

February 10, 2012

Water Docket  
Environmental Protection Agency, *Mail Code:* 4101T  
1200 Pennsylvania Avenue NW  
Washington, DC 20460

Re: Comments on the Proposed General Permit for Discharges Incidental to the Normal Operation of a Vessel: Ballast Water Discharges. Docket EPA–HQ–OW–2011–0141

To whom it may concern:

We submit these comments on the EPA’s proposed ballast water discharge standards, and its reliance on the report of the Science Advisory Board Panel on Ballast Water (hereinafter “SAB Panel”) in developing those standards.

In the Fact Sheet issued with the Vessel General Permit, under the heading “Finding that the Ballast Water Limits in this Permit Represent the BPT and BAT Level of Control,” the EPA wrote:

“The numeric limitations in today’s permit represent the most stringent standards that ballast water management systems currently safely, effectively, credibly, and reliably meet (US EPA SAB, 2011).” (Fact Sheet, p. 77)

and:

“Based upon the data available, no current ballast water treatment technologies were considered likely to meet standards more stringent than IMO D-2/Phase 1 (US EPA SAB, 2011).” (Fact Sheet, p. 79)

These two references to the SAB Panel report appear to be the only support provided in the four documents released by the EPA (the 12/8/11 Federal Register notice, the Proposed 2013 VGP, the Fact Sheet, and the Economic and Benefits Analysis) for the conclusion that the proposed ballast water discharge standards represent the best that can be achieved by available technology. However, the SAB Panel did not reach that conclusion, and the two quoted statements misstate the SAB Panel’s findings, whether the statements are taken to apply to available treatment technologies generally, or to shipboard treatment technologies only.

The SAB Panel never actually addressed the question of what is the best treatment that available technology can achieve, because the EPA Office of Water instructed the Panel to focus on the much narrower question of whether shipboard treatment systems could meet certain specific sets of standards (EPA Charge Questions, listed in the SAB Panel report on pp. 9-10). When members of the Panel tried to broaden the inquiry to assess the capability of treatment

technologies other than shipboard treatment systems, or to consider treatment levels other than the specific sets of standards referenced by the EPA's Charge Questions, the Office of Water's representative argued against it. Although the SAB Report does discuss an alternative treatment approach (onshore treatment, specifically treatment in plants designed to treat ballast water, located at or near each US port, with pipe connections to each berth to receive ballast water discharges from vessels), the analysis and discussion in the final report were substantially constrained by the Office of Water's insistence on a narrower approach.

Two issues are of greatest concern:

(1) The four documents released by the EPA fail to explain why the EPA concluded that treating ballast water onshore using methods and technologies that have long and successfully been employed for the treatment of drinking water is either unavailable or economically unachievable.

The first quote above (from the Fact Sheet, p. 77) refers to "ballast water management systems." Although the Fact Sheet doesn't define this term, the SAB Panel Report (p. 13) defined it as commercially developed shipboard treatment systems. However, as discussed below, these quotes do not accurately state the SAB Panel's findings even with regard to shipboard treatment; they do not apply to onshore treatment at all.

Rather, the SAB Panel found that onshore treatment plants, being subject to fewer physical restrictions, can use "more effective technologies and processes" and "show promise to achieve more stringent ballast water treatment standards than shipboard" systems (SAB Panel Report, pp. 80-82). The Panel concluded that onshore treatment is technically feasible and "likely to be more reliable and more readily adaptable than shipboard treatment" (SAB Panel Report, Executive Summary, p. 7), and that it requires fewer treatment plants and less treatment capacity than shipboard treatment (SAB Panel Report, p. 81). In addition, based on existing economic studies it is "at least as economically feasible as shipboard treatment," and the cost of monitoring and enforcement is also likely to be less (SAB Panel Report, Executive Summary, p. 7).

In the four documents released by the EPA, onshore ballast water treatment is discussed or mentioned in ten places (Permit at pp. 34 and 65-66; Fact Sheet at pp. 70, 71, 76 and 102-104; Economic and Benefits Analysis at pp. 11, 55, 60 and 63). Most of these simply state that vessels could use onshore treatment to meet the proposed discharge standards, and that some vessels might choose to do so. The most substantive discussion of onshore treatment is on pp. 102-104 of the Fact Sheet, which includes a few sentences listing some challenges to implementing onshore treatment. Whether or not these challenges are significant, their mere listing does not constitute an analysis of the issue or a demonstration that onshore treatment is not an available technology.

The stakes at issue could not be higher. The SAB Panel Report notes that the standards proposed by the EPA would reduce the concentrations of organisms in the two largest size classes (10-50 micrometers, and larger than 50 micrometers) by about 30 times and 500 times, respectively, from the average concentrations in untreated ballast water discharges, and would require no reduction at all in the concentrations of smaller protists (smaller than 10 micrometers), total bacteria or viruses (SAB Panel Report, p. 82). In contrast, technologies that the water industry

refers to as “conventional water treatment” (gravity filtration followed by a single, conventional disinfection process such as chlorination or UV treatment), which have been utilized by treatment plants around the world for many decades and could be applied to onshore treatment of ballast water discharges, are capable of reducing the concentration of organisms in the two largest size classes, smaller protists, bacteria and viruses by at least 30,000 times (SAB Panel Report, p. 83). Optimized systems may do considerably better: the EPA requires drinking water treatment systems to be capable of reducing the concentration of smaller protists by up to 100,000 times and viruses by up to 1,000,000 times, depending on the quality of the source water (SAB Panel Report, p. 83).

(2) The documents released by the EPA fail to consider the full potential of existing shipboard treatment systems to treat ballast water.

As noted, the EPA Charge Questions, and the verbal explanations by the EPA’s Office of Water, directed the SAB Panel to consider only those sets of standards referenced by the charge questions, as follows:

- (a) The **IMO D-2/Coast Guard Phase 1** standards, which specify numeric concentration limits for two organism size classes (10-50 micrometers, and larger than 50 micrometers) and 3 types of pathogens and pathogen indicators.
- (b) **10x D-2, 100x D-2 and 1000x D-2**, which specify numeric concentration limits for the two organism size classes that are 10, 100 and 1000 times more stringent than the IMO D-2 concentration limits, respectively (SAB Panel Report, p. 15).
- (c) The **Coast Guard Phase 2** standards, which specify numeric concentration limits for the two organism size classes that are 1000 times more stringent than the IMO D-2 concentration limits, concentration limits for the 3 types of pathogens and pathogen indicators that are somewhat more stringent than the IMO D-2 limits, and concentration limits for total bacteria and total viruses.
- (d) The **California Interim** standards, which are identical to the Coast Guard Phase 2 standards except that the standard for the largest organism size class (larger than 50 micrometers) is discharge with “no detectable living organisms.”
- (e) The **California Final** standards, which specify discharge with “no detectable living organisms” for both organism size classes and for total bacteria and viruses.
- (f) **Discharge of “no living organisms”**.

In addition, the list referenced by the EPA Charge Questions includes some state standards that are minor variants of the above.

The SAB Panel primarily assessed shipboard treatment systems in terms of the standards listed in (a) and (b) above, finding that there were systems that could or likely could meet the IMO D-2/Phase 1 standards; systems that with reasonable/feasible modifications may have the potential

to meet 10x D-2; and no systems that could meet or were likely to meet 100x D-2 or more stringent standards, even with reasonable/feasible modifications (SAB Panel Report, pp. 31-35, 37 and 42-49). The SAB Panel also noted that no systems met the total bacteria limit of the Coast Guard Phase 2/California Interim standards (SAB Panel Report, p. 37).

Consistent with the EPA's instructions, the SAB Panel did not consider whether shipboard treatment systems could meet discharge limits other than the specified sets of limits referenced by the Charge Questions. For example, the Panel did not consider whether any shipboard treatment systems could meet discharge limits for the two organism size classes that are more stringent than IMO D-2 but less stringent than 10x D-2 (such as 2x D-2 or 5x D-2). It did not consider whether any systems could meet any limit for total bacteria that is less stringent than the Coast Guard Phase 2/California Interim limit. And it did not consider whether any systems could meet any discharge limit for protists smaller than 10 micrometers in size, which includes human pathogens and other harmful species, even though the Panel recommended that discharge limits be set for selected organisms in this size class (SAB Report, pp. 8, 65, 95-96) and some test data are available.

Considerable test data are available on these systems' impacts on bacterial concentrations in ballast discharges. According to studies cited by the SAB Panel Report, some shipboard treatment systems consistently reduce bacterial concentrations, by up to 100 to 10,000 times, while other systems are inconsistent in their effects and some actually increase bacterial concentrations (because killing the larger organisms may provide food for bacteria, remove consumers of bacteria, or both). Thus, although some shipboard treatment systems have the ability to substantially reduce the discharge of bacteria, the EPA's proposed permit does not require any reduction, and would even allow the use of treatment systems that increase the discharge of bacteria.

Although no test data are available on the ability of shipboard treatment systems to reduce the concentration of viruses in ballast discharges, many of these systems use common water treatment processes (filtration plus UV, or filtration plus chlorination) whose impact on viruses has been well studied in bench-scale tests and assessments of operating water or wastewater treatment plants. While the filters used in shipboard systems are probably too coarse to remove viruses significantly, both UV and chlorine treatment have been shown by numerous studies to produce substantial inactivation of viruses. These data could be used to assess the ability of shipboard treatment systems to reduce viral concentrations.

Finally, in tests of shipboard treatment systems the discharge concentrations of the three types of pathogens and pathogen indicators consistently met the limits that the EPA proposes to include in the VGP, but they also met the more stringent limits in the Coast Guard Phase 2/California Interim standard. We note that these tests were not valid assessments of the ability of shipboard treatment systems to remove or kill these pathogens and pathogen indicators, since the concentrations in the input waters and control discharges also meet the standards in nearly all cases (and in most cases were at non-detectable levels). For a minimally valid test, the concentrations in both the intake waters and the control discharges should be detectable and exceed the standard being assessed, but neither the IMO nor the EPA require this (SAB Panel Report, pp. 62-63); thus equipment manufacturers have been able to satisfy test requirements by

running tests that are known to be meaningless. In any case, the results from these tests cannot be used to distinguish between standards, to conclude, for example, that shipboard treatment systems can meet one standard (the EPA's proposed limits) and not another (the more stringent Phase 2/California Interim limits), as the EPA claims.

We wish to make two additional points.

First, in the 12/8/11 Federal Register notice the EPA asks for comment on “whether the controls in this permit represent the BPT, BCT and BAT levels of control. If commenters believe that the proposed controls do not, or that other controls would better represent the BPT, BCT or BAT levels of control, explicitly provide data and information about the applicability of such controls to all types of commercial vessels in all weather/operating situations, and the costs and non-water quality environmental impacts, including energy impacts, of such options.” (§III.C.5) The EPA further asks for comment on “the appropriateness of the technology-based ballast water controls proposed in this VGP, and whether there are data sources which indicate that certain ballast water treatment systems reliably exceed the limits established in this permit.” (§III.C.16) During the SAB Panel meetings and discussions, some members of the Panel attempted to develop and include in the Panel report a more detailed assessment of onshore treatment, including its cost impacts, and an assessment of the full capability of shipboard treatment as described in point 2 above. As discussed above, these assessments would have further demonstrated that available technology can achieve levels of treatment beyond what the EPA has proposed as controls. The EPA Office of Water, however, consistently opposed including such information in the report. As a result, some relevant information and analysis that could have been developed by the Panel was not, and some of what was developed by Panel members was excluded or deleted from the final report. If there was less information developed on these issues and less provided in the report than the EPA considers sufficient, it is in large part because the EPA Office of Water opposed the development and inclusion of such information. However, there is considerable material that was developed by SAB Panel members—including additional information on the efficacy of onshore treatment, the larger treatment capacity needed for shipboard vs. onshore treatment, and screening-level cost estimates for US-wide implementation of each approach—that is contained in earlier drafts but was deleted from the final report. As these drafts are part of the SAB record, they are available to the EPA. Data on the capability of certain shipboard treatment systems to reduce the concentrations of protists smaller than 10 micrometers and bacteria are contained in the source documents used for the SAB Panel's analysis and cited in the report.

Second, we note that shipboard treatment and onshore treatment represent distinct approaches to ballast water management that would each require different large investments in infrastructure. If the less stringent discharge standards that can be met by shipboard treatment systems are adopted and the shipping industry installs the required equipment (which the US Coast Guard estimated would cost over \$3 billion), it would probably not be economically practical to switch in 5 or 10 years to more stringent standards that would require the shipping industry to build the different, expensive infrastructure needed for onshore treatment. Thus we are almost certain to be stuck for a very long time with whichever approach is used as the BAT in setting discharge standards in

2013. It is thus of the utmost urgency that a fair and thorough comparison of the two approaches be made at this time. The EPA has not yet done this.

Should the EPA decide to address the concerns in this letter, we remain available to assist in whatever way we can.

Respectfully,

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