V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

EU MRV and "Navigator Insight"

Why:

- "What is **not measured** - cannot be controlled"

- **Each tonne of (petroleum based) fuel consumed emits approximately 3 tonnes of CO2**

- **CO2** is considered as one of the **main Green-House Gases (GHG) contributing to global warming** and climate change

- There is a lot of political **pressure to include shipping under GHG control**, reduction and/or trading schemes or taxes

State of play:

- The European Union has issued **Regulation (EU) 2015/757 on the Monitoring (M), Reporting (R) and Verification (V) [=MRV] of Carbon Dioxide (CO$_2$) emissions**, based on fuel consumption, from maritime transport

- **As of 01 January 2018**, all ships with GT>5000 sailing from/to/between EU (and European Economic Area (EEA) like Iceland and Norway) ports **must monitor and report fuel consumption and voyage data and also work (for passenger ships – the number of passengers carried)** to a Verifier

- We have contracted **DNVGL** as a Verifier. **The Verifier will verify all of our data reported for the whole 2018** and submit an emission report to EMSA (The European Maritime Safety Agency) by 31 April 2019. Each ship that has called EU/EEA ports and has monitored and reported data for 2018 will be **issued then with a Document of Compliance (DoC) by 30 June 2019**

- **Port State Control** in EU/EEA ports **may inspect ships for MRV compliance** starting as of 01 Jan 2018

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships
Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

Going Forward:

- **The IMO** is implementing a similar MRV regulation that **will apply worldwide as of 01 January 2019.** This will be implemented as a **revised section of the SEEMP** (Shipboard Energy Efficiency Monitoring Plan)

- Ships will monitor and report the fuel, voyage and work data for all voyages to their **Class Organizations who will serve as Verifiers**

- **The Verifiers will report the verified data to the ship's Flag State** who will report it further to IMO

- The EU and IMO MRV regulations may unfortunately run in parallel for some time, and it is expected that the EU aligns with IMO going forward

Compliance:

- All Leisure ships have been issued with a ship specific **MRV Plan and a relevant Statement of Compliance** by DNVGL for it which must be available onboard.

- We have contracted for use onboard our managed Leisure ships a software platform by DNVGL – "Navigator Insight" (NI) for monitoring and reporting of voyage, fuel and work data

- All Leisure ships have the NI software already installed onboard and assigned persons from the Bridge and ECR Teams **must start continuous reporting by 01 January 2018**

- Each ship's Fleet Cell will monitor the MRV reporting of the ship in a shoreside / frontend server application for data quality and plausibility

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
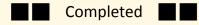**HSEQ MANAGEMENT LEISURE**

Actions required

All Deck and Engine Officers incl. Master and Chef Engineer

1) Get to know your ships specific MRV Plan

2) Familiarize yourselves with the relevant procedures and gap methods in the MRV plan

> **Note:** See Attachment **1)** with all extracts of the V.Ships Leisure's EU MRV Plan's Procedures and Gap Methods
> The Company preferred ones are highlighted in green therein however some of these may be differently assigned to your ship as applicable

3) Review the MRV Plan periodically as part of the Master's review for the effectiveness of the management system (VMS) and advise your DPA cc Leisure.CQ@vships.com for any revisions required

■■ Completed ■■

Assigned person(s) from the Bridge and ECR Team:

> *It is recognized that the Navigator Insight platform is continuously being developed further to better meet the new EU MRV regulation and ships' specifics and operations, so will be therefore subject to frequent upgrades/changes along with this Work Instruction*

1) Be aware of the following specific situations and activities for the purpose of the MRV:

a) Interpret that the MRV term of "embarkation and disembarkation of passengers" refers to CHANGING of passengers

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships
Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

b) Consider that a MRV "voyage" is from the last berth or ship-to-ship transfer (eg tendering) within the limits of a port of call, to the first berth or ship-to-ship transfer (e.g. tendering) in the following port of call

  - Consider a MRV "port of call" as the port where a ship stops to CHANGE passengers
  - Verify port limits as defined by the competent authority or body designated by EU Member States e.g. port authority in each port
  - Ship to ship transfer (called herewith "tendering") of passengers can be done by the ships boats/tenders/zodiacs or shoreside craft

> **Note:** MRV "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

c) Anchoring or Drifting for Ship to Ship transfer of Passengers (e.g. by tendering) for CHANGING:

  - If carried out **outside the limits of a port of call** – consider it as part of the voyage
  - If carried out **within the limits of a port of call**:
    ◆ consider it in the same way as an operation at berth and
    ◆ if done at the CHANGE OF A CRUISE - consider it as the end point of the incoming voyage and/or the start point of next voyage

d) Anchoring for purpose other than tendering for change of passengers:

  - Consider it as part of the voyage
  - Exclude it from the time spent at sea

e) Drifting for purpose other than tendering for change of passengers

  - Consider it as part of the voyage

f) Maneuvering

  - Consider times, distances and consumptions between Departure and Beginning of Sea Passage (BoSP) and between End of Sea Passage (EoSP) and Arrival as SEA time / mileage / consumption for the purpose of the MRV

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

> **EXCLUDE:**
> -stops for the sole purpose 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
> -stops for ship-to-ship transfers carried out outside ports
> -stops for the sole purpose of taking shelter from adverse weather or rendered necessary by search and rescue activities

2) Familiarize yourselves with the Navigator Insight User Manual (available at the Help menu ("?" Symbol) of the software)

and **specifically** with the paragraphs below as applicable to a passenger ship/your operation:

a) 6. Daily tasks

b) 7. Non-daily tasks

c) 8. Overview of event types

3) Consider data quality input

a) During entry use frequently the Check button to see the minimum data required which if not entered would result in an Error (highlighted in red and unable to save and/or send)

b) Resolve any errors (highlighted in red) in order to save and send data

Error   Warning   Information

c) Check and if plausible - consider fixing also any warnings (highlighted in blue)

> **Note:** Warnings are not always critical or strictly related for the purpose of MRV, so you may disregard some of them, if applicable

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

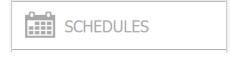4) Enter data on daily basis in "Navigator Insight" as per the following available main Menus

a) **Create a Voyage first** for your forthcoming Cruise by specifying the following Voyage (Cruise) details:

- Voyage No.

- Service: Cruise or Positioning

- Type: One way or Round

◆ If your cruise starts and ends at different ports, select One Way and:

  ▸▸ Enter Ports of Departure and Arrival with their times/zones

  ▸▸ Choose for Stage beginning: either W, E, S, N

  > **Note:** You may skip adding other stages besides the Ports of Arrival and Departure

◆ If your cruise starts and ends in the same port select Round voyage then:

  ▸▸ Select for a Turning port the one that is distance- or time- wise farthest away

  ▸▸ Add its time/zone

  ▸▸ Associate a stage for that turning port – North, South, East or West

  > **Note:** Start and end ports of Cruises (Voyages) would normally always:
  > - have a UN/LCODE identifier
  > - if at anchor/tendering – be within the limits of a port and not a location

b)

Schedules

> *If required by your Port Operations department - only then use the Schedules menu*

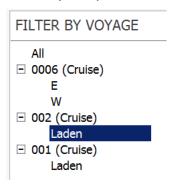| Port	Terminal	Arrival pilot station [LT] ▲	Arrival berth [LT]	Departure berth [LT]	Departure pilot station [LT]	Omit

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships
Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

c)

EVENTS

Chose your pre-created Voyage (Cruise) to create **Events** in them:

FILTER BY VOYAGE

All
☐ 0006 (Cruise)
    E
    W
☐ 002 (Cruise)
    Laden
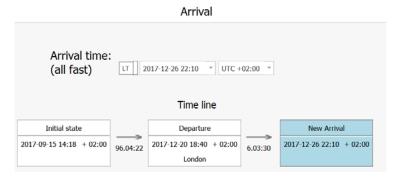☐ 001 (Cruise)
    Laden

New voyage event

- Create a New voyage event for each:

Refer to the following operations for Voyage events:

- *Arrival = Finished with Engines (FWE) after berthing / anchoring, "All fast"*
- *Departure = Stand by Engines (SBE) before un-berthing / weighing up anchor, "Beginning of un-mooring"*
- *Beginning of Sea Passage (BOSP) = FWE after maneuvering for departure*
- *End of Sea Passage (EOSP) = SBE for maneuvering for arrival*
- *Noon = noon position at 12.00 LT for a day at sea*

Departure/Arrival at a port/anchorage location for each cruise leg:

When creating events - consider how they relate chronologically in time by reviewing the Time line boxes

Arrival

Arrival time:
(all fast)   LT 2017-12-26 22:10   UTC +02:00

Time line

Initial state	Departure	New Arrival
2017-09-15 14:18 + 02:00	2017-12-20 18:40 + 02:00	2017-12-26 22:10 + 02:00
	London	

96.04:22   6.03:30

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

◆ Enter for **Departure:**

- ▸▸ Departure port – code and time for beginning of unmooring

- ▸▸ If a departure location is within the limits of a port of call – report it with the port's UN/LCODE

- ▸▸ If a departure location does not have a port UN/LOCODE – report it as "Other location" and:

  (i) Enter Type "Unspecified" or "Unspecified in EU" as applicable whether in EU waters or not

  (ii) Enter a disruptive "Name"

- ▸▸ Enter for Next voyage leg

  (i) If direct navigation is intended – Transit

  (ii) If indirect navigation is intended – Coast (e.g. scenic cruising)

- ▸▸ Enter Distance to go in nm

- ▸▸ Enter details for Passengers:

  (i) Total number of passengers on departure

  (ii) PAX embarked – newly joined passengers in that port/location

  (iii) PAX disembarked – passengers that have left the cruise and are not returning

  > **Note:** Embarkation operations times might be entered (not mandatorily) for cruise change

- ▸▸ Enter Consumptions data:

  (i) duration in hhh:mm

  (ii) per fuel type and

  (iii) per engine type (source) – Main Engine(s) , Auxiliary Engine(s) and Boiler(s) as applicable

  If you are a diesel-electric ship – enter data as if for Main Engines (ME) instead of for Auxiliary Engines (AE)

**V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)**

V.Ships
Leisure

**VERSION: 1 (12/17)
REVISION: 0**

**SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING**

**APPROVED BY:
HSEQ MANAGEMENT LEISURE**

Note:	Oil consumers / Circulating oils for ME, AE, Stern-tube do not need to be entered

- ⯮ Check ROB

  (i) FUEL Oils Virtual Consumers

> *For small uses (up to 100 kg) of **FUEL oil**, unaccounted for the above engine sources (ME, AE or Boilers) like incinerator or Emergency Diesel Generator or tenders' / boats' /zodiacs' consumption or use of fuel oil for cleaning or other purposes – enter such consumption as Virtual Consumption and the Reason thereof*

  (ii) LUBE Oils Virtual Consumers

Note:	Virtual consumers for cylinder oil, circulating oils, stern-tube sealing oil etc do **not** need to be entered

- ⯮ Remarks – enter as feasible for the Departure event

- ◆ Enter for **Arrival:**

  - ⯮ As above (for Departure), as applicable

    (i) If anchoring (or drifting) within port limits without going alongside– enter as Port with the UN/LOCODE data

  - ⯮ Sailed distance in nm

- ◆ Enter **Beginning and End of Sea Passage (B / EoSP)** – for information only in order to distinguish between vessel in sea passage mode and maneuvering mode

  - ⯮ Enter data as above, as applicable

  - ⯮ For EoSP

    (i) enter Weather data

    (ii) if you have navigated through ice – Enter ice information

---

- ◆ If you for a full day at sea- create a **Noon report**

  - ⯮ Enter data as above, as applicable

  - ⯮ enter Weather data

  - ⯮ if you have navigated through ice – Enter ice information

---

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships
Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

◆ <u>If you have an</u> **anchoring or drifting not for tendering**

  ▶▶ enter a voyage event for Begin Anchoring/Drifting for both scheduled (e.g. awaiting canal transit) and unscheduled events (incl. black-out, weather etc)

  (i) Enter kind of and reason for stoppage

  (ii) Enter data as above, as applicable

New special event

- In case of a **deviation / change of destination - create a New special event**

  ◆ Enter data as above, as applicable

New operational event

- Create a new **Operational Event related to fuel quantities**

  ◆ Enter fuel details for each Bunkering event for:

    ▶▶ Bunkering in tanks considered as empty including Sulphur %,

    and/or

    ▶▶ Bunkering in non-empty tanks / mixing (topping-up of tanks) including

      (i) ROB in mt

      (ii) Sulphur %

      (iii) Resulting fuel Sulphur %

    | **Note:** | Bunkering of oils (cylinder, circulating, stern-tube sealing etc) do not need to be entered |

  ◆ Verify fuel ROBs and enter a sounding correction:

    ▶▶ Enter actual ROB for Fuel consumers (Main Engine(s), Auxiliary Engine(s) and Boiler(s)) as applicable

    ▶▶ Specify Reason for correction as relevant:

      (i) Imprecise Consumption Reports,

      (ii) Air bubbles in bunker,

      (iii) Bunkering / barge dispute,

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships
Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

(iv) No difference

Verify fuel ROBs every week and record a sounding correction even if 0, as a good practice

Note: Sounding corrections for oils (cylinder, circulating, stern-tube sealing etc) do not need to be entered

5) Export at least daily the data to the DNVGL NI server

Report data worldwide and daily – the software will automatically filter out the applicable EU/EEA voyages

6) Follow up any requests or enquiries received from your shoreside (Fleet Cell) monitoring of the ship's data input

7) If any errors identified at a later date after export, advise Leisure.MRV@vships.com cc-ing your Fleet Cell to identify best way to correct them

8) Raise any other issues with Leisure.MRV@vships.com cc-ing your Fleet Cell, which may be escalated to DNVGL

■■ Completed ■■

Chief Engineer:

1) Ensure fuel consumption measurements / tank soundings are made for the above events (arrival, departures, noon (if a day at sea)

2) Ensure all fuel measuring devices (sounding tapes, remote gauging, flow-meters, etc) as applicable and as referenced on your MRV plan, are maintained, verified for calibration or renewed on annual basis

3) Following receipts of your fuel analysis reports – verify that fuel data is updated in Navigator insight for relevant values

■■ Completed ■■

V.SHIPS LEISURE
LOCAL WORK INSTRUCTION #69
(REF. V.GROUP CIRC. TEC-0103)

V.Ships
Leisure

VERSION: 1 (12/17)
REVISION: 0

SCOPE / APPLICATION:
OFFICE: HSEQ & TECH. DEPTS
SHIPS: ALL EU/EEA GOING

APPROVED BY:
HSEQ MANAGEMENT LEISURE

References:

1) VMS: <u>Operations</u> > <u>Environmental Management</u> > <u>Air Pollution (MARPOL Annex VI)</u> > <u>8 - Carbon Emissions - MRV (Monitoring Reporting and Verification)</u>

2) Regulation (EU) 2015/757 on the Monitoring, Reporting, and Verification of Carbon Dioxide (CO2) emissions:

   <u>https://ec.europa.eu/clima/policies/transport/shipping_en#tab-0-1</u>

Attachments:

1)   Extracts from V.Ships Leisure's EU MRV Plan for Procedures and Gap Methods

#	Procedures	Proposals			
		1	2	3	4
1	Managing the completeness of the list of emission sources	Whenever a new emission source is installed or an existing emission source is replaced, the monitoring plan will be revised accordingly. The verifiers will be informed without undue delay.	Whenever a new emission source is installed or an existing emission source is replaced, the monitoring plan will be revised accordingly. The verifiers will be informed without undue delay. Additional verification is done by the C/E at vessel take-over, by comparing the as-built engine room drawings with the actual situation on board (to check if, e.g., an auxiliary engine had been replaced or a main engine de-rated). The C/E has to report any discrepancies to the office.		
2	Determining fuel bunkered and fuel in tanks	As the vessel is not equipped with its own flow meter, bunkered fuel volume is measured using the supplier's calibrated gauge (volumetric flow meter or Coriolis mass flow meter). If no flow meter is available, the volume is measured by ullage ('dip method') and calculation using the vessel's tank tables, correcting for trim. The temperature is measured using a calibrated thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). When a volumetric flow meter is used, fuel mass is calculated using the density as given on the bunker delivery note (BDN); this step is not required when a mass flow meter is used. Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.	Bunkered fuel volume is measured using the vessel's volumetric flow meter. The temperature is measured using a calibrated thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). Fuel mass is calculated using the density as given on the bunker delivery note (BDN). Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.	Bunkered fuel volume is measured using the vessel's mass flow meter (Coriolis type). The flow meter gives a direct fuel mass reading.	The bunkered fuel volume is measured by ullage ('dip method') and calculation using the vessel's tank tables, correcting for trim. The temperature is measured using a thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). Fuel mass is calculated using the density as given on the bunker delivery note (BDN). Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.
3	Regular cross-checks between bunkering quantity as provided by BDNs and bunkering quantity indicated by on-board measurement	Whenever bunkering operations are carried out, possible discrepancies between the BDN and the vessel's fuel measurement are brought to the supplier's attention before signing the BDN. If a discrepancy cannot be reconciled, the vessel issues a letter of protest (LoP) before signing the BDN and sends the LoP together with the BDN to the office for further processing.			
4	Recording, retrieving, transmitting and storing information regarding measurements	Fuel consumption data is recorded by automated instruments. Fuel consumption data is collected on board by meters connected to the on-board network. The vessel is reporting the data in electronic form daily to the office in standardized formats; the data is then stored, processed, and analyzed ashore. Relevant data is stored for at least 5 years.	Fuel consumption data is recorded partly by automated instruments and partly manually. The vessel is reporting the data in electronic form daily to the office in standardized formats; the data is then stored, processed, and analyzed ashore. Relevant data is stored for at least 5 years.	Fuel consumption data is recorded manually on board. The vessel is reporting the data in electronic form daily to the office in standardized formats; the data is then stored, processed, and analyzed ashore. Relevant data is stored for at least 5 years.	Fuel consumption data is recorded manually on board. The vessel is reporting the data in electronic form daily to the office in free form (by e-mail, fax, or phone); the data is then recorded, stored, processed, and analyzed ashore. Relevant data is stored for at least 5 years.
5	Ensuring quality assurance of measuring equipment	The fixed measuring devices are regularly tested on board according to manufacturer's instructions. Maintenance jobs are entered into the planned maintenance system (PMS) on board. Performance of the tests is recorded in the PMS.	Fixed measuring devices, such as flow meters, are calibrated/tested on board by service engineers approved by the device manufacturer, in line with manufacturer's instructions. These jobs are entered into the planned maintenance system (PMS) on board. Performance of the tests is recorded in the PMS.	Portable measuring devices are either sent ashore for calibration or replaced when their manufacturer set calibration period is up, or when their accuracy is in doubt.	
5	Determining the split of fuel consumption into freight and passenger part	Applied allocation method according to EN 16258:	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:	Split of fuel consumption (in %) into freight and passenger part:	
				Freight % =	
				Passengers % =	
10	Recording and safeguarding completeness of voyages	Voyages are recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, EU MRV relevant ports are identified and voyage reports are generated. EU MRV relevant voyage means any movement of a ship that originates from or terminates in a EU and EFTA port of call and that serves the purpose of transporting passengers or cargo for commercial purposes. To safeguard completeness, the office compares voyage reports against commercial voyage data, sailing schedules, and charter parties to ensure that all voyages are recorded.	Voyages are recorded on board in voyage reports. Voyage reports are sent ashore and collected in the office. The office identifies EU MRV relevant ports manually and consolidates the voyage reports annually. EU MRV relevant voyage means any movement of a ship that originates from or terminates in a EU and EFTA port of call and that serves the purpose of transporting passengers or cargo for commercial purposes. To safeguard completeness, the office compares voyage reports against external data sources, e.g. AIS or dSSAS oe dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.	Voyages are recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, EU MRV relevant ports are identified and voyage reports are generated. EU MRV relevant voyage means any movement of a ship that originates from or terminates in a EU and EFTA port of call and that serves the purpose of transporting passengers or cargo for commercial purposes. To safeguard completeness, the office compares voyage reports against external data sources, e.g. AIS or dSSAS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.	
11	Recording and determining the distance per voyage made	Distances over ground are obtained from GPS and recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, voyage reports are calculated. The office compares voyage reports against commercial voyage data, sailing schedules, and charter parties to ensure that all voyages are recorded.	Distances over ground are obtained from GPS and recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, voyage reports are calculated. The office compares voyage reports against external data sources, e.g. AIS or dSSAS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.	Distances over ground are obtained from GPS and recorded on board in voyage reports. Voyage reports are sent ashore and collected in the office. The office consolidates the voyage reports annually. The office compares voyage reports against external data sources, e.g. AIS or dSSAS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.	Distances over ground are obtained from GPS and recorded on board in voyage reports. Voyage reports are sent ashore and collected in the office. The office consolidates the voyage reports annually. The office compares voyage reports against commercial voyage data, sailing schedules, and charter parties to ensure that all voyages are recorded.
12	Determining and recording the distance travelled when navigating through ice	Distances in ice over ground are obtained from GPS and recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, voyage reports are calculated. The office compares voyage reports against commercial voyage data, sailing schedules, and charter parties to ensure that all voyages are recorded. Distances in areas with ice (typically more than 1/10 ice concentration) are marked accordingly and the comparison above takes into consideration	Distances in ice over ground are obtained from GPS and recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, voyage reports are calculated. The office compares voyage reports against external data sources, e.g. AIS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.	Distances in ice over ground are obtained from GPS and recorded on board in voyage reports. Voyage reports are sent ashore and collected in the office. The office consolidates the voyage reports annually. The office compares voyage reports against external data sources, e.g. AIS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.	Distances in ice over ground are obtained from GPS and recorded on board in voyage reports. Voyage reports are sent ashore and collected in the office. The office consolidates the voyage reports annually. The office compares voyage reports against commercial voyage data, sailing schedules, and charter parties to ensure that all voyages are recorded.

#	Procedures	Proposals			
		1	2	3	4
1	Managing the completeness of the list of emission sources	Whenever a new emission source is installed or an existing emission source is replaced, the monitoring plan will be revised accordingly. The verifiers will be informed without undue delay.	Whenever a new emission source is installed or an existing emission source is replaced, the monitoring plan will be revised accordingly. The verifiers will be informed without undue delay. Additional verification is done by the C/E at vessel take-over, by comparing the as-built engine room drawings with the actual situation on board (to check if, e.g., an auxiliary engine had been replaced or a main engine de-rated). The C/E has to report any discrepancies to the office.		
2	Determining fuel bunkered and fuel in tanks	As the vessel is not equipped with its own flow meter, bunkered fuel volume is measured using the supplier's calibrated gauge (volumetric flow meter or Coriolis mass flow meter). If no flow meter is available, the volume is measured by ullage ('dip method') and calculation using the vessel's tank tables, correcting for trim. The temperature is measured using a calibrated thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). When a volumetric flow meter is used, fuel mass is calculated using the density as given on the bunker delivery note (BDN); this step is not required when a mass flow meter is used. Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.	Bunkered fuel volume is measured using the vessel's volumetric flow meter. The temperature is measured using a calibrated thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). Fuel mass is calculated using the density as given on the bunker delivery note (BDN). Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.	Bunkered fuel volume is measured using the vessel's mass flow meter (Coriolis type). The flow meter gives a direct fuel mass reading.	The bunkered fuel volume is measured by ullage ('dip method') and calculation using the vessel's tank tables, correcting for trim. The temperature is measured using a thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). Fuel mass is calculated using the density as given on the bunker delivery note (BDN). Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.
13	Recording and determining the amount of cargo carried and/or the number of passengers	Before departure from each port a count of passengers shall be made and communicated to the Master and to the Passenger Registrar (Marine Superintendent / Manager). This passenger count will be entered in the deck log. When the email communication system is operational upon vessel's clearance at departure from each port an update of the Passenger List must be communicated to the Passenger Registrar via email to the vessel's dedicated manifest email address. In case of email communication system failure during clearance at departure, a hard copy of the above lists will be handed to the ship's agent with a request for further email communication to the Registrar to the vessel's dedicated manifest email address.			
15	Determining and recording the time spent at sea from berth of port of departure to berth of the port of arrival	Voyages are recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, time spent at sea will be calculated based on port departure and arrival information excluding anchoring (drifting is included as part of time at sea). The office compares voyage reports against external data sources, e.g. AIS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.	Voyages are recorded on board in voyage reports. Voyage reports are sent ashore and collected in the office. The office consolidates the voyage reports annually. Based on the voyage reports, time spent at sea will be calculated based on port departure and arrival information excluding anchoring (drifting is included as part of time at sea). The office compares voyage reports against external data sources, e.g. AIS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course.		
16	Determining and recording the time spent at sea when navigating through ice	Voyages are recorded in log abstracts, consisting of departure reports, daily noon reports, and arrival reports. The reports are collected online and stored in a database. Based on the database, time spent at sea will be calculated based on port departure and arrival information excluding anchoring (drifting is included as part of time at sea). The office compares voyage reports against external data sources, e.g. AIS or dSSAS, to verify that any discrepancies or implausible data is caught and corrected in due course. Times spent in areas with ice (typically more			
17	Regular check of the adequacy of the monitoring plan	The monitoring plan is reviewed annually. A meeting is called with the relevant stakeholders ashore, and minutes are kept. The monitoring plan will be modified at least in any of the following situations: (a) where a change of company occurs; (b) 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; (c) 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; (d) where data resulting from the monitoring method applied has been found to be incorrect; (e) where any part of the monitoring plan is identified as not being in conformity with the requirements of this Regulation and the company is required to revise it pursuant to Article 13(1). The verifiers will be informed without undue delay any proposals for modification of the monitoring plan. Modifications of the monitoring plan under points (b), (c) and (d) will be send to assessment by the verifier	Masters are requested to review the monitoring plan during their regular review of the vessel's safety management system. They advise the office if the plan is adequate, robust, and practical, and if there are any difficulties in implementations or suggestions for improvement. The monitoring plan will be modified at least in any of the following situations: (a) where a change of company occurs; (b) 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; (c) 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; (d) where data resulting from the monitoring method applied has been found to be incorrect; (e) where any part of the monitoring plan is identified as not being in conformity with the requirements of this Regulation and the company is required to revise it pursuant to Article 13(1). The verifiers will be informed without undue delay any proposals for modification of the monitoring plan. Modifications of the monitoring plan under points (b), (c) and (d) will be send to assessment by the verifier		
18	Information Technology Management (e.g. access controls, back up, recovery and security)	The company's IT operations are run in accordance with applicable best-practice standards such as ITIL and ISO/IEC 27001	The company's IT operations are run in accordance with Class Requirements (e.g. such as DNVGL-RP-0496) on cyber security resilience management for ships and mobile offshore units in operation	The company's IT operations are certified in accordance with ISO/IEC 27001.	
19	Internal reviews and validation of EU MRV relevant data	The system performs continuously plausibility checks on voyage data completeness, cargo and/or passengers data, distances sailed and calculates an expected fuel consumption (per day and per nautical mile) and highlights significant deviations. These are then brought to the superintendent's attention for review and investigation.	Quarterly, the office manually performs plausibility checks on voyage data completeness, cargo and passenger data, distances sailed and calculates an expected fuel consumption (per day and nautical mile) and reviews any significant deviations. (and analyzes trends over several years when there is sufficient data)		

#	Procedures	Proposals			
		1	2	3	4
1	Managing the completeness of the list of emission sources	Whenever a new emission source is installed or an existing emission source is replaced, the monitoring plan will be revised accordingly. The verifiers will be informed without undue delay.	Whenever a new emission source is installed or an existing emission source is replaced, the monitoring plan will be revised accordingly. The verifiers will be informed without undue delay. Additional verification is done by the C/E at vessel take-over, by comparing the as-built engine room drawings with the actual situation on board (to check if, e.g., an auxiliary engine had been replaced or a main engine de-rated). The C/E has to report any discrepancies to the office.		
2	Determining fuel bunkered and fuel in tanks	As the vessel is not equipped with its own flow meter, bunkered fuel volume is measured using the supplier's calibrated gauge (volumetric flow meter or Coriolis mass flow meter). If no flow meter is available, the volume is measured by ullage ('dip method') and calculation using the vessel's tank tables, correcting for trim. The temperature is measured using a calibrated thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). When a volumetric flow meter is used, fuel mass is calculated using the density as given on the bunker delivery note (BDN); this step is not required when a mass flow meter is used. Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.	Bunkered fuel volume is measured using the vessel's volumetric flow meter. The temperature is measured using a calibrated thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). Fuel mass is calculated using the density as given on the bunker delivery note (BDN). Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.	Bunkered fuel volume is measured using the vessel's mass flow meter (Coriolis type). The flow meter gives a direct fuel mass reading.	The bunkered fuel volume is measured by ullage ('dip method') and calculation using the vessel's tank tables, correcting for trim. The temperature is measured using a thermometer. Fuel volume is then corrected to 15°C by using the VCF table (ISO 91-1). Fuel mass is calculated using the density as given on the bunker delivery note (BDN). Should the analysis of the samples indicate a different density, the fuel mass is corrected accordingly.
20	Corrections and corrective actions	When implausible data is spotted, all suitable actions are taken to correct the immediate mistake (such as data entry error, faulty equipment, etc.). Further, a root cause analysis is performed to derive a corrective action to prevent reoccurrence. Audits are recorded and records are analyzed ashore. Corrective and preventive actions are planned, recorded, and their completion is documented.			
21A	Outsourced activities	The company operates all key activities related to MRV in house (i.e. not outsourced.)	The company uses outsourced IT services to support MRV, maintained by an external service provider under contract. The contract includes service level agreements as attached. (trend analysis when there is sufficient data over several years)	The company outsourced generation of MRV emission reports to an external full service provider under contract. The contract includes service level agreements as attached. The company performs spot checks before submitting the MRV emission report to the verifier.	
21B	Outsourced activities	In addition, the company's management system is certified in accordance with ISO 9001 (which requires suppplier evaluation)	In addition, the supplier's management system is certified in accordance with ISO 9001.	In addition, the supplier's IT operations are certified in accordance with ISO/IEC 27001.	In addition, the supplier's operations are regularly audited by the company.
22	Documentation	All records shall be kept in specific files (hardcopy or electronically) both on board and in the office and be legible, readily identifiable and retrievable. Records shall be stored and retained in such a manner as to avoid deterioration or damage abd be readily retrievable. Electronic records shall be regularly backed-up. The Company's office filing system is in an electronic form (per matrix SAF94) and iregularly backed up(retention period for ships in management: electronic copies 6 years, hard copies 3 years at office and then archived for another 3 years off-site; for ships out of management: for 2 years after the termination of contract). The MRV Document of Compliance (DoC) is kept for at least 18 months. The filing system on board can be also in electronic form if adequatly organized (per matrix OP130) and regularly backed up. MRV records and documentation including database data (ie Shipsure) are retained for at least 3 years.			

#	Gap Methods	Proposals		
		1	2	3
1	Method to be used to estimate fuel consumption	Using Method A: In case of a data gap due to unexpected conditions, the Superintendent communicates its existence to the Chief Engineer who fills the gap on arrival using the average of the ROB difference between arrival and departure ROBs. He then records the value as an error to the engine log book / sounding logbook and communicates this back to the Superintendent	Using Method B: When the related data is missing, the Chief Engineer performs as soon as possible tank sounding in order to close the gap. In case where the missing data is not immediately identified then the responsible Superintended shall close the gap manually by using the average fuel consumption of the previous and the next day	Using Method C: In case of a data gap, the Chief Engineer will use the readings of the fitted flow-meters to estimate it and correct it
2	Method to treat data gaps regarding distance travelled	Review logbook data to determine distances sailed. (In case of ECDIS/NNSS data gap - review terrestrial navigation documented in logbook)	Use the distance of a historical voyage (same port of departure/arrival).	Use port to port distance tables with a conservative correction factor, to be decided and documented on a case by case basis.
3	Method to treat data gaps regarding cargo or passengers carried	Review bills of lading and stevedore loading/discharging reports to determine cargo carried	Review cruise bookings or tickets with the booking department shoreside to determine passengers carried	
4	Method to treat data gaps regarding time spent at sea	Review logbook (or other electronic record system ECDIS, VDR, dSSAS) data to determine time spent at sea	Use port-to-port distance calculator and typical vessel speed to cross-check	Use the time spent at sea of a historical voyage (same port of departure/arrival).