

Sulphur Inspection Guidance

Directive (EU) 2016/802

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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 (codification of Council Directive 1999/32/EC), as regards the sulphur content of marine fuels (hereafter referred to as ‘the Directive’).

1.2. 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 in 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 SO_x 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 apply¹.

Any sulphur inspection can only focus on the operation and behaviour of a ship while in areas and ports of the geographical jurisdiction of the Member State. However, additional enforcement actions may be required in accordance with international maritime law.

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

	outside EU SECAs**	inside EU SECAs**	Exceptions
Ships at berth in EU ports (includes at anchor)	0.10% Not if timetable < 2 hrs or engines switch off and shore-side electricity		Ships using Approved Emission Abatement Methods****
Passenger ships on regular services to/from EU ports	Until 01-01-2020 1.5% From 01-01-2020 0.50%	From 01-01-2015 0.10%	
Other ships/cases	From 18-06-2014 3.50% *** From 01-01-2020 0.50%		

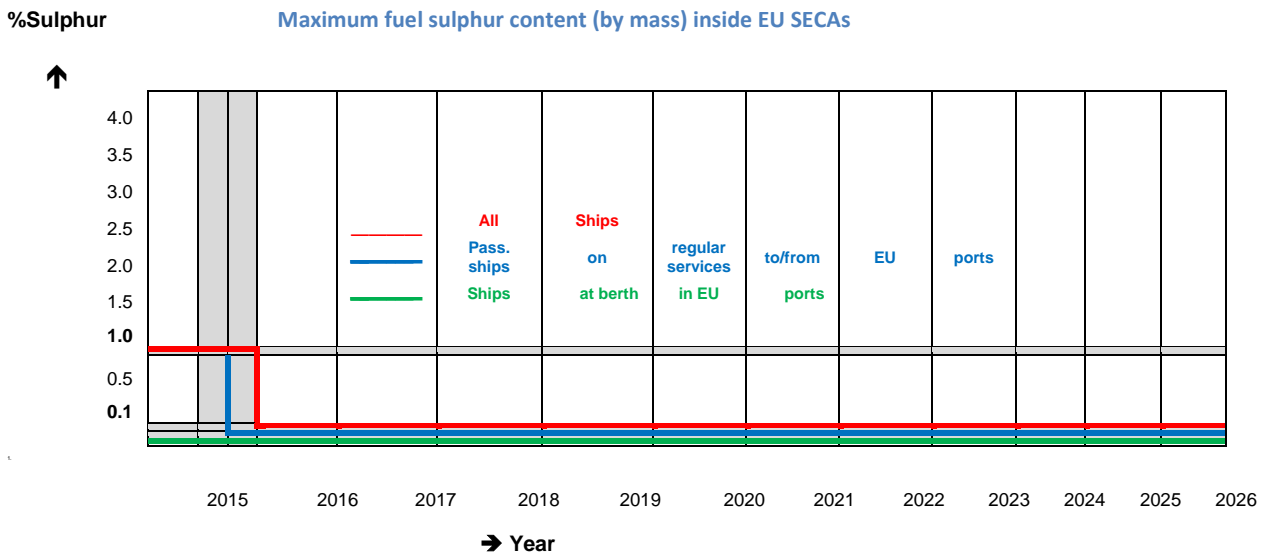
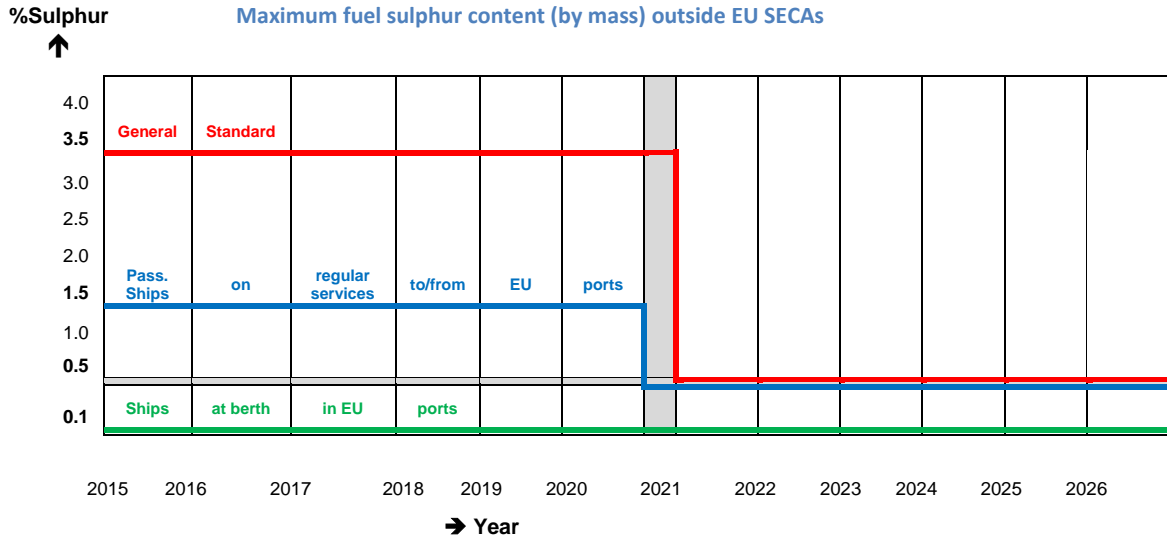
* Concentration for Solutions = grams solute /grams solution × 100%

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

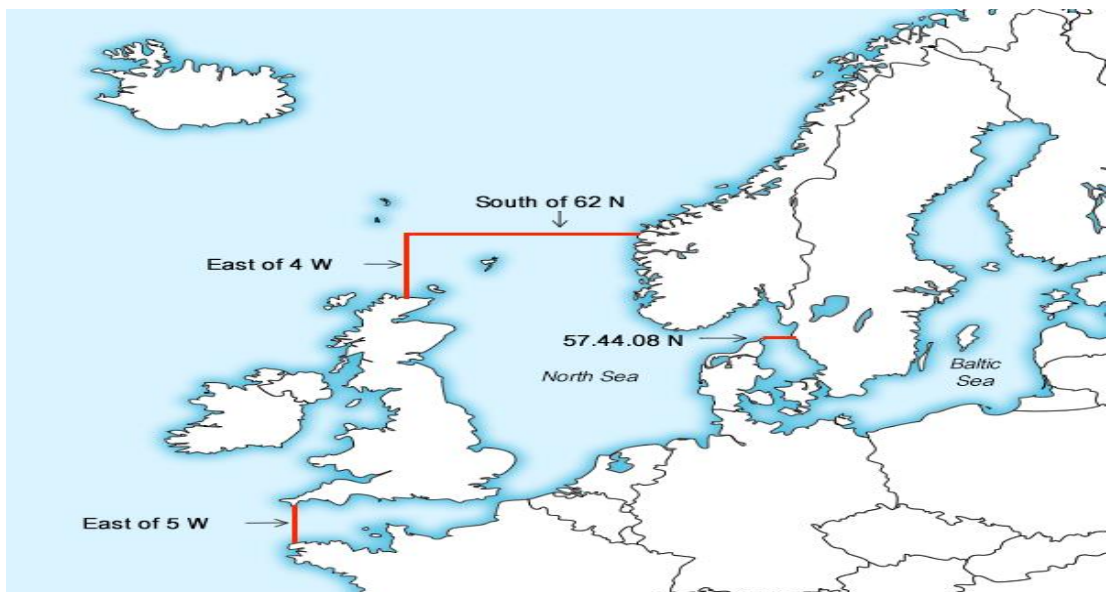
*** Referred to as the "General Standard" within the Directive. This can only be exceeded by fuels used on ships with approved emission abatement methods (such as scrubbers operating in closed mode)

**** 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 SO_x emissions which are at least equivalent to using compliant marine fuels.

¹ 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 (Article 1 of the Directive- Paragraphs 2f, 2g and 2h).



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



1.3. 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. In these cases, account should be taken of any relevant guidelines developed by the IMO² 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.

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 ships³, 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.

²'2009 Guidelines for exhaust gas cleaning systems' (IMO Resolution MEPC.184(59), or 2015 Guidelines for exhaust gas cleaning systems (IMO Resolution MEPC.259(68) taking into account the date of fabrication.

³'2009 Guidelines for the sampling of fuel oil for determination of compliance with the revised MARPOL Annex VI' (IMO Resolution MEPC.182(59))

1.4. 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. The delivery note should be accompanied by a representative sample of the fuel oil delivered (the MARPOL Representative Sample).

The sample is to be sealed and signed by the supplier's representative and the master or officer in charge of the bunker operation on completion of bunkering operations and retained under the ship's control until the fuel oil is substantially consumed. In any case this should be for a period of not less than 12 months from the time of delivery.

The administration and storage of consecutive bunker delivery notes and associated samples should be in order. In particular, bunker delivery note 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.

Ships' log books

Under the term of ships' log books, the following documents, as a minimum, are included:

- Oil Record Book Part I,
- Records of navigational activities,
- Records of internal transfer of fuel,
- Engine logbooks,
- Tank sounding records, and,
- Fuel oil change over records.

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 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* 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 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 is also essential to obtain a complete record of the voyage, which may be used during the Sulphur Inspection. 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 SO_x emission requirements whilst entering or leaving a SECA, should carry a written procedure describing how the fuel oil change-over is to be achieved⁴. To comply with the SO_x 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 filters⁵.

In addition, 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 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 years⁶ 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 (SO_x) 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. Moreover, any "equivalent arrangements at least as effective in terms of SO_x 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.

⁴ Regulation 14 (6) of the revised MARPOL Annex VI (MEPC 58/23/Add1 Annex 13)

⁵ 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-SO_x compliance – Assistance to Member State Administrations" (November 2014), ECSA-ICS

⁶ Regulation 9 of the revised MARPOL Annex VI

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.

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.


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 alerts exists through the alerting icon .

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 exists (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 inspection⁷.

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 related competent authority following the inspection.

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 VII). 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.

⁷ A list of relevant parameters was adopted at the 27th May 2016 Committee on the Implementation of the Sulphur Directive

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):

- Ship particulars⁸ (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 company and company identification number, rate of engine),
- Confirmation of the primary purpose of the port call (i.e. commercial business or force majeure)⁹,
- 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.

In addition to confirming the above information, the Sulphur Inspector should determine the method used or being used by the ship to control SO_x 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 III):

- 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. In addition, the bunker delivery notes should show the quantity and the sulphur content of the delivered marine fuel oils and state the:

- Name and IMO number of receiving ship
- Port (of delivery)
- Date, address, and telephone number of marine fuel oil supplier
- Product name(s)
- Quantity (metric tons)
- Density at 15°C (kg/m³)¹⁰
- Sulphur content (% m/m)
- A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with regulation 14(1) or 14(4) and regulation 18(3) of MARPOL Annex VI.

⁸ 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.

⁹ 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)

¹⁰ Fuel oil should be tested in accordance with ISO 3675:1998 or ISO 12185:1996 under IMO Regulations

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 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,
- 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),
- 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 the ship has made internal transfers between the bunker tanks, before fuel was transferred to settling tanks/service tanks prior to combustion. If such a case, this should have been logged accordingly. Sulphur Inspectors should keep in mind the sulphur requirements of the Directive (table and figures in pages 2 and 3) and the various different options of the trading pattern of a ship (figures in Appendix VI).

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 in a log-book 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.

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 METHOD

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

- 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 be limited to determining whether the ship:

- has received an appropriate approval for using an EAM (approved, under trial or being commissioned), and
- is using the EAM for all fuel combustion machinery on board.

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.

EGCS

EGCS systems should comply with the relevant IMO Resolutions. Resolution MEPC.184(59) or Resolution. MEPC.259 (68) 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:

- any supporting documents from the flag State referring to the approval of trial, if applicable
- any supporting documents system approval:
 - o MED certification on EU flagged ships, or
 - o MARPOL Annex VI performance Scheme A or B, as applicable on non-EU flagged ships
- 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 addition, a visual inspection of the system should be conducted in order to verify that is properly functioning, is in operation, there are tamper-proof continuous-monitoring systems (for Scheme B), and applies to all fuel combustion machinery on board.

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,
- 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 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,
- 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, 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 fuels¹¹.

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

- sample collection and subsequent analysis of the fuel being supplied to the vessel,
- sampling of the fuel in the ship's fuel lines or in holding tanks, or
- analysis of the MARPOL representative samples, as appropriate.

¹¹ Article 3 Commission Implementing Decision (EU) 2015/253

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 the at berth or SECA fuel oil (lower sulphur) which is being investigated, the issue 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.

Analysis of the MARPOL representative samples

In the case of analysis of sealed bunker samples of marine fuel delivered on board, 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:

- seal applied, its marking and integrity, and
- applied label, the security of its attachment, and the conformity of details given thereon with the corresponding Bunker Delivery Note.

Sampling from the fuel service system^{12 13}

Sulphur Inspectors should take the on-board spot sample of marine fuel through a single or multiple spot sample at the location where a valve is fitted for the purpose of drawing a sample in the fuel service system, as indicated on the ship's fuel piping systems or arrangement plan and as approved by the flag Administration or Recognized Organization acting on its behalf. In the absence of this location, the fuel sampling point shall be the location where a valve is fitted for the purpose of drawing a sample and shall fulfil all of the following conditions:

- be easily and safely accessible,
- 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,

¹² '2016 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)

¹³ Article 6 Commission Implementing Decision (EU)2015/253

- 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 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 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.

Sampling and analysis 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)¹⁴. Moreover, the equipment as outlined in this Resolution should therefore be available to the persons in charge of the sampling process.

Each Member State should manage the verification procedure, and the laboratories responsible for the verification procedure, set forth in MARPOL Appendix VI, should be fully accredited in accordance with ISO 17025 or an equivalent standard for the purpose of conducting the tests.

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 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 system¹⁵ supporting the enforcement under the Directive for those member States that have opted to use the system. Along with

¹⁴ '2009 Guidelines for the sampling of fuel oil for determination of compliance with the revised MARPOL Annex VI' (IMO Resolution MEPC.182(59))

¹⁵ 'Union information system' as defined in Article 2 (5) of Commission Implementing Decision (EU) 2015/253

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 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. 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.

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.

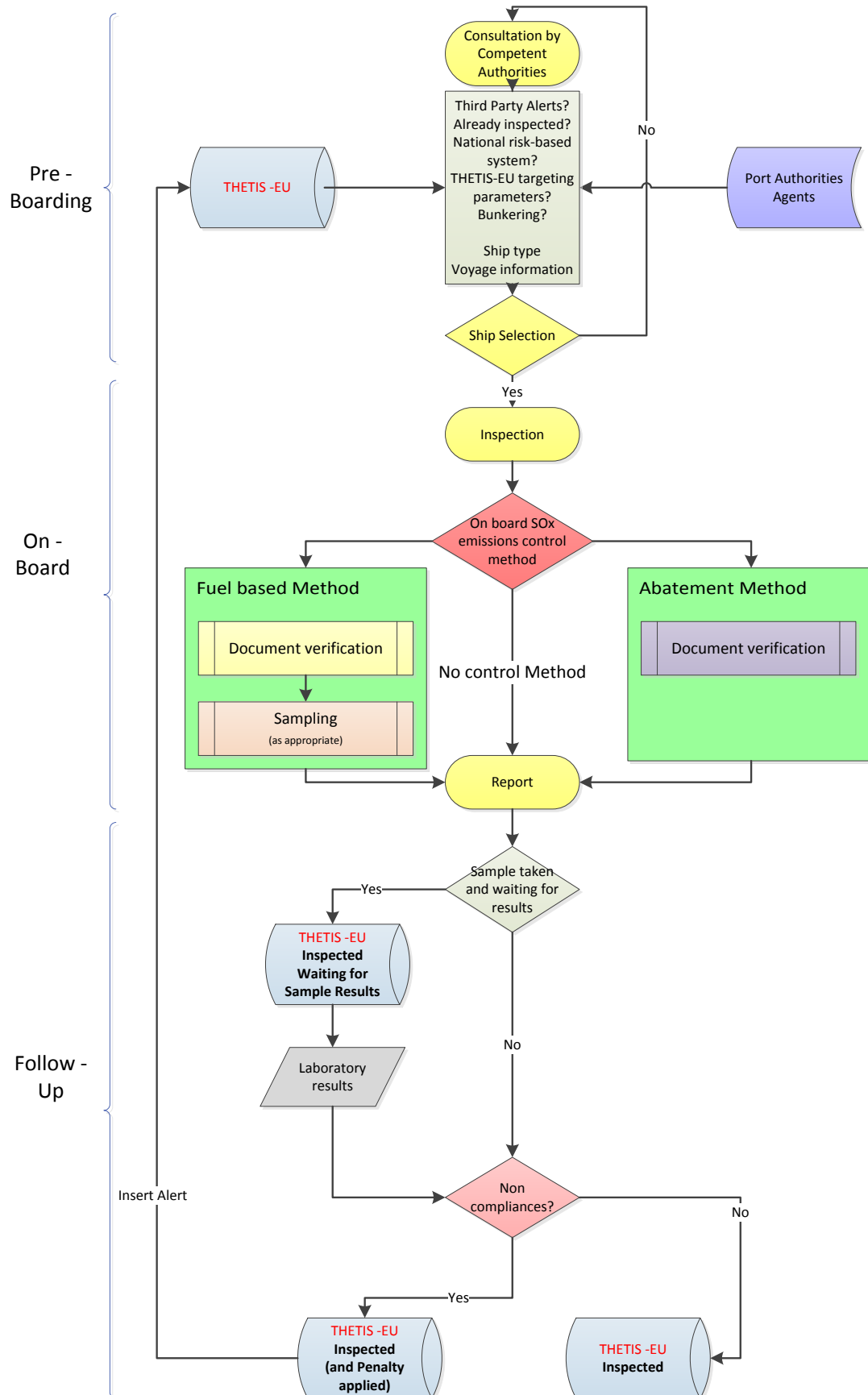
In particular, the report must at least contain the following information for each individual ship:

- 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.

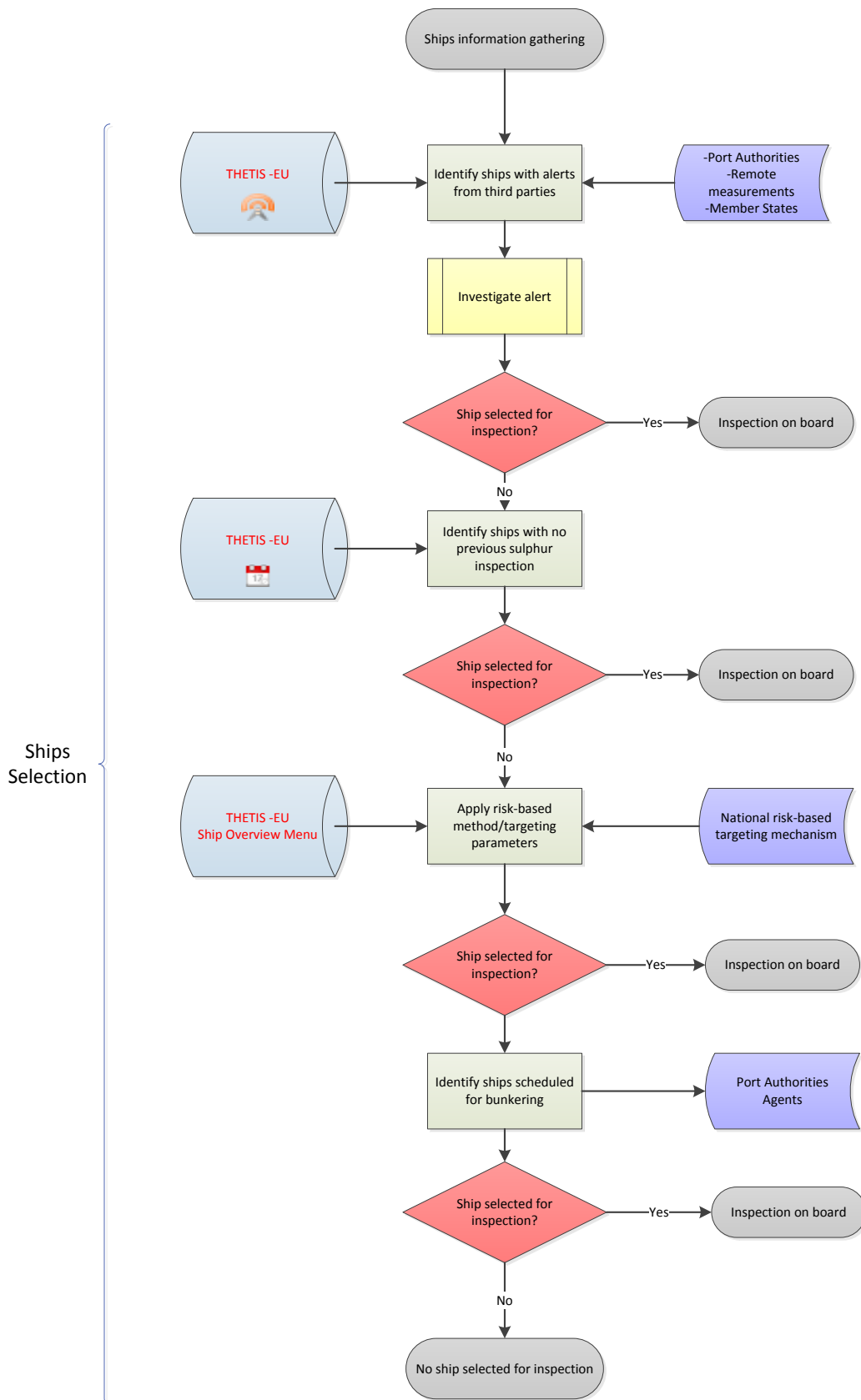
In addition, the following aggregated information shall also be required:

- 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 SO_x 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.

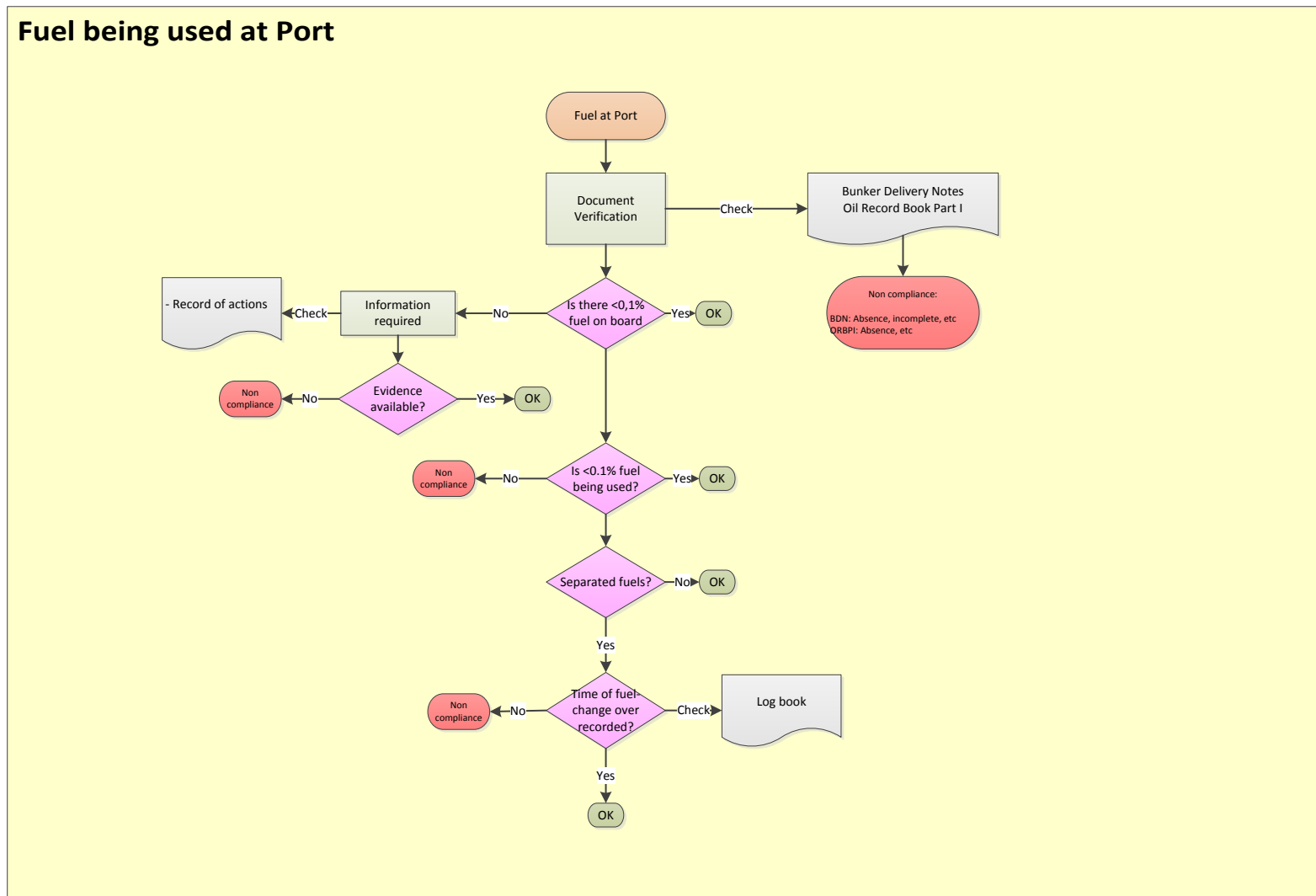
APPENDIX I – INSPECTION FLOWCHART



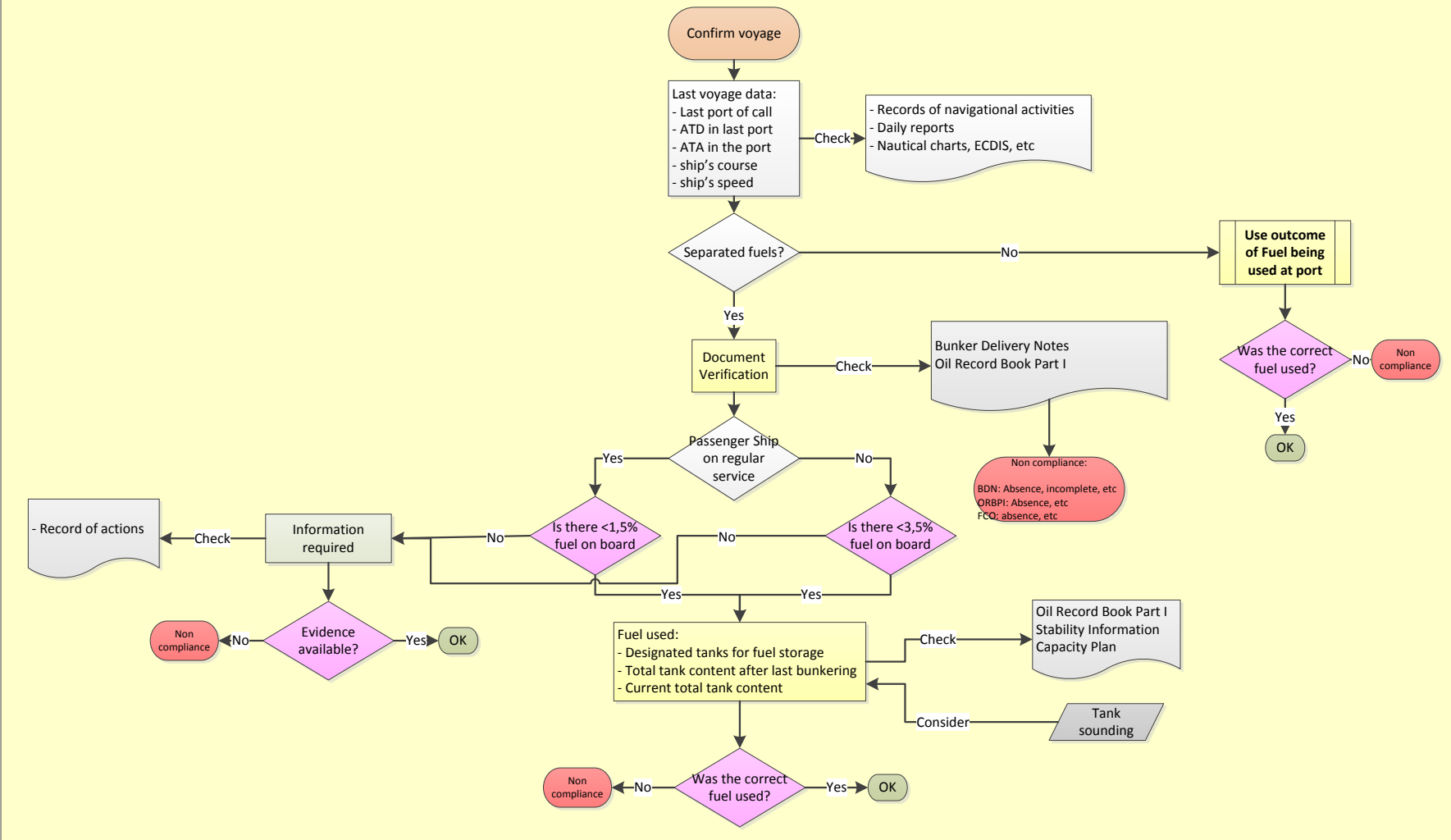
APPENDIX II – SHIPS SELECTION FLOWCHART



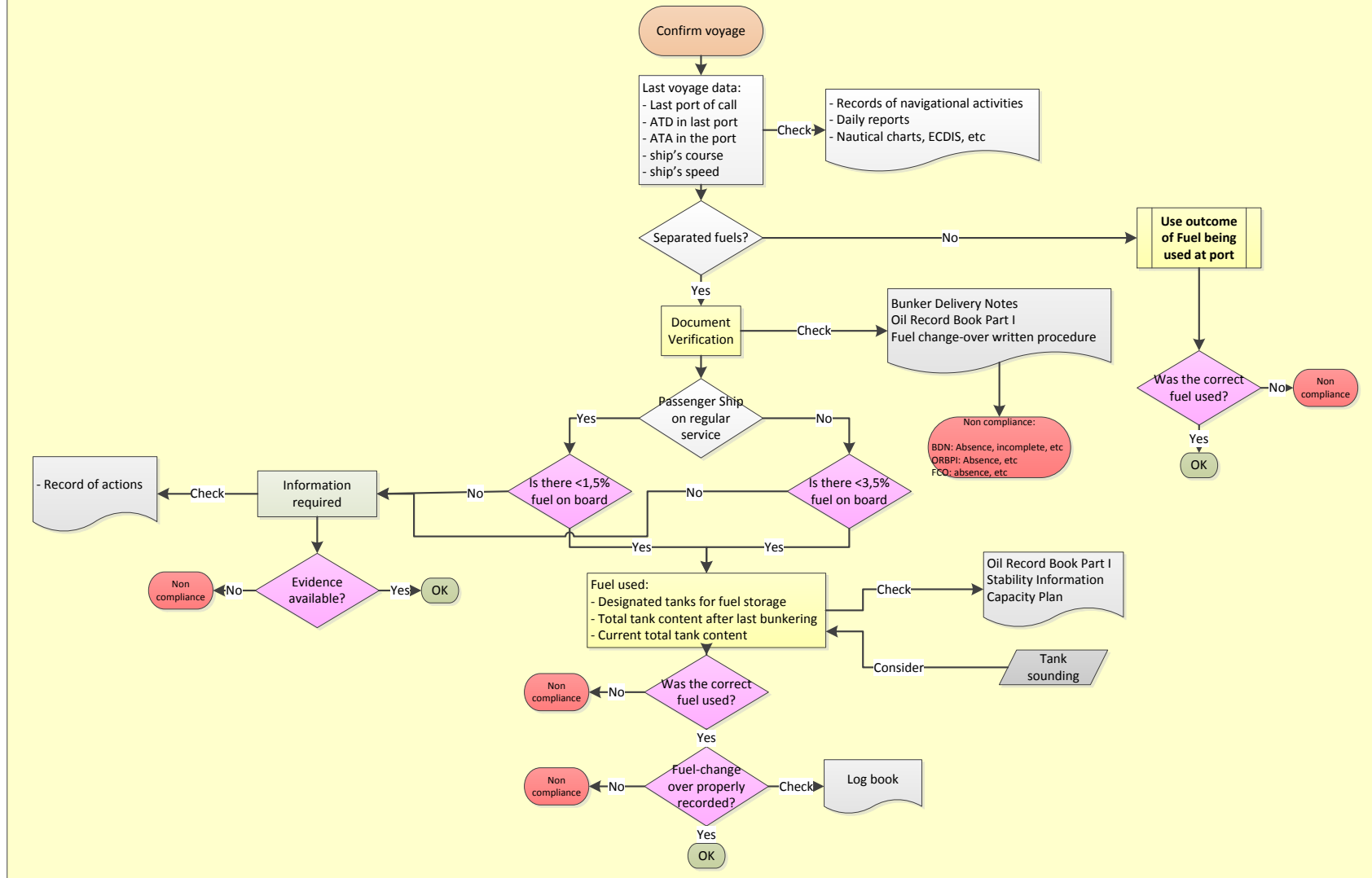
APPENDIX II – FUEL BASED METHOD



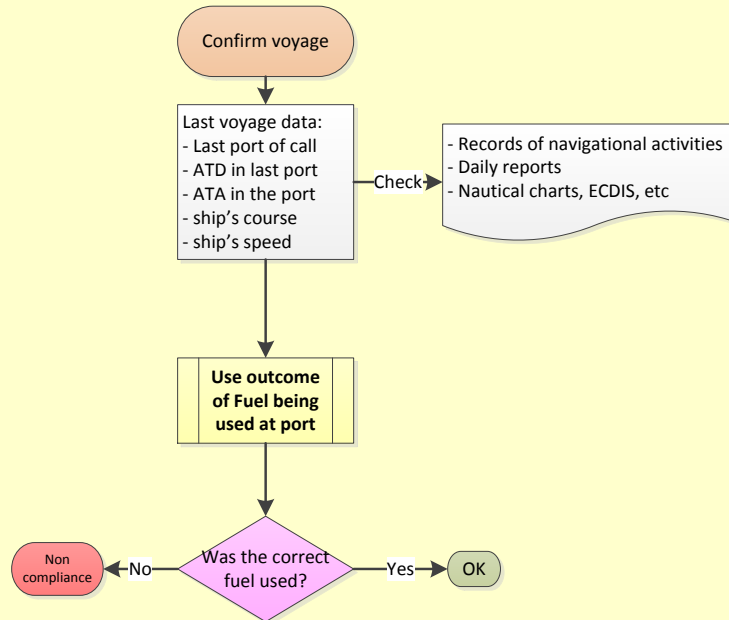
Fuel used at Sea – Outside SECA



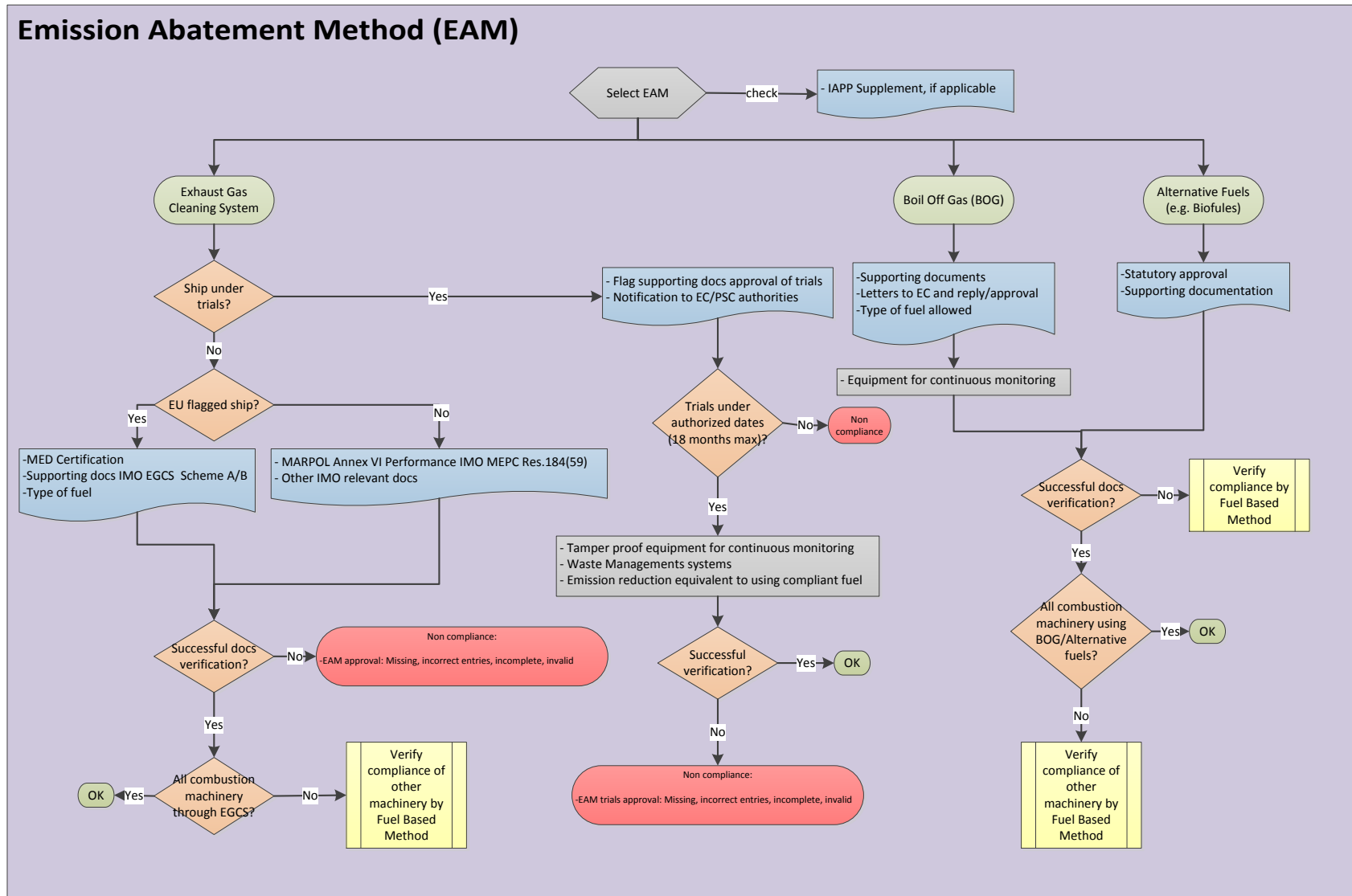
Fuel used at Sea – Inside/Outside SECA



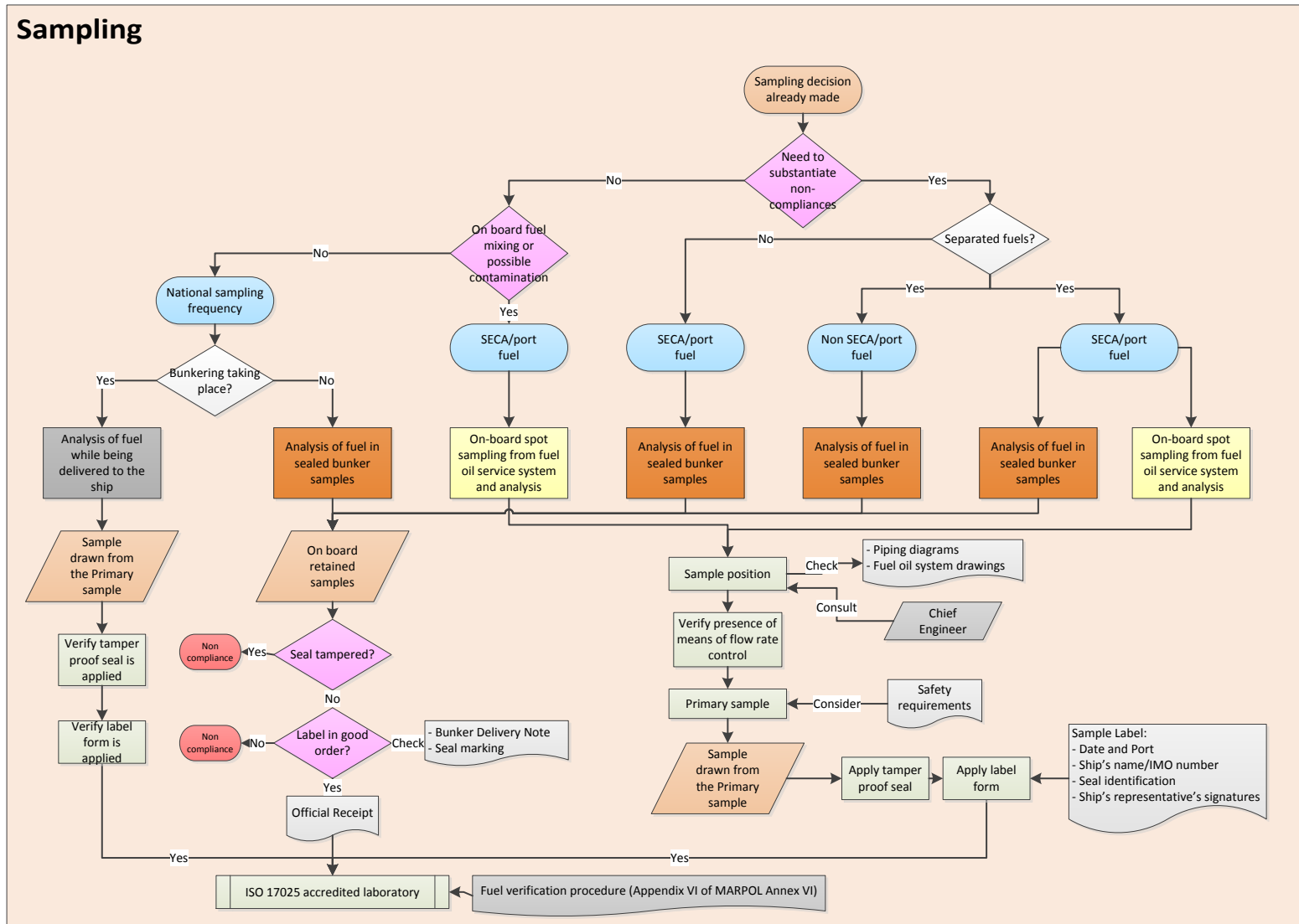
Fuel used at Sea – Inside SECA



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]

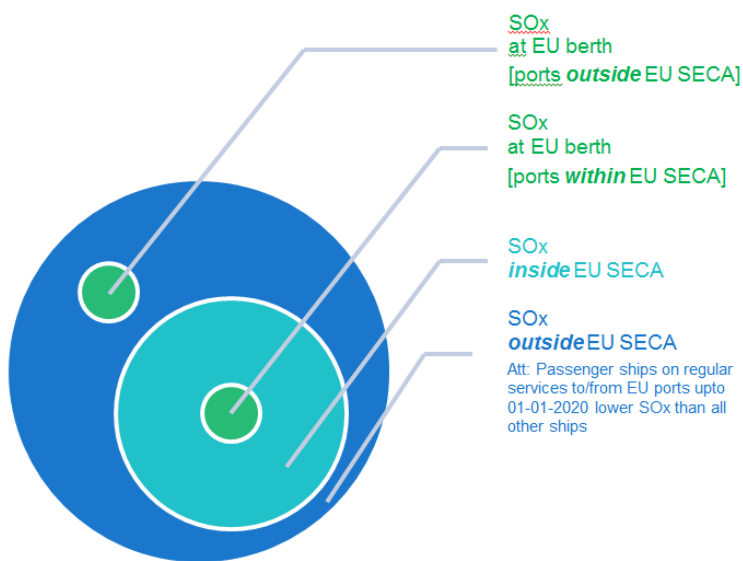


Figure 1: EU region: MSs territory, territorial seas and exclusive economic zones or pollution control zones

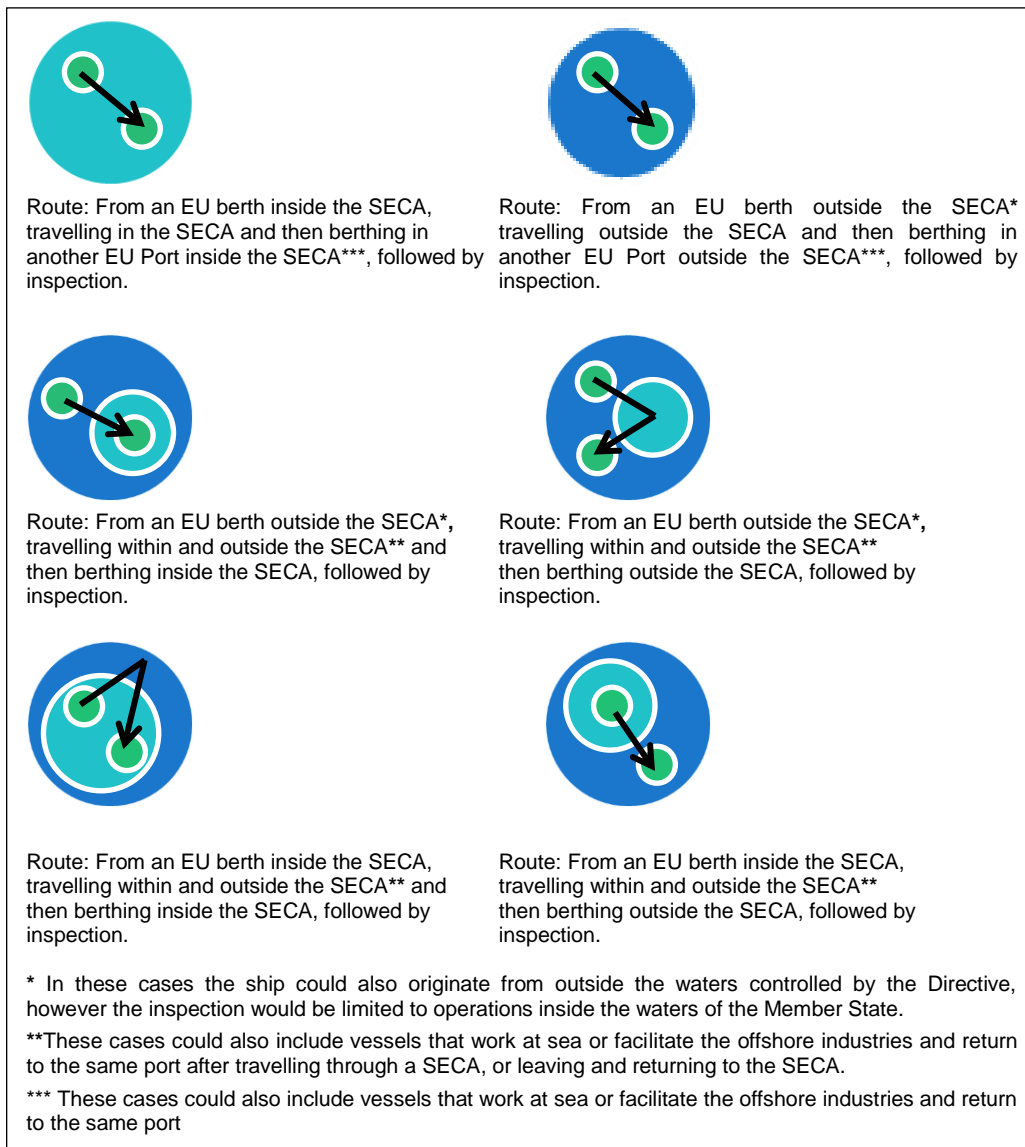


Figure 2: Potential journeys that a ship may make in the EU prior to a Sulphur Inspection.

APPENDIX VI – RISK-BASED PARAMETERS

Historical parameters <i>(to be used in the selection of ships)</i>	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 <i>(to be used as additional info in cases of ships meeting same historical parameters)</i>	Total installed power above 10,000kW ¹⁶
	Keel date before 1 July 1998 ¹⁷
	Entered EU ¹⁸
	Entered SECA ¹⁹
	Ship flying the flag not party to MARPOL, ANNEX VI

¹⁶ Criteria based on the risk of air pollution (the higher the power the higher the consumption)

¹⁷ SOLAS Ch.II-1 Regulation 26.11 regarding the provision of two fuel oil service tanks for each type of fuel used on board

¹⁸ Last port of call outside the EU or unknown

¹⁹ 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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
MARPOL sample	Not available, not complete, not sealed, not marked, not as required	<ul style="list-style-type: none"> - 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	<ol style="list-style-type: none"> 1. Above 3.5 % (Outside SECA) 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) 	<ul style="list-style-type: none"> - Compliant - Penalty as per provisions pursuant to national legislation - PSC authority informed - National Flag State authority informed - Foreign Flag consulted - Other (free text) 	<ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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,	<ul style="list-style-type: none"> - 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, unrepresentative sampling point; refusal by ship	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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