Sulphur Inspection Guidance

Directive (EU) 2016/802

INTRODUCTION

1.1. GOALS AND PURPOSE

This document is intended to provide guidance for a harmonised approach to the inspection of ships, ascertaining their compliance, identifying non-compliances and applying control procedures for the enforcement of Directive (EU) 2016/802 (codified Council Directive 1999/32/EC as amended), as regards the sulphur content of marine fuels (hereafter referred to as 'the Directive').

1.2. DEFINITIONS

- "Bunker barge provider": Owner/operator of tankers or barges providing transportation services for a physical supplier. Usually issues the BDN on behalf of the supplier;
- "Bunker supplier/ Physical supplier /Supplier": Manufactures or buys, owns, stores and sells bunkers. Distributes bunkers from pipelines, trucks and/or barges. May blend products to meet the customer's specifications. May own or charter a distribution network or may hire delivery services from a third party. Issues the bunker delivery note (BDN)[1];
- "Distillate marine fuels" (DM) are as specified in ISO 8217:20171 (e.g. DMA, DMB, DMX, DMZ):
    - "marine diesel oil" means any marine fuel as defined for DMB grade in Table I of ISO 8217 with the exception of the reference to the sulphur content;
    - "marine gas oil" means any marine fuel as defined for DMX, DMA and DMZ grades in Table I of ISO 8217 with the exception of the reference to the sulphur content;
- "FONAR": fuel oil non-availability report to be sent to the flag Administration and to the competent authorities in the relevant ports of destination in accordance with regulation 18.2.4 of MARPOL Annex VI;
- "Fuel Oil Sample Point" means a point designated for the purpose of taking representative samples of the fuel oil being used on board the ship;
- "Fuel service system" means the system supporting the distribution, filtration, purification and supply of fuel from the service tanks to the fuel-oil combustion machinery;
- "In-use sample" (i.e. on board spot sample defined in Article 5.1.(b).(ii) the Commission Decision) means a sample of fuel oil in use on a ship;
- "Low-flashpoint fuel" means gaseous or liquid fuel having a flashpoint lower than otherwise permitted under paragraph 2.1.1 of SOLAS regulation II-2/4 *(flash point of not less than 60 °C);*
- "MARPOL delivered sample" (i.e. sealed bunker sample defined in Article 5.1.(b).(i) in the Commission Decision) means a sample of fuel oil delivered in accordance with MARPOL Annex VI Reg. 18.8.1;
- "Marine fuel" means any petroleum-derived liquid fuel intended for use or in use on board a vessel, including those fuels defined in ISO 8217. It includes any petroleum-derived liquid fuel in use on board inland waterway vessels or recreational craft:
    - "Residual marine fuels" (RM) are as specified in ISO 8217:2017 (e.g. RMD 80, RMG 380);
    - "High sulphur heavy fuel oil" (HSHFO) exceeding 0.50% sulphur;
- "On board sample" (i.e. sample of marine fuel for on-board combustion contained in tanks defined in Article 13.2.(b). (ii)) means the sample of fuel oil intended to be used or carried for use on board a ship;
- "PSCO, Port State Control Officer" means a public-sector employee or other person, duly authorised by the competent authority of a Member State to carry out port-State control Inspections, and responsible to that competent authority;
- "Ship's representative" means the ship's master or officer in charge who is responsible for the marine fuels being used, documentation and for agreeing on the alternative fuel oil sampling point location;

[1] Definitions for "Bunker Supplier/Supplier", "Bunker barge provider" and "Truck provider" from IMO MEPC.1/Circ.875/Add.1

- "Service tank" means a tank from where fuel is taken to feed the downstream fuel-oil combustion machinery;
- "Sulphur Inspector" means a person duly authorised by the competent authority of a member state to verify the compliance with the provisions of Directive (EU) 2016/802;
- "Sulphur content" means the concentration of sulphur in any fuel oil, measured in %m/m as tested in accordance with ISO method 8754 (2003) or EN ISO 14596:2007;
- "Truck provider": Owner/operator of tank trucks. Usually issues BDN on behalf of the supplier;
- Ultra-low sulphur fuel oil" (ULSFO) are as specified in ISO 8217:20171 (e.g. maximum 0.10% sulphur ULSFO-DM, maximum 0.10% sulphur ULSFO-RM);
- "Union information system (THETIS-EU)" means the system using the port call data of individual ships within SafeSeaNet, the information management system established by Article 22a of Directive 2002/59/EC of the European Parliament and of the Council, to record and exchange information on the results of individual compliance verifications under Directive (EU) 2016/802 and operated by the European Maritime Safety Agency;
- "Very low sulphur fuel oil" (VLSFO) (e.g. maximum 0.50% sulphur VLSFO-DM, maximum 0.50% sulphur VLSFO-RM).

1.3. MARINE SULPHUR CONTENT LIMITS AND SCOPE OF APPLICATION

The provisions of the Directive apply to all ships of all flags, including domestic shipping and those whose journey began outside the EU. It sets sulphur content limits of the marine fuels that can be used by ships in territorial seas, exclusive economic zones and pollution control zones of the EU Member States, including SOx Emission Control Areas (SECA).

The limitations on the sulphur content of certain fuels shall in principle not apply to e.g. fuels used by warships and other vessels under military service, and to fuels used on board vessels employing emission abatement methods in accordance with the Directive. Under some exceptional circumstances, the limitations on the sulphur content of fuels used by ships shall also not apply[2].

A sulphur inspection under the Directive should focus on the operation and behaviour of a ship while in sea areas and ports of the geographical jurisdiction of the Member State. However, additional enforcement actions may be required in accordance with international maritime law in relation to the operation and behaviour in those areas or beyond[3].

Maximum fuel sulphur content (by mass - % m/m*) established by the Directive

<table>
<tr><th></th><th>outside EU SECAs**</th><th>inside EU SECAs**</th><th>Exceptions</th></tr>
<tr><td>Ships at berth in EU ports
(includes at anchor)</td><td colspan="2">0.10%
Not if timetable < 2 hrs or engines switch off and shore-side electricity</td><td rowspan="2">Ships using Approved Emission Abatement Methods[4] ***</td></tr>
<tr><td>Passenger ships on regular services to/from EU ports

Other ships/cases</td><td>0.50%</td><td>0.10%</td></tr>
</table>

** Concentration for Solutions = grams solute /grams solution × 100%*

*** Current EU SECAs are the Baltic Sea, North Sea (and English Channel) as defined in MARPOL Annex VI Regulation 14.3.1*

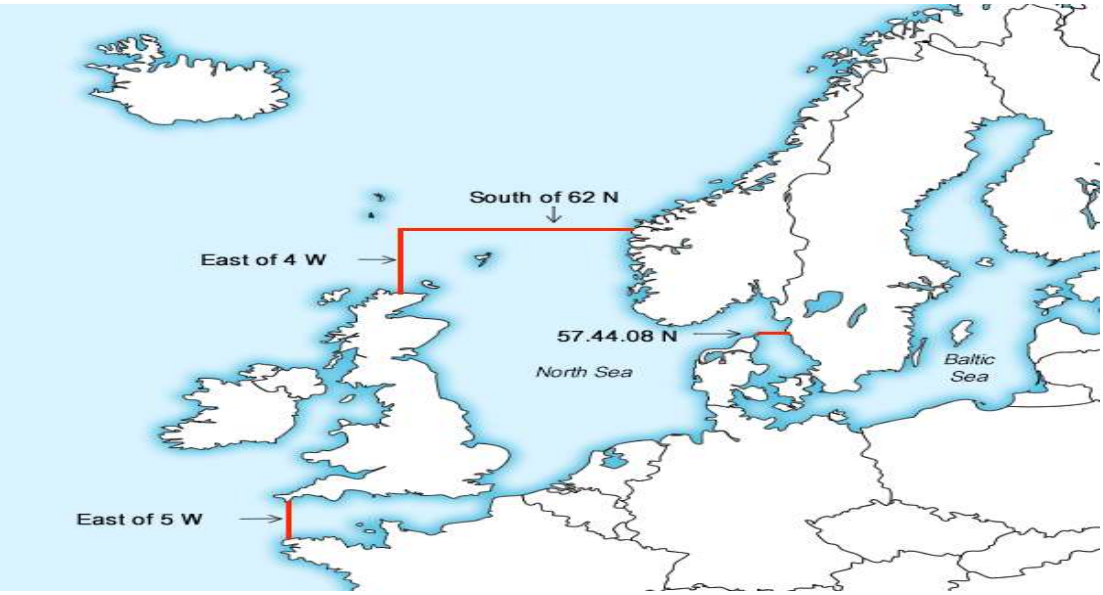
**** Emission abatement methods and alternative fuels (e.g. exhaust gas cleaning systems, mixtures of marine fuel and boil-off gas, LNG, fuel cells and biofuels) are permitted for ships of all flags in EU waters as long as they continuously achieve reductions of SOx emissions which are at least equivalent to using compliant marine fuels.*

[2] E.g. in case of damage to the ship or its equipment, and in case of securing the safety of a ship or saving life at sea or when emission abatement methods are used (Article 1 of the Directive- Paragraphs 2f, 2g and 2h).

[3] Regulation 14.1.3 of MARPOL Annex VI was amended by IMO Res. MEPC.280(70) making 1 January 2020 the effective date of implementation is already set in Article 6 of the Sulphur Directive the effective date of implementation of the 0.50% m/m fuel oil sulphur content limit requirement. Complementarily, further MARPOL amendments prohibit from 1 March 2020 the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship - unless the ship has an exhaust gas cleaning system ("scrubber") fitted. In this regard, this additional requirement which is in MARPOL Annex VI and not in the Directive should be followed by the appropriate authorities.

[4] On ships using approved emission abatement methods, the sulphur content of the marine fuels may exceed 3,50% by mass only if the emission abatement method operates in closed mode".

EU SECAs: Baltic Sea & North Sea (and English Channel)



1.4. PRELIMINARY CONSIDERATIONS

Ships flying the flag of a Member State, and ships of other States

Sulphur inspections on ships in the EU, irrespective of their flag, to which the Directive is applicable should be harmonised. In addition to the Directive requirements, there may be requirements arising from national legislations or international regulations from the International Maritime Organization (IMO) that should also be correctly enforced.

SOLAS and MARPOL

Sulphur inspections must be based on the requirements of the Directive. However, where the Directive lacks further guidance on issues of importance to the sulphur inspection, regulations from the relevant IMO Conventions (i.e. SOLAS, MARPOL) may be used as bench marks.

Where, for example due to the ship type or gross tonnage of the ship, neither the Directive nor an IMO Convention is applicable, the actual enforcement is up to the competent authorities of the Member States.

Emission Abatement Methods

Sulphur inspections differ according to whether ships are using compliant fuel or are using an approved emission abatement method (or are trialling new emission abatement systems, which have yet to be approved) or alternative fuels. If a ship has been allowed to use an emission abatement method, this should be laid down in the IAPP certificate Supplement, if applicable (see relevant fields 2.3.1.2, 2.3.2.2 and 2.6). In these cases, account should be taken of any relevant guidelines developed by the IMO[5] pertaining to the equivalents (or alternatives to low sulphur compliance) provided for in Article 8 of the Directive or to other specific Commission Decisions (i.e. use of the mixture of boil off gas with pilot heavy fuel oil).

Member States obligations in relation to the Directive

Sulphur inspections should focus on the main obligations placed on the Member States in the Directive:

i) *'Member States shall take all necessary measures to ensure'* (Article 6 & 7 of the Directive) that marine fuels of which the sulphur content (by mass) exceeds the maximum sulphur requirements of the Directive, are not used.

[5] '2009 Guidelines for exhaust gas cleaning systems' (IMO Resolution MEPC.184(59), or 2015 Guidelines for exhaust gas cleaning systems (IMO Resolution MEPC.259(68) that supersede IMO Resolution MEPC.184(59), taking into account the date of fabrication.

Member States shall also require the:

- correct completion of ships' logbooks, including fuel-changeover operations (Art.6 Par.6), and
- recording of the time of any fuel-changeover operation in the ship's logbooks (Art.7 Par.1, at berth).

ii) *'Member States shall take all necessary measures to check by sampling that the sulphur content of marine fuels being used by vessels while in relevant sea areas and ports'* (Article 6 & 7 of the Directive) does not exceed the maximum sulphur requirements of the Directive.

The following means of sampling, analysis and inspection of marine fuel are specified (Art. 13 Par. 2):

(a) inspection of ships' log books and bunker delivery notes;

and, as appropriate, the following means of sampling and analysis:

(b) sampling of the marine fuel for on-board combustion while being delivered to ships[6], or

(c) sampling and analysis of the sulphur content of marine fuel for on-board combustion contained in tanks, where technically and economically feasible, and in sealed bunker samples on board ships[7].

1.5. RELEVANT CERTIFICATES AND OTHER DOCUMENTATION

In order to establish whether a ship is in compliance with the requirements of the Directive, the documentation on board the ship shall be examined. An overview of this documentation follows:

Bunker delivery notes

Details of fuel oil for combustion purposes delivered to and used on board should be recorded by means of a *bunker delivery note* (BDN). Bunker delivery notes should be:

- kept on board the ship in such a place as to be readily available for inspection at all

reasonable times, and

- retained on board for a period of three years after the fuel oil has been delivered.

The BDN should be accompanied by a *representative sample* of the fuel oil delivered (the MARPOL delivered sample). The sample should be:

- sealed and signed by the supplier's representative and the master or officer in charge of the bunker operation on completion of bunkering operations and

- retained under the ship's control until the fuel oil is substantially consumed, in any case this should be for a period of not less than 12 months from the time of delivery.

Ships' log books

Under the term of ships' log books, the following documents, maybe taken into account:

- Oil Record Book Part I,
- Records of navigational activities,
- Log book (as prescribed by the Administration) for fuel oil change over records,
- Engine logbooks, and
- Tank sounding records.

Oil Record Book

Every ship of 400 gross tonnage and above and every Oil Tanker of 150 gross tonnage and above must be provided with an *Oil Record Book - Part I* Machinery space operations. Entries in the *Oil Record Book* should be drawn up at least in English or French or Spanish. In addition to other

[6] '2009 Guidelines for the sampling of fuel oil for determination of compliance with the revised MARPOL Annex VI' (IMO Resolution MEPC.182(59))
[7] 'Guidelines for onboard sampling for the verification of the sulphur content of fuel oil used on board ships' (IMO MEPC.1 Circ. 864-Rev.1 2019).

machinery space operations related to the handling of fuel oil, lubricant oil or oil mixtures, any bunkering of fuel or bulk lubricating oil must be recorded in the Oil Record Book Part I under Code H on each occasion.

The *Oil Record Book* shall be kept on board the ship in such a place as to be readily available for inspection. It shall be preserved for a period of three years after the last entry has been made. For compliance verification with the Directive, the *Oil Record Book* is therefore an essential part of the Sulphur Inspection.

Records of navigational activities

Records of navigational activities must be kept on board all ships of 150 gross tonnage and above engaged on international voyages and on all other ships of 500 gross tonnage and above (excluding fishing vessels). In addition, each ship of 500 gross tonnage and above, in the case where the voyage exceeds 48 hours, must submit a daily report to its company, which shall retain this and all subsequent daily reports for the duration of the voyage. The reports shall contain, as a minimum, the following information:

- the ship's position,
- the ship's course and speed, and
- details of any external or internal conditions that are affecting the ship's voyage or the normal safe operation of the ship.

The above information in the navigational records is also essential to obtain a complete record of the voyage, which may be used during the Sulphur Inspection.

Log book (as prescribed by the Administration) for Fuel oil change over records

The volume of low sulphur fuel oils in each tank, as well as the date, time, and position of the ship when any fuel oil change-over operation has been completed prior to the entry into the SECA or commenced after exit from such an area, should be recorded in such log-book as prescribed by the flag Administration of the ship. In the absence of specific requirements from the flag Administration about the dedicated log book the recording may be included in other log books (e.g. the Engine Room Logbook or the Oil Record Book).

Furthermore, ships at berth in Union ports also need to complete any necessary fuel change-over operation. For ships at berth, the time of any fuel-changeover operation shall be recorded in the ships' logbooks. (e.g. in the oil record book or the engine room logbook).

Studying these documents should allow the Sulphur Inspector to gain an understanding of whether the operations on the vessel match up with the operational plans on-board and whether the vessel has met the requirements of the Directive.

Written procedure for fuel oil change over

Ships using separate fuel oils to comply with the SOx emission requirements whilst entering or leaving a SECA, should carry a written procedure describing how the fuel oil change-over is to be achieved[8]. To comply with the SOx emission requirements, the procedure should foresee allowing sufficient time for the fuel oil service system to be fully flushed of all fuel oils exceeding the new applicable sulphur content, prior to entry into a SECA, in order to avoid any contamination.

Fuel oil change-over presents some challenges requiring the crew's attention and experience, for instance, to variables such as risk of thermal shock to injection components, low viscosity of the distillate fuel oil to avoid fuel pump failure or seizure, or risk of incompatibility between the fuel oils that may clog filters[9].

[8] Regulation 14 (6) of the revised MARPOL Annex VI (MEPC 58/23/Add1 Annex 13)

[9] Further Information on fuel oil change-over technical challenges can be found in the following publications:

- "*Sulphur Limits 2015 – Guidelines to ensure Compliance*" (November 2014), DNV-GL
- "*Overview of 'fuel changeover' issues and challenges as they affect ECA-SOx compliance – Assistance to Member State Administrations*" (November 2014), ECSA-ICS

In addition to the above documents, Sulphur Inspectors may be presented by the crew of the ships with other additional documentation as a proof of compliance with the Directive. An overview of this other additional documentation follows:

IAPP Certificate and Supplement

Every ship of 400 gross tonnage must be issued with an *International Air Pollution Prevention Certificate* (IAPP Certificate). The *IAPP Certificate*, and its *Supplement*, confirms that a ship and its equipment conform to the requirements of MARPOL Annex VI. The *Certificate* should be properly completed and signed by the flag State, or a recognised organisation on behalf of a flag State, and valid for five years[10] and provide details of when the required annual and intermediate surveys have been performed and the results of those surveys. The certificate must be drawn up at least in English, French or Spanish.

The *Supplement to the IAPP certificate* details, in section 2, the way in which the control of emissions from the ship is achieved. For sulphur oxides (SOx) and particular matter (PM) this is laid down in section 2.3 of the *Supplement*. In this section, the sulphur content limit values for fuel oil are indicated for ships operating inside and outside of a SECA. Evidence that these have been met needs to be supported by the bunker delivery notes kept by the ship.

Also, new sections 2.3.4 and 2.3.5 of the *Supplement* indicate whether the ship is fitted with designated sampling points[11]. Moreover, any "equivalent arrangements at least as effective in terms of SOx emission reductions", or emission abatement methods, are specified in this document (see section 2.6), if applicable.

Nautical charts, Electronic Chart Display and Information System (ECDIS)

Nautical charts and ECDIS, if installed on board the ship, in combination with the record of navigational activities and any daily reporting activities, might be valuable resources to obtain a complete record of the voyage and have a better understanding of the shipping routes that a ship may have taken prior to entering the port.

Tank plans and piping diagrams

Studying these plans and diagrams might help Sulphur Inspectors to understand whether the fuel changeover has been undertaken properly, especially when used in conjunction with the fuel logs and bunker delivery notes. In addition, the capacity plan, tank sounding tables book or the stability information book may as well provide useful information. Plans and piping diagrams should be updated in case of changes to the ship or the equipment.

SULPHUR INSPECTION

Sulphur Inspectors should be duly authorised by the Member States to perform an inspection in relation to the Directive, and be conversant with its requirements, relevant national legislation and the IMO Conventions and Guidelines therein referenced.

In addition, organisations authorized by the Member States should be available in case a sample of marine fuel oil needs to be analysed to ascertain its sulphur content.

In relation to the pre-boarding preparation, the Member States may need to develop pre-boarding preparation documents, specific instructions regarding the selection of ships for inspection as well as any other relevant form that may be required to conduct sulphur inspection. A form available in THETIS-EU may be used to introduce the report of the on board sulphur inspection.

[10] Regulation 9 of the revised MARPOL Annex VI

[11] MARPOL Annex VI Reg.14 has been amended requiring ships subject to the Annex to be fitted or designated with sampling point(s) for the purpose of taking representative samples of fuel oil being used. Existing ships must comply with this regulation no later than the first renewal survey that occurs 12 months after entry into force which is forecasted by September 2021. However, IMO Circular MEPC.1/882 invites Parties to MARPOL Annex VI to an early application of these new provisions before their entry into force.

2.1. SULPHUR INSPECTION SEQUENCE

Sulphur inspections consist on the following phases in sequence (Appendix I):

Pre-boarding

- Ships information (paragraph 2.2)
- Ships selection (paragraph 2.3)

On board

- Preliminary verifications (paragraph 2.4)
- Inspection of a ship using a fuel based compliance method (paragraph 2.5)
- Inspection of a ship using an abatement method (paragraph 2.6)
- Sample collection and analysis (paragraph 2.7)

Follow-up

- Non-compliances with the Directive (paragraph 2.8)
- Reporting the findings of the Sulphur Inspection (paragraph 2.9)

2.2. SHIPS INFORMATION

Before boarding, relevant information about the ships in port may be obtained from THETIS-EU and other sources. This may include information on, for example, ship particulars (as described in section 2.4 below), last and next port of call, arrival and departure times, port stay duration, ship stores in relation to marine fuels and whether marine fuels for on-board combustion will be delivered to the ship during the call in port. Further information may directly be obtained through the port Authorities or the ship's agent.

When THETIS-EU is used, there may be occasions when ships known to be in the port are not listed in THETIS-EU. These situations may be due to different reasons (i.e. ship unknown, ship call not in the system, etc). In order to resolve these situations contact should be made to the PSC national administration and/or the system helpdesk (thetis@emsa.europa.eu).

IMO GISIS[12] also provides additional relevant information on compliant fuel oil unavailability[13]. This may be relevant for instance to identify the number of non-availability of compliant fuel oil reports (FONARs) submitted by a particular ship including where the unavailability occurred. It also provides information on cases where fuel oil suppliers have failed to meet the requirements (Letters of Protest)[14]. Furthermore, additional information about EAMs and equipment fitted on board ships and associated certificates.

2.3. SHIPS SELECTION

Based on the ships in port and their related information, a ship may be selected for a sulphur inspection (Appendix II). This decision may be based on risk based methods developed at national level and on specific alerts on individual ships in THETIS-EU. The selection process should follow the following sequence regarding the ships in port:

1. Identify whether there is any alert

Information regarding alerts on ships received from third parties can be found in THETIS-EU. On the main page, the system identifies ships for which an active alert exists through the alerting icon .

[12] https://gisis.imo.org/Public/Default.aspx
[13] Regulation 18.2.5 of the revised MARPOL Annex VI
[14] Regulation 18.9.6 of the revised MARPOL Annex VI

2. Identify whether there have been any previous sulphur inspections

Information regarding previous sulphur related inspections on ships can be found in THETIS-EU. On the main page, the system identifies ships for which no records of a sulphur inspection exist (or has taken place/was carried out within the last 12 months) through the alerting icon  .

3. Apply any risk based method developed at national level or targeting parameters

Prioritization of individual ships for inspection may be based on risk based methods developed at national level, including the use and outcome of remote sensing and other available technologies. Information on targeting parameters can be found in THETIS-EU. A "Ship's Overview" menu provides a list of parameters with ship related criteria to support a risk-based decision on the selection of a ship for inspection[15].

4. Identify whether bunkering operations are scheduled

A ship scheduled for bunkering might be also selected for a sulphur inspection. In such a case, it may be appropriate to board the ship just before the delivery will take place to verify the sampling method used during delivery of the marine fuels and the eventual analysis of the samples in relation to the bunker delivery notes supplied to the ship.

Alerts

Any alerts indicating potential non-compliance received from a third party, especially from another Member State, concerning the marine fuel used on board or being used in the relevant sea area or ports should be investigated to determine whether a ship should be inspected. Currently, THETIS-EU provides information on the following type of alerts:

- Complaint by the ship (e.g. report from a crew member)
- Evidence of non-compliant fuel in use (e.g. results from a laboratory analysis after the ship has left the port)
- Report by any Member State (e.g. claims of non-availability, safety reasons, force majeure, etc)
- Portable hand equipment indication of non-compliant fuel in use (e.g. hand held equipment indicates sulphur content above limits but confirmation in laboratory is not possible, non-compliance indication but no action due to uncertainty of equipment)
- Remote measurement indicating non-compliance (e.g. alert from a Member State based on a remote sensing measurement; the ship does not call at the originating Member State' ports)

Whenever there is an alert for a particular ship, the ship should be prioritized for an inspection. If the ship is selected for an inspection, the alert that triggered its selection should be archived by the inspector following the inspection (or the reason that originated the alert no longer applies) while reporting in THETIS-EU.

Risk-based parameters

THETIS-EU provides a list of historical and generic parameters met by each individual ship which is available for consultation during the decision process of selecting a ship for inspection (Appendix VI). Whereas the historical parameters could be used to trigger an inspection (i.e. a ship gets selected for an inspection based on them), the generic parameters could be taken into account when choosing between ships where the same number of historical parameters are fulfilled or in cases where there are no ships fulfilling the criteria. The historical parameters take into account prior sulphur related and port State control inspection history whereas the generic parameters are specific to the ship.

2.4. PRELIMINARY VERIFICATIONS

During the pre-boarding phase, significant information about the ship is collected which should be verified once on board. This information may be also important as part of the details that need to be recorded after the inspection and connected with the annual reporting to the Commission (Section 3):

[15] A list of relevant parameters was adopted at the 27th May 2016 Committee on the Implementation of the Sulphur Directive

- Ship particulars[16] (i.e. IMO number, type, flag, age of ship and tonnage),
- Any additional information which may be relevant for the report of Sulphur Inspection (e.g. keel date, name of the ISM company and its identification number, rate of engine),
- Confirmation of the primary purpose of the port call (i.e. commercial business or force majeure)[17],
- Last port of calls and arrival and departure times,
- Actual time of arrival (ATA) in the port,
- Port stay duration (estimated time of departure (ETD)),
- Information on whether marine fuels will be delivered to the ship during the port call,
- Notifications to the ship's flag Administration relevant to non-compliant bunker deliveries,
- Fuel Oil non-Availability Reports (FONARs).

In addition to confirming the above information, the Sulphur Inspector should determine the method used or being used by the ship to control SOx emissions. Therefore, it should be established whether:

- emission abatement methods are being used,
- all combustion machinery uses any abatement methods in place, or
- compliance is intended through marine fuel oils under the sulphur content limits.

2.5. *FUEL BASED METHOD*

On a ship that uses low sulphur fuel oil to meet the requirements, the sulphur inspection should be limited to determining whether the ship (Appendix II):

- is using the correct fuel at the time of the inspection at port, and
- was using the correct fuel in waters under the jurisdiction of the Member State on its last voyages.

Quantity and quality of marine fuel oils on board

The tanks that are designated for the storage of marine fuel oil for on board combustion should be identified, for example using the capacity plan, tank sounding tables book or stability information document.

Once this is established, it should be determined with the aid of the Oil Record Book Part 1, if applicable, the ships' logbook or another form approved by the flag Administration of the ship, the content of these tanks after delivery of the marine fuel oils. Sulphur Inspectors should bear in mind that any bunkering of fuel must be recorded in the Oil Record Book Part I under Code H (and vice-versa) as follows[18]:

Example #18

Bunkering of Fuel oil

Date	*Code*	*Item No.*	*Record of operations/signature of officer in charge*
dd-MONTH-yyyy	*H*	*26.1*	*[Name of Port]*
		26.2	*Start* dd-MONTH-yyyy-*hh:mm Stop* dd-MONTH-yyyy-*hh:mm*
		26.3	*xxxx MT of ISO-xxxxx HFO x.x % S bunkered in tanks:*
			aaaa MT added to [Tank Name & Designation] now containing bbbb MT
			cccc MT added to [Tank Name & Designation] now containing dddd MT
			signed: (Officer-in-charge, Name & Rank) dd-MONTH-yyyy

In addition, the BDNs should show the quantity and the sulphur content of the delivered marine fuel oils and state the:

- Name and IMO number of receiving ship

[16] This information may be obtained from the ship's statutory certificates, if applicable, or from any national certificates and documents in the case of non-Convention ships.
[17] Deviations from the intended voyage due to stress of weather or any other cause of force majeure should be taken into account in relation to the Sulphur Inspection, as they may have affected the use of fuel (Article 1 of the Directive)
[18] IMO MEPC.1/Circ.736/Rev.2

- Port (of delivery)
- Date of commencement of delivery
- Name, address, and telephone number of marine fuel oil supplier
- Product name(s)
- Quantity (metric tons)
- Density at 15°C (kg/m³)[19]
- Sulphur content (% m/m)[20]
- A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with regulation 18.3 of MARPOL Annex VI and that the sulphur content of the fuel oil supplied does not exceed the corresponding values (the applicable box(es) shall be marked)[21].

It should be checked whether the ship carries compliant fuel oils for use, based on the BDNs on board, any other document or fuel oil samples as appropriate. Sulphur Inspectors should verify whether BDNs are available and if they are in compliance with the relevant requirements regarding the Sulphur content. Attention should be paid to the maximum sulphur limit for high sulphur fuels[22]. In addition, Sulphur Inspectors should be aware of subsequent changes to the format of the declaration of fuel oil conformity. For each BDN, there should be a corresponding record in the Oil Record Book (Part I) under code H (and vice-versa). The non-existence of a BDN or the non-recording of bunkering should be considered as a non-compliance.

If carriage of high sulphur marine fuel oil for use is identified, it should be further checked whether the ship encountered a fuel availability problem. If that is the case, a FONAR notification regarding this should have been received from the ship prior arrival. Regarding this, the master or officer in charge of the bunker operation should have documented the non-availability through a FONAR notification to the ship's flag Administration and the competent authorities in the relevant ports of destination.

In addition, if the bunker delivery note shows compliant fuel, but the master has independent test results which indicates non-compliance, the master may have:

- documented that, through a Notification to the ship's flag Administration,
- sent copies to the competent authority of the relevant port of destination,
- sent copies to the Administration under whose jurisdiction the bunker deliverer is located, and
- sent copies to the bunker deliverer.

Ascertaining Emission Compliance under the Directive

The verification period over which it is needed to ascertain whether the ship has been in compliance with the Directive should be established. It should be noted that the geographical area covered by the Directive is limited to the waters under the jurisdiction of EU Member States and defined as "Member States' territorial seas and exclusive economic zones or pollution control zones". If deemed necessary, confirmation of the routes which the ship travelled can be obtained from the voyage recording procedure on the vessel, including but not limited to the record of navigational activities, and daily reports if applicable, and passage plans with the nautical charts used for navigation or ECDIS.

Compliance can be ascertained from checking data in, and comparison between, the following documents:

- Bunker Delivery Notes,

[19] Fuel oil should be tested in accordance with ISO 3675:1998 or ISO 12185:1996 under IMO Regulations
[20] Fuel oil shall be tested in accordance with ISO 8754:2003
[21] The new format of the Declaration (field no.9) applies from 1st January 2019 (i.e. the declaration was required prior that date but the format has changed after 1st January 2019) as per the amendments in IMO Res. MEPC.286(71).
[22] As MARPOL amendments prohibit from 1 March 2020 the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board, bunkering operations taking place after that date shall relate to fuels of less than 0.50% maximum sulphur content- unless the ship has an exhaust gas cleaning system ("scrubber") fitted.

- Oil Record Book Part I,
- fuel logs,
- quantity and quality benchmarks from the tanks at the starting point of verification period,
- fuel change-over plan (information on the time it takes to undertake the change-over),
- continuous SOx monitoring (if appropriate or in case of EAMs),
- record of navigational activities and daily reports (special consideration is needed to ascertain if there was sufficient time provided to allow a proper fuel change-over before entering into a SECA and the fuel switch over procedure has been followed),
- fuel line diagrams, or
- information on which fuel is in which tank.

It should be noted that during the verification period it may be possible that, for operational reasons, the ship might have made internal transfers between the bunker tanks, before fuel was transferred to settling tanks/service tanks prior to combustion. Sulphur Inspectors should keep in mind the sulphur requirements of the Directive (table and figures in pages 4 and 5) and the various different options of the trading pattern of a ship (figures in Appendix V). Also, sulphur Inspectors may gain additional understanding of the fuel management on board by verifying these records and identify potential cases of crossed contamination of the fuel in the tanks.

Fuel-change over recording

Ships not equipped with emission abatement methods, under the requirements of MARPOL Annex VI, should carry a written procedure showing how the fuel oil change-over is to be done, prior to entry into a SECA.

The volume of low sulphur fuel oils in each tank, as well as the date, time, and position of the ship when any fuel-oil-change-over operation is completed prior to the entry into an SECA, or begun following the exit from such an area, should be recorded by means as prescribed by the Administration.

With this information, it should be possible to assess whether the ship has complied with the Directive requirements and will be able to comply with the Directive's requirements in relation to the port stay duration in the port and the voyage to the next port of call.

Some ships may be equipped with computerized tools for calculating the fuel change-over time required (fuel oil change-over calculators). If this is the case, records of these calculations may also be requested during the document review inspection.

It should be noted that the fuel change-over may have taken place outside the jurisdiction of the Member State undertaking the Sulphur Inspection, and action may be limited to the situation where adequate time has not been allowed for the switchover before entry into its territorial seas, exclusive economic zones or pollution control zone.

Ships not equipped with emission abatement methods should also record the time of any fuel oil change-over operations in the ships' logbook while at berth or at anchor into European ports outside SECA.

2.6. ABATEMENT METHODS

The following Emissions Abatement Methods (EAMs) and alternative fuels may be considered as an alternative to using marine fuel meeting the requirements (Appendix III):

- mixtures of marine fuel and boil-off gas (**BOG**) (in the case of LNG carriers),
- Exhaust Gas Cleaning Systems (**EGCS**) (commonly known as 'scrubbers'),
- Biofuels (and mixtures of biofuels and marine fuels), or
- other Alternative Fuels (e.g. LNG, Methanol).

On a ship that uses an EAM to meet the requirements, the sulphur inspection should, in principle, be limited to determining whether the ship:

- has received an appropriate approval for any installed equivalent EAM (approved, under trial or being commissioned),
- is using the EAM, as identified on the Supplement of the IAPP certificate, for all fuel combustion machinery on board or the compliant fuel is used in equipment not so covered,
- has on board bunker delivery notes which indicate that the fuel oil is intended to be used in combination with an equivalent means of SOx compliance or the ship is subject to a relevant exemption to conduct trials for SOx emission reduction and controlled technology research[23].

On a ship using an EAM that has an exemption to conduct trials, it should be verified whether:

- a notification has been received through the flag State of the ship at least six months prior the commencement of the trials about the approval of the trials,
- the period limitation of the exemption regarding the trials for SOx emission reduction has not been exceeded[24].
- The additional conditions specified in the trial permit are being maintained[25].

1. BOG

BOG systems while at berth should comply with Commission Decision 2010/769/EU of 13 December 2010. The following documents and records should be verified as part of the verification:

- any supporting documentation from the Flag State showing that the approval complies with the relevant decisions from the European Commission and COSS,
- any documentation referring to the type of fuel and its sulphur content allowed,
- appropriate records in the ship log books, and
- bunker delivery notes.

In case of ships using BOG when transiting Sulphur Emission Control Areas (SECAs), it should also be possible to demonstrate that the consumption rates and ratios between LNG and the HFO pilot fuel of the ship specific installations and operational profile would ensure that the ship in question continuously achieves, throughout the entire journey in the emission control areas, sulphur reductions at least equivalent to those which would be achieved by using compliant fuel.

In addition, a visual inspection of the system should be conducted in order to verify that it is properly functioning, is in operation, there is continuous-monitoring of the quantities of LNG and HFO pilot fuel taking place and applies to all fuel combustion machinery on board.

2. EGCS

EGCS systems should comply with the relevant IMO Resolutions. Resolution MEPC.184(59) or Resolution. MEPC.259 (68) (superseding Resolution MEPC.184(59)) taking into account the date of fabrication. In these cases, there may be an approval for a period of trials under certain conditions. Therefore, as part of the verification the following documents and records should be considered:

1. any supporting documents from the flag State referring to the approval of trial, if applicable:
    - MED certification on EU flagged ships, or
    - MARPOL Annex VI performance Scheme A or B, as applicable on non-EU flagged ships,
2. any supporting documents relating to the system approval (SO_X Emissions Compliance Certificate (SECC) for Scheme A EGC system – Technical Manual (ETM), Onboard Monitoring Manual

[23] The Bunker Delivery Notes should include a declaration signed and certified by the fuel oil supplier's representative that the sulphur content of the fuel oil supplied does not exceed the corresponding values (the applicable box(es) shall be marked).
[24] Article 10.(b) of the Directive requires Member States to issue permits of trials not exceeding 18 months in duration.
[25] Article 10 of the Directive specifies conditions during trials permitted by Member States including the installation of tamper-proof equipment for continuous monitoring, the ship achieves emission reductions equivalent to those which would be achieved through the sulphur limits required, and that proper waste management systems are in place.

(OMM,) SO_X Emissions Compliance Plan (SECP)) any documentation referring to the type of fuel and its sulphur content allowed,

3. appropriate records in the ship log books or evidence of continuous monitoring system (i.e. performance records for EGCSs approved in accordance with Scheme B), and
4. bunker delivery notes.

In addition, a visual inspection of the system should be conducted in order to verify that is properly functioning, has been and is in operation, there are continuous-monitoring systems with tamper-proof data recording and processing devices, if applicable (for Scheme B) and the records demonstrate the necessary compliance when set against the limits given in the approved documentation and applied to relevant fuel combustion units on board.

On ships equipped with Scheme A EGC systems, the operation parameters are to be continuously monitored and recorded and daily spot checks of the emissions ratio SO_2(ppm)/CO_2(%v/v) should be recorded, if a continuous exhaust gas monitoring system is not fitted. On ships equipped with Scheme B EGC systems, the emissions ratio SO_2(ppm)/CO_2(%v/v) is to be continuously monitored and recorded and daily spot checks of the operation parameters are needed to verify proper operation of the EGC unit which should be recorded.

Concerning washwater discharges, pH, PAH, turbidity and nitrates appropriate limit values should be specified in the ETM-A or ETM-B and operation parameters listed in the system documentation. When the EGC system is operated in ports, harbours, or estuaries, the washwater monitoring and recording should be continuous. The values monitored and recorded should include pH, PAH, turbidity and temperature. In other areas the continuous monitoring and recording equipment should also be in operation, whenever the EGC system is in operation, except for short periods of maintenance and cleaning of the equipment.

Concerning the washwater residues generated by the EGC system, these should be delivered ashore to adequate reception facilities. Such residues should not be discharged to the sea or incinerated on board. Each ship fitted with an EGC unit should record the storage and disposal of washwater residues in an EGC log, including the date, time and location of such storage and disposal. The EGC log may form a part of an existing log-book or electronic recording system as approved by the Administration.

It may also be relevant to verify if the EGCS works in open or close loop mode and if in the port of inspection there exist restrictions in the operation of the system[26]. In this case, the EGCS must have been switched off and fuel change-over operations undertaken and recorded in the ships' log books.

In a case where an EGCS has not been in compliance with the relevant requirements for other than transitory periods and isolated spikes in the recorded output, related information may have been received from the ship prior to the inspection. In addition, the master or officer in charge may have documented that through a notification to the ship's flag Administration and present evidences of the corrective actions taken in order to rectify the situation in accordance with the guidance given in the EGCS Technical manual. a malfunction occurs in the instrumentation for the monitoring of emission to air or the monitoring of wash water discharge to sea, the ship may have alternative documentation demonstrating compliance[27].

Biofuels

The use of Biofuels, and mixtures of biofuels and marine fuels, should be in compliance with Directive 2009/28/EC of 23 April 2009 and the Sulphur Directive requirements for mixtures. The following documents and records should be verified as part of the verification:

- any supporting documentation from the flag State or a Classification Society referring to the use of those specific fuels,

[26] Some Union ports have enacted local regulations imposing restrictions in the use of open loop EGCSs.
[27] MEPC.1/Circ.883 on Guidance on temporary indication of ongoing compliance in the case of the failure of a single monitoring instrument, and recommended actions to take if the EGCS fails to meet the requirements of the Guidelines, including need for ships to have documented the notification to relevant authorities of system non-compliance.

- appropriate records in the ship log books, and
- where feasible any document including information on the type of fuel and amount supplied to the ship.

In addition, a visual inspection of the system should be conducted in order to verify that is properly functioning, is in operation and applies to all fuel combustion machinery on board.

Alternative Fuels

In the case of alternative fuels, the following documents and records should be examined as part of the verification process:

- any supporting documentation from the flag State or a Classification Society referring to the use of those specific fuels,
- appropriate records in the ship log books, and
- where feasible any document including information on the type of fuel and amount supplied to the ship.

In addition, a visual inspection of the system should be conducted in order to verify that is properly functioning, is in operation and applies to all fuel combustion machinery on board.

2.7. SAMPLE COLLECTION AND ANALYSIS

Should the Sulphur Inspector's observations, general impressions and on board checks of documentation confirm the ship is meeting the requirements of the Directive then the sulphur inspection should be limited to these checks. However, situations might arise where proof may be needed as to what fuel was, or is, being used at one particular time in order to among other cases (Appendix VI):

- substantiate any non-compliances found during the document verifications,
- ascertain the sulphur content in cases of on board fuel mixing or contamination, or
- comply with any established national frequency of sampling of marine fuels[28].

These situations may be but are not limited to cases where:

- information or evidence that the master or crew are not familiar with essential shipboard operations relating to the prevention of air pollution, or that such operations have not been carried out (e.g. unjustified delays in producing the relevant documents or evidences for inspection, delays in making progress towards a visual inspection in engine room, etc.)
- evidence of inconsistencies between information in the bunker delivery note and the information in the Supplement to the IAPP certificate,
- evidence that an equivalent means has not been used as required,
- evidence, for example by fuel calculators, that the quantity of bunkered compliant fuel oil is inconsistent with the ship's voyage plan, or
- receipt of a report or complaint containing information that the ship appears to be non-compliant including but not limited to information from remote sensing surveillance of SOX emissions or portable fuel oil sulphur content measurement devices indicating that a ship appears to use non-compliant fuel while in operation/underway.

In the above scenarios, it may be appropriate to proceed without delay to a fuel oil sample collection[29].

[28] Article 3 Commission Implementing Decision (EU) 2015/253

[29] Sulphur inspectors have to bear in mind that fuel change-over operations normally have a duration of several hours. However, the change-over operation when the ship is alongside at berth generally should last +/- 2 hours as normally the main engine is not involved. Therefore, long document reviews may affect the ability to identify late fuel change-over operations.

Depending on the case, the proof may be obtained through:

- sample of the fuel being supplied to the vessel,
- sampling of the fuel in the ship's fuel service system,
- sampling of the fuel in holding tanks, or
- analysis of the MARPOL representative samples which are on board, as appropriate.

Although the decision is up to the Sulphur Inspector, some facts may help the inspector to decide where and how to collect a fuel sample.

In general, there are no means by which a ship could increase the sulphur content of a fuel oil on board the ship. In cases where the fuel oil actually in use is a mix of a number of different supplies, the resulting fuel oil will simply contain a directly proportional intermediate value of the sulphur content of each supply making the mix.

Therefore, it may be enough to analyze whether the fuel oils as supplied were compliant and thus test from their associated MARPOL sample in the following cases:

- on ships operating only within a SECA area with only one sulphur grade of fuel oil on board, or
- on ships with two sulphur grades of fuel oil on board and being the outside SECA fuel oil (higher sulphur) which is being investigated.

In the case of a ship with two sulphur grades of fuel oil on board and being at berth or into a SECA area, the case of fuel oil (lower sulphur) which is being investigated, divides into whether the:

- lower sulphur fuel oil as supplied to the ship was compliant, or
- the ship has properly managed the lower sulphur fuel oil while on board such that it has not been mixed or contaminated with the higher sulphur fuel oils.

In the above scenario, there may be a need to draw a sample from the fuel service system.

Sampling from the fuel as being delivered

In the case of sampling of the marine fuel while being delivered to the ship, if the delivery takes place in the port, it should be verified that samples are being taken in accordance with IMO Resolution MEPC.182 (59). Moreover, the equipment as outlined in this Resolution should therefore be available to the persons in charge of the sampling process. Sulphur Inspectors should therefore observe that the sampling procedure during the fuel delivery to the ship is in accordance with the IMO Resolution MEPC.182 (59), verify that the proper sampling equipment is in place and at the end of the overall process, obtain a representative sample for analysis.

Sampling from the fuel service system[30] [31]

Sulphur Inspectors should take the on-board spot sample of marine fuel at the location where a valve is fitted for the purpose of drawing a sample in the fuel service system (designated sampling point(s)), as clearly indicated for easy identification on the ship's fuel piping systems or arrangement plan and as approved by the flag Administration or Recognized Organization acting on its behalf[32].

In the absence of this location, the fuel sampling point shall fulfil all of the following conditions:

- be easily and safely accessible,

[30] '2019 Guidelines for on-board sampling for the verification of the sulphur content of the fuel oil used on board ships' (IMO MEPC.1/Circ.864/Rev.1)
[31] Article 6 Commission Implementing Decision (EU)2015/253
[32] IMO MARPOL Annex VI Reg.14 has been amended requiring ships subject to the Annex to be fitted or designated with sampling point(s) for the purpose of taking representative samples of fuel oil being used. Existing ships must comply with this regulation no later than the first renewal survey that occurs 12 months after entry into force which is forecasted by September 2021. However circular MEPC.1/882 invited MS to an early application before their entry into force.

- take into account different fuel grades being used for the fuel-oil combustion machinery items;
- be downstream of the fuel in use from the service tank,
- be as close to the fuel inlet of the fuel-oil combustion item as feasible and safely possible taking into account the type of fuels, flow-rate, temperature, and pressure behind the selected sampling point,
- be located in a position shielded from any heated surface or electrical equipment and the shielding device or construction should be sturdy enough to endure leaks, splashes or spray under design pressure of the fuel oil supply line so as to preclude impingement of fuel oil onto such surface or equipment, and
- be proposed by the ship's representative and accepted by the sulphur inspector.

The Sulphur Inspector should ensure that the spot sample is collected in a sampling container from which at least three sample bottles can be filled and are representative of the marine fuel being used.

The Sulphur Inspector may take the on-board sample of marine fuel at one location in the fuel service system or at more than one location (e.g. auxiliary engines and boiler). If more than one location for sampling is used, then a primary sample and three sample bottles shall be filled for each location used.

During the sampling process, Sulphur Inspectors should be aware of the temperature of the fuel oil service system. Depending on the fuel grade on board, the fuel might need to be kept warm or be warmed up at a certain temperature to achieve the right viscosity to be used in the main engines. Knowledge on the temperatures reached may provide an understanding of the fuel used and its potential sulphur content[33].

Sampling of the fuel oil in holding tanks[34]

Tank sampling involves obtaining a sample of fuel oil from the tank in question. The sample obtained is representative of the fuel oil at the location from which it was drawn. Therefore, in obtaining a tank sample it is not necessary to sample the contents of the entire tank. Fuel oil in a tank may be sampled by use of a pump connected to that tank, for example a transfer pump or, in some instances, directly. In the case of a sample taken from a pump, the sample will be representative of the fuel oil being drawn from the tank at that time. In the case of a directly drawn sample, that sample will be representative of the fuel oil at the level in that tank at which it was drawn. The exact arrangements in each case should be agreed with the ship's representative.

- Sampling by using of a pump

When sampling by using of a pump it should preferably be set up to recirculate to the tank from which it is drawing. In instances where that is not possible, close attention should be given to not over-filling the receiving tank or mixing fuel oils from different consignments. Attention should be paid to the temperature needed for a viscous fuel oil to be in a pumpable condition.

Sampling should be undertaken downstream of the pump using a suitable sampling connection drawing from the flowing fuel oil. That sampling connection should fulfil all the following conditions:

- it should be easily and safely accessible;
- the sampling connection point should be in a position shielded from heated surfaces or electrical equipment, and any necessary shielding device or construction should be sturdy enough to ensure that any leaks, splashes or spray, under pump discharge pressure, do not impinge onto such surfaces or equipment; and
- the sampling connection should be provided with suitable spill collection arrangements or drainage to the drain tank or other safe location.

Having established that the pump is handling the fuel oil to be sampled, the sampling connection should be thoroughly flushed through and thereafter the required sample should be obtained.

[33] Marine fuels of residual origin (RM) need to be heated up to around 100-120 ºC for combustion purposes.
[34] Applicable after 1st March 2020, if appropriate. Regulation 14.1.3 of MARPOL Annex VI was amended by IMO Res. MEPC.305(73) making 1 January 2020 the effective date of implementation of the 0.50% m/m fuel oil sulphur content limit requirement. Complementarily, further MARPOL amendments prohibit from 1 March 2020 the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship - unless the ship has an exhaust gas cleaning system ("scrubber") fitted.

- Direct sampling from a tank

System tanks, such as settling or service tanks, should preferably be sampled using the procedure described in section on Sampling from the fuel service system. To be noted that viscous fuel oils in such tanks will be at elevated temperatures and hence due caution would be necessary. If such tanks are to be sampled directly that should be only by means of, if fitted, tapping points mounted on the tank which should meet the conditions given in the above procedure. Sampling from a system tank should not be undertaken by means of removing an access plate or from the test drain connection.

Loaded cargo or other ship operational factors may preclude direct sampling from a tank. Where direct tank sampling is to be undertaken it should be understood that the ship itself may not carry the necessary sampling equipment. In order to take a fuel oil sample direct from a tank, consideration should be given to the use of a specialist service provider having the appropriate sampling equipment, such as that given in ISO 3170:2004, and the expertise necessary to obtain the required sample in a safe and competent manner. Since a sample obtained is representative of the fuel oil at the point from which it was drawn it might therefore be necessary to take samples from more than one level in a tank.

Analysis of the MARPOL representative samples

In the case of analysis of on-board sealed bunker samples of the marine fuel delivered to the ship (MARPOL representative samples), national legislation that implements MARPOL Annex VI should be followed in order to take possession of the fuel samples on board the ship for analysis purposes. In any case, the Sulphur Inspector should provide the ship with an official receipt for each such sample in order that, as required by MARPOL Annex VI, the ship can maintain a complete record of those samples which can be shown at future inspections or surveys as required.

- For each sealed bunker sample taken, the Sulphur Inspector should note at that time the condition of the:
  (i) seal applied, its marking and integrity, and
  (ii) applied label, the security of its attachment, and the conformity of details given thereon with the corresponding Bunker Delivery Note.

Sample handling

The sampling containers and sample bottles should be made of metal or a plastic suitable for the temperature of the fuel oil being sampled. Where the sampled oil is heated the sampling containers should either be fitted with handles or held within a second container. Directly following the collection, the primary sample should be thoroughly shaken and then used to fill three clean, sample bottles provided by the inspector. Then, two bottles are to be taken ashore for analysis and the third one is to be retained on board the ship for a period of not less than 12 months from the date of collection. The Sulphur Inspector should also ensure that the sample bottles are sealed and labelled with a unique means of identification applied in the presence of the ship's representative.

The label should include the following information:

- sampling point location where the sample was drawn;
- date and port of sampling;
- unique means of identification of the ship[35];
- details of the seal identification; and
- signatures and names of the inspector and the ship's representative.

Sample's analysis results

Each Member State should manage the verification procedure, and the laboratories responsible for the verification procedure, set forth in MARPOL Appendix VI (i.e. *Part 2 – In-use and on board fuel oil*

[35] Attention should be placed to the local practice and national legislation regarding confidentiality in the handling of evidences by competent authorities.

samples[36]), should be fully accredited in accordance with ISO 17025 or an equivalent standard for the purpose of conducting the tests. Fuel oil shall be tested in accordance with the ISO 8754:2003 or 14596:2007.

The laboratory shall:

- record the details of the seal number and the sample label on the test record;
- record the condition of the seal on the sample as received on the test record; and
- reject any sample where the seal has been broken prior to receipt and record that rejection on the test record.

If the seal of the sample as received has not been broken, the laboratory shall proceed with the verification and unseal the sample, thoroughly homogenize the sample, draw two sub samples, reseal the sample and record the new seal on the test record.

The two subsamples shall be tested in succession in accordance to the procedure described in MARPOL Appendix VI[37]. If the text results of both subsamples are valid, an average of the two results shall be calculated thus giving the result and recorded on the text record as "Z":

Aplicable limit % m/m: V	Test margin value: W	Z≤V	V < Z≤W	Z > W
0.10	0.11	Meets the requirement	Meets the requirement	Does not meet the requirement
0.50	0.53			
		Result "Z" reported to 2 decimal places[38]		

2.8. NON-COMPLIANCES WITH THE DIRECTIVE

In the case where the master of the ship claims that it has not been possible to purchase low sulphur fuel, evidence must be provided that all reasonable measures were taken to source this fuel. In particular, the master may be required to present a record of actions taken to attempt to bunker compliant fuel oil and provide evidence:

- of attempts to purchase compliant fuel oil in accordance with its voyage plan
- if the fuel oil was not made available where expected, that attempts were made to locate alternative sources for such fuel oil, and
- that despite best efforts to obtain compliant fuel oil no such fuel oil was made available for purchase.

If, despite best efforts, it was not possible to procure compliant fuel, a FONAR notification regarding this should have been received from the ship (as well as a notification to its flag State Administration).

The ship shall not be required to deviate from its intended voyage or to delay unduly the voyage in order to achieve compliance. However, a FONAR[39] is not an exemption, therefore the information provided by the master should be scrutinized and take action, as appropriate. In the case of insufficiently supported and/or repeated claims of non-availability, the Sulphur Inspector may require additional documentation and substantiation of fuel oil non-availability claims. In relation to this, the following should be taken into account:

[36] *MARPOL Annex VI Appendix VI on Fuel verification procedure for fuel oil* samples has been amended with expected entry into force in September 2021. However, the IMO approved a circular (MEPC.1 /Circ.882) to encourage early application of the approved amendments to the verification procedures.

[37] It should be noted that when analysing samples obtained while the marine fuel was being delivered to the ship, consideration should be given to amended *MARPOL Appendix VI Part 1 – MARPOL delivered fuel oil sample* for potential follow-up with the respective marine fuel supplier registered in the Member State.

[38] Without prejudice of the requirements established in ISO 8754:2003. While laboratory results may be reported to more than 2 decimal values, for compliance purposes, the results should be assessed by the competent authorities up to the 2 decimal.

[39] Appendix 1 to the 2019 Guidelines on consistent implementation of 0.50% sulphur limit under MARPOL Annex VI (IMO Res. MEPC.320(74) includes a template for a "Fuel Oil Non-Availability Report (FONAR)".

- Ships/operators are expected to take into account logistical conditions and/or terminal/port policies when planning bunkering, including but not limited to having to change berth or anchor within a port or terminal in order to obtain compliant fuel.
- Ships/operators are expected to prepare as far as reasonably practicable to be able to operate on compliant fuel oils. This could include, but is not limited to, fuel oils with different viscosity and different sulphur content not exceeding regulatory requirements (requiring different lube oils) as well as requiring heating and/or other treatment on board.
- Cost of compliant fuel should not be considered as a valid basis for claiming non-availability of fuel[40].

In the case where the master claims that non-compliant fuels have been used due to damage sustained to the ship or its equipment, suitable evidence must be provided. The master must also prove that all reasonable measures were taken after the occurrence of the damage to prevent excessive emissions, the flag Administration and port State authorities were notified, and that measures have been taken as soon as possible to repair the damage.

In the case where the master claims that the fuel switch-over had to be delayed due to inclement weather or to maintain the safety of the ship, the master must be able to provide suitable evidence and should have informed the port before arrival.

If non-compliances are found during the Sulphur Inspection, any follow up or corrective actions should be taken in accordance with the national legislation transposing the Directive in each Member State.

2.9. REPORTING THE FINDINGS OF THE SULPHUR INSPECTION

Sulphur Inspections should be reported in THETIS-EU, the Union information system[41] supporting the enforcement under the Directive for those member States that have opted to use the system. Along with the outcome of the inspection, other ship specific information should be inserted in THETIS-EU which could be of relevance for future inspections (e.g. ship's emission abatement methods, main and auxiliary engines rated power, fuel tanks information, etc.).

Any sulphur inspection processed in THETIS-EU will set the 'Inspection outcome' to 'on-going' by default. The inspection outcome is visible to all authorised users. As soon as a Sulphur Inspection is finalised, this should be reported in the information system and the outcome changed consequently to 'Inspected' or 'Inspected and penalty applied', depending on the final result.

In case of an inspection based on a THETIS-EU alert on the ship visited, as a result of the inspection the alert status should be changed to "Close" to avoid further inspections or misunderstandings in the next ports.

In case the Sulphur Inspection cannot be finalised before departure of the ship (e.g. the MS is waiting for the analysis of the samples) this should be indicated in the information system. The inspection outcome should be set to 'Waiting for sampling results' until the result of the analysis is reported in the information system.

Once the sampling analysis has been received and found not in compliance an alert should be introduced in THETIS-EU as warning for the next port.

In cases where as a result of the inspection a penalty proceeding is started, then the inspection outcome should be set to 'Waiting for penalty decision' which should again be updated to 'Inspected and penalty applied' depending on the final result.

The outcome of the inspection must be selected from a drop-down menu.

[40] Appendix to the 2019 Guidelines for Port state Control Under MARPOL Annex VI Chapter 3 (IMO Res. MEPC.321(74))
[41] 'Union information system' as defined in Article 2 (5) of Commission Implementing Decision (EU) 2015/253

REPORTING

The Directive requires each Member State to submit a yearly report to the Commission on the compliance with the sulphur standards and on the basis of the results of the sampling, analysis and inspections carried out (Article 14.1). The information to be included in the annual report is specified in the Commission Implementing Decision laying down the rules concerning the sampling and reporting under the Directive.

In particular, the report must at least contain the following information for each individual ship:

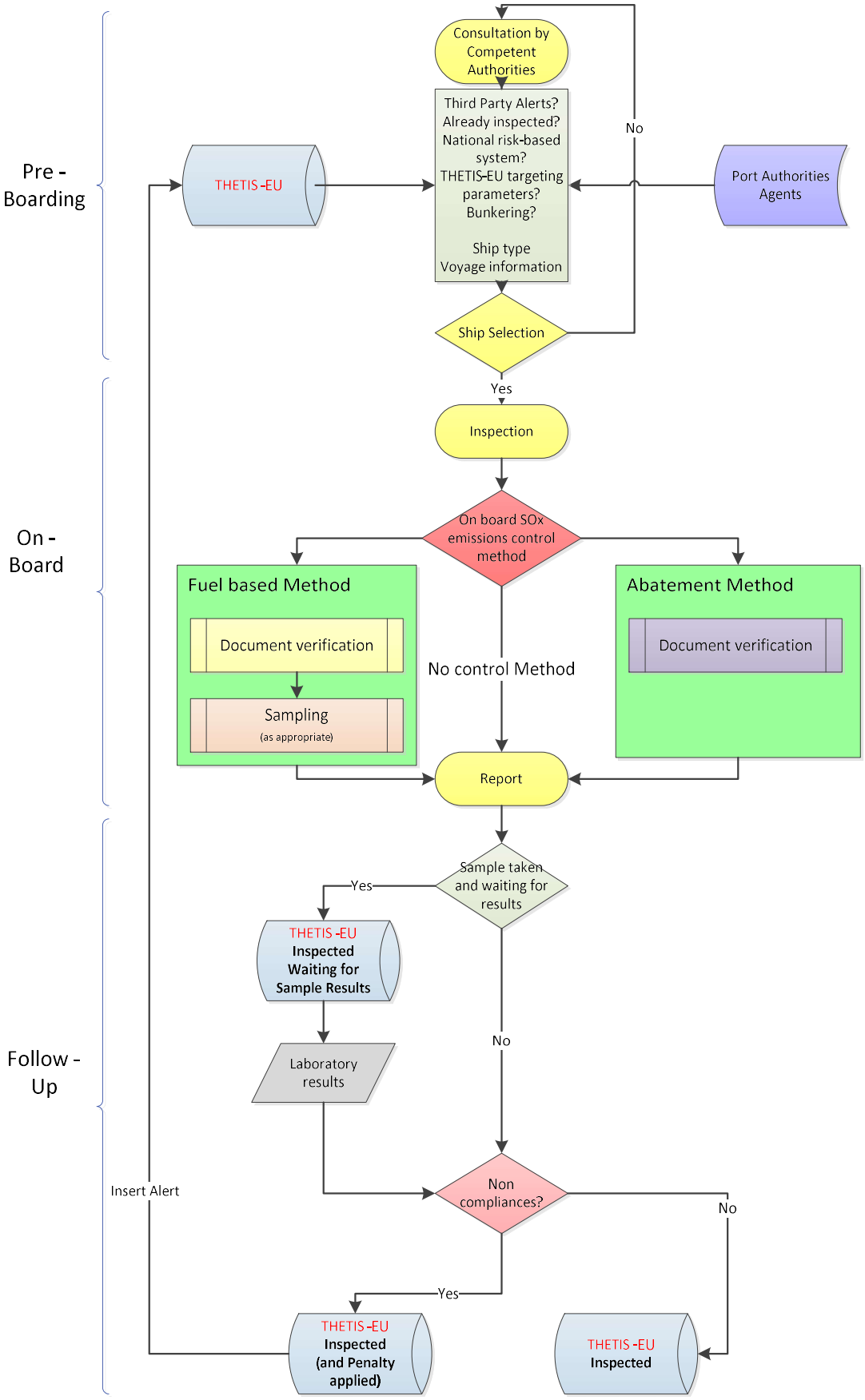
- ship particulars, including IMO number, type, age of ship and tonnage,
- reports on sampling and analysis, including the number and type of samples, the sampling methods used, and sampling locations, for compliance verification of the ship type,
- relevant information on bunker delivery notes, location of fuel bunkering, oil record books, log books, and fuel change-over procedures and records,
- enforcement action and legal procedures initiated at the national level or penalties or both against that individual ship.

In addition, the following aggregated information shall also be required:

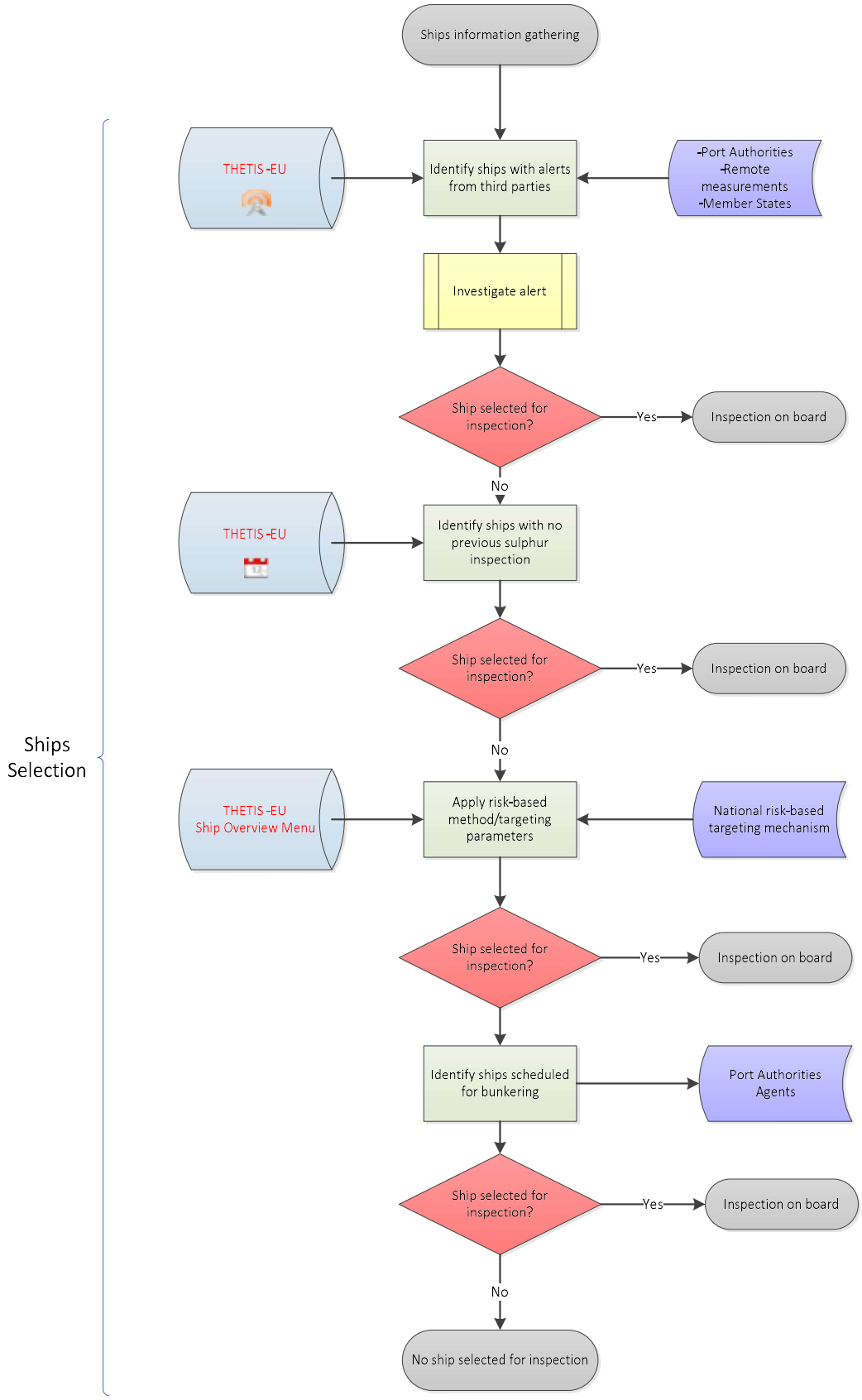
- the total annual number and type of non-compliance of measured sulphur content in examined fuel, including the extent of individual sulphur content non-conformity and the average sulphur content determined following sampling and analysis,
- the total annual number of document verifications, including bunker delivery notes, location of fuel bunkering, oil record books, log books, and fuel change-over procedures and records,
- information about claims of non-availability of marine fuels which comply with the Directive,
- information on notifications and letters of protest with respect to the sulphur content of fuels against marine fuel suppliers in their territory,
- a list containing the name and address of all marine fuel suppliers in the relevant Member State,
- the description of the use of alternative emission abatement methods, including trials and continuous emission monitoring, or alternative fuels and compliance checks of continuous achievement of SOx reduction in accordance with Annexes I and II to Directive of the ships flying the flag of the Member State,
- where applicable, description of national risk-based targeting mechanisms, including specific alerts, and the use and outcome of remote sensing and other available technologies for prioritizing individual ships for compliance verification,
- total number and type of infringement procedures initiated or penalties or both, the amount of fines imposed by the competent authority to both ship operators and marine fuel suppliers.

A Member State using the Union information system (THETIS-EU) to record, exchange and share data on the compliance verification may use the annual aggregated compilation of enforcement efforts provided by the Union information system to fulfil their reporting obligations.

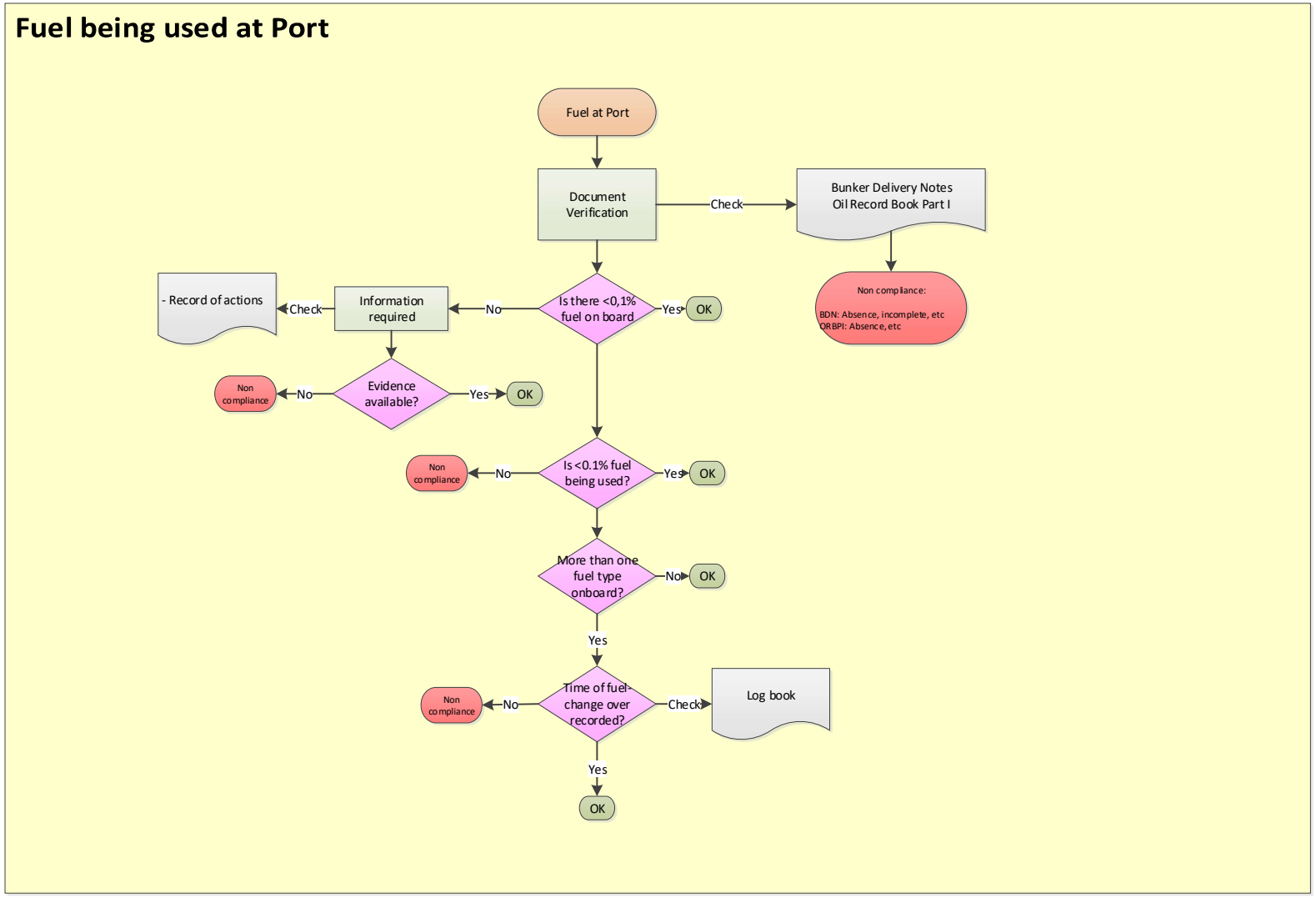
APPENDIX I – INSPECTION FLOWCHART

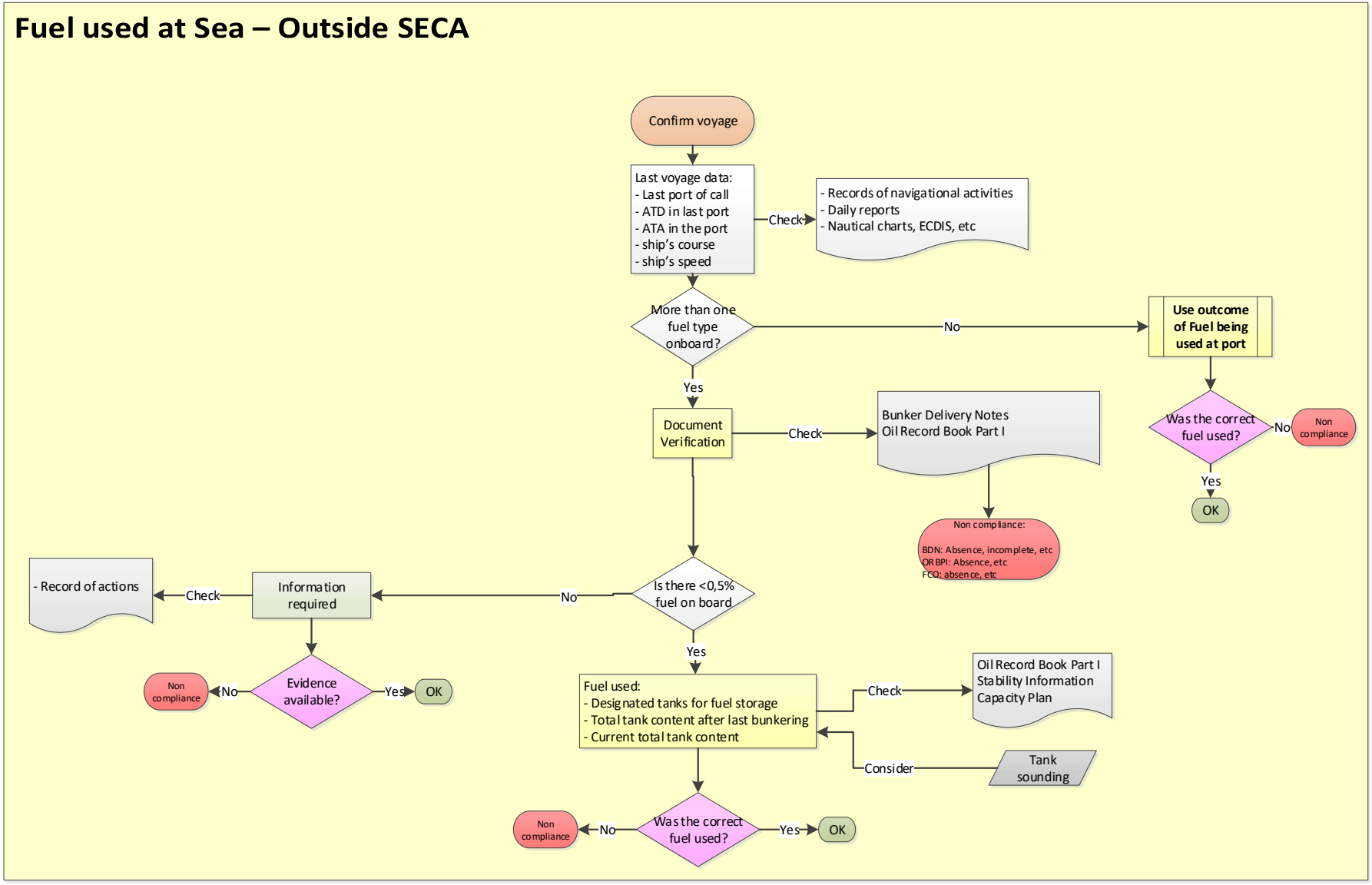


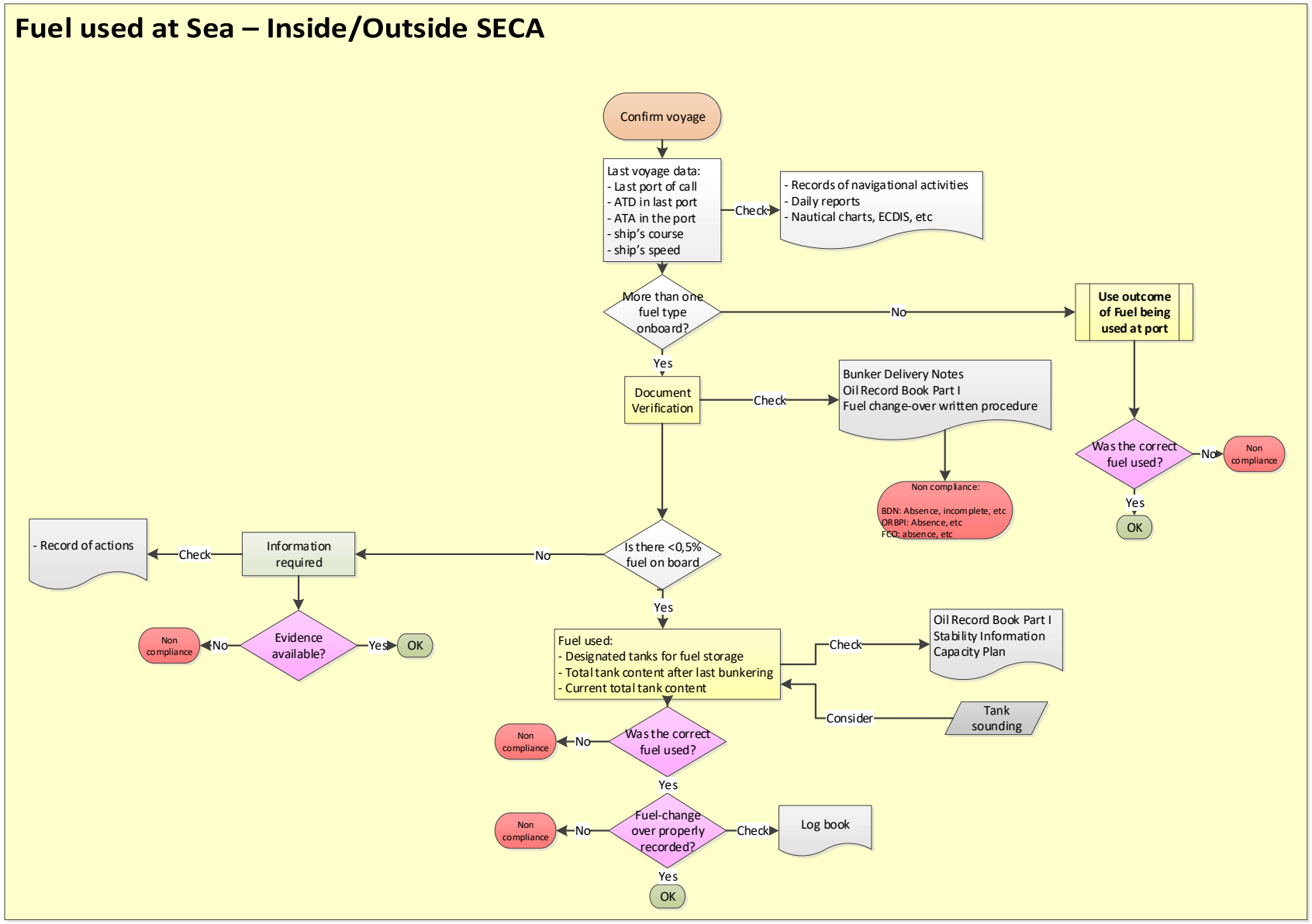
APPENDIX II – SHIPS SELECTION FLOWCHART



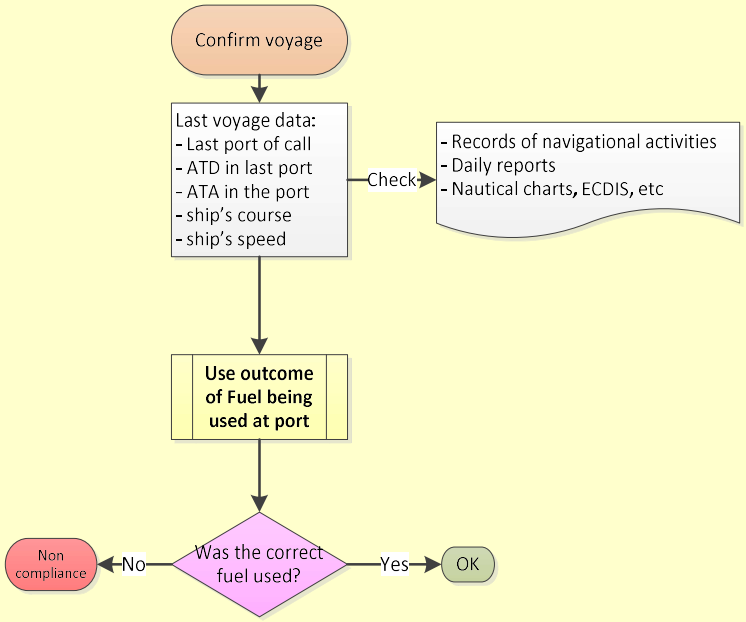
APPENDIX II – FUEL BASED METHOD



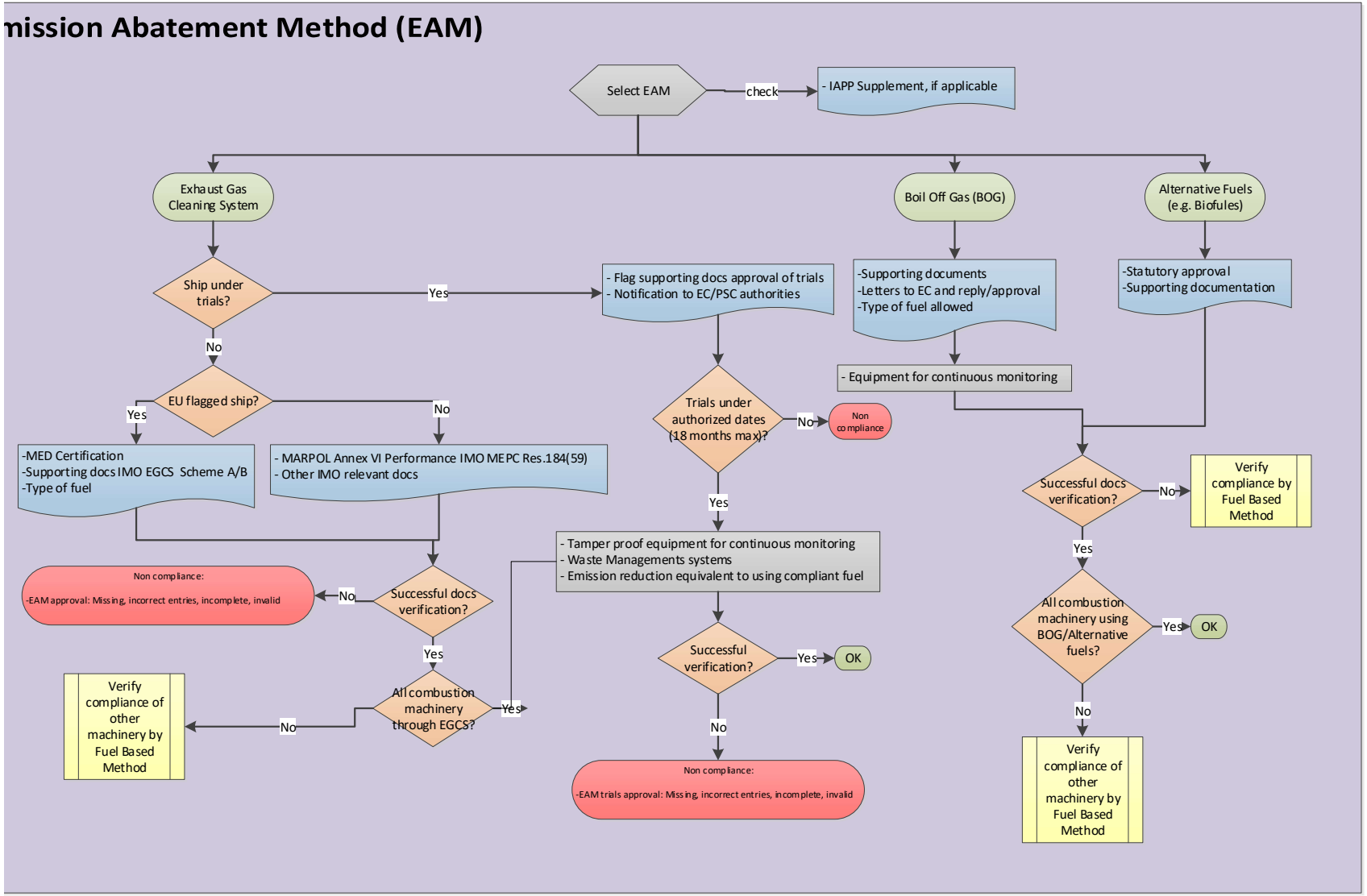

Fuel used at Sea – Outside SECA
Confirm voyage
Last voyage data:
- Last port of call
- ATD in last port
- ATA in the port
- ship's course
- ship's speed
Check
- Records of navigational activities
- Daily reports
- Nautical charts, ECDIS, etc
More than one fuel type onboard?
No
Use outcome of Fuel being used at port
Was the correct fuel used?
No
Non compliance
Yes
OK
Yes
Document Verification
Check
Bunker Delivery Notes
Oil Record Book Part I
Non compliance:
BDN: Absence, incomplete, etc
ORBPI: Absence, etc
FCO: absence, etc
Is there <0,5% fuel on board
No
- Record of actions
Check
Information required
Evidence available?
No
Non compliance
Yes
OK
Yes
Fuel used:
- Designated tanks for fuel storage
- Total tank content after last bunkering
- Current total tank content
Check
Oil Record Book Part I
Stability Information
Capacity Plan
Consider
Tank sounding
Was the correct fuel used?
No
Non compliance
Yes
OK


Fuel used at Sea – Inside/Outside SECA
Confirm voyage
Last voyage data:
- Last port of call
- ATD in last port
- ATA in the port
- ship's course
- ship's speed
Check
- Records of navigational activities
- Daily reports
- Nautical charts, ECDIS, etc
More than one fuel type onboard?
No
Use outcome of Fuel being used at port
Yes
Document Verification
Check
Bunker Delivery Notes
Oil Record Book Part I
Fuel change-over written procedure
Non compliance:
BDN: Absence, incomplete, etc
ORBPI: Absence, etc
FCO: absence, etc
Was the correct fuel used?
No
Non compliance
Yes
OK
Is there <0,5% fuel on board
No
Information required
Check
- Record of actions
Evidence available?
No
Non compliance
Yes
OK
Yes
Fuel used:
- Designated tanks for fuel storage
- Total tank content after last bunkering
- Current total tank content
Check
Oil Record Book Part I
Stability Information
Capacity Plan
Consider
Tank sounding
Was the correct fuel used?
No
Non compliance
Yes
Fuel-change over properly recorded?
No
Non compliance
Check
Log book
Yes
OK

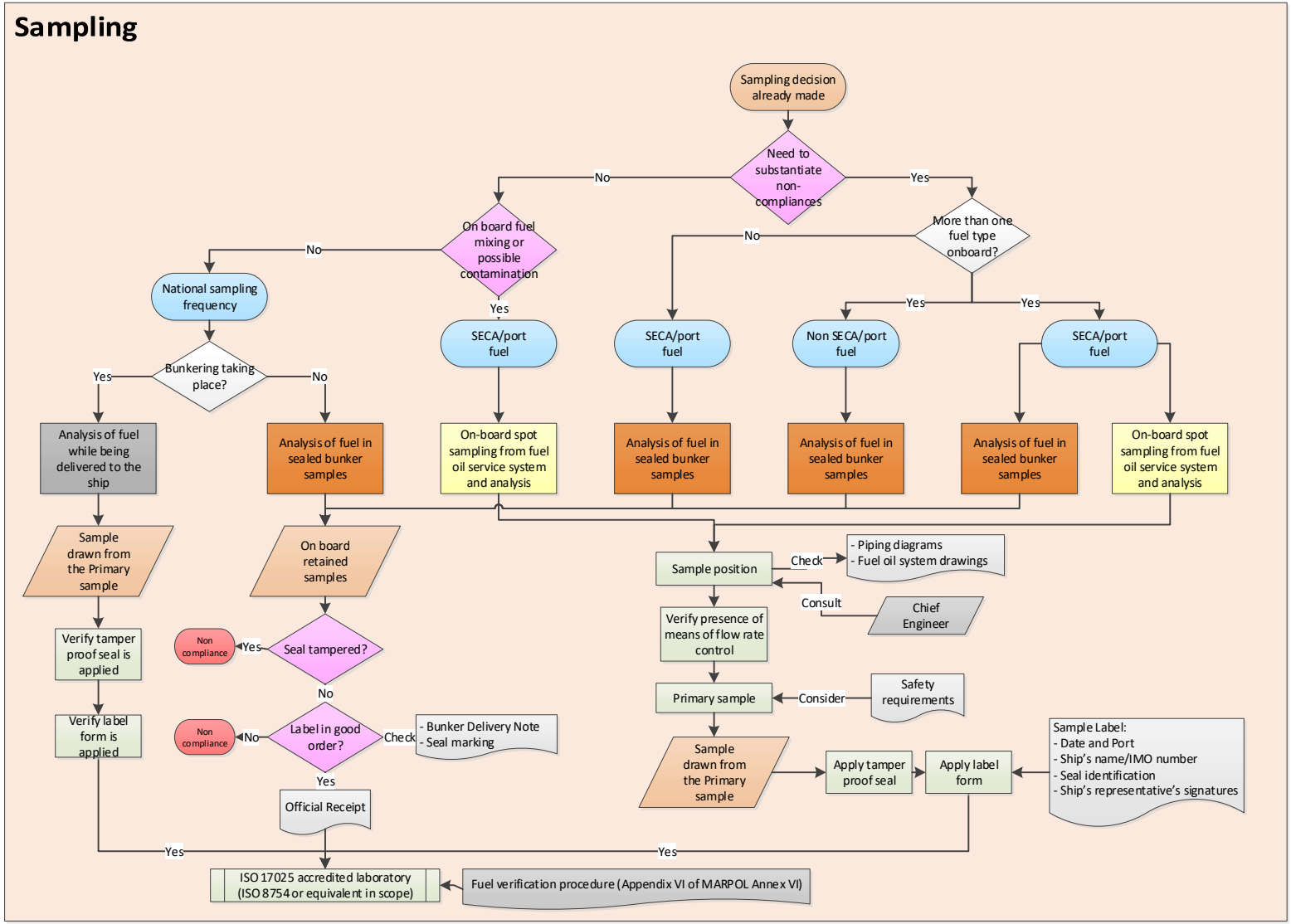
Fuel used at Sea – Inside SECA



APPENDIX III – ABATEMENT METHOD



APPENDIX IV – SAMPLING AND ANALYSIS



APPENDIX V – POTENTIAL SHIP JOURNEYS

In relation to the recent activities of a ship berthed in a port, as this sets the reference for compliance, during a Sulphur Inspection is of importance to make a difference between:

- EU ports situated outside an EU SECA, and (in ; see Figure 1 below)
- EU ports situated inside an EU SECA, (in ; see Figure 1 below)

The recent activity of a ship is considered as the route of the ship since the last port of call, and more specifically the route travelled within the EU region. In this respect, the ship may have travelled:

- a route which covers only waters where the Directive applies, but outside the EU SECAs

  [; see figure 1 & 2]

- a route which covers only the area inside the EU SECAs,

  [; see figure 1 & 2]

- a route which covers the waters where the Directive applies, both outside & inside the EU SECAs

  [+ ; see figure 1 & 2]

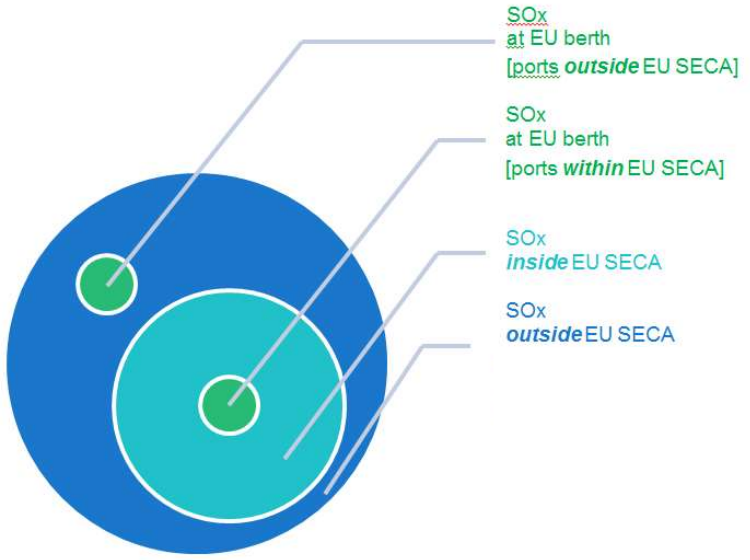
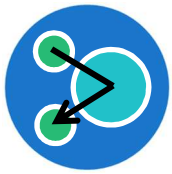


Figure 1: EU region: MSs territory, territorial seas and exclusive economic zones or pollution control zones

Route: From an EU berth inside the SECA, in the SECA and then berthing in another EU Port inside the SECA***, followed by inspection.

Route: From an EU berth outside the SECA* travelling travelling outside the SECA and then berthing in another EU Port outside the SECA***, followed by inspection.

Route: From an EU berth outside the SECA*, travelling within and outside the SECA** and then berthing inside the SECA, followed by inspection.



Route: From an EU berth outside the SECA*, travelling within and outside the SECA** then berthing outside the SECA, followed by inspection.

Route: From an EU berth inside the SECA, travelling within and outside the SECA** and then berthing inside the SECA, followed by inspection.

Route: From an EU berth inside the SECA, travelling within and outside the SECA** then berthing outside the SECA, followed by inspection.

* In these cases the ship could also originate from outside the waters controlled by the Directive, however the inspection would be limited to operations inside the waters of the Member State.

**These cases could also include vessels that work at sea or facilitate the offshore industries and return to the same port after travelling through a SECA, or leaving and returning to the SECA.

*** These cases could also include vessels that work at sea or facilitate the offshore industries and return to the same port

Figure 2: Potential journeys that a ship may make in the EU prior to a Sulphur Inspection.

APPENDIX VI – RISK-BASED PARAMETERS

Historical parameters (*to be used in the selection of ships*)	**Sulphur**	Ships for which an active alert exist in the system, other than a remote sensing alert
		Ships for which an active remote-sensing alert exist in the system
		Ships having been identified with Sulphur related non-compliances within the last 6 months, with a relevant report in THETIS-EU, provided that no inspection without non-compliances has taken place afterwards
		Ships having been identified as having unduly used non-compliant fuel within the last 24 months, with a relevant report in THETIS-EU, provided that no inspection without non-compliances has taken place afterwards
		Ships from companies with 3 times Sulphur related deficiencies in the last 3 months
	PSC	Ships having been PSC detained within the last 12 months on the account of MARPOL Annex VI Sulphur related deficiencies (THETIS codes 01124, 14604, 14606, 14607 and 14614)
		Ships having been identified with MARPOL Annex VI Sulphur related deficiencies (THETIS codes 01124, 14604, 14606, 14607 and 14614) within the last 6 months under the PSC regime

Generic parameters ***(to be used as additional info in cases of ships meeting same historical parameters)***	Total installed power above 10,000kW[42]
	Keel date before 1 July 1998[43]
	Entered EU[44]
	Entered SECA[45]
	Ship flying the flag not party to MARPOL, ANNEX VI

[42] Criteria based on the risk of air pollution (the higher the power the higher the consumption)
[43] SOLAS Ch.II-1 Regulation 26.11 regarding the provision of two fuel oil service tanks for each type of fuel used on board
[44] Last port of call outside the EU or unknown
[45] Last port of call outside SECAs or unknown

APPENDIX VII – LIST OF NON-COMPLIANCES

Non Compliance	Description	Action Taken	Directive Reference
Bunker delivery note	Missing, incomplete, not as required	- Compliant - Case raised as per provisions to national legislation - Penalty as per provisions pursuant to national legislation - PSC authority informed - Warning issued - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 13.2.(a)
Ships Log Books, including fuel changeover procedures	Missing, incomplete, not as required	- Compliant - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 6.6 Art 7
MARPOL sample	Not available, not complete, not sealed, not marked, not as required	- Compliant - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 13.2.(b)
Fuel sample of fuel used	1. Above 3.5 % (Outside SECA until 01/01/2020) 2. Above 0.1 % (Inside SECA) 3. Above 0.1 % (Outside SECA at berth) 4. Above 1.5 % (Pass at sea outside SECA until 01/01/20) 5. Above 0,5% (Outside SECA since 01/01/2020)	- Compliant - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	1. Art 6.1.(a) 2. Art 6.2.(b) 3. Art 7.1 4. Art 6.5
Record of action taken to achieve compliance	Not provided, not complete	- Compliant - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 6.8.(a)
Evidence of purchase attempts	Not provided, not sufficient, not complete	- Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 6.8.(b)
Evidence of the non-availability	Not provided, not complete	- Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 6.8.(b)
Emission abatement method approval document or trial approval	Missing, incorrect entries, incomplete, invalid Commissioning in progress	- Fuel sampling - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 9.2 Art 10
Change over	Too late, not complete, not documented	- Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 7.1
Sampling	Technically impossible, no standard sample, no approved way, unsafe, un-representative sampling point; refusal by ship	- Compliant - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 13
Abatement method (EU flag only)	Not approved, no equivalence	- Compliant - Fuel sampling - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 8.1
Abatement technology	Not continuously reducing SOX emissions	- Compliant - Penalty as per provisions pursuant to Sulphur Directive - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text)	Art 8.2