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and Food of Denmark**
Environmental
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Bunker Supply and Quality Survey Bunkering in Denmark

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Miljøstyrelsen offentliggør rapporter og indlæg vedrørende forsknings- og udviklingsprojekter indenfor miljøsektoren, som er finansieret af Miljøstyrelsen. Det skal bemærkes, at en sådan offentliggørelse ikke nødvendigvis betyder, at det pågældende indlæg giver udtryk for Miljøstyrelsens synspunkter. Offentliggørelsen betyder imidlertid, at indlægget udgør et væsentligt indlæg i debatten omkring den danske miljøpolitik.

Må citeres med kildeangivelse.

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1. Summary

1.1 Introduction

This survey on marine fuel supplies and suppliers was initiated by the Danish Environmental Authority (EPA). A supply contract between the EPA and BunkerCare dated 1 May 2017 where the scope of work was defined was duly signed by both parties.

1.2 Summary

The Danish bunker market is a so-called niche market where the bunker receivers mainly take smaller volumes for reaching the more price-attractive larger bunker hubs. Despite the niche characteristics, there are national, regional, and international suppliers operating in Denmark and an overcapacity of bunker tonnage. Offshore barges capable of a turnover of 30–40,000 metric tons per month, with an optimum logistic, today turnover significantly lower volumes, stressing the margins and profitability.

However, we found the Danish bunker supply market well regulated, and the authorities have easy access to data on quantities and qualities for the offshore market, but more difficulties for the onshore market. The onshore market is mainly gas oil supplies, dominantly with product derived from the oil major companies. We found no evidence to suggest any violations of the current legislation focused on sulphur regulations.

1.3 Writers

Founder and owner of BunkerCare Mr. Steffen Kortegård has collected, validated, and edited all the data and written most of the chapters, strongly supported with linguistic skills from associated partner Mr. Claus Erik Mortensen, presently working for the OW Bunker & Trading A/S trustee fund. Also, Mr. Mortensen has participated as an author for a number of vital chapters.

2. Scope of work

2.1 Scope of work

- Mapping of bunker supplies in Danish territorial waters, including port bunkering, ex-wharf, and truck supplies. The mapping will include information of supplier (BDN issuing company), barge, truck, quantity, and quality. The data will be collected from numerous sources of which can be mentioned VFK database, DMA database of approved barges compared with AIS data for a limited period, interview with major ports, the top three bunker suppliers plus one minor supplier, and a number of shipowners.
- Seek evidence of consistency between BDNs and actual quality through voluntary information sharing from bunker suppliers, shipowners, and fuel testing laboratories. Data will be published anonymously.
- Describe typical bunker supply chains. Supported by interviews with the top three bunker suppliers plus one minor supplier.
- Map and describe the degree of formalized and documented quality control systems at the top three bunker suppliers plus one minor supplier, especially weighted on quality, MARPOL Annex VI and EU Sulphur Directive compliance.
- Describe typical quality control regimes in Shipowners technical organizations, supported by three interviews.
- The role of fuel testing laboratories supported by three plus one interviews.
- Survey of three typical bunker barges for establishing evidence for MARPOL Annex VI/EU compliance weighted on the issuing of BDNs and MARPOL sampling procedures. Also, looking into on-board blending and tank-cleaning procedures.
- Evaluate the efficiency of the Danish bunker legislation. Are all barges approved accordingly and are all stems reported correctly to VFK? How do appropriate authorities ensure the suppliers and barges are in compliance with MARPOL Annex VI, the EU Sulphur Directive and Danish legislation. Are any non-conformances or violations reported from VFK or port state since 1 January 2015?
- Is the legislation sufficient and are the appropriate authorities gathering sufficiently documented and valuated data?
- Are MARPOL Annex VI and the EU Sulphur Directive fully implemented seen from the public interest and what are the experiences of the functionality since 1 January 2015 until today. Based on interviews with appropriate authorities.
- Visit and interviewing of VFK operational staff to validate the quality of their procedures and data collection.
- Brain storming on simple, efficient means to improve certainty of compliance with all relevant, national, regional, and international rules and regulations in the public interest. New initiatives must not place any new bureaucratic burdens on any stakeholders; on the contrary, they should reduce these
-

2.2 Not in the scope

- Supplies for vessels; typical ferries and fishing vessels in domestic trade; plus offshore installations not complying with regional and international legislative regimes.

3. Description of the project

3.1 Description

The purpose of this project is to create an overview of the bunker activities in Danish waters (both ports and in the territorial waters), and to report the status of the procedures that the suppliers have implemented to make sure that the bunker fuel is in compliance with the EU and IMO regulation (the EU Sulphur Directive and MARPOL Annex VI). Furthermore, the aim is also to identify any non-compliance with the said regulations and to make recommendations as to how the Danish Administration can strengthen the inspection of the bunker suppliers.

In respect of legislation, this survey will only cover compliance with:

- MARPOL Annex VI regulation 14 and 18, 2013 edition
- *Directive (EU) 2016/802 of the European Parliament and of the Council of 11 May 2016 relating to a reduction in the sulphur content of certain liquid fuels (codification) – (EU Sulphur Directive)*
- *Statutory order no. 733 of 25 June 2007 on exchange of bunker oil between ships in Danish territorial waters (Bekendtgørelse om overførsel af bunkersolie mellem skibe på dansk søterritorium – Bunkersbekendtgørelsen)*
- *Statutory order no. 640 of 12 June 2014 on the sulphur content of solid and liquid fuels (Bekendtgørelse om svovlindholdet i faste og flydende brændstoffer - Svovlbekendtgørelsen).*

The volumes, number of supplies and geographical offshore supply areas are relatively well known, as there are extensive reporting requirements in the Danish Bunker Directive. However, port supplies are not covered by any of the above-mentioned legislative requirements of reporting to any authority. But all onshore import and export volumes are reported to the local tax authorisation for custom declaration purposes (“local” refers to the municipality in which the company is registered).

A focus area will be the suppliers’ control and documentation of the sulphur content in the delivered products and how they ensure consistency between the samples taken during the supply and the sulphur content printed on the BDN, and how they ensure and document that the samples are representative for the entire supply, for the commercial samples in general, and for the MARPOL sample in particular.

As a natural consequence of evaluating the questionnaires, interviews, and visits are performed and the efficiency of the international, regional, and local legislation is evaluated and a number of recommendations are presented for consideration.

The intention and purpose of the project is to provide an objective and representative overview of the compliances of the bunker industry operating in Denmark. The project covers the time since the latest sulphur regulation came into force on 1 January 2015. In conclusions and evaluations, the latest statistical material will be weighted higher than the oldest.

MARPOL Annex VI regulation 18.9.3 “require local suppliers to retain a copy of the bunker delivery note for at least three years for inspection and verification by the Port State as necessary”, which is covering the full duration of the project.

4. Definitions of specific business-related terms

4.1 Bunker delivery note

The bunker delivery note (BDN) is a receipt of the delivered volumetric mass of bunkers used as the basis for a commercial invoice. The BDN also lists the sulphur content in % m/m plus a small number of other physical characteristics stipulated in MARPOL Annex VI regulation 18. The BDN must be accompanied by a so-called MARPOL drip sample, which must be sealed and labelled. In order to identify the correlation between a BDN and the accompanying sample, the seal number is normally printed on the BDN.

In usual practices, the commercial drip samples are taken in parallel with the MARPOL sample, and the seal numbers will normally also be printed on the BDN. Those samples are governed by a commercial settlement (Terms and Conditions)¹ between the bunker seller and the bunker buyer and can be used as evidence in a quality dispute.

4.2 Bunker barge

For offshore bunker deliveries in Denmark a bunker barge is a tank vessel approved for offshore voyages and approved and fitted for trading the products in question. It can be a product tanker with a flash point restriction of a minimum flash point of 60 °C. Which means there are no specific requirements for atex/explosion-proof equipment. Some suppliers also own or charter product or chemical tankers with no flash point restrictions, whereby they can receive slop water from tank washing from crude oil carriers or even slop from tank washing or cleaning of chemical tankers.

For inland or port supplies, much simpler tankers are built for the purpose and with a typical manning of only a captain and one or two deck hands. In doing this, the transport costs and delivery cost are significantly reduced. However, they are restricted to ports and inland waterways, typically used in ARA (the area covering Amsterdam, Rotterdam, and Antwerp – see list of abbreviations) and the larger ports.

There are few barges still in service that are especially designed for port deliveries in Denmark, and with the very restricted trading area within port limits, they are typically only occasionally manned with a single skipper and a very low cargo capacity of 100 m³ or even less. Those remaining barges will most likely be replaced in the near future with more flexible tank trucks.

4.3 Bunkers

The fuel burned on board ships for propulsion and auxiliary purposes. The word bunkers derives from the time of coal-fired steam ships, where “bunkers” were the storage rooms or compartments on board. The name of the coal itself was soon simply called bunkers, and this name has since continued for any kind or type of bunkers used, regardless of whether it is coal, fuel oil, gas oil, LNG, etc.

¹ See appendix I

4.4 Drip sample

Expression used for commercial samples that are often taken in parallel with the MARPOL sample by a manual valve-setting continuous-drip sampler in accordance with MEPC 59/24 guidelines.

4.5 Ex-wharf or ex-pipe delivery

Port facilities owned or rented by bunker suppliers to supply directly to vessels berthing in the port or vessels shifting to the facility with the purpose of taking bunkers.

4.6 MARPOL representative sample

A sample of the delivered product, as stipulated in MARPOL Annex VI, that must be representative for the delivered product. It is of vital importance that the sampling is initiated upon start of a delivery, as a few percent of high sulphur product in the manifold system, pipes, and hoses can jeopardize the MARPOL compliance of an ECA compliant 0.10% sulphur product. There is normally no difference between a commercial drip sample and a MARPOL representative sample. In some terms and conditions it is stipulated the MARPOL sample to be taken on board the receiving vessel and the commercial sample on the barge, but even stipulated seldom used in practice.

4.7 Oil major company

Originally a term used for the “seven sisters” (the companies Standard Oil was divided into in 1911).² Today, it is also used more widely for big oil companies with a dominating role locally. For example, Statoil is considered an oil major in Scandinavia.

4.8 Shipowner

A shipowner is a definition widely used in the bunker business. It may be the person or legal entity that actually owns the ship or vessel, it could be a company having taken the vessel on charter for a period or a number of voyages, or it could be a management company holding an ISM Document of Compliance (DOC) under which they manage one or a number of ships. A DOC-holding shipowner or management company is responsible for MARPOL compliance and is identified by a unique IMO number listed under Lloyd’s list.

4.9 Terms and conditions (T&Cs)

A commercial agreement between a bunker seller and a bunker buyer that stipulates the terms and conditions for a sale or purchase and the physical supply. All bunker suppliers and major buyers have their own T&Cs. BIMCO have developed a set of “balanced” T&Cs that can be a compromise between sellers’ and buyers’ terms.

For a typical seller’s terms and conditions, see appendix I.

4.10 Trucks for bunker delivery

Road tank trucks for delivery in ports, today mainly chartered for the purpose and more or less substituting the small port bunker barges. The capacity of a road truck is approximately 40 m³, so although typically used for smaller supplies, road trucks can also deliver larger port supplies by using a number of trucks.

4.11 Type of fuels

Marine fuels are categorized according to ISO standard 8216 and are normally purchased according to the ISO standard 8217. In this standard, the fuels are divided into “Table 1 – Distillate marine fuels”³ with 4 categories and into “Table 2 – Residual marine fuels”⁴ with 11

² Danish Broadcast by journalist Frank Esmann.

³ ISO 8217 – edition 2010/12.

categories. In some places worldwide, a purchaser may be able to buy qualities that are not covered by the ISO specification, which would be beneficial for the shipowner (buyer) if the vessel has the capability of utilizing ISO off-spec qualities that then would be sold with a rebate. It should also be stated that in some parts of the world suppliers are not able to provide products that comply with the standards and requirements of the latest edition of ISO 8217.

Within the scope of this supply and quality survey, the fuels referred to have been divided into four main categories: two ECA-compliant and two non-ECA-compliant fuels.

4.11.1 High sulphur heavy fuel oil (HS HFO)

Fuels that are not distillate marine fuels⁵ and have a sulphur content >0.10%.

4.11.2 Ultra low sulphur fuel oil (ULSFO)

Fuels with a sulphur content of 0.10% or less and that cannot be categorized as a distillate marine fuel.

4.11.3 Marine gas oils (MGO)

Fuels covered in ISO 8217 under Table 1 – Distillate marine fuels and that have a sulphur content >0.10%.

It is noted that according to the EU Sulphur Directive (EU 2016/802), EU member states must ensure that marine gas oils (DMA, DMX, and DMZ grades) are not placed on the market in their territory if the sulphur content of those marine gas oils exceeds 0.10% by mass. Thus, these are sold as DMB grade.

4.11.4 Low sulphur marine gas oil (LS MGO)

Fuels covered in ISO 8217 under Table 1 – Distillate marine fuels and that have a sulphur content of 0.10% or less.

⁴ ISO 8217 – edition 2010/12.

⁵ Typical RM grades according to ISO 8216.

5. Abbreviations

- % m/m – Percent calculated from the mass of sulphur and mass of oil.
- ARA – Area covering Amsterdam, Rotterdam, and Antwerp.
- BDN – Bunker delivery note (synonym for bunker delivery receipt).
- BDR – Bunker delivery receipt (synonym for bunker delivery note).
- BIMCO – The Baltic and International Maritime Council. An NGO developing contracts and clauses for their members, being mainly dry cargo/bulk shipowners or charterers but also tanker owners or operators and operators of other types of vessels.
- CMP – Copenhagen and Malmoe Port
- CRM – Customer relationship management. An IT system managing a company's interaction with current and potential customers.
- DMA – Danish Maritime Authority.
- DSA – Danish Shipowners' Association.
- ECA – Emission Control Area stipulated by MARPOL. ECA area also covers regulation on NOx emissions. SECA and ECA are used interchangeably.
- EPA – Danish Environmental Protection Agency.
- IMO – International Maritime Organization under the United Nations. The IMO govern the international regulations and legislation for ships.
- ISM – International Safety Management. A compulsory quality management system for ship management.
- ISO – International Standard Organisation.
- LOI – Letter of indemnity. Normal validity: minimum of 1 year.
- MARPOL – Convention on Marine Pollution adopted by the IMO.
- MEPC – Marine Environmental Protection Committee under MARPOL.
- MPA – Singapore Maritime and Port Authority.
- MST – Danish Environmental Protection Agency.
- ROB – Remain on board. Expression used for cargo remaining on board after a discharge.
- SECA – Sulphur emission control area. Introduced by IMO in 2005 in the Baltic and, in 2006, expanded to the North Sea, and in January 2012 also to USA and Canada, with a 200 nm border. SECA and ECA are used interchangeably.
- STS – Ship-to-ship transfer. Transfer of cargo from cargo tanks of one vessel into cargo tanks of another vessel.
- VFK – "Værnsfælles Forsvarskommando". An entity within the Danish Ministry of Defence.

6. Short historical view on bunkering in Danish national waters

6.1 History

Until the first large oil crisis in the early 1970s, shipowners did not pay much attention to where to take the bunkers. The price was quite low, quality was generally high, and whenever possible bunkers was taken on board at port during cargo operations.

Later in the 1970s and during the early 1980s – when prices had risen substantially – more focus was placed on price and actual supply possibilities. In the Baltic Sea, at the former Soviet Union ports of Russia, Estonia, Latvia, Lithuania, Poland, and the DDR, the supplies were facing uncertainty, as much of the locally produced and stored fuel was primarily designated for inland use within the industry and heating of the houses.

Therefore, ships had to take their bunkers en route to or from the Baltic Sea, being either off Rotterdam in the North Sea, or at Rivö Fjord outside Gothenburg. However, both of these places had additional costs added to the bunker prices, as pilotage and agency fees were needed, and for Rivö Fjord a deviation was also faced when entering or leaving the Baltic through the Great Belt or the Sound.

In 1985, the first offshore operations of bunker fuel supplies were commenced in Danish waters, being in the Great Belt, where the refinery source was the local facility at Guldhavn/Stigsnaes, where small tanker vessels of some 500–700 tons deadweight loaded and transported the bunkers to anchorages just outside Guldhavn. The benefits for the shipowners and operators were substantial, as there were no calling costs allocated to taking the bunkers here, and neither was any deviation required. After short time the operations and supplies were also provided outside Copenhagen for vessels passing through the Sound.

In order to provide additional services when the vessels were taking bunkers in the Great Belt, the operations were transferred shortly after to Kalundborg Fjord or Kerteminde Bay (for finding the best possible shelter, depending on the weather and the wind), whereby the receiving vessels could have fresh supplies of provisions, freshwater, lubricating oils, etc., and could also make crew changes during the time they were stopping to take the bunkers. Time was, also at that time, money.

The supplies in the Danish straits were successful from the beginning, and larger tanker barges of 3–6,000 dwt were needed, as more and more ships in transit to/from the Baltic made the calls for bunkers in the Danish waters. Typical supplies were then 3–500 tons of heavy fuel, plus some 50–75 tons of gasoil or marine diesel oil for the auxiliaries, so on one cargo load, the larger-sized barges could supply several receiving vessels without having to make additional port calls for loading.

When the local refinery at Guldhavn stopped their production, the replacement was already found long before. The bunker providers loaded their cargoes from Baltic refineries, as the various Baltic countries could now provide cargoes for exports. The fuel was loaded onto larger tankers, who operated as feeder vessels for the more stationary bunker barges, and shore tank installations were used for storage of the remaining cargo on board the larger feeders.

These short storage tanks were typically placed in the ports of Copenhagen and Aarhus, and also Aalborg.

When the supplies in the Danish waters commenced in the mid 1980s, there was no special legislation or directives to be referred to. It was considered sufficient that the tanker barges and the involved sellers, buyers, and receiving vessels used “common sense” and always ensured that they operated without causing environmental conflicts, and in general this common sense operating worked well throughout the years. In 1999, however, an incident occurred where a barge lost power and manoeuvrability and collided with a tanker that had dropped anchor and waited for the barge to go alongside. The barge’s collision caused large damages on the receiving tanker vessel, from which a quite substantial quantity of heavy fuel oil was spilt into the sea, causing pollution to the beaches as well as the Kalundborg Fjord. This incident led to the issuance of the first Danish Bunker Directive, which was issued in the year 2000, and which stipulated operational performances and guidelines.

During the 1990s and 2000s, the main offshore anchorage for bunker supplies were changing from the Great Belt area to the roads off Skaw, and still today the Skaw is by far the largest offshore bunkering position in Denmark. The change to Skaw was made because the anchorages east of the Skaw were and are being used for larger vessels having anchored whilst awaiting orders.

Today, a larger number of bunker sellers and suppliers are offering services off Skaw – these being Danish, Swedish, and also international suppliers and sellers.

7. Legislation

7.1 MARPOL

The first MARPOL convention was adopted by the IMO back in 1973, and annex VI on the prevention of air pollution from ships was first adopted in 1997. Annex VI regulation 14 governs the sulphur content used on board ships, and regulation 14.4.3 stipulates a maximum sulphur content of *0.10% m/m on and after 1 January 2015* within ECA areas, and §1.2 stipulating *3.50% m/m on and after 1 January 2012* outside ECA, which will be lowered to *0.50% m/m on and after 1 January 2020* according to §1.3.

Regulation 18 on *fuel oil availability and quality* governs the administrative control of how authorities ensure compliance with the legislation, which is one of the cornerstones of this survey.

7.2 EU Sulphur Directive (EU) 2016/802

This directive is mainly the EU's adoption of MARPOL Annex VI regulation 14 and 18. With some additional requirements to EU member states regarding control and reporting to the EU Commission.

7.3 Statutory order no. 733 of 25 June 2007 on exchange of bunker oil between ships in Denmark

The Danish legislation does not govern any quality of the products delivered, but only stipulates operational requirements, where especially two paragraphs are used as a source of data for this survey:

Section 4. Inspection of the bunker ship:

Bunkering operations shall only take place if the bunker ship has been inspected by the Danish Maritime Authority within the past 12 months to verify that the ship and its equipment comply with the provisions of this Order and are fit to perform bunkering operations without risk to safety or the marine environment. The inspection shall be documented by a declaration from the Danish Maritime Authority.

and

Section 10. Notification of the bunkering operation

At least 6 hours before the scheduled performance of a bunkering operation the bunker ship shall (1) inform the Admiral Danish Fleet (VFK) of the operation, including details of: 1. the bunker ship's and the receiving ship's names, IMO numbers and call signs, 2. the location where the bunkering operation is to be performed, and 3. the time at which the bunkering operation is expected to be commenced and completed; and (2) Once the bunkering operation has been completed the bunker barge shall inform the Admiral Danish Fleet of the quantity of oil transferred. More details of the oil product transferred shall be able to be provided on request.

It must be noticed that this statutory order is only covering offshore operations and not port operations.

VFK (Admiral Danish Fleet) are notified at every and each bunkering in Danish territorial waters and maintain a database of all operations, including supplied volumes and qualities divided in the same four categories as in this survey: HS HFO, LS HFO, LS GO, and HS GO. If a barge forgets to notify VFK, it is accordingly given a friendly call from the VFK duty officer, and if two vessels performing a STS operation not known to VFK they will also be given a friendly call.

*Statutory order no. 640 of 12 June 2014 on the sulphur content of solid and liquid fuels
(Bekendtgørelse om svovlindholdet i faste og flydende brændstoffer)*

The Danish implementation of MARPOL regulations 14 and 18 as well as the EU Sulphur Directive.

§ 8 of the statutory order requires suppliers of marine fuels to register with the Danish EPA.

§ 26 of the statutory order enables the Danish EPA to report infringements of the sulphur regulation to the Danish police. It is then up to the police to issue penalties.

8. Development and description of methods

8.1 Methods

To fulfil the specification of requirements defined in the contract between the Danish EPA and BunkerCare dated 1 May 2017, this survey is supported by documentation from questionnaires and interviews of several stakeholders.

It has not been possible to interview all stakeholders, but all major and few minor stakeholders with interests in the bunker industry were selected for interviews. Many short telephone interviews were carried out to select and shortlist the stakeholder lists, which were divided into suppliers, ports, fuel test providers, refineries, and shipowners.

Refineries were later withdrawn when it became clear that they have made no bunker supplies for many years and are thus no longer direct players in the Danish bunker market.

9. Stakeholders

9.1 Suppliers

For the bunker suppliers, all suppliers listed by EPA⁶ were asked to participate in completing the “supplier questionnaire”. Also, suppliers not listed with EPA but known to BunkerCare were listed, and, finally, two suppliers who became known during the survey are listed. The top three on volumes are also interviewed by telephone or by visits.

TABLE 1. Suppliers

Company (BDN)	Contact person	Mail address	Telephone no
A/S Dan-Bunkering Ltd.	Nicolai Troen	nit@dan-bunkering.com	+45 3345 5434
BTB Olie A/S		btbolie@gmail.com	+45 9849 1549
Carl Jensen's Marinelager A/S	Hanne Jensen	carlj@os.dk	+45 98 94 11 29
DCC Energi A/S	Jan Hansen	Jan.Hansen@dccenergi.dk	+45 45 58 01 58
Fiskernes Olielager	Johannes Palsson	olie@ffskagen.dk	+45 9844 1812
Friedrich G. Frommann GmbH & Co. KG	Tim Heikmann	tim@frommann.info	+49 40 766 268-11
Hanstholm Havns Olieforsyning Aps	Per Skovmose	hh.olie@mhb.net	+45 97 96 12 65
Hirtshals Fiskernes Handelsselskab	Hans-Christian Andersen	hca@hirtshals-marineolie.dk	+45 24 45 44 52
KPI Bridge Oil A/S	Kenni GOLDENBECK	denmark@kpibridgeoil.com	+45 7642 9680
Malik Supply	Steen Møller	sm@nordicmarineoil.dk	+45 3842 3240
Monjasa A/S	Svend S. Mølholt	mat@monjasa.com	+45 70 260 230
Niels Weje Nielsen			+45 86 32 15 27
Nordic Marine Oil A/S	Steen Møller	sm@nordicmarineoil.dk	+45 3842 3240
Obast	Mathias Berndt	mbe@obast.de	+49 1 76 20 63 5 951
OK a.m.b.a	Thomas Jønshøj	thlj@ok.dk	+45 7873 1076
Q8 Denmark A/S	Hans Ørum Andersen	Hans.Andersen@q8.dk	+45 7012 8888
Shell			
Shell Refinery			
Statoil			
Statoil Refinery			
Stena Oil	Patrik Petersson	patrik.petersson@stenaoil.com	+46 10 445 14 01
Top Oil AB	Carl Johan von Sydow	carljohan@topoil.se	+46 709 759 218
Unioil Supply A/S	Jesper Sander	jsr@unioil-supply.com	+45 8882 8181
YX	Jan Achmann	jan.achmann@yx.dk	+45 2147 1129

Supplies to minor vessels, ferries in domestic trade, and the domestic fishing fleet are included, as they must also comply with the EU Sulphur Directive.

9.2 Ports

Ports have a vital role facilitating services for the bunker receivers and suppliers. It is the nature of a port to be as attractive as possible for their customers, and they supply all services necessary for the shipping industry. The ports are naturally concerned and focused on water pollution from bunker supplies and are supposed to adjust their oil recovery response according to bunker activities in their areas, especially since there is no legislative requirement for any oil recovery equipment for tankers or trucks delivering in port opposite offshore supplies. However, evaluation of the regulations for ports is not in the scope for this report.

The 10 major Danish ports for fishing vessels, ferries, and the merchant fleet, based on estimated bunker volumes⁷ are shown in Table 2 and were asked to complete the port questionnaire.

⁶ <http://mst.dk/luft-stoej/luft/luftforurening-fra-skibe/register-over-leverandoerer-af-braendstoffer/>

⁷ <http://www.danskehavne.dk/fakta-om-havne/havne-i-tal/>

TABLE 2. Ports

Port	Contact person	Mail address	Telephone no
Aabenraa	Henrik Thykjær	henrik@aabenaarhavn.dk	+45 7462 2514
Aalborg	Claus Holstein	ch@aalborghavn.dk	+45 9930 1501
Århus	Jakob Flyvbjerg Christensen	jfc@portofaarhus.dk	+45 8936 8214
Copenhagen	Jørn Christiansen	jorn.christiansen@cmport.com	+45 3546 1326
Esbjerg	Ole Ingrisch	oi@portesbjerg.dk	+45 4057 4300
Fredericia	Nils Skeby	ns@adp-as.dk	+45 7921 5010
Frederikshavn	Mikkel Seedorff Sørensen	ms@fhavn.dk	+45 9620 4701
Hirtshals	Peter Ydesen	p.ydesen@hirtshalshavn.dk	+45 9656 5005
Odense	Carsten Aa	caa@lpo.dk	+45 2294 4400
Skagen	Villy B Hansen	wbh@skagenhavn.dk	+45 9944 6911

9.3 Fuel test providers

Fuel test providers support their customers with statistical data on fuel qualities. Also, they track and register off-spec deliveries and announce so-called bunker alerts. For raising a bunker alert, most fuel test providers require minimum of three off-spec incidents originating from the same source/region/supplier in a period of one week.⁸

TABLE 3. Fuel test providers

Fuel Test Provider	Contact person	Mail address	Telephone no
Fobas	Naeem Javaid	fobas@lr.org	+44 2380 249 797
Intertek		web.cm-ship@intertek.com	+44 1325 3901180
Verifuel	Gunnar Kjeldsen	Gunnar.Kjeldsen@inspectorate.com	+47 95 72 28 24
Viswa	Holger Jacobsen	holger@viswalab.com	+ 1713 291 6913
VPS	Bjørn Olav Odland	boo@v-p-s.com	+47 99228217

9.4 Shipowners

We found it not possible to gather sufficient valuable data on single shipowner level, why no specific questionnaire was developed. A single ship owner was interviewed and supported us with data which we were not able to get from a specific supplier.

9.5 Authorities and NGOs

No questionnaire was developed for authorities or any NGO. However, the listed stakeholders have participated in the form of interviews, phone calls, and e-mail.

TABLE 4. Authorities and NGOs

Authority & Organisations	Contact person	Mail address	Telephone no
Danish Maritime Auth. DMA	Palle Kristensen	pk@dma.dk	+45 7219 6372
Environmental Protective Agency	Dorte Kubel	dokub@mst.dk	+45 7254 4320
Vaerns Faelles Komandoen VFK	Søren Mønster	VFK@mil.dk	+45 7284 0000
Danske Havne	Bjørn B. Christiansen	bbc@danskehavne.dk	+45 2537 0364
Danske Rederier	Per Winter Christensen	pwc@danishshipping.dk	+45 3348 9252

⁸ Fobas.

10. Development of questionnaires

10.1 Supplier questionnaire

It was vital during the development of the questionnaires that the stakeholders would reply with useable and reliable data and that filling the questionnaire should not be a too heavy administrative burden. Many of the suppliers could draw the data directly from their CRM system; however, it became clear that a small number of suppliers still use manual records for quantity and quality control. The latter are mainly gas oil suppliers to fishing, work, and pleasure boats.

To reassure the single supplier that sensitive or competitive information would not be revealed, they were promised that all data would be kept confidential and only published in anonymous form. EPA holds all the raw data; however, this data will not be revealed.

Also, in the cover letter, we reassured the suppliers that there was no intention of accusing anyone for any unintended breach of any legislation.

The reply ratio was 20/24, which is found to be very satisfactory. The four who did not reply are considered to be minor players. One of the 20 suppliers who answered the questionnaire did not want to participate in the full questionnaire.

10.2 Port questionnaire

The purpose with the port questionnaire was to gain a picture of the ports' involvement in bunkering activities within their domain.

The data collected from the ports is also presented anonymously, as the intention with this survey is to gain a picture of activities and not to reveal single ports' superiority or the opposite.

The reply ratio was 8/10, which is found to be very satisfactory. One of the ports would not participate but referred to a local shipping agency, and one port could not find time to reply within the time frame or an extended time frame.

10.3 Fuel test provider questionnaire

The fuel test providers are not directly involved in bunkering but provide quality assurances for the shipowners by testing the fuel in comparison with the specification agreed between the seller and the buyer. They hold much technical data on the supplied products, name of suppliers, supply barges, quantities, etc. However, they hold only statistical data for their own customers, so without knowing their market shares the volumetric data has a limited value. But data on off spec deliveries are very valuable.

The reply ratio of 2/5 was relatively poor, but, as one of the companies expressed, "the Danish market is very small compared to the bigger hubs and it is difficult to draw useful statistical data from our database".

Evaluation of data, included uncertainties

10.4 Evaluations

It is difficult to verify volumes and number of deliveries: Some suppliers provide their numbers in very rounded figures, while others are very accurate down to litres or kilos. Also, some volumes might be counted more than once when transferred between bunker barges. Based on VFK data, we see a relatively large number of “supplies” between barges, which rightfully should be considered as ship-to-ship transfer rather than a bunkering operation. When evaluating VFK’s data, we have cleaned the figures where it is estimated that cargoes are transferred between barges. Transfer between barges correspond to approximately 10% of the total volumes.

When evaluating the VFK figures with the supplier questionnaire replies, they correspond within few percent, why both deemed to be very accurate.

As one of the major suppliers did not answer the questionnaire with regard to volumes supplied, we looked up the barges normally used by this company in the VFK reports, cleaned for internal transfer between barges and estimated the volumes delivered in ports, mainly in Copenhagen, based on information from shipowners.

TABLE 5. Non-responding supplier

Estimates from the non-responding supplier								
In metric tons			HFO		Gas oil		Totals	Market shares
			LS	HS	LS	HS		
2015	01-01-15	31-12-15	43742	226163	165455		435360	26%
2016	01-01-16	31-12-16	65793	208960	195343		470096	27%
2017	01-01-17	31-05-17	12735	86707	78323		177765	24%
2017	Full-year estimate		30564	208097	187975		426636	24%

The greatest uncertainty is if the supply companies shifted between barges, but as the barges are mainly long-term time chartered barges, the uncertainty is relative small.

10.5 The Danish market

TABLE 6. Total supplies according questionnaire

Quality and total quantity of supplies according questionnaires								
In metric tons			HFO		Gas oil		Totals	
			LS	HS	LS	HS		
2015	01-01-15	31-12-15	62864	409,897	744840		1,217,601	
2016	01-01-16	31-12-16	66754	397254	838750		1,302,758	
2017	01-01-17	31-05-17	23231	191217	346810		561,258	
2017	Full -year estimate		55754.4	458920.80	832344	0	1,347,019	

TABLE 7. Total including estimates vessels trading

Quality and total quantity of supplies inclusive non-responding estimates							
In metric tons			HFO		Gas oil		Totals
			LS	HS	LS	HS	
2015	01-01-15	31-12-15	106606	636,060	910295		1,652,961
2016	01-01-16	31-12-16	132547	606214	1034093		1,772,854
2017	01-01-17	31-05-17	35966	277924	425133		739,023
2017	Full-year estimate		86318.4	667017.60	1020319.2	0	1,773,655

The total volume in the Danish market was 1.65 million tons in 2015, 1.77 million tons in 2016, and estimated to be 1.77 million tons in 2017.

Since the introduction of SECA in 2005, the Danish offshore bunker market has been divided into approximately equal supplies of high sulphur (HS) and low sulphur (LS) fuels (ECA-compliant fuel), which is also revealed in this survey. However, as the port supplies to vessels trading domestic and fishing fleet are also covered here, the total low sulphur and ECA-compliant market covers approximately two thirds of the total market.

From the suppliers questionnaire we know that no HS gas oils were supplied, and from the interviews we learned that they do not sell or market HS gas oils any more. Why we know few of the VFK entries below are wrongly registered.

TABLE 8. VFK figures 2015

Summary of VFK Figures 2015					
	HFO HS	HFO LS	MGO LS	MGO HS	Total
Offshore supplies acc VFK	585,803	123,176	554,690	20,673	1,284,342
Cleaned for internal transfer between barges	491,244	93,630	464,307	18,119	1,067,300
Number of supplies	1,112	441	2,976	106	4,635
Average size per supply	442	212	156	171	

TABLE 9. VFK figures 2016

Summary of VFK Figures 2016					
	HFO HS	HFO LS	MGO LS	MGO HS	Total
Offshore supplies acc VFK	482,732	112,105	499,135	17,608	1,111,580
Cleaned for internal transfer between barges	435,732	99,979	426,067	15,486	977,264
Number of supplies	1,003	428	2,797	82	4,310
Average size per supply	434	234	152	189	

TABLE 10. VFK figures 2017 – 01/01–31/05

Summary of VFK Figures 2017- 01/01 - 31/05					
	HFO HS	HFO LS	MGO LS	MGO HS	Total
Offshore supplies acc VFK	231,627	52,581	240,989	7,561	532,758
Cleaned for internal transfer between barges	199,476	39,726	203,862	7,111	450,175
Number of supplies	400	142	1,130	29	1,701
Average size per supply	499	280	180	245	

TABLE 11. VFK figures 2017 – full-year estimates

Summary of VFK Figures 2017- full year estimates					
	HFO HS	HFO LS	MGO LS	MGO HS	Total
Offshore supplies acc VFK	555,905	126,194	578,374	18,146	1,278,619
Cleaned for internal transfer between barges	478,742	95,342	489,269	17,066	1,080,420
Number of supplies	960	341	2,712	70	4,082
Average size per supply	499	280	180	245	

TABLE 12. Seasonal variations

Seasonal VFK figures					
	HFO HS	HFO LS	MGO LS	MGO HS	Total
1st qrt 2015	178383	39286	180616	2569	400854
2nd qrt 2015	153114	26405	136782	5855	322156
3rd qrt 2015	113713	25413	111615	8585	259326
4th qrt 2015	140593	32072	125677	3664	302006
1st qrt 2016	128291	26652	126349	5181	286473
2nd qrt 2016	103835	17140	120157	4727	245859
3rd qrt 2016	148835	26094	139834	4134	318897
4th qrt 2016	100171	42219	113695	3566	259651
1st qrt 2017	118888	34983	145960	822	300653

There does not seem to be any pattern in the seasonal variations, which is why the 2017 full-year estimate is calculated by simple ratio calculations. (Volume from first 5 month X 12/5)

It is noted that the number of supplies is not equal to the number of operations, as two or even three products can be delivered to one receiving vessel in the same operation. The total offshore operations in 2016 (cleaned for transfer between barges) were 3,607 rendezvous/STS operations.

There has been a small decline in offshore supplies, but a small growth in the total market, which means the domestic and fishing supply volumes have grown.

10.6 Annual total approximate volume estimates

Offshore supplies for merchant fleet	1,000,000 mt
Onshore supplies for merchant fleet, mainly ferries	200,000 mt
Onshore supplies for domestic, work, and fishing vessels	400,000 mt

On an international scale, the Danish market is very small. The total annual worldwide volumes are difficult to measure but are normally estimated to be between 250 to 300,000,000 mt for the merchant fleet. The Danish market is less than 0.5% of the worldwide market ((1 + 0.2) / 275 x 100). In comparison, the Singapore market is about 48,000,000⁹ mt per year.

The limited average size per supply might explain the relatively small market share. It seems that many buyers only fill sufficient product to reach a more price attractive bunker hub (e.g., ARA or Russian port).

⁹ MPA 2016 figures.

11. Geography

TABLE 13. Number of supplies

Number of supplies:						
			Delivered by			
			Barge		Ex-pipe	Truck
			Offshore	In port		
2015	01-01-15	31-12-15	3995	8915	3199	3713
2016	01-01-16	31-12-16	4407	9062	3291	3657
2017	01-01-17	31-05-17	947	5213	1708	1643
2017	Full-year estimate		3673	12561	4099	3943

The offshore market in 2015 was concentrated off Skaw in the bay of Aalbaek, with 3,941 operations of a total of 3,985, which means only 44 operations outside this area. The same pattern can be seen in 2016, with 3,249 operations off Skaw of a total of 3,294 operations.

The onshore market is more scattered between the ports holding ferry terminals and the larger fishing ports, and the onshore market is far more blurred, as we did not differentiate between the markets and ex-pipe deliveries can be a self-service system or a fixed pipe installation in a tank terminal. Also, there are many “in port supplies” by barges, which can cover a supply of 600 mt to a ferry down to 0.5 mt to a minor work or fishing vessel.

The largest ports for supplies to ferries and merchant fleet are Copenhagen, with Stenaoil and Topoil as the major suppliers, and Esbjerg, with Nordic Marine Oil and KPI as big suppliers. Many ports share third place. Large ports for supplies to fishing vessels are Skaw, Hanstholm, and Thybroen, predominantly with local suppliers such as FF, Hanstholm Olieforsyning, Nordic Marine Oil as major suppliers.

12. Barges

This survey differentiates between offshore barges and barges for port deliveries. Since 2000, where the first Danish Bunker Directive came into force, barges for offshore deliveries must annually undergo a vetting and be approved by DMA. The list of approved barges can be found on DMA's website.¹⁰

Since 1 January 2015, which is the time frame of this survey, there are no indications of any violations of the statutory order on exchange of bunker oil by any supplier or any use of non-approved barges.

Normally, a barge is equipped with a sampling device for taking samples during the complete supply. A drip sampling device is a very simple and efficient way to take representative samples of the delivered product. Even though the device is simple to operate, many samples are, according to BunkerCare's experience, not taken correctly – regardless of whether this is deliberate or not.



BunkerCare drip sample devices

Before 2005 with no SECA, it was good practice not to commence the sampling process before the lines were flushed clean (meaning approximately within the first 10–15 minutes of the supply). However, with the new sulphur regulations, this is no longer considered good practice. If the last preceding delivery from a barge was an HS HFO of, for example, 2.8% sulphur and the lines or hose have not been cleaned 100% after completion by flushing with an LS product, then the low sulphur product will most probably be outside the agreed and required specifications. A 1% contamination with the high sulphur product will result in 0.13% sulphur content in the final product. As the high sulphur product will be discharged during the first minutes of the supply, it is extremely important for the receiving vessel to start sampling from the first second of the delivery. Also, if there is free water contained in the fuel, this will be captured by proper sampling carried out throughout the entire supply process.

¹⁰

<https://www.dma.dk/SynRegistrering/Autorisationer/HvemAutoriseret/Documents/Bunker%20vessel.pdf#search=bunker>

Barge crews are normally very skilled in the sampling procedures; however, based on BunkeCare's experiences, many crew from receiving vessels are not or pay little attention, which can be very expensive – not just for legislative matters, but also for commercial matters. In most cases, the MARPOL and commercial samples are drawn as one common sampling where after poured up in a number of different bottles; labelled and sealed. The label should be signed by the barge crew and countersigned by the receiving vessel.

MARPOL MEPC 59/24 recommends the MARPOL sample to be drawn on the receiving vessel, but in practice this is often not possible, since physical access between the vessels can be restricted or non-existent and can be very labour intensive for the suppliers and barge companies, with many daily operations for each barge. If the crew of the receiving vessel has access to witness the sampling process from the very beginning until sample bottles are sealed and numbers are printed on the BDN, it does not matter if the sample is drawn at one or the other end of the hose between the vessels.

As mentioned, the sampling procedures are governed by the agreed T&Cs, but it is rare that the barge crew or even the crew of the receiving vessels are familiar with those T&Cs.

TABLE 14. Barges

Barges confirmed used since 01-01-2015			
	Name of barge	IMO no.	Is the barge fitted with drip sample device according Marpol Annex VI
1	Aalborg	9327475	Yes
2	Amba	N/A	
3	Ängön	9131199	Yes
4	Annika	9628489	yes
5	Antares	9449223	Yes
6	Atlantic	9268186	Yes
7	Claudia	9280110	yes
8	Copenhagen	9327487	Yes
9	Dagmar	8835748	yes
10	Dana	8502286	Yes
11	Eships Bainuanah	9293325	Yes
12	Føniks Supporter	8661020	Yes
13	Fox Luna	9390458	Yes
14	Fox Sunrise	9333917	Yes
15	Fram	8412235	Yes
16	Fredericia	9341421	Yes
17	Gaia Nordic	9614593	Y
18	Jette	N/A	no
19	Kirsten Gullev	N/A	no
20	Kösterberg	9184677	yes
21	Kuwait 10	MMSI1219007671	yes
22	Marmara Mariner	9175183	y
23	Norden	9346641	Yes
24	Northern Kattegat	8827052	
25	Oljaren	9236315	Yes
26	Pallas	9631436	Yes
27	Pallas Glory	9318230	Yes
28	Q8 rita	N/A	yes
29	Ristna	7915113	y
30	San Padre Pio	9610339	Yes
31	Scandinavia	9341419	
32	Skaw Provider	9327281	Yes
33	Stathav 20	N/A	
34	Stathav 21	N/A	
35	Stathav 22	9096399	N
36	Strombus	FTJ 1083	No
37	Süllberg	9100114	yes
38	Venol	N/A	
39	Vinga Safir	9200158	Yes
40	Wappen Von Berlin	9255804	Yes
41	Wappen Von Nurnberg	9365257	Yes
42	Zircon	9010929	y
		Approved for off shore bunkering by DMA - Sep 2017	

13. A typical supply chain of bunkers

13.1 Supply chain

It is close to impossible to describe a typical supply chain for bunkers, because a typically chain hardly exist.

Bunkers are normally divided into two categories: 1. distillate fuels, and 2. residual fuels; also commonly phrased as clean products (CPP) for the distillates and dirty products (DPP) for the residuals.

Close to 100% of all bunkers is being sold with reference to the ISO 8217 specification. However, none of those products are “off-the-shelf products” and must be mixed from a variety of products, and as each refinery has a unique product portfolio, none of the products are alike. Fuel blending can be performed by the refiners, trading houses, or bunker suppliers, and as with all kinds of business, the fuel blender aims to optimize their own business by choosing the most cost-effective products and by blending just to fulfil the required specification. Since 2005, the sulphur legislation has made this equation even more complicated, as the fuel blender has one more parameter to meet in order to fulfil the requirements of international, regional, or local sulphur contents.

For the clean products, there do not appear to be many combinations to play with, but as this is a marginal business the individual fuel blender strives to reach ISO-required specifications with the heaviest possible product and blend just to comply with the maximum sulphur limit. During recent years, some products have been placed on the market that would normally be considered off spec on cold properties,¹¹ doped on the pour point with additives and thereby achieving compliance with the specification. The fuel is an excellent fuel but challenges the safety of ships not able to heat the product when trading in cold climates. This is a typical example of how some suppliers are much faster than the working committees under ISO 8217.

For residual/dirty products, there is much more room for the fuel blenders to work with. The ISO specification brands the residual products according to their kinematic viscosity at 50 °C and in grades from A to K. For an old-fashioned so-called “straight-run” fuel derived from atmospheric distillation, this made very good sense, as the kinematic viscosity then would be a fair and good expression of the quality. The lower kinematic viscosity, the better quality. This is just not the case for a modern refinery where the crude oil is not fractionized by distillation only but also manipulates hydrocarbon molecules in a number of different kinds of so-called crackers and cokers. The bottom residues from these processes are all kinds of amputated asphaltenes and other heavy hydrocarbons including sulphur and metals.

One heavy bottom residue can be blended with a cocktail of other bottom residues or distilled products to fulfil the ISO specification. The products can be difficult to handle, as their stability often is low and has low compatibility with other fuels, especially with high paraffinic fuels.

¹¹ Pour point which is the only cold property in ISO 8217 2010/12 edition.

The latest demand for cost-effective MARPOL-compliant 0.10% sulphur fuels has made the fuel blenders look for sweet¹² sources, and today there are a number of so-called hybrid fuels on the market. The main component in most of those fuels is vacuum gasoil, a product derived from vacuum distillation of a residual straight-run fuel. This product is very paraffinic and naturally low in sulphur, however with a very high pour point, why it has to be blended with other gas oils, which could be desulphurized products. There might be other lower cost sources mixed in as well. Those fuels are excellent fuels but have a very low compatibility with cracked HFO.

Also, few sources of straight-run fuels are on the market for MARPOL-compliant 0.1% sulphur fuels derived from sweet crude oil sources from central Africa (Doba¹³ or DAR crudes), which are excellent fuels but are still not seen in the Danish market.

They are called hybrid fuels because the blend target to ISO 8217 is secondary compared to EU and MARPOL sulphur legislation and thereby does not really fit into the normal specifications of ISO 8217.

No fuel supplier has an interest in delivering non-compliant fuels or fuels not fit for purpose, which is why they put a great deal of effort into testing for MARPOL and ISO compliance. Typically, no batch is delivered without a certificate from an accredited laboratory. Thereby, it is not necessary to follow a supply chain to look for courses for off-spec supplies, as the supplier is the direct source providing their own tests certificates. This at least covers the top four Danish offshore suppliers, which is supported by interviews and the supplier questionnaire. The minor suppliers, supplying gas oils, have traditionally one source of supply, which can be a related refinery or an "oil major" terminal, and those suppliers rely on the "oil major" warranties and certificates. Our supplier questionnaire revealed that none of those have ever had a single sulphur claim, which stipulates good quality control, even though it is a secondary quality assessment.

¹² Sweet in this sense means low sulphur content, opposite sour.

¹³ Crude oil brand named after the capital Doba of the central African country Chad.

14. Quality control

14.1 Quality control

The minor suppliers supplying “ready-made” gas oils deriving directly from refineries or oil majors’ terminals and not shifting between low and high sulphur or clean and dirty products are not the main focus of this study, as they are covered by the oil majors’ quality controls, which appear to be very efficient.

The larger suppliers, supplying the full pallet of products, appear to have more problems with their quality control. In our questionnaire, four or possibly five of the suppliers replied that they have issued a minimum of one “letter of indemnity” (LOI) for off-spec deliveries on sulphur content.

A LOI is a supplier’s guarantee towards a shipowner to indemnify the shipowner in case the owner is violating EU/MARPOL sulphur regulations for a specific bunker batch. In other words, if the owner is caught by a port state control and found to be in violation of EU/MARPOL sulphur regulations, then the bunker supplier will take full responsibility. The LOI is normally formulated so it only covers or is valid if there is a discrepancy in sulphur content between the BDN and MARPOL sample. And valid in typically 1 year. In such an event, it is extremely important for the owner to have full control over – and full confidence in – the MARPOL sampling process.

It is very difficult for a shipowner to handle non-compliant ECA fuels revealed from a commercial laboratory test. If the owner complains to the flag state or a port state, the ship might be detained for a violation of the EU directive and MARPOL Annex VI, and an eventual LOI from the supplier might not be worth the paper it is written on, unless the owner has 100% security for a correctly drawn MARPOL sample and the supplier is financially very strong.

14.2 Examples

Theoretical example 1

Barge A deliver a high sulphur batch to receiving vessel B. On completion of this supply, barge A shifts to receiving vessel C for delivering 35 mt of ECA-compliant fuel. The hose was blown empty at the first delivery, but 1.5 m³ of HS HFO still remains in the manifold and pipe lines. On board receiving vessel C, they take samples for their own quality purposes and start sampling right at the beginning of the supply; however, on the barge they wait few minutes before starting sampling. The supplying barge delivers a commercial and MARPOL sample and BDN with correctly printed sample numbers.

One week later, the supplier receives a claim on the sulphur content of 0.21% versus the BDN figure of 0.1%. The owner of vessel C issues the claim based on the receiver’s samples and the test result provided by the owner’s laboratory. The supplier issues a LOI and the case is closed from supplier’s side.

If the owner notifies the port state in the next coming port and his flag state, he risks being fined or detained with huge direct and indirect costs and losses on income. The port state control will probably draw a sample from the vessel at the engine, and since the manifold and pipe lines of the barge did contain HS fuel from the previous supply, the tanks of receiving vessel C will also contain too much sulphur. If the port state tests the MARPOL sample, it will

be ECA compliant, since this sampling was commenced a few minutes after pumping commenced, thereby the supplier rejects any claim whatsoever. In this case, the LOI is worth absolutely nothing.

14.2.1 Theoretical example 2

Barge A had a previous cargo of HS HFO, and the barge crew wants to save time and money for the supplier so they “forget” to flush the “dirty” tank with a low sulphur product. Thus 5 m3 HS HFO ROB (remains on board) and on top is loaded 100 mt ULSFO to the next customer, the cruise liner M/V Adventure. All sampling is witnessed by both parties and in best order. M/V Adventure sends one of the commercial samples for analysis but starts burning the product two days after receiving it. A few days later, they receive results from their laboratory, the analysis showing 0.23% sulphur content. An offloading of the product is too late. The economic consequences can be enormous, especially if headlines reach the press with “130% violation of EU and international sulphur requirements”. And the sleep for the person responsible at HQ will be ruined until the product is burned and gone

For both examples, no supply chain QA will reveal this, as the contamination occurs in the absolute last link of the chain and it might not be in control of the supplier, but in hands of a sub-contractor. This should of course not prevent the supplier from requesting a proper handling of their products on board a sub-supplier’s barge or introducing a proper quality assessment also covering the very last link in the chain.

An offloading (also called a de-bunkering) is possible but is always the last option to choose. It is a slow and extremely expensive process. The transfer pump of a receiving vessel is designed to feed the engines and not discharge the product. Also, in some countries (e.g., the Netherlands) an off-loaded bunker product is considered chemical waste and is thus extremely expensive to discharge.

14.3 Supplier quality assessment

TABLE 15. Supplier QA

Quality assessment:												
Do you have a quality assessment program in place and can document Marpol annex VI reg 14 compliance.	Yes	No	Yes	No	ISO9001	Y	NO	Yes	ISO9001	Yes	No	yes
If yes for above, is it certified by any recognised body. And in that case whom	No	no	No		Yes/BV	Yes/BV		No	Yes DNV	No	No	no
Can you trace back and document the sulfur content from BDN and backwards in all your supply chain.	Yes	Yes	Yes	Yes	yes	Y	YES	Yes	Yes	Yes	Yes	yes
Do you have a quality assessment program in place for cargo handling onboard own barges.	No barges	Yes	Yes		No	Y	YES	No	Yes	-	N/A	N/A
Do you have a quality assessment program in place for cargo handling onboard chartered barges.		Yes	N/A	Yes	No	N	YES	No	Yes	Yes	N/A	N/A
Do you keep statistic records of incoming claims for off spec on sulfur content (Irrespective true or false)	Yes	No	Yes	No	Yes	N	YES	Yes	No	No	Yes	N/A
Have you ever issued any "letter of indemnity" for any delivery for off spec on sulfur content	No	Yes	No	No	Yes	NTMK	YES	No	No	Yes	No	no

All tables are formatted as answered in the questionnaires.

The four largest suppliers all have a quality assessment in place, whereof two are approved by a recognized organization. An approved system is, however, no guarantee for any better QA assessment. No external auditor has the capability or knowledge to know all the details of such a supply chain. And how to ensure ECA compliance is not necessarily in the scope of the certification.

From interviews, we learned that all the big suppliers have good control over the sulphur quality in their supply chain, and, in case they make blending themselves, all perform their own sulphur testing in external laboratories. - Laboratories that are accredited and normally considered reliable.

None of the interviewed supply companies have a system in place for sampling on board their barges and refer to normal ship practices and on-board ISM procedures.

15. Fuel testing providers

15.1 Fuel test providers

We received feedback from two of the fuel test providers. Their market shares are unknown, but since these are two of the major providers in this specialized market, their market shares are determined to be considerable, estimated to 20% share each. From the questionnaire, we know they have tested samples from all barges known to be engaged in Danish waters since 2015, except for a number of the small “in-port” gas oil barges.

TABLE 16. Fuel test providers QA

Quality assessment:				
	Yes	No	Number	
Have you made any "Bunker alerts" since 01-01-2015 on too high sulfur content; geographically restricted to Denmark.	No	No		
Do you have records of any off spec deliveries in Denmark on sulfur content since 01-01-2015.	Yes	No	2 above R95	
Do you have records of any off spec deliveries with substantial exceeding of the sulfur content, since 2015	Yes	No	2	
Do you have records over supplies in specific ports and off shore areas.	Yes	Yes		
Do you have records of barges and/or suppliers, supplying bunkers in Denmark since 01-01-2015	Yes	Yes		
Have you an idea of your marked shares of the total annual supplies in Denmark.	No	No		
Will you share your bunker alerts with the Danish authorities and BunkerCare for off spec deliveries in Denmark (Or all bunker alerts)	Yes	Yes		

It is remarkable that only 2 of the estimated 1,800¹⁴ samples have been tested to be off spec on sulphur content in same period. An off-spec delivery is defined in ISO 8217 to be a delivery exceeding the 95% confidence limit of the maximum allowable limit (according to ISO 4259). For 0.1% sulphur content, the 95% confidence limit is 0.012. Which means that a product tested with sulphur content >0.112% will be considered off spec.

In the questionnaire, we defined substantial exceeding as a sulphur content of 0.2% or more above the BDN figure, which the two off-spec deliveries seem to have been. A result of 0.20% is 100% more than the limit, but a shipowner has hardly any economic benefits for such a violation, and instead violates the legislation for other reasons – for example, as stated in the previously mentioned examples or it can be caused from poor housekeeping or poor procedures on board the Ship owners own vessel.

¹⁴ Approximately 9,000 supplies in the 2.4 years, whereof 50% estimated analysed and the two companies estimated to hold 20% market share each = 9,000 x 50% x (20% x 2) = 1,800.

16. Ports

16.1 Ports

From interviews, we know the ports are generally very satisfied with the operation of bunker supplies in their domain. Fuel availability in a port is an important asset making the port attractive for its customers. Thus, most ports let bunker barges operate within their limits without any restrictions or any kind of payment or fees. In many cases, this has led to low attention towards the barges and their operations, with a very low level of registration. Few ports register the names of barges, but practically none of questioned ports register anything on qualities or quantities.

TABLE 17. Ports QA

Quality assessment:						
	1	2	3	4	5	6
Do you record and register number of bunker supplies in your port.	No	No	Y	Yes	No	Yes
Do you have records over bunker barges calling or working in your port for bunker deliveries.	No	Yes	Y	yes	No	Yes
Do you have records over truck deliveries in your port.	No	Yes	N/A	no	No	No
Do you have records over supplied quantity of bunkers delivered in your port	No	No	U/R	no	No	No
Do you have copies of BDN's for port bunkerings in your port	No	No	Y	no	No	NO
Do your port have facilities for ex-pipe/ex-wharf deliveries and in use since 01-01-2015	Dan Balt tank store	Yes	Y	yes	No	Yes
Do you know the suppliers, supplying bunkers in your port.	By truck yes	No	U/R	yes	No	Yes

The ports answering “Yes” to register supplies and barge calls within their domain; have not been able to quantify any of those calls later in the questionnaire and only one port has revealed the names of the barges calling their port.

17. Conclusions

17.1 Conclusions

Due to the work made by VFK, the Danish offshore bunker market is very transparent", and this survey has not uncovered any mentionable violations of any of the legislation. The statistical material is very accurate: VFK noticed 4,310 batches delivered in 2016 versus 4,407 from our questionnaire, which is a discrepancy of 2.2%, and the same very accurate pattern covers the summary of volumes. The discrepancy can be from the supplier questionnaire, where one of the biggest suppliers revealed very approximate figures.

The port supplies are less transparent because the data has a lower validity, mainly for the minor suppliers supplying to fishing- and workboats. Those suppliers are, however, supplying products directly from the oil major companies covered by their quality assessment, and there is no evidence of any violations of the EU Sulphur Directive. From interviews, we know that the normal sulphur content from those installations is 0.05% S, and thus well under the MARPOL/EU limits.

In general, the offshore supply companies are very keen to comply with the legislation and all have, to a certain extent, a quality assessment system in place. The weak link in the chain is, as mentioned before, the last link, with improper on-board housekeeping and low attention to the correct sampling procedures. As revealed from our barge visits, we experienced that there seems to be a tendency for the barges to go more for fully segregated tank and pipe systems, which significantly reduces the risk of product contamination. However, this can change from day to day if the demand for products changes or by any single large order that might be odd for the tank configuration.

The conclusion is that the suppliers are in general very keen on compliance with their deliveries, but at the same time are willing to go just to the limits. When introduced in a supplier QA system, the supplier would not answer when asked if he would supply a DMA gas oil internally tested to 0.11% S, which expressed a lot.

18. Recommendations

18.1 Co-operation with fuel test providers

The fuel test providers are holding vital statistical information on sulphur in bunkers oil and they can be a vital key to visibility of the product quality in the market, thus a cooperation with the four biggest on their statistical information's would be very informative. Of course, the companies cannot reveal any information on a ship- or company-specific level, but they can reveal "bunker alerts" and statistical trends in the market. Some might be reluctant to participate in such co-operation in Denmark only, as the Danish market is very small and transparent, but it could be an idea at an EU level. Also, the fuel test providers have an interest in mitigating the consequences for their customers receiving non-compliant fuel, which is extremely difficult to handle for the single owner.

18.2 Bunker supplier or shipowner's responsibility

Introduce a system where the individual ship and shipowner is not penalized if they act in good faith. For example, if a vessel burns non-compliant fuel which was delivered on a BDN as ECA-compliant fuel. Good faith or not can only be revealed by testing the MARPOL sample and comparing this with the BDN. This is why it is extremely important for the shipowner to have full evidence that the MARPOL sample is 100% representative for the total batch of fuel delivered under the accompanied BDN.

18.3 Development of best practices

Develop a set of voluntarily best practices for fuel suppliers and receivers, especially with a focus on the few weak links in the supply chain, mainly housekeeping on board trucks and barges and not least sampling procedures.

18.4 Non-blame policy

Introduce and proclaim a non-blame policy towards ships and shipowners who file ECA non-compliance notes of protests with port or flag state authorities, especially where the owner finds a contradiction between the sulphur content printed on the BDN and a commercial laboratory analysis. In both of the above-mentioned examples 1 and 2, it is in the public interest to file cases with the authorities. However, if the same authorities penalize the owner with fines or even detain a ship, no owner will dare to file any note of protest.

18.5 New interpretation of "local supplier"

According to MARPOL regulation 18.9.1, Parties undertake to ensure that appropriate authorities designated by them maintain a register of local suppliers of fuel oil.

The present interpretation of a "local supplier" is a supplier with an office address in Denmark. Suppliers with no office in Denmark are operating in Danish waters with bunker barges approved by DMA, and we found few suppliers' barges operating in Danish ports without any knowledge of any Danish authority. It could be considered extending the interpretation of a "local supplier" to a supplier supplying products in Denmark. Danish authorities will have better access to statistical data because the same authorities are entitled to inspect and verify BDNs from the latest 3 years according to MARPOL annex VI regulation 18.9.3.

18.6 Extended VFK registration – Port supplies

The Danish bunker directive is applicable to Danish and foreign bunker ships that carry out bunkering operations in Danish territorial waters outside of harbour areas.

It could be considered extending the Danish statutory order on bunker supply to all supplies in Denmark where it is applicable to issue a BDN. Then, all MARPOL-compliant supplies need to be reported to VFK and they will get the full picture of all Danish MARPOL deliveries. It is roughly estimated to be between 200 and 300 extra reports annually, corresponding to approximately 5%.

18.7 Harmonization of MARPOL and ISO

It has long been a wish from the bunker and shipping industry for a harmonization of the test regimes of MARPOL Annex VI regulation 18.8.2 and ISO 8217. It would be preferred to define the true sulphur value according ISO 4259, which is a widespread and well-known standard for all accredited fuel test laboratories worldwide. Also, such harmonization would simplify testing, with much faster results at less cost.

18.8 Retrospective MARPOL tests

To introduce spot checks of sulphur compliance in a cost-effective manner through voluntarily participation from the suppliers. Visit the barges and terminals and ask for their file of BDNs; choose one or two randomly and ask for the associated commercial sample. The sample and BDN must of course be out of the time barrier stipulated in the T&C's for any commercial claim. Test the samples for sulphur and the few other fingerprints printed on the BDN. Because delivery time of a few days does not matter, one of the specialized fuel testing laboratories can be used, and thus the test price should be affordable.

These tests have no legal value but could provide transparency and indicate towards the suppliers that EU and MARPOL sulphur compliance is a strong focus area.

The suppliers participating in this could be rewarded with an official certificate that they can use commercially, those who reject to participate, if any, could be listed on DMA or EPA's websites.

Appendix 1. Typical supplier's terms and conditions

OW BUNKER GROUP

Terms and Conditions of sale for Marine Bunkers Edition 2013

A. GENERAL INTRODUCTION

- A.1 This is a statement of the terms and conditions according to which the International O.W. Bunker Group (hereinafter called "OWB") will sell marine bunkers.
- A.2 These conditions apply to all offers, quotations, orders, agreements, services and all subsequent contracts of whatever nature, except where otherwise is expressly agreed in writing by OWB.
- A.3 General trading conditions of another party will not apply, unless expressly accepted in writing by OWB.
- A.4 In the case that, for whatever reason, one or more of the (sub)clauses of these general conditions are invalid, the other (sub)clauses hereof shall remain valid and be binding upon the parties.

B. DEFINITIONS

- B.1 Throughout this document the following definitions shall apply:
- "Seller" means OWB; any office, branch office, affiliate or associate of the OWB Group; being the legal entity within the OWB Group, whose name is included in the Order Confirmation, sent to the Buyer.
- "Buyer" means the vessel supplied and jointly and severally her Master, Owners, Managers/Operators, Disponent Owners, Time Charterers, Bareboat Charterers and Charterers or any party requesting offers or quotations for or ordering Bunkers and/or Services and any party on whose behalf the said offers, quotations, orders and subsequent agreements or contracts have been made;
- "Bunkers" means the commercial grades of bunker oils as generally offered to the Seller's customers for similar use at the time and place of delivery and/or services connected thereto;
- "Owner" means the registered Owner, Manager or Bareboat Charterer of the vessel;
- "Vessel" means the Buyer's Vessel, Ship, Barge or Off-Shore Unit that receives the supply/bunkers; either as end-user or as transfer unit to a third party;
- "Nomination" means the written request/requirement by the Buyer to the Seller, for the supply of the Bunkers;
- "Order Confirmation" means the written confirmation as issued by the Seller and forwarded to the Buyer to conclude the conclusion of the negotiated sale/purchase of the Bunkers. In case of conflict between the Nomination and the Order Confirmation, unless the Seller otherwise agrees in writing, the wording and content of the Order Confirmation is deemed contain the prevailing terms of the Agreement;
- "Agreement" means the concluded terms for the sale/purchase of the Bunkers;
- "Supplier" means any party instructed by or on behalf of the Seller to supply or deliver the Bunkers;
- "GTC" means these General Terms and Conditions which shall govern the contractual regulations between the Seller and the Buyer
- "BDR" means the Bunker Delivery Receipt, being the document(s) which is/are signed by the Buyer's representative(s) at the place of the supply of the Bunkers to the Vessel, evidencing the quality and quantity of the Bunkers supplied to and received by the Vessel.

C. OFFERS, QUOTATIONS AND PRICES

- C.1 An Agreement shall only be concluded and binding on the Seller when the Seller sends the Order Confirmation to the Buyer. Each Order Confirmation shall incorporate these GTC by reference so that the GTC are considered a part of the Confirmation.
- C.2 Agreements entered into via brokers, or any other authorised representative on behalf of the Seller, shall only bind the Seller upon the Sellers' broker or other authorised representative sending the Order Confirmation to the Buyer or the Buyer's broker as the case may be.
- C.3 The Seller's offer is based on the applicable taxes, duties, costs, charges and price level of components for Bunkers existing at the time of the conclusion of the Agreement. Any later or additional tax, assessment, duty or other charge of whatever nature and however named, or any increase of components for Bunkers or any additional costs borne by the Seller whatsoever caused by any change in the Seller's contemplated source of supply or otherwise, coming into existence after the Agreement has been concluded, shall be added to the agreed purchase price, provided that the Seller shall give the Buyer prior notice of this effect within a reasonable (under the prevailing circumstances) time after the Seller becoming aware of the relevant circumstances.
- C.4 All prices and/or tariffs are exclusive VAT, unless specifically stated otherwise. Any VAT or other charge and/or tax applicable and whenever imposed, shall be promptly paid by the Buyer, and unless otherwise agreed in writing all supplies are quoted and invoiced based on quantity calculated quantity in metric tons in vacuum.
- C.5 If the party requesting Bunkers is not the Owner of the Vessel, the Seller shall have the right (but will not be obliged) to insist as a precondition of sale that a payment guarantee is provided by the Owner. The Seller shall have the right (but will not be obliged) to cancel any agreement with the Buyer at any time, if such payment guarantee is not received upon request thereof from the Seller to the Owner. The Seller's decision to forego obtaining a payment guarantee under this Clause C.5 shall have no effect on Seller's right to a lien on the Vessel for any Bunkers supplied under this Agreement.
- C.6 The Buyer warrants that it is authorized as agent to order Bunkers for the Vessel, and that the Seller has a lien on the Vessel for any Bunkers supplied under this Agreement. If the party requesting Bunkers is not the Owner of the Vessel, Buyer assumes the sole responsibility for communicating the terms and conditions of this Agreement to the Owner of the Vessel prior to the date of delivery.
- C.7 If at any time before the delivery the financial standing of the Buyer appears to the Seller (in its absolute discretion) to have become impaired or unsatisfactory, the Seller may require cash payment or security to be provided by the Buyer prior to delivery, failing which the Seller may cancel the delivery without any liability on the part of the latter or its subcontractors.

D. SPECIFICATIONS (QUALITY – QUANTITY)

- D.1 The Buyer assumes the sole responsibility for the choice of nominating the quantity and quality of Bunkers and determine (if applicable) potential compatibility with any Bunkers already on board the Vessel. The Buyer also assumes sole responsibility for the selection and fitness of its choice of Bunkers for any particular use or purpose, and the Seller shall assume no responsibility whatsoever for the compliance or fitness of the Bunkers for a specific type of engine or equipment which the Buyer may or may not have agreed upon in any C/P (Charterparty) term or otherwise. This includes but is not limited to the quality, sulphur content and any other specific characteristics of the Bunkers whatsoever. Any and all warranties regarding the satisfactory quality, merchantability, fitness for purpose, description or otherwise, are hereby excluded and disclaimed.
- Where specifications designate a maximum value, no minimum value is guaranteed unless expressly stated in the Order Confirmation, and conversely where minimum values are provided in a specification, no maximum values are guaranteed unless expressly stated in the Order Confirmation.

- D.2 The quality and quantity shall be as agreed between the Seller and the Buyer and shall correspond to the Seller's Order Confirmation. Unless otherwise agreed in writing the Bunkers are delivered and sold based on metric tons in vacuum.
- D.3 Where standard specifications are being given or referred to, tolerances in accordance with ISO 4259 in respect of Reproducibility/Repeatability in quality are to be accepted without compensation or other consequences whatsoever.
- D.4 In respect of the quantity agreed upon the Seller shall be at liberty to provide, and the Buyer shall accept a variation of 5% from the agreed quantity, with no other consequence than a similar variation to the corresponding invoice from the Seller.
- D.5 Information regarding the typical characteristics of the Bunkers at any delivery location shall only be indicative of the Bunkers that have been made available at that location and shall not form a part of the specification of the Bunkers to be delivered. All grades of produce may contain petroleum industry allowed bio-derived components.

E. MEASUREMENTS – NON CLAUSING OF THE BDR(S)

- E.1 The quantities of bunkers shall be determined only from the official gauge or meter of the bunkering barge, tank truck or of the shore tank in case of delivery ex wharf.
- E.2 The Buyer's representative shall together with the Seller's representative measure and verify the quantities of Bunkers delivered from the tank(s) from which the delivery is made. When supplied by bunkering barge/tanker the particular barge/tanker will present its tank calibration and ullage sounding records, which are agreed to be the sole valid and binding document(s) to determine the quantity or quantities supplied. Quantities calculated from the Receiving Vessel's soundings shall not be considered.
- E.3 Should the Buyer's representative fail or decline to verify the quantities, the measurements of quantities made by the Seller or the Supplier shall be final, conclusive and binding and the Buyer shall be deemed to have waived any and all claims in regard to any variance.
- E.4 The Buyer expressly undertakes not to make any endorsement, complaint/ comment (including but without limitation any "No-lien" clausings) on the BDR when presented for signature by the Buyer's representative(s), any such insertion shall be invalid and of no effect whatsoever.
- E.5 In the event of complaint/comment on the quantity of Bunkers delivered, the Buyer or the Master of the Vessel shall give to the Seller/Supplier a letter of protest separately, followed by a complaint in detail to the Seller, setting out the exact quantity(ies) claimed shortsupplied, and with full supporting vouchers, in writing within 7 (seven) days thereof, failing which, any such claim by the Buyer shall be extinguished as non existent, and the Buyer shall be deemed to have expressly waived any such claim against the Seller/Supplier, the relevant claim being time barred, and the Seller/Supplier's weight and measurements shall be conclusive evidence of the quantity of Bunkers delivered.

F. SAMPLING

- F.1 The Supplier shall arrange for four (4) representative samples of each grade of Bunkers to be drawn throughout the entire bunkering operation. The Buyer's representative has the responsibility to witness that such samples are drawn correctly and shall confirm his witnessing thereof and also confirm the proper and correct sealing by signing the labels of the sample bottles.
- F.2 In case that dripsampling is not available onboard the barge, tanktruck or shore tank, samples shall be taken as a composite of each tank from which supplies are made, onboard the barge (respectively at the shore tank or tanktruck), divided with 1/3 from each the top, mid and bottom of the tanks.

- F.3 The samples shall be securely sealed and provided with labels showing the Vessel's name, identity of delivery facility, product name, delivery date and place and seal number, authenticated with the Vessel's stamp and signed by the Seller's representative and the Master of the Vessel or his representative. The seal numbers shall be inserted into the BDR/Bunker Delivery Receipts, and by signing the BDR both parties agree to the fact that the samples referred to therein are deemed valid and taken in accordance with the requirements as specified in this Chapter F.
- F.4 Two (2) samples shall be retained by the Seller for ninety (90) days after delivery of the Bunkers, or if requested by the Buyer in writing, for as long as the Buyer reasonably required. The other two (2) samples shall be retained by the receiving Vessel, one of which being dedicated as the MARPOL sample.
- F.5 In the event of a dispute in regard to the quality of the Bunkers delivered, the samples drawn pursuant to this Chapter F, shall be conclusive and final evidence of the quality of the Bunkers delivered. One, and only one, of the samples retained by the Sellers shall be forwarded to an independent laboratory to perform a set of tests, the result of which is to be made available to both parties. Those test results shall be final and binding upon both Buyer and Seller as to the parameters tested. The parties are to use best endeavours to agree the independent laboratory to perform the tests. If, however, no agreement can be reached on the choice of laboratory within 3 days of the Buyer being advised of the Seller opting to have the sample tested, the Seller is at liberty to send the sample to a reputable and independent laboratory of its choice for the tests to be conducted, and those test result will be final and binding upon Buyer and Seller as set out above.
- F.6 The seal must be breached only in presence of both parties unless one/both in writing have declared that they will not be present, or fails to be present at the appropriate time and place; and both parties shall have the right to appoint independent person(s) or surveyor(s) to witness the seal breaking.
- F.7 No samples subsequently taken shall be allowed as (additional) evidence. If any of the seals have been removed or tampered with by an unauthorised person, such sample(s) shall be deemed to have no value as evidence.
- F.8 Any eventual samples drawn by Buyer's personnel either during bunkering or at any later date after bunkering shall not be valid as indicator of the quality supplied. The fact that such samples may eventually bear the signature of personnel on board the barge or tank truck or other delivery conveyance shall have no legal significance as such local personnel have no authority to bind Seller to different contractual terms. Seller shall have no liability for claims arising in circumstances where Buyer may have commingled the products on board the Vessel with other fuels.

G. DELIVERY

- G.1 The time of delivery, as given by the Seller, has been given as an approximate time, unless it has been otherwise specifically agreed in writing between the parties.
- G.2 The time of delivery will only be binding upon the Seller when all information necessary for the Seller to comply with its obligations hereunder, have been properly delivered to the Seller in reasonable time before the delivery. In the event the Nomination addresses a spread of dates for delivery, the Seller has the sole discretion to commence the delivery within any time, day/night/sshinc of these dates, always subject to the circumstances set out below in Clause G.3.
- G.3 The Vessel shall under all circumstances be bunkered as promptly as the prevailing circumstances permit, having regard to congestion affecting the delivery facilities of Seller, its Suppliers or Agents and to prior commitments of barges or other delivery means. The Seller and/or the Supplier shall not be liable for any consequences or any time lost due to the Vessel having to wait for berth for bunkering or for completion of bunkering, and unless otherwise agreed in writing, the Seller shall not be obligated to deliver prior to the nominated date or spread of dates. The Seller is not responsible for delays caused by local customs, pilots, port- or other authorities.

- G.4 In any case the Buyer, unless otherwise agreed in writing, must give not less than 72 (seventy two) hours approximate notice of readiness of the Vessel for delivery, which is to be followed by 48 (forty eight) hours and 24 (twenty four) hours such notices, where the last notice must also specify the exact place of delivery. All these notices must be given to the Sellers and the Seller's representatives/agents in writing.
- G.5 The Seller shall be entitled to deliver the Bunkers by separate part deliveries, in which case each part delivery shall be construed as a separate delivery.
- G.6 The Seller shall not be required to deliver any Bunkers if any customs and/or other government permit required for such purpose has not been obtained in due time before the delivery.
- G.7 If the Seller at any time for any reason believes that there may be a shortage of supply at any place and that as a result thereof it may be unable to meet the demands of all its customers, the Seller may allocate its available and anticipated quantity/ies of Bunkers among its customers in such a manner as it may determine appropriate in its sole discretion.
- G.8 The Vessel shall be accessible at all times to Seller and Supplier and shall be bunkered as promptly as the circumstances permit. The Seller and/or the Supplier shall not be liable for any demurrage paid or incurred by the Buyer or for any loss, damage or delay of the Vessel (consequential and/or liquidating damages included) of any nature whatsoever due to congestion at the loading terminal, prior commitments of available barges or tank trucks or any other reason.
- G.9 The Buyer shall ensure that the Vessel provides a free, safe and always afloat and accessible side for the delivery of bunkers and that all necessary assistance as required by the Seller or the Seller's representative is rendered in connection with the delivery. If in the Supplier's opinion clear and safe berth is unavailable, delivery might be delayed or, in Seller's option, cancelled and all costs related to above will be on account of the Buyer.
- G.10 The Vessel shall moor, unmoor, hoist and lower bunkering hose(s) from the barge(s) whenever required by the Seller, Seller's representative or Supplier, free of expenses and in any way as may be requested to assist the barge equipment to a smooth supply. The Buyer shall make and be responsible for all connections and disconnections between the delivery hose(s) and the Vessel's bunker intake manifold/pipe and ensure that the hose(s) are properly secured to the Vessel's manifold prior to commencement of delivery.
During bunkering the Vessel's scuppers must be safely blocked, which blocking must be made by the Vessel's own crew. Furthermore the Vessel must ensure that all pipes and manifolds and receiving tanks are properly checked and ready to receive the bunkers, including but not limited to ensuring proper opening/closing of relevant valves, without any risk for spillages, etc, during the bunkering. Local further special requirements for receiving bunkers must be followed strictly by the Vessel, whether advised or not by the Seller or the Seller's representative, as it is always the Vessel and the Buyer who remains solely responsible for the knowledge and awareness of such eventual additional requirements for safety reasons.
- G.11 In the event that the Vessel is not able to receive the delivery promptly, the Buyer is thereby in default and shall pay damages and/or any reasonable demurrage claim to the barging/supplying facilities and shall indemnify the Seller in each and every respect as a result thereof.
- G.12 Delivery shall be deemed completed and all risk and liabilities, including loss, damage, deterioration, depreciation, contamination, evaporation or shrinkage to the Bunkers delivered and responsibility for loss, damage and harm caused by pollution or in any other manner to third parties shall pass to the Buyer from the time the Bunkers reach the flange/connecting pipe line(s)/delivery hoses provided by the Seller on the barge/ tank truck/shore tank.
- G.13 If the Buyer for whatever reason is unable or refuses to receive the full quantity ordered, the Seller shall have the right to invoice the Buyer for the loss incurred by having to transport the undelivered Bunkers back to the storage or by having to sell the Bunkers in a degraded form or at a lower price. The Seller may exercise this right without prejudice to the Seller's other rights for damages or otherwise pursuant to these conditions.

- G.14 The Vessel shall provide and have appropriate and segregated tanks to receive the contracted quantity of Bunkers; and the Vessel shall always be able to perform its own blending on board if any blending is deemed to be required by the Buyer. The Vessel shall upon delivery test the Bunkers supplied by running her engines or auxiliaries or equipment, for which the Bunkers are supplied, for a minimum of 1 (one) hour to determine that the Bunkers are satisfactory. In the event the Bunkers are not considered satisfactory, the Seller and Supplier are to be notified in writing immediately after such test period has expired. Otherwise, it shall be deemed that the Bunkers were satisfactory and that in any event the Buyer has waived any right to claim in this regard.
- G.15 If delivery is required outside normal business hours or on local weekends, Saturday, Sunday, national religious or public holidays the extra expenses incidental to such delivery shall be reimbursed by the Buyer as additional costs.
- G.16 In the event the Bunker delivery is made by vessel or barge as a ship-to-ship transfer, any damage caused by contact and/or collision and/or swell and/or other weather or sea related condition or incident, is to be dealt with by the Owners directly with the owners of the units involved, and Seller/Supplier shall not be held nor be responsible for any such damages. If, however, any of the involved units choose to pursue Seller and/or Supplier, Buyer will fully indemnify and hold Seller harmless in relation thereto.
- G.17 For safety reasons it is agreed that it is solely the Master of the bunkering barge that determines whether mooring alongside is safe, taking weather, swell and forecasts into consideration. Supplier/Seller not to be held responsible for any delays, demurrages, liquidating damages or similar whatsoever as a result of any eventual delays caused by any decision by the Master of the barge in this connection. Supplies being always performed weather permitting.
- H. TITLE**
- H.1 Title in and to the Bunkers delivered and/or property rights in and to such Bunkers shall remain vested in the Seller until full payment has been received by the Seller of all amounts due in connection with the respective delivery. The provisions in this section are without prejudice to such other rights as the Seller may have under the laws of the governing jurisdiction against the Buyer or the Vessel in the event of non-payment.
- H.2 Until full payment of the full amount due to the Seller has been made and subject to Article G.14 hereof, the Buyer agreed that it is in possession of the Bunkers solely as Bailee for the Seller, and shall not be entitled to use the Bunkers other than for the propulsion of the Vessel, nor mix, blend, sell, encumber, pledge, alienate, or surrender the Bunkers to any third party or other Vessel.
- H.3 In case of non or short payment for the Bunkers by the Buyer, the Seller is entitled (but not obliged) to repossess the Bunkers without prior juridical intervention, without prejudice to all other rights or remedies available to the Seller.
- H.4 In the event that the Bunkers have been mixed with other bunkers on board the Vessel, the Seller shall have the right to trace its proprietary interest in the Bunkers into the mixed bunkers and/or a right of lien to such part of the mixed bunkers as corresponds to the quantity or net value of the Bunkers delivered.
- H.5 The provisions of this Chapter H do not prejudice or in any way limit the Seller's right to arrest/attach the Vessel and/or sister ship and/or any sister or associate ship and/or other assets of the Buyer (or the Owner of the Vessel or any other party liable), wherever situated in the world, without prior notice.
- H.6 Where, notwithstanding these conditions, title in and to the Bunkers delivered has passed to the Buyer and/or any third party before full payment has been made to the Seller, the Buyer shall grant a pledge over such Bunkers to the Seller. The Buyer shall furthermore grant a pledge over any other Bunkers present in the respective Vessel, including any mixtures of the delivered Bunkers and other bunkers. Such pledge will be deemed to have been given for any and all claims, of whatever origin and of whatever nature that the Seller may have against the Buyer.

H.7 For the avoidance of doubt, where a mortgagee bank enforces any rights against the Vessel and becomes a mortgagee in possession of the Bunkers then as bailee the mortgage bank is liable to the Seller for fulfilment of the Agreement.

I. PAYMENT – MARITIME LIEN

I.1 Payment for the Bunkers and/or the relevant services and/or charges shall be made by the Buyer as directed by the Seller within the period agreed in writing.

I.2 Payment shall be made in full, without any set-off, counterclaim, deduction and/or discount free of bank charges to the bank account indicated by the Seller on the respective invoice(s).

I.3 (i) If at any time after delivery but before the due date the financial standing of the Buyer appears to the Seller (in its sole discretion) to have become impaired or unsatisfying, the Seller may require immediate full payment of all its invoices due and/or those not yet due, or such security as it shall deem to be satisfactory.

(ii) In the event that the Buyer shall default in making any payment due, the Seller may suspend deliveries of Bunkers until such payment has been made in full (together with default/delay compensation and costs), or the Seller may, in its discretion, elect to treat such default as a serious breach of the Agreement and thereupon terminate the Agreement on whole or in part without prejudice to any claim against the Buyer for damages, including cancellation charges. Such termination or suspension shall not relieve the Buyer of any obligation undertaken by virtue of an Agreement so terminated.

(iii) Where the Seller has extended any kind of credit facility to a group of companies or associated companies, default by any one relevant Buyer in respect to any invoice of the Seller shall give the right to the Seller to cancel all credit arrangements of the entire group or of all the associates, whereupon sub-clauses I.3.(i) and I.3.(ii) shall apply as appropriate.

(iv) Where the Buyer fails to pay timely, the Seller has the right to (without prejudice to its rights to receive default/delay compensation) take all appropriate steps to secure and enforce its claim; the Seller may also unilaterally cancel any credit arrangements agreed with/extended to the Buyer.

(v) All judicial and extrajudicial costs and expenses, including pre-action costs, fees, expenses and disbursements of the Seller's lawyers/attorneys-at-law, incurred in connection with non payment or delayed payment or by any other breach by the Buyer of these conditions, shall be for the Buyer's account, immediately payable by the latter to the Seller. In case of litigation, the Buyers shall also pay all the relevant expenses to the Seller, including but without limitation all his reasonable attorneys/lawyers' fees, costs and disbursements.

I.4 Payment shall be deemed to have been made on the date of which the Seller has received the full payment and such is available to the Seller. If payment falls due on a non-business day, the payment shall be made on or before the business day nearest to the due date. If the preceding and the succeeding business days are equally near to the due date, then payment shall be made on or before the preceding business day.

I.5 Any delay in payment of the full sum due shall entitle the Seller to interest at, the rate of 3 (three) per cent per month (compounded monthly for each month [or part thereof] of non payment) without prejudice to any rights or remedies available to the Seller. Furthermore the Seller is entitled to charge a delayed payment administration fee of USD 1.50 per mton supplied, or the equivalent thereof in local currency, with a minimum administration fee of USD 350.00 for each delivery made. All reasonable attorneys' fees incurred by Seller in connection with the collection of overdue payments shall be for the sole account of the Buyer.

I.6 Payments made by the Buyer in respect of a supply of Bunkers shall at all times be credited in the following order: (1) costs of any kind or nature, including but not limited to legal costs and attorneys' fees, (2) interest and administrative fee, and (3) invoices in their order of age, also if not yet due, or in Seller's sole discretion to specify a payment to any such invoice Seller considers relevant.

- I.7 All costs borne by the Seller in connection with the collection of overdue payments, including those of the Seller's own legal and credit department and, including but not limited to, reasonable attorneys' fees, whether made in or out of court and in general all costs in connection with breach of any agreement by the Buyer, including but not limited to reasonable attorneys' fees, shall be for the sole account of the Buyer.
- I.8 The Seller shall at all times, in its absolute discretion, be entitled to require the Buyer to provide the Seller what the Seller deems to be proper security for the performance of all of Buyer's obligations under the Agreement. Failing the immediate provision of such security upon Seller's demand, the Seller shall be entitled to stop any further execution of any agreement(s) between the parties until such time as the Buyer has provided the required security.
- I.9 Where Bunkers are supplied to a Vessel, in addition to any other security, the Agreement is entered into and the Goods are supplied upon the faith and credit of the Vessel. It is agreed and acknowledged that the sale of Bunkers to the Buyer and/or their acceptance on the Vessel create a maritime lien over the Vessel for the price of the Bunkers (and all interest and costs payable in respect thereof; including but not limited to the reasonable attorney's fees), such maritime lien afforded to the Seller over the Vessel. In any event any applicable Law shall not prejudice the right of the maritime lien of the Seller afforded hereunder or by any other applicable Law, be it of the place of delivery, or the flag of the Vessel, or the place of jurisdiction and/or an arrest of the Vessel, or otherwise howsoever.
- I.10 It is mutually agreed that the Bunkers provided by the Seller to the Buyer under the terms of this Agreement have been ordered by the Buyer in the ordinary course of business between Seller and Buyer. All payments from Buyer to Seller for Bunkers supplied under this Agreement are deemed to have been made in the ordinary course of business between Seller and Buyer, according to these ordinary business terms agreed between them.

J. CLAIMS

- J.1 In addition to the obligations referred to in Article E.4 above, any claim in connection with the quantity of the Bunkers delivered must be notified by the Buyer, or the Master of the Vessel, to the Seller or Supplier immediately after completion of delivery in the form of a letter of protest. If the Buyer or the Vessel's Master fails to present such immediate notice of protest to the Seller or Supplier, such claim shall be deemed to have been waived and shall be absolutely barred for all purposes.
- J.2 Always without prejudice to Article G.14 herein, any and all claims concerning the quality of the Bunkers delivered or time consumed for the entire operation, shall be submitted to the Seller in writing within 15 (fifteen) days after delivery with a clear statement as to the nature or the claim(s) along with appropriate supporting documentation, failing which any rights to complain or claim compensation of whatever nature shall be deemed to have been waived and absolutely barred for all purposes.
- J.3 The Buyer shall be obliged to make payment in full and fulfil all other obligations in accordance with the terms of the Agreement and these conditions, whether or not it has any claims or complaints. If Buyer submits a claim against Seller with respect to the quality or quantity of the products supplied, the Seller or the Seller's nominated representative shall be entitled to board the Vessel and investigate the Vessel's records, log books, engine logs, etc, and to make copies of any such document the Seller or the Seller's nominated representative may consider necessary for its investigations connected to the case. The Buyer shall allow this, or where Buyer has chartered the Vessel then the Buyer shall obtain authorization from Owner to allow the herein stated steps and to provide full assistance and support by the Vessel's officers and crew in any such manner the Seller or Seller's nominated representative may require. Failure to allow boarding and/or produce required copies of documents and/or lack of full cooperation by the Vessel's officers and crew shall constitute a waiver of the Buyer's claim.
- J.4 The Seller shall be allowed, and the Buyer, Owner, Officers and Crew onboard the receiving Vessel shall agree and in any way support and cooperate with Seller's representative, to draw samples from the Vessel's storage tanks, settling tanks and service tank and/or from before and after the Vessel's centrifuges to have extra tests carried out for such samples at independent laboratory.

J.5 In each and every case, any and all claims of the Buyer shall be timebarred unless arbitration/legal proceedings have been commenced/issued at the competent tribunal/court set forth in Chapter P hereof and served within 12 (twelve) months from the date of delivery of the Bunkers, or the date that delivery should have commenced pursuant to the Order Confirmation from the Seller.

K. LIABILITY – LIMIT TO SELLER'S LIABILITY

- K.1 The Seller and/or Supplier shall not be liable for damages of whatever nature, including physical injury, nor for delay of delivery of Bunkers or services, no matter whether such damages or delay have been caused by fault or negligence on the side of the Seller. The Seller shall furthermore not be liable for damages or delay as described above when such damages or delay have been caused by the fault or negligence of its personnel, representatives, Supplier or (sub)contractors.
- K.2 Liabilities of the Seller for consequential and/or liquidated damages including but not limited to loss of time, loss of cargo or charter cancelling date, loss of income or profit/earnings, are excluded. In any event and notwithstanding anything to the contrary herein, liability of the Seller shall under no circumstances exceed the invoice value of the Bunkers supplied under the relevant agreement to the relevant Vessel.
- K.3 The Buyer shall be liable towards the Seller and herewith undertakes to indemnify the Seller for any and all damages and/or costs suffered or otherwise incurred on the Seller due to a breach of contract and/or fault or neglect of the Buyers, its Supplier, agents, Servants, (sub)contractors, representatives, employees and the officers, crews and/or other people whether or not on board of the Vessel(s). The Buyer furthermore undertakes to hold the Seller harmless in case of any third party institutes a claim of whatever kind against the Seller whether direct or indirect relation to any agreement regulated by these terms and conditions. Third party shall mean any other (physical or legal) person/company than the Buyer.
- K.4 No servant, supplier or agent of the Seller/Supplier (including independent (sub)contractors from time to time employed by the Seller/Supplier) shall be liable to the Buyer for loss, damage or delay, while acting in the course of or in connection with its employment and/or agency for the Seller. Without prejudice to the above every exemption, limitation, condition and liberty herein contained, and every right, exemption from or limit to liability, defence or immunity of whatever nature applicable to the Seller or to which it is entitled hereunder shall also be available and shall extend to protect every such servant, representative or agent of the Seller and/or the Supplier acting as aforesaid.

L. EXEMPTIONS AND FORCE MAJEURE

- L.1 Neither the Seller nor the Seller's Supplier shall be liable for any loss, claim, damage, delay or demurrage due to any delay or failure in their performance under this Agreement (a) by reason of compliance with any order or request of any government authority, or person purporting to act therefore, or (b) when supply of the Bunkers or any facility of production, manufacture, storage, transportation, distribution or delivery contemplated by the Seller or Supplier is interrupted, delayed by congestion or other event (also see Article G.3 above), or by unavailability of product and/or barge equipment or by inadequate resource for any cause whatsoever which interruption, delay, unavailability or inadequate resources is not within the immediate control of the Seller or the Supplier, including (without limitation) if such is caused wholly or partly by labour disputes, strikes, stoppages, lock-out, governmental intervention, wars, civil commotion, riot, quarantine, fire flood, earthquake, accident, storm, swell, ice, adverse weather or any act of God. Neither the Seller nor the Supplier shall be required to remove any such cause or replace any affected source or supply or facility if doing so shall involve additional expense or a deviation from the Seller's or the Supplier's normal practices. Neither the Seller, nor the Supplier shall be required to make any deliveries which fail in whole or in part as a result of the causes set out in this Article at any later time.
- L.2 If the Buyer exercises reasonable diligence, the Buyer shall not be liable for failure to receive any particular delivery if prevented therefrom by force majeure. The Buyer shall indemnify the Seller or the Seller's supplier for any damage caused by the Buyer, the Buyer's agent or employees in connection with deliveries hereunder.

- L.3 Declaration of Force Majeure shall be given without undue delay once such event(s) have come to the knowledge of the respective party declaring same. However, under no circumstances and for no reason whatsoever, can Force Majeure entitle the Buyer not to pay promptly any invoice of the Seller.
- L.3 In the event that the Seller, as a result of force majeure, can only deliver a superior grade of bunkers, the Seller is entitled to offer the said grade, and the Buyer must accept delivery thereof and pay the applicable price.
- L.4 (a) These Terms and Conditions are subject to variation in circumstances where the physical supply of the Bunkers is being undertaken by a third party which insists that the Buyer is also bound by its own terms and conditions. In such circumstances, these Terms and Conditions shall be varied accordingly, and the Buyer shall be deemed to have read and accepted the terms and conditions imposed by the said third party.
- (b) Without prejudice or limitation to the generality of the foregoing, in the event that the third party terms include:
- (i) A shorter time limit for the doing of any act, or the making of any claim, then such shorter time limit shall be incorporated into these terms and conditions.
- (ii) Any additional exclusion of liability clause, then same shall be incorporated mutatis mutandis into these.
- (ii) A different law and/or forum selection for disputes to be determined, then such law selection and/or forum shall be incorporated into these terms and conditions.
- (c) It is acknowledged and agreed that the buyer shall not have any rights against the Seller which are greater or more extensive than the rights of the supplier against the aforesaid Third Party.

M. BREACH/CANCELLATION

- M.1 Without prejudice to any other remedies and rights, the Seller shall have the option immediately to cancel the Agreement in full or in part, or to store or procure the storage of the Bunkers, in whole or in part, for the account and risk of the Buyer and to charge the Buyer the expenses thereby incurred, or to hold the Buyer fully to the agreement, or take any other measures which the Seller deems appropriate, without prejudice to its rights of indemnification, without any liability on the side of the Seller, in any one of (but not limited to) the following cases:
- a) when the Buyer, for whatever reason, fails to accept the Bunkers in part or in full at the place and time designated for delivery;
 - b) when the Buyer fails in part or in full to comply with its obligations to pay any amount due to the Seller and/or provide security as set out in these GTC;
 - c) when, before the date of delivery, it is apparent in the opinion of the Seller that the financial position of the Buyer entails a risk to the Seller;
 - d) when, in case of force majeure, the Seller is of the opinion that the execution of the agreement should be cancelled.
- M.2 The Seller may terminate any Agreement with the Buyer in whole or in part, in its full discretion, upon the breach of any provisions hereof by the Buyer or in the event that the Buyer fails to make or suspends payment, ceases to carry on business, makes an arrangement with its creditors or undergoes any form of bankruptcy, administration, re-organisation or asset rearrangement.

- M.3 The Seller has the option to immediately cancel the Agreement for the account and risk of the Buyer if at any time the Seller, in its sole discretion, has reasonable grounds to believe that:
- a) The Vessel; or
 - b) The Charterer of the Vessel; or
 - c) The fully or partly Owner(s) of the Vessel; or
 - d) Any officers of the Vessel; or
 - e) The Operator and/or Manager of the Vessel; or
 - f) Any other person or entity in any way related to the Agreement or delivery is/are
- 1) Iranian(s); or
 - 2) Related in any way to Iran or Iranians; or
 - 3) Listed on the US OFAC Specially Designated Nationals List; or
 - 4) Covered by any US, UN- and/or EU sanctions; or
 - 5) Covered by any sanctions of any other jurisdiction and/or administration.

Under no circumstances can the Seller be held liable for any loss, delays, claims or damages of whatever kind suffered by the Buyer due to a cancellation under this Article.

The Buyer must inform the Seller immediately the Buyer becomes aware of or has reasons to believe that any of the above items a) to f) in combination with any of the above items 1) to 5) are fulfilled/apply. Should the Buyer breach its obligation to inform the Seller, the Buyer shall fully indemnify and keep the Seller harmless for any damage or loss caused by such breach, including consequential or liquidated damages.

- M.4 The Buyer acknowledges that any agreements with the Seller and any actions related to such agreements as well as any interaction with third parties related to such agreements are covered by certain anticorruption laws and regulations which can include any anticorruption law, including but not limited to the U.S. Foreign Corrupt Practices Act ("FCPA"), and the UK Bribery Act. Therefore, the Buyer declares to comply with all applicable anticorruption laws and regulations and agrees that the Buyer has not, and will not, offer, promise, pay, or authorize the payment of any money or anything of value, or take any action in furtherance of such a payment, whether by direct or indirect means, to any public official or private individual to influence the decision of such person in the performance of his duties to a government or to his company. Any breach of this clause will void the related Agreement and in the sole discretion of the Buyer any other Agreement between the parties, making any claims for payment, delivery or any other obligation of the Seller under this Agreement void. The Buyer is liable for all and any costs or losses incurred by the Seller due to such breach and/or an Agreement becoming void as a consequence.

N. SPILLAGE, ENVIRONMENTAL PROTECTION

- N.1 If a spill occurs while the Bunkers are being delivered, the Buyer shall promptly take such action as is necessary to remove the spilled Bunkers and mitigate the effects of such spill. Without prejudice to the generality of the foregoing the Seller is hereby authorised by the Buyer in the absolute discretion of the Seller, but at the expense of the Buyer, to take such measures and incur such expenses (whether by employing its own resources or by contraction with others) as are necessary in the judgment of the Seller to remove the spilled Bunkers and mitigate the effects of such spill. The Buyer shall cooperate and render such assistance as is required by the Seller in the course of the action. All expenses, claims, costs, losses, damages, liability and penalties arising from spills shall be borne by the party that caused the spill by a negligent act or omission. If both parties have acted negligently, all expenses, claims, losses, damages, liability and penalties, shall be divided between the parties in accordance with the respective degree of negligence. The burden of proof to show the Seller's negligence shall be on the Buyer. The Buyer shall give the Seller all documents and other information concerning any spill or any programme for the prevention thereof that is required by the Seller, or is required by law or regulation applicable at the time and place of delivery.

O. DELAYS AND CANCELLATIONS

- O.1 Notwithstanding anything else to the contrary herein, and without prejudice to any rights or remedies otherwise available to the Seller, the Buyer, by its acceptance of these conditions, expressly agrees that Seller has the sole discretion to cancel or to adjust prices in the event the Vessel is suffering a delay exceeding 24 hours from the (last) nomination date.
- O.2 If the Buyer for whatever reason (including circumstances entirely outside Buyer's control) cancels the Agreement, where Order Confirmation has been sent by Seller, the Buyer shall be liable for any and all losses suffered and liabilities incurred by the Seller and/or the Supplier as a result of such cancellation, including, but not limited to, barge costs, re-storing of the Bunkers, and hedging costs, and also in Seller's sole option any difference between the contract price of the undelivered product and the amount received by the Seller upon resale to another party or, if another buyer cannot be found, any market diminution in the value of the product as reasonably determined from available market indexes. These losses and liabilities shall be indemnified by a minimum amount of USD 4,000 by way of agreed minimum liquidated damages, and shall be indemnified in full if they in total exceed USD 4,000.

P. LAW AND JURISDICTION

- P.1 This Agreement shall be governed and construed in accordance with English law. The 1980 United Nations Convention on Contracts for the International Sale of Goods (CISG) shall not apply. Except for circumstance referred to in Clause P.5 below all disputes arising in connection with this Agreement or any agreement relating hereto, save where the Seller decides otherwise in its sole discretion, shall be finally settled by arbitration in London, England in accordance with the Arbitration Act 1996 (or any subsequent amendment).
- P.2 In the event that the Seller determines to refer any dispute to arbitration it shall be referred to a tribunal of three arbitrators consisting of one arbitrator to be appointed by the Seller, one by the Buyer, and one by the two arbitrators already appointed. Each member of the tribunal shall be a full member of The London Maritime Arbitrators Association (the 'LLMA'). Either party may call for Arbitration by service of written notice, specifying the name and address of the arbitrator appointed and a brief description of the dispute(s) or difference(s) to be the subject of the Arbitration. If the other party does not within 14 days serve notice of appointment of an arbitrator to arbitrate the dispute(s) or difference(s), then the first moving party shall have the right without further notice to appoint its own arbitrator as sole arbitrator and shall subsequently advise the other party accordingly. The award of the sole arbitrator shall be binding on both parties as if he had been appointed by agreement. Provided each party appointed their own arbitrator then these two arbitrators shall jointly appoint the third arbitrator. In the event that the two arbitrators fail to appoint a third arbitrator within twenty days of the appointment of the second arbitrator, either party may apply to the English courts for the appointment of a third arbitrator. Any disputes to be referred to Arbitration are to be determined in accordance with the current LMAA terms unless the parties agree otherwise.
- P.3 Nothing herein shall prevent the parties agreeing in writing to vary these provisions to provide for the appointment of a sole arbitrator.
- P.4 In cases where neither the claim nor any counterclaim exceeds the amount of USD 100,000 (or such other sum as the parties may agree) the Arbitration shall be conducted in accordance with the LMAA Small Claims Procedure current at the time when the arbitration proceedings are commenced.
- P.5 The General Maritime Law of the United States shall always apply with respect to the existence of a maritime lien, regardless of the country in which Seller takes legal action. Seller shall be entitled to assert its rights of lien or attachment or other rights, whether in law, in equity or otherwise, in any jurisdiction where the Vessel may be found. Without prejudice to any other Clause herein any disputes and/or claims arising in connection with these conditions and/or any Agreement governed by them, any dispute and/or claim arisen in connection with a Vessel detained by Seller at any port, place or anchorage within the United States shall be submitted to the United States District Court for the Southern District of New York.

P.6 If any procedure of any nature whatsoever is instituted under Clause P.5 above, in connection with any controversy arising out of this Agreement or to interpret or enforce any rights under this Agreement, the prevailing party shall have the right to recover from the losing party its reasonable costs and attorneys' fees incurred in such proceeding.

Q. VALIDITY

Q.1 These terms and conditions shall be valid and binding for all offers, quotations, prices and deliveries made by the O.W. Bunker Group, any associated company, representative or agent as of September 1, 2013, or at any later date.

Q.2 These terms and conditions are available at the website www.owbunker.com, on which site as well the Sellers may notify amendments, alterations, changes or verifications to same. Such amendments, alterations, changes or verifications are deemed to be a part of the entire terms once same have been advised on the website.

Appendix 2. Letter – Fuel suppliers

Steffen Kortegaard

From: Steffen Kortegaard
Sent: Tuesday, May 30, 2017 19:52
Subject: Compliance with Marpol and EU Sulfur directive
Attachments: Steffen Kortegaard.vcf; supplier.xlsx

Dear bunker fuel supplier.

I have the pleasure to announce that BunkerCare have made a contract with the Danish Environmental Protective Agency EPA (Miljøstyrelsen) where we shall produce a report including a survey covering the scope and mapping of bunker supplies made in Danish territorial waters inclusive ports and evaluate compliances with MARPOL annex VI latest amendment and EU sulfur directive 2012 amendment. Time to be covered; since the new ECA limits on sulfur came into force 01-01-2015 and till today

Participants in the survey are:

Suppliers questionnaire:

- All suppliers recognized and authorized by EPA in accordance with MARPOL annex VI reg 18. (Total 18)
- All suppliers known to VFK (Danish Navy) and BunkerCare (Total 3)
- All suppliers (If any) who become known during interviews and other questionnaires

Ports questionnaire:

- The 10 biggest commercial non-fishing ports in Denmark

Authority and organizations.

- Danish Maritime Administration DMA
- Danish Environmental Authority
- Vaerns Faelleskabs Kommando VFK (Danish Navy)
- Danish Ports
- Danish Ship Owners Association

Ship Owners questionnaire:

A number of key ship owners and ferry companies frequent operating in Denmark and Danish waters.

Fuel Testing laboratory questionnaire:

4 biggest worldwide fuel test laboratories.

The data will be published in anonymous form and there will be placed no files against unintentionally breach of MARPOL or EU Sulfur directive.

It is voluntarily to participate in the survey, however it is vital that companies are complying with MARPOL annex VI, especially regulation 18 § 9.3 where bunker suppliers are obliged to retain BDN's for minimum three years for inspection purposes. If you are refraining to participate we will ask for an official inspection of the BDN's.

We will much appreciate if you can reply within the 26th of June 2017.

Last; but not least; we hope for your positive participation and we might like to follow up on this questionnaire with a visit from BunkerCare and interviews in your office and onboard your barges and installations. EPA will participate in a number of visits, however still not identified nor quantified.

Best regards/Venlig hilsen
Steffen Kortegaard

BunkerCare Ltd.
+45 4034 9406

svk@bunkercare.com
Bunkercare.com

Appendix 3. Supplier questionnaire



Suppliers Questionnaire

Company name:	
---------------	--

Please use the same name and address as you use on the BDN's you issue from your barges, trucks or ex-pipe installations. If you supply under different brands, please fill one questionnaire per brand.

Number of supplies:

			Delivered by		
			Barges	ex pipe	Truck
2015	01-01-15	31-12-15			
2016	01-01-16	31-12-16			
2017	01-01-17	31-05-17			

Number of BDN's issued supplying under Danish jurisdiction off shore and in port and according to MARPOL annex VI reg 18 § 5 and retained three years for inspection puposes according to MARPOL annex VI reg 18 §9.3

Quality and quantity of supplies:

			HFO		Gas oil	
In metric tons			LS	HS	LS	HS
2015	01-01-15	31-12-15				
2016	01-01-16	31-12-16				
2017	01-01-17	31-05-17				

HFO = All grades under ISO 8217 from RMA10* to RMK700 and non ISO grades with density > 900 kg/m3
 Gas Oil = ISO8217 DMA, DMB, DMZ & DMC* or non ISO grades with Density < 900 kg/m3
 LS = Low Sulfur with sulfur content of 0,1% m/m or less

*ISO 8217-2005 DMC = RMA10 ISO 8217-2010

Barges used since 01-01-2015

	Name of barge	IMO no.	Is the barge fitted with Drip sample device according Marpol Annex VI
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Quality assessment:

	Yes or No
Do you have a quality assessment program in place and can document Marpol annex VI reg 14 compliance.	
If yes for above, is it certified by any recognised body. And in that case whom	
Can you trace back and document the sulfur content from BDN and backwards in all your supply chain.	
Do you have a quality assessment program in place for cargo handling onboard own barges.	
Do you have a quality assessment program in place for cargo handling onboard chartered barges.	
Do you keep statistic records of incoming claims for off spec on sulfur content (Irrespective tru or false)	
Have you ever issued any "letter of indemnity" for any delivery for off spec on sulfur content	

Marpol Annex VI reg. 14 is covering the sulfur limits for fuel burned inside and outside ECA's

Any remarks you might find relevant:

Appendix 4. Letter – Ports

Steffen Kortegaard

From: Steffen Kortegaard
Sent: Thursday, June 8, 2017 14:28
Cc: Dorte Kubel
Subject: EU and Marpol compliance
Attachments: Steffen Kortegaard.vcf; Ports.xlsx; Bilag 1 - Kravspecifikation .pdf

Dear Port.

I have the pleasure to announce that BunkerCare have made a contract with the Danish Environmental Protective Agency EPA (Miljøstyrelsen) where we shall produce a report including a survey covering the scope and mapping of bunker supplies made in Danish territorial waters inclusive ports and evaluate compliances with MARPOL annex VI latest amendment and EU sulfur directive 2012 amendment. Time to be covered; since the new ECA limits on sulfur came into force 01-01-2015 and till today.

I know I might address the wrong person, in that case will you be so kind to forward this to the right person in your organization

Participants in the survey are:

Suppliers questionnaire:

- All suppliers recognized and authorized by EPA in accordance with MARPOL annex VI reg 18. (Total 18)
- All suppliers known to VFK (Danish Navy) and BunkerCare (Total 3)
- All suppliers (If any) who become known during interviews and other questionnaires

Ports questionnaire:

- The 10 biggest commercial non-fishing ports in Denmark

Authority and organizations.

- Danish Maritime Administration DMA
- Danish Environmental Authority
- Vaerns Faelleskabs Kommando VFK (Danish Navy)
- Danish Ports
- Danish Ship Owners Association

Ship Owners questionnaire:

A number of key ship owners and ferry companies frequent operating in Denmark and Danish waters.

Fuel Testing laboratory questionnaire:

4 biggest worldwide fuel test laboratories.

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The data will be published in anonymous form and there will be placed no files against unintentionally breach of MARPOL or EU Sulfur directive.

It is voluntarily to participate in the survey, however stakeholders not willing to participate will be mentioned in the final report.

We will much appreciate if you can reply within the 29th of June 2017. - If that for some reason is not possible please revert.

Last; but not least; we hope for your positive participation and we might like to follow up on this questionnaire with a visit from BunkerCare and interviews in your office and onboard your barges and installations. EPA will also participate in a number of visits, however still not identified nor quantified.

Best regards/Venlig hilsen
Steffen Kortegaard

BunkerCare Ltd.
+45 4034 9406

svk@bunkercare.com
Bunkercare.com

	<p>Steffen Kortegaard BunkerCare +45 40 34 94 06 Mobile +45 40 34 94 06 Home svk@bunkercare.com steffen.kortegaard@verifavia... Granvej 23 9000 Aalborg Denmark www.bunkercare.com</p>
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Appendix 5. Port questionnaire



Ports Questionnaire

svk@bunkercare.com

Port name:	
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Quality assessment:

Yes or No

Do you record and register number of bunker supplies in your port.	
Do you have records over bunker barges calling or working in your port for bunker deliveries.	
Do you have records over truck deliveries in your port.	
Do you have records over supplied quantity of bunkers delivered in your port	
Do you have copies of BDN's for port bunkerings in your port	
Do your port have facilities for ex-pipe/ex-wharf deliveries and in use since 01-01-2015	
Do you know the suppliers, supplying bunkers in your port.	

A bunker supply is defined as transfer of marine fuel to a ship from a facility, which can be a bunker barge, a truck or a fixed pipe installation.

A bunker Barge is a tank vessel used for bunker supplies or a self-propelled or push barge used for bunker supplies

Suppliers in your port:

1	
2	
3	
4	
5	
6	

Number of supplies in port:

Delivered by

			Barges	ex pipe	Truck
2015	01-01-15	31-12-15			
2016	01-01-16	31-12-16			
2017	01-01-17	31-05-17			

If you have data asked for will you please issue below.

Number of BDN's issued supplying under Danish jurisdiction in your port and according to MARPOL annex VI reg 18.

Quality and quantity of supplies:

	In metric tons		HFO		Gas oil	
			LS	HS	LS	HS
2015	01-01-15	31-12-15				
2016	01-01-16	31-12-16				
2017	01-01-17	31-05-17				

HFO = All grades under ISO 8217 from RMA10* to RMK700 and non ISO grades with density > 900 kg/m3
Gas Oil = ISO8217 DMA, DMB, DMZ & DMC* or non ISO grades with Density < 900 kg/m3
LS = Low Sulfur with sulfur content of 0,1% m/m or less

*ISO 8217-2005 DMC = RMA10 ISO 8217-2010

Barges working in your port for bunkering since 01-01-2015

	Name of barge	IMO no.	Official number if no IMO
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Any remarks you might find relevant:



Appendix 6. Letter – Fuel test providers

Steffen Kortegaard

From: Steffen Kortegaard
Sent: Sunday, June 11, 2017 23:45
Subject: Fuel test providers questionnaire
Attachments: Appendix i approved barges.pdf; Appendix ii Authorized suppliers in Denmark.pdf; fuel test labs..xlsx

Dear Fuel Test Provider.

I have the pleasure to announce that BunkerCare have made a contract with the Danish Environmental Protective Agency EPA (Miljøstyrelsen) where we shall produce a report including a survey covering the scope and mapping of bunker supplies made in Danish territorial waters inclusive ports and evaluate compliances with MARPOL annex VI latest amendment and EU sulfur directive 2012 amendment. Time to be covered; since the new ECA limits on sulfur came into force 01-01-2015 and till today.

I know I might address the wrong person, in that case will you be so kind to forward this to the right person in your organization with svk@buinkercare.com in copy, please.

Participants in the survey are:

Fuel Testing laboratory questionnaire:

6 biggest worldwide marine fuel test laboratories.

Suppliers questionnaire:

- All suppliers recognized and authorized by EPA in accordance with MARPOL annex VI reg 18. (Total 18)
- All suppliers known to VFK (Danish Navy) and BunkerCare (Total 3)
- All suppliers (If any) who become known during interviews and other questionnaires

Ports questionnaire:

- The 10 biggest commercial non-fishing ports in Denmark

Authority and organizations.

- Danish Maritime Administration DMA
- Danish Environmental Authority
- Vaerns Faelleskabs Kommando VFK (Danish Navy)
- Danish Ports
- Danish Ship Owners Association

Ship Owners questionnaire:

A number of key ship owners and ferry companies frequent operating in Denmark and Danish waters.

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The data will be published in anonymous form and there will be placed no files against unintentionally breach of MARPOL or EU Sulfur directive.

It is voluntarily to participate in the survey, however stakeholders not willing to participate will be mentioned in the final report.

We will much appreciate if you can reply within the 01st of July 2017. - If that for some reason is not possible please revert.

Last; but not least; we hope for your positive participation and we might like to follow up on this questionnaire with a visit from BunkerCare and interviews in your office or on telephone. EPA will also participate in a number of visits, however still not identified nor quantified.

Best regards/Venlig hilsen
Steffen Kortegaard

BunkerCare Ltd.
+45 4034 9406

svk@bunkercare.com
Bunkercare.com

Appendix 7. Fuel test providers



BunkerCare

svk@bunkercare.com

Fuel test providers

Name of Company	
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Quality assessment:

	Yes or No	Number
Have you made any "Bunker alerts" since 01-01-2015 on too high sulfur content; geographically restricted to Denmark.		
Do you have records of any off spec deliveries in Denmark on sulfur content since 01-01-2015.		
Do you have records of any off spec deliveries with substantial exceeding of the sulfur content, since 2015		
Do you have records over supplies in specific ports and off shore areas.		
Do you have records of barges and/or suppliers, supplying bunkers in Denmark since 01-01-2015		
Have you an idea of your marked shares of the total annual supplies in Denmark.		
Will you share your bunker alerts with the Danish authorities and BunkerCare for off spec deliveries in Denmark (Or all bunker alerts)		
What is your policy on bunker alerts on too high sulfur content - % wise and number wise		

With Denmark means all danish ports and territorial waters, Not inclusive Faroe Islands and Greenland.

Off spec on sulfur means a sulfur content higher than the sulfur content printed on the BDN taking the reproducibility of ISO 4259 into account.

Substantial exceedings means a sulfur content of 0,2 % or more above the BDN figure.

If yes, please fill details below.
List of Danish EPA authorised suppliers attached. Appendix 1

If yes, It might be interesting for us to compare the list with the list of barges and suppliers in compliance the Danish Bunker Directive and MARPOL annex VI. Appendix 1 & 2.

FYI 4017 supplies were identified by the Danish Navy in 2015 with a total delivery of 1,3 mill mt (1 supply is 1 STS operation and can cover over different grades and BDN's)

If yes, Please use the addresses dokub@mst.dk & bunkercare@bunkercare.com on your mail list.

Supplies in port and off shore.

Port or off shore area and supplier	Number
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

We will like to have all suppliers included in this survey, why we will appreciate if you can fill as many as you can., best possible

Barges working in Denmark since 01-01-2015

	Name of barge	IMO no.	Official number if no IMO
1			
2			
3			
4			
5			
6			
7			
8			
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10			
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We will like to have all barges included in this survey, why we will appreciate if you can fill as many as you can, best possible.

Any remarks you might find relevant:

Bunker Supply and Quality Survey – Bunkering in Denmark

The Danish bunker market is a so-called niche market where the bunker receivers mainly take smaller volumes for reaching the more price-attractive larger bunker hubs. Despite the niche characteristics, there are national, regional, and international suppliers operating in Denmark and an overcapacity of bunker tonnage. Offshore barges capable of a turnover of 30–40,000 metric tons per month, with an optimum logistic, today turnover significantly lower volumes, stressing the margins and profitability.

However, we found the Danish bunker supply market well regulated, and the authorities have easy access to data on quantities and qualities for the offshore market, but more difficulties for the onshore market. The onshore market is mainly gas oil supplies, dominantly with product derived from the oil major companies. We found no evidence to suggest any violations of the current legislation focused on sulphur regulations.



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