

## Report – 1<sup>st</sup> Ad Hoc Working Group on Scrubbers (Brussels, 3 June 2013)

### **1. Opening and introduction**

Magda Kopczynska, Head of Unit D1, DG MOVE opened the meeting and welcomed the participants on behalf of the Commission and EMSA. The large number of participants (about 80), including also a number of Member States' representatives (10), indicated a vast interest in the topic among the maritime industry and Member States. Mrs. Kopczynska highlighted that with the publication of the amendments to the Sulphur Directive (2012/33/EU) in November 2012, there is now a **legal framework and certainty** concerning the applicable requirements for sulphur content in fuel.

The Commission further highlighted that in order to facilitate the use of scrubbers some of the **provisions of the revised Directive** may require **further clarification or guidance** at EU level or at national level following the transposition of the Directive into national law. Also, a number of **technical, operational and financial issues** may hamper the full potential of the take-up of scrubbing technology. The objective of the ad-hoc working group was to – following an open discussion - **identify** and list all those possible **barriers**, to share the limited experience with the use of scrubbers and to determine at what level (EU, national, industry) necessary **follow-up actions** would have to be taken to overcome these barriers and to **enhance a cost-effective use of scrubbers**.

This approach fits in the overall objective of the 2011 '**Sustainable Waterborne Transport Toolbox**' which aims at supporting the maritime industry with complying with the new sulphur requirements through implementing a number of measures (short term or long term; financially or regulatory). The Commission will soon report on the status of the implementation of these measures in the Toolbox Progress Report. The Commission is also working on the establishment of the **European Sustainable Shipping Forum (ESSF)**. The ESSF will be a more formal and permanent expert group which will discuss various elements related to the promotion of sustainable shipping in the EU. An official call for (a limited number of) experts for the ESSF will be launched soon. The first meeting of the ESSF is foreseen for September 2013. A number of more dedicated Working Groups under the umbrella of the ESSF (such as on 'financial issues', LNG as fuel, scrubbers,...) is also foreseen. The outcome and recommendations of this Ad Hoc Working Group will feed into the preparation of the ESSF.

**DG ENV** also announced their plans of setting up a specific ESSF-sub group composed of Member States' representatives to discuss various aspects of implementation of the Sulphur Directive. In addition, a Committee will be created on the basis of the Sulphur directive to develop implementing acts foreseen therein.

To further stimulate the discussions, **EMSA** prepared a **discussion paper** containing a number of questions on various regulatory, technical and operational issues related to the use of scrubbers. The agenda points are linked to the different

chapters in the discussion paper and the participants of the meeting were asked to share information with the group relevant to the different questions.

EMSA, in their presentation, compared the relevant provisions of Marpol Annex VI (including the guidelines) and Directive 2012/33 related to the use of scrubbers. The Directive goes beyond the requirements of Marpol for a number of aspects, reflecting the **outcome of the political discussions now in the text the Directive**; the provisions are now legally binding. There are also a number of provisions in the Directive (including some references to Marpol and its Guidelines) which may require additional guidance; on some occasions the Commission is empowered to adopt implementing acts or delegated acts to clarify certain provisions.

## **2. General**

The **Exhaust Gas Cleaning Systems Association (EGCSA)** presented the different types of scrubbers and highlighted that the technique in itself is not new, but has undergone a considerable design evolution. EGCSA also stated that scrubbers are in many cases the cheapest compliance method for the stringent sulphur in fuel requirements. Yet, EGCSA members currently have 'only' 45 orders for scrubbers. The experience with the scrubber installed on one of the DFDS vessel (Ficaria Seaways) showed according to EGCSA that there are no problems and that it is fully reliable.

**SeaEurope** mentioned that the delivery time of a scrubber can be 6-9 months. Installation time for a short sea vessel could be around 3 to 4 weeks, while for a cruise ship this would be 5-9 weeks. According to SeaEurope, around 60% of the totals costs are fitting costs, and 40% are equipment costs. While there seems to be sufficient space and time available in EU shipyards, orders for installation of scrubber remain low.

According to Alfa Laval roughly 2200 EU ships need to be converted for adaption to the SOx requirements.

It was also generally agreed that **experience** with scrubbers as an alternative emission abatement method **is still very limited**, which also partly explains the wide range of outstanding questions related to the impacts of the use of scrubbers.

## **3. Marine environment**

### **3.1 Wash water**

**EGCSA** emphasized in their presentation the need for further **regulatory certainty** related to the use of scrubbers and to identify what exactly will be allowed and what will not be allowed in the EU, in Member States and in different ports. This is most relevant for **wash water discharges**, including the allowable pH limit.

Stricter requirements than described in the IMO EGCS Guidelines regarding wash water discharge could have an impact on already installed scrubbers. Those owners should not be penalized for having installed scrubbers in an early phase. In case of the already installed scrubbers will not be able to comply with more stringent wash

water discharge criteria, the possibility of applying **grandfather clauses** needs to be considered.

As the wash water discharge criteria are defined in the IMO EGCS Guidelines, a wide variety of different national and local rules should be avoided. Different rumours about stricter wash water discharge regulations in some ports, may especially have an impact on the use of **open loop scrubbers**. More clarity about this, and specifically in relation to Art. 3a of the Directive which explicitly refers to closed loop scrubbers, is therefore desirable as soon as possible. It was also pointed out that the discharge criteria are defined in the IMO Guidelines and not in the EU Directive. So, if something needs to be clarified or changed in the Guidelines, it needs to be done at IMO.

The **Danish Environmental Protection Agency (EPA)** mentioned the wash water data collection following the trials with Ficara Seaways which indicated that the impact of the scrubber water on the pH and buffering capacity of waters will be negligible. The pH level of discharge water was at 3-5 depending on exhaust gas and water flow. The Danish EPA further advised that the pH background level will be reduced by less than 0,1 pH in shipping lanes. According to them, this also applies to sea areas with significantly lower buffer capacity, even in case of busy shipping lanes.

**Carnival Cruises** indicated that their experience is mainly in US waters and early results from onboard testing showed that the wash water complies with all regulatory standards for pH, turbidity and PAH. They also stressed that more experience and trial data is needed for general conclusions regarding performance. Carnival further announced that the use of closed loop scrubbers on cruise ships involves a number of possible issues related to the use of hazardous chemicals (especially for personnel handling during bunkering and usage). When further restricting open loop scrubbers this should be also kept in mind. Carnival also highlighted that the US and EU requirements are not fully in line with each other or with the IMO Guidelines, which leads to unwanted regulatory disparity.

It was further mentioned, that wash water can also be mixed on-board in order to adapt its qualities, but this will require additional energy consumption (and thus additional CO2 emissions).

The **Netherlands Shipping Inspectorate** mentioned that effective application of Annex II of the Directive (comprising criteria for the use of scrubbers) may require much more data. Especially the obligation to demonstrate that wash water discharge has 'no significant negative impacts on and not pose risks to human health and the environment' will require further regulatory guidance.

**DG ENV** stressed that the Annexes of the Directive can be adapted in time (see Art. 4c(4) of the Directive) but only **if justified in the light of scientific development** and **in line with the international rules**. Similar as for the Marpol EGCS Guidelines (Appendix 3 of the Guidelines), a revision of the wash-water criteria should be based on available information related to the discharges and its effects. The Commission can also adopt more detailed rules on emission monitoring (through implementing acts).

In relation to this it was mentioned that especially since experience is still limited, the few studies and reports (like the Danish study on wash water) providing data

need to be taken seriously, should be easily accessible and discussed with the industry and Member States.

**ESPO** mentioned that local rules on wash water discharges are based on requirements at national or local level, and are not based on decisions of the port authority itself.

To avoid further uncertainty, Member States should, as soon as possible, identify what kind of discharge criteria they will impose in their waters and ports. Even if a hybrid scrubber is used, it should be clear when its operation needs **to change from open to close loop**. It should be kept in mind though that Member States do have the discretion, for EU legislation with an environmental basis, to introduce environmental standards which go beyond the requirements in the Directive (and Marpol) – if prior notified for approval to the Commission.

It was also stressed that that not all scrubbers produce wash water with a very low pH (2,5 – 3) when operating in open loop. Caustic soda can be used also in open loop mode, to achieve discharge wash water that complies with the IMO Guidelines when measured at the outlet.

### **3.2 Scrubber sludge**

**Marpobel**, a Belgian port reception facility provider, highlighted that it still requires more data about the **enrichment of scrubber sludge by chemical elements and heavy metals** in order to make a full assessment of the exact delivery requirements/appropriate treatment. Depending on the concentration of the heavy metals (i.e. vanadium, PAHs) these may be difficult to remove.

According to the **Danish EPA**, the liquid fresh water waste is not to be classified as hazardous waste, while for the sludge the contents of nickel, vanadium and THC exceed the limits for classification as hazardous waste. Further, Danish EPA informed that most Danish ports have the relevant facilities for reception of waste from exhaust gas scrubbers.

According The **Netherlands Shipping Inspectorate**, Marpol Annex I sludge should not be mixed with scrubber sludge. Not all participants seemed to agree with this statement.

**ECSA** asked about the (additional) costs for ship owners for the treatment of scrubber sludge and about the status of availability of adequate reception facilities for scrubber waste in EU ports.

It was also mentioned that specific Marpol Annex VI waste types are currently not within the remit of the **EU PRF Directive** (2000/59/EC) as it does not cover Marpol Annex VI.

**EGCSA** highlighted that they have done some research on the composition of the scrubber sludge and that they could share the results of this work with other participants.

## **4. Trials**

It was mentioned that the exemption regime for trials under the Sulphur Directive is different from IMO. In the Directive, 18 months is allowed once, while IMO can allow an additional period of 18 months. Finland mentioned that in one specific case the 18 months were not enough to finish the scrubber trials because of some technical issues which considerably delayed the trial, and an additional 12 months were granted.

Despite the difference with Marpol Annex VI, the Directive is clear about the allowed duration of trials ('permits for trials do not exceed 18 months in duration' – Art. 4e(b)), which was the outcome of political discussions. Therefore, additional guidance or interpretation in this particular matter does not seem appropriate. There is, however, an unclear case relating to ships that fly the flag of an EU Member State but that may wish to carry out trials in non-EU waters.

## **5. Approval**

**EGCSA** highlighted that system **approval** by classification societies should be a streamlined procedure. Furthermore, Flag State or RO Marpol approvals have proven to be slow in some EU Member States. One Italian shipowner has already installed scrubbers on board of some vessels, but cannot use them because they have not been approved yet by the Administration.

The **Danish Environmental Protection Agency (EPA)** informed that the measuring of pH at 4 metres from the discharge point is difficult in practice, and basically only feasible while the ship is at rest in the port. This was also confirmed by the **Finnish Maritime Transport Agency**, who further explained that while at rest in port, the main engines cannot run. Also the accuracy of modern calculation methods could be deemed satisfactory as to comply with this requirement.

**DNV** mentioned that they have carried out their first statutory approval for a new building project at 4 m away from the ship for the auxiliary engines. Compliance with this requirement for the main engine seems to be more problematic though.

The **Netherlands Shipping Inspectorate** mentioned that it is involved in the approval of a scrubber (following Scheme B) and wonders how the provisions in the Directive on approval in Art. 4d(2) need to be complied with in practice. This applies specifically to 'demonstrating the impacts on the ecosystems in enclosed ports'.

**Lloyds Register** believes the IMO EGCS Guidelines provide a robust and workable guide for wet scrubbers. LR believes that, in time, similar guidelines will be needed for other potential alternative means of compliance which may be presented to shipping (dry scrubbing, non thermal plasma, etc.)

Also Flag State approval vs. coastal state acceptance may become an issue for further attention. The **US Environmental Protection Agency** has issued some guidance in a policy letter on how they deal with scrubbers used in US waters, but which have been approved elsewhere (16711/CG-CVC/12-04/25 July 2012 ??). This should be further analysed.

Reacting to the **EMSA discussion paper** (in section 3 on approval and survey) it was also mentioned that continuous exhaust gas monitoring (according Scheme A or B) was acceptable under Annex II of the Directive. This certification requirement

should not be confused with the requirement of 'continuously achieving reductions of SOx emissions that are at least equivalent to reductions that would be achieved by using compliant marine fuels' (see Art. 4c(2) of the Directive), which is an operational matter. The first issue, is a purely approval related requirement which is linked to the presence of having a continuous exhaust gas monitoring system in place (or alternatively by daily spot checks of the exhaust gas quality in terms of SO2/CO2 ratio).

There are some outstanding questions regarding the application of the **Marine Equipment Directive** (MED) on scrubber systems. It seems that until now, no scrubber system has been approved according the procedure in the MED (only monitoring devices until now) while exhaust gas cleaning systems are included in the Marine Equipment Directive. It seemed though that the relevant entry for exhaust gas cleaning systems will only become binding as of October 2014.

## **6. Port State inspections/enforcement**

**Port State inspections** in case of malfunctioning of scrubber equipment should preferably be **standardized**. **EGCSA** volunteered to help with developing such standards.

It was also mentioned that Art. 1(g) of the Directive allows some flexibility in terms of damaged equipment.

The **Danish EPA** stated that in Denmark the Danish Maritime Authority (DMA) acting as Port State will check the relevant documentation for the use of scrubbers, but as that experience is still limited, it is difficult to say how procedures will work in practice.

The **Netherlands Shipping Inspectorate** outlined the necessary documentation to be kept on board for inspections under Scheme A and B. It was further mentioned that wash water monitoring is only mentioned in the Guidelines of Marpol Annex VI. PSC cannot enforce voluntary IMO Guidelines.

**Malta** raised a specific question regarding the application of the Directive on ships flying the flag of an EU MS, but operating outside EU waters in relation to the approval of trials of emission abatement methods on board ships. This specifically relates to Art. 4a, which requires Member States to take necessary measures to ensure that marine fuels are not used in the areas of their territorial seas. However, articles 4d (approval of emission abatement methods) and 4e (trials) refer to ships flying the flag of a Member State. In that context, there seems to be a need to define the appropriate legal regime for vessels flying the flag of a Member State but conducting a trial in waters outside of the EU (this is also relevant for the duration of the trial as this can potentially be longer under Marpol Annex VI than when applying the Sulphur Directive).

It was also highlighted that it is important to look separately at enforcement of the EU Directive and Port State Control. PSC, according the Paris MoU, will not verify specific requirements of the EU Directives and results of enforcement of the EU Directive will not be entered into PSC databases, as the administration of both is separated.

## **7. Financial measures**

**ECSA** asked how environmental state aid can be used. Article 4f in the revised Directive is clear in saying that the Member States may adopt financial measures in favour of operators affected as long as they are in accordance with State Aid rules. This can only be verified if the Member State concerned notifies the scheme to the Commission. So far only Finland has done so.

**Brittany Ferries** provided an in-depth presentation regarding their assessment of possible retrofitting of their fleet with scrubbers, comprising a lot of information regarding energy consumption, wash water quantities and sludge production. Brittany Ferries mentioned technical considerations such as engine room space, piping, tank arrangements, but also commercial ones, such as high costs and long return of investment, insecurity regarding possible regulatory changes, future availability of heavy fuel oil, allowed use of open loop scrubbers in ports. Taking all these elements into account Brittany Ferries decided that LNG was a better option.

**Stena Line** showed similar costs for the installation of scrubbers and highlighted that for a specific ship (Stena Scandinavica) a total cost of 8M€ was to be expected for scrubber retrofitting. From the 35 assessed ships 12 showed a return of investment below 6.5 years while also being less than 20 years old. Finally, Stena decided to further investigate the use of methanol as alternative fuel because of price (conversion costs are similar to the installation of a scrubber – 300 Euro/kWH, and further emission reduction prospective (also CO2 emissions).

It was also mentioned that some financial initiatives are not used to promote scrubbers, as some countries do not wish to support the use of **HFO** in the future.

## **8. Operational reliability**

**ECSA** raised a number of questions related to the operational reliability of scrubbers such as the impact of the scrubber when different fuels with different sulphur content are being used. What is the reaction speed of the scrubber in case of sudden changes in engine load and the effects on the performance of the scrubber? Is the functioning of the scrubber guaranteed in cold weather? There also seems to be at least one case where at 50% engine power reduction happened as a result of the installation of a scrubber.

**Stena** (who have considered 35 ships for possible retrofitting with scrubbers) highlighted some concerns regarding losses due to the increased draft and increased fuel consumption, as well as due to the reduced cargo capacity and stability.

The **Belgian Shipowners Association** mentioned that the possible barriers are different in case of the installation of scrubbers on different vessel types.

**LR** stated that exhaust gas cleaning does introduce additional potential risks to the ship (i.e stability). However, LR believes that these can be managed satisfactorily and that there is no reason why exhaust gas cleaning systems cannot be integrated on-board safely. Most of the technologies being offered to shipping are mature technologies with a demonstrated record of safe, reliable and effective operation in other industrial sectors (e.g. power generation)

## **9. Conclusions**

- Following publication of the text of the revised Sulphur Directive, there is a need for further legal and regulatory certainty as a number of provisions of the Directive require further clarification in relation to the use of scrubbers. Some of these issues could be clarified through additional guidance.
- There was a general agreement among all participants regarding the main issue that is hampering scrubber technology take-up (see the next section below). The most relevant is the different application of wash water discharge criteria at local and national level.
- There also seem to be a lot of uncertainty about how EU Member States will implement the revised Directive.
- It was confirmed that experience with the use of scrubbers is still limited this makes certain issues more difficult to assess. Thus the cooperation in sharing and assessing the new knowledge gains importance.
- There seemed to be a need for further meetings to discuss some of the issues in more depth and in smaller groups.
- Appropriate financial and fiscal measures may further stimulate the uptake of scrubbing technology.

## **10. Recommendations**

- The application of **wash water discharge** regulations and especially the pH limits was generally considered to be the most relevant current obstacle related to the (future) use of (open loop) scrubbers. Therefore the Commission, together with MS and industry, should identify ways of addressing this matter.
- The Commission could further verify with coastal Member States (and ports) about their intentions regarding the use of **open loop scrubbers** (the discharge of wash water in ports and estuaries). Considering also that the revised Directive needs to be transposed by June 2014.
- More information is needed about the quantities of heavy metals in **scrubber sludge** in order to assess how the sludge should be collected and effectively treated.
- Future application of Directive 2000/59/EC on port reception facilities delivery of Ship Generated Waste and Cargo Residues needs to be further considered.
- Flag State or RO **approvals under Marpol** have proven to be slow in some Member States. Despite this being a matter of national concern, some further guidance regarding the **approval** of scrubbers under the provisions of the Directive (requirements of Art. 4d(2)) may be needed.
- Also the application of the **Marine Equipment Directive** (96/98/EC) on scrubber systems should be further verified.
- Some further guidance on **PSC procedures** related to the inspection of the use of scrubbers may be useful (following coordination with the Paris MoU on

this). Since PSC under Paris MoU does not enforce EU maritime legislation, it has no authority to inspect specific requirements arising from the Sulphur Directive. Guidance on enforcement of this Directive (measures by port States) may be of added value.

- The application of the Sulphur Directive on emission abatement methods on board of the EU flagged vessels but operating **outside of EU waters** needs to be clarified.
- The meeting agreed that experience is limited. In order to share information, experience, EMSA's website could be used to gather different studies and reports related to the use of scrubbers.

*Lisbon, 14 June 2013, Roel Hoenders*