board ships shall not exceed the following limits:

(a) 1.50% m/m prior to July 1, 2010;

(b) 1.00% m/m on and after July 1, 2010;

(c) 0.10% m/m on and after January 1, 2015

(d) Prior to January 1, 2012, the sulphur content of fuel oil referred to in this sub-section shall not apply to ships operating in the North American area or the United States Caribbean Sea area defined in sub-section (3)(c), built on or before August 1, 2011 that are powered by propulsion boilers that were not originally designed for continued operation on marine distillate fuel or natural gas.

(5) The sulphur content of fuel oil referred to in subsections (1) and (4) of this section shall be documented by its supplier as required by sections 13 and 14 of this Regulation.

Written procedure of fuel oil change-over to be carried by ships

(6) ---A. Those ships using separate fuel oils to comply with subsection (4) of this section and entering or leaving an Emission Control Area set forth in subsection (3) of this section shall carry a written procedure showing how the fuel oil change-over is to be done, allowing sufficient time for the fuel oil service system to be fully flushed of all fuel oils exceeding the applicable sulphur content specified in subsection (4) of this section prior to entry into an Emission Control Area.

Use of Logbook

B. The volume of low sulphur fuel oils in each tank as well as the date, time, and position of the ship when any fuel-oil-change-over operation is completed prior to the entry into an Emission

Control Area or commenced after exit from such an area, shall be recorded in such log-book as prescribed by the Administration.

(7) During the first twelve months immediately following entry into force of an amendment designating a specific emission control area under subsection (3) of this section, ships operating in that emission control area are exempt from the requirements in subsections (4) and (6) of this section and from the requirements of subsection (5) of this section insofar as they relate to subsection (4) of this section.

Completion of fuel oil assessment by 2018

(8) A review of the standard set forth in subsection(1)(c) of this section shall be completed by 2018 to determine the availability of fuel oil to comply with the fuel oil provision set forth in that subsection and shall take into account the following elements:

(a) the global market supply and demand for fuel oil to comply with sub-section(1)(c) of this section that exist at the time that the review is conducted;
(b) an analysis of the trends in fuel oil markets; and
(c) any other relevant issue.

(9) The Organization shall establish a group of experts, comprising of representatives with the appropriate expertise in the fuel oil market and appropriate maritime, environmental, scientific, and legal expertise, to conduct the review referred to in sub-section(8) of this section. The group of experts shall develop the appropriate information to inform the decision to be taken by the Administration.

Extension of fuel oil compliance no later than January 1, 2025

(10) The Administration, based on the information developed by the group of experts, may decide whether it is possible for ships to comply with the date in subsection (1)(c)of this section. If a decision is taken that it is not possible for ships to comply, then the provision in that subsection shall become effective on 1 January 2025.

Volatile organic compounds

11. ----(1)The emissions of volatile organic compounds (VOCs) from a tanker in the ports or terminals under the Jurisdiction of the Administration shall be regulated in accordance with the provisions of this section.

Conditions to be complied with for vapour emissions control system

(2) Pursuant to subsection (1), a notification shall be submitted to the Organisation and such notification shall indicate that the Administration is regulating tankers for VOC emissions. This notification shall include information on the size of tankers to be controlled, the cargoes requiring vapour emission control systems, and the effective date of such control. The notification shall be submitted at least six months before the effective date.

(3) Where the Administration has designated ports or terminals at which VOC emissions from tankers are to be regulated, the Administration shall ensure that vapour emission control systems, approved by them are provided in any designated port and terminal and are operated safely and in a manner so as to avoid undue delay to a ship. The implementation of such a system should subscribe to the safety standards developed by the Organization.

(4) Pursuant to subsection (2) the Organization shall circulate a list of the ports and terminals designated by the Administration to other Member states for their information.

(5) A tanker to which sub-section (1) of this section applies shall be provided with a vapour emission collection system approved by the Administration taking into account the safety standards for such systems developed by the Organization, and shall use this system during the loading of relevant cargoes. A port or terminal which has installed vapour emission control systems in accordance with this section may accept tankers which are not fitted with vapour collection systems for a period of three years after the effective date identified in subsection (2) of this section.

(6) A tanker carrying crude oil shall have on board and implement a VOC Management Plan approved by the Administration. Such a plan shall be prepared taking into account the guidelines developed by the Organization. The plan shall be specific to each ship and shall at least:

(a) provide written procedures for minimizing VOC emissions during the loading, sea passage and discharge of cargo;
(b) give consideration to the additional VOC generated by crude oil washing;
(c) identify a person responsible for implementing the plan; and
(d) for ships on international voyages, be written in the working language of the master and officers and, if the working language of the master and officers is not English, French, or Spanish, include a translation into one of these languages.

(7) This section shall also apply to gas carriers only if the types of loading and containment systems allow safe retention of non-methane VOCs on board or their safe return ashore.

Ship-board incineration

12. -----(1) Except as provided in subsection (4) of this section, shipboard incineration shall be allowed only in a shipboard incinerator.

(2) Shipboard incineration of the following substances shall be prohibited:

(a) residues of cargoes or related contaminated packing materials;
(b) polychlorinated biphenyls (PCBs);
(c) garbage, containing more than traces of heavy metals;
(d) refined petroleum products containing halogen compounds;
(e) sewage sludge and sludge oil either of which are not generated on board the ship; and
(f) exhaust gas cleaning system residues.

Prohibition of substances in shipboard incinerator

(3) Shipboard incineration of polyvinyl chlorides (PVCs) shall be prohibited, except in shipboard incinerator for which an IMO Type Approval Certificate has been issued.

Shipboard incineration of certain substances

(4) Shipboard incineration of sewage sludge and sludge oil generated during normal operation of a ship may also take place in the main or auxiliary power plant or boilers, but in those cases, shall not take place inside ports, harbours and estuaries.

(5) Nothing in this section neither:

(a) affects the prohibition in, or other requirements of, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended, and the 1996 Protocol thereto, nor
(b) precludes the development, installation and operation of alternative design shipboard thermal waste treatment devices that meet or exceed the requirements of this section.

(6)---A. Except as provided in sub-paragraph (b)of sub-section(6), each incinerator on a ship constructed on or after 1 January 2000 or incinerator which is installed on board a ship on or after 1 January 2000 shall meet the requirements contained in Schedule V to this Regulation. Each incinerator subject to this subparagraph shall be approved by the Administration taking into account the standard specification for shipboard incinerators developed by the Organization ; or

B. The Administration may allow exclusion from the application of paragraph (A) of subsection (6) to any incinerator which is installed on board a ship before May 19 2005, provided that the ship is solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly.

Incinerator Manuals to be retained on board

(7) Incinerators installed in accordance with the requirements of paragraph (A) of subsection (6) of this section shall be provided with a manufacturer's operating manual which is to be retained with the unit and which shall specify how to operate the incinerator within the limits described in paragraph 2 of Schedule…… of this Regulation.

(8)Personnel responsible for the operation of an incinerator installed in accordance with the requirements of paragraph (A) of subsection 6 of this section shall be trained to implement the guidance provided in the manufacturer's operating manual as required by subsection (7) of this section.

Monitoring of the combustion chamber

(9) For incinerators installed in accordance with the requirements of paragraph (A) of subsection (6) of this section, the combustion chamber gas outlet temperature shall be monitored at all times the unit is in operation. Where that incinerator is of the continuous-feed type, waste shall not be fed into the unit when the combustion chamber gas outlet temperature is below 850°C. Where that incinerator is of the batch-loaded type, the unit shall be designed so that the combustion chamber gas outlet temperature shall reach 600°C within five minutes after start-up and will thereafter stabilize at a temperature not less than 850°C.

Reception facilities for ozone depleting substances and other harmful gases

13. ----(1) The Administration undertakes to ensure the provision of facilities adequate to meet the:
    (a) needs of ships using its repair ports for the reception of ozone depleting substances and equipment containing such substances when removed from ships;
    (b) needs of ships using its ports, terminals or repair ports for the reception of exhaust gas cleaning residues from an exhaust gas cleaning system, without causing undue delay to ships; and
    (c) needs in ship-breaking facilities for the reception of ozone depleting substances and equipment containing such substances when removed from ships.

    (2) If a particular port or terminal, is lacking in the industrial infrastructure necessary to manage and process those substances referred to in subsection (1) of this section and therefore cannot accept such substances, then the Administration shall inform the Organization of any such port or terminal so that this information may be circulated to other Member States to the Convention for their information and any appropriate action.

    (3)Where the Administration has provided ports or terminals with reception facilities able to manage and process such substances, notice of this should be given to the Organization.

(4) The Administration shall notify the Organization of all cases where the facilities provided under this section are unavailable or alleged to be inadequate.

PART III- *Fuel Oil Availability and Quality*

Fuel Oil Availability

14. -----(1) The Administration shall take all reasonable steps to promote the availability of fuel oils which comply with this Regulation and inform the Organization of the availability of compliant fuel oils in its ports and terminals.

(2) If a ship is found not to be in compliance with the standards for compliant fuel oils set forth in this Regulation, the Administration is entitled to require the ship to:

(a) present a record of the actions taken to attempt to achieve compliance; and

(b) provide evidence that it attempted to purchase compliant fuel oil in accordance with its voyage plan and, if it was not made available where planned, that attempts were made to locate alternative sources for such fuel oil and that despite best efforts to obtain compliant fuel oil, no such fuel oil was made available for purchase.

(3) The ship should not be required to deviate from its intended voyage or to delay unduly the voyage in order to achieve compliance.

(4) If a ship provides the information set forth in subsection (2)(a) of this section, the Administration shall take into account all relevant circumstances and the evidence presented to determine the appropriate action to take, including not taking control measures.

(5) A ship shall notify its Administration and the Administration as defined in section3 of this Regulation when it cannot purchase compliant fuel oil.

(6) The Administration shall without delay notify the Organization when a ship has presented evidence of the non-availability of compliant fuel oil.

Fuel Oil Quality

15. -----(1) Fuel oil for combustion purposes delivered to and used on board ships to which this Regulation applies shall meet the following requirements:

(a) except as provided in sub-section (2) of this section:

(b) the fuel oil shall be blends of hydrocarbons derived from petroleum refining. This shall not preclude the incorporation of small amounts of additives intended to improve some aspects of performance;

(c) the fuel oil shall be free from inorganic acid; and

(d) the fuel oil shall not include any added substance or chemical waste which:

(e) jeopardizes the safety of ships or adversely affects the performance of the machinery, or

(f) is harmful to personnel, or

(g) contributes overall to additional air pollution.

(2) Fuel oil for combustion purposes derived by methods other than petroleum refining shall not:

(a) exceed the applicable sulphur content set forth in section 9 of this Regulation;

(b) cause an engine to exceed the applicable NOx emission limit set forth in section 6 (5)(6)(7)(1)(a) and section 8(4)of this regulation;

(c) contain inorganic acid; or
(d) jeopardize the safety of ships or adversely affect the performance of the machinery, or
(e) be harmful to personnel, or
(f) contribute overall to additional air pollution.

Substances not considered as acceptable fuels

(3) This section does not apply to coal in its solid form or nuclear fuels. Subsections (4),(5),(6),(6)(b), (7), (8), (8)(b) and (9)(b)(c)(d) of this section do not apply to gas fuels such as Liquified Natural Gas, Compressed Natural Gas or Liquified Petroleum Gas. The sulphur content of gas fuels delivered to a ship specifically for combustion purposes on board that ship shall be documented by the supplier.

Procedure to be followed regarding Bunker Delivery Note

(4) For each ship subject to sections 15 and 16 of this Regulation, details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note which shall contain at least the information specified in Schedule VI to this Regulation.

(5) The bunker delivery note shall be kept on board the ship in such a place as to be readily available for inspection at all reasonable times. It shall be retained for a period of three years after the fuel oil has been delivered on board.

(6) The Administration may inspect the bunker delivery notes on board any ship to which this Regulation applies while the ship is in its port or offshore terminal, may make a copy of each delivery note, and may require the master or person in charge of the ship to certify that each copy is a true copy of such bunker delivery note. The Administration may also verify the contents of each note through consultations with the port where the note was issued.

(7) The inspection of the bunker delivery notes and the taking of certified copies by the Administration under subsection (6) shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

(8) ---(A)The bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered taking into account guidelines developed by the Organization. The sample is to be sealed and signed by the supplier's representative and the master or officer in charge of the bunker operation on completion of bunkering operations and retained under the ship's control until the fuel oil is substantially consumed, but in any case for a period of not less than 12 months from the time of delivery.

(B) If an Administration requires the representative sample to be analysed, it shall be done in accordance with the verification procedure set forth in Schedule VII to determine whether the fuel oil meets the requirements of this Regulation.

Procedure to be followed by the Administration

(9) The Administration undertakes to ensure that appropriate authorities designated by them:

(a) maintain a register of local suppliers of fuel oil;
(b) require local suppliers to provide the bunker delivery note and sample as required by this section, certified by the fuel oil supplier that the fuel oil meets the requirements of sections 9, 13 and 14 of this Regulation;
(c) require local suppliers to retain a copy of the bunker delivery note for at least three years for inspection and verification by the port State as necessary;
(d) take action as appropriate against fuel oil suppliers that have been found to deliver fuel oil that does not comply with that stated on the bunker delivery note;

(e) inform the Organisation of any ship receiving fuel oil found to be non-compliant with the requirements of sections 9, 13 and 14 of this Regulation; and

(f) inform the Organization for transmission to Parties and Member States of the Organization of all cases where fuel oil suppliers have failed to meet the requirements specified in sections 9, 13 and 14 of this Regulation.

(10) In connection with port State inspections carried out by the Administration, the Administration the further undertakes to:

(a) inform the flag state under whose jurisdiction a bunker delivery note was issued of cases of delivery of noncompliant fuel oil, giving all relevant information; and

(b) ensure that remedial action as appropriate is taken to bring noncompliant fuel oil discovered into compliance.

(11) For every ship of 400 gross tonnage and above on scheduled services with frequent and regular port calls, the Administration may decide after application and consultation with affected States that compliance with subsection (5)of this section may be documented in an alternative manner which gives similar certainty of compliance with sections 9, 13 and 14 of this Regulation.

PART IV- *Survey, Certification and Means of Control*

Surveys and Inspection

16. ----(1) Every ship of 400 gross tonnage and above and every fixed and floating drilling rig and other platforms shall be subject to the surveys specified below:

Initial Surveys

(a) An initial survey before the ship is put into service or before the certificate required under section 17 of this Regulation issued for the first time. This survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Regulation;

Renewal Surveys

(b) A renewal survey at intervals specified by the Administration, but not exceeding five years, except where section 20 of this Regulation is applicable. The renewal survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with applicable requirements of this Regulation;

Intermediate Surveys

(c) An intermediate survey within three months before or after the second anniversary date or within three months before or after the third anniversary date of the certificate which shall take the place of one of the annual surveys specified in sub-paragraph (d) of this section. The intermediate survey shall be such as to ensure that the equipment and arrangements fully comply with the applicable requirements of this Regulation and are in good working order. Such intermediate surveys shall be endorsed on the certificate issued under sections 17 and 18 of this Regulation;

Annual Surveys

(d) An annual survey within three months before or after each anniversary date of the certificate, including a general inspection of the equipment, systems, fittings, arrangements and material referred to in sub- paragraph (a) of this regulation to ensure that they have been maintained in accordance with subsection 4 of this

regulation and that they remain satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the certificate issued under sections 17 and 18 of this Regulation; and

Additional Surveys

(e) An additional survey either general or partial, according to the circumstances, shall be made whenever any important repairs or renewals are made as prescribed in subsection (4) of this regulation or after a repair resulting from investigations prescribed in subsection (5) of this regulation. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory and that the ship complies in all respects with the requirements of this Regulation.

(2) In the case of ships of less than 400 gross tonnage, the Administration may establish appropriate measures in order to ensure that the applicable provisions of section 29 of this Regulation are complied with.

Surveys to be carried out by nominated surveyors

(3) Surveys of ships as regards the enforcement of the provisions of this Regulation shall be carried out by officers of the Administration.

(a) The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it. Such organizations shall comply with the guidelines adopted by the Organization;

(b) The survey of marine diesel engines and equipment for compliance with section 6 of this Regulation shall be conducted in accordance with the revised NOx Technical Code 2008;

Action to be taken surveyors where non-compliance of equipment is discovered

(c) When a nominated surveyor or recognized organization determines that the condition of the equipment does not correspond substantially with the particulars of the certificate, it shall ensure that corrective action is taken and shall in due course notify the Administration. If such corrective action is not taken, the certificate shall be withdrawn by the Administration. If the ship is in a port of another Party, the appropriate authorities of the port State shall also be notified immediately. When an officer of the Administration, a nominated surveyor or recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned shall give such officer, surveyor or organization any necessary assistance to carry out their obligations under this section; and

(d) In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation.

(4) Ships to which section 29 of this Regulation applies shall also be subject to the surveys specified below, taking into account the guidelines adopted by the Organisation.

Initial surveys and new ships

(a) An initial survey before a new ship is put into service and before the International Energy Efficiency Certificate is issued. The survey shall verify that the ship's attained EEDI is in accordance with the requirements in section 29 of

this Regulation, and that the SEEMP required by the section 27 of this Regulation is on board;

General and partial survey done after a major conversion of a ship & the EEDI

(b) A general or partial survey, according to the circumstances, after a major conversion of a ship to which this section applies. The survey shall ensure that the attained EEDI is recalculated as necessary and meets the requirement of section 26 of this Regulation, with the reduction factor applicable to the ship type and size of the converted ship in the phase corresponding to the date of contract or keel laying or delivery determined for the original ship in accordance with section 3of this Regulation

EEDI & the SEEMP

(c) In cases where the major conversion of a new or existing ship is so extensive that the ship is regarded by the Administration as a newly constructed ship, the Administration shall determine the necessity of an initial survey on attained EEDI. Such a survey, if determined necessary, shall ensure that the attained EEDI is calculated and meets the requirements of section 26 of this Regulation, with the reduction factor applicable corresponding to the ship type and size of the converted ship at the date of the contract of the conversion, or in the absence of a contract, the commencement date of the conversion. The survey shall also verify that the SEEMP required by section 27 of this Regulation is on board; and

(d) For existing ships, the verification of the requirement to have a SEEMP on board according to section 27 of this Regulation shall take place at the first intermediate or renewal survey identified in sub-section (1) of this section, whichever is the first, on or after January 1, 2013.

Maintenance of equipment to be done in line with Regulation

(5) The equipment shall be maintained to conform with the provisions of this Regulation and no changes shall be made in the equipment, systems, fittings, arrangements, or material covered by the survey, without the express approval of the Administration. The direct replacement of such equipment and fittings with equipment and fittings that conform with the provisions of this Regulation is permitted.

Shipowner or Master to report accident or defect that substantially alters equipment performance to relevant authority

(6) Whenever an accident occurs to a ship or a defect is discovered that substantially affects the efficiency or completeness of its equipment covered by this Regulation, the master or owner of the ship shall report at the earliest opportunity to the Administration, a nominated surveyor, or recognized organization responsible for issuing the relevant certificate.

Issue of International Air Pollution Prevention Certificate

17. ----(1) An International Air Pollution Prevention Certificate shall be issued, after an initial or renewal survey in accordance with the provisions of section 16 of this Regulation, to:

(a) any ship of 400 gross tonnage and above engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties; and

(b) platforms and drilling rigs engaged in voyages to waters under the sovereignty or jurisdiction of other Parties.

(2) A ship constructed before May 19 2005 for such ship's administration shall be issued with an International Air Pollution Prevention Certificate in accordance with subsection (1) of this section no later than the first scheduled dry-docking after May 19 2005, but in no case later than three years after this date.

Certificate Endorsement

(3) Such certificate shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificate.

(4) An International Energy Efficiency Certificate for the ship shall be issued after a survey in accordance with the provisions of section 16 (4) of this Regulation to any ship of 400 gross tonnage and above before that ship may engage in voyages to ports or offshore terminals under the jurisdiction of the Administration.

(5) Such certificate shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificate.

Issue of a Certificate by another Government

18. ----(1) The Administration may at the request of the Organisation, cause a ship to be surveyed and, if satisfied that the provisions of this Regulation are complied with, shall issue or authorize the issuance of an International Air Pollution Prevention Certificate to the ship, and where appropriate, endorse or authorize the endorsement of that certificate on the ship, in accordance with this Regulation.

(2) A copy of the certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

(3) A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a certificate issued under section 16 of this Regulation.

(4) No International Air Pollution Prevention Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party to MARPOL Annex VI.

Form of Certificate

19. The International Air Pollution Prevention Certificate shall be drawn up in a form corresponding to the model given in Schedule I to this Regulation and shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in case of a dispute or discrepancy.

Duration and validity of Certificate

20. ----(1) An International Air Pollution Prevention Certificate shall be issued for a period specified by the Administration, which shall not exceed five years.

(2) Notwithstanding the requirements of subsection (1)of this section:

(a) when the renewal survey is completed within three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate;

(b) when the renewal survey is completed after the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate; and

(c) when the renewal survey is completed more than three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of completion of the renewal survey.

(3) If a certificate is issued for a period of less than five years, the Administration may extend the validity of the certificate beyond the expiry date to the maximum period specified in subsection (1) of this section, provided that the surveys referred to in section 16 (1)(c)(d) of this Regulation applicable when a certificate is issued for a period of five years are carried out as appropriate.

(4) If a renewal survey has been completed and a new certificate cannot be issued or placed on board the ship before the expiry date of the existing certificate, the person or organization authorized by the Administration may endorse the existing certificate and such a certificate shall be accepted as valid for a further period that shall not exceed five months from the expiry date.

(5) If a ship, at the time when a certificate expires, is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No certificate shall be extended for a period longer than three months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new certificate. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.

(6) A certificate issued to a ship engaged on short voyages that has not been extended under the foregoing provisions of this section may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.

(7) In special circumstances, as determined by the Administration, a new certificate need not be dated from the date of expiry of the existing certificate as required by paragraph sub-section(2)(a) of this section or sections 15 and 16 of this Regulation. In these special circumstances, the new certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.

(8) If an annual or intermediate survey is completed before the period specified in section 16 of this Regulation, then:

(a) the anniversary date shown on the certificate shall be amended by endorsement to a date that shall not be more than three months later than the date on which the survey was completed;

(b) the subsequent annual or intermediate survey required by section 16 of this Regulation shall be completed at the intervals prescribed by that section using the new anniversary date; and

(c) the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by section 16 of this Regulation are not exceeded.

(9) A certificate issued under sections 17 and 18 Regulation shall cease to be valid in any of the following cases:

(a) if the relevant surveys are not completed within the periods specified under section 16 (1) of this Regulation;

(b) if the certificate is not endorsed in accordance with section 16 (1)(c(d)regulation of this Regulation; and

(c) upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of section 16 (4) of this Regulation. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.

International Energy Efficiency Certificate

21. ----(1)The International Energy Efficiency Certificate shall be valid throughout the life of the ship subject to the provisions as outlined below.

(2) An International Energy Efficiency Certificate issued under this Regulation shall cease to be valid in any of the following cases:

(a) if the ship is withdrawn from service or if a new certificate is issued following major conversion of the ship; or

(b) upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of Part IV of this Regulation. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.

Port State control on operational requirements

22. ------(1) A ship, when in a port or an offshore terminal under the jurisdiction the Administration, is subject to inspection by officers duly authorized by the Administration concerning operational requirements under this Regulation, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of air pollution from ships.

(2) In the circumstances given in subsection (1) of this Regulation, the Party shall take such steps as to ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this Regulation.

(3) Procedures relating to the port State control shall apply to this section.

(4) Nothing in this section shall be construed to limit the rights and obligations of the Administration carrying out control over operational requirements.

Detection of violations and enforcement

23. ----(1) The Administration shall cooperate with other flag states in the detection of violations and the enforcement of the provisions of this Regulation, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.

(2) A ship to which this Regulation applies may, in any port or offshore terminal of any foreign Administration, be subject to inspection by officers appointed or authorized by that foreign Administration for the purpose of verifying whether the ship has emitted any of the substances covered by this Regulation in violation of the provision of this Regulation. If an inspection indicates a violation of this Regulation, a report shall be forwarded to the Administration for any appropriate action.

Actions that can be taken by a foreign Administration

(3) Any foreign Administration shall furnish to the Administration evidence, if any, that the ship has emitted any of the substances covered by this Regulation in violation of the provisions of this Regulation. If it is practicable to do so, the foreign Administration or other competent authority shall notify the master of the ship of the alleged violation.

(3) Upon receiving such evidence, the Administration so informed shall investigate the matter, and may request the foreign Administration or other competent authority to furnish further or better evidence of the alleged contravention. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken in accordance with Part VI as soon as possible. The Administration shall promptly inform the foreign Administration or other competent authority that has reported the alleged violation, as well as the Organization, of the action taken.

(4) A foreign Administration or other competent authority may also inspect a ship to which this Regulation applies when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any other foreign Administration or competent authority together with sufficient evidence that the ship has emitted any of the substances covered by the Regulation in any place in violation of this Regulation. The report of such investigation shall be sent to the foreign Administration or competent authority requesting it and to the Administration so that the appropriate action may be taken under the Regulation.

(5) The international law concerning the prevention, reduction, and control of pollution of the marine environment from ships, including that law relating to enforcement and safeguards, in force at the time of application or interpretation of this Regulation, applies, mutatis mutandis, to the rules and standards set forth in this Regulation.

PART V- *Energy Efficiency for Ships*

Application

24. ----(1) This chapter shall apply to all ships of 400 gross tonnage and above.

(2) The provisions of this PART shall not apply to:

(a) ships solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly. However, the Administration should ensure, by the adoption of appropriate measures, that such

ships are constructed and act in a manner consistent with this Regulation, so far as is reasonable and practicable.

(b) Sections 24 and 25 shall not apply to ships which have diesel-electric propulsion, turbine propulsion or hybrid propulsion systems.

(2) Notwithstanding the provisions of sub-section (1) of this section, the Administration may waive the requirement for a ship of 400 gross tonnage and above from complying with sections 24 and 25 of this Regulation.

(3) The provision of subsection(2)of this section shall not apply to ships of 400 gross tonnage and above:

(a) for which the building contract is placed on or after 1 January 2017; or

(b) in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2017; or

(c) the delivery of which is on or after 1 July 2019; or

(d) in cases of a major conversion of a new or existing ship, as defined in section 3, on or after 1 January 2017, and in which section 16 (4)(b)and (c) apply.

(4) Where the Administration allows application of subsection (2) of this section or suspends, withdraws or declines the application of this subsection, to a ship entitled to fly its flag, it shall forthwith communicate this to the Organization.

Attained Energy Efficiency Design Index (Attained EEDI)

25. ---(1) The attained EEDI shall be calculated for:

(a) each new ship;

(b) each new ship which has undergone a major conversion; and

(c) each new or existing ship which has undergone a major conversion, that is so extensive that the ship is regarded by the Administration as a newly constructed ship which falls into one or more of the categories in section 3. The attained EEDI shall be specific to each ship and shall indicate the estimated performance of the ship in terms of energy efficiency, and be accompanied by the EEDI technical file that contains the information necessary for the calculation of the attained EEDI and that shows the process of calculation. The attained EEDI shall be verified, based on the EEDI technical file, either by the Administration or by any organization duly authorized by it.

(2) The attained EEDI shall be calculated taking into account guidelines developed by the Organization.

Required EEDI

26. ----(1) For each:

(a) new ship;

(b) which has undergone a major conversion; and

(c) new or existing ship which has undergone a major conversion that is so extensive that the ship is regarded by the Administration as a newly constructed ship which falls into one of the categories defined in section 3 and to which this chapter is applicable, the attained EEDI shall be as follows:

Calculation of the EEDI

(d) Attained EEDI $\leqq$ Required EEDI = 1- (X/100) × Reference line value; where X is the reduction factor specified in Table 1 for the required EEDI compared to the EEDI reference line.

(2) For each new and existing ship that has undergone a major conversion which is so extensive that the ship is regarded by the Administration as a newly constructed ship, the attained EEDI shall be calculated and meet the requirement of section 25(1) with the reduction factor applicable corresponding to the ship type and size of the converted ship at the date of the contract of the conversion, or in the absence of a contract, the commencement date of the conversion.

(3) The reference line values shall be calculated as:

(a) Reference line value= a. b-c where a, b and c are parameters given in Schedule ……

(4) If the design of a ship allows it to fall into more than one of the ship types listed in Schedule……., the required EEDI for the ship shall be the most stringent (the lowest) required EEDI.

(5) For each ship to which this section applies, the installed propulsion power shall not be less than the propulsion power needed to maintain the maneuverability of the ship under adverse conditions.

(6) At the beginning of phase 1 and phase 2 and at the midpoint of phase 2, the Organization shall review the status of technological developments and, if proven necessary, amend the time periods, the EEDI reference line parameters for relevant ship types and reduction rates set out in this Section.

Ship Energy Efficiency Management Plan (SEEMP)

27. -----(1) Each ship shall keep on board a ship specific Ship Energy Efficiency Management Plan (SEEMP). This may form part of the ship's Safety Management System (SMS).

(2) The SEEMP shall be developed taking into account guidelines adopted by the Organization.

Promotion of Technical Cooperation and Transfer of Technology

28. -----(1) The Administration shall, in co-operation with the Organization and other international bodies, promote and provide as appropriate, support, directly or through the Organization to States; especially developing States, that request technical assistance.

(2) The Administration shall cooperate actively with other foreign Administrations or competent authorities, subject to its national laws, regulations and policies, to promote the development and transfer of technology and exchange of information to States which request technical assistance, particularly developing States, in respect of the implementation of measures to fulfil the requirements of PART IV of this Regulation, in particular section 23(2)(4).

PART VI- *General Exceptions*

Excepted Emission

29. -----(1) This Regulation shall not apply to:

(a) any emission necessary for the purpose of securing the safety of a ship or saving life at sea; or

(b) any emission resulting from damage to a ship or its equipment, provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the emission for the purpose of preventing or minimizing the emission; and

except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result.

Issue of exemption certificate from Administration for the purpose of conducting trials or other emission reduction research

30. -----(1) The Administration may, in cooperation with other Administrations as appropriate, issue an exemption from specific provisions of this Regulation for a ship to conduct trials for the development of ship emission reduction and control technologies and engine design programmes. Such an exemption shall only be provided if the applications of specific provisions of the Regulation or the revised NOx Technical Code 2008 could impede research into the development of such technologies or programmes. A permit for such an exemption shall only be provided to the minimum number of ships necessary and be subject to the following provisions:

a) for marine diesel engines with a per cylinder displacement up to 30 litres, the duration of the sea trial shall not exceed 18 months. If additional time is required, a permitting Administration or Administrations may permit a renewal for one additional I8-month period; or

(b) for marine diesel engines with a per cylinder displacement at or above 30 litres, the duration of the ship trial shall not exceed 5 years and shall require a progress review by the permitting Administration or Administrations at each intermediate survey. A permit may be withdrawn based on this review if the testing has not adhered to the conditions of the permit or if it is determined that the technology or programme is not likely to produce effective results in the reduction and control of ship emissions. If the reviewing Administration or Administrations determine that additional time is required to conduct a test of a particular technology or programme, a permit may be renewed for an additional time period not to exceed five years.

Exemptions of emissions arising from certain activities

31. -----(1) Emissions directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources are, exempt from the provisions of this Regulation. Such emissions include the following:

(a) emissions resulting from the incineration of substances that are solely and directly the result of exploration, exploitation and associated offshore processing of sea-bed mineral resources, including but not limited to the flaring of hydrocarbons and the burning of cuttings, muds, and/or stimulation fluids during well completion and testing operations, and flaring arising from upset conditions;

(b) the release of gases and volatile compounds entrained in drilling fluids and cuttings;

(c) emissions associated solely and directly with the treatment, handling, or storage of sea-bed minerals; and

(d) emissions from marine diesel engines that are solely dedicated to the exploration, exploitation and associated offshore processing of sea-bed mineral resources.

(2) The requirements of sections 13 and 14 of this Regulation shall not apply to the use of hydrocarbons that are produced and subsequently used on site as fuel, when approved by the Administration.

Equivalents

32. -----(1) The Administration may allow any fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Regulation if such fitting, material,

appliance or apparatus or other procedures, alternative fuel oils, or compliance methods are at least as effective in terms of emissions reductions as that required by this Regulation, including any of the standards set forth in sections 5 and 9.

(2) Where pursuant to subsection (1) of this section, the Administration allows a fitting, material, appliance or apparatus or other procedures, alternative fuel oils, or compliance methods to be used as an alternative to that required by this Regulation, it shall communicate this to the Organization for their information and appropriate action, if any.

(3) The Administration should take into account any relevant guidelines developed by the Organization pertaining to the equivalents provided for in this section.

(4) Pursuant to the provisions of subsection (2), where the Administration allows the use of an equivalent as set forth in subsection (1) of this section, it shall endeavour not to impair or damage its environment, human health, property, or resources, or those of other States.

PART VII-*Legal Proceedings*

Penalties

33. ----(1) A person who commits an offence under this Act, shall be liable to a fine not exceeding four million dollars and not less than one million dollars or to imprisonment for six months failing the payment of the fine.

(2) Where an offence under this Regulation is a continuing one, every person who commits that offence, in addition to any other liability, is liable to a fine of five hundred thousand dollars for every day or part thereof during which the offence continues after conviction.

Prosecution of offences

34. Prosecutions in respect of offences under this Act shall be conducted by the Office of the Director of Public Prosecutions or by any officer appointed under this Act and specially authorized in writing in that behalf by the Director.

Warrant of arrest served on vessel during prosecution

35. During the prosecution of the offence, a warrant of arrest shall be served on the vessel and shall only be lifted after the fine has been paid.

Part VIII

Schedule I

Form of International Air Pollution Prevention (lAPP) Certificate (Section 16)

INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE

Issued under the provisions of the Protocol of 1997, as amended by resolution MEPC.176(58) in 2008, to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 related thereto (hereinafter referred to as "the Convention") under the authority of the Government of:

(Full designation of the country)

by

.

(Full designation of the competent person or organization authorized under the provisions of the Convention)

Particulars of ship *

Name of ship

Distinctive number or letters

Port of registry

Gross tonnage

IMO Number+

* Alternatively, the particulars of the ship may be placed horizontally in boxes.

+ In accordance with IMO ship identification number scheme, adopted by the Organization by resolution A. 600(15).

THIS IS TO CERTIFY:

That the ship has been surveyed in accordance with section 16 of the Regulations; and

2 That the survey shows that the equipment, systems, fittings, arrangements and materials fully comply with the applicable requirements of the Regulation.

Completion date of survey on which this Certificate is based: (dd/mm/yyyy)

This Certificate is valid until and subject to surveys in accordance with section 16 of the Regulations.

Issued at

(Place of issue of certificate)

(dd/mm/yyyy):
(Date of issue)
(Signature of authorized official issuing the certificate)

(Seal or stamp of the authority, as appropriate)

Schedule II

Endorsement for annual and intermediate surveys

THIS IS TO CERTIFY that at a survey required by section 16 of the Regulation the ship was found to comply with the relevant provisions of that Section:

Annual survey:

Signed:
(Signature of authorized official)

Place:

Date (ddimm/yyyy):

(Seal or stamp of the authority, as appropriate)

.

Annual/Intermediate' survey:

Signed:
(Signature of authorized official)

Place:

Date (ddimmlyyyy):

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate' survey:

Signed:
(Signature of authorized official)

Place:

Date (ddimmlyyyy):

(Seal or stamp of the authority, as appropriate)

Annual survey:

Signed:
(Signature of authorized official)

Place:

Date (ddimmlyyyy):

(Seal or stamp of the authority, as appropriate)

* Delete as appropriate.

Annual/intermediate survey in accordance with section 20(8)(c)

THIS IS TO CERTIFY that, at an annual/intermediate survey in accordance with section 20 (8)(c) of the Regulations, the ship was found to comply with the relevant provisions of that Regulation:

Signed:
(Signature of authorized official)

Place:

Date (dd/mmlyyyy):

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the certificate if valid for less than 5 years where section 20 (3) applies

The ship complies with the relevant provisions of the Regulations, and this certificate shall, in accordance with section 20 (3) of the Regulation, be accepted as valid until (dd/mmlyyyy): .

Signed:
(Signature of authorized official)

Place:
Date (dd/mmlyyyy):

(Seal or stamp of the authority, as appropriate)

Endorsement where the renewal survey has been completed and section 20(4) applies

The ship complies with the relevant provisions of the Regulations, and this certificate shall, in accordance with section 20 (4) of the Regulations, be accepted as valid until (dd/mmlyyyy):

Signed:
(Signature of authorized official)

Place:
Date (dd/mmlyyyy):

(Seal or stamp of the authority, as appropriate)

Delete as appropriate.

Endorsement to extend the validity of the certificate until reaching the port of surveyor for a period of grace where section 20 (5) or section 20 (6) applies.

This certificate shall, in accordance with section 20 (5) or section 20 (6) of the Regulations, be accepted as valid until (dd/mm/yyyy):

Signed:
(Signature of authorized official)

Place:
Date (ddimmlyyyy):

(Seal or stamp of the authority, as appropriate)

Endorsement for advancement of anniversary date where section 20 (8) applies

In accordance with section 20 (8) of the Regulations, the new anniversary date is (dd/mm/yyyy):

Signed:
(Signature of authorized official)

Place:
Date (dd/mm/yyyy):

(Seal or stamp of the authority, as appropriate)

In accordance with section 20 (8) of the Regulations, the new anniversary date is (dd/mm/yyyy):

Signed:
(Signature of authorized official)

Place:
Date (dd/mm/yyyy):

(Seal or stamp of the authority, as appropriate)

- Delete as appropriate.

*Insert the date of expiry as specified by the Administration in accordance with section 20 of the Regulations. The day and the month of this date correspond to the anniversary date as defined in section 3 of the Regulations, unless amended in accordance with section 20 (8) of the Regulations.

Schedule III

SUPPLEMENT TO INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE (lAPP CERTIFICATE)

RECORD OF CONSTRUCTION AND EQUIPMENT

Notes:

1. This Record shall be permanently attached to the lAPP Certificate. The lAPP Certificate shall be available on board the ship at all times.
2. The Record shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in case of a dispute or discrepancy.
3. Entries in boxes shall be made by inserting either a cross (x) for the answer "yes" and "applicable" or a (-) for the answers "no" and "not applicable" as appropriate.
4. Unless otherwise stated, sections mentioned in this Record refer to the sections of the Regulation and resolutions or circulars refer to those adopted by the International Maritime Organization.

1. Particulars of ship

1.1.Name of ship

.

1.2. IMO number

.

1.3.Date on which keel was laid or ship was at a similar stage of construction

1.4. Length (L) # metres

Completed only in respect of ships constructed on or after 1 January 2016, which are specially designed, and used solely, for recreational purposes and to which, in accordance with section 7(8)(a) the NOx emission limit as given by section 7(7)(1(a)(i) will not apply.

2. Control of emissions from ships

2.1.Ozone-depleting substances (section 4)

2.1.1. The following fire-extinguishing systems, other systems and equipment containing ozone-depleting substances, other than hydro chlorofluorocarbons, installed before 19 May 2005 may continue in service:

System or equipment	**Location on board**	**Substance**

2.1.2. The following systems containing (HCFCs) installed before January 1, 2020 may continue in service:

System or equipment	Location on board	Substance

2.2. Nitrogen oxides (NOx) (section 6)

2.2.1. The following marine diesel engines installed on this ship comply with the applicable emission limit of (section 6) in accordance with the revised NOx Technical Code 2008:

	Engine #1	Engine #2	Engine #3	Engine #4	Engine#5	Engine #6
Manufacturer and model						
Serial number						
Use Power output (kW) Rated speed (rpm)						
Date of installation (dd/mm/yyyy)						
According to Section 7(4)						
Date of major conversion (dd/mm/yyyy)						

According to Section 7(4)

Exempted by Section 6(1)(b)	D	D	D	D	D	D
Tier I Section 7(5)	D	D	D	D	D	D
Tier II Section 7(6)	D	D	D	D	D	D
Tier II Section 7(1)(b) or *7(8)*	D	D	D	D	D	D
Tier **III** Section 7(1)(a)	D	D	D	D	D	D
Approved method exists	D	D	D	D	D	D
Approved method not commercially available	D	D	D	D	D	D
Approved method installed	D	D	D	D	D	D

2.3 Sulphur oxides (SOx) and particulate matter (Section 10)

2.3.1 When the ship operates within an emission control area specified in section 10 (3), the ship uses:

.1 fuel oil with a sulphur content that does not exceed the applicable limit value as documented by bunker delivery notes; or......
O

.2 an equivalent arrangement approved in accordance with s e c t i o n 3 2 a s listed in section 3
O

2.4 Volatile organic compounds (VOCs) (Section 11)

2.4.1 The tanker has a vapour collection system installed and approved in accordance with
MSC/Circ.585.
O

2.4.2.1 For a tanker carrying crude oil, there is an approved VOC management plan .. ..
O

2.4.2.2 VOC management plan approval reference:
..

2.5 Shipboard incineration (Section 12)

The ship has an incinerator:

.1 installed on or after 1 January 2000 which complies with resolution MEPC.76 (40) as amended.. ….. .. .. …. …. ….. ……. ….…….……….….. . **O**

.2 installed before 1 January 2000 which complies with:

.2.1 resolution MEPC.59(33) .
o

.2.2 resolution MEPC.76(40) .
o

2.6 Equivalents (Section 32)

The ship has been allowed to use the following fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Regulation:

System or equipment	**Equivalent used**	**Approval reference**

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at
.
(Place of issue of the Record)

(dd/mrn/yyyy): .
(Date of issue)

(Signature of duly authorized official issuing the Record)

(Seal or stamp of the authority, as appropriate)

Schedule IV

Test cycles and weighting factors (Section 6)

The following test cycles and weighing factors shall be applied for verification of compliance of marine diesel engines with the applicable NO_X limit in accordance with section 6 of this Regulation using the test procedure and calculation method as specified in the revised NO_X Technical Code 2008.

.1 For constant-speed marine engines for ship mam propulsion, including diesel-electric drive, test cycle E2 shall be applied;

.2 For controllable-pitch propeller sets test cycle E2 shall be applied;

.3 For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied;

.4 For constant-speed auxiliary engines test cycle D2 shall be applied; and

.5 For variable-speed, variable-load auxiliary engines, not included above, test cycle C 1 shall be applied.

Test cycle for *constant speed main propulsion* application
(including diesel-electric drive and all controllable-pitch propeller installations)

Test cycle type E2	Speed	100%	100%	100%	100
	Power	100%	75%	50%	25%
	Weighting 0.15 factor	0.2	0.5	0.15	

Test cycle for *propeller-law-operated main* and *propeller-law-operated auxiliary engine*
application

Test cycle type E3	Speed	100%	91%	80%	63%
	Power	100%	75%	50%	25%
	Weighting 0.15 factor	0.2	0.5	0.15	

Test cycle for *constant-speed auxiliary engine* application

Test cycle type D2	Speed	100%	100%	100%	100%	100
	Power	100%	75%	50%	25%	10%
	Weighting 0.1 factor	0.05	0.25	0.3	0.3	

Test cycle for *variable-speed and -load auxiliary engine* application

Test cycle type Cl	Speed	Rated				Intermediat			Idle
		100%	7S%	SO%	10%	100%	7S%	SO%	0%
	Weighting factor	O.IS	O.1S	O.1S	0.1	0.1	0.1		0.1
	O.IS								

In the case of an engine to be certified in accordance with paragraph subsection (1) of section 6, the specific emission at each individual mode point shall not exceed the applicable NO_X emission limit value by more than SOx except as follows:

.1 The 10% mode point in the D2 test cycle.

.2 The 10% mode point in the Cl test cycle.

.3 The idle mode point in the CI test cycle.

Schedule V

Type approval and operating limits for shipboard incinerators

(Section 12)

1 Ships' incinerators described in section 12 (6)(A) on board shall possess an IMO Type Approval Certificate for each incinerator. In order to obtain such certificate, the incinerator shall be designed and built to an approved standard as described in section 12 (6)(A). Each model shall be subject to a specified type approval test operation at the factory or an approved test facility, and under the responsibility of the Administration, using the following standard fuel/waste specification for the type approval test for determining whether the incinerator operates within the limits specified in paragraph 2 of this Schedule:

Sludge oil consisting of: (HFO);	75% sludge oil from heavy fuel oil 5% waste lubricating oil; and 20% emulsified water.
Solid waste consisting of:	50% food waste; 50% rubbish containing; approx. 30% paper, " 40% cardboard, " 10% rags, " 20% plastic The mixture will have up to 50% moisture and 7% incombustible solids.

2 Incinerators described in section 12 (6)(A) shall operate within the following limits:

O_2 in combustion chamber: CO in flue gas maximum average:	6-12%
Soot number maximum average:	200 mgIMJ Bacharach 3 or Ringelman 1 (20% opacity)(a higher soot number is acceptable only during very short periods such as starting up)
Unburned components in ash residues:	Maximum 10% by weight
Combustion chamber flue gas outlet temperature range:	

Schedule VI

Information to be included in the bunker delivery note

(Section 15(4))

Name and IMO Number of receiving ship

Port

Date of commencement of delivery

Name, address, and telephone number of marine fuel oil supplier

Product name(s)

Quantity in metric tons

Density at 15°C, kg/nr"

Sulphur content (%

m/m)"

A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with the applicable paragraph of section 10 (1) or 1 0 (4) and section 15(1) of this Regulation .

" Fuel oil shall be tested in accordance with ISO 3675:1998 or ISO 12185:1996 .

" Fuel oil shall be tested in accordance with ISO 8754:2003.

Schedule VII

Fuel verification procedure for fuel oil samples

(Section 15(8)(b))

The following procedure shall be used to determine whether the fuel oil delivered to and used on board ships is compliant with the sulphur limits required by section 10 of this Regulation.

1 *General Requirements*

1.1 The representative fuel oil sample, which is required by section 15(8)(A) (the "MARPOL sample") shall be used to verify the sulphur content of the fuel oil supplied to a ship.

1.2 An Administration, through its competent authority, shall manage the verification procedure.

1.3 The laboratories responsible for the verification procedure set forth in this appendix shall be fully accredited' for the purpose of conducting the tests.

2 *Verification procedure stage 1*

2.1 The MARPOL sample shall be delivered by the competent authority to the laboratory.

2.2 The laboratory shall:

.1 record the details of the seal number and the sample label on the test record;

.2 confirm that the condition of the seal on the MARPOL sample is that it has not been broken; and

.3 reject any MARPOL sample where the seal has been broken.

2.3 If the seal of the MARPOL sample has not been broken, the laboratory shall proceed with the verification procedure and shall:

.1 ensure that the MARPOL sample is thoroughly homogenized;

.2 draw two sub-samples from the MARPOL sample; and

.3 reseal the MARPOL sample and record the new reseal details on the test record.

Accreditation is in accordance with ISO 17025 or an equivalent standard.

2.4 The two sub-samples shall be tested in succession, in accordance with the specified test method referred to in Schedule VI . For the purposes of this verification procedure, the results of the test analysis shall be referred to as "A" and "B":

.1 If the results of "A" and "B" are within the repeatability *(r)* of the test method, the results shall be considered valid .

.2 If the results of "A" and "B" are not within the repeatability *(r)* of the test method, both results shall be rejected and two new sub-samples should be taken by the laboratory and analysed. The sample bottle should be resealed in accordance with paragraph 2.3.3 above after the new sub-samples have been taken.

2.5 If the test results of "A" and "B" are valid, an average of these two results should be calculated thus giving the result referred to as "X":

.1 If the result of "X" is equal to or falls below the applicable limit required by Annex VI, the fuel oil shall be deemed to meet the requirements .

.2 If the result of "X" is greater than the applicable limit required by Annex VI, verification procedure stage 2 should be conducted; however, if the result of "X" is greater than the specification limit by *O.59R* (where *R* is the reproducibility of the test method), the fuel oil shall be considered non-compliant and no further testing is necessary.

3 Verification Procedure Stage 2

3.1 If stage 2 of the verification procedure is necessary in accordance with paragraph 2.5.2 above, the competent authority shall send the MARPOL sample to a second accredited laboratory.

3.2 Upon receiving the MARPOL sample, the laboratory shall:

.1 record the details of the reseal number applied in accordance with 2.3.3 and the sample label on the test record;

.2 draw two sub-samples from the MARPOL sample; and

.3 reseal the MARPOL sample and record the new reseal details on the test record.

3.3 The two sub-samples shall be tested in succession, in accordance with the test method specified in appendix V (second footnote). For the purposes of this verification procedure, the results of the test analysis shall be referred to as "C" and "D":

.1 If the results of "C" and "D" are within the repeatability *(r)* of the test method, the results shall be considered valid.

.2 If the results of "C" and "D" are not within the repeatability *(r)* of the test method, both results shall be rejected and two new sub-samples shall be taken by the laboratory and analysed. The sample bottle should be resealed in accordance with paragraph 3.2.3 above after the new sub-samples have been taken.

3.4 If the test results of "C" and "D" are valid, and the results of "A", "B", "C", and "D" are within the reproducibility *(R)* of the test method then the laboratory shall average the results, which is referred to as "Y":

.1 If the result of "Y" is equal to or falls below the applicable limit required by Annex VI, the fuel oil shall be deemed to meet the requirements .

.2 If the result of "Y" is greater than the applicable limit required by the Regulations, then the fuel oil fails to meet the standards required by said Regulations.

3.5 If the result of "A", "B", "C" and "D" are not within the reproducibility *(R)* of the test method then the Administration may discard all of the test results and, at its discretion, repeat the entire testing process.

3.6 The results obtained from the verification procedure are final.