GUIDANCE NOTES
GD25-2018

Guidelines for the Monitoring Reporting and Verification of Ship CO_2 Emissions

Effective date: 1st October 2018

Introduction

International marine shipping is the only means of transportation not subject to the greenhouse gas emission reduction commitment. To reduce the influence of CO_2 emissions from marine transport on the climatic environment, the Regulation (EU) 2015/757 concerning the monitoring, reporting and verification (MRV) of CO_2 emissions from marine transport has been adopted by the European Parliament and the European Council and officially came into effect on July 1, 2015. As the first step of periodic measures for emission reduction, the decree specifies the regulations on the monitoring, reporting and verification of CO_2 emissions and related information of the commercial ships of above 5000 gross tonnage arriving or berthing at or leaving from the ports under the jurisdiction of the member states of the EU, so as to facilitate the CO_2 emission reduction in marine shipping in an economical and effective way.

Whether in the EU or all over the globe, the robust MRV system is a prerequisite for carrying out the market measures, energy efficiency standards or other measures. To this end, the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO), at its 70th session (October 2016), approved the amendment to Annex VI of the *International Convention for the Prevention of Pollution from Ships* (MARPOL), which supplements the requirements for CO_2 emissions, monitoring, verification and certification of ships in Chapter 4, Regulations on Energy Efficiency for Ships, applicable to all commercial ships of 5000 gross tonnage and above engaged in international voyages. The Ship Energy Efficiency Management Plan (SEEMP) is required to include the description of the methodology that will be used to collect the data and data reporting process (Part II, SEEMP) and subject to the compliance verification by the competent authority or an organization recognized by it prior to the implementation (the first reporting period).

The Guideline is prepared by this society in accordance with the Regulation (EU) 2015/757 on MRV, the amendment to MARPOL, Annex VI and related decrees and guidelines, for the purpose of assisting the shipowners and companies on the implementation of ship CO_2 emissions monitoring, reporting and verification, and ensuring compliance of the relevant requirements of the MRV Regulation of EU and the amendment to MARPOL Annex VI.

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Chapter I General

1.1 Purpose

1.1.1 The Guideline is intended to assist the shipowners or companies on preparation and implementation of the Monitoring Plan for CO_2 emissions, preparation of annual emissions report and application for the assessment and verification to the competent authority or an organization recognized by it in accordance with the Regulation (EU) 2015/757 on MRV (hereinafter referred to as the MRV Regulation) and the amendment to MARPOL Annex VI.

1.1.2 The Guideline mainly illustrates the general requirements and methods for the preparation and implementation of the Monitoring Plan for shipowners or companies.

1.1.3 The Guideline also provides a guidance on the assessment of the Monitoring Plan for CO_2 emissions and the verification of the Emissions report which are carried out by China Classification Society (hereinafter referred to as ISC).

1.2 Basis

1.2.1 The MRV Regulation and the related implementation and delegated regulations, and other guidance documents;;

1.2.2 ISO 14065 requirements related to impartiality, confidentiality, communication and records, appeals and complaints;

1.2.3 The amendment to MARPOL, Annex VI of IMO MEPC concerning the Fuel Consumption Data Collection System (MEPC.70) and the related implementation guidance.

1.3 Scope of application

1.3.1 The MRV regulation applies to ships above 5000 gross tonnage in respect of CO_2 emission released during their voyages from their last port of call to a port of call under the jurisdiction of an EU member state, and from a port of call under the jurisdiction of an EU member state to their next port of call and as well as within the ports under the jurisdiction of an EU member state. It does not apply to the warships, naval auxiliaries, fishing-catching or fish-processing ships, wooden ships of a primitive build, ships not propelled by mechanical means, or government ships used for non-commercial purpose.

The expression "ports of call under the jurisdiction of a Member State" refers to ports of call located on "EU territory", (in other words, to which EU law fully applies). Not all ports belonging to an EU Member State are EU territories (see list below). For a voyage to be covered by the MRV Regulation at least one of the ports of call shall be located in a EU territory. Ports of call in the nine EU outermost regions (Açores, Madeira, Canarias, Guadeloupe, French Guyana, Martinique, Mayotte, Saint Martin and Reunion), and also ports of call in Norway (except those on Svarbald) and Iceland qualify as EU ports of call.

EEA Member States' Overseas Countries and Territories which do not qualify as EU ports of call.
Greenland and the Faroe Islands
French Polynesia, New Caledonia, Saint Barthélemy, Saint Pierre and Miquelon, Wallis and Futuna
Aruba, Bonaire, Saba, Sint Eustatius, Curaçao, Sint Maarten
Anguilla, Bermuda, British Antarctic Territory, British Indian Ocean Territory, British Virgin Islands, Cayman Islands, Falkland Islands, Bailiwick of Guernsey, Isle of Man, Jersey, Montserrat, Pitcairn, Henderson, Ducie and Oeno Islands, Saint Helena, Ascension and Tristan da Cunha, South Georgia and the South Sandwich Islands, Turks and Caico Islands, Akrotiri and Dhekelia
Svarbald

1.3.2 The amendment to MARPOL, Annex VI is applicable to all ships of 5000 gross tonnage and above engaged in international voyages, but not applicable to ships not propelled by mechanical means and the platforms for floating production storage and offloading (FPSO), floating storage units (FSU) and drilling devices regardless of the propulsion means.

1.3.3 Other ships may refer to the requirements as voluntary.

1.4 Definitions and abbreviations

1.4.1 Definitions

1.4.1.1 "Company" in EU MRV Regulation means the shipowner or any other organization or person which has assumed the responsibility for operation of the ship from the shipowner, such as the ship manager or the bareboat charterer.

“Company” in MARPOL ANNEX VI means the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship *and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Management Code for the Safe Operation of Ships and for Pollution Prevention, as amended*.

1.4.1.2 "port of call" means the port where a ship stops to load or unload cargo or to embark or disembark passengers; consequently, stops for the sole purpose of refueling, obtaining supplies, relieving the crew, going into dry-dock or making repairs to the ship and/or its equipment, stops in port because the ships is in need of assistance or in distress, ship-to-ship transfers carried out outside ports, and stops for the sole purpose of taking shelter from adverse weather or rendered necessary by search and rescue activities are excluded.

1.4.1.3 "voyage" means any movement of a ship that originates from or terminates in a port of call and that serves the purpose of transporting passengers or cargo for commercial purposes.

1.4.1.4 "verifier" means a legal entity carrying out verification activities which is accredited by a national accreditation body pursuant to Regulation (EC) No 765/2008 (to which the MRV Regulation of EU applies).

1.4.1.5 "verification" means the activities carried out by a verifier to assess the conformity of the documents transmitted by the company with the requirements of the applicable regulations/convention.

1.4.1.6 "Other related information" means information related to CO_2 emissions from the consumption of fuels, to transport work and to the energy efficiency of ships, which enables the analysis of emission trends and the assessment of ship’s performance.

1.4.1.7 "emission factor" means the average emission rate of a greenhouse gas relative to the activity data of a source stream, assuming complete oxidation for combustion and complete conversion for all other chemical reactions.

1.4.1.8 "uncertainty" means a parameter, associated with the result of the determination of a quantity, that characterizes the dispersion of the values that could reasonably be attributed to the particular quantity, including the effects of systematic as well as of random factors, expressed as a percentage, and describes a confidence interval around the mean value comprising 95% of inferred values taking into account any asymmetry of the distribution of values.

1.4.1.9 "conservative" means that a set of assumptions is defined in order to ensure that no under-estimation of annual emissions or over-estimation of distances or amounts of cargo carried occurs.

1.4.1.10 "materiality level" means the quantitative threshold or cut-off point above which the misstatements, individually or taken together, are considered to be material.

1.4.1.11 "misstatement" means an omission, misstatement or error in the reported data, apart from the uncertainty permissible pursuant to Regulation (EU) 2015/757 and taking into consideration the guidelines developed by the Commission on these matters.

1.4.1.12 "material misstatement" means a misstatement that, in the opinion of the verifier, individually or when taken together with other misstatements, exceeds the materiality level or

could otherwise, have an impact on the total reported emissions or other relevant information.

1.4.1.13 The "non-conformity" means one of the following:

(a) for the purpose of assessing a monitoring plan, that the plan does not fulfil the requirements under Articles 6 and 7 of Regulation (EU) 2015/757 and the Implementing Regulation;

(b) for the purpose of verifying an emissions report, that the CO_2 emissions and other relevant information are not reported in line with the monitoring methodology described in a monitoring plan that an accredited verifier has assessed as satisfactory.

1.4.1.14 "reasonable assurance" means a high but not absolute level of assurance, expressed positively in the verification statement, as to whether the emission report subject to verification is free of material misstatements..

1.4.1.15 "reporting period" in EU regulation means one calendar year during which CO_2 emissions have to be monitored and reported. For voyage starting and ending in two different calendar years, the monitoring and reporting data shall be accounted under the first calendar year concerned.

"reporting period" in MEPC.282(70) for a voyage that extends across the data reporting period, the tank reading should occur by tank monitoring at the ports of departure and arrival of the voyage and by statistical methods such as rolling average using voyage days.

1.4.1.16 " ship at berth" means a ship which is securely moored or anchored in a port falling under the jurisdiction of a Member State while it is loading, unloading or hoteling, including the time spent when not engaged in cargo operations.

1.4.1.17 "ice class" means the notation assigned to the ship by the competent national authorities of the flag state or an organization recognized by that state, showing that the ship has been designed for navigation in sea-ice conditions.

1.4.1.18 "site", for the purposes of assessing the monitoring plan or verifying the emissions report of a ship, means a location where the monitoring process is defined and managed, including locations where relevant data and information are controlled and stored.

1.4.1.19 "shipping MRV auditor" means an individual member of a verification team responsible for assessing a monitoring plan or verifying an emissions report.

1.4.1.20 "independent reviewer" means a person assigned by the verifier specifically to carry out internal review activities, who belongs to the same entity but has not carried out any of the verification activities subject to review.

1.4.1.21 "technical expert" means a person who provides detailed knowledge and expertise on a specific matter as required for the performance of verification activities.

1.4.1.22 "Distance travelled" means distance travelled over ground.

1.4.2 Abbreviations

1.4.2.1 MRV - Monitoring, reporting and verification

1.4.2.2 EU - European Union

1.4.2.3 IMO - International Maritime Organization

1.4.2.4 MEPC - Marine Environment Protection Committee

1.4.2.5 EEDI - Energy Efficiency Design Index

1.4.2.6 SEEMP - Ship Energy Efficiency Management Plan

Chapter II Content and requirements of the monitoring plan

2.1 General requirements

2.1.1 Principles of preparation

2.1.1.1 During the preparation of a monitoring plan, the company shall ensure the integrity, accuracy and suitability of the monitoring plan and guarantee that the plan complies with the requirements of MRV regulation, and/or the amendments to MARPOL Annex VI and any other related guidelines as appropriate.

2.1.2 The monitoring plan shall be prepared based on the template in 2.3 of the Guideline according to the actual ship conditions.

2.1.3 The monitoring plan shall be at least in English or provided with English translation.

2.1.4 The monitoring plan may be split into a company-specific part and a ship-specific part, provide that all elements set out in the template. The information contained in the company-specific part may include Table B.2, B.5, D, E and F.1 and shall be applicable to all ships of the company which need to comply with the regulation.

2.2 Content of the monitoring plan

The monitoring plan shall at least consist of following elements according to the related requirements:

2.2.1 the identification and type of the ship, including its name, its IMO identification number, its port of registry or home port, and the name of the shipowner;

the name of the company and the address, telephone and e-mail details of a contact person;

2.2.2 A description of the following CO_2 emission sources on board the ship: main engines, auxiliary engines, gas turbines, boilers and inert gas generators, and the fuel types used;

2.2.3 A description of the procedures, systems and responsibilities used to update the full list of CO_2 emission sources over the reporting period;

2.2.4 A description of the procedures used to monitor the completeness of the list of voyages;

2.2.5 A description of procedures for monitoring the fuel consumption of the ship, including:

2.2.5.1 The method chosen from among those set out in EU Regulation/Resolution MEPC.282(70) for calculating the fuel consumption of each CO_2 emission source, including, where applicable, a description of the measuring devices used;

2.2.5.2 The procedures for measurement of fuel uplifts and fuel in tanks, a description of the measuring equipment used and the procedures for recording, retrieving, transmitting and storing information regarding measurements, as applicable;

2.2.5.3 The method chosen for the determination of density, where applicable;

2.2.5.4 A procedures to ensure that the total uncertainty of fuel measurements is consistent with the requirements of these regulations, where possible referring to national laws, clauses in customer contracts or fuel supplier accuracy;

2.2.6 The single emission factors used for each fuel type, or in the case of alternative fuels, the methodologies for determining the emission factors, including the methodology for sampling, methods of analysis and a description of the laboratories used, with the ISO 17025 accreditation of those laboratories, if any;

2.2.7 A description of the procedures used for determining the activity data per voyage, including:

2.2.7.1 The procedures, responsibilities and data sources for determining and recording the distance;

2.2.7.2 The procedures, responsibilities, formulae and data sources for determining and recording the number of passengers and cargo carried, as applicable;

2.2.7.3 The procedures, responsibilities, formulae and data sources for determining and recording the time spent at sea between the port of departure and the port of arrival;

2.2.8 A description of the method to be used to determine surrogate data for closing the data gaps;

2.2.9 A revision record sheet to record all the details of the revision history.

2.2.10 In addition, according to the requirements of MEPC.282(70), the ship fuel oil consumption data collection plan shall also include the following items,

2.2.10.1 A description of the following CO2 emission sources on board the ship which include but not limited to main engines, auxiliary engines, gas turbines, boilers and inert gas generators, and the fuel types used;

2.2.10.2 A description of the processes that will be used to report the data to the Administration;

2.3 Template for the monitoring plan

The template below is taken from the commission implementing regulation (EU) 2016/1927, and companies are encouraged to use this template for both EU MRV and IMO MARPOL Annex VI amendments (SEEMP – PART II <Fuel Oil Consumption Data Collection Plan> purposes.

The general description of each content in the sample:

Tittle	Guidance	Example
Reference to existing procedure	Enter the name of the manual, the chapter and paragraph	Office Operations Manual, Chapter 7.2.1
Version of existing procedures	Use version or data of the doc	Version 2
Description of procedure (if applicable)	Describe the procedures or leave empty if a reference is mad above	See procedure on Guidance on fuel oil monitoring
Name of person or position responsible for this procedure	Based on the official organogram	Operational manager, HSQE manager, Master, etc.
Location where records are kept	Ref to the company address and department or onboard(master's office)	Company's Office/Technical Department Files
Name of IT system used	Use name, version and module of the system used within procedure, as per IT system provider manual. For internal system specify characteristics for identification.	Software X, Module: vessel management
Data source	Enter the source from where the data is collected	Noon Report, Oil Record Book, BDN, GPS etc.

Part A Revision record sheet

Version No	Reference date	Status at reference date[1]	Reference to Chapters where revisions or modifications have been made, including a brief explanation of changes

[1] Select one of the following categories: 'Working draft', 'Final draft submitted to the verifier', 'Assessed', 'Modified without need for re-assessment'.

Part B Basic data

Table B.1. Identification of the ship

Name of the ship	
IMO identification number	
Port of registry	
Home port (if not identical with port of registry)	
Name of the shipowner	
IMO unique company and registered owner identification number	
Type of the ship[1]	
Deadweight (in metric tonnes)	
Gross Tonnage	
Net Tonnage	
Classification Society (voluntary)	
Ice class[2]	
Flag State	
Voluntary open description field for additional information about the characteristics of the ship	

Table B.2. Company information

Name of the company	
Address Line 1	
Address Line 2	
City	
State/Province/Region	
Postcode/ZIP	
Country	

[1] Select one of the following categories: 'Passenger ship', 'Ro-ro ship', 'Container ship', 'Oil tanker', 'Chemical tanker', 'LNG carrier', 'Gas carrier' , 'Bulk carrier', 'General cargo ship', 'Refrigerated cargo ship', 'Vehicle carrier', 'Combination carrier', 'Ro-pax ship', 'Container/ro-ro cargo ship', 'Other ship types'.
[2] Select one of the Polar Classes PC1 - PC7.

Contact person	
Telephone number	
Email address	

Table B.3. Emission sources and fuel types used

Please list all the following emission sources used for the ship in detail (if applicable): main engines, auxiliary engines, gas turbines, boilers and inert gas generators.

Emission source reference No.	Emission source (name)	Type	Technical description of emission source (performance/power, specific fuel oil consumption (SFOC), year of installation, identification number in case of multiple identical emission sources, etc.)	(Potential) Fuel types used[1]

Example as follow:

Emission source reference No.	Emission source (name)	Type	Technical description of emission source (performance/power, specific fuel oil consumption (SFOC), year of installation, identification number in case of multiple identical emission sources, etc.)	(Potential) Fuel types used[2]
1	Main Engine	Hitachi Zosen Type MAN B & W 6S60MC Mk6	Serial No: 3896 Year of Installation: 2001 Rated Power (MCR): 10750 kW @ 99 RPM SFOC (MCR): 172 g/ kWh	HFO LFO MGO
2	Auxiliary Engine	HYUNDAI-HIMSEN 6H21/32	Serial No: BA5832-1 Year of Installation: 2016 Rated Power (MCR): 1200kW @900RPM SFOC: 195g/kWh	HFO LFO MDO MGO
3	Inert Gas Generator	WARTSILA MOSS AS	Serial No: n/a Year of Installation: 2016 Performance: 4500 Nm3/hr SFOC: 333 kg/hr	MDO MGO

[1] Select one of the following categories: 'Heavy Fuel Oil (HFO)', 'Light Fuel Oil (LFO)', 'Diesel/Gas Oil (MDO/MGO)', 'Liquefied Petroleum Gas (Propane/Butane, LPG)', 'Liquefied Natural Gas (LNG)', 'Methanol', 'Ethanol', 'Other fuel with non-standard emission factor'

[2] Select one of the following categories: 'Heavy Fuel Oil (HFO)', 'Light Fuel Oil (LFO)', 'Diesel/Gas Oil (MDO/MGO)', 'Liquefied Petroleum Gas (Propane/Butane, LPG)', 'Liquefied Natural Gas (LNG)', 'Methanol', 'Ethanol', 'Other fuel with non-standard emission factor'

Table B.4. Emission factors

Select the applicable emission factors from the table below according to the fuel types used as listed in Table B3 above.

Fuel type	IMO emission factors (in tonnes of CO_2/ tonne fuel)
Heavy Fuel Oil (Reference: ISO 8217 Grades RME through RMK)	3.114
Light Fuel Oil (Reference: ISO 8217 Grades RMA through RMD)	3.151
Diesel/Gas Oil (Reference: ISO 8217 Grades DMX through DMB)	3.206
Liquefied Petroleum Gas (Propane)	3.000
Liquefied Petroleum Gas (Butane)	3.030
Liquefied Natural Gas	2.750
Methanol	1.375
Ethanol	1.913
Other fuel with non-standard emission factor	

- ✧ All the fuel types used and corresponding emission factor in the Table B.3 should be listed;
- ✧ Recommend to delete the fuel types used and emission factors which are not applicable for the ship;

In case of use of non-standard emission factors:

Non-standard fuel	Emission factor	Methodologies for determining the emission factor (methodology for sampling, methods of analysis and a description of the laboratories used, if any)
Distillates (MGO/MDO) ISO 8217 Grades DMA through DMZ	3,206	when viscosity is within DMA to DMZ
Light fuel oil (LFO) ISO 8217 Grades RMA through RMD	3,151	when viscosity is within RMA to RMD

- ✧ Since 1 January 2015, ships have been supplied with an increased number of Ultra Low Sulphur Fuel Oils (ULSFO), for simplicity and consistency reasons, it is suggested that such new fuels should use the standard CO2 – conversion factors applied for light fuel oil 3.151, when its viscosity is within RMA to RMD grades and for distillates 3.206 when similar to DMA or DMZ grades.
- ✧ If use the non-standard emission factors in the above table (such as other synthetic fuel), the

relevant of evidence to determine the emission factor should be provided in the monitoring plan (such as the laboratory measurement record).

Table B.5 Procedures, systems and responsibilities used to update the completeness of emission sources

Title of procedure	Managing the completeness of the list of emission sources
Reference to existing procedure	
Version of existing procedure	
Description of procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

Companies should provide details about the systems, procedures and responsibilities used to track the completeness of the list of emission sources over the reporting period. For example:
Procedure: In case any change in the emission sources occur for the vessels under the company's management, the Technical Manager is responsible to fully inform the assigned Superintendent Engineer for the changes and provide them with all the necessary information. The responsible assigned Superintendent Engineer must review and update the list of the emission sources in the related Monitoring Plan(s) and in any other report and document that the Company maintains with the latest information of the emission sources on board, when applicable, in order to ensure completeness and accuracy.
Name of person or position: Assigned Superintendent Engineer/ Technical Department
Location where records are kept: The list is saved at the vessel's Monitoring Plan which isolated at the Company's Office/ Technical Department Files.

Part C Activity date

Without prejudice to the annual monitoring data (Article 10 in the Regulation (EU) 2015/757), a company shall be exempt from the obligation to monitor the information referred to in Paragraph 1, Article 9 in the Regulation (EU) 2015/757 on a per-voyage basis in respect of a specified ship, if:

(a) all of the ship's voyages during the reporting period either start from or end at a port under the jurisdiction of an EU Member State; and

(b) the ship, according to its schedule, performs more than 300 voyages during the reporting period.

Table C.1. Conditions of exemption related to Article 9 (2)

Item	Confirmation field
Minimum number of expected voyages per reporting period falling under the scope of the EU MRV Regulation according to the ship's schedule	
Are there expected voyages per reporting period not falling under the scope of the EU MRV Regulation according to the ship's schedule?[1]	

1 Select either 'Yes' or 'No'.

Conditions of Article 9 (2) fulfilled?[1]	
If yes, do you intend to make use of the derogation for monitoring the amount of fuel consumed on a per-voyage basis?[2]	

Table C.2. Monitoring of fuel consumption

C.2.1. Methods used to determine fuel consumption of each emission source:

Emission source[3]	Chosen methods for fuel consumption[4]
Example: All sources	“Method A: BDN and periodic stocktakes of fuel tanks

C.2.2. Procedures for determining fuel bunkered and fuel in tanks:

Title of procedure	Determining fuel bunkered and fuel in tanks
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

1 Select either 'Yes' or 'No’.
2 Select 'Yes', 'No' or 'Not applicable'.
3 Select one of the following categories: 'All sources', 'Main engines', Auxiliary engines', 'Gas turbines', 'Boilers' or Inert gas generators'.
4 Select one or more of the following categories: 'Method A: BDN and periodic stocktakes of fuel tanks', 'Method B: Bunker fuel tank monitoring on-board', 'Method C: Flow meters for applicable combustion processes' or 'Method D: Direct CO_2 emissions measurement'.

The procedure should contain the below content:

- ✧ Bunkering procedure (or refer to existing procedure): should describe how bunkering is performed to ensure that tanks are fueled with the agreed quantity.

  Example: Chief Engineer or other appointed crew members check all bunker tanks and complete the respective part of the “Bunker Calculation” Form. All quantities of bunkers(e.g. HFO, ULSHFO, MGO or other types of LSFOs) are recorded separately. Common practice is to receive new bunker in empty bunker tanks. If not possible, comingling of different fuel batches may happen. In general, cominglings is not favorable. The appointed Engineer Officer has to implement the bunkering plan, supervise bunkering process and ensure that bunkering procedure is followed throughout the bunkering operations. Relevant action to secure correct assessment of the bunker received:

  1） carry out a pre-bunkering survey of the bunker barge, as per shipping company/bunker suppliers agreement in order to determine exact quantity onboard together with appointed Deck Officer of the watch;

  2） check all bunker tanks;

  3） witness the completion of the ullage report (for this purpose, the co-operation of bunker barge personnel should be secured);

  4） sign and obtain a copy of completed ullage report, the copy should be attached to the Bunker Receipt Form；

  5） inform Master and request approval to start receiving bunkers when both quantity i.e. own vessel and bunker barge have been completed;

  6） upon completion of the bunkering, the Master and the Chief Engineer should arrange for a post bunkering survey (own vessel and bunker barge) similarly as with the “pre-bunkering survey procedures” above;

  7） the Chief Engineer reviews the BDN and declaration of compliance with MARPOL Annex VI, presented by the bunker barge;

  8） during the review, Chief Engineer compares received quality and quantity against the Company’s bunkering information i.e. ordered regarding quality and quantity;

  9） both the Chief Engineer and the Master should sign for acceptance the Bunker Delivery Note issued by the bunker barge only if the agree with the figures received;

  Upon completion of each bunkering, the following documentation is to be submitted to company::

  1） Bunker Report Form;

  2） Bunker Quantity Calculation Form;

  3） Bunkering sample registration and consumption log Form;

  4） Bunkering pre-loading plan Form;

  5） Letter of Protest, if applicable;

  6） Ship-Barge Safety Checklist;

The Chief Engineer should also maintain copies onboard. All relevant forms and checklists are

kept onboard for minimum 3 years. Officer in charge makes relevant entries in the Engine Log Book and in the Oil Record Book.

✧ Fuel oil consumption monitoring procedure（or refer to existing procedure）: should describe how fuel consumption is monitored in a consistent and accurate manner.

1） Fuel oil consumption monitoring procedure should contain the applicable requirements in below and clearly state the frequency and the time of measurement and the formula used for calculation:

Method A: BDN and periodic stocktakes of fuel tanks, the method shall not be used especially when the cargo is used as a fuel.

a) At the beginning of the period(within the port), the fuel oil measurement should be done when bunkering and de-bunkering, arrival at the port (the first berth (anchoring or mooring)), departure from the port (the last berth(anchoring or mooring)).

b) The trim, heel and temperature should be recorded except the liquid level of oil tanks and temperature inside the oil tanks when measurement, so that the correction will be done according to the sounding table.

c) The calculation method for each type of fuel oil as follow:

- The fuel oil consumption at sea for each voyage = stocktakes of fuel tanks when departure + Bunking during voyage BDN (if applicable) – stocktake of fuel tanks when arrival – de-bunkering(if applicable)
- The fuel oil consumption within the port for each voyage = stocktakes of fuel oil when arrival + bunkering within the port (BDN,if applicable) – stocktakes of fuel oil when departure – de-bunkering (if applicable)
- The total fuel oil consumption in the whole of reporting period =Σ the fuel oil consumption at sea+ Σ the fuel oil consumption within the port

d) The amount of de-bunkering is based on the record of oil record book.

Method B:Bunker fuel tank monitoring on-board:

a) At the beginning of the period(within the port), the fuel oil measurement should be done when bunkering and de-bunkering, arrival at the port (the first berth (anchoring or mooring)), departure from the port (the last berth(anchoring or mooring)), and the daily measurement (at 1200) when sailing, and the measurement should done before entrance/exist from SECA(if fuel oil transfer happened);

b) The trim, heel and temperature should be recorded except the liquid level of oil tanks and temperature inside the oil tanks when measurement, so that the correction will be done according to the sounding table.

c) The calculation method for each type of fuel oil as follow:

- The fuel oil consumption amount of each voyage at sea = from departure to arrival Σdaily fuel oil consumption
- The fuel oil consumption amount within the port = the sum of fuel oil consumption from departure to arrival

Method C:Flow meters for applicable combustion processes:

a) The measurement can be done when arrival and departure; or arrival, departure and daily measurement at sea, when use the mass flow meters;

- The fuel oil consumption amount of each voyage at sea = the reading when arrival – the reading when departure
- The fuel oil consumption amount of each voyage within port = the reading of departure – the reading of arrival

b) When the volume flow meter used, the density under corresponding temperature should be multiplied;

c) The calibration and maintenance of the flow meters should kept onboard.

Method D:Direct CO2 emissions measurement

a) The measurement can be done when arrival and departure or when arrival, departure and daily measurement.

- The fuel oil consumption amount of each voyage at sea = (the reading when arrival – the reading when departure)/CF
- The fuel oil consumption amount within the port = (the reading of departure – the reading of arrival) /CF

2) The volume correction of fuel oil:

According to the sounding of oil tanks, the volume of fuel oil is the result after correction and calculation under measured temperature according to the sounding table, that should be corrected according to: ASTM D 1250-80 standard table 54B or GB/T1885-1998 or ISO91-1 and so on.

3) LNG consumption – onboard monitoring of BoG:

The BoG can be measured by calculating the total LNG consumed for a voyage by custody transfer measurement system (CTMS) or by flow meter (onboard). CTS systems are the predominant system available for all LNG carriers. They are used for determining the amount of cargo loaded or discharged and they have universally accepted with commercial relevance and are typically third-party verified.

a) Calculation BoG quantity by CTMS

Cargo consumed on the passage is calculated by using the “CTMS closing”(final volume onboard at the loading terminal upon completion of loading) and “CTMS opening” (total volume upon arrival at the discharge terminal just before commencement of discharging) figures. CTMS measures the volume of cargo in the tanks and further calculations convert the volume to weight / mass at the reference temperature. Therefore, the BoG is calculated as the difference between “CTMS closing” figure at the loading port and the “CTMS opening” figure at the discharging port.

b) Calculation BoG quantity by flow meter

If it is chosen to measure the BoG with flow meters instead of measuring through the CTMS, the BoG is measured either in volume and then converted to mass using appropriate density, pressure and temperature correction or measured directly in

mass (coriolis type flow meters)

In cases where the BoG is measured via onboard volume flow meters, the method to convert volume to weight will decided by the company and described in the company's management procedures.

c) Shipping companies may determine the LNG vapour density for onboard flow meters using standard temperature of 15 ^{o}C and at vapour space condition <<< by the following calculation based upon ideal gas laws:

$$\rho_{vt} = \frac{T_s}{T_v} \times \frac{P_v}{P_s} \times \frac{M_m}{I} \left[\frac{kg}{m^3}\right]$$

注意:

T_s: is the standard temperature of 288 K (15°C)

T_v: is the average temperature of vapour in degrees in Kelvin

P_v: is the is absolute pressure of vapour space in bar

P_s: is the standard pressure of 1.013 bar

M_m: is the molecular mass of vapour mixture in [kg/k mol](provided from industry table or from shore)

I : is the ideal gaseous molar volume at the standard temperature(288 K) and standard pressure(1.013 bar) = 23.645 [m3/k mol]

Note: An accurate knowledge of the vapour composition in deriving Mmis not necessary and the deviation of saturated liquid gas vapours from the ideal gas laws is usally ignored.

C.2.3. Regular cross-checks between bunkering quantity as provided by BDN and bunkering quantity indicated by on-board measurement:

Title of procedure	Regular cross-checks between bunkering quantity as provided by BDNs and bunkering quantity indicated by on-board measurement
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	

✧ The procedure should describe how the company cross-checks the bunkering quantity between onboard measurements vs. the quantity provided by the supplier as displayed on the BDNs. For example, the Chief Engineer performs cross-checks between the sounding readings and the Bunker Delivery Note(s), every time upon completion of the bunkering

operations. The quantity and receipt number of the Bunker Delivery Note(s) are recorded into the Sounding Form located onboard.

Note: the Chief Engineer should issue a Letter of Protest in the following situations, but not limited to:

- shortage of bunker delivered;
- quality issues (e.g. failure of fulfilling ISO specification);
- slow pumping rate;
- ship's fuel sample not signed by the supplier;
- lack of co-operation from bunker barge personnel to conduct mutual ullage inspection.

C.2.4. Description of the measurement instruments involved:

Measurement equipment (name)	Elements applied to (e.g. emission sources, tanks)	Technical description (specification, age, maintenance intervals)
Name of manufacture, Type(sounding tape, flowmeter, CO2 sensor), Model	Main Engine	Date of Installation, Reference to manufacture specifications, Calibrations and interval standards used.

✧ Companies should insert the name of the measurement instrument (i.e. tank sounding, flowmeter) involved (relevant to method A, B, C, D), the sources used along with the technical characteristics.

C.2.5. Procedures for recording, retrieving, transmitting and storing information regarding measurements:

Title of procedure	Recording, retrieving, transmitting and storing information regarding measurements
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Companies should describe the whole process of how data information related to fuel is recorded, retrieved, transmitted and stored, data flow diagrams can be provided, for example: Recording and retrieving: the Chief Engineer responsible for recording fuel measurement performing manually daily tank soundings, Chief Engineer then informs the Master who is responsible for retrieving these values and entering them into the X system in order to be

transmitted to shore.

Transmitting and Storing: the exchange of information or “transmitting” regarding fuel measure for all CO_2 emissions sources installed onboard, is governed by internal procedure (reference) sets clearly the steps which need to be followed: four types of reports (arrival, departure, noon and port) are sent from the Master through the system X to the Technical and Operations departments onshore each with specific values on the fuel consumed per CO_2 emission source at specific time intervals.

C.2.6. Method for determination of density:

Fuel type/tank	Method to determine actual density values of fuel bunkered[1]	Method to determine actual density values of fuel in tanks[2]

✧ In the case where the amount of fuel bunkered or the amount of fuel remaining in the tanks is determined in units of volume or is measured through a volume flow meter, the company should convert that amount from volume to mass by using actual density values by using one of the following options:

a) onboard measurement systems;

b) the density measured by the fuel supplier at fuel bunkering and recorded on the fuel invoice or BDN;

c) the density measured in a test analysis conducted in an accredited fuel test laboratory.

ASTM D 1250-80 Standard Guide for Petroleum Measurement, table 54B, or equivalent tables or a substantiated software for temperature and atmospheric pressure corrections of density and mass calculation should be used. As an alternative to above – volume to mass conversion – may be done using standard conversion factors, the company may use bespoke conversion factors for the entire reporting period subject to criteria for establishing these have met the agreement of ISC.

0.96 ： RME180, RMG 180/380/500/700 or RMK 380/500/700

0.88 ： MGO/MDO

✧ Density for commingled bunkers:

When there are 2 types of fuel (or more) mixed and stored in one fuel tank then density volume to mass conversion factor of the fuel tank of the mixed oil should be calculated as per the below mentioned formula:

$$\frac{\text{`A` fuel volume x Density (A)} + \text{`B` fuel volume x Density (B)}}{\text{`A` fuel volume} + \text{`B` fuel volume}} = \text{mixed fuel Density}$$

✧ Density for blended fuels:

In the rare event that fuel types with different densities are blended in a tank, the weighted average density should be determined, unless a density analysis of the mixed fuel sample is

1 Select one of the following categories: 'On-board measurement equipment', 'Fuel supplier' or 'Laboratory test'.
2 Select one of the following categories: 'Measurement equipment', 'Fuel supplier', 'Laboratory test'.

available:

$$\rho_w = \rho_{add} \times \frac{m_{add}}{m_{total}} + \rho_{exist} \times \frac{m_{exist}}{m_{total}}$$

Remark::

ρ_w : is the weighted average density of fuel in the tank after additions[t/m^3]

ρ_{add} : is the density of the fuel added to the tank[t/m^3]

m_{add} : is the amount of fuel added to the tank[t]

m_{total} : is the total amount of fuel in the tank after addition[t]

ρ_{exist} : is the density of the existing fuel in the tank before addition[t/m^3]

m_{exist} : is the existing amount of fuel in the tank before addition[t]

C.2.7. Level of uncertainty associated with fuel monitoring:

Monitoring method[9]	Approach used[1]	Value

✧ The overall uncertainty level should be described as follow as recommended in the Best Pratice:

Monitoring Method	Overall max uncertainty level
Method A)	± 10%
Method B)	± 10%
Method C)	± 10%

✧ In case the uncertainty will be determined in more details, the combined uncertainty should be calculated by using the following formula:

$$u_c(V) = \sqrt{u(V, bunkering)^2 + u(V, density)^2 + u(\dots)^2 + \cdots}$$

C.2.8. Procedures for ensuring quality assurance of measuring equipment:

Title of procedure	Ensuring quality assurance of measuring equipment
Reference to existing procedure	

9 Select one or more of the following categories: 'Method A: BDN and periodic stocktakes of fuel tanks', 'Method B: Bunker fuel tank monitoring on-board', 'Method C: Flow meters for applicable combustion processes' or 'Method D: Direct CO2 emissions measurement'
12 Select one of the following categories: 'Default value' or 'Ship specific estimate'.

Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

- ✧ Companies should describe in the Monitoring Plan the procedures with regards the effective functioning of relevant measuring equipment (calibration; malfunctions, repairs; accuracy, determining reference figures and comparative measurements). Measuring equipment manuals, technical datasheets, and certificates can be used as a reference. Often companies include this procedure within the Planned Maintenance System. Form includes but not limited to Calibration status report or instrument calibration record.
- ✧ Moreover, training and familiarization of personnel with the measuring equipment can also be used as procedure.

  Example (in case of manual sounding): before performing a sounding, the Chief Engineer or the crew member assigned by the Chief Engineer to perform the sounding, should make sure that: the sounding tape to be used is of sufficient length for the height of the tank to be gauged. The sounding tape is graduated in feet, inches, and fractions of an inch; feet and hundredths of a foot; or meters, centimeters, and millimeters. Making are visible. The sounding tape is not kinked or spliced. In case any of the above does not hold, then the sounding tape should be discarded and a sounding tape fulfilling the criteria above should be used.

  Example (in case of flow meters): the quality of measuring equipment is supported by the fact that company performs maintenance and calibration of flow meters according to the manufacturer's specifications and if not feasible by the operating experience. This is outlined in the company's Planned Maintenance System (PMS) which describes clearly the procedure and the roles of doing so. Additionally the technical department checks periodically the output of the flowmeter to ensure that works properly. If a flow meter malfunctions, then the chief engineer informs the technical department and all the necessary steps are followed to immediate replace it.

C.2.9. Method for determining the split of fuel consumption into freight and passenger part (for ro-pax ships only):

Title of method	Determining the split of fuel consumption into freight and passenger part
Applied allocation method according to EN 16258[1]	
Description of method to determine the mass of freight	

1 Select either 'Mass method' or 'Area method'.

and passengers including the possible use of default values for the weight of cargo units/ lane meters (if mass method is used)	
Description of method to determine the deck area assigned to freight and passengers including the consideration of hanging decks and of passenger cars on freight decks (if area method is used)	
Split of fuel consumption into freight and passenger part (if area method is used only)	
Name of person or position responsible for this method	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

- ✧ Method for determining the split of fuel consumption could use either “Mass method” or “Area method”, reference to EN 16258, requirements as below:

  a) The mass method is based on operational transport statistics on total cargo gross mass (vehicles + cargo) and total passenger mass (passenger, luggage and accompanied vehicles), included transported entities shall be clearly specified per ship/fleet or route(s).

  Calculation of the mass should be based on:

  - number of passengers
  - number of accompanied cars
  - number of accompanied caravans/mobile homes etc.
  - number of accompanied buses
  - total mass of cargo being carried, including an packaging, container, and means of handing or means of transport like trailers and vehicles.

  b) The area method is based on 100% area capacity according to valid general arrangement plan. Including areas are: accessible vehicle decks area, including hanging decks; accessible passenger decks area. Areas not in use for passengers and cargo, such as bridge, engine are, crew area, galley and other service areas, are excluded. Whole passenger deck area shall be allocated to passengers. Vehicle deck area shall be allocated according to the ratio between passenger vehicles and freight vehicles including their cargo. This ratio shall be based on their real or default mass or length.

- ✧ If “Mass method” is selected, the mass of the cargo may be much larger than that of the passengers, which yields a larger proportion of the cargo fuel consumption; conversely, if “Area method” is selected, the area occupied by passengers is much larger than that of the cargo, which yields a larger proportion of the passenger fuel consumption;
- ✧ Since there tend to be obvious gaps between the two allocation methods, consistency of the use of one of the method is required. It is also of importance that same allocation method shall be used when comparing two ships of the same type;
- ✧ Reference to EN16258 B.4, default values for mass, length, and width presented in below

Table may be used for both methods. Mass of vehicles in below Table does not include mass of transported passenger and/or cargo. For freight, mass of cargo shall be added to the values in below Table, where using mass for allocation;

Default values for mass and lengths

NOTE These values are based on statistic from ferry lines.

	Mass (kg)	Length (m)	Width (m)
Passenger and luggage	100	not applicable	not applicable
Passenger car	1500	6	3,1
Bus	15000	12	3,1
Caravan (small)	1000	3	3,1
Caravan (medium)	2000	6	3,1
Caravan (large)	2500	10	3,1
Mobile home	3500	8	3,1
Motorcyle	200	1,5	3,1
Unaccompanied trailer	8000	14	3,1
Accompanied / articulated trailer (Semi / mega trailer plus tractor unit)	16000	17	3,1
Road Train Continent	18500	19	3,1
Road Train Scandinavia	20000	24,5	3,1

C.2.10 Procedures for determining and recording the fuel consumption on laden voyages (voluntary monitoring):

Title of procedure	Determining and recording the fuel consumption on laden voyages
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

C.2.11 Procedures for determining and recording the fuel consumption for cargo heating (voluntary monitoring for chemical tankers):

Title of procedure	Determining and recording the fuel consumption for cargo heating
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

C.2.12. Procedures for determining and recording the fuel consumption for dynamic positioning (voluntary monitoring for oil tankers and 'other ship types'):

Title of procedure	Determining and recording the fuel consumption for dynamic positioning
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	

Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

Table C.3. List of voyages

Title of procedure	Recording and safeguarding completeness of voyages
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Data sources	
Location where records are kept	
Name of IT system used (where applicable)	

- ✧ How to divide the voyage correctly is the important aspect to ensure the quality of monitoring data and avoid material misstatement.
- ✧ The start of voyage is from the time when the ship left the last berth at loading/unloading port. If the port is as the last berth, the departure time is when detaching the last anchoring rope; the anchoring lift time is the departure time, if the last berth is anchor area within port. The arrival time to get in the next berth of loading/unloading port is the end of the voyage. If the first berth is the anchor are within the port, the anchoring time is the arrival time; if the berth is the port, the arrival time is the time when first rope sending out.
- ✧ Stops for the sole purposes of refueling, obtaining supplies, relieving the crew, going into dry-dock or making repairs to the ship and/or its equipment, that is not the start/end of the voyage, because no any load/unload cargo or embark/disembark passengers.
- ✧ Ship to Ship Transfer within port area should be considered as a port of call. That should be the start of the voyage, if it is the last berth of departure port (which should be the end of the voyage, if that is the first berth of arrival port). The fuel oil consumption needs to consider when calculating the fuel oil consumption within the port, the distance between this point and anchor area within the port/berth needs to consider as movement within the port, not calculating as distance travelled.
- ✧ Ship to Ship Transfer outside of port area of port of call should be considered as part of voyage, which should not be considered as start/end of the voyage. The fuel oil consumption needs to consider when calculating fuel oil consumption during voyage, if anchoring, the time

should be deleted from time spent at sea, the distance from this point to anchor area within the port/berth needs to consider when calculating distance travelled, cargo carried needs consider when calculating the average cargo carried during the whole of voyage before/after loading/unloading.在

Cargo carried of the voyage = (the distance travelled before loading/unloading x the cargo carried before loading/unloading + the distance travelled after loading/unloading x cargo carried after loading/unloading) / the total distance travelled.

- ✧ Anchoring outside of port area should not be treated as start/end of the voyage, the fuel oil consumption of which needs to consider when calculating fuel oil consumption during voyage, anchoring time should be deleted from time spent at sea, the distance from this point to anchor area within the port/berth needs to consider when calculating distance travelled,
- ✧ Anchoring within the port area should be treated as start/end of the voyage. That should be the start of the voyage, if it is the last berth of departure port (which should be the end of the voyage, if that is the first berth of arrival port). the fuel oil consumption of which needs to consider when calculating fuel oil consumption within the port, the distance from this point to anchor area within the port/berth needs to consider as movement within the port, should not be considered when calculating distance travelled,
- ✧ The drifting should be considered as part of voyage if happening prior to arrival at port of call or after departure from port of call, the fuel consumption should be monitored in the voyage, the drifting time should be considered as time spent at sea, the distance should be considered as distance travelled.
- ✧ The tank cleaning should be considered as part of voyage if happening prior to arrival at port of call or after departure from port of call. CO2 emission from movements to tank cleaning between the arrival at por of call and the departure from port of call (in the EEA) are considered as part of “CO2 emissions within EEA ports”.
- ✧ In order to understand the key points sufficiently of voyage, take the example as follow:

Example of voyages (Greenwich time (GMT), 8 hours later than Beijing time), the ship XXX berthed at the terminal of Ningbo Port for loading on 29th December 2017, the loading work was finished and she departed from the berth at 16:00 on 2nd January 2018, and arrived at the anchorage of Ningbo Port for anchoring at 20:00 on the same day, she was unmoored for sailing at 06:00 on 13th January 2018, she arrived at the anchorage at Singapore Port for anchoring and uplift fuel at 10:00 and then be unmoored for sailing at 18:00.on 18th January 2018, she arrived at the anchorage of Rome Port in Italy for anchoring at 15:00 on 25th January 2018, she was unmoored and departed for Rome Port for unloading at 11:00 on 16th February 2018, the unloading work was finished and she sailed to the anchorage of Rome Port for anchoring at 1530 on 18th February 2018, she was unmoored for sailing at 07:00 on 19th February 2018, she arrived at the anchorage at Greece Port by 11:00 on 21st February 2018, the loading work was finished and she departed at 12:00 on 24th February 2018, she arrived at the terminal of Shanghai Port anchorage at 17:00 on 6th March 2018, and moved to Shanghai Port for unloading at 1000 on 25th March 2018, she departed from the berth at 07:00 on 29th March 2018, she arrived at the anchorage of Hong Kong Port for berthing then sailed to the port for loading at 08:00 on 1st April 2018.

Voyage List of M.V XXX in the year of 2018 (The example is taken for the ship that trades in both EU and non EU ports)

VOY NO.	Port of Dep.	Time of Dep.(GMT)	Port of Arr.	Time of Arr.(GMT)	Status of Voy. at Sea	Status of Voy. Within port
Within port	Ningbo	2018/1/13 0600	Ningbo	20171229 1000		Non EU
Voy201801	Ningbo	2018/1/13 0600	Rome	2018/1/25 1500	To EU	
Within port	Rome	2018/2/19 0700	Rome	2018/1/25 1500		EU
Voy201802	Rome	2018/2/19 0700	Athens	2018/2/21 1100	Within EU	
Within port	Athens	2018/2/24 1200	Athens	2018/2/21 1100		EU
Voy201803	Athens	2018/2/24 1200	Shanghai	2018/3/6 1700	From EU	
Within port	Shanghai	2018/3/29 0700	Shanghai	2018/3/6 1700		Non EU
Voy201804	Shanghai	2018/3/29 0700	Hong Kong	2018/4/01 0800	Non EU	

Table C.4. Distance travelled

Title of procedure	Recording and determining the distance per voyage made
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures (including recording and managing distance information) if not already existing outside the MP	
Name of person or position responsible for this procedure	
Data sources	
Location where records are kept	
Name of IT system used (where applicable)	

✧ As explained in the best practices document on monitoring and reporting, distance travelled is determined as distance over ground. Should the vessel be adrift (i.e. malfunction on main engine) the distance should be included as the vessel is underway. The start to calculate distance travelled is the start of the voyage,(departure from the last berth of port of call), the end to calculate distance travelled is the end of the voyage (arrive at the first berth of port of call). The movement within the port is not included.

Distance travelled = real distance travelled; or

Distance travelled = the distance of the most direct route between the port of departure and the port of arrival x conservative correction factor (ensure that the distance travelled is not significantly underestimated)

Example:

The distance travelled may be calculated by the two Electronic Chart Display and

Information System (ECDIS) which are installed onboard per vessel and connected with two GPS apparatus. The master reports distance travelled through the daily message(departure/noon/arrival) and records distance travel on the Log Book.

Procedures for determining and recording the distance travelled when navigating through ice (voluntary monitoring):

Title of procedure	Determining and recording the distance travelled when navigating through ice
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures (including recording and managing distance and winter conditions information) if not already existing outside the MP	
Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

Table C.5. Amount of cargo carried & number of passengers

Title of procedure	Recording and determining the amount of cargo carried and/ or the number of passengers
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures (including recording and determining the amount of cargo carried and/or the number of passengers and the use of default values for the mass of cargo units, if applicable) if not already existing outside the MP	
Unit of cargo/passengers[14]	
Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

[14] For passenger ships, the 'Unit of cargo/passengers' shall be specified as 'passengers'.

For ro-ro ships, container ships, oil tankers, chemical tankers, gas carriers, bulk carriers, refrigerated cargo ships, combination carriers, the 'Unit of cargo/passengers' shall be specified as 'tonnes'.
For LNG carriers, container/ro-ro cargo ships, the 'Unit of cargo/passengers' shall be specified as 'cubic metres'.
For general cargo ships, the 'Unit of cargo/passengers' shall be specified by selecting one of the following categories: 'tonnes of deadweight carried', 'tonnes of deadweight carried and tonnes'.
For vehicle carriers, the 'Unit of cargo/passengers' shall be specified by selecting one of the following categories: 'tonnes', 'tonnes and tonnes of deadweight carried'.
For ro-pax ships, the 'Unit of cargo/passengers' shall be specified as 'tonnes' and as 'passengers'.
For other ship types, the 'Unit of cargo/passengers' shall be specified by selecting one of the following categories: 'tonnes', 'tonnes of deadweight carried'.

- ✧ Company will be requested to provided information on how the amount of cargo carried will be complied and calculated. The determination of cargo carried should be kept consistent in the entire of reporting period. Cargo carried can be recorded and retrieved in different ways and should all be described in the monitoring plan. Company will be asked to provide details about the procedures, responsibilities and data sources for determining and recording the cargo carried.

  Example(Tanker)

  Procedure: Before loading, the Chief Officer performs ullage measurements using portable instrument (which are certified and annually inspected). A second ullage measurement is performed again upon completion of loading. Ullage measurements on all cargo tanks are converted from volume to mass of cargo through utilization of density. Cargo calculation reports are then cross checked by the Captain with the Bill of Lading(B/L). Loading takes place always at the presence of a Cargo Surveyor (who can be from the supplier's side when loading or buyer's side when unloading). As a control, a second measurement can be obtained from electronic cargo tank soundings which are conducted by the Chief Officer before and after loading. Further cross-check is performed between cargo tank electronic readings and ullage measurements.
- ✧ Parameters to determine the "cargo carried" per ship category:
  - for passenger ships, the number of passengers shall be used to express cargo carried.
  - For ro-ro ships, vehicle carriers, ro-pax ships: ro-ro ships and vehicle-carrier, the mass of the cargo onboard shall be used to express cargo carried, the ro-pax ships, the number of passengers and the mass of the cargo onboard should be used to express cargo carried. The mass of cargo carried can be determined by below methods:
    a) the actual mass (t); or
    b) the occupied lane-meters(one lan-meters = 2m2) multiplied by default values for their weight; or
    c) the number of cargo units multiplied by their default weight.

    When use method b) or c) to determine the amount of cargo carried, the company should state the default weight in the monitoring plan, the relevant default values have to be representative for the trade in which the vessel is intended to trade and the so applied default value(s) have to be substantiated by the company to the satisfaction of ISC. Such substantiation can be:
    - ➢ pas performance
    - ➢ on the performance of a vessel serving the same trade
    - ➢ based on the company's estimated use for the coming period
    - ➢ based on another method that satisfies the verifier

    The so declared default weights have to remain unchanged for the reporting period unless the monitoring plan is revised to reflect a fundamental change to the average weights per lanemeter or per unit during a reporting period.

The passenger vehicle units loaded in the area allocated to passenger vehicles (which

included in the area allocated) must not be included in the calculation of cargo mass.
In addition, on a voluntary basis, for vehicle carriers, cargo carried may also be determined as deadweight carried as deadweight carried for laden voyages (and zero for ballast voyages).
DWT carried = volume displacement x water density – ship's lightweight – fuel weight

- Container ships: the actual cargo weight or number of 20-foot equivalent units(TEU) multiplied by default values for their weight to determine the amount of cargo carried. If the actual cargo weight used to determine the cargo carried, the actual cargo weight shall be determined reference to MSC.1/Circ/1475). If use another way to determine cargo carried, the default value should be stated clearly in the monitoring plan, the default weights as noted below is recommended:

Container Size	TEU Conversion factor (TE equivalents)	Default weight empty containers (in tonnes)	Default container weights (in tonnes)
20' ST TEU 8'6'' PLUS 20' High Cube (HC)	1.0	2	12
40' ST FFE 8'6'' (forty-foot equivalent unit)	2.0	4	24
40' High Cube (FFE9'6'') plus 45' and 48'	2.25	4.5	27

- For bulk carriers, oil tankers, chemical tankers, gas carriers, refrigerated cargo ships, combination carriers: the actual mass of the cargo onboard
- For LNG carriers, as the volume of the cargo on discharge, or if the cargo is discharged at several during a voyage, the sum of the cargo discharged during a voyage and the cargo discharged at all subsequent ports of call until new cargo is loaded.

Example: LNG Carried XXX loading at A port, unloading X m3 after arrival of B port, then traveled to next port C and unloading Y m3, then back to A port without any unloading, the cargo carried for A-B voyage is X+Y, the cargo carried for B-C voyage is Y, the cargo carried for C-A voyage is 0.

- for general cargo ships in EU MRV regulation, excluding livestock carrier, barge carrier, heavy load carrier, yacht carrier and nuclear fuel carrier. The cargo carried use the definition in 1.4.1.18 as deadweight carried for laden voyages and as zero for ballast voyage. The calculation formula as follow:

  DWT carried = volume displacement x water density – ship's lightweight – fuel weight

- for container/ro-ro cargo ships: the volume of the cargo onboard to determine the cargo carried, the determination method is as follow:

Cars, trailers, trucks and other standard units multiplied by a default area and by the height of the deck (the distance between the floor and the structural beam), of the number of occupied lane-meters multiplied by the height of deck (for other ro-ro cargo) and of the number TEUs

multiplied by 38.3 m^3.

- for other ship types: the actual mass of cargo carried, or use the definition in 1.4.1.18 as deadweight carried for laden voyages and as zero for ballast voyage. The calculation formula as follow:

  DWT carried = volume displacement x water density – ship's lightweight – fuel weight

Procedures for determining and recording the average density of the cargoes transported (voluntary monitoring for chemical tankers, bulk carriers and combination carriers):

Title of procedure	Determining and recording the average density of the cargoes transported
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures (including recording and managing cargo density information) if not already existing outside the MP	
Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

Table C.6. Time spent at sea

Title of procedure	Determining and recording the time spent at sea from berth of port of departure to berth of the port of arrival
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures (including recording and managing port departure and arrival information) if not already existing outside the MP	
Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Determining and recording the time spent at sea from the arrival at the first berth and the departure of the last berth in a port, the drifting time during the voyage should be concluded in the time spent at sea, anchorage is excluded from time spent at sea.

Time spent at sea of each voyage = the time between the last berth of departure port and the

first berth of arrival port – the time of refueling, making repair or mooring (if applicable)
Example:

The Master reports the tim as per the GPS indications (or the Master Clock(s)/ local time zone or GMT) in the Deck Log Book and in the Daily Noon Reports, Arrival and Departure. Time spent at sea is calculated at the end of each voyage and recorded in the voyage documents.

Procedures for determining and recording the time spent at sea when navigating through ice (voluntary monitoring):

Title of procedure	Determining and recording the time spent at sea when navigating through ice
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures (including recording and managing port departure and arrival and winter conditions information) if not already existing outside the MP	
Name of person or position responsible for this procedure	
Formulae and data sources	
Location where records are kept	
Name of IT system used (where applicable)	

Part D Data gaps

- ✧ The risk of the occurrence of data gaps should be minimized by developing an appropriate monitoring plan. However, it is not possible to completely exclude events that require the closure of a data gap.
- ✧ There are several reasons for data gaps or estimations in order to deliver data to be used in the emission report. It can be distinguished between events that require the closure of a data gap and those that require the correction of existing data. Corrective measures can be made by using secondary data. In contrast to this, estimations have to be used for real data gaps, i.e. when no information by the applied monitoring approach is available.
- ✧ Companies will be asked to provide a brief description of the method to treat data gaps regarding the parameters other than fuel consumption (i.e. list of voyages, distance, total time spent at sea, cargo carried, number of passengers) as well as control activities to prevent missing data. This may be the case if information is missing, lost or found corrupt. It should include a back-up solution for each parameter and a formula/description of the calculation. For example, assume that a flow meter did not output values for 1 day. The Chief Engineer is responsible for noticing this data gap and applying the back-up monitoring method e.g. tank sounding. The Chief Engineer should report the failure promptly to the managing office. If for any other reason, the Chief Engineer cannot close or detect this data gap, then the shore side is responsible for closing it, by applying formulae, historic data etc.

Table D.1. Methods to be used to estimate fuel consumption

Title of method	Method to be used to estimate fuel consumption
Back-up monitoring method (A/B/C/D)[15]	

Formulae used	
Description of method to estimate fuel consumption	
Name of person or position responsible for this method	
Data sources	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Companies can select on of the four methods (A, B, C, D) or can describe a method to estimate fuel consumption which is different from the method used in Table C2.

Example using Method A: in the event of a data gap due to unexpected condition, the performance manager(shore) communicates its existence to the Chief Engineer who fills the gap once arrival established using the average of the ROB difference between arrival and departure ROBs. He then records the values as an error to the engine log book and communicates this to the Performance Manager(shore).

Example using Method B: when the related data is missing, the Chief Engineer requests to perform as soon as possible tank sounding in order to close the gap. In the case where the missing data is not immediately identified then the responsible Superintended closes the gap manually by using the average fuel consumption of the previous and the next day.

Table D.2. Methods to be used to treat data gaps regarding distance travelled

Title of method	Method to treat data gaps regarding distance travelled
Formulae used	
Description of method to treat data gaps	
Name of person or position responsible for this method	
Data sources	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Example:

In the event of a data gap related to distance traveled, while using automated/electronic chart navigation system, the master can fill the gap by means of back-up methods such as terrestrial or celestial navigation being documented in the Deck Log Book.

Table D.3. Methods to be used to treat data gaps regarding cargo carried

Title of method	Method to treat data gaps regarding cargo carried

Formulae used	
Description of method to treat data gaps	
Name of person or position responsible for this method	
Data sources	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Example (bulk carrier)）

In the event of a cargo related document been lost and therefore the occurrence of a一旦data gap, then the Master can report values from other cargo related documents such as Bill of Lading, Mate Receipt or Statement of Facts.

If the total transported cargo cannot be ascertained otherwise, the draft readings may如be used to estimate it. From the drafts, the total displacement of the ship is calculated (basis the hydrostatic properties included in the stability booklet or loading computer). By subtracting the Light Weight of the ship, the content in all tanks, as well as consumables, provisions, spares and Crew, the Cargo can be detived.

Table D.4. Methods to be used to treat data gaps regarding time spent at sea

Title of method	Method to treat data gaps regarding time spent at sea
Formulae used	
Description of method to treat data gaps	
Name of person or position responsible for this method	
Data sources	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Example:

In the event of a data gap related to time spent at sea, the responsible Operator must一immediately communicate with the Master and raise the existence of it and close it using the data from the Statement of Facts documents.

The data gap can be filled by using the average of the time difference in hours between Arrival and Departure.

Part E Management

Table E.1. Regular check of the adequacy of the monitoring plan

Title of procedure	Regular check of the adequacy of the

	monitoring plan
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Companies check regularly, and at least annually, whether MP is adequate and can be improved further (Article 7 of the MRV Regulation).

Example:

The HSQE manager includes the Monitoring Plan in the official company procedures being经 subject to review and/or updates through the Management of Change procedure. This should be done at list annually and on a when needed basis for example when new flow meters are installed, new procedures are in place or roles and responsibilities are amended, and in general changes which can affect the Monitoring Plan of a vessel

Table E.2. Control activities: Quality assurance and reliability of information technology

Title of procedure	Information Technology Management (e.g. access controls, back up, recovery and security)
Reference for procedure	
Brief description of procedure	
Name of person or position responsible for data maintenance	
Location where records are kept	
Name of system used (where applicable)	
List of relevant existing management systems	

✧ In case of an internal IT system used, the company must describe the back-up procedure in place (i.e. how often are backups taken? Are they tested? Where are they stored? Who has access to those backups? etc.), the user access management procedure (i.e. who is responsible for granting privileges, are the super privileges reviewed? Password policy etc.), the change management procedure (i.e. how requests / issues are reviewed, tracked, are there any user acceptance tests performed?) as well as the logging & monitoring procedure admin action.

Example

Backup Servers will occur every day after regular business hours. Full Back up includes all the source files. Only one full backup will be done once a week. Incremental Backups

includes only files that have changed since the last full backup. The next time an incremental backup is done, this file is skipped (unless it is modified again).

Table E.3. Control activities: Internal reviews and validation of EU MRV relevant data

Title of procedure	Internal reviews and validation of EU MRV relevant data
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Companies should have a procedure which ensures quality of information before submitting the respective reports to verifiers. The written procedure should lay down checks to be performed. Minimum review check may include: data completeness check; trend analysis (relative comparison of data over several years) etc.

Example

For Example, this procedure will formalize all actions conducted by the Operations Department with regards to the checks and the reviews applied to measurements related to fuel, time, distance and cargo.

Cargo: The reported cargo values are observed so as to make sure that the number is not bigger than the DWT nominal value. If discrepancies are found, communication with the vessel is established.

Distance: Distances are validated by the Operations Department with the geographical shape and previous similar voyages. Noon reports and reported distances are checked on a monthly basis and verified. In rare cases a big deviation is found, communication is established with the vessel directly.

Time: The Operations Department performs cross-checks between the sum of steaming hours + non steaming hours + off hire hours versus the difference (in hours) between dates from berth to berth. If a difference higher than 10 hours is identified, communication is established with the vessel directly and it is included as an error in the Logbook.

Table E.4. Control activities: Corrections and corrective actions

Title of procedure	Corrections and corrective actions
Reference to existing procedure	
Version of existing procedure	

Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

✧ Companies can make a reference to existing procedures on ISM with an extended scope to include MRV.

1) How an MRV non-conformity is reported
2) Review of a non-conformity
3) How to implement the corrective action and
4) How corrective actions are followed-up

Table E.5. Control activities: Outsourced activities (if applicable)

Title of procedure	Outsourced activities
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	
Location where records are kept	
Name of IT system used (where applicable)	

✧ A procedure for deciding how to outsource to a third party a service related to the Company's MRV management system, and for ensuring quality of outputs. The procedure should describe:

1) How the decision to outsource an activity related to MRV is taken, and
2) How quality in delivering is ensured

The Company might develop a Supplier Performance Rating system and a series of criteria (e.g. level of confidence, response and time availability etc.)

Table E.6. Control activities: Documentation

Title of procedure	Documentation
Reference to existing procedure	
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	
Name of person or position responsible for this procedure	

Location where records are kept	
Name of IT system used (where applicable)	

- ✧ All companies which are ISM certified do have in place such a procedure. Companies may consider extending the scope in order to include MRV relevant documents as well as the new legal documents imposed by the MRV Shipping Regulation (Monitoring Plan, Emissions Report and Document of Compliance) including the retention period (e.g. DOC 18 months).
- ✧ Example

  All records should be kept in specific files both on board and in the office and be legible, readily identifiable and retrievable. Records should be stored and retained in such a manner as to avoid deterioration or damage.

  The Company's filing system is divided in the filing system of each department (i.e. Operations Department, Technical Department and HSQE Department). Each Department is responsible to maintain all hard copies in the floor it is located for at least 3 years after the date of issue. Document of compliance should be kept for at list 18 months. The filing system on board each ship is divided in the systems of the Master, Chief Engineer, Chief Officer and bridge. All records are retained for at least 3 years after the date of issue.

Part F Further information

Table F.1. List of definitions and abbreviations

Abbreviation, acronym, definition	Explanation

- ✧ Companies should list any abbreviations, acronyms or definitions that they have used in completing this monitoring plan (e.g. PMS, SMS)

Table F.2. Additional information

- ✧ In this chapter companies may enter any additional information on the MRV matter that they consider relevant for their ship and relevant management procedures (e.g. Data flow diagrams, task s lists, organizational diagram etc.)
- ✧ Example: in order to fulfill the requirement of IMO, the processes that will be used to report the data to the Administration.

  Processes that will be used to report the data to the Administration)

2.4 Modifications of monitoring plan

2.4.1 Companies shall check regularly, and at least annually, whether a ship's monitoring plan reflects the nature and functioning of the ship and whether the monitoring methodology can be improved.

2.4.2 Companies shall modify the monitoring plan in any of the following situations:

2.4.2.1 where a change of company occurs;

2.4.2.2 where new CO2 emissions occur due to new emission sources or due to the use of new fuels not yet contained in the monitoring plan;

2.4.2.3 where a change in availability of data, due to the use of new types of measuring equipment, new sampling methods or analysis methods, or for other reasons, may affect the accuracy of the determination of CO2 emissions;

2.4.2.4 where data resulting from the monitoring method applied has been found to be incorrect;

2.4.2.5 where any part of the monitoring plan is identified as not being in conformity with the requirements of the relevant Regulations/conventions of EU/IMO and the company is required to revise it.

2.4.3 Companies shall notify to the verifier without undue delay any proposals for modification of the monitoring plan.

2.4.4 If the monitoring plan is modified according to 2.4.2 2), 3), 4), the company should submit the monitoring plan for modification approval to ISC.

Chapter III Assessment of the monitoring plan

3.1 General principles

3.1.1 When the companies apply the assessment of monitoring plan according to the EU MRV regulation and/or amendment of MARPOL Annext VI, the way of email or fax etc.is accepted by local branch where the company located, the company should provide the related documents, and use the application in ISC official website voluntarily.

3.1.2 Basis of verification:

3The Regulation (EU) 2015/757 on MRV and the related Implementation and Delegated Regulation(if applicable), and/or MARPOL ANNEX VI as amended and relevant resolutions of IMO, as appropriated;

The flag state special requirements for MRV verification.

3.1.3 Information to be provided by companies

3.1.3.1 Companies shall provide the verifier with the following information for monitoring plan initial assessment:,

3.1.3.1.1 their ship's monitoring plan,

3.1.3.1.2 procedures, processes, flowcharts and etc. prepared and maintained outside the plan, where applicable, to which reference is made in the plan,

3.1.3.1.3 SMC copy, if the vessel is not audited by ISC;

3.1.3.1.4. the production certification or relevant technical specification of all CO2 emission sources onboard;

3.1.3.1.5 the production certification or other equivalent documents of main measurement instrument onboard, such as flow meter, CO2 direct measurement instrument etc.

3.1.1.6 if not use the default uncertainty level, the estimation specification details should be provided;

3.1.1.7 the fuel oil consumption data under normal working condition of main engine, auxiliary engines and boiler;

3.1.1.8 other information relevant to the assessment of monitoring plan;

3.1.3.2 If a site visit is waived, the following document shall also be submitted at least:

3.1.2.3.1 Fuel piping arrangements, fuel tanks arrangement, fuel tank measurement piping arrangements, arrangements of all measurement equipment and sounding tables of all fuel tanks(Monitoring method A, B C);

3.1.2.3.2 Flow meter arrangement plan for fuel oil consumption (Monitoring method C);

Schematic diagram of direct CO2 measurement (Monitoring method D);

3.1.2.3.3 Additional supporting documents or information requested by for the purpose of assessment;

3.1.3 When assessing the monitoring plan, ISC shall address assertions of completeness, accuracy, relevance and conformity with Regulation (EU) 2015/757 and/or relevant requirements of IMO the information provided in the monitoring plan.

3.1.4.1 The company should use the appropriate monitoring plan template and that information is provided for all mandatory items referred to in Annex I to Implementing Regulation (EU) 2016/1927 and/or MEPC.282(70)..

3.1.4.2 The information in the monitoring plan accurately and completely describes the emission

sources and measurement equipment installed on board the ship and the systems and procedures in place to monitor and report relevant information pursuant to Regulation (EU) 2015/757 and/or relevant requirements of IMO.

3.1..4.3 To ensure that adequate monitoring arrangements are provided for in the event of the ship seeking to benefit from the derogation of 'per voyage' monitoring of fuel and CO2 emissions pursuant to Article 9(2) of Regulation (EU) 2015/757.

3.1.4.4 Where applicable, assess whether the information submitted by the company regarding elements, procedures or controls implemented as part of the ship's existing management systems or covered by harmonised relevant quality, environmental or management standards is relevant for monitoring CO2 emissions and other relevant information and reporting .

3.1.4.5 For the purpose of assessing the monitoring plan, tISC MRV auditor may resort to inquiry, document inspection, observation and any other audit technique deemed appropriate.

3.2 Types of assessment

3.2.1. Initial approval: an assessment for the first submission of monitoring plan to the verifier for each of company managed ship falling under the scope of the EU regulation and/or MARPOLS Annex VI as amended.

3.2.1.1 According to EU MRV schedule, by 31 August 2017, companies shall submit to the ISC a monitoring plan for each of their ships under their management; or

3.2.1.2 for ships falling under the scope of the EU MRV regulation for the first time after 31 August 2017, companies shall submit a monitoring plan to the ISC without undue delay and no later than two months after each ship's first call in a port under the jurisdiction of a Member State of EU.

3.2.1.3 According to the requirement of MARPOL ANNEX VI as amended, in the case of a ship of 5,000 gross tonnage and above, the SEEMP which includes a description of the methodology that will be used to collect the data required by regulation 22A.1 of the Annex VI and the processes that will be used to report the data to the ship's Administration, shall be approved before 31 December 2018 or the ship's first reporting period.

3.2.2 Modification approval: companies shall notify to the ISC without undue delay any proposals for modification of the monitoring plan after initial assessment. Modifications of the monitoring plan under point2.4.2.2,2.4.2.3and 2.4.2.4 shall be subject to assessment by the verifier. The revise record, related revised content and its supporting documents should be provided for modification approval.

3.3.1 Site visits

ISC shall carry out site visits for the initial approval and, if necessary, for the modification approval:

3.3.1 The purpose of site visits is to gain sufficient understanding of the procedures described in the monitoring plan and validate that the information therein is accurate.

3.3. 2 ISC shall determine the location or locations of the site visit after taking into consideration the place where the critical mass of relevant data is stored, including electronic or hard copies of documents of which the originals are kept on the ship, and the place where data-flow activities are carried out.

ISC will communicate with company to determine the activities to be performed and the time needed for the site visit.

3.3.2 Waive of site visit

3.4.1 ISC may waive a site visit provided that one of the following conditions is fulfilled:

3.4.1.1 it has sufficient understanding of the ship's monitoring and reporting systems, including their existence, implementation and effective operation by the company;

3.4.1.2 the nature and level of complexity of the ship's monitoring and reporting system are

such that a site visit is not required;

3.4.1.3 its ability to obtain and assess remotely all requisite information.

3.4 Addressing non-conformities found through verification

3.4.1 Where the ISC identifies non-conformities in the course of the assessment of the monitoring plan, it shall inform the company thereof without undue delay. The company shall correct all the non-conformities and submit the revised monitoring plan to the verifier according to the agreed timeframe(before the reporting period starts) that allows the verifier to reassess it before the start of the reporting period.

3.4.2 All the non-conformity found during the process of monitoring plan assessment will be recorded in the assessment report, whether that is corrected or not. The situation that may lead to non-conformity, such as:

1) not comply with the requirements of EU MRV regulation, amendments of MARPOL Annex VI and SEEMP guidance, such as the template doesn't contain all mandatory elements, no English version;

2) the description in the monitoring plan no comply with the fact onboard, such as the emission sources are not complete, the type of fuel oil used is not as the same as onboard;

3) the procedure or control activity is not clear or not consist in the monitoring plan, or the documents provided are not complete;

4) other situation may lead to non-conformity happened of emission report.

3.4.3 if the non-conformity is found(when verification of emission report, PSC/FSC inspection, the third party feedback etc.) after the assessment of monitoring plan, ISC will notify the company to take correction action after confirm with the branch responsible for approval, the revised monitoring plan should be submitted for modification approval. If the monitoring plan is not revised as required by ISC or assessed satisfactory, the confirmation of compliance will be withdraw.

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3.5 Confirmation of compliance of monitoring plan

3.5.1 On the basis of the information collected during the assessment of the monitoring plan, ISC shall without delay inform the company in writing of the conclusions reached and indicate clearly whether the monitoring plan contains non-conformities, whether compliance with

a. the Regulation (EU) 2015/757 and/or relevant requirements of IMO convention.

3.5.2 After satisfactory assessment of the monitoring plan, a Confirmation of compliance shall be provided to and retained on board the ship.

Chapter IV Content and requirements of the emissions report

4.1 Content of the emissions report

4.1. 1 The content of emission report provided by company as required by EU MRV Regulation, reference attachment 2.

4.1.1.1 Data identifying the ship and the company, including:

(1) Name of the ship;

(2) IMO identification number;

(3) Port of registry or home port;

(4) Ice class of the ship, if included in the monitoring plan;

(5) Technical efficiency of the ship (the Energy Efficiency Design Index (EEDI) or the Estimated Index Value (EIV) in accordance with IMO Resolution MEPC.215 (63), where applicable);

(6) Name of the shipowner;

(7) Address of the shipowner and its principal place of business;

(6) Name of the company (if not the shipowner);

(9) Address of the company (if not the shipowner) and its principal place of business;

(10) Address, telephone and e-mail details of a contact person.

4.1. 2 The identity of the verifier that assessed the emissions report.

4.1. 3 Information on the monitoring method used and the related level of uncertainty.

4.1. 4 The results from annual monitoring of the parameters according to Article 10 of the regulation (EU) 2015/757..

4.1.2 The reporting content of IMO Fuel Oil Consumption Database

1) IMO Identification number

2) Start date and end date of reporting period

3) Type of the ship

4) Gross tonnage

5) Net tonnage

6) Deadweight

7) Main engine rated output power

8) Auxiliary engine rated power

9) EEDI

10) Ice class

11) Amount of fuel oil consumption, type of fuel oil consumption and the data collection method of fuel oil consumption

12) the distance travelled from berth to berth

13) time spent at sea

4.2 Requirements of the emissions report

4.2.1 Submission of the emissions report

4.2.1.1 In accordance with Article 11 in the EU MRV Regulation, from 2019, by 30 April of each year, companies shall submit to the Commission and to the authorities of the flag states concerned, an emissions report which has been verified as satisfactory by ISC. The emission report should be submitted through electronic format by use of data exchange. Therefore, the company should submit the emission report to ISC for verification before 31st March of each year after the year of 2019. 4.2.1.2 In accordance with Reg. 22A of Annex VI of MARPOL 1973/1978 as amended, within three months after the end of each calendar year, the ship shall report to its Administration or ROs duly authorized by it, the aggregated value for each datum specified in appendix IX to this Annex. The emission report should use IMO standard format and submit through the way of electronic information exchange.

4.2.1.3 The company shall submit the emission report s in a timely manner based on practical ship operation conditions and reasonably schedule the verification to avoid overdue verification of emission report.

4.2.2 Change of company

4.2.2.1 In accordance with Article 11 in the Regulation (EU) 2015/757, where there is a change of company, the new company shall ensure that each ship under its responsibility complies with the requirements of the regulations in relation to the entire reporting period during which it takes responsibility for the ship concerned.

4.2.2.2 In accordance with Reg. 22A of Annex VI of MARPOL 1973/1978 as amended,

a. In the event of the transfer of a ship from one Administration to another, the ship shall on the day of completion of the transfer or as close as practical thereto report to the losing Administration or ROs duly authorized by it, the aggregated data for the period of the calendar year corresponding to that Administration, , upon prior request of that Administration, the disaggregated data.

b. In the event of a change from one Company to another, the ship shall on the day of completion of the change or as close as practical thereto report to its Administration or RO duly authorized by it, the aggregated data for the portion of the calendar year corresponding to the Company, and, upon request of its Administration, the disaggregated data.

c. In the event of change from one Administration to another and from one Company to another concurrently paragraph a shall apply.

Chapter V Verification of the emissions report

5.1 Verification requirements of the emissions report

5.1.1 When the companies apply the assessment of monitoring plan according to the EU MRV regulation and/or amendment of MARPOL Annex VI, the way of email or fax etc.is accepted by local branch where the company located, the company should provide the related documents, and use the application in ISC official website voluntarily.

5.1.2 Basis of verification:

3The Regulation (EU) 2015/757 on MRV and the related Implementation and Delegated Regulation(if applicable), and/or MARPOL ANNEX VI as amended and relevant resolutions of IMO, as appropriated;

The flag state special requirements for MRV verification

According to the requirement of EU MRV regulation, ISC will complete verification of emission report before 30th April since 2019.

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5.1.33 According to the requirement of amendment of MARPOL Annex VI: ISC will complete the verification of IMO emission report before 31st May of each year since 2020.

5.1.4 Information to be provided by companies for emission report verification

5.1.4.1 Before the start of the verification of the emissions report, companies shall provide the verifier with the following supporting information:

(1) a list of voyages carried out by the ship in question during the reporting period according to Article 10 of Regulation (EU) 2015/757, including the voyage monitoring data and information ;

(2) To provide the BDN summary table and data collected summary table as required in attachment 4;

(3) to provide the related information of data gaps if applicable;

(4) a copy of the emissions report from the previous year where appropriate, if the ISC did not carry out the verification for that report;

(5) a copy of the monitoring plan or plans applied, including evidence of the conclusions from the assessment, where appropriate.

5.1.4.2 In order to further verify the accuracy of reporting data, companies shall also provide the following information:

(a) copies of the ship's official logbook and of the oil record book ;

(b) copies of bunkering documents;

(c) copies of documents containing information on the number of passengers transported and the amount of cargo carried, distance travelled and time spent at sea for the ship's voyages during the reporting period.

5.1.4.3 Additionally, and if applicable on the basis of the monitoring method applied, the verifiers may ask the company to provide:

(a) an overview of the IT landscape showing the data-flow for the relevant ship;

(b) evidence of the maintenance and accuracy/uncertainty of measurement equipment/flow meters (e.g. calibration certificates);

(c) an extract of fuel consumption activity data from flow meters;

(d) related evidence of fuel tank meter readings;

(e) an extract of activity data from the direct emissions measurement systems;

(f) any other information relevant to the verification of the emissions report.

5.1.4.4 In the event of a change of company, the companies involved (including the previous one and present one after this change) shall exercise due diligence to provide the verifier with the above-mentioned supporting documents or information relating to the voyages performed under their respective responsibilities.

5.1.4.5 The company should import the voyage information and data in to ISC MRV system by the standard template provided by ISC.

5.1.4.6 Companies shall retain the above-mentioned information in accordance with the requirements of SOLAS and MARPOL . Pending the issuance of the documents of compliance, ISC may request any of the information above from the companies.

5.2 Verification process of the emissions report

5.2.1 Risk assessment

5.2.1.1 ISC will carry out risk assessment before verification of emission report:

1) To identify the potential risk in the process of monitoring and reporting through comparing the CO2 reporting data, tracking ship data and the estimated data of engine power installed onboard and so on;

2) To determine the potential risk in different calculating steps through review all the data source and method used;

3) Take into consideration of efficiency risk control activity of company to decrease the accuracy of monitoring method and relevant uncertainty.

5.2.1.2 In addition ISC shall identify and analyze all of the following:

(a) the inherent risks: the risk of misstatements happened before taking into consideration the effect of any related control activity

(b) the control risks: the risk of misstatements still happened even taking into consideration the effect of related control activity;

(c) the detection risks: the risk that the verifier cannot find the material misstatement;

5.2.1.3 When carry out risk assessment, shall consider areas of higher verification risk and at least the following: voyage data, fuel consumption, CO_2 emissions, distance travelled, time spent at sea, cargo carried and aggregation of data in the emissions report. And consider the existence, completeness, accuracy, consistency, transparency and relevance of the information reported.

5.2.1.4 According to the level of risk assessment, to determine the verification risk assessment, the calculation formula as follow:

Verification Risk (VR) = Inherent risk (IR) x Control risk (CR) x Detection Risk (DR)

		Control risk		
		Low	**Medium**	**High**
Inherent risk	**Low**	Low	Medium	Medium
	Medium	Medium	Medium	High
	High	Medium	High	High

5.2.1.5 When appropriate in the light of the information obtained in course of the verification, ISC shall revise the risk assessment and modify or repeat the verification activities to be performed.

5.2.2 Verification plan

5.2.2.1 The audit team shall draft a verification plan commensurate with the information obtained and the risks identified during the risk assessment. The verification plan shall include at

least:

1)Before the opening meeting, the lead MRV auditor is fully responsible for making the verification plan;

2) a verification plan should based on the identified risk through risk assessment, to determine the nature and scope of the verification activities and the time and manner in which they are to be carried out;

3) The description of verification activity should contain the departments involved and documents to be inspected;

5.2.2. 2 According to the information of emission report and result of risk assessment, a data sampling plan should be set out the scope. Sampling method as follow:

Scenario 1: 15 voyages a year.

		Sample size
Combined inherent & control risk	Low	5
	Medium	11
	High	15

Scenario 2: 50 voyages a year.

		Sample size
Combined inherent & control risk	Low	9
	Medium	20
	High	33

Scenario 3: The ship made 150 voyages a year.

		Sample size
Combined inherent & control risk	Low	13
	Medium	29
	High	48

Scenario 4: The ship made 400 voyages a year.

		Sample size
Combined inherent & control risk	Low	16
	Medium	36
	High	60

Scenario 5: The ship made 800 voyages a year.

		Sample size
Combined inherent & control risk	Low	16
	Medium	36
	High	60

5.2.3 Verification activities concerning the emissions report

5.2.3.1 ISC shall implement the verification plan and, on the basis of the risk assessment, verify whether the monitoring and reporting systems, as described in the monitoring plan that has been assessed as satisfactory, exist in practice and are properly implemented.

The verification method can use:

(1) enquiry with relevant staff;

(2) document inspection;

(3) observation and walkthrough procedures.

5.2.3.2 If applicable, ISC shall check whether the internal control activities described in the monitoring plan are implemented effectively. For that purpose, may consider testing the effectiveness of documented controls on the basis of a sample.

5.2.4 Verification of reported data

5.2.4.1 ISC shall verify the data reported in the emissions report through: detailed testing, including by tracing them back to the primary data source; cross-checking them with external data sources, including ship-tracking data; performing reconciliations; checking thresholds as regards appropriate data; and carrying out recalculations.

5.2.4.2 As part of the data verification referred to in 5.2.4.1, the verifier shall check:

(1) The completeness of emission sources as described in the monitoring plan;

(2) The completeness of data, including those on voyage reported as falling under Regulation (EU) 2015/757;

(3) The consistency between reported aggregated data and data from relevant documentation or primary sources;

(4) The consistency between aggregated fuel consumption and data on fuel purchased or otherwise supplied to the ship in question, if applicable;

(5) The reliability and accuracy of the data.

5.2.5 Materiality level

5.2.5.1 For the purpose of verifying fuel consumption and CO_2 emissions data in the emissions report, the materiality level shall be 5 % of the respective total reported for each item in the reporting period, including: cargo carried, transport work, distance travelled and time spent at sea, the materiality level shall be 5 % of the respective total reported for each item in the reporting period.

5.2.5.2 In the process of verification, if one or more misstatement is over than 5%, that means the material misstatement for the emission report.

5.2.6 Site visits

5.2.6.1 The site visits should be carried out for the purpose of gaining sufficient understanding of the company and the ship’s monitoring and reporting systems as described in the monitoring plan.

5.2.6.2 ISC shall determine the location or locations for the site visit on the basis of the results of the risk assessment and after taking into consideration the place where the critical mass of relevant data is stored, including electronic or hard copies of documents of which the originals are kept on the ship, and the place where data-flow activities are carried out.

5.2.6.3 ISC shall also determine the activities to be performed and the time needed for the site visit.

5.2.6.4 ISC may waive a site visit provided that, on the basis of the outcome of the risk assessment,:

(1) it has sufficient understanding of the ship's monitoring and reporting systems, including their existence, implementation and effective operation by the company;

(2) the nature and level of complexity of the ship's monitoring and reporting system are such that a site visit is not required;

(3) its ability to obtain and assess remotely all requisite information, including correct application of the methodology described in the monitoring plan and verification of the data reported in the emissions report.

5.2.6.5 On the basis of the outcome of a site visit to an onshore location, where it concludes that an on-board verification is needed to reduce the risk of material misstatements in the emissions report, ISC may decide to visit the ship.

5.2.6.6 If waives a site visit, it shall provide justification for doing so in the ISC internal verification documentation.

5.2.7 Addressing misstatements and non-conformities in the emissions report

5.2.7.1 Where ISC identifies misstatements or non-conformities in the course of the verification of the emissions report, it shall inform the company thereof without undue delay and request relevant corrections within a reasonable deadline. Considering the verified emission report should be submitted to EU before 30th April, ISC should make a reasonable correction deadline so that the time is adequate to verify the efficiency of correction action of misstatement or material misstatement.

5.2.7.2 When correct misstatement, not only the findings need to be corrected which does not comply with requirements, but also to analysis the root cause of non-conformity, to make and implement the prevention action to prevent the same non-conformity happened again. If the non-conformity is related to the accuracy of reporting data, the wrong data should be corrected at the same time and the revised emission report should be submitted.

5.2.7.3 Where the company does not correct the misstatements or non-conformities MRV auditor shall, before issuing the verification report, ask the company to explain the main causes of the misstatements or non-conformities and stated in the verification report.

5.2.7.4 The verifier may consider misstatements or non-conformities which, individually or together with other misstatements, are below the materiality level where that is justified by their scale and nature or by the particular circumstances of their occurrence.

5.2.7.5 If the non-conformity is found(when verification of emission report, PSC/FSC inspection, the third party feedback etc.) after the verification of emission report, ISC will notify the company to take correction action after confirm with the branch responsible for verification, the revised emission report should be submitted for verification. If the monitoring plan is not revised as required by ISC or not verified satisfactory, the confirmation of compliance will be withdraw.

5.2.8 Conclusion of the emissions report verification

To complete the verification of the emissions report, ISC shall at least:

(1) confirm that all verification activities have been carried out;

(2) perform final analytical procedures on the aggregated data to ensure that they are free of material misstatements;

(3) verify whether the information in the report satisfies the requirements of the Regulation (EU) 2015/757;

(4) before issuing the report, prepare the internal verification documentation and the draft report and submit them to the independent reviewer;

(5) authorize a person to authenticate the report on the basis of the conclusions reached by the independent reviewer and the internal verification documentation, and notify the company thereof；

(6) notify the Commission and the ship’s flag state whether the conditions for issuing the document of compliance are fulfilled.

5.2.9 Recommendations for improvement

5.2.9.1 ISC shall communicate to the company recommendations for improvement in relation to the uncorrected misstatements and non-conformities not leading to material misstatements.

5.2.9.2 may communicate other recommendations for improvement that it finds relevant, in the light of the outcome of the verification activities.

5.2.9.3 When communicating recommendations to the company, ISC shall remain impartial vis-à-vis the company, the ship and the monitoring and reporting system. ISC shall not jeopardize its impartiality by giving advice or developing parts of the monitoring and reporting procedures.

5.2.10 Verification report

5.2.10.1 On the basis of the information collected, ISC shall issue a verification report to the company on each emissions report subject to verification.

5.2.10.2 In case it contains material misstatements that were not corrected before the report was issued, the verification report shall include a statement verifying the emissions report as unsatisfactory.

5.2.10.3 The verification report shall contain at least the following elements:

(1) the name of the company and identification of the ship;

(2) a title making it clear that it is a verification report;

(3) the identity of the verifier;

(4) a reference to the emissions report and the reporting period subject to verification;

(5) a reference to one or more monitoring plans that have been assessed as satisfactory;

(6) a reference to the verification or assurance standard (s) used;

(7) a summary of the verifier's procedures, including information on site visits or the exemption of site visits;

(8) a summary of significant changes to the monitoring plan and activity data in the reporting period, where applicable;

(9) a verification statement;

(10) a description of uncorrected misstatements and non-conformities, including their nature and scale, and whether or not they have a material impact on related elements of the emissions report;

(11) where applicable, recommendations for improvement;

(12) the date of the verification report and signature of an authorized person on behalf of the verifier.

5.2.11 Document of Compliance of EU MRV Regulation

5.2.11.1 Where the emissions report fulfils the requirements of EU MRV Regulation, ISC shall issue, on the basis of the verification report before 30th April since 2019, a document of compliance which will be valid for 18 month after end of reporting period for the ship concerned. The document of compliance shall include the following information:

(1) identity of the ship (name, IMO identification number and port of registry or home port);

(2) name, address and principal place of business of the shipowner;

(3) identity of the verifier;

(4) date of issue of the document of compliance, its period of validity and the reporting period it refers to.

5.2.11.2 Where company has changed, a document of compliance shall be reissued with the same validity.

5.2.11.3 After issuing the document of compliance by CS, the relevant information as required by 5.2.11.1 will notify the EU committee and flag administration by automatic data exchange system.

5.2.11.5 By 30 June of the year following the end of a reporting period, the ships shall carry a valid document of compliance onboard when arriving at, departure from and sail within EAA ports..

5.2.12 Statement of Compliance of IMO fuel oil consumption reporting

52.12.1.1 If the emission report is verified satisfactory and comply with requirement of MARPOL Annex VI, the Statement of Compliance will be issued by ISC before 30th May since 2020 to the

ship applied. .

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5.3.3 The Statement of Compliance shall be valid for the calendar year in which it is issued and for the first five months of the following calendar year. The Statement of Compliance shall be valid for the calendar year in which it is issued, for the following calendar year, and for the first five months of the subsequent calendar year. All Statements of Compliance shall be kept on board for at least the period of their validity.

Chapter VI Communication responsibility and confidentiality

6.1 Communication

6.1.1 ISC shall provide the following information to its client or the responsible party by guideline, website, circulars, application forms or email:

(1) a detailed description of the verification process;

(2) changes to the verification requirements that may affect the objectives of the clients;

(3) a schedule of verification activities and tasks;

(4) relevant information on the verification team members;

(5) information about the verification fee;

(6) the policy governing any statement that the client is authorized to use making reference to its verification;

(7) information on procedures for handling complaints and appeals.

(8) the contact information of business, and its scope and responsible department

6.1.2 the company shall provide adequate and correct information for the purpose of assessment of monitoring plan and verification of emission report.

6.1.3 If any situation happened to impact the validity of confirmation of compliance of monitoring plan and emission report, the company should notify ISC, if the verification activities are carried out by ISC.

6.2 Responsibility

6.2.1 If ISC would carry out the assessment of monitoring plan and verification of emission report, the company shall:

(1) to comply with the verification requirements;

(2) to make all the necessary arrangements for the conduct of verification, including provisions for examining documentation and access to all relevant processes, areas, records and personnel;

(3) to make provisions, where applicable, to accommodate observers.

6.2.2 When implement the verification activities, ISC shall:

1) to ensure relevant staff understand related requirements of convention, regulation and standards, the assigned audit should be qualified and experienced, and have the ability to carry out assessment of monitoring plan and verification of emission report/

2) to ensure the assessment of monitoring plan and verification of emission report comply with the EU MRV Regulation and/or amendment of MARPOL Annex VI and flag state special requirements.

6.3 Confidentiality

6.3.1 The verification information obtained or created during the verification or obtained from sources other than the client or responsibility party shall be treated as confidential by ISC.

6.3.2 The information that is not public about a client or responsible party shall not be disclosed to a third party without express consent of that client or responsible party by ISC.

6.3.3 Before placing any information in the public domain where required by disclosure provisions, the client and the responsible party shall be informed, as appropriate.

6.3.4 The available equipment and facilities shall be used to ensure the secure handling of

confidential information.

6.7.4 All the information that is not public about ISC should be confidential for company.

Chapter VII Impartiality and independence

7.1 The arrangement of impartiality and independence

7.1.1 To ensure the impartiality and independence related to verification activities carried out by ISC comply with the requirements of regulation and standard, the below MRV application will be rejected by ISC:

(1) The confirmation or verification application from the applicant that ISC has provided the technical services to, and ISC has the relationship with those who provided technical services to the responsible party that support the poses an unacceptable risk to impartiality.

7.1.2 To ensure the impartiality and independence of MRV verification relevant staff, ISC will ensure:

1) shall not use the personnel with actual or potential conflict of interest to carry out MRV verification activities;

2) the personnel who carried out assessment of monitoring plan, shall not verify the emission report for the same vessel;

3) shall not use the personnel who provide the technical service to the company to carry out the verification activities;

All the verification activities carried out by ISC will be done independently.

7.1.3 In order to assist company to understand the convention, regulation and related guidelines, ISC will carry out training about those public information, but that does not mean the companies that are trained would be simpler, easier, faster, or less expensive when apply ISC verification.

Chapter VIII Appeals and complaints

8.1 General requirements

8.1.1 The handling of complaints and appeals is based on facts and in accordance with international conventions, regulations and flag state requirements and relevant working procedure of ISC;

8.1.2 All the participants in the handling of complaints and appeals shall respect to the confidentiality of any non-public information on complaints and appeals obtained in the course.

8.1.3 All the participants in the handling of complaints and appeals shall be objective and impartial and free from any interest in the object of complaints or appeals. The person with direct interest in a complaint or appeal shall avoid the work relating to this complaint or appeal.

8.1.4 The Society shall not accept, for the moment, complaints in legal proceedings.

8.1.5 The filing, investigation of and decision-making on an appeal shall not bear any prejudice against the appellant.

8.1.6 The charges of handling an appeal shall be paid by the appellant or reasonably apportioned between the appellant and the Society, except when the appeal proves correct.

8.1.7 Normally, the Society shall not accept anonymous complaints with vague details.

8.2 Complaints

8.2.1 A customer may file a complaint against the assessment of monitoring plan or verification of emission report provided by ISC to the branches/oversea centers the business area of which covers the customer. If still dissatisfied with the handling result, the customer may file a re-handling request or an appeal in writing together with background information to ISC Headquarters.

8.2.2 After receiving the compliant, will inform the complainant of the acceptance of complaint in written form within 5 working days.,

8.2.3 ISC will select experienced personnel to undertake investigation and collect evidence.

8.2.4 In general, the acceptance department shall, after the complaint acceptance notice is issued, formally notify the complainant of the decisions on handling of complaint within 30 working days.

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8.3 Appeals

8.3.1; A customer or responsible part have any appeal against the assessment of monitoring plan or verification of emission report provided by ISC to ISC Headquarters by written.

8.3.2 After receiving the appeal, will inform the complainant of the acceptance of complaint in written form within 5 working

8.3.3 If still dissatisfied with the handling result, the customer may file a re-handling request or an appeal in writing together with background information to ISC Headquarters.

8.3.4 After the investigation is completed, the Appeals Committee shall submit an objective and impartial written report as well as suggestions on how to handle the appeals

8.3.5 Following the handling principles, select a ruling team of 5 members from the Appeals Committee with one of them nominated as the team leader. The appellant shall be notified of the composition of the team members and the members may be replaced as necessary if there is any objection from the appellant.

8.3.6 The ruling shall be made based on a majority opinion; however, it may be made by the team leader where it fails to reflect the majority opinion.

8.3.7 In general, the acceptance department shall, after the complaint acceptance notice is issued, formally notify the complainant of the decisions on handling of complaint within 30 working days. If not satisfy with the result, the customer can continue the appeal by other way.

Chapter IX Special verification

9.1 If facts that could materially affect the verification statement are discovered by client or responsible part after issuance of the verification statement, ISC will take the following action:

(1) to make sure whether the fact was adequately shown in the verification report and emission report;

(2) considering if the statement/document of compliance, emission report or emission report requires revision;

(3) discussing the matter with company; If the statement/document of statement requires revision, ISC shall implement processes to issue a revised statement/document of compliance, emission report or verification report.

(4) Based on previous compliant about MRV verification, or the fact found after issuance of document/statement of compliance, if necessary, the special verification concerned on the relevant aspect will be carried out, ISC shall

(1) notify, in advance, the company of the conditions under which the special verification is to be conducted, and

(b) shall use additional care in assigning verification team members if there is a lack of opportunity for the responsible party to object.

Attachment 1

MRV Monitoring Plan

Name: _____

Type: _____

IMO: _____

Gross Tonnage: _____

TEU: _____

Part A Revision record sheet

Version No	Reference date	Status at reference date[1]	Reference to Chapters where revisions or modifications have been made, including a brief explanation of changes
2017/1.0			First Edit

[1]Select one of the following categories: 'Working draft', 'Final draft submitted to the verifier', 'Assessed', 'Modified without need for re-assessment'.

Part B Basic data

Table B.1. Identification of the ship

Name of the ship	
IMO identification number	
Port of registry	
Home port (if not identical with port of registry)	
Name of the shipowner	
IMO unique company and registered owner identification number	
Type of the ship[(1)]	
Deadweight (in metric tonnes)	
Gross Tonnage	
Classification Society (voluntary)	
Ice class (voluntary) [(2)]	
Flag State (voluntary)	
Voluntary open description field for additional information about the characteristics of the ship	

[(1)]Select one of the following categories: 'Passenger ship', 'Ro-ro ship', 'Container ship', 'Oil tanker', 'Chemical tanker', 'LNG carrier', 'Gas carrier' , 'Bulk carrier', 'General cargo ship', 'Refrigerated cargo ship', 'Vehicle carrier', 'Combination carrier', 'Ro-pax ship', 'Container/ro-ro cargo ship', 'Other ship types'.

[(2)]Select one of the Polar Classes PC1 - PC7.

Table B.2. Company information

Name of the company	
Address Line 1	
Address Line 2	
City	
State/Province/Region	
Postcode/ZIP	
Country	
Contact person	
Telephone number	
Email address	

Table B.3. Emission sources and fuel types used

Emission source reference no.	Emission source (name, type)	Technical description of emission source (performance/power, specific fuel oil consumption (SFOC), year of installation, identification number in case of multiple identical emission sources, etc.)	(Potential) Fuel types used[(1)]
1	Main Engine	Cylinder Diameter : mm, Stroke: mm, Power: kw, Year of Installation: , Fuel Consumption at the Normal Rating: g/kwh, Identification No.:	HFO,LFO,MDO
2	No.1 Auxiliary Engine	Cylinder Diameter : mm, Stroke: mm, Power: kw, Year of Installation: , Fuel Consumption at the Normal Rating: g/kwh, Identification No.:	HFO,LFO,MDO
3	No.2 Auxiliary Engine	Cylinder Diameter : mm, Stroke: mm, Power: kw, Year of Installation: , Fuel Consumption at the Normal Rating: g/kwh, Identification No.:	HFO,LFO,MDO
4	No.3 Auxiliary Engine	Cylinder Diameter : mm, Stroke: mm, Power: kw, Year of Installation: , Fuel Consumption at the Normal Rating: g/kwh, Identification No.:	HFO,LFO,MDO
5	No.4 Auxiliary Engine	Cylinder Diameter : mm, Stroke: mm, Power: kw, Year of Installation: , Fuel Consumption at the Normal Rating: g/kwh, Identification No.:	HFO,LFO,MDO
6	No.5 Auxiliary Engine	Cylinder Diameter : mm, Stroke: mm, Power: kw, Year of Installation: , Fuel Consumption at the Normal Rating: g/kwh, Identification No.:	HFO,LFO,MDO
7	Boiler	Boiler Rated Evaporating Capacity: t/h, Heating Area: m^2, Year of Installation: , Identification No.:	HFO,LFO,MDO

[(1)]Select one of the following categories: “Heavy Fuel Oil(HFO)”, “Light Fuel Oil(LFO)”, “Diesel/Gas Oil(MDO/MGO)”, “Liquefied Petroleum Gas(Propane/Butane, LPG)”, “Liquefied Natural Gas(LNG)”, “Methanol”, “Ethanol”, “Other fuel with non-standard emission factor”

Table B.4. Emission factors

Fuel type	IMO emission factors (in tonnes of CO_2/ tonne fuel)
Heavy Fuel Oil (Reference: ISO 8217 Grades RME through RMK)	3.114
Light Fuel Oil (Reference: ISO 8217 Grades RMA through RMD)	3.151
Diesel/Gas Oil (Reference: ISO 8217 Grades DMX through DMB)	3.206
Liquefied Petroleum Gas (Propane)	3.000
Liquefied Petroleum Gas (Butane)	3.030
Liquefied Natural Gas	2.750
Methanol	1.375
Ethanol	1.913
Other fuel with non-standard emission factor	--

In case of use of non-standard emission factors:

Non-standard fuel	Emission factor	Methodologies for determining the emission factor (methodology for sampling, methods of analysis and a description of the laboratories used, if any)
N/A	N/A	N/A

Table B.5. Procedures, systems and responsibilities used to update the completeness of emission sources

Title of procedure	Managing the completeness of the list of emission sources
Reference to existing procedure	Ships and Equipment Maintenance Procedure
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	In case any add, renew, conversion, remove or discard for emission sources, that should be recorded in Engine Log Book and Maintenance Record Book, the Captain or Chief Engineer shall report these changes to the company. The XX Department shall review these changes and update any report and document that the Company maintains with the latest information of the emission sources on board, the XX Department shall update the list of the emission sources in the Monitoring Plan, where applicable, the verifier should be noticed for Monitoring Plan modification. In case any new type of fuel oil used which is not covered by Monitoring Plan, the XX Department should be reported and the related information in MP shall be update and submit to verifier for modification approval.
Name of person or position responsible for this procedure	Captain and Chief Engineer
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Part C Activity data

Table C.1. Conditions of exemption related to Article 9 (2)

Item	Confirmation field
Minimum number of expected voyages per reporting period falling under the scope of the EU MRV Regulation according to the ship's schedule	<300
Are there expected voyages per reporting period not falling under the scope of the EU MRV Regulation according to the ship's schedule?(1)	Yes
Conditions of Article 9 (2) fulfilled?(2)	No
If yes, do you intend to make use of the derogation for monitoring the amount of fuel consumed on a per-voyage basis?16	Not applicable

(1)Select either "Yes" or "No".

(2)Select either "Yes" or "No".

(3)Select "Yes", "No" or "Not applicable".

Table C.2. Monitoring of fuel consumption

C.2.1. Methods used to determine fuel consumption of each emission source:

Emission source(1)	Chosen methods for fuel consumption(2)
All sources	Method A: BDN and periodic stocktakes of fuel tanks

(1)Select one of the following categories: 'All sources', 'Main engines', Auxiliary engines', 'Gas turbines', 'Boilers' or Inert gas generators'.

(2)Select one or more of the following categories: 'Method A: BDN and periodic stocktakes of fuel tanks', 'Method B: Bunker fuel tank monitoring on-board', 'Method C: Flow meters for applicable combustion processes' or 'Method D: Direct CO2 emissions measurement'.

C.2.2. Procedures for determining fuel bunkered and fuel in tanks:

Title of procedure	Determining fuel bunkered and fuel in tanks
Reference to existing procedure	Fuel Oil and Lubricated Oil Bunkered Management Instruction
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	The fuel oil measurement should be done after arrival at the first berth of port of call and before departure of last berth of port of call as well as before and after bunkering. The responsible engineer shall perform the measurement as per specified method and all measurement instruments shall be in good condition. Except measuring and recording the height of liquid, temperature of fuel oil, the heel, trim and draft should also be recorded in order to do the correction according to Sounding Table. The chief engineer should review the record and is ultimately responsible for this.
Name of person or position responsible for this procedure	Chief Engineer
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

C.2.3. Regular cross-checks between bunkering quantity as provided by BDN and bunkering quantity indicated by on-board measurement:

Title of procedure	Regular cross-checks between bunkering quantity as provided by BDNs and bunkering quantity indicated by on-board measurement
Reference to existing procedure	Fuel Oil and Lubricated Oil Bunkered Management Instruction
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	Nil
Name of person or position responsible for this procedure	Chief engineer

C.2.4. Description of the measurement instruments involved:

Measurement equipment (name)	Elements applied to (e.g. emission sources, tanks)	Technical description (specification, age, maintenance intervals)
Sounding Scale	Fuel Oil Tanks	Range: M Accuracy: M Year of manufacture: Maintenance intervals: year
Thermometer	Fuel Oil Tanks	Range: ℃ Accuracy: ℃ Year of installation: Maintenance intervals: year
Clinometer	Fuel Oil Tanks	Range: Degree Accuracy: Degree Year of installation: Maintenance intervals: every voyage
Liquid level gauge	Fuel Oil Tanks	Range: M Accuracy: M Year of installation: Maintenance intervals: year
Sounding Table	Fuel Oil Tanks	Made by shipyard, and including the heel, trim and draft correction.

C.2.5. Procedures for recording, retrieving, transmitting and storing information regarding measurements:

Title of procedure	Recording, retrieving, transmitting and storing information regarding measurements
Reference to existing procedure	Documentation Control Procedure
℃Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	The fuel oil measurement should be done after arrival at the first berth of port of call and before departure of last berth of port of call as well as before and after bunkering. The Chief Engineer responsible for recording fuel measurements and inform the Master who is responsible for retrieving these values and preparing the four types of reports (arrival, departure, noon and voyage) in order to transmit to the relevant departments of company. The above-mentioned measurement records shall be submitted to the XX Department after the end of voyage.
Name of person or position responsible for this procedure	Chief Engineer, Captain
Location where records are kept	Onboard and Company
Name of IT system used (where	N.A

applicable)	

C.2.6. Method for determination of density:

Fuel type/tank	Method to determine actual density values of fuel bunkered[1]	Method to determine actual density values of fuel in tanks[2]
All fuel tanks	Fuel supplier	Fuel supplier

[1]Select one of the following categories: 'On-board measurement equipment', 'Fuel supplier' or 'Laboratory test'.

[2]Select one of the following categories: 'Measurement equipment', 'Fuel supplier', 'Laboratory test'.

C.2.7. Level of uncertainty associated with fuel monitoring:

Monitoring method[1]	Approach used[2]	Value
Method A	Default value	10%

[1]Select one or more of the following categories: 'Method A: BDN and periodic stocktakes of fuel tanks', 'Method B: Bunker fuel tank monitoring on-board', 'Method C: Flow meters for applicable combustion processes' or 'Method D: Direct CO2 emissions measurement'

[2]Select one of the following categories: 'Default value' or 'Ship specific estimate'.

C.2.8. Procedures for ensuring quality assurance of measuring equipment:

Title of procedure	Ensuring quality assurance of measuring equipment
Reference to existing procedure	Monitoring and Measurement Devices Control Procedure
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	The relevant devices should be approved or inspected by class society or any national administration. The responsible person shall regularly maintain these equipment according to the requirements of procedure and C.2.4 of this plan and check the condition of measuring equipment to ensure all function is in order before using.
Name of person or position responsible for this procedure	Chief engineer
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Table C.3. List of voyages

Title of procedure	Recording and safeguarding completeness of voyages
Reference to existing procedure	Voyage Plan Development Instruction Ship Daily Report and Status Tracing Instruction ---
Version of existing procedure	
Description of EU MRV procedures (including recording voyages, monitoring voyages etc.) if not already existing outside the MP	The Captain shall prepare each arrival, departure, noon report according to the requirements of relevant procedures, which shall be submitted to xxxxx system. The filtering of EU MRV voyages is done through the xxxxx system as per EU voyage definition of Table F.1 and the XX Department is responsible for review the voyage information to ensure the completeness of voyages list. Time format: The ship voyage report shall use the Greenwich Mean Time (GMT-YYYYMMDD).
Name of person or position responsible for this procedure	Captain
Data sources	Arrival, Departure, Noon Report
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	xxxxx

Table C.4. Distance travelled

Title of procedure	Recording and determining the distance per voyage made
Reference to existing procedure	Voyage Plan Development Instruction Ship Daily Report and Status Tracing Instruction
Version of existing procedure	
Description of EU MRV procedures (including recording and managing distance information) if not already existing outside the MP	The distance travelled shall be determined from berth of the port of departure to berth of the port of arrival and shall be expressed in nautical miles; The data of GPS shall be used for determining distance travelled which may be calculated by the Electronic Chart Display and Information System (ECDIS). The Second Officer is responsible for recording the distance travelled in the deck logbook and the Captain should review the records prior to submit it to xxxxx
Name of person or position responsible for this procedure	Captain
Data sources	Deck logbook
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	xxxxx

Table C.5. Amount of cargo carried & Number of passengers

Title of procedure	Recording and determining the amount of cargo carried and/ or the number of passengers
Reference to existing procedure	Instruction for carriage of good by sea. Ship Daily Report and Status Tracing Instruction.
Version of existing procedure	
Description of EU MRV procedures (including recording and determining the amount of cargo carried and/or the number of passengers and the use of default values for the mass of cargo units, if applicable) if not already existing outside the MP	For this vessel, the cargo carried is defined as the total weight in metric tonnes of the cargo.(For example: Container Ship) The chief officer shall review the final cargo information provided by shipper, port or agent, and confirm the accurate amount of cargo carried when departure as well as record in the deck logbook. The captain should review the records with Bill of lading (B/L) and submit it to the xxxxx.
Unit of cargo/passengers[(1)]	Tonne
Name of person or position responsible for this procedure	Captain
Formulae and data sources	Deck logbook, Bill of lading
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	xxxxx

[(1)]For passenger ships, the 'Unit of cargo/passengers' shall be specified as 'passengers'.

For ro-ro ships, container ships, oil tankers, chemical tankers, gas carriers, bulk carriers, refrigerated cargo ships, combination carriers, the 'Unit of cargo/passengers' shall be specified as 'tonnes'.

For LNG carriers, container/ro-ro cargo ships, the 'Unit of cargo/passengers' shall be specified as 'cubic metres'.

For general cargo ships, the 'Unit of cargo/passengers' shall be specified by selecting one of the following categories: 'tonnes of deadweight carried', 'tonnes of deadweight carried and tonnes'.

For vehicle carriers, the 'Unit of cargo/passengers' shall be specified by selecting one of the following categories: 'tonnes', 'tonnes and tonnes of deadweight carried'.

For ro-pax ships, the 'Unit of cargo/passengers' shall be specified as 'tonnes' and as 'passengers'.

For other ship types, the 'Unit of cargo/passengers' shall be specified by selecting one of the following categories: 'tonnes', 'tonnes of deadweight carried'.

Table C.6. Time spent at sea

Title of procedure	Determining and recording the time spent at sea from berth of port of departure to berth of the port of arrival
Reference to existing procedure	Voyage Plan Development Instruction Ship Daily Report and Status Tracing Instruction
Version of existing procedure	
Description of EU MRV procedures (including recording and managing port departure and arrival information) if not already existing outside the MP	The time spent at sea per voyage shall be calculated from the arrival at the first berth to the departure of the last berth in a port where cargo operations had been conducted. The time spent at sea shall exclude the mooring time of the sole purposes of refuelling, obtaining supplies, relieving the crew, going into dry-dock or making repairs to the ship and/or its equipment, stops in port because the ship is in need of assistance or in distress, ship-to-ship transfers carried out outside ports, and stops for the sole purpose of taking shelter from adverse weather or rendered necessary by search and rescue activities, and so on of which happened during the voyage. The GPS timer will be used for determining the time spent at sea with the unit of hour. The second officer is responsible for calculating the time spent at sea of voyage according to the definition and recording in voyage documents. The captain should review the accuracy of the records that made by second officer and submit it to xxxxx.
Name of person or position responsible for this procedure	Captain
Formulae and data sources	Deck logbook, arrival and departure report
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	xxxxx

Part D Data gaps

Table D.1. Methods to be used to estimate fuel consumption

Title of method	Method to be used to estimate fuel consumption
Back-up monitoring method (A/B/C/D)[1]	Method B: Bunker fuel tank monitoring on-board
Formulae used	The amount of fuel supplied = the difference between the amount of fuel oil remain on board before and after bunkering; The consumption of each type of fuel oil per voyage= from the departure port to arrival port Σ daily amount of fuel consumption The consumption of each type of fuel oil at berth= from arrival port to departure port Σ daily amount of fuel oil consumption
Description of method to estimate fuel consumption	Fuel measurement should be done daily when the ship is at sea or port and each time the ship is bunkering or de-bunkering. In the event of a data gap due to unexpected conditions, the Chief engineer is responsible for the closure of data gap as per the relevant measurement data or closing it by applying formulae, historic data etc. The estimated data for closure of data gap shall be remarked in the voyage report.
Name of person or position responsible for this method	Chief engineer
Data sources	Fuel Oil Measurement Record
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	xxxxx

(1) Select one of the following categories: 'Method A: BDN and periodic stocktakes of fuel tanks', 'Method B: Bunker fuel tank monitoring on-board', 'Method C: Flow meters for applicable combustion processes', 'Method D: Direct CO2 emissions measurement' or 'Not applicable'. The selected category must be different from the category selected under 'Chosen methods for fuel consumption' in table C.2. (Monitoring of fuel consumption – Methods used to determine fuel consumption of each emission source).

Table D.2. Methods to be used to treat data gaps regarding distance travelled

Title of method	Method to treat data gaps regarding distance travelled
Formulae used	Distance travelled = most direct route between port of departure and port of arrival * conservative correction factor
Description of method to treat data gaps	When use the formulae to treat data gap of distance travelled, the route changed due to the bad weather and any other limitation should be considered, the conservative factor should be corrected in order to the data of distance travelled will not be underestimated; In order to ensure the data can be traced, all significant deviation from original route should be recorded in the deck logbook; The second officer is responsible for treating the data gap and the captain should review and be ultimately responsible for this. The estimated data for closure of data gap shall be remarked in the voyage report.
Name of person or position responsible for this method	Captain
Data sources	Deck Logbook, Nautical Charts
Location where records are kept	Onboard
Name of IT system used (where applicable)	Not applicable

Table D.3. Methods to be used to treat data gaps regarding cargo carried

Title of method	Method to treat data gaps regarding cargo carried
Formulae used	Cargo carried = Measured volume displacement * water density — ship's lightweight – weight of ballast water on board — weight of fresh water on board — weight of fuel oil on board —ship’s constant
Description of method to treat data gaps	In the event of a cargo related document been lost and therefore the occurrence of a data gap, the draft readings shall be used to estimate the cargo carried. From the drafts, the total displacement of the ship is calculated (basis the hydrostatic properties included in the stability booklet or loading computer). By subtracting the Light Weight of the ship, the content in all tanks, the weight of ballast and fresh water as well as consumables, provisions, spares and Crew, the Cargo can be derived. The Chief officer is responsible for determining the cargo carried and recording in the Deck logbook, the captain should review and be ultimately responsible for this. The estimated data for closure of data gap shall be remarked in the voyage report.
Name of person or position responsible for this method	Captain
Data sources	Deck Logbook, Stability Booklet, Loading Computer
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Table D.4. Methods to be used to treat data gaps regarding time spent at sea

Title of method	Method to treat data gaps regarding time spent at sea
Formulae used	Time spent at sea = distance travelled / average speed.
Description of method to treat data gaps	In the event of a data gap related to time spent at sea, the calculation should be done as the above formulae and based on the data regarding to the distance travelled as required in Table C.4 or D.2 and the average speed recorded in the engine look book; The Second officer is responsible for estimating the time spent at sea and recording it in the voyage report, the captain should review and be ultimately responsible for this. The estimated data for closure of data gap shall be remarked in the voyage report.
Name of person or position responsible for this method	Captain
Data sources	Engine Logbook, Deck Logbook
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Part E Management

Table E.1. Regular check of the adequacy of the monitoring plan

Title of procedure	Regular check of the adequacy of the monitoring plan
Reference to existing procedure	1. Ships and Equipment Maintenance Procedure; 2. Monitoring and Measurement Devices Control Procedure 3. Change Control Procedure
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	The monitoring plan should be checked by Captain whether the below situation happened once a half year or before annual leave in order to ensure the adequacy: (a) where new CO_2 emissions occur due to new emission sources or due to the use of new fuels not yet contained in the monitoring plan (b) where a change in availability of data, due to the use of new types of measuring equipment, new sampling methods or analysis methods, or for other reasons, may affect the accuracy of the determination of CO_2 emissions; (c) where data resulting from the monitoring method applied has been found to be incorrect; (d) where any part of the monitoring plan is identified as not being in conformity with the requirements of EU MRV Regulation. If necessary, report to the XX Department to do the modification accordingly.
Name of person or position responsible for this procedure	Captain
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Table E.2. Control activities: Quality assurance and reliability of information technology

Title of procedure	Information Technology Management (e.g. access controls, back up, recovery and security)
Reference for procedure	Document Control Procedure
Brief description of procedure	Backup Servers will occur every day after regular business hours. Full Back up includes all the source files. Only one full backup will be done once a week. Incremental Backups includes only files that have changed since the last full backup.
Name of person or position responsible for data maintenance	Information system manager
Location where records are kept	Company
Name of system used (where applicable)	xxxxx
List of relevant existing management systems	xxxxx

Table E.3. Control activities: Internal reviews and validation of EU MRV relevant data

Title of procedure	Internal reviews and validation of EU MRV relevant data
Reference to existing procedure	Internal Audit Procedure ---
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	The XX Department shall check the completeness of voyage information and review the applied to measurements related to fuel, time, distance and cargo carried after the end of voyage. If discrepancies are found, communicates with the vessel to revise accordingly. The XX shall carried out internal reviews and validation of MRV relevant data during ship internal audit according to the requirements of the EU MRV Regulation. The result of internal review and validation of MRV relevant data should be stated in the internal audit report.
Name of person or position responsible for this procedure	Responsible Person of XX Department and XX Department
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Table E.4. Control activities: Corrections and corrective actions

Title of procedure	Corrections and corrective actions
Reference to existing procedure	Internal Audit Procedure. Monitor procedure. Corrective action and prevention measures procedure.
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	Any non-conformity or misstatement raised during internal MRV review or external MRV verification should be corrected as the requirements of existing procedure. The prevention measurement should be taken and implemented if necessary.
Name of person or position responsible for this procedure	Responsible Person of XX Department
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Table E.5. Control activities: Outsourced activities (if applicable)

Title of procedure	Outsourced activities
Reference to existing procedure	N.A
Version of existing procedure	N.A
Description of EU MRV procedures if not already existing outside the MP	N.A
Name of person or position responsible for this procedure	N.A
Location where records are kept	N.A
Name of IT system used (where applicable)	N.A

Table E.6. Control activities: Documentation

Title of procedure	Documentation
Reference to existing procedure	Documentation Control Procedure
Version of existing procedure	
Description of EU MRV procedures if not already existing outside the MP	The documents and records generated during the implementation of Monitoring Plan should be controlled according to the requirements of the existing procedure.
Name of person or position responsible for this procedure	XX Department
Location where records are kept	Onboard and Company
Name of IT system used (where applicable)	N.A

Part F Further information

Table F.1. List of definitions and abbreviations

<table>
<tr><td>Abbreviation, acronym, definition</td><td>Explanation</td></tr>
<tr><td>Definition</td><td>The definitions specified in EU Regulation 2015/757, 2016/2072, 2016/1928 apply to this Monitoring Plan</td></tr>
<tr><td>EU Voyage</td><td>Refers to the voyages entering or leaving the loading/unloading ports under European jurisdiction, as well as the voyages between the loading/unloading ports under European jurisdiction.</td></tr>
<tr><td>Ports of Call under the Jurisdiction of a Member State</td><td>Refers to ports of call located on "EU territory", (in other words, to which EU law fully applies). Not all ports belonging to an EU Member State are EU territories (see list below).

<table><tr><td>Greenland and the Faroe Islands</td></tr><tr><td>French Polynesia, New Caledonia, Saint Barthélemy, Saint Pierre and Miquelon, Wallis and Futuna</td></tr><tr><td>Aruba, Bonaire, Saba, Sint Eustatius, Curaçao, Sint Maarten</td></tr><tr><td>Anguilla, Bermuda, British Antarctic Territory, British Indian Ocean Territory, British Virgin Islands, Cayman Islands, Falkland Islands, Bailiwick of Guernsey, Isle of Man, Jersey, Montserrat, Pitcairn, Henderson, Ducie and Oeno Islands, Saint Helena, Ascension and Tristan da Cunha, South Georgia and the South Sandwich Islands, Turks and Caico Islands, Akrotiri and Dhekelia</td></tr><tr><td>Svarbald</td></tr></table>
Ports of call in the nine EU outermost regions (Açores, Madeira, Canarias, Guadeloupe, French Guyana, Martinique, Mayotte, Saint Martin and Reunion), and also ports of call in Norway (except those on Svarbald) and Iceland qualify as EU ports of call.

EEA Member States' Overseas Countries and Territories which do not qualify as EU ports of call.</td></tr>
</table>

Table F.2. Additional information

Nil

Attachment 2

Calculation sample of voyage data

						Arrival information			Departure information				
Location	Within/ outside of anchorage area	Arrival time (GMT)	Activity	Departure time (GMT)	Distance travelled from last port	HFO Remaining onboard	MDO Remaining onboard	Cargo carried	HFO Remaining onboard	MDO Remaining onboard	Cargo carried	HFO Amount of bunkering	MDO Amount of bunkering
Qingdao	Within	2016/8/29 12:00	Loading	2016/8/30 08:00	600	2033	203	0	2032	202	30000		
Ningbo	Within	2016/9/1 12:00	Loading	2016/9/2 09:00	400	2000	200	30000	1999	198	60000		
Within anchorage of Ningbo	Within	2016/9/2 11:00	Shelter from wind	2016/9/5 10:00	3	1998	197	60000	1996	192	60000		
Drifting	At the sea	2016/9/8	Drifting	2016/9/8	1050	1916	188	60000	1916	188	60000		

		11:00	due to malfunction on main engine	17:30									
Singapore	Within	2016/9/11 19:00	Bunkering	2016/9/12 03:00	1150	1830	183	60000	2499	182	60000	670	0
Said	Within	2016/9/28 06:00	Change crew	2016/9/28 20:00	5000	2100	158	60000	2099	157	60000		
Rotterdam outside of anchorage area	Outside	2016/10/9 06:30	STS	2016/10/9 19:30	3434	1840	141	60000	1839	140	45000		
Rotterdam within anchorage area	Within	2016/10/9 21:00	Anchoring to wait for berth	2016/10/15 09:00	6	1823	139	45000	1822	131	45000		
Rotterdam	Within	2016/10/15 11:00	unloading	2016/10/17 18:00	3	1820	130	45000	1819	126	20000		
Hamburger	within	2016/10/18 15:00	unloading	2016/10/19 22:30	254	1798	124	20000	1796	123	0		

Attachment 3

Template for emissions report

Part A Data identifying the ship and the company

1) Name of the ship

2) IMO identification number

3) a) Port of registry OR b) Home port

4) Ship category [drop down menu: 'Passenger ship', 'Ro-ro ship', 'Container ship', 'Oil tanker', 'Chemical tanker', 'LNG carrier', 'Gas carrier' , 'Bulk carrier', 'General cargo ship', 'Refrigerated cargo carrier', 'Vehicle carrier', 'Combination carrier', 'Ro-pax ship', 'Container/ ro-ro cargo ship', 'Other ship types']

5) Ice class of the ship (non-mandatory – only if included in the monitoring plan) [drop down menu: Polar Class PC1 - PC7]

6) Technical efficiency of the ship

a) Energy Efficiency Design Index (EEDI), where required by MARPOL, Annex VI, Chapter 4, Regulations 19 and 20, expressed in grams CO_2/ tonne-nautical mile OR

b) Estimated Index Value (EIV), calculated in accordance with IMO Resolution MEPC.215 (63), expressed in grams CO_2/ tonne-nautical mile

7) Name of the shipowner

8) Address of the shipowner and its principal place of business: address line 1, address line 2, city, state/ province/ region, postcode/ ZIP, Country

9) Name of the company (only if not the shipowner)

10) Address of the company (only if not the shipowner) and its principal place of business: address line 1, address line 2, city, state/ province/ region, postcode/ ZIP, Country

11) Contact person

a) Name: title, first name, surname, job title

b) Address: address line 1, address line 2, city, state/ province/ region, postcode/ ZIP, Country

c) Telephone

d) e-mail

Part B Verification

1) Name of the verifier

2) Address of the verifier and its principal place of business: address line 1, address line 2, city, state/ province/ region, postcode/ ZIP, Country

3) Accreditation number

4) Verifier's statement

Part C Information on the monitoring method used and the related level of uncertainty

1) Emission source [drop down menu: 'All sources', 'Main engines', Auxiliary engines', 'Gas turbines', 'Boilers', Inert gas generators']

2) Monitoring method(s) used (per emission source) [drop down menu: 'Method A: BDN and periodic stocktakes of fuel tanks', 'Method B: Bunker fuel tank monitoring on-board', 'Method C: Flow meters for applicable combustion processes', 'Method D: Direct CO_2 emissions measurement']

3) Related level of uncertainty, expressed as % (per monitoring method used)

Part D Results from annual monitoring of the parameters in accordance with Article 10

Fuel consumption and CO_2 emitted

1) Amount and emission factor for each type of fuel consumed in total:

a) Fuel type [drop down menu: 'Heavy Fuel Oil (HFO)', 'Light Fuel Oil (LFO)', 'Diesel/Gas Oil (MDO/MGO)', 'Liquefied Petroleum Gas (Propane/Butane, LPG)', 'Liquefied Natural Gas (LNG)', 'Methanol', 'Ethanol', 'Other fuel with non-standard emission factor']

b) Emission factor, expressed in tonnes CO_2/ tonne fuel

c) Total fuel consumption, expressed in tonnes fuel

2) Total aggregated CO_2 emitted within the scope of the regulations, expressed in tonnes CO_2

3) Aggregated CO_2 emissions from all voyages between ports under a Member State's jurisdiction, expressed in tonnes CO_2

4) Aggregated CO_2 emissions from all voyages which departed from ports under a Member State's jurisdiction, expressed in tonnes CO_2

5) Aggregated CO_2 emissions from all voyages to ports under a Member State's jurisdiction, expressed in tonnes CO_2

6) CO_2 emissions which occurred within ports under a Member State's jurisdiction at berth, expressed in tonnes CO_2

7) Total fuel consumption and total aggregated CO_2 emitted assigned to passenger transport (for ro-pax ships), expressed in tonnes fuel and in tonnes CO_2

8) Total fuel consumption and total aggregated CO_2 emitted assigned to freight transport (for ro-pax ships), expressed in tonnes fuel and in tonnes CO_2

9) Total fuel consumption and total aggregated CO_2 emitted on laden voyages (voluntary), expressed in tonnes fuel and in tonnes CO_2

10) Total fuel consumption for cargo heating (for chemical tankers, voluntary), expressed in tonnes fuel

11) Total fuel consumption for dynamic positioning (for oil tankers and 'other ship types', voluntary), expressed in tonnes fuel

Distance travelled, time spent at sea and transport work

1) Total distance travelled, expressed in nautical miles

2) Total distance travelled when navigating through ice (voluntary), expressed in nautical miles

3) Total time spent at sea, expressed in hours

4) Total time spent at sea when navigating through ice (voluntary), expressed in hours

5) Total transport work, expressed in

passenger-nautical miles (for passenger ships)

tonne-nautical miles (for ro-ro ships, container ships, oil tankers, chemical tankers, gas carriers, bulk carriers, refrigerated cargo carriers, vehicle carriers, combination carriers)

cubic meter-nautical miles(for LNG carriers, container/ ro-ro cargo ships)

deadweight-tonne carried-nautical miles (for general cargo ships)

passenger-nautical miles AND tonne-nautical miles (for ro-pax ships)

tonne-nautical miles OR deadweight-tonne carried-nautical miles (for other ship types)

6) Second parameter for total transport work (voluntary), expressed in

tonne-nautical miles (for general cargo ships)

deadweight-tonne carried-nautical miles (for vehicle carriers)

7) Average density of the cargoes transported in the reporting period (for chemical tankers, bulk carriers and combination carriers, voluntary), expressed in tonnes per cubic meter

Energy efficiency

1) Average energy efficiency

a) Fuel consumption per distance, expressed in kilogram per nautical mile

b) Fuel consumption per transport work, expressed in grams per passenger-nautical mile, grams per tonne-nautical mile, grams per cubic meter-nautical mile, grams per deadweight-tonne carried-nautical mile, grams per passenger-nautical mile AND grams per passenger-nautical mile, as applicable to relevant ship category

c) CO_2 emissions per distance, expressed in kilograms CO_2 per nautical mile

d) CO_2 emissions per transport work, expressed in grams CO_2 per passenger-nautical mile , grams CO_2 per tonne-nautical mile, grams CO_2 per cubic meter-nautical mile, grams CO_2 per deadweight-tonne carried-nautical mile or grams CO_2 per passenger-nautical mile and grams CO_2 per tonne-nautical mile, as applicable to relevant ship category

2) Second parameter for average energy efficiency per transport work (voluntary), expressed in

grams per tonne-nautical mile and grams CO_2 per tonne-nautical mile (for general cargo ships)

grams per deadweight-tonne carried-nautical mile and grams CO_2 per deadweight-tonne carried-nautical mile (for vehicle carriers)

3) Differentiated average energy efficiency (fuel consumption and CO_2 emitted) of laden voyages (voluntary), expressed in

kilograms per nautical mile

grams per tonne-nautical mile, grams per cubic meter-nautical mile, grams per deadweight-tonne carried-nautical mile or grams per passenger-nautical mile, as applicable to relevant ship category

kilograms CO_2 per nautical mile

grams CO_2 per tonne-nautical mile, grams CO_2 per cubic meter-nautical mile, grams CO_2 per deadweight-tonne carried-nautical mile or grams CO_2 per passenger-nautical mile, as applicable to relevant ship category

4) Additional information to facilitate the understanding of the reported average operational energy efficiency indicators of the ship (voluntary)

Attachment 4

STANDARDIZED DATA REPORTING FORMAT FOR THE DATA COLLECTION SYSTEM

APPENDIX 3

STANDARDIZED DATA REPORTING FORMAT FOR THE DATA COLLECTION SYSTEM

Method used to measure fuel oil consumption[9]	Fuel oil consumption (t)										Hours underway (h)	Distance Travelled (nm)	Power output (rated power) (kW)[8]		Ice class[7] (if applicable)	EEDI (if applicable)[6] (gCO_2/t.nm)	DWT[5]	NT[4]	Gross tonnage[3]	Ship type[2]	IMO number[1]	End date (dd/mm/yyyy)	Start date (dd/mm/yyyy)
	Other(……)	(Cf i:……)	Ethanol (Cf: 1.913)	Methanol (Cf: 1.375)	LNG (Cf: 2.750)	LPG (Butane) (Cf: 3.030)	LPG (Propane)	HFO (Cf: 3.114)	LFO (Cf: 3.151)	Diesel/Gas Oil (Cf: 3.206)			Auxiliary Engine(s)	Main Propulsion Power									

1 In accordance with the *IMO Ship Identification Number Scheme*, adopted by the Organization by resolution A.1078(28).
2 As defined in regulation 2 of MARPOL Annex VI or other (to be stated).
3 Gross tonnage should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969.
4 NT should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969. If not applicable, note "N/A".
5 DWT means the difference in tonnes between the displacement of a ship in water of relative density of 1025 kg/m^3 at the summer load draught and the lightweight of the ship. The summer load draught should be taken as the maximum summer draught as certified in the stability booklet approved by the Administration or an organization recognized by it.
6 EEDI should be calculated in accordance with the *2014 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, as amended, adopted by resolution MEPC 245(66). If not applicable, note "N/A".
7 Ice class should be consistent with the definition set out in the *International Code for ships operating in polar waters (Polar Code)*, adopted by resolutions MEPC.264(68) and MSC.385(94)). If not applicable, note "N/A".
8 Power output (rated power) of main and auxiliary reciprocating internal combustion engines over 130 kW (to be stated in kW). Rated power means the maximum continuous rated power as specified on the nameplate of the engine.
9 Method used to measure fuel oil consumption: 1: method using BDNs, 2: method using flow meters, 3: method using bunker fuel oil tank monitoring

Attachment 5 Sample of data collection and summary

BDN summary table

Bunkering data (day/month/year)	Type of Fuel Oil/Mass（MT）							Description
	DO/GO	LFO	HFO	LPG(P)	LPG(B)	LNG	Others(C_F)	
① BDN								
09/01/2019								
02/05/2019			150					
08/07/2019								
09/10/2019								
10/12/2019			300					
①Amount of annual bunkering	0	0	450	0	0	0	0	
② Correction of fuel oil remaining in the tank								
01/01/2019			400					
31/12/2019			200					
②Correction of fuel oil remaining in	0	0	200	0	0	0	0	The difference between beginning and
③ Other correction								
30/03/2019								
15/09/2019								
31/12/2019								
③Annual other correction	0	0	0	0	0	0	0	
Annual fuel oil consumption								
Annual fuel oil consumption (①+②+③)	0	0	650	0	0	0	0	

Data collected summary sample

Start data (dat/month/year)	End data* (dat/month/year)	Distance travelled	Time spent at sea	Fuel oil consumption (MT)						
				DO/GO	LFO	HFO	LPG(P)	LPG(B)	LNG	其他(CF)
01/01/2019		210	24:00	2	3	19	0	0	0	0
02/01/2019		283	24:00	2	0	20	0	0	0	0
03/01/2019		321	24:00	2	0	18	0	0	0	0
04/01/2019		221	24:00	1	0	19	0	0	0	0
05/01/2019		320	18:00	2	0	13	0	0	0	0
06/01/2019		302	24:00	2	0	17	0	0	0	0
07/01/2019		210	24:00	1	0	19	0	0	0	0
08/01/2019		302	24:00	1	0	20	0	0	0	0
09/01/2019		280	24:00	2	0	21	0	0	0	0
10/01/2019		50	01:00	3	0	2	0	0	0	0
11/01/2019		198	24:00	3	0	21	0	0	0	0
·		·	·	·	·	·	·	·	·	·
·		·	·	·	·	·	·	·	·	·
·		·	·	·	·	·	·	·	·	·
30/12/2019		320	24:00	0	0	20	0	0	0	0
31/12/2019		213	24:00	1	0	17	0	0	0	0
Annual summary										

Ship Energy Efficiency Management Plan Part II

Ship Fuel Consumption Data Collection Plan

XXXXXXX Co., Ltd.

Ship Particulars

Name of Ship	
IMO Number	
Call Sign	
Port of Registry	
Flag	
Ship Type	
Gross Tonnage	
Net Tonnage	
Deadweight	
EEDI (if applicable)	
Ice class	
Company	

Record of Revision of Fuel Oil Consumption Data Collection Plan

Date of revision	Revised provision

Contents

1. Introduction

1) The SEEMP Part II has been developed in accordance with the standards described in MARPOL Annex VI, as amended by Resolution MEPC.278(70), Chapter 4: Regulations on Energy Efficiency for Ships, Regulations 22.2 and 22A.

2) The SEEMP Part II has been developed taking into account the information contained in Resolution MEPC.282(70) – 2016 Guidelines for the Development of a SEEMP – as identified by the IMO.

3) Data collected for the current calendar year shall be readily accessible for at least one year from the end of the current calendar year and shall be made available to the Administration or any organisation duly authorised by it upon request, as required by MARPOL Annex VI, Chapter 4, Regulation 22A.8.

4) The purpose of the plan is to develop a ship-specific method to collect, aggregate and report ship data with regard to annual fuel oil consumption, distance travelled, hours underway, and other data required by Regulation 22A of MARPOL Annex VI to be reported to the Administration or any organisation duly authorised by it.

5) Pursuant to Regulation 5.4.5 of MARPOL Annex VI, the Administration shall ensure that the ship's SEEMP complies with Regulation 22.2 of MARPOL Annex VI prior to collecting any data.

6) The plan has been checked by ISC on behalf of the Flag Administration and no alteration or revision shall be made to any part of it without the prior approval of the Administration or ISC.

2. Scope

1) Each ship of 5,000 GT and above shall have on board a ship fuel oil consumption data collection plan describing the methodology that will be used to collect the data required by Regulation 22A.1 of MARPOL Annex VI and the processes that will be used to report the data to the ship's Administration or any organisation duly authorised by it.

2) A copy of the approved data collection plan shall be provided on board and this shall be done prior to collecting data under Regulation 22A of MARPOL Annex VI in order to ensure the methodology and processes are in place prior to the beginning of the ship's first reporting period.

3. Objectives

The data collection plan contains the following information:

1) Description of the method used to measure fuel oil consumption.

2) Description of the method used to measure distance travelled.

   Description of the method used to measure hours not at berth.

3) Description of the data quality control measures.

4) Description of the processes that will be used to report the data.to the Administration

4. Methodology for collecting data on fuel oil consumption

4.1 Ship engines and other fuel oil consumers and fuel oil types used

	Engines and other fuel oil consumers	Power	Fuel oil types
1	Type/model of main engine	(kW)	
2	Type/model of No.1 auxiliary engine	(kW)	
3	Type/model of No.2 auxiliary engine	(kW)	
4	……..	(kW)	
5	Boiler	(……)	
6	Inert gas generator (if applicable)	(……)	

4.1.1 Procedures, systems and responsibilities used to update the completeness of ship engines and other fuel oil consumers

Tittle of procedure	Managing the completeness of the list of fuel oil consumers
Reference to existing procedure	
Description of the procedure if not already existing	

The company should provide the detailed description of procedure, system and responsibilities to trace the completeness of ship engines and other fuel oil consumers.

For example:

If any change happened on ship engines or other fuel oil consumers, the responsible person should notice the company and provide related supporting documents. The company should confirm and update the list and other relevant reports and documents, to ensure the completeness and accuracy of the fuel oil consumer onboard, when necessary, submit the SEEMP PART II to Administration or RO for modification approval.

4.2 Emission factor

Fuel type	C_F (t - CO2/ t - Fuel)
Heavy Fuel Oil (Reference: ISO 8217 Grades RME through RMK)	3.114
Light Fuel Oil (Reference: ISO 8217 Grades RMA through RMD)	3.151
Diesel/Gas Oil (Reference: ISO 8217 Grades DMX through DMB)	3.206
Liquefied Petroleum Gas (LPG）(Propane)	3.000
Liquefied Petroleum Gas (LPG）(Butane)	3.030
Liquefied Natural Gas (LNG）	2.750
Methanol	1.375
Ethanol	1.913
Other fuel with non-standard emission factor	--

4.3 Method to measure fuel oil consumption（Only retain a method applied onboard）

Method	Description
BDNs	Annual consumption of the fuel for reporting period = the fuel at the beginning of the period + deliveries – fuel available at the end of the period – de-bunkered fuel 1. The tank reading should be carried out at the beginning and the end of the period, fuel oil tank readings should be carried out by the methods of sounding and dip tapes(automated systems) 2. In the case of a voyage that extends across the data reporting period, the tank reading should occur by tank monitoring at the ports of departure and arrival of the voyage and by statistical methods such as rolling average using voyage days; 3. Any supplemental data used for closing identified difference in bunker quantity should be supported with documentary evidence.
Flow Meters	Annual consumption of the fuel for reporting period = the sum of daily fuel consumption values from 1st January to 31st December If the method of Flow Meters is chosen, the Data Collection Plan should set out information about the ship's flow meters（their link to specific fuel oil consumers）and how the data will be collected and summarized, as well as how necessary tank readings should be conducted. Any consumer not monitored with a flow meter should be clearly identified, and an alternative fuel oil consumption measurement method should be included. Calibration of the flow meters should be specified. Calibration and maintenance records should be available on board; It should not be necessary to correct this fuel oil measurement method for sludge if the flow meter is installed after the daily tank as sludge will be removed from the fuel oil prior to the daily tank;
Bunker Fuel Oil-Tank Monitoring Onboard	Annual consumption of the fuel for reporting period = the sum of daily fuel consumption values from 1st January to 31st December 1. The tank readings shall be carried out by soundings and dip tapes (or automated systems) daily when the ship is at sea and each time the ship is bunkering or de-bunkering. 2. The summary of monitoring data containing records of measured fuel oil consumption should be available on board.

4.3.1 Description of measurement instruments involved

Name of measurement equipment	Elements applied to (e.g. fuel oil consumer, tanks)	Technical description (specification, maintenance intervals)
Sounding Scale	Fuel Oil Tanks	Range：0~50M Accuracy： 0.001M Year of manufacture：2015 Maintenance intervals：1 （year）

4.3.2 Procedure for determining fuel bunkered and fuel in tanks

Tittle of procedure	Determining fuel bunkered and fuel in tanks
Reference to existing procedure	
Description of the procedure if not already existing	The fuel oil measurement should be done after arrival at the first berth and before departure of last berth as well as before and after bunkering. The responsible person shall perform the measurement as per specified method and all measurement instruments shall be in good condition. Except measuring and recording the height of liquid, temperature of fuel oil, the heel, trim and draft should also be recorded in order to do the correction according to Sounding Table. （applied to the method of BDN） The chief engineer should review the record and is ultimately responsible for this.

4.3.4 Regular cross-checks between bunkering quantity as provided by BDN and bunkering quantity indicated by on-board measurement

Tittle of procedure	Regular cross-checks between bunkering quantity as provided by BDN and bunkering quantity indicated by on-board measurement
Reference to existing procedure	
Description of the procedure if not already existing	The Chief Engineer performs cross-checks between the sounding readings and the Bunker Delivery Note(s), every time upon completion of the bunkering operations. The quantity and receipt number of the Bunker Delivery Note(s) are recorded into the Sounding Form located on board.

5. Methodology for collecting data on distance travelled

Tittle of procedure	Recording and determining the distance per voyage made
Reference to existing procedure	
Description of the procedure if not already existing	The distance travelled shall be determined from berth of the port of departure to berth of the port of arrival and shall be expressed in nautical miles; The data of GPS shall be used for determining distance travelled which may be calculated by the Electronic Chart Display and Information System (ECDIS). The Second Officer is responsible for recording the distance travelled in the deck logbook and the Captain should review the records prior to submit it to xxxxx system. The annual distance travelled = the sum of the distance travelled per voyage

6. Methodology for collecting data on hours underway

Tittle of procedure	Determining and recording the hours underway from berth to berth
Reference to existing procedure	
Description of the procedure if not already existing	The hours underway per voyage shall be calculated from the arrival at the first berth to the departure of the last berth in a port. The time spent at sea shall exclude the mooring time of the sole purposes of refuelling, obtaining supplies, relieving the crew, going into dry-dock or making repairs to the ship and/or its equipment, stops in port because the ship is in need of assistance or in distress, ship-to-ship transfers carried out outside ports, and stops for the sole purpose of taking shelter from adverse weather or rendered necessary by search and rescue activities, and so on of which happened during the voyage. The GPS timer will be used for determining the hours underway with the unit of hour. The second officer is responsible for calculating the hours underway of voyage according to the definition and recording in voyage documents. The captain should review the accuracy of the records that made by second officer and submit it to xxxxx system. The annual hours underway = the sum of the hours underway per voyage

7. Processes that will be used to report the data to Administration

Process and requirements	1. By the end of each voyage, the shipmaster (or company responsible person) shall upload the voyage monitoring data to ISC through ISC Ship Efficiency Data Collection and Monitoring System / Standard Data Template / Company System. 2. By 31 March of each year, the company shall report the annual monitoring data to IS Class authorised by Flag State in the standardised format shown in Appendix A.（The ISC web MRV system could be used to output the annual monitoring report automatically ） Additional documentation required is as follows: 1) A copy of the ship's data collection plan； 2) Summaries of BDNs, in sufficient detail to show that all fuel oil consumed by the ship is accounted for (see sample form of BDN summary set out in Appendix B)； 3) Summaries of disaggregated data of fuel oil consumption, distance travelled and hours underway, in a format specified by the Administration (see sample form of data summary set out in Appendix B)；（The ISC ship MRV monitoring system could be used to output the summary of voyage report automatically） 4) Information to demonstrate that the ship followed the data collection plan set out in its SEEMP Part II, including information on data gaps and how they were filled, as well as how the event that caused each data gap was resolved； 5) Copies of documents containing information on the amount of fuel oil consumption, distance travelled and hours underway for the ship's voyages during the reporting period (e.g. the ship's official logbook, oil record book, BDNs, and arrival/noon/departure reports).

8. Data Quality

8.1. The method to be used to treat data gap regarding fuel consumption

Tittle of procedure	Method to be used to estimate fuel consumption
Reference to existing procedure	Bunker Fuel Tank Monitoring Onboard
Description of the method to treat data gap	Fuel measurement should be done daily when the ship is at sea or port and each time the ship is bunkering or de-bunkering. In the event of a data gap due to unexpected conditions, the Chief engineer is responsible for the closure of data gap as per the relevant measurement data or closing it by applying formulae, historic data etc. The estimated data for closure of data gap shall be remarked in the voyage report. The amount of fuel bunkered = the difference between the amount of fuel oil remain on board before and after bunkering; The consumption of fuel oil per voyage= from the departure port to arrival port Σ daily amount of fuel consumption The consumption of fuel oil at berth= from arrival port to departure port Σ daily amount of fuel oil consumption

8.2. The method to be used to treat data gap regarding distance travelled

Tittle of procedure	Method to be used to treat data gas regarding distance travelled
Description of the method to treat data gap	When use the formulae to treat data gap of distance travelled, the route changed due to the bad weather and any other limitation should be considered, the conservative factor should be corrected in order to the data of distance travelled will not be underestimated; In order to ensure the data can be traced, all significant deviation from original route should be recorded in the deck logbook; The second officer is responsible for treating the data gap and the captain should review and be ultimately responsible for this. The estimated data for closure of data gap shall be remarked in the voyage report. Distance travelled = most direct route between port of departure and port of arrival * conservative correction factor

8.3. The method to be used to treat data gap regarding hours not at berth

Tittle of procedure	Method to be used to treat data gas regarding hours not at berth
Description of the method to treat data gap	In the event of a data gap related to hours not at berth, the calculation should be done as the below formulae and based on the data regarding to the distance travelled and the average speed recorded in the engine look book; The Second officer is responsible for estimating the time spent at sea and recording it in the voyage report, the captain should review and be ultimately responsible for this. The estimated data for closure of data gap shall be remarked in the voyage report.

8.4. Internal reviews and validation of relevant data

Tittle of procedure	Internal reviews and validation of relevant data
Reference to existing procedure	
Description of the procedure if not already existing	The person in charge of XXXX Department shall check the completeness of voyage information and review the data of fuel oil consumption, distance travelled and hours not at berth. If any problem happened, should communicate with the vessel to revise accordingly. If no problem, should upload the data to ISC EEMS. The XXXX Department shall carried out internal reviews and validation of relevant data during ship internal audit according to the requirements of the EU MRV Regulation. The result of internal review and validation of MRV relevant data should be stated in the internal audit report

8.5. Documentation Management

Tittle of procedure	Documentation Management
Reference to existing procedure	Document Control Procedure
Description of the procedure if not already existing	The documents and records generated during the implementation of the plan should be controlled according to the requirements of the existing procedure.

9. Appendices

9.1. Appendix A – Standardised data reporting format for the data collection system

STANDARDIZED DATA REPORTING FORMAT FOR THE DATA COLLECTION SYSTEM

Method used to measure fuel oil consumption9		
Fuel oil consumption (t)	Other(… .....)	
	(Cf ;…..)	
	Ethanol (Cf: 1.913)	
	Methanol (Cf: 1.375)	
	LNG（Cf: 2.750）	
	LPG (Butane) (Cf: 3.030)	
	LPG (Propane)（Cf: 3.000）	
	HFO (Cf: 3.114)	
	LFO (Cf: 3.151)	
	Diesel/Gas Oil (Cf: 3.206)	
Hours underway (h)		
Distance Travelled (nm)		
Power output (rated power) (kW)[8]	Auxiliary Engine(s)	
	Main Propulsion Power	
Ice class[7] (if applicable)		
EEDI (if applicable)[6] (gCO2/t.nm)		
DWT[5]		
NT[4]		
Gross tonnage[3]		
Ship type[2]		
IMO number[1]		
End date (dd/mm/yyyy)		
Start date (dd/mm/yyyy)		

1. In accordance with the IMO Ship Identification Number Scheme, adopted by the Organization by resolution A.078(28).
2. As defined in regulation 2 of MARPOL Annex VI or other (to be stated).
3. Gross tonnage should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969.
4. NT should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969. If not applicable, note "N/A".
5. DWT means the difference in tonnes between the displacement of a ship in water of relative density of 1025 kg/m3 at the summer load draught and the lightweight of the ship. The summer load draught should be taken as the maximum summer draught as certified in the stability booklet approved by the Administration or an organization recognized by it.
6. EEDI should be calculated in accordance with the 2014 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships, as amended, adopted by resolution MEPC 245(66). If not applicable, note "N/A".
7. Ice class should be consistent with the definition set out in the International Code for ships operating in polar waters (Polar Code), adopted by resolutions MEPC 264(68) and MSC 385(94)). If not applicable, note "N/A".
8. Power output (rated power) of main and auxiliary reciprocating internal combustion engines over 130 kW (to be stated in kW). Rated power means the maximum continuous rated power as specified on the nameplate of the engine.
9. Method used to measure fuel oil consumption: 1: method using BDNs, 2: method using flow meters, 3: method using bunker fuel oil tank monitoring

9.2. Appendix B – Sample of the BDN summaries and sample of the collected data summaries

SAMPLE OF THE BDN SUMMARIES

Date of Operations (dd/mm/yyyy)	Fuel Oil Type/Mass(MT)							Descriptions
	DO/GO	LFO	HFO	LPG(P)	LPG(B)	LNG	Others(C_F)	
① BDN								
09/01/2019								
02/05/2019			150					
08/07/2019								
09/10/2019								
10/12/2019			300					
①Annual Supply Amount	0	0	450	0	0	0	0	
②Correction for the tank oil remaining								
01/01/2019			400					
31/12/2019			200					
②Correction for the tank oil remaining	0	0	200	0	0	0	0	The difference in the amount of the remaining tank oil
③Other corrections								
30/03/2019								
15/09/2019								
31/12/2019								
③Annual other corrections	0	0	0	0	0	0	0	
Annual Fuel Consumption								
Annual Fuel Consumption (①+②+③)	0	0	650	0	0	0	0	

SAMPLE OF THE COLLECTED DATA SUMMARIES

Date from (dd/mm/yyyy)	Date to* (dd/mm/yyyy)	Distance Travelled (n.m)	Hours Underway (hh:mm)	Fuel Consumption (Metric tons)						
				DO/GO	LFO	HFO	LPG(P)	LPG(B)	LNG	Other(CF)
01/01/2019		210	24:00	2	3	19	0	0	0	0
02/01/2019		283	24:00	2	0	20	0	0	0	0
03/01/2019		321	24:00	2	0	18	0	0	0	0
04/01/2019		221	24:00	1	0	19	0	0	0	0
05/01/2019		320	18:00	2	0	13	0	0	0	0
06/01/2019		302	24:00	2	0	17	0	0	0	0
07/01/2019		210	24:00	1	0	19	0	0	0	0
08/01/2019		302	24:00	1	0	20	0	0	0	0
09/01/2019		280	24:00	2	0	21	0	0	0	0
10/01/2019		50	01:00	3	0	2	0	0	0	0
11/01/2019		198	24:00	3	0	21	0	0	0	0
.		.	.	.	.	.	.	.	.	.
.		.	.	.	.	.	.	.	.	.
.		.	.	.	.	.	.	.	.	.
30/12/2019		320	24:00	0	0	20	0	0	0	0
31/12/2019		213	24:00	1	0	17	0	0	0	0
Annual Total										

*In the case of daily underlying data, this column would be left in blank.

Explanatory remarks;

If the listed data in the format have been recorded in a Comp any 's electronic reporting system, the data is acceptable to be submitted in the existing format instead of submitting the data by this format.