West of England

Loss Prevention Bulletin

Bunker Quality Disputes Part 1: Practical and Technical Measures

Introduction

The consequences of burning off-specification bunkers can be severe, possibly leading to the breakdown of the vessel's machinery. Even where off-specification bunkers do not result in a breakdown, the loss of time and expenses incurred if it is necessary to de-bunker or deviate to stem fresh bunkers can be significant.

Off-specification bunkers can potentially give rise to claims under an owner's hull and machinery insurance as well as under Club cover, whether by way of an FD&D claim against time charterers or bunker suppliers and/or by way of a P&I claim, such as for delay in delivery of cargo or if that delay causes the cargo to deteriorate. There may also be a charterer's liability to owners for providing off-specification bunkers.

In this pair of publications, Part 1 (below) deals with the practical measures that should be considered in order to avoid off-specification bunker disputes and "Bunker Quality Disputes Part 2: Legal and Claims Handling Considerations", sets out the legal and claims handling steps that should be taken in the event of an off-specification bunker claim arising.

Part 1: Practical and Technical Measures

1) Bunker delivery: on board procedures

a) Sampling

The vessel's Safety Management System (SMS) and associated documentation should contain detailed guidelines, instructions, procedures and checklists covering the bunkering process, including the taking of samples of all bunkers stemmed.

If a quality dispute arises, samples of the bunkers concerned are of crucial importance. Care should be taken to ensure that the samples taken are truly representative of the bunkers loaded and that all sources of contamination that may affect the sample itself are eliminated.

To ensure that any fuel received meets the contractual specification, does not contain contaminants and is in all respects suitable for the vessel's machinery, it is recommended that samples are drawn to protect the vessel's interests which should then be subjected to independent analysis by a reputable third party laboratory prior to the fuel being used.

MARPOL Annex VI requires representative bunker samples to be taken and retained on board, which can be used, if necessary, to demonstrate compliance with Annex VI bunker sulphur limits. Although the MARPOL sample cannot be used for any other purpose, the sampling, storage and documentation requirements detailed in Resolution MEPC.182(59) "2009 Guidelines for the sampling of fuel oil for

determination of compliance with the revised MARPOL Annex VI" can be used as a sound basis for developing sampling procedures, taking the following factors into account:

- The MARPOL sample is to be drawn continuously throughout the bunker delivery period at the receiving vessel's inlet bunker manifold. In some ports the vessel supplying the bunkers may also take a sample at their manifold. Ideally all samples should be taken at the receiving vessel's manifold, being the point of custody transfer when the fuel is transferred. Such samples will also show any contamination in the supply hose.
- Sampling equipment and containers should be clean - ideally sample containers should be new.
- Sampling equipment and containers should be sealed for the duration of the supply, with sealing witnessed by supplier and receiver.
- The integrity of the sampling equipment and containers should be checked periodically during bunkering.
- Seals on the sampling arrangement should be checked for integrity by all parties on completion of bunkering prior to being broken.

Only the MARPOL sample is mandatory, therefore any further samples taken will depend on the circumstances of the operation and owner's and/or charterer's instructions. There may also be local regulatory sampling requirements to consider. Typically five samples are taken as follows unless more are required by the charter party or local requirements:

- MARPOL sample (not less than 400 ml)
- Bunker supplier's sample
- Vessel's sample
- Vessel's sample for laboratory analysis
- Bunker surveyor's sample (if a surveyor is in attendance)

The primary sample should be shaken to ensure homogeneity prior to being poured into the required number of individual sub-sample bottles. Each bottle should be filled a small amount at a time, until the sub-sample reaches the top.

The MARPOL sample must, and other samples should, be sealed with a tamper proof security seal with a unique identity number by the supplier's representative, witnessed by the receiving vessel's representative.

Sample bottle labels should be completed in the presence of both supplier and vessel's representatives and should contain the following information:

- Name and IMO number of receiving vessel*
- Date of commencing delivery*
- Name of bunker barge/tanker/bunker installation*
- Sampling location and method*
- Signatures and names of supplier's representative and the vessel's representative*
- Seal identification number*
- Bunker grade*
- Port and location of bunkering
- Name of bunker supplier

The items marked with an asterisk should be recorded on the MARPOL sample in accordance with the IMO Guidelines. In addition, the seal number of the MARPOL sample should be recorded on the Bunker Delivery Note (BDN). It is recommended that all other seal numbers are also recorded on the BDN.

Sample labels should not be signed until the operation has been completed, and extra labels should not be completed or signed.

MARPOL samples must, and the vessel's samples should, be retained in accordance with the guidance contained in Resolution MEPC.182(59). To ensure they remain in optimum condition they should be stored:

- Outside the accommodation
- In a safe, sheltered and ventilated location
- At a cool/ambient temperature
- Not exposed to direct sunlight

The samples should be retained until the fuel is substantially consumed, but for not less than 12 months from the time of delivery. The vessel should also maintain a record to keep track of the MARPOL and other samples.

If a MARPOL sample is not provided by the supplier, or is of unknown origin or if the sampling has not been witnessed, a letter of protest should be issued to the bunker supplier, with copies sent to the local port authority, the vessel's flag state[1] and the owner. A copy should also be retained on board.

[1]Parties to MARPOL are obliged to inform the IMO of instances of non-compliance with Annex VI, hence vessels are required to inform their flag state when there are problems with the MARPOL sample / BDN etc. Port State Control will also look to see that this reporting has been done in the event of MARPOL non-compliance (due to lack of a MARPOL sample, for example).

The BDN should be retained on board for three years from the date of delivery of the fuel to which it relates. BDNs should be readily available for inspection by the competent authority of any country which is a party to the MARPOL Convention. If a BDN is not issued in accordance with MARPOL requirements, a letter of protest should be issued to the supplier with copies sent to the local port authority, the vessel's flag state and the owner. A copy should also be retained on board.

Examples of letters of protest which may be used when bunkers have not been provided in accordance with MARPOL, or when suppliers have not complied with MARPOL requirements, can be found in IMO Circular MEPC.1/Circ.551.

b) Bunker Delivery Note (BDN)

As well as taking a bunker sample, MARPOL also requires the supplier to provide the vessel with a Bunker Delivery Note (BDN).

As a minimum, MARPOL Annex VI Regulation 18.5 requires the BDN to include following information:

- Name and IMO number of receiving vessel
- Port
- Date of commencement of delivery
- Name, address and telephone number of marine fuel oil supplier
- Product name(s)
- Quantity in metric tonnes
- Density at 15°C (kg/m^3)
- Sulphur content by weight (% m/m), stated to two decimal places
- A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with MARPOL Annex VI, Regulation 14.1 (worldwide sulphur limit) or Regulation 14.4 (Sulphur Emission Control Area (SECA) sulphur limit) and Regulation 18.3 (confirming that the fuel oil is not harmful to personnel and does not contain chemical waste).

Prior to starting bunkering the specification of the fuel should be checked to ensure that it complies with charter party requirements. The BDN should also be scrutinised carefully as there have been cases where bunkers with the wrong sulphur content has been delivered, unnoticed by the vessel's crew.

After bunkering the BDN should be signed by the supplier's representative and counter-signed by the vessel's representative.

c) On board testing

In order to obtain an early indication regarding potential problems with fuel supplied, on board testing may be carried out to check a limited number of fuel characteristics. Portable testing apparatus may be used to check density, viscosity, pour point, cloud point, water content and fuel oil compatibility. In addition, sending samples drawn during bunkering to be tested prior to use by a reputable third party laboratory is always advisable so that the entire range of fuel oil characteristics can be compared with the contractual specification and mandatory requirements.

d) The bunkering process

Fuel should be ordered fully blended prior to delivery as in-line blending by the supplier during delivery can lead to differences in specification during the bunkering operation. In-line blending may also cause the fuel to stratify within the bunker tanks on passage.

Newly stemmed bunkers should be stored in empty tanks. Moreover, bunkers from different suppliers should not be mixed and the new bunkers should not be used until the third party laboratory test results have been received and are found to be in order.

If empty tanks are not available and it is necessary to mix new and old bunkers, efforts should be made to carry out a compatibility test beforehand. Ideally the mixing ratio should be 80/20 (new bunkers/old bunkers) or better, but if not, as close to these proportions as possible. Although fuel in a bunker tank and bunkers to be stemmed and loaded on top may both comply with international standards, if the fuels are incompatible mixing the two fuels may produce a fuel that does not comply with international standards, hence the need to avoid a mixing ratio close to 50/50 between old and new bunkers.

2) Potential problems if off-specification fuel is used:

a) Mandatory fuel specification requirements

Burning fuel that does not comply with mandatory requirements may lead to the vessel being detained and financial penalties being imposed. MARPOL and SOLAS contain limits regarding sulphur content and flash point respectively. The use of low flash point fuels may also violate Classification society rules.

b) Factors that can lead to off-specification and/or contaminated fuel

Fuel specifications contain numerous parameters that need to be satisfied. Using fuel that does not meet these requirements or burning contaminated fuel may cause machinery problems. Factors that need to be considered include:

- **Ash –** A non-combustible material that can form deposits on exhaust valves and turbocharger blades causing loss of efficiency and damage.
- **Asphaltenes –** May affect the ignition performance of engines and cause a build-up of sludge in storage tanks.
- **Calculated Carbon Aromaticity Index (CCAI) –** High CCAI fuels may have poor ignition and combustion qualities. Medium and high speed diesel engines and older diesels may be particularly affected at low or partial load.
- **Micro carbon residue –** High levels can cause carbon deposits to form on fuel injectors.
- **Density –** High density can cause poor purifier performance, increasing the carryover of abrasives and contaminants.
- **Low viscosity –** May cause internal leakages in the fuel system and poor combustion if combined with high density.
- **High viscosity –** May cause pumping problems and poor combustion if not heated to the correct temperature.
- **High aluminium/silica (catalyst fines from the refinery) –** Very hard and abrasive, "cat fines" can cause mechanical damage and rapid and excessive wear on an engine's piston rings and ring grooves, cylinder liners, fuel injection pumps and injectors.
- **Hydrogen sulphide –** A highly toxic gas which can form in the head space of storage tanks, affecting personnel in the vicinity of the tank vents, when opening manholes or entering empty tanks.
- **Incompatibility with other bunkers on board –** May result in the formation of waxes and tar-like solids.
- **Iron (Fe)** – A non-combustible material that can form deposits on exhaust valves.
- **Lubricity (distillate fuels only) –** May lead to poor lubrication of fuel pump components and subsequent seizure of pumps. In general, the lower the sulphur content the more likely that this will be a problem.
- **Nickel (Ni) –** A non-combustible material that can form deposits on exhaust valves and turbocharger blades causing loss of efficiency and damage.
- **Potassium (K) –** May lead to increased post-combustion deposits and possibly deposits on and corrosion of turbocharger nozzle rings. Can also affect Selective Catalytic Reduction (SCR) units.
- **Pour point –** At lower sea water temperatures the transfer and filtration of fuels with a high pour point may be difficult without heating.
- **Sediment (Total Sediment Potential – TSP) –** May increase the possibility of sludge forming in centrifuges and filters causing blockages.
- **Sodium (Na) –** May cause corrosion on exhaust valves, increased ash deposits in the exhaust gas system and in turbochargers, particularly when combined with vanadium.
- **Vanadium (Va) –** Similar problems to those associated with sodium, particularly if the Va/Na ratio is in the region of 3:1.
- **Waste products –** Used lubricating oil is sometimes added to fuel oil, it can contain high concentrations of wear metals which may lead to problems with ash formation.
- **Water –** High levels can cause loss of energy, sludge formation, as well as corrosion of fuel injection equipment and exhaust valves. Sea water contamination can cause corrosive compounds to form.

The routine analysis of bunkers by third party laboratories may not include tests for all possible contaminants that could be present. A more detailed analysis may be necessary in order to identify all of the above.

Members requiring further guidance should contact the Loss Prevention department.

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